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INSIDE

The Challenge of
Climate Neutrality

Using Carbon Offsets

Combined Heat and
Power Strategies

LED Technology



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ENERGY & UTILITIES SUSTAINABILITY

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Campus Climate Neutrality—Yes We Can It's a Big Challenge, But Here's How to Do It

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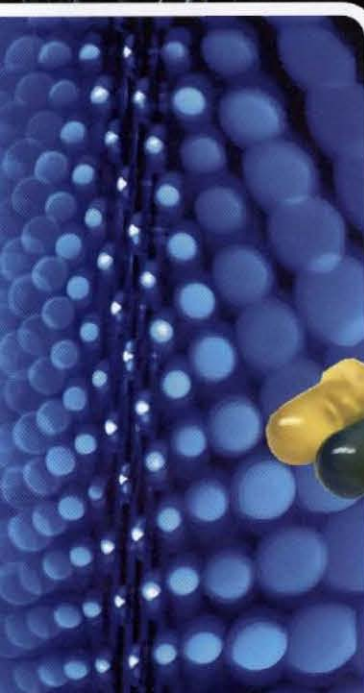
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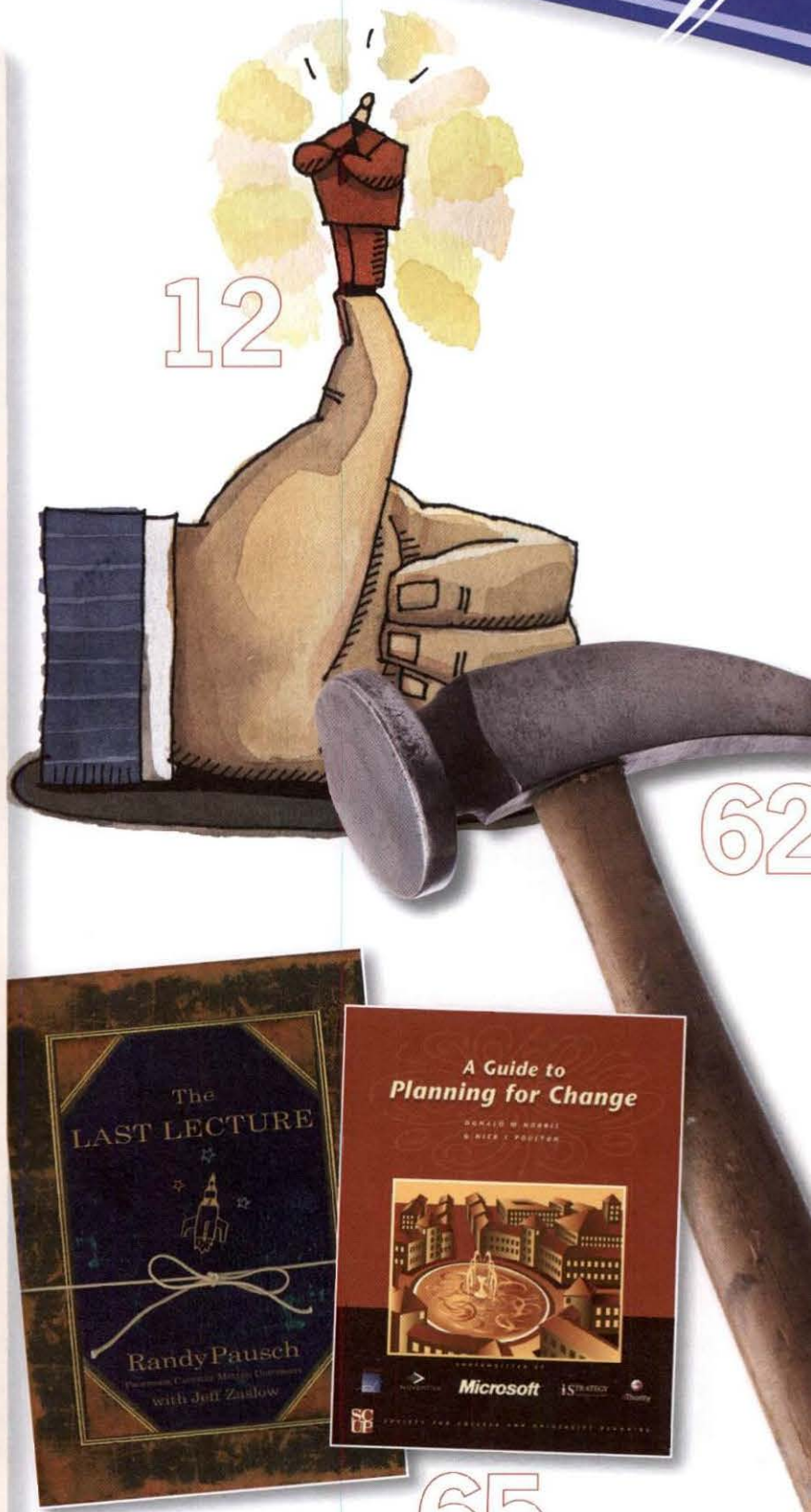
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As a founding member of HEASC, the Higher Education Associations Sustainability Consortium, APPA has learned a lot, and shared a lot, in our ongoing discussions with colleagues at other administrative and academic organizations.

Over the past two years APPA has made significant moves to enhance our commitment to environmental stewardship, energy conservation and efficiencies, and sustainable education and practice. Here are just a few of our efforts:

Board of Director/APPA Staff

- Board adopted a Sustainability Statement in July 2008
- Board made a substantial contribution by holding its February meeting via video conference; this greatly reduced costs and eliminated greenhouse gas emissions for 20 round-trip flights
- four APPA staff members (25 percent), including your editor, regularly use public transportation to get to work

Professional Development Programs

- no printed handouts
- no water bottles or soda cans
- when possible, work with local shelters and kitchens for donating leftover food
- more electronic promotions, fewer direct mail brochures
- forthcoming policy to offset greenhouse gas emissions generated by air travel to our Institute, Leadership Academy, Supervisor's Toolkit, and SFO Summit programs
- development of more virtual meetings and webinars
- successful sustainability track conducted at the January 2009 Institute; will be repeated at the September 2009 Institute
- participating association of the annual Smart & Sustainable Campuses Conference


Publications and Resources

- publication of two major books: *The Green Campus: Meeting the Challenge of Environmental Sustainability* and *The*

Environmental Compliance Assistance Guide, second edition

- release of the recent sustainability implementation guide, *The Educational Facilities Professional's Practical Guide to Reducing the Campus Carbon Footprint*
- this theme issue of *Facilities Manager*
- several forthcoming books and reports will be Web-based only
- contributing partner in the Campus Environmental Resources Center website (www.campuserc.org)
- forthcoming sustainability/environmental stewardship website

In addition, we've made some changes to the paper used to print *Facilities Manager*. With this issue we have switched to a paper stock that is 50 percent recycled paper, with 25 percent made up of post-consumer waste. The paper is certified by the Forest Stewardship Council and is considered elemental chlorine free. We continue to use soy ink in our printing, as we have for the past 15 years.

While we are aiming for 100 percent recycled paper and even higher concentrations of post-consumer waste in our magazine stock, our recent changes are a vast improvement over what we previously had used. There's much more we can do throughout all our programs, and we will continue to practice the messages we send to our members. 

Coming in May/June 2009

- Special theme issue on Building Information Modeling
- BIM and the Total Cost of Ownership
- The Whole Building Design Guide
- Managing Foot Traffic with Brick

FACILITIES manager

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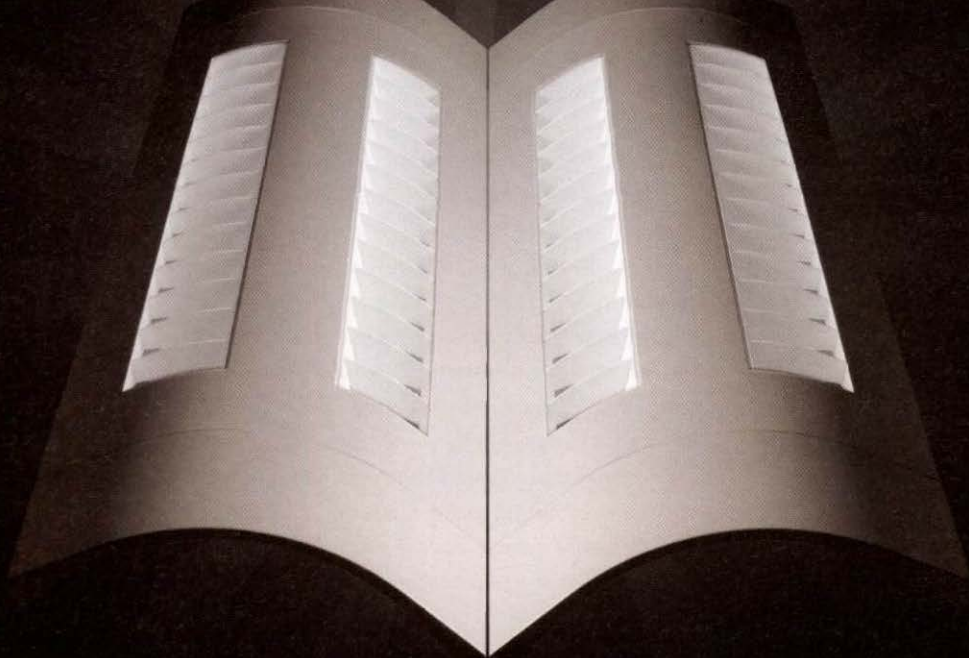
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About APPA

APPA promotes leadership in educational facilities for professionals seeking to build their careers, transform their institutions, and elevate the value and recognition of facilities in education. APPA provides members the opportunity to explore trends, issues, and best practices in educational facilities through research, publications, professional development, and credentialing. Formerly the Association of Physical Plant Administrators, APPA is the association of choice for 5,200 educational facilities professionals at more than 1,500 learning institutions throughout the United States, Canada, and abroad. For more information, visit us at www.appa.org.



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facilities digest

2009-2010 CANDIDATES FOR APPA OFFICE

The Nominating Committee, led by immediate past president Alan Bigger, is pleased to present the selected slate of officers for the 2009-2010 APPA elections:

President-Elect:

David Button

VP Administration
University of Regina
RMA

Darrel W. Meyer

Director of Facility Services
Metropolitan Community College/Kansas City
CAPPA

VP for Professional Affairs:

David Cain

Associate Vice President
California State University – East Bay
PCAPPA

Joseph R. Wojtysiak

Executive Director, Facilities Management
Harrisburg Area Community College
ERAPPA

Secretary-Treasurer:

Nancy K. Hurt

Associate Director, Real Estate Office
Colorado State University
RMA

Sherell Vucci

Associate Director, Business Operations
Smithsonian Institution
ERAPPA

Voting is scheduled to begin in early April 2009 and will be open to primary/institutional representatives. Those eligible to vote will be able to do so online, or via paper ballot.

Please note that beginning this year, the primary/institutional representative will have the option of having an associate member vote on their behalf via proxy (only one vote will be accepted from each institution). The associate member with proxy rights has been listed on the dues notice. If you wish to change the person listed, contact the APPA office at 703-684-1446.

Additionally, APPA is scheduled to hold a webinar, allowing the candidates more exposure and interaction with the members.

Please look for details, updates, and additional information on the APPA website, via e-mails, and in *Inside APPA*, APPA's biweekly e-newsletter.

If you have any questions, contact Anita Dosik, anita@appa.org or 703-684-1446 ext. 237.

CUSTODIAL STAFFING/CLEAN OPS STAFF BOOK AND SOFTWARE PACKAGE

We have had great success with this recent offering! Long the standard for APPA members seeking excellence in their cleaning operations, APPA's

Custodial Staffing Guidelines for Educational Facilities, second edition is now the recognized resource for cleanliness in education.

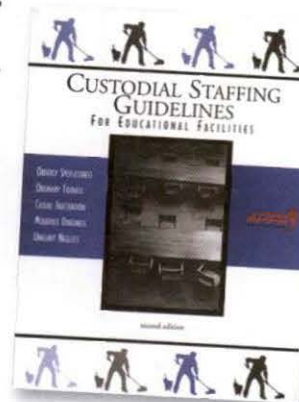
In fact, the U.S. Green Building Council (USGBC) now offers LEED

for Existing Buildings (LEED-EB) credits for those institutions conducting an audit of their facilities using APPA's *Custodial Staffing Guidelines*.

And now it's easier than ever to implement APPA's *Custodial Staffing Guidelines* using *CleanOpsStaff* software, which allows you to run calculations on your cleanliness data without pushing a pencil. The *CleanOpsStaff* software will:

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- Help you balance FTE assignments to individual buildings or zones on your campus

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If you are looking for a highly qualified pool of candidates for a facilities management opening, *Job Express* can help you. Your ad will be posted online where it can be seen by thousands of facilities professionals who access APPA's website. The *Job Express* audience consists of professional facilities managers in top executive level positions, individuals who are retiring from the military with extensive facilities and engineering experience, and graduates of APPA's Institute for Facilities Management.

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SMART AND SUSTAINABLE CAMPUSES CONFERENCE

The 4th Annual Smart & Sustainable Campuses Conference will be held April 5-7, 2009 at the Inn and Conference Center adjacent to the campus of the University of Maryland. Housing accommodations will also be at the Inn and Conference Center.

For more information, visit <http://www.nacubo.org/x10606.xml>.

THE 2007-08 FPI REPORT & DASHBOARD IS NOW AVAILABLE!

The 2007-08 Facilities Performance Indicators Report is available at no cost to all APPA members who participated in the survey, or for purchase through the APPA website for all others. The new

report is based on an extensive data collection effort last fall for the 2007-08 fiscal year. Anyone with access to the

2007-08 Web-based FPI report will be able to view data from 2006-07, 2005-06, and the new set of Dashboard Indicators.

- APPA Member Participant – FREE
- APPA Member Non-Participant – \$500
- Nonmember Participant – \$895
- Nonmember Non-Participant – \$1,000

Accessing the report allows your institution to identify up to five users who can view your report. In addition, you'll have access to the dashboard gauges for all performance indicators. All purchases are secure and must be made using a valid credit card. To purchase the FPI Report, visit: <http://www.appa.org/research/fpi.cfm>.

View webinars on the FPI and dashboards—including how to access various reports, indicators, and results—at <http://www.appa.org/research/fpi/webinar.cfm>.

You will also learn how to best utilize the report for your own budgeting, staffing, and planning purposes.

APPA MEMBERSHIP DUES NOTICES SENT

The 2009-2010 membership year begins April 1, 2009 and runs through March 31, 2010. Renewal notices have been sent and prompt payment is greatly appreciated. Your regional membership dues are also included in this invoice. When you return your payment, please include staff changes or corrections.

Note that beginning this year, the primary/institutional representative will have the option of having an associate member vote on their behalf via proxy (only one vote will be accepted from each institution). The associate member with proxy rights has been listed on the dues notice. If you wish to change the person listed, contact the APPA office at 703-684-1446.

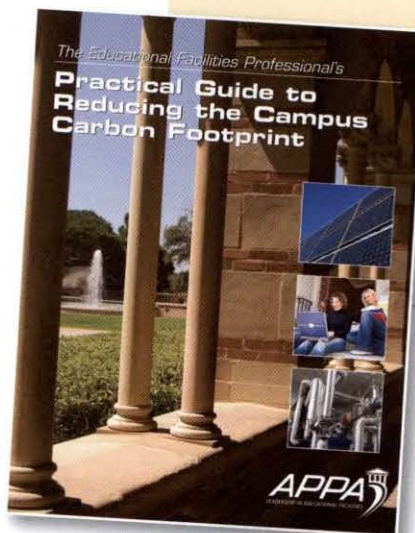
For questions or additional information, e-mail membership@appa.org.

ANNOUNCING THE RELEASE OF APPA'S NEW REPORT ON REDUCING THE CAMPUS FOOTPRINT

APPA recently published a new report in our Thought Leaders Series – *The Educational Facilities Professional's Practical Guide to Reducing the Campus Carbon Footprint*.

Sponsored by Affiliated Engineers Inc., this implementation guide gives educational facilities professionals a practical framework for moving forward in their unique role within the sustainability process. The intent is to help facilities managers maximize their specific contributions and share their expertise and knowledge while working in tandem with other campus stakeholders to meet their institutions' goals of carbon neutrality and reduced greenhouse gas emissions.

To download the guide at no charge, visit www.appa.org/bookstore.



APPA EVENTS – 2009

Apr 5-7 Smart and Sustainable Campuses Conference College Park, MD

Apr 6-7 SFO Summit Asheville, NC

Apr 26-30 Leadership Academy Fort Lauderdale, FL

Apr 26-30 Supervisor's Toolkit Fort Lauderdale, FL

Jun 4-5 Wyoming Chapter Meeting Casper, WY

Jul 8-10 APPA 2009: Focusing on the Critical Few Vancouver, BC, Canada

Jul 11 EFP Prep Course, EFP Examination, and CEFP Examination Vancouver, BC, Canada

Jul 12 EFP Examination Vancouver, BC, Canada

Sep 6-10 Institute for Facilities Management Hilton Head, SC

Sep 6-10 Supervisor's Toolkit Hilton Head, SC

Sep 11 EFP Prep Course, EFP Examination, and CEFP Examination Hilton Head, SC

Sep 12 EFP Examination Hilton Head, SC

Sep 20-23 RMA Regional Meeting Tucson, AZ

Sep 26-30 CAPPA Regional Meeting Grand Forks, ND

Sep 27-30 MAPPA Regional Meeting Iowa City, IA

Oct 4-7 ERAPPA Regional Meeting Portland, ME

Oct 7-9 PCAPPA Regional Meeting Universal City/Hollywood, CA

Oct 24-27 SRAPPA Regional Meeting Daytona Beach, FL

OTHER EVENTS – 2009

Apr 30-May 1 Symposium on Building Envelope Sustainability Washington, DC

Sep 12-16 URMIA's Risk Management Conference Nashville, TN

For more information or to submit your organization's event, visit www.appa.org/applications/calendar/events.cfm.



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will deliver a program that was designed for you, the senior facility officer, and provide the networking opportunity to get the answers you need today!

If you have questions or require assistance, please contact APPA's Director of Professional Development Suzanne Healy at 703-684-1446, or suzanne@appa.org.

APPA'S LEADERSHIP ACADEMY

April 26 - 30, 2009

Marriott Harbor Beach Resort & Spa
Fort Lauderdale, FL

The purpose of the Leadership Academy is to enhance and further develop leadership throughout the educational industry. The

Leadership Academy provides opportunities for professionals to increase their awareness of industry issues, to learn the skills necessary to handle today's changes, and to discover the leadership potential within each of us.

The Leadership Academy has been developed for, and focuses on, the educational institution's administrative professionals. These include: facilities staff, buyers/purchasing agents, business/finance professionals, and auxiliary services professionals. The program is designed in tracks, with each track emphasizing a different perspective and type of leadership skill.

If you have questions or require assistance, please contact APPA's registrar, Cotrenia Aytch at 703-684-1446 or cotrenia@appa.org

APPA'S SUPERVISOR'S TOOLKIT

April 26-30, 2009

Marriott Harbor Beach Resort & Spa
Fort Lauderdale, FL

Supervisor's Toolkit has been specifically designed to meet the needs of the facilities management professional. 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. Join us for an open-ended, and pragmatic approach to developing supervisors. It is not so much a teach program as a development process, designed to help supervisors realize both personal and professional growth.

If you have questions or require assistance, please contact APPA's registrar, Cotrenia Aytch at 703-684-1446 or cotrenia@appa.org.



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The Stimulus Bill and the Education Industry

By E. Lander Medlin

By all accounts the \$789 billion economic stimulus package enacted into law as the American Reinvestment & Recovery Act (ARRA) by President Obama on February 17 represents a huge investment in the country's human/intellectual capital and its research capacity. These resource allocations have achieved historic levels for the education industry sector. Indeed, there were some big wins and a few losses once the final bill passed through the House and Senate conference committee. The bill does contain a massive increase for student aid and basic research, and seeks to relieve states of potential cuts to higher education and K-12 schools. However, it excludes a separate pot of money for campus infrastructure modernization and eliminated money for the student loan program that private colleges hoped would be funded.

Nevertheless, monies did materialize in the form of a "State Fiscal Stabilization Fund" along with increased funding for Medicaid that should ease pressure on state budgets and allow governors to address the need for public and private education facilities infrastructure projects. Facilities professionals should take note of this "opening" and work closely with their institutions to ensure their "shovel-ready" projects are packaged and ready immediately for funding consideration at the state level. Once governors have made specific application to the Secretary of the Department of Education for their portion of this \$48 billion (population-based, formula-funded distribution method), these monies must be disbursed quickly following these caveats:

- Will mitigate the need to raise tuition and fees for in-state students;
- Funds for modernization, renovation, or repair (*not* new construction) of higher education facilities;
- These facilities must primarily be used for instruction, research, or student housing;
- These modernizations must be consistent with a recognized green building rating system.

Addressing these caveats within your submittal materials will help you make the most effective case for your projects.

HUGE DOLLARS HAVE BEEN ALLOCATED FOR RESEARCH, WHICH WILL BENEFIT HIGHER EDUCATION INSTITUTIONS ENORMOUSLY.

In addition, huge dollars have been allocated for research, which will benefit higher education institutions enormously. Facilities professionals should also take note of these allocations since a number of them may provide major financial opportunity. Specifically, I am referring to the unfunded portions of "prior" energy legislation (i.e., policy, conservation, production, independence, and security) and the introduction of new funding for alternative energy and energy efficiency programs. The Department of Energy (DOE) Energy Efficiency & Renewable Energy Program Office (EE&RE) has been funded to an unprecedented level totaling \$16.8 billion. In particular, facilities professionals should focus on the

\$3.2 billion set aside for energy efficiency and conservation "block" grants; the \$3.1 billion for State Energy Programs; and \$3.5-billion for general DOE/EE&RE programs; and, the separate pot of \$4.5 billion targeted for electricity delivery and energy reliability.

Although a notice of intent and subsequent solicitation of grant proposals will be forthcoming within 60 days of the bill's enactment, unsolicited research/application proposals will be reviewed upon receipt as Energy Secretary Steven Chu announced on February 19. Clearly, projects focused on energy efficiency, climate change, biofuels, innovative technologies, energy creation with industry, the use of alternative or renewable energy, and other contributions to the "green" industry will have great opportunities for funding. You should be able to show how this project is a real investment in the new energy economy. The elements of any standard project proposal (scope, tasks, benefits, etc.) should be included along

with institutional cost-share and financing plans, expectations for job creation, number of Americans put back to work, and readiness for implementation.

In addition, there are other federal agencies with opportunities worth pursuing:

- National Institutes of Health will have \$1.5-billion for the agency to spend on renovating university facilities to help them compete for biomedical research grants. What better way to collaborate with your faculty researcher than to assist in the preparation of such a proposal.
- National Institute of Standards and Technology has been allocated \$180 million for competitive grants for academic research science building con-

struction (another campus academic collaborative opportunity).

- National Science Foundation has \$900 million for infrastructure generally in the area of equipment, instrumentation, and modernization, so it is worth looking into the specifics.

Finally, the area of "job training" received \$3.95 billion, of which about one-half was provided to support retraining of dislocated workers and adults.

This just may be an opportunity for an organized, well-developed Apprenticeship Training Program. I am aware of a few such programs that could use this type of financial bolstering. It could make a huge difference in the lives of displaced workers and provide support to the operations budget. Emphasis was also made on the importance of preparing workers for the "green" industry.

During the congressional hearings it was said, "Economists tell us that strategic investments in education are one of the best ways to help America become more productive and competitive." Let's make them right for once!

Because criteria, procedures, and details for implementation continue to emerge, and will rapidly throughout this process, APPA is committed to providing you regular information updates on our website and in electronic communications. In addition, given our proximity to the Washington, D.C. area and extensive contact with the federal agencies (such as DOE), the APPA staff will serve you by facilitating and/or providing a conduit for the flow of information and gathering answers to your specific questions. What we can do individually pales to what we can do collectively. Let's work together.

As you can readily surmise, a great deal of money is now available at both federal agencies and the state level. Huge decisions will be made at an accelerated pace. This is a different approach to the infusion of new resources into the economy and specifically into education. This is indeed an historic commitment. It will take all our creativity, innovation,

and inventiveness to make the best use of the resources we secure.

And, we must seek these dollars and these opportunities in equally different ways. Don't wait for these programs to come to you. You must jump right in and have your plans, proposals, programs, and projects ready to seize the moment. This window of opportunity

will be small and only open for what will seem a fleeting few seconds. Let's talk – now! ☎

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



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Thank You, APPA! Our Membership Efforts are a Success

By Nancy Hurt

As we begin the 2009-10 APPA fiscal/membership year, it seems an appropriate time to recognize the significant accomplishments of APPA's Membership Committee and membership staff. As chair of the APPA Membership Committee, I've seen a dramatic increase in member engagement, commitment, and active participation. APPA membership initiatives provide operational and leadership networks into all six APPA regions. Through our mission of recruitment and retention, and dovetailed policies of the APPA Board of Directors with the boards in all six regions, there is an active, "hands-on" approach in the regions that serves the entire organization well.

INSTITUTIONAL MEMBERS

Over the past year, the committee and staff have helped APPA quietly turn an important corner on the membership front. Through a combination of a record institutional retention rate of nearly 98 percent and successful new institution recruitment efforts, APPA has reversed a decade-long decline in APPA institutional memberships. The committee's recent focus has been on institutional members, which is the core constituency of APPA International, and the regions.



THE MEMBERSHIP COMMITTEE

The challenges for the 2009-10 membership year are many. The recent economic downturn and continuing uncertainty threatens the budgets of all our member institutions. The Membership Committee is, however, steadfastly behind the vision that APPA International and its regions are a resource and community in both good times and bad. Indeed, the need for APPA's programs, advice, community,

benchmarking, and collective resources becomes even more apparent as budgets are trimmed and we are once again asked to do more with less.

The Membership Committee consists of one representative from each of the six regions. These regional representatives are appointed to the committee by their regional boards and the APPA President. Each representative has a strong commitment to membership within their region, chair their regional membership committee, and report out to their regional boards on membership goals and objectives. It's a tough job that involves knowledge of regional structure, management of many different relationships, and the ability to work with both the regional board, and the APPA committee structure.

APPA REGIONS

In early December 2008, the committee traveled to APPA in Alexandria, Virginia for two days of meetings. All six APPA regions were represented and actively engaged during both the individual committee meeting and the important cross-committee strategy session. The committee representatives also gather in July at the APPA annual conference and meet via conference call several times a year. I continue to be amazed and humbled by the level of commitment and involvement the APPA organizations engender.

The regional representatives to the APPA Membership Committee are important points of contact for membership issues within your region, and your conduit to the APPA Member-

ship Committee. Your committee representatives are:

- **ERAPPA (Eastern Region)**
Jeff Foster, University of Rochester,
jfoster@facilities.rochester.edu
 - **SRAPPA (Southeastern Region)**
Wayne Goodwin, Jackson State
University, wayne.goodwin@jsums.edu
 - **MAPPA (Midwestern Region)**
Kristie Kowall, Illinois State
University, klender@ilstu.edu
 - **CAPPA (Central Region)**
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Viron Lynch, Weber State University,
vlynch@weber.edu
 - **PCAPPA (Pacific Coast Region)**
John Wong, British Columbia Institute
of Technology, john_wong@bcit.ca
- In addition, I would like to recognize two dynamic committee members who have recently rotated off the committee,


I CONTINUE TO BE AMAZED AND HUMBLLED BY THE LEVEL OF COMMITMENT AND INVOLVEMENT THE APPA ORGANIZATIONS ENGENDER.

Randy Culver in CAPPA, and Chuck Scott in MAPPA.

Our membership committee is staffed by John Bernhards, APPA's associate vice president (john@appa.org), and Santianna Stewart, APPA's manager of membership & outreach (santianna@appa.org).

INITIATIVES

Initiatives for the 2009-10 membership year include expanding the number of Associate members participating via their respective umbrella institutional memberships, reaching out to institutions that are members of NA-CUBO but not yet part of the APPA

family, and building a new network of student participation in support of APPA's Certification Program and to ensure the continuity and professionalism engendered under APPA's 7 Key Strategies. 

Nancy Hurt is associate director, real estate office, at Colorado State University in Fort Collins, CO, and chair of the APPA Membership Committee. She can be reached at nancy.hurt@csurf.colostate.edu.

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APPA Code Advocacy Task Force Wins Change In the Fire Alarm Code

By Carl Willms, Michael A. Anthony, Kevin Folsom

APPA's equity stake in the international safety standards landscape will yield dividends in the 2010 version of *NFPA 72 - National Fire Alarm and Signaling Code*®. A proposal described in the November/December 2008 Code Talkers column resulted in the change that APPA's Code Advocacy Task Force was seeking on behalf of the education facilities industry. The change does not present a new or costly technical requirement, but rather it is a clarification of an existing requirement that is overlooked when interconnecting multiple fire alarm control units (FACUs). The actual text of the fire alarm code technical committee's action is shown in the sidebar.

The interconnection of FACUs is a very frequent occurrence in educational facilities that evolve over time. If the interconnecting methods are not designed and configured properly, there will be significant negative impact on the ability to control and manage the fire alarm system.

BACKGROUND

NFPA-72 has clearly addressed the methods by which the separate panels can be interconnected. The problem is not in the interconnection methods but the performance of the system when it comes to the ease and ability to silence or reset separate fire alarm control panels.

The method of interconnecting a primary fire alarm panel to monitor a new and separate fire alarm panel utilizing

electrical contacts to monitor the alarm, trouble, and supervisory contacts of a sub panel in certain applications could be a straightforward one-way path design. This one-way configuration is similar to monitoring a manual pull station that needs to

be manually reset before the main panel can be returned to a normal condition.

When both panels control independent notification appliance circuits and other independent fire safety functions, such as AHU control and door release, the design of the interconnection becomes more critical. Depending on the manufacturer, model, flexibility and configuration of each panel the challenge to design a code compliant interconnection can be significant. Where each panel controls independent notification appliance circuits, significant issues arise where compliance with NFPA-72-2007 section 4.4.3.7.5 is considered which requires the subsequent reactivation of

Comment On Original APPA Proposal By Carl F. Willms:

"Add new text as follows:

4.4.3.7.7 Resetting alarm signals shall not require the simultaneous operation of multiple reset switches or the disconnection of any wiring or equipment to reset the alarm condition.

SUBSTANTIATION

I agree with the committee statement that it should not limit the capabilities of resetting signals to 1 location. There is, however, a situation that needs to be recognized and addressed. It is common that buildings with partial upgrades or fire alarm expansions may have separate fire alarm panels that are interconnected. If the interconnecting means is not properly designed and implemented, significant operational problems can occur. I have personally seen unacceptable conditions where 2 separate panels must be reset at the **SAME TIME** or the interconnecting wiring had to be physically disconnected to allow a reset. If the interconnection of the fire alarm panels is properly designed, the process of resetting a remote panel should be equivalent to resetting a manual pull station. Once the remote panel or (pull station) is reset, the main panel can be reset."

NFPA 72 COMMITTEE ACTION ACCEPTS THE PRINCIPLE:

"Revise proposed text as follows:

- 4.4.3.7.7* Resetting of alarm signals shall comply with the requirements of 6.8.2.1.
- A 4.4.3.7.7 Resetting of alarm signals should not require the simultaneous operation of multiple reset switches or the disconnection of any wiring or equipment to reset the alarm condition.

The committee agrees with the intent of the submitter and notes that a similar requirement exists in Chapter 6. The committee rephrased the proposed text to be positive language and placed the proposed text into the Annex."

the notification appliances if the system is silenced and additional alarms are initiated from addressable devices or other initiation device circuits.

This is where many systems fail to meet the operational needs of the building staff responsible for managing the fire alarm systems within their facilities. The fact is there are "Approved" fire alarm systems in service that require each panel to be individually silenced at each control panel. The silencing of only a portion of the alarm signals at one panel, followed by the delay of time it takes to travel to the second panel to activate the silence switch, creates a series of subsequent issues. Even worse, in many of these poorly designed interconnected systems, both panel reset buttons need to be pushed simultaneously.

POOR DESIGN

These poorly designed and interconnected "Approved" systems by NFPA-72 definition that are "acceptable to the Authority Having Jurisdiction" are *not* acceptable to the building staff that need to manage the fire and life safety systems within their facilities. An example of a code compliant — but poorly designed and possibly dangerous — reset configuration is shown in the photos of Figure 1. An order of magnitude labor cost estimate associated with public safety and fire alarm technicians having to deal with complicated reset procedures is \$100 to \$1000 — per event. Not included in this estimate is the cost of lost business continuity when occupants are confused about the fire safety status of a building when its fire alarm system rings and re-rings.

There are, however, numerous and varied simple cost effective ways to properly design the interconnection of separate fire alarm panels of different types and manufacturers with a relatively quick payback.

Depending on the specific application an example of a possible cost effective way to solve the audible and visual alarm notification issue is the utilization of notification circuit expander panels

connected to a notification circuit of the primary fire alarm panel. These expander panels are so cost effective, many times they are used instead of the panel's internal alarm notification circuits. In this configuration all of the notification appliances can be silenced from the designated fire panel or its remote annunciators and/or other operator interface locations.

A SIMPLE SOLUTION

Again, depending on the specific application the simultaneous resetting of two separate panels can also be easily corrected. In a high percentage of situations where the reset issue arises, Fire Security Technologies identifies one of the two panels that have the capability to control a programmable output relay to activate for a designated period of time then to restore to the original

state. In this configuration, the automatically restoring alarm relay contact at the primary control panel activates an alarm condition at the secondary panel and the secondary panel's latching alarm relay activates a separate alarm condition at the primary panel. Both panels activate an alarm condition simultaneously, but the resetting can be easily accomplished by resetting the secondary panel and then the primary panel in that order. In almost all cases there is a cost effective design and implementation solution. Unfortunately, poorly configured interconnected systems are still being approved. Improperly interconnected systems exist by falling through a loophole in the installation specifications and/or contract or just by an inappropriate system design creating operational difficulties that the facility staff is forced to deal with.

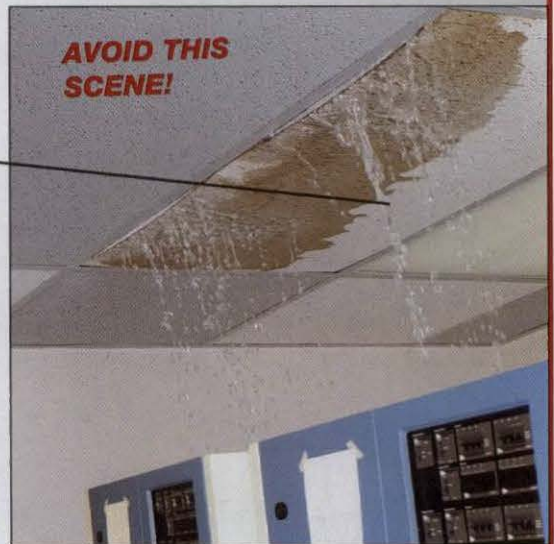
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A poorly designed interconnection of separate control panels may process an initiation device's alarm signal and subsequently activate an alarm condition at both panels, thus activating by all of the appropriate notification and control devices meeting the intent of NFPA-72-2007 section 6.8.2.1, but what section 6.8.2.1 does not specifically address is the process that may be required to silence or reset the system.

When the design and system function fails to meet the needs of the personnel responsible for managing their fire alarm systems, NFPA-72 needs to clearly identify that such systems do not meet the requirements and intent of the National Fire Alarm Code. (Schematics of a poorly and properly designed reset systems appear in the November/December 2008 Code Talkers article available at <http://www.appa.org/files/FMArticles/FM111208Code%20Talkers.pdf>)

Procedure for Resetting the Fire Alarm Panels

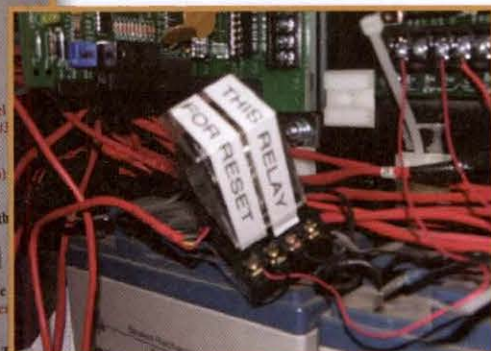
Upon alarm activation for either the existing System #3 alarm panel which is located in the mechanical room (Rink #1) or the new MXL alarm panel which is located in the electrical room (Rink #3.)

After all of the alarm conditions have been investigated and the fire department representative has given permission to reset the system, the following procedure may be followed:

1. If the alarm is in Rink #1 or #2, you must silence the alarm in the System #3 panel (mechanical room) by pressing the alarm silence button.
2. Next you go to the MXL panel (Rink #3) and continue the sequence.
3. Press the acknowledge alarm button.
4. Press the audible silence button.
5. Press the F4 button, which will prevent the System #3 panel (mechanical room) from re-arming the MXL panel (Rink #3). The system trouble light will then go on.
6. Now you may go to the System #3 panel (mechanical room) and reset the alarm by pressing the alarm reset button.
7. Then you go back to the MXL panel (Rink #3) and press the acknowledge trouble button.
8. Press the reset button on the MXL panel (Rink #3).
9. Press F1, the ARM button, to re-arm the link between the MXL panel (Rink #3) and the System #3 panel (mechanical room.)
10. Open the VoiceCom panel and press the EVAC button. This will ensure that the low level tone will not go out across the speakers.

An example of what education facility managers should NOT do with multiple fire alarm control units that are located in more than one location in a single building.

PHOTOS BY FIRE SECURITY TECHNOLOGIES, FARMINGDALE, NEW JERSEY



initiative, and to freely contribute his expertise to help us get the proposal through. If you are someone who has interest in participating in this important work, please contact Kevin Folsom. ☎

PROPOSALS SUBMITTED

Michael A. Anthony submitted two proposals to the nation's fire safety thought leaders for incorporation into the 2010 edition of NFPA-72. The committee initially rejected these proposals in the first phase of the code change process known as the ROP (Report of Proposals) phase. Carl Willms noted the 2009 NFPA-72 ROP rejection and the associated committee statements and provided further clarification in support of the proposals in the form of a comment that was submitted to the NFPA for reconsideration of the proposal at the ROC (Report on Comments) technical committee meetings last October. The comment by Carl Willms was Accepted in Principle by the committee. The code change will provide the clarification that is intended to prevent further unacceptable interconnections of multiple FACU's once the code is adopted. Assuming that no challenges will occur at the NFPA Standards Council meeting in July, many APPA stakeholders will benefit from this change.

The APPA Code Advocacy Task Force is a group of volunteers who are practicing educational facility managers. Each of them has expertise in various areas of code and standards development. We're grateful to have Carl Willms see our need in this

Carl Willms is CEO of Fire Security Technologies, Inc. in Farmingdale NJ. He is a member of the NFPA-72 Protected Premises Technical Committee, a NFPA Certified Fire Protection Specialist and a NICET Certified Senior Engineering Technician in Fire Alarm Systems as well as serving as a volunteer firefighter for 35 years. He may be reached at ceo@firesecuritytech.com. This is his first article for *Facilities Manager*.

Mike Anthony is a senior electrical engineer at the University of Michigan and APPA's representative on the National Electric Code. He may be reached at maanthon@umich.edu.

Kevin Folsom is director of facilities & plant operations at Dallas Theological Seminary and APPA Vice President for Professional Affairs and Chair of the Code Advocacy Task Force. He may be reached at kfolsom@dts.edu.

The authors wish to express their gratitude to Rodger Reiswig of SimplexGrinnell and Greg Masters of the University of Michigan Department of Occupational Safety and Environmental Health for their review and helpful comments on the preparation of this article.

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Exploring the Best LEED Program Application Strategy

By Harvey Chace

The overarching mission of APPA's Center for Facilities Research (CFaR) is to assure that our research priorities match the needs of the APPA membership. To that end we aggressively solicit input from members, review the results of Thought Leader programs, and consult the APPA Board of Directors to identify the issues where immediate review will benefit facility managers from Athabasca to Augusta.

Although we have all been sensitized to the need to reduce our carbon footprint and build more sustainable campuses, it seems we still need to expand our body of knowledge about managing our opportunities to become greener. Many APPA members are learning that the expressway to sustainability is more like the four-wheel-drive-only passage from Silverton to Ouray, Colorado. Most troublesome is the dilemma of integrating the pursuit of LEED certification [U.S. Green Building Council's Leadership in Energy and Environmental Design] with best-payback, lowest life-cycle-cost outcomes. In order to help our members to meet this emerging challenge, the CFaR Advisory Council is seeking corporate sponsorship for research in this important new facet of capital construction optimization.

WHAT IS THE NEED?

Sustainability in its current context is generally accepted to mean "meeting the needs of the present without compromising the ability of future generations to meet their own needs." The modern derivation of the term "sustain-

ability" stems from the consensus in the scientific community that mankind is consuming nonrenewable resources at a pace that nature cannot replenish and sustain. Therefore, it is imperative that we begin to introduce whole-nation, whole-community, and, in our case, whole-campus solutions that move us toward consumption neutrality.

Education facility portfolio managers will play a pivotal role in our pursuit of sustainability. Along with our corporate cousins who preside over industrial parks and our military brothers and sisters who operate enormous defense complexes, university facility professionals

are among the world's most influential sustainability agents of change. We are, in most circumstances, the single largest stewards of each state or province's capital assets. And the influential positions we hold in the communities surrounding each campus thrust us, often reluctantly, into the position of pacesetter in environmental protection and conservation issues. Clearly, APPA members will disproportionately influence the tempo and weight of society's progress toward a more sustainable world.

LEED AS A DRIVER

APPA members use several tools to keep their institutions on a steady course toward a more "sustainable future." State-level mandates on new

building energy performance and local campus conservation targets, as well as adoption of LEED program criteria are helping higher education facility officers to define and narrow the path of measurable progress.

The promotion of LEED-driven sustainability outcomes has been a priceless gift to facility portfolio managers whose worries about the capital renewal backlog are being swept up in the new wave of concern about making both new and old buildings more "sustainable." Jumping on, or in some cases driving, the sustainability bandwagon gives campus facility managers unprecedented opportunities to push their lingering building performance headaches to the top of the campus sustainability improvement project list.

But it is critical at this juncture to ask if the instruments we are using to guide us to a more sustainable future are really

taking us down the correct path to the right destination. In more direct terms, will the

design agents' unfettered pursuit of a maximum LEED point score always represent the best outcome for the institution? Or will proactive oversight of the LEED point accumulation strategy and an overarching design imperative based on minimizing post-construction operating costs produce a better outcome for the institution?

More importantly can we have both, e.g., the public demonstration of our commitment to a high level of LEED certification *and* uncompromised, lowest-life-cycle-cost buildings? And do we need to broaden the decision matrix to include the cost benefit of designing to an appropriate set of LEED criteria, but forgoing costly audit and certification costs?


CFaR | Center for Facilities Research

A review of current LEED scoring guidelines for new construction and major renovation provide a menu of LEED point accumulation alternatives, from the installation of showers for building occupants who choose to bike to work to the use of certified wood products and regionally extracted and processed materials. This plethora of options presents a dilemma when committing the marginal project dollar.

Should we maximize HVAC performance and indoor air quality points before considering "soft" LEED points that have little or no effect on the university's post-construction utility bills? What is the true life-cycle cost benefit to the institution if it chooses to invest first in systems and architectural elements that minimize the consumption of purchased energy, second in lab and classroom equipment that optimize learning and student success, and

THE PROMOTION OF LEED-DRIVEN SUSTAINABILITY OUTCOMES HAS BEEN A PRICELESS GIFT TO FACILITY PORTFOLIO MANAGERS WHOSE WORRIES ABOUT THE CAPITAL RENEWAL BACKLOG ARE BEING SWEEPED UP IN THE NEW WAVE OF CONCERN ABOUT MAKING BOTH NEW AND OLD BUILDINGS MORE "SUSTAINABLE."

third in the LEED features that have social and economic impact outside the campus boundary? Each sustainability strategy option generates competing consequences for our world, nation, community, and campus.

Our senior campus administrators want to understand their strategic options and choose the right course. They are looking to APPA members to supply the answers. As a service to its members and as a contribution to the health of the education community, APPA is placing a high priority on the commissioning of a research study that compares and contrasts the sustainability design strategies open to universities and colleges to include examination and rationalization of the trade-offs between designing to accumulate LEED points, and obtain certification, versus designing for lowest total cost of ownership. 

Harvey Chace has recently retired as associate director of maintenance and planning at the University of New Mexico, NM in Albuquerque, NM and is a member of the CFaR Advisory Council. He can be reached at hx2inabg@msn.com. This is his first article for *Facilities Manager*.



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We know climate change is real, it's happening quickly, its risks are great, and it is not too late to do something about it. So let's get to work!

Indicative of change is the fact that as of early 2009 over 600 colleges and universities have pledged to achieve climate neutrality through the American College & University Presidents Climate Commitment. Presidents of large and small institutions of higher education have made this commitment, recognizing that colleges and universities must be leaders in the effort to address the gravest environmental threat we have ever faced.

As the meaning of climate neutrality sinks in, i.e., the daunting task of reducing net reliance on fossil fuels to zero, many campus leaders — including facilities managers — may be shaking their heads wondering what their president has gotten them into. While students and many others on campus are applauding the move, those charged with achieving climate neutrality may be wondering how to do it. Let's walk through the process. Hopefully, this discussion will be of interest not only to campuses that have signed the Presidents Climate Commitment but also to those that have not — since we all have an interest in being good environmental stewards. We can all take steps to reduce our greenhouse gas (GHG) emissions — principally carbon dioxide caused by burning coal, oil, and natural gas. Yes we can shrink our carbon footprints.

HERE'S HOW.





CAMPUS CLIMATE NEUTRALITY

YES WE **CAN!**

IT'S A BIG
CHALLENGE,
BUT HERE'S HOW
TO DO IT

BY WALTER SIMPSON

CREATING YOUR CLIMATE ACTION PLAN

The American College & University Presidents Climate Commitment requires all signatories to create a Climate Action Plan (CAP) within two years. This CAP should stipulate the date when your school expects to achieve climate neutrality, outline interim targets and set out the mitigation strategies and measures and projects your campus will use to achieve these interim targets and ultimately climate neutrality.

The plan you develop and the steps you take are informed by an initial and updated greenhouse gas inventories (see sidebar) to establish your emissions starting point and demonstrate your progress along the way. Your CAP will need to:

- Identify, evaluate, prioritize, and schedule GHG mitigation strategies
- Lay out financing options
- Be flexible enough to allow for occasional revisions
- Include plans for involving your entire campus community

Most significantly, your CAP will need to be attractive and feasible enough to be approved by your administration and garner the support of your campus community. These are tall orders.

Since much of your carbon footprint is the result of campus operations — specifically direct and indirect energy use — facilities managers and their staff will play a key role in these efforts. Note that the Presidents Climate Commitment obliges signatories to also address curricular and research opportunities for promoting solutions to the climate crisis — though these will not be addressed here. Suffice it to say we should

involve students as much as possible to enrich their learning experience and prepare them to be part of the solution after they graduate.

Since much of your carbon footprint is the result of campus operations — specifically direct and indirect energy use — facilities managers and their staff will play a key role in these efforts.

GETTING STARTED

The first steps are completing an initial greenhouse gas inventory and creating appropriate institutional structures for developing and implementing the climate action plan. Typically, the latter will comprise one or more committees or working groups — hopefully operating with the blessing, full support, and involvement of campus top leadership.

If your school already has an environmental task force or sustainability committee, that's the place to start. This committee can be assigned the overall responsibility of developing your CAP or minimally should be substantially involved. All along the way appropriate stakeholders should be involved — not just campus environmental activists but also those representing key segments of the campus community — students, faculty, and staff — and the offices and departments that make the campus run. Facilities management is key among these. Since the CAP is multifaceted, there will need to be subcommittees with appropriate responsibilities.

CARBON MITIGATION STRATEGIES

Let's admit it, reducing and eventually eliminating greenhouse gas emissions from campus operations is utopian. The Presidents Climate Commitment is all about modeling a new energy future for humankind, one that is a complete break with our past and current heavy reliance on dirty fossil fuels. Nonetheless, to some extent, achieving climate neutrality involves doing what environmentally responsible schools have been doing all along — but taking those steps further. Here are the key strategies:

- Maximize energy conservation and efficiency
- Make appropriate fuel choices — stop burning coal and minimize the use of oil and natural gas
- Install renewable energy technologies on campus
- Buy green power — eventually 100 percent
- Maximize space utilization to minimize new construction
- Design and construct only the greenest, most energy efficient new buildings
- Find clean energy solutions for fleet vehicles and campus commuting

Doing a Campus GHG Inventory

A campus greenhouse gas inventory examines aspects of campus operations that contribute to global climate change. An inventory tool, such as Clean Air Cool Planet's Campus Carbon Calculator (<http://www.cleanair-coolplanet.org/toolkit>), can be used to calculate annual greenhouse gas emissions (in metric tons per year), principally carbon dioxide from burning fossil fuels.

The inventory establishes your school's carbon footprint and can help identify priority targets for action — though typically the largest sources of direct and indirect carbon emissions are easy to anticipate, namely, electricity use (purchased or self-generated), on-site fossil fuel burning for space and water heating, and commuting. To a lesser extent solid waste production, fleet vehicle use, and CFC releases from refrigeration equipment also contribute to the carbon footprint.

Perhaps the real value of a GHG inventory is educational since it allows campus climate activists to equate energy use and transportation to the problem of climate change. This can be a big wake-up call. Also, when occasionally repeated, the inventory becomes a means of tracking progress toward reducing emissions.

Also contributing to reduced emissions are campus waste reduction campaigns of all types, aggressive comprehensive recycling, purchasing programs that encourage buying less and only buying energy efficient green products such as those made with maximum recycled content (e.g., 100 percent post-consumer content recycled paper), and buying local products including locally produced food. Even though some of the GHG emissions reductions associated with these practices are unlikely to be captured or evaluated by your GHG inventory, they are still important to undertake. How far do we take it? Optimally, campus food service would offer and encourage meatless meals since nearly 20 percent of GHG emissions globally are the result of livestock production.

The GHG mitigation strategy of last resort is creating or buying carbon offsets to displace or cancel out the fossil fuel energy use and GHG emissions that your campus is still responsible for after you have done everything you can do to reduce and eliminate these emissions.

REDOUBLING CAMPUS ENERGY CONSERVATION EFFORTS

Most colleges and universities have been practicing energy conservation and efficiency for many years. The threat of climate change challenges us to do even more — much more. Admittedly there are structural inefficiencies in many of our buildings that make deep cuts in energy use difficult but we must try harder to wring savings out while still maintaining comfortable indoor environments so the educational, research, and business functions of our institutions can continue effectively.

Over the years at the University at Buffalo (UB) our energy conservation program managed to reduce energy consumption in campus buildings by over 30 percent. Could we double that? Perhaps that is a farfetched goal, but students and faculty could assist facilities management in researching that possibility.

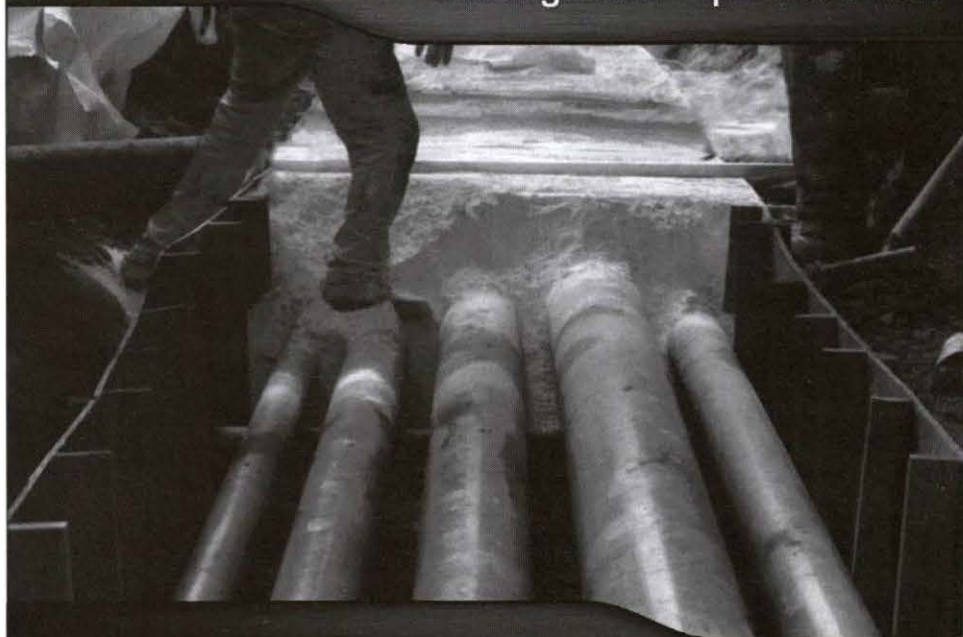
Some conservation measures implemented by facilities management will be inexpensive and operational, e.g., tightening up on temperatures and

equipment operating hours, but these can not be maximized without the full support of campus leadership and a lot of understanding by the rest of the campus community. Thus, energy awareness efforts — with a strong climate change message — must be redoubled. To achieve deep cuts in energy consumption with capital projects that cost big bucks, it will be necessary to relax payback requirements — allowing projects to go forward with longer 10-, 15-, and 20-year paybacks instead of limiting projects to those which payback quickly.



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Performance contracting should be revisited so that large comprehensive campuswide self-financing energy conservation projects can be undertaken without delay. It may be possible to get more bang for our buck from these projects if we avoid paying for guaranteed savings and do projects on a “cost plus” basis instead of fixed cost. Of course, this will mean more facilities management involvement.

QUITTING COAL

Across the U.S. there is a huge fight against coal burning power plants. Proposed new plants are being stopped, and soon existing coal plants may be asked to shut down. And no wonder – coal is the worst fossil fuel from a greenhouse gas emissions perspective. Much more carbon dioxide is released for each BTU produced by burning coal than by burning oil or natural gas. So if your campus burns coal in its power plant, quitting coal should be a top priority. It makes sense to get started on this quickly before protestors start knocking

If your campus burns coal in its power plant, quitting coal should be a top priority.

on your door. In 2007 Sierra Club filed a lawsuit against the University of Wisconsin at Madison because of pollution from its Charter Street coal plant.

Of course, quitting coal is more easily said than done. There are at least two big hurdles – the potentially much higher cost of alternative fuels (e.g., natural gas, biomass, etc.) and the cost to build a new campus heating/power plant or retrofit an old one.

Many colleges and universities, especially those in coal states in Appalachia and the Midwest, have traditionally used coal for what seemed to be good reasons before we became aware of the problem of climate change. Coal is, after all, plentiful and cheap – though during the first half of 2008 increasing international demand caused the price of coal to double before returning to normal once the global economic

meltdown occurred. Much higher coal prices may return once the world economy gets back on track.

Moreover, coal prices will definitely rise to much higher levels as effective cap and trade or carbon tax regimes are disproportionately applied to coal to actively discourage its use. Coal mining presents a raft of troubling environmental and health issues. And as many facilities and energy managers know, coal is dirty to handle and can have adverse health impacts on employees.

So it makes sense to look at alternatives to coal burning – perhaps making plans to convert once the economy picks up and revenues become available. There is even a silver lining to quitting coal. Switching to a higher price heating fuel will increase the incentive your campus has to implement energy conservation measures to reduce your heating load. And those measures will further reduce your carbon footprint. In any event, Climate Commitment signatories with campus coal plants can't avoid this difficult issue.

While natural gas is the most expensive fossil fuel, it is also the cleanest. A highly efficient natural gas-fired cogeneration plant can provide lower GHG emissions and reasonable cost effectiveness. The use of expensive natural gas becomes more affordable if you practice aggressive conservation on campus and reduce your heating load. Also, note that in the future all fossil fuels will be more expensive, especially coal, as carbon taxes are applied.

Of course, on-site coal burning is not the only use of coal on campus. Most schools purchase electricity from regional grids that are fed by coal burning power plants. In states like Ohio, heavy coal reliance makes purchased electricity very carbon intensive. In other areas, much less so, such as the Pacific Northwest where carbon-free hydro power predominates. Thus, depending on where your campus is located, addressing the carbon emissions embodied in your electricity will be more or less of a problem.

SHIFTING TO RENEWABLE ENERGY SOURCES

Conservation and efficiency can take us far but not all the way. Even after we have reduced our energy load to a minimum, we will still have to meet that remaining load with some form of energy. To achieve climate neutrality, our campuses must transition to carbon-free renewable energy technologies – solar, wind, biomass, geothermal, and hydro (though the latter is pretty much tapped out in most regions). We can either build renewable energy capacity on campus or buy green power.

Many campuses are installing photovoltaic solar electric arrays. These become cost-effective where conventional electric rates are high and ample incentives are offered by state government or local utilities. Obviously, the amount of available sunlight is an important factor though nonetheless PV works well in all areas.

Campus Climate Leadership is Critical

“College and universities have a critical role to play. By demonstrating their campuses can operate effectively while significantly curtailing greenhouse gas emissions, institutions of higher learning can show what is possible and point the way for others to follow. The American College & University Presidents Climate Commitment is a particularly hopeful development.”

— Jim Hansen, Director, NASA Goddard Institute for Space Studies

There are a variety of financial models for installing PV on campus. Your school need not own the system. It can be built by a third-party vendor and clean, green electrons can be yours via a power purchase agreement – though be sure to buy the renewable energy credits associated with those electrons if your campus wants to claim the PV power it receives as carbon-free.

A few schools have installed wind turbines to cleanly address their electricity needs. For example in Northfield, Minnesota, both Carleton College and St. Olaf College have installed gigantic 1.65 MW wind turbines in corn fields adjacent to their campuses to signal their environmental commitment and lighten their carbon footprints. Campus-owned wind turbines need not be on campus to meet campus carbon-free power needs. As long as they displace conventional electrical power, they can be anywhere. However, as with photovoltaics, the campus must own the renewable energy credits produced by the turbines in order to take credit for carbon-free power.

In its pursuit of climate neutrality Middlebury College is installing a biomass cogeneration plant on its campus in Middlebury, Vermont. The idea is to use locally grown wood and biomass to produce near-carbon free heat as well as electricity. While not every school can rely on sustainably produced biomass, it represents a strategy for some campuses to replace fossil fuels for heating as well as electrical generation.

BUYING GREEN POWER

Producing on-campus green power is difficult and producing enough of it to make a difference is even harder. Hence, the need to buy green power. Green power purchasing involves buying renewable energy credits or RECs, which represent the “environmental attribute” associated with renewable power. RECs typically cost 1 - 3 cents/kWh, a premium cost over and above your normal cost of power. Of course, these costs can be mitigated by careful shopping for RECs and by an aggressive campus energy conservation program that reduces the amount of electricity that must be purchased in the first place.

Not all green power is equal. For example, if you are buying or producing biomass-generated electricity, due diligence requires that you take into account the amount of fossil fuel used to produce, transport and process the biomass fuel. Wind, on the other hand

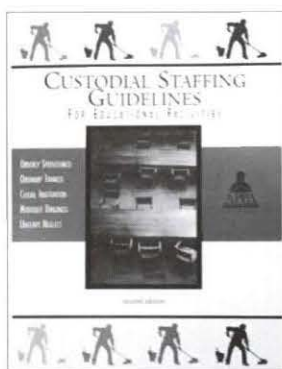
is emissions-free except for the fossil fuel used in making the wind turbines themselves, a carbon debt which is generally paid off in the first year.

There is no overall GHG emissions reduction unless each purchase of green power spurs the development of more green power capacity – so that over time, the mix of electrical generation shifts from fossil fuels to renewables. The best way to leverage new wind capacity is to build a new wind farm. The second best approach is to buy wind-generated RECs on a long term contract which makes it easier for the wind developer to finance his or her next wind farm.

AVOIDING NEW CONSTRUCTION OR GOING ALL THE WAY WITH GREEN DESIGN

While new construction is sexy and having a LEED Gold or Platinum building on campus certainly gives you bragging rights, the reality is that each new building adds to your campus carbon footprint unless it is a zero-energy building. Thus colleges and universities committed to climate neutrality need to look at new construction in a new way. We can reduce carbon emissions and save operating dollars by maximizing the utilization of existing space and thus avoiding or minimizing new construction.

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Campus Climate Action Resources

- **The Educational Facilities Professional's Practical Guide to Reducing the Campus Carbon Footprint;** Karla Hignite, principal author; APPA 2008-2009.
- **The Green Campus: Meeting the Challenge of Environmental Sustainability;** Walter Simpson, editor; APPA 2008, <http://appa.org/bookstore/index.cfm>. This book contains numerous articles on the campus climate challenge.
- **American College & University Presidents Climate Commitment (ACUPCC),** <http://www.presidentsclimatecommitment.org>. This site lists signatories and includes various resources including an implementation guide.
- **Association for the Advancement of Sustainability in Higher Education,** www.aashe.org. This site contains numerous resources on campus climate action, <http://www.aashe.org/resources/climate.php>. AASHE offers a monthly newsletter, the *ACUPCC Implementer*, for those involved in implementing the Presidents Climate Commitment of their campuses. To subscribe, reporting@aashe.org.
- **Boldly Sustainable: Hope and Opportunity for Higher Education in an Age of Climate Change;** Andrea Putman and Peter Bardaglio; 2009, NACUBO.
- **The Business Case for Renewable Energy: A Guide for Colleges and Universities;** Andrea Putman and Michael Philips; NACUBO, 2006.
- **Clean Air Cool Planet,** <http://www.cleanair-coolplanet.org/>, provides a Campus Climate Action Toolkit and the CACP Campus Carbon Calculator, http://www.cleanair-coolplanet.org/for_campuses.php.
- **Guide to Climate Action Planning: Pathways to a Low Carbon Campus;** David J. Eagan, Terry Calhoun, Justin Schott, Praween Dayananda; Campus Ecology, National Wildlife Federation, 2008, <http://www.nwf.org/campusecology/pdfs/climateactionplanning.pdf>.
- **Higher Education in a Warming World: The Business Case for Climate Leadership on Campus;** David J. Eagan, Terry Calhoun, Justin Schott, Praween Dayananda, Campus Ecology; National Wildlife Federation, 2008, <http://www.nwf.org/campusEcology/BusinessCase/index.cfm>.
- **Second Nature,** <http://www.secondnature.org>, is a primary sponsor of the ACUPCC, and its site contains numerous helpful resources.

There are a variety of ways of increasing space utilization efficiency. For example, if your school is committed to a growth scenario, it might be possible to accommodate many more students without new construction of classroom buildings if you operated academic programs at full tilt year round and thus made better use of existing buildings over the summer. Like at many other schools, at UB all campus building systems operate at 100 percent during the summer months even though the vast majority of students and faculty are elsewhere. That's pretty wasteful.

If you are contemplating new construction, just going for a LEED rating is not good enough. Your goal should be LEED Gold or Platinum with a maximum number of LEED energy points.

ADDRESSING THE TRANSPORTATION CONUNDRUM

Facilities managers can address greenhouse gas emissions associated with fleet vehicles in a variety of ways which include buying only the most fuel efficient vehicles, running vehicles on less carbon-intensive fuels like electricity, biodiesel, or compressed natural gas, and implementing policies to reduce miles driven and idling.

The larger transportation problem is commuting. At most colleges and universities, commuters dominate and typically arrive and depart from campus in single occupancy vehicles – many with poor fuel economy. Commuting by students, faculty and staff may add up to many millions of miles of driving per year at larger schools – and thus represent a substantial carbon footprint.

The Presidents Climate Commitment requires the mitigation of GHG emissions produced by campus commuting. While facilities managers may be only peripherally involved in addressing this source of emissions, campuses striving for climate neutrality will need to develop low-carbon transportation alternatives. Strategies may include increasing the use of public transit, bicycling, carpooling, and encouraging the use of more fuel efficient vehicles. In the end, the lion's share of these emissions may have to be offset.

CARBON OFFSETS TO CANCEL REMAINING EMISSIONS

Try as we might, the vast majority of us will be only partially successful in eliminating campus fossil fuel use and GHG emissions. What to do about our remaining GHG emissions? To achieve climate neutrality those remaining emissions will have to be canceled out with carbon offsets. We can offset campus carbon emissions by creating or investing in projects which reduce GHG emissions elsewhere. It's a simple concept, but the devil is in the details.

At present, the carbon offset market is in its infancy and buying offsets might seem like buying a pig in a poke. Offsets have been ridiculed by comparing them to faith-based absolution or forgiveness of sins. But with the right guarantees carbon offsets can produce real emissions reductions, and those who are responsible for creating or financing these reductions have the right to take credit for them. Schools may want to help their local regions become more sustainable by developing local community-based energy efficiency and renewable energy projects and then taking some credit for the carbon reduction these projects produce.

To define legitimate carbon offsets, the American College & University Presidents Climate Commitment program has recently issued a carbon offset protocol (<http://www.presidentsclimatecommitment.org/offsetprotocol.php>). Among other things, this protocol requires that carbon offsets produce permanent GHG emissions reductions that are in addition to any reductions that would have occurred anyway and an accounting system must be in place to ensure that they not be double counted. Participants in the Presidents Climate Commitment are strongly encouraged not to rely too heavily on offsets and thus not buy their way out of on-campus GHG emissions reductions.


CREATING A SMART PLAN

A climate action plan needs to be smart enough to chart a viable path to climate neutrality while being persuasive enough to receive wholehearted support from campus leaders and the entire campus community. A smart and persuasive CAP will evaluate and prioritize mitigation strategies on the basis of a number of criteria including the cost-effectiveness of possible measures in terms of tons of carbon dioxide mitigated per dollar invested. Out of necessity, a smart plan will also carefully consider funding and financing options, taking full advantage of grants and incentives from foundations, alumni, and local, state and federal

governments. Your plan will get a boost if it lays out a sequence of actions wherein earlier steps help pay for later ones.

Most importantly, a smart CAP will be the result of an inclusive process that involves and respects everyone and benefits by the collective wisdom and good will of the entire college or university community.

Whether your school's president made the climate neutrality commitment with full knowledge or just out of a sense of goodwill or expediency, achieving climate neutrality by any reasonable measure will be difficult and perhaps expensive. But do it we must.

We cannot stand idly by as global climate shifts, creating an untenable world for our children and for the members of other species. Colleges and universities hold a unique position in our society and have a special obligation to demonstrate intellectual and moral leadership and to inspire hope by setting an example that inspires others. The next ten years are crucial, so let's get going. 

Walter Simpson, an Emeritus member of APPA, is retired University at Buffalo energy officer and editor/co-author of *The Green Campus: Meeting the Challenge of Environmental Sustainability*, published by APPA in 2008. He now works as an energy consultant assisting AASHE in its support of the American College & University Presidents Climate Commitment, and can be reached at enconser@buffalo.edu.

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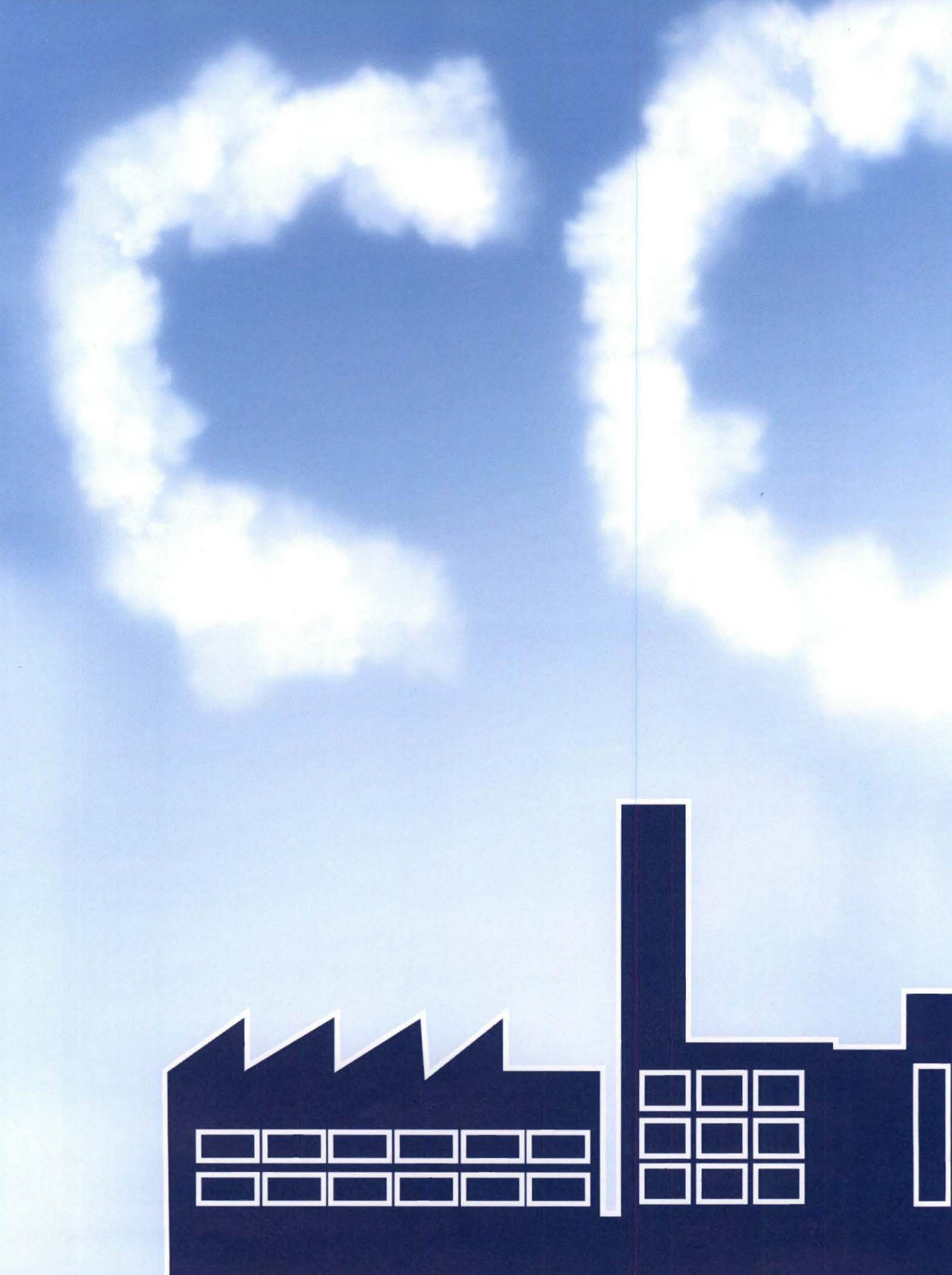
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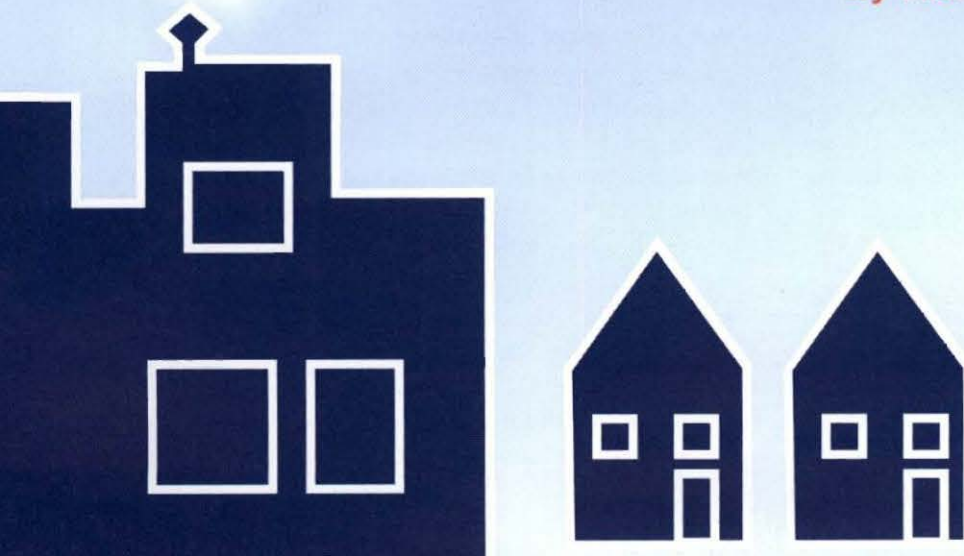
Carbon -Neu+rality and the Use of Offsets

MANY ORGANIZATIONS, INCLUDING COLLEGES

and universities, are moving to address the threat of climate change by reducing greenhouse gas (GHG) emissions from their operations. For example, the rapid growth of participation in the Presidents Climate Commitment (PCC) now means that more than 600 colleges and universities have pledged to develop plans to become carbon neutral. So what does this mean?

Carbon neutrality is defined as achieving a state where the operation has zero-net emission of greenhouse gases. The key word here is "net." It is highly unlikely that an organization will be able to achieve zero absolute emissions of greenhouse gases, since most forms of energy, many materials, and wastes all contribute to GHG emissions. This means that despite aggressive programs to switch to renewable energy, and reduce consumption and waste, credits or offsets must be purchased to counteract those emissions that the institution cannot prevent emitting. The result of the Presidents Climate Commitment is that over 600 colleges and universities are now committed to reducing their own GHG emissions. Because they cannot realistically reduce their own emissions to zero, they will be out in the marketplace looking to purchase the rights to carbon offsets. Buyer beware.

**By Richard A. Ney, Ph.D., LEED AP
and Judith R. Purman**





WHAT IS A CARBON OFFSET?

It is important to first define what a carbon offset is. *Carbon* is used in this context interchangeably with *greenhouse* gases. This is done because although there are numerous types of GHG, the differential effect of each can be converted into a common term of carbon dioxide-equivalents (CO₂-eq) based upon their relative effectiveness at producing heat once released to the atmosphere. In turn, carbon dioxide can be related to the carbon portion of the compound using molecular weight ratios.

All of this means that the term *carbon offset* refers to a reduction in emissions of any GHG, such as methane, nitrous oxide, or even sulfur hexafluoride. The *offset* is a quantified GHG reduction purchased and used to negate or cancel out an equivalent emission from the operation.

WHERE DO CARBON OFFSETS COME FROM?

In general terms, carbon offsets come from a variety of projects that either pull GHG from the atmosphere, reduce the amount of GHG historically emitted to the atmosphere, or avoid future GHG emissions by stopping or changing future

**carbon offset
refers to a reduction
in emissions of any
GHG, such as
methane, nitrous
oxide, or even
sulfur hexafluoride.**

developments. *Sequestration* (preserving carbon in storage) projects pull carbon dioxide from the atmosphere through photosynthesis (biological sequestration) or by capture and underground injection of exhaust CO₂ (terrestrial sequestration).

Reduction projects can include energy efficiency improvements, fuel switching to lighter fossil fuels or biofuels, or the destruction of methane from animal wastes or landfill gas – projects where the amount of GHG emitted can be reduced from previous levels. *Avoidance* offsets could occur

if, for example, a planned coal-fired power plant was pulled from future plans or was shifted to lower-emitting options.

NOT ALL CARBON OFFSETS ARE CREATED EQUAL

Care must be exercised when evaluating different projects for the quality of their claimed carbon offset. There are a series of criteria that a potential offset must meet in order to be deemed adequate for use in the carbon neutrality calculation of the PCC. Many of these qualities are somewhat subjective and can be quite difficult to evaluate. We describe a few of the criteria here that the offset must meet:

- **Additional** – the concept of additionality says that an emission reduction can only be considered as an offset if the project that created the reduction would not have happened without the lure of the offsets themselves, or if

the action was otherwise required. Example 1: if an electric utility was required to install carbon dioxide capture and injection equipment as a term of a permit, no offset is created because the action was otherwise required by regulation. Example 2: if an operation has traditionally performed more inefficiently than its peers, offsets would not be created by a project that brings that poor operation up to the standard efficiency of its peers. Only to the extent that the efficiency exceeds benchmarks would offsets be awarded.

- **Measureable** – an offset credit must be measurable. This sounds rather straightforward, yet the amount of carbon sequestered within a forest or agricultural field can be extremely complex and therefore quite expensive to quantify; determining the actual amount of energy saved through implementing efficiency measures can also be a daunting task. The buyer of an offset should be in a position to

evaluate whether the proposed offset has been measured, or estimated with sufficient conservatism, to ensure that the offset does in fact represent the intended amount of reduction.

There are a series of criteria that a potential offset must meet in order to be deemed adequate for use in the carbon neutrality calculation of the PCC.

- **Permanent** – a project or change that results in an emission reduction could be deemed as an offset provided the project or change results in permanent reduction. Imagine a facility switching from coal to natural gas combustion one year and selling the emission reductions as offsets, only to switch back to coal in year two. Permanence is determined by a relatively straightforward evaluation for most projects, but remains a challenge for

biological sequestration projects. An offset buyer could purchase offsets from a forest only to see a fire burn the

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land in future years, releasing all of the carbon that was credited as offsets. A number of methods have been developed to try to address permanence for these bio-processes; the use of a buffer or pool of excess credits that must be maintained (i.e., the buyer may only take credit for 75 percent of purchased offsets) and specialized insurance to provide some protection to buyers are two examples.

- **Avoid Leakage** – leakage is terminology developed to describe the shifting of emissions from one source to another. Example: a great number of offsets could be generated if an electric utility shut down an existing power plant; however, if that shutdown resulted in another power plant picking up the same load, the reduction would have leaked from one plant to the other and no offset would be generated. Leakage can be difficult to determine and remains a subjective analysis – the key is to clearly draw boundaries for your analysis and view impacts of the project “as the atmosphere sees it.”
- **Verified or Verifiable** – the number of offsets claimed by the project or seller need to be verified by an independent third party having established credentials for determining offsets. Different projects may require different levels of verification, depending on applicable protocols and standards.
- **Registered** – there are a number of registries that have been developed over the years to keep track of specific emission reductions. The purpose of a registry is to ensure that the

same emission offset is not double counted. When an offset is generated and verified, it is reported and recorded in the registry and the disposition of the offset is tracked via the sales agreement.

- **Enforceable** – the offset transaction must be enforceable through a contract. The contract must clearly define the offset and the actions required in order for the offset to remain valid.

Organizations will need to chart a course through challenges of energy efficiency, waste minimization, purchase of green power, and development of local renewable energy sources.

WILL RENEWABLE ENERGY CREDITS (RECS) ALSO FUNCTION AS OFFSETS?

A Renewable Energy Credit (REC) represents the positive environmental attributes of “clean” electricity; that is, the REC stands for the amount of sulfur dioxide, nitrogen oxides, particulate matter, and carbon dioxide that are *not* emitted when this clean energy source displaces a more polluting source. A REC does not represent a ton of a particular pollutant as a carbon credit does, but rather is the amount of various pollutants tied to a kilowatt hour (kWh) of electricity. RECs have existed for several years now, resulting from the creation of Renewable Portfolio Standards (RPS) for electric generation within states. Utilities could generate electricity from renewable sources to meet their targets

(continued on page 37)

Carbon Offset Contacts

Carbon Fund

www.carbonfund.org

Chicago Climate Exchange

www.chicagoclimatex.com

e-Blue Horizons

www.e-bluehorizons.net

Environmental Defense Fund

www.edf.org

Native Energy

www.nativeenergy.com

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Stephen R. Covey

Stephen R. Covey achieved international acclaim, and is perhaps best known, for his self-help book *The 7 Habits of Highly Effective People*, which was first published by Simon & Schuster in 1989 and has sold around 12 million copies world-wide. Covey has a Harvard MBA and has spent most of his career at Brigham Young University, where he was professor of organizational

behavior and business management. In addition to his MBA, he also has a doctorate which he completed at Brigham Young University. He is widely acknowledged as one of the world's leading authorities on the subject of time-management. Thousands of organizations across the world, including many of the Fortune 500 companies, have adopted his innovative techniques on leadership, teamwork, and customer-focused service.



Mike Abrashoff

Mike Abrashoff, former Commander of the Guided Missile Destroyer USS Benfold, has spent the last 4 years developing the management techniques he used during his tenure in the Navy into a methodology for application to the business community. His ideas are more fully explained in his book, *"It's your Ship,"* which has sold 160,000 copies to date and has been #9 on

the *NY Times* Business Best Sellers List and #7 on the *Wall Street Journal* List. He has been featured in the *Harvard Business Review* (March 2002) and *Fast Company* (April, 1999). Critical to the success of that initiative found in *"It's Your Ship"*, was the realization that people really do make the difference. Mike's model stresses a top-down, command, and, control management style which was very successful. But in today's world of instant communication and information flow that model has proven to be slow to react and ineffective. Through progressive leaders like Mike, the military services are now scrambling to adjust to the new order that Mike believes will result in the antithesis of top-down management — bottom-up or "GrassRoots Leadership" as Mike has coined it.



Dan & Chip Heath — The Heath Brothers

Chip Heath is a Professor of Organizational Behavior in the Graduate School of Business at Stanford University. He is the co-author of the book *Made to Stick: Why Some Ideas Survive and Others Die*, which has been a *New York Times*, *Wall Street Journal*, and *BusinessWeek* bestseller. Chip is also a columnist for *Fast Company* magazine, and he has spoken and

consulted on the topic of "making ideas stick" with organizations such as Nike, the Nature Conservancy, Microsoft, Ideo, and the American Heart Association. Chip has taught courses on Organizational Behavior, Negotiation, Strategy, and International Strategy. Prior to joining Stanford, Professor Heath taught at the University of Chicago Graduate School of Business and the Fuqua School of Business at Duke University. He received his B.S. in Industrial Engineering from Texas A&M University and his Ph.D. in Psychology from Stanford.



Dan Heath is a Consultant to the Policy Programs for the Aspen Institute. He is the co-author of the book *Made to Stick: Why Some Ideas Survive and Others Die*, which has been a *New York Times*, *Wall Street Journal*, and *BusinessWeek* bestseller. Dan is also a columnist for *Fast Company* magazine, and he has spoken and consulted on the topic of "making ideas stick" with organizations such as Microsoft, Nestle,

the American Heart Association, Nissan, and Macy's. In 1997, Dan co-founded and served as Editor in Chief of a startup publishing company called Thinkwell, which created from scratch an innovative new line of college textbooks. Thinkwell celebrates its 10th anniversary this fall.

Dan has an MBA from Harvard Business School, and a BA in the Plan II Honors Program from the University of Texas at Austin. Two proud (sort of) moments for Dan are his stint driving a promotional car called the "Brainmobile" across the country and his victory in the 2005 *New Yorker* Cartoon Caption Contest, beating out 13,000 other entrants.

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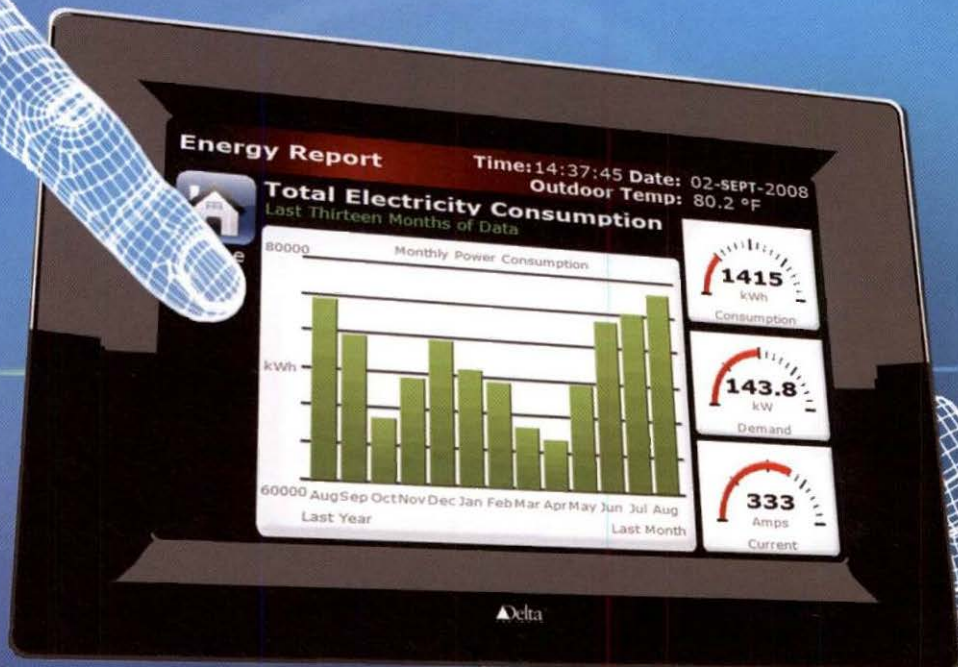
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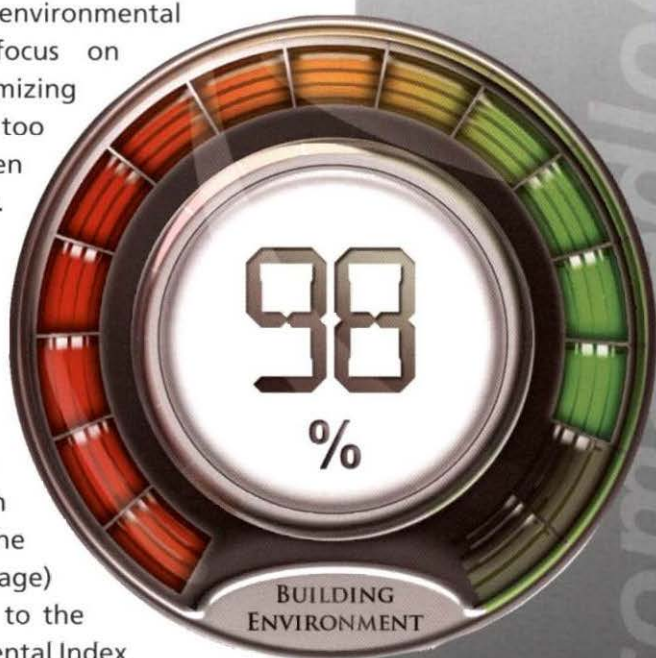
Soaring energy prices and a growing environmental consciousness have renewed the focus on sustainability, energy efficiency, and minimizing energy consumption. Facility managers know too well that sacrificing human comfort costs even more in terms of lost productivity and revenue. Comfort is influenced by temperature, relative humidity, gaseous contaminants, lighting, and other factors. So the challenge is how do we measure comfort objectively?

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Crosby Integrated School District, near Houston, Texas, is testimony to the effectiveness of the Environmental Index. In just six months, the school system reduced their energy consumption by 1.6 million KWh, saved \$131,000, and substantially improved occupant comfort. The Environmental Index made it easy to compare comfort versus energy consumption, revealing areas for improvement.

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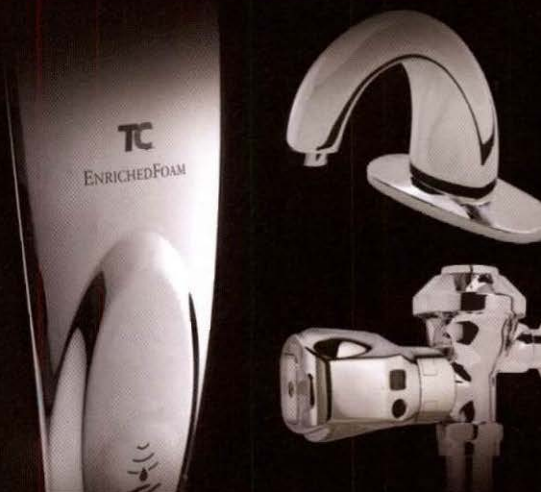
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Influence/Leadership/Communication

Standing Out From The Crowd: Marketing of Facilities Management Departments

Every facility management employee is in a position to market facility services with every customer they come into contact and in the conduct of their business daily. Customer service is vital, however, the terms "marketing" and "customer service" are not synonymous. While customer service provides opportunities to reinforce positive images of a facility management department, marketing involves first researching who your customers are, what they need and then promoting and selling services to them. This main responsibility ultimately falls on the shoulder of the facility management department leader. Join us for this informative session as we discuss how to determine your market's needs, evaluate facility management department's strengths and weaknesses, tips to develop a "true" marketing plan that serves as a road map and incorporates the importance of quality customer service.

Change is Like a Slinky

Watch where you step! Change or perish — is a current motto for leaders in all types of organizations. But how does one adapt to such fast and furious change and effectively lead the organization through such change? Join us for this high energy session where you will learn that 'A slinky can be a lot of fun, but it is also completely unpredictable.' Instead of grudgingly wading through inevitable change, participants will find themselves equipped and fired up to tackle change head on.

Navigating the Next Steps: APPA's Thought Leaders Symposium

The road is not always certain and causes us to step gingerly as we move forward. Relying on data and informed perspectives provides solid footing that is essential to your survival today. APPA's Thought Leaders Symposium was developed to promote an annual discussion and distillation of the future of higher education and its impact on the built environment. Since 2006, the symposium has convened senior officers from across the United States and Canada along with association leaders and industry consultants. We have reported on the challenges of demographic changes & accountability; the impact of technology, and changing stakeholder expectations; and the university facilities response to this changing landscape. Join us for a report on the future trends from our Thought Leaders Chair and how the current economic climate of higher education is impacting the educational facilities.

Disciplines/Accountability/Expectations

Mirror, Mirror on the Wall: Understanding Our Facilities Colleagues

To transform ordinary work environments into extraordinary ones, you need to create an environment where leaders can leverage the unique strengths thus maximizing a competitive advantage. As the Boomer generation moves into their next career phase, many

facilities departments are discovering gaps as Generations X&Y take their place. Attend a session where partnering with an eye toward succession planning is seen as one of the keys to success for the future.

Passionate Performance

Did you know that 83% of U.S. gross domestic product comes from the services/ information industries? The need for an engaged workforce couldn't be greater. Yet the challenge for leaders is revealed in the Gallup poll that shows only 26% of U.S. employees are fully engaged at any time. And the other end of the spectrum, 19% of employees are actively disengaged, meaning they intentionally act in ways that negatively impact their organizations. The annual cost nationwide to employ this actively disengaged group exceeds \$300 billion. Your people — and the performance they deliver — are the defining competitive advantage for your organization. Join us as we explore methods to engage employees' minds and hearts so they deliver value for your organization.

Doing More With Less: Take the "Lean" Approach

The lean production concept was to a large extent inspired by Kaizen — the Japanese strategy for continuous improvement. Employee empowerment and promotion focused on improving processes, imitation of high quality customer relationships, fast product development; and collaboration with suppliers are the key strategies of leading "lean" companies. At a time when you are asked to do more with less, tackle the issue and come out on top. Participate in a session where accountability and expectations are key factors to the success of your department.

Sustainability

Implementation for Change: APPA's Practical Guide to Reducing Your Campus Carbon Footprint

Over the last 18 months APPA in collaboration with Affiliated Engineers, Inc., has embarked on an effort to evaluate steps toward carbon neutrality. Released in January 2009, APPA's implementation guide has given educational facilities professionals a practical companion framework for moving forward in their unique role within this process. Participate in this highly informative session where we help facilities professionals maximize their specific contributions and share best practices on how to work in tandem with other campus stakeholders to meet your institutions' goals of carbon neutrality and reduced greenhouse gas emissions.

We did ... why didn't you?: Presidential Climate Commitment Signatories or Not

Building on the growing momentum for leadership and action on climate change, the Presidents Climate Commitment provides a framework and support for America's colleges and universities to go climate neutral. The college and university presidents and chancellors who are joining and leading the Commitment believe that exerting leadership in addressing climate change will stabilize and reduce their long-

term energy costs, attract excellent students and faculty, attract new sources of funding, and increase the support of alumni and local communities. However, there are many college and university presidents and chancellors who feel that they are making impacts on their campus that support climate change and don't see where a signature is necessary. Join us for this point/counterpoint session and hear both sides of the story.

GREEN is not a 4 Letter Word

Environmental stewardship, sustainability, and green are all terms used to describe our renewed focus on the environment and its preservation for the generations to follow. This interactive session engages the attendee in exploring how institutions, particularly small institutions, can begin and then grow environmental sustainability programs on their campuses without incurring significant costs. The presentation will include a case study of how Erskine College, a small private liberal arts college, has begun implementing a comprehensive environmental sustainability program and how such initiatives are transforming the campus community.

Total Cost of Ownership

Paying it Forward — Building Information Modeling

Building Information Modeling (BIM) is changing the way Owners, Architects and Contractors work together to design and construct facilities. Models can also be used to support the operations of a facility once the Architect and Contractor move on to the next project. This Owner, Architect, and Contractor panel will explore the positive impact BIM has on the Total Cost of Ownership from the moment a project is conceived, through its development in construction and maturation into an operating facility. Real world examples of model uses will be shared with the attendees so they gain an understanding of critical points of collaboration between all parties.

Improving Affordability of Higher Education through Buying Consortia for Energy Efficiency Improvements

Many public and private higher education institutions continue to experience flat or reduced state budget allocations, coupled with tuition and fees that continue to exceed inflation. These factors continue to make higher education more difficult to afford by a larger percentage of potential students in this country. Finding proactive and innovative approaches to reduce costs without sacrificing quality of instruction and service is truly the challenge facing facility and business officers. In November 2008, the Midwestern Higher Education Compact (MHEC) was awarded an \$800,000 grant from Lumina Foundation for Education to implement regional initiatives to improve higher education productivity for colleges and universities that face increasing costs for energy and utilities and for employee and student health care. The goal of this initiative is for institutions to realize financial savings in these two areas where costs continue to rise at a significant rate.

Spouse/Guest Tour Activities

As a spouse/guest attending the APPA 2009 event, you are a VIP. While your significant other is attending their professional development offerings, we want you to enjoy 'our home' — Vancouver.

Our Home — Come In & Enjoy!

As a coastal city and major seaport, Vancouver is located in the Lower Mainland of southwestern British Columbia, Canada. It is the largest city in British Columbia and the second largest in the Pacific Northwest region. It is bounded by the Strait of Georgia, Burrard Inlet, the Fraser River, the city of Burnaby, and the University Endowment Lands.

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Visit the North Shore

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A Day Trip to Victoria

Today with a growing regional population, a moderate climate and scenic setting, Victoria has retained a very vital but comfortable quality of life. The City is proud of its rich heritage, its First Nations totem poles, its fine homes and neighbourhoods, its historic and attractive downtown, the flowers and parks and, of course, its Inner Harbour with scenic vistas toward the famous Empress Hotel and the Parliament Buildings.

Visit us at <http://www.appa.org/training/appa2009/activities.cfm> for APPA special pricing and for additional recommendations on what to see while in Vancouver.



Registration

APPA 2009 takes place in Vancouver, British Columbia, Canada. All educational sessions, breakfasts, lunches, committee meetings, and the Hall of Resources will take place at the Vancouver & Exhibition Centre. Shuttle service will not be provided due to the close proximity of the hotels to the Centre.

Registration Fees

	By April 30, 2009	After April 30, 2009
Member	\$795	\$895
Non-Member	\$1,395	\$1,495
Single Day Pass	\$350	\$350
One Day Hall Pass	\$125	\$125
Spouse/Guest	\$175	\$175

Cancellation Policy

APPA will refund the full cost of registration for cancellations received on or before June 15, 2009. Absolutely no refunds will be issued for cancellations received after June 15. APPA is not responsible for any travel or lodging charges incurred.

Hotel and Travel

Hotel:

APPA 2009 events will take place the Vancouver Convention Centre. APPA will be using the following hotels for lodging:

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APPA's group rates for the event are \$245 (CN) for single/double plus 16% tax. Reservations can be made by calling Marriott at 1-800-207-4150.

Air Travel:

Vancouver can be reached by traveling to Vancouver International Airport (YVR). For more specific information on the Airport please visit <http://www.yvr.ca/>.

We encourage you to secure your passport. For more information or how to obtain your passport, please visit: http://travel.state.gov/passport/passport_1738.html

Ground Transportation:

Taxis charge a metered rate based on time and distance travelled, the approximate fare to downtown Vancouver is \$23-\$26 (inclusive of all taxes) under normal conditions. For additional information on taxi or shuttle service you may visit suggested listings at <http://www.yvr.ca/guide/toandfrom/taxis.asp>.

Contact Us

Registration Questions and Assistance

Contact Cotrenia Aytch, Registrar, at cotrenia@appa.org or 703-684-1446 ext. 235.

Exhibitor Questions and Assistance

Contact Maxine Mauldin, Exhibits Coordinator, at mmauldin@appa.org or 703-684-1446 ext. 245.

General APPA 2009 Questions and Assistance

Contact Derrick Johnson, Professional Development Manager, at derrick@appa.org or 703-684-1446 ext. 228.

(continued from page 32)

and then sell any excess renewable power back into the marketplace via RECs.

Given their development from a variety of state regulations, there is quite a variance among RECs in terms of quality and cost. Various regulatory and voluntary REC certification groups can provide review and certification that the RECs meet specified quality requirements. Although a REC may be certified for regulatory use for meeting RPS requirements, this certification may or may not meet carbon offset requirements. Example: a 2005 cogeneration project is eligible to sell RECs for 2008 into a state power market, but could not qualify as carbon credits for a program starting in 2007. Additionally, the REC certification may not have required the leakage test that a carbon credit faces. The PCC specifically cautions colleges and universities against relying heavily on RECs to meet their carbon neutral pledge because of these uncertainties.

STRATEGIES FOR MANAGING THE CARBON FOOTPRINT AND CARBON NEUTRALITY

We are all venturing off into the great unknown as we seek to reduce GHG from our operations. Organizations

will need to chart a course through challenges of energy efficiency, waste minimization, purchase of green power, and development of local renewable energy sources. The carbon offset will also play a significant role in making carbon neutrality a possibility. Special care must be taken to determine the quality of a carbon offset to ensure that it is recognized by the PCC or by other voluntary or regulatory programs aimed at GHG reduction.

There are many surprises out there. In many cases a project that would appear to offer carbon offsets may have no value, because contractual terms may take ownership of the "environmental attributes" away from the project owner. Due diligence, knowledge of greenhouse gas accounting rules and offset requirements, and an understanding of environmental credit markets will help the organization navigate through the difficult decisions ahead on the path to carbon neutrality. ☺

Rick Ney is senior environmental consultant and manager, Iowa operations, of Sebesta Blomberg; he can be reached at rney@sebesta.com. Judith Purman is sustainability specialist for Sebesta Blomberg, she can be reached at jpurman@sebesta.com. This is their first article for *Facilities Manager*.



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Facility professionals continuously search for projects that reduce energy consumption and operating costs so as to directly benefit their bottom line.

Many institutions nationwide have contemplated or made investments in combined heat and power (CHP) projects as a life-cycle strategy to minimize operating costs. However, recent sustainability and climate change initiatives have revealed another significant benefit of CHP — reduced greenhouse gas (GHG) emissions. We show that the treatment of CHP emissions requires special considerations in GHG emissions trading programs in order to ensure the benefit doesn't become a liability¹.

In many regions, policies for regulating GHG emissions are being drafted for near-term implementation, with an emphasis on “cap-and-trade” mechanisms. Unless thoughtfully composed, these programs may distort and corrupt the incentives for carbon emission reductions that are realized by CHP investments. In this article we demonstrate the potential economic consequences of cap-and-trade programs in a CHP environment, basing an example on the current draft of the Western Climate Initiative programs and the University of New Mexico facilities operations. This demonstration serves as an *urgent call to action* for facilities managers and administrators to participate in developing climate initiatives that recognize and facilitate the environmental benefits of combined heat and power systems.





ARBON

EMISSIONS TRADING AND COMBINED HEAT AND POWER STRATEGIES:

UNINTENDED CONSEQUENCES

**BY JOHN C. TYSSELING, PH.D.,
MARY VOSEVICH,
BENJAMIN R. BOERSMA,
AND JEFFREY A. ZUMWALT**

EFFICIENT COMBINED HEAT AND POWER (CHP) SYSTEMS

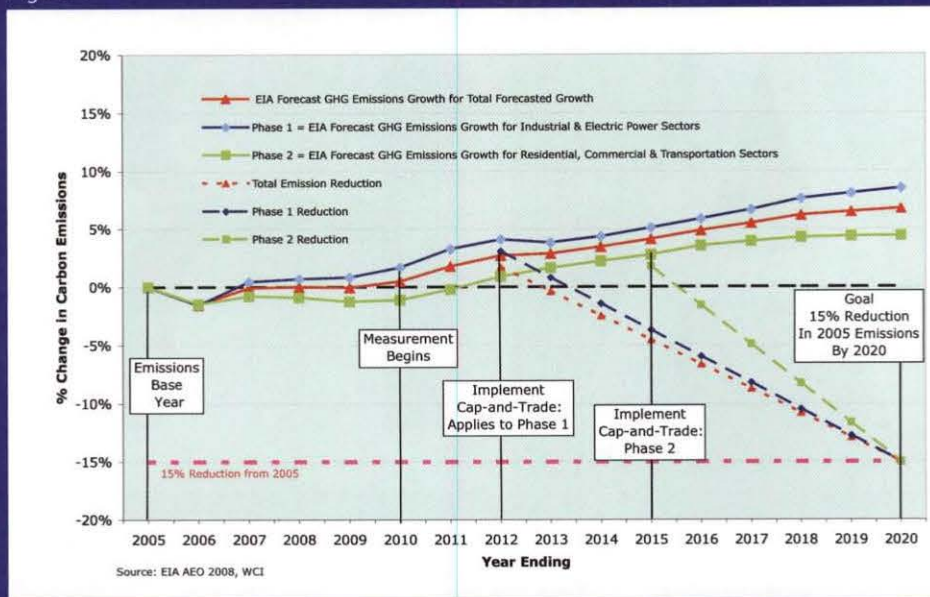
Facility managers are well aware of the profound improvements in energy efficiency offered by CHP or cogeneration, which generates electricity and utilizes waste steam for heating, cooling, or other processes. Importantly, CHP offers equally profound reductions in greenhouse gas emissions. (See also the U.S. Environmental Protection Agency's website, www.epa.gov/chp/basic/methods.html.)

Although utilizing a CHP system approach can achieve a significant reduction in total carbon emissions, the CHP facility will likely face a significant increase in *onsite* emissions it produces, as less electricity is produced at the electric utility company's facility. If the CHP facility incurs financial costs (under pending climate initiatives) for this increase in on-site emissions, the increased cost could act as a significant deterrent or barrier to the implementation or operation of CHP Systems that have proven to be highly efficient and potent sources of emissions reductions. This is the Achilles heel of a CHP emissions profile.

IMPLEMENTING CLIMATE INITIATIVES

Emission trading schemes are at the heart of regional GHG climate initiative market-based programs, specifically: California Air Resources Board (CARB) programs, the Western Climate Initiative (WCI), the Mid-Western Greenhouse Gas Reduction Accord (Accord), and the Regional Greenhouse Gas Initiative (RGGI). The comprehensive GHG emissions provisions of the (draft) WCI "cap-and-trade" program — partnered by seven western U.S. states and four Canadian provinces — serve as the foundation for the balance of this discussion. The cap-and-trade program for the WCI is slated to begin January 1, 2012, with a 2020 emissions reduction target of 15 percent from 2005 emissions levels.

Figure 1



The WCI reporting program starts with measurement of 2010 emissions, to be reported in early 2011. The aggregate regional cap for emissions allowances included in the cap-and-trade program will be the sum of the annual allowance budgets for all of the WCI Partners beginning in 2012 (a "unit" of allowances is measured in metric tons of carbon dioxide equivalent (MTCDE)). Figure 1 illustrates the WCI "trajectory" for emissions reductions, based on the nationwide trend in carbon emissions (by sector) forecasted by the U.S. Energy Information Administration.

CASE STUDY: APPLICATION OF WCI INITIATIVES TO CHP

The University of New Mexico (UNM) relies on a CHP system — commonly identified as a complex District Energy System (DES) — for delivery of its comprehensive utility services to approximately six million square feet of campus facilities. Additionally, the university currently purchases more than half of its electricity requirements from its local utility provider, and has provided "plug-in" expansion capability to double its cogeneration facilities. We present two scenarios that model UNM's facility operations using a cogeneration ("Cogen")

facility and without using cogeneration facility operations ("No Cogen").

EMISSIONS PROFILES FOR UNM'S ALTERNATIVE OPERATIONS SCENARIOS

In the No Cogen Scenario, UNM's electrical needs are purchased from the local utility, and UNM's boilers

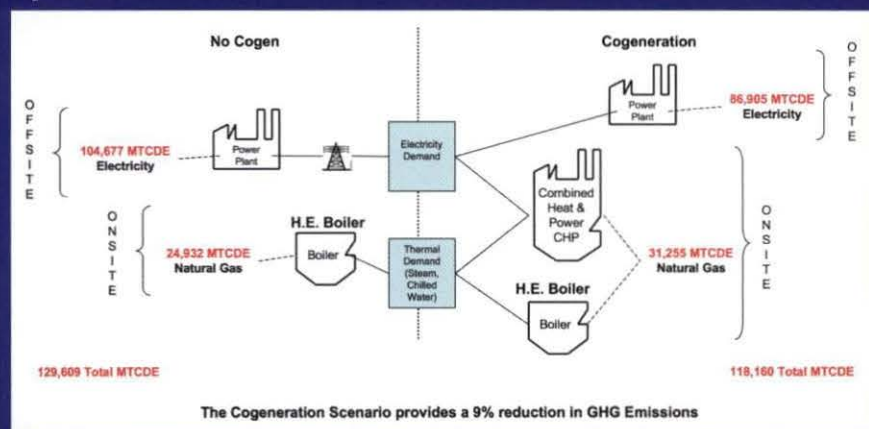
Table 1 — Greenhouse Gas Emissions — Impact of UNM Cogeneration

UNM Operating Scenario	ONSITE CARBON EMISSIONS Purchased Natural Gas			OFFSITE CARBON EMISSIONS Purchased Electricity			Total GHG Emissions (MTCDE)
	MMBTU	MTCDE / MMBTU	GHG (MTCDE)	kWh	MTCDE / kWh	GHG (MTCDE)	
No Cogen	472,197	0,0528	24,932	120,317,822	0,00087	104,677	129,609
Cogeneration	591,944	0,0528	31,255	99,890,822	0,00087	86,905	118,160
Difference	119,747	0,0528	6,323	-20,427,000	0,00087	-17,771	-11,449
Percentage Change in Emissions	Onsite Emissions		25.4%	Offsite Emissions		-17.0%	-8.8%

are utilized to meet steam requirements. In the Cogen Scenario, a significant portion of the steam requirements and 17 percent of the purchased electricity are provided by cogeneration, with the balance of energy service requirements provided from the same facilities used in the No Cogen case. Table 1 states the energy use and GHG emissions from the scenarios.

The Cogen case produces 8.8 percent less total GHG emissions than the No Cogen. This net reduction is primarily due to the COGEN SCENARIO's decreased electricity purchases (by 20.4 million kWh), substituting increased gas use and (corresponding) cogeneration output. While the COGEN SCENARIO reduces total GHG emissions by nearly 9 percent, it also results in increases in onsite emissions by more than 25 percent. Figure 2 illustrates this — if UNM decides to operate under the COGEN SCENARIO, it produces 6,323 MTCDE more emissions than under the No COGEN SCENARIO, but utility company emissions are reduced by 17,771 MTCDE. This is the fundamental issue requiring recognition: shifting emissions from offsite to onsite locations may also *shift the compliance obligations and economic burdens* from one party to another under cap-and-trade programs.

Figure 2



EMISSIONS COSTS AND EMISSION REDUCTIONS INCENTIVES IN A CHP ENVIRONMENT

We conclude our analysis by demonstrating how specific *compliance obligations* and *emission allowance allocations* under WCI can dramatically impact the economic *compliance costs* associated with CHP investments under the WCI program.²

Summary of Potential Emissions Compliance Costs Under WCI

Fast-forwarding to 2012, we assume the WCI program is implemented consistent with its current specification. We compare the *onsite emissions compliance costs* under a No COGEN SCENARIO to two different specifications of UNM's hypothetical

compliance obligation through 2020 relating to its cogen facilities under the WCI program (draft). We also assume an allowance cost of \$10 per MTCDE in 2012, increasing to \$25 per MTCDE in 2020.

The emission allowances allocated to UNM under the WCI program decrease annually from 2012 through 2020 — starting in 2012 with a 1 percent reduction in allowed emissions that is further reduced by the additional requirement that 10 percent of its allowed emissions be dedicated to “reallocation” through the WCI auction program. Assuming that UNM energy systems have to satisfy constant annual loads, UNM must purchase emission allowances equal to 10.9 percent of its 2012 actual emissions. By 2020 UNM must reduce its carbon emissions by 15 percent (i.e., its pre-auction “allocated allowances”), and contribute 25 percent of its allocated allowances to the auction. Thus, if UNM continues to have the same energy requirements in 2020, it will be required to *purchase emissions allowances* equal to 36.25 percent of its actual emissions in 2020, based on an assumed straight-line increase from 10 to 25 percent for allowed emissions allocated in the auction.

Figure 3 (on next page) demonstrates this compliance obligation for the No COGEN SCENARIO. The dashed lines reflect the 2020 WCI combined requirements of a 15 percent emission reduction and a 25 percent allowed emission allowance contribution to the WCI auction. Amounts under the dashed lines represent *allocated allowances* that the WCI program would provide to emitters without cost. The difference between onsite (and offsite) total emissions in 2020 and the allocated allowances in 2020, defines the amount of emission allowances that must be purchased. Implementing WCI programs from 2012 through 2020 under SCENARIO ONE: No COGEN, UNM would face total (undiscounted) compliance costs of approximately \$1.0 million (for onsite emissions), with costs increasing annually from approximately \$27,000 in 2012 to approximately \$226,000 in 2020.

The second scenario, SCENARIO TWO: CHP ADDITION, represents the addition of a CHP facility between 2005 and 2012. This scenario raises a number of issues relating to compliance obligations and costs. Importantly, cogeneration has the additional benefit of lower operating costs — estimated to be nearly \$600,000 per year for UNM at currently anticipated natural gas and electricity prices. In SCENARIO TWO, the WCI program again sets UNM's 2020 target based on its actual 2005 emissions, but UNM begins with a now increased 2012 onsite emission profile. Due to UNM's addition of CHP, off-

Figure 3

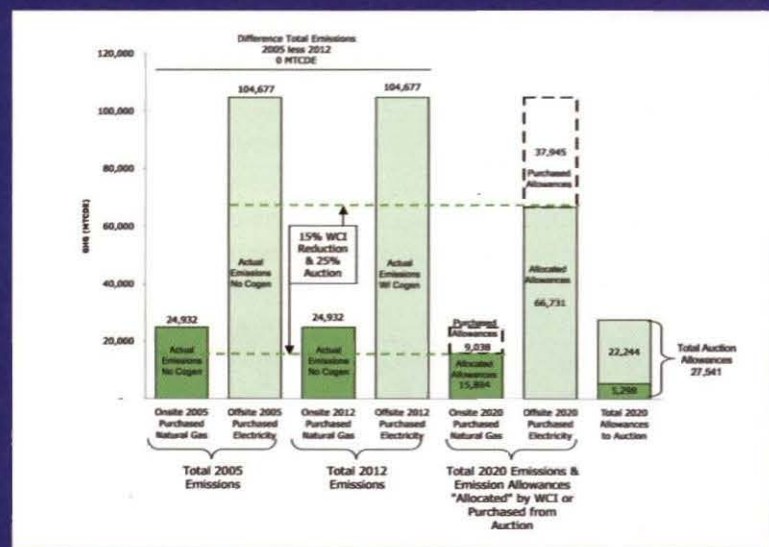


Figure 4

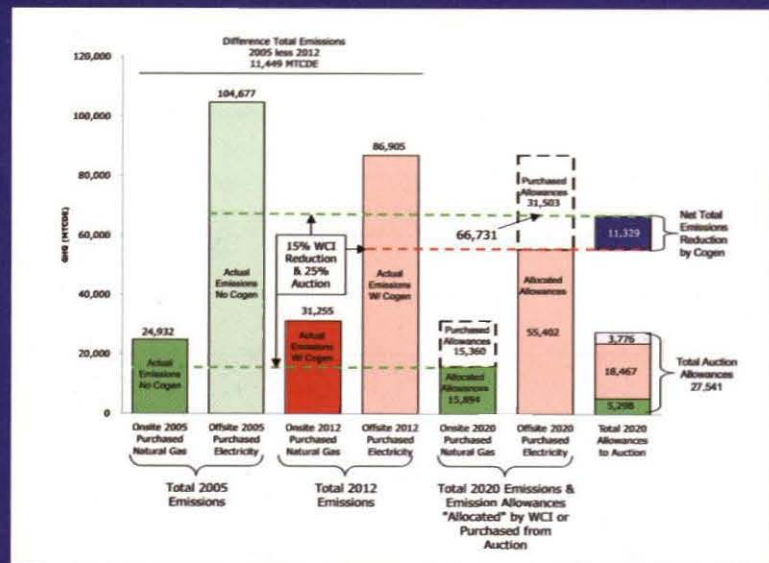
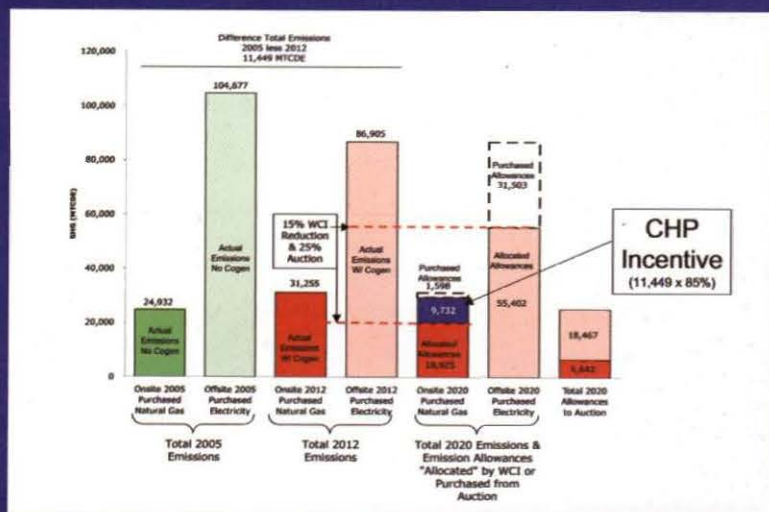


Figure 5



site 2012 emissions are now lower.

In Figure 4, SCENARIO TWO: CHP ADDITION, the dashed lines again represent *allocated allowances* that the proposed WCI program provides to emitters without cost, and for emissions above the lines emitters must purchase allowances (or physically eliminate). The graph depicts UNM's higher onsite emissions from the addition of CHP after 2005, as well as the higher level of required purchased emission allowances in 2020. Most important, the available allowances in the WCI auction are lower, but there is no recognition of the net social benefit from UNM's reducing total emissions by implementing cogeneration.

In SCENARIO Two, UNM's compliance costs are substantially increased over the previous scenario as a result of its higher onsite emissions (relating to cogen operations). In fact, UNM's onsite allocated allowances would actually be 32.2 percent lower than its actual 2012 emissions. Total onsite compliance costs (2012 through 2020) soar to more than \$2.0 million, with 2012 compliance costs of more than \$90,000 increasing to more than \$384,000 in 2020. This scenario considers *neither* the social benefit of the UNM cogeneration investment (reducing actual emissions by 11,449 MTCDE when compared to 2005 emissions), nor the "windfall" of offsite emission reductions (17,771 MTCDE) – except to the extent it is implicitly "allocated" to the electric utility.

The final scenario, SCENARIO THREE: CHP INCENTIVE, an "incentive" is provided to UNM by crediting a net social benefit as an addition to its allocated allowances. Figure 5, SCENARIO THREE: CHP INCENTIVE, implements this policy to encourage CHP investment. The incentive (9,732 MTCDE) is assessed by looking at the actual change in emissions in 2012 (11,449 MTCDE) and taking 85 percent of it, to account for the WCI goal of a 15 percent reduction by 2020. The "incentive" allocation of emission allowances increases UNM's allowances by allocating to UNM the net total reduction in emissions associated with its investment in cogeneration technology.

The incentive, when combined with the allocated allowances otherwise granted to UNM by the WCI program, exceeds UNM's actual total emissions for most of the 2012 through 2020 period. It is only at the end of that period that UNM will be forced to purchase allowances to match its total emission levels. In fact, for a portion of the compliance period (2012–2018) UNM will have surplus allowances allocated to it which it can sell in the WCI auction.

Thus, UNM has no additional compliance costs under the WCI program. Indeed, in this specific example it obtains a slight benefit in the form of estimated

income (of \$349,400) from selling allowances through the 2012 through 2020 period (nearly \$1.4 million in savings and benefit over No Cogen Scenario, ignoring the additional benefit of lower operating costs).

CONCLUSIONS

CHP presents opportunities to both reduce overall emissions in a region and to lower overall operating costs; however, the Achilles heel of CHP is that onsite GHG emissions increase due to burning additional fuel. Greenhouse gas emissions regulations must be written in a manner that adequately addresses the CHP total emission reduction issue. In particular, although WCI has identified CHP as an issue that needs to be addressed,³ it has proposed no structure or provisions to provide an incentive for CHP implementation. Without special consideration the GHG regulations might encourage institutions like UNM *not to invest* in energy efficient technology like CHP or to choose *not to operate* existing CHP facilities.

In our case study, under the WCI program UNM must reduce overall emissions by 15 percent or purchase an equivalent amount of emission allowances. By implementing CHP, overall actual emissions are already reduced almost 9 percent. Clearly, CHP is a useful tool in achieving some of the reduction that will be required, even given that onsite emissions must increase slightly to achieve overall reductions in GHG emissions.

The UNM case study demonstrates that the current structure of the WCI could impose a significant financial burden on CHP projects if improperly designed. A strong incentive is needed to provide the institutions implementing CHP with the assurance that a decision to implement CHP is indeed the environmentally *and* economically correct one. This incentive should encourage onsite implementation of CHP by correctly identifying the party responsible for the reduction in the region's overall GHG emissions and ensuring allowance credit for their actions is not diverted to other parties. ☎

NOTES

1. Calculated emissions information in this article came from the Lobo Energy Model (LEM), a model jointly developed by E3c, Lobo Energy, Inc. (a UNMowned nonprofit corporation),

and UNM's Physical Plant Department to analyze possible strategies for both required capital investment and efficient operations of UNM's DES. The LEM calculates the purchased quantities of natural gas and electricity for defined operational scenarios and provides useful information related to GHG emission issues for UNM's facilities' operations.

2. An interested reader can find this analysis more fully developed in a series of related articles at http://e3c.com/~Climate_Initiatives_and_CHP/.
3. WCI, "Essential Requirements of Mandatory Reporting for the Western Climate Initiative, Second Draft," September 30, 2008, p. 12.

John Tysseling is president, and Benjamin Boersma is a senior modeler/database analyst, with E3c, Inc. (d/b/a Energy, Economic and Environmental Consultants www.e3c.com) in Albuquerque, NM. Mary Vosevich is director, and Jeffrey Zumwalt is associate director for utilities, of the University of New Mexico Physical Plant Department, Albuquerque, NM. All opinions expressed are those of the authors, and not necessarily those of the University of New Mexico. This is the first article in *Facilities Manager* for Tysseling, Boersma, and Zumwalt.



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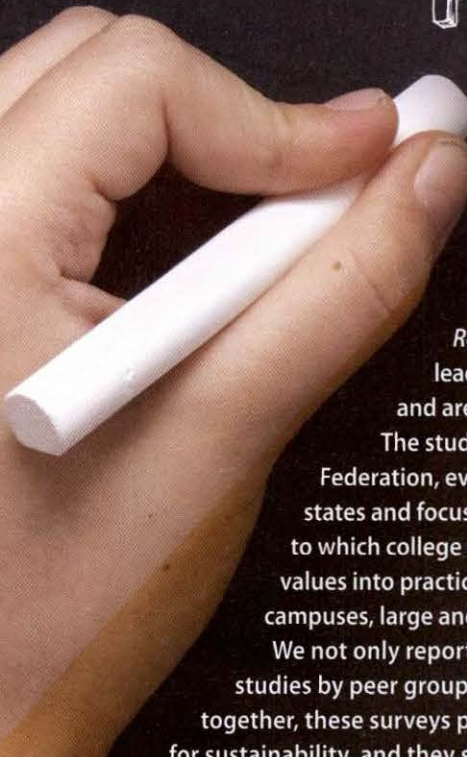
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NATIONAL TRENDS IN

SUSTAINABLE PERFORM

Lessons for Facilities Leaders

By Kristy M. Jones and L. Julian Keniry



For most facilities leaders, sustainability is nothing new. We have observed repeatedly over several decades that administrative and facilities staff have often taken the lead in initiating many of the most effective and visible efforts on campuses to dramatically curb energy use and waste and contain costs, even during times of rapid growth. It was not particularly a surprise to us, therefore, when the findings of our new study, *Campus Environment 2008: A National Report Card on Sustainability in Higher Education*, released last August, revealed campus operations as leading the effort to green America's colleges and universities. It also identifies a few missed opportunities and areas where facilities and other leaders on campuses are planning to do much more.

The study, conducted by Princeton Survey Research Associates International for the National Wildlife Federation, evaluates sustainability performance at 1,068 two- and four-year colleges and universities in 50 states and focuses on three areas: curriculum, management, and operations. Its purpose is to explore the extent to which college and university leaders value environmental performance and sustainability and are putting these values into practice. It also aims to glimpse beyond the anecdotal evidence into nationwide trends across all types of campuses, large and small, public and private, in all regions of the country.

We not only report on current activity and performance, but also compare these trends with our 2001 study. Other studies by peer groups, looking in different ways at select colleges and universities, have emerged since 2001. Taken together, these surveys provide varied lenses through which to view the vast and complex subject of campus leadership for sustainability, and they signal the growing interest in this topic.

BILITY ANCE



GREENER LEADERSHIP

The findings highlight areas where more emphasis is needed and where considerable progress is underway. In some cases, our findings challenge the claims of recently published articles about campus greening that suggest promising new trends based on a few anecdotal examples. In other cases, our findings corroborate such stories. Overall, in 2008, we found greener leadership of colleges and universities.

A welcome discovery, for example, is that university leaders value environmental, social, and economic sustainability considerably more than in 2001 and are putting structures in place to broaden and sustain engagement campus-wide. Indicators of this commitment include increased goal-setting for improving performance, more staffing for sustainability programs, and a rise in orientation programs for students, faculty, and staff on the "green" aims and practices of their college or university.

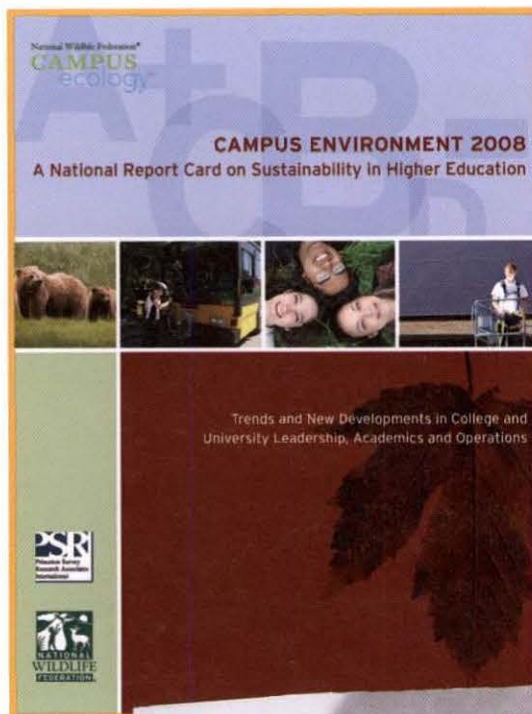
Since 2001, schools have stepped up efforts to hire personnel to focus on campus sustainability. More than half (57 percent) of the campuses surveyed, for example, have hired a recycling coordinator or manager, almost half (45 percent) have an energy conservation coordinator or manager, and about half (51 percent) have hired a staff person or administrator who leads sustainability issues. Colleges and universities are also committed to putting senior level management positions in place that are responsible for environmental and sustainability performance (e.g., 36 percent report having a director-level position focused on sustainability, and 23 percent report having a vice president or assistant vice president position).

FACULTY AND STUDENTS LAGGING

Campus management and facilities leaders, the findings suggest, are leaping ahead of their faculty peers when it comes to fostering sustainability on campus—even more so than when this survey was first conducted in 2001. Although facilities staff have often done their part to set a good example in their operations (as well as serving as guest lecturers in the classroom), teaching capstone courses, or serving as project advisors to students, today's student is just as unlikely as in 2001 to graduate with exposure to basic ecological principles. Much less with an understanding of how the human-designed economy can work

in harmony with natural systems. This is because most faculty have not formally incorporated sustainability into the classroom.

At only a minority of schools have 50 percent or more of the students taken a course on the basic functions of the earth's natural systems, and even fewer have taken courses on the connection between human activity and environmental sustainability. Areas such as business, engineering, health sciences, and teacher education still lag far behind the natural and physical sciences in offering environmental or sustainability courses within their disciplines. Relatively small percentages of campuses offer interdisciplinary degree opportunities in environmental and sustainability studies. Moreover, considerably fewer campuses today require all students to take courses on environmental or sustainability topics. In 2008, for example, only 4 percent report having a campus-wide requirement to take courses on environmental or sustainability topics, compared with 8 percent in 2001.



Since 2001, schools have stepped up efforts to hire personnel to focus on campus sustainability.

ONE DAY AT A TIME

It is in the day-to-day operations where the effort to green the campus shines most brightly. Facilities leaders, together with students and faculty, have been instrumental in driving programs to conserve energy and water, increase the amount of clean energy used to power the campus and reduce waste. Almost all campuses, for example, are working to improve the efficiency of heating, ventilation, and air conditioning (HVAC) systems, which are responsible for the largest share of direct emissions of carbon dioxide (CO₂) into the atmosphere. In order of popularity, lighting upgrades once again top the list of energy and utilities efficiency programs, with 81 percent of schools reporting having implemented these types of projects on campus. This was followed by water improvements with 76 percent of schools, and HVAC upgrades at 73 percent.

Since 2001, a new movement to reduce emissions of CO₂ and shift to cleaner sources of energy has taken hold in a variety of ways. One-third (35 percent) of campuses report that they regularly set and review goals for reducing emissions of CO₂ and other greenhouse gases, and one-quarter of campuses (12 percent campus-wide and 15 percent in some campus units) have implemented formal plans for reducing greenhouse gas emissions; almost half report that they have plans to do more. These numbers are a bit higher than the number of campuses (613 as of this writing) that have formally adopted the American College & University Presidents Climate Commitment (ACUPCC), suggesting that many of the campuses that are working to reduce greenhouse gas emissions have yet to formally sign this important commitment.

A SHIFT

One of the most important steps campus leaders can take in reducing greenhouse gas emissions and other pollution is to shift to cleaner forms of energy. One-third (32 percent) of colleges and universities use off-campus renewable energy sources to meet some of their electricity, heating, and cooling needs, and more than 36 percent of schools say they have plans to generate more renewable energy on campus. Fossil fuels are the most common energy source used for on-campus generation, but a noteworthy number of schools are utilizing solar, wind, biomass, and other forms of clean energy to meet their energy demands.

In total, 12 percent of schools report using at least some form of clean energy to some extent for on-campus generation. Of the clean energy sources, 12 percent of schools report that at least some of the electricity generated on campus comes from solar electricity (photovoltaic), (5 percent from wind energy and 2 percent from biomass energy) and a total of 5 percent of schools report at least some of the electricity generated on campus comes from other clean sources, such as landfill gas or fuel cells. For on-campus heating

and cooling, 14 percent of schools report using at least some energy from on-site ground-source (geothermal) heat pumps, direct-heat geothermal, solar, biomass, landfill gas, aquifer, or lake-source thermal systems.

Overall, campus use of clean energy sources (on- and off-campus) has increased since 2001; 6 percent report that their total electricity demand is met by off-campus renewable energy sources, compared with 1 percent in 2001. More than one-third of schools say they have plans to do more to meet their cam-

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pus's electricity, heating, and cooling demand; this represents a nearly four-fold increase since 2001 (10 percent).

HEALTHY HABITATS

As a wildlife conservation organization, National Wildlife Federation is committed to protecting and restoring forests, wetlands, and other types of habitats on campus and beyond, and we are pleased to see this same commitment from colleges and universities. Healthy habitats play a key role in confronting global warming, while providing food, shelter, clean air, and water for people and wildlife. A sizable number of campuses are working actively to ensure healthy habitats and wildlife-friendly landscape management. A majority of schools maintain native landscaping and Integrated Pest Management (IPM) programs on campus – 34 percent of schools report landscaping using native plants or low-maintenance vegetation compared with 21 percent in 2001, while a solid minority of schools have implemented programs to provide food and shelter to attract wildlife, restore natural habitats on campus, and identify and remove exotic species.

A sizable number of campuses are working actively to ensure healthy habitats and wildlife-friendly landscape management.

A small minority of colleges and universities have green-roof building programs in place, while a solid majority have also set aside at least part of their campus for natural areas such as a forest, wetland, nonagricultural fields, or prairie. Compared with 2001, there has been more than a four-fold increase in schools reporting plans to do more in landscaping with native species, IPM, and developing programs to provide food.

MORE OPPORTUNITIES

Facilities and other operations staff do have a ways to go, however, in fully seizing the potential to reduce waste and curb costs. One of the missed opportunities to curb waste and costs is to monitor energy consumption on a building-by-building basis through the use of utility sub-meters—only 29 percent report

monitoring energy use in more than 50 percent of the buildings on campus.

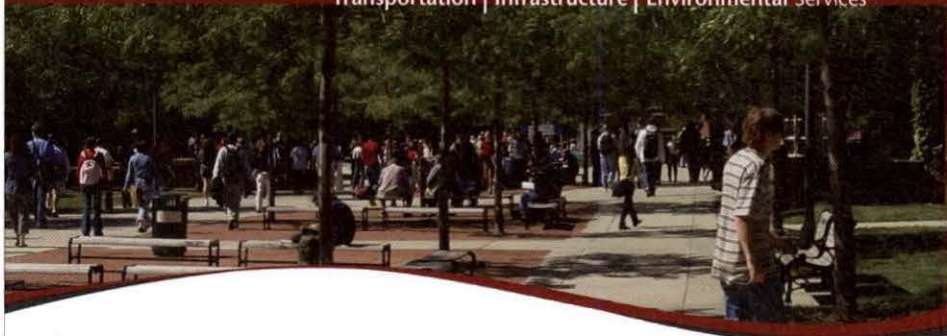
Investing in generating clean, renewable energy on-site is another largely missed opportunity to curb costs long-term. Fewer than one-fifth of schools report using either on-campus clean sources for heating and cooling (14 percent of schools) or on-campus cogenerated heat and electricity (9 percent of schools), and the percentage generating clean electricity on-site (as noted above) is even lower.

Campus leaders generally think of recycling and composting as one of the first and most basic sustainability projects to launch, and as one of the areas in which campuses most excel, but the reality is a little different. While campuses continue to support and implement a variety of waste reduction and recycling programs, our study found that roughly 70 percent of waste generated ends up in landfills or incinerators. Schools show a high percentage of recycling paper, aluminum, plastic, and electronics (50 to 70 percent of the schools surveyed), but there is room for improvement in diverting waste such as



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construction materials and food scraps from the landfill. Pacific University in Oregon, a campus we profiled in the report because of its leadership in this area, recycles more than 80 percent of total municipal solid waste, including organic wastes (pre-consumer food scraps from dining services and grass clippings are composted at the campus B-Street Farm).

As was the case in 2001, transportation remains one of the largely overlooked opportunity areas that often falls within the jurisdiction of administration and facilities. Little progress has been made to date in reducing the congestion, pollution, and other environmental impacts associated with staff and student commuting. The majority of faculty and staff and a large minority of students still drive alone to campus, with only 10 percent reporting in both 2001 and 2008 that they offer incentives to share rides.

MODEL CAMPUSES

For each case in which national collective campus performance levels are low, there are campuses with outstanding examples of practices in place that can serve as a model for others. Based on campus leaders' self-reporting, we include a chart in the report listing exemplary projects in place at hundreds of responding schools. We also include 14 short profiles on schools with particularly strong programs in place in areas such as greener transportation, generating renewable energy on site, and integrating sustainability into the curriculum.

Taken together, the findings of the current survey are quite encouraging. While some areas are in need of significant improvement, there is a sense of real progress across the board. Endowed with excellent research facilities, libraries, inspirational educators leading a broad array of disciplines, energized students and experienced staff, colleges and universities enjoy a unique mix of resources that, when harnessed with vision and persistence, can help lead society toward a more sustainable future. *Campus Environment 2008* makes it clear that facilities staff leadership has been and will continue to be crucial in harnessing this potential.

To view the full report, go to www.nwf.org/campusreportcard. 

Kristy Jones is manager, campus climate education & action, for the National Wildlife Federation's Campus Ecology program; she can be reached at jonesk@nwf.org. Julian Keniry is senior director, campus and community leadership and a cofounder of the Campus Ecology program; she can be reached at keniry@nwf.org. The authors are based in Reston, VA, and this is their first article for *Facilities Manager*.



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LEDS



DOE PROGRAMS

Add Credibility to a Developing TECHNOLOGY

By Susan Conbere

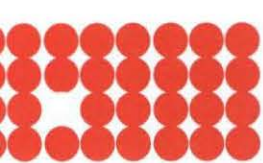
LED technology (light-emitting diode) is moving fast, and with justification, some facility managers have viewed it with a wary eye.

"We've tried about half a dozen LED products and we haven't been overly impressed," says Marlowe Leafy, assistant director for electrical systems at the University of Maryland, College Park. "The lamp will last [as long as advertised], but the driver doesn't. I'm also not convinced yet that LED technology has settled down. My big concern is maintainability. Will you be able to get parts down the road once you put those products in, since technology is changing so quickly? We're standing back and watching to see how the technology develops."

To date, Leafy's concerns have been quite valid: some LEDs on the market do not perform as promised, and the technology is changing rapidly. But new developments from the U.S. Department of Energy (DOE) now make it easier for facility managers to find LEDs that meet manufacturers' claims for light quality, life expectancy, and efficiency.

DOE has invested significant effort in supporting LEDs, which, due to their much greater durability and potential for efficiency, DOE calls a revolution in lighting. In December 2008, DOE released the first ENERGY STAR criteria for LED fixtures. DOE also announced the creation of Solid State Lighting Quality Advocates, a new program designed to help purchasers find a wider range of high-quality LEDs.





LEDs brighten this hallway beautifully.

PHOTO COURTESY OF LIGHTOLIER, A DIVISION OF PHILIPS.

ENERGY STAR AND QUALITY ADVOCATES

ENERGY STAR began qualifying seven types of residential LED products:

1. Under-cabinet kitchen lights
2. Shelf-mounted display and task lights
3. Portable desk lamps
4. Recessed down lights
5. Outdoor wall-mounted porch lights
6. Outdoor step lights
7. Outdoor pathway lights



ENERGY STAR qualified LEDs are not only efficient, but exceptionally durable, with residential products lasting 25 times longer than incandescents and more than twice as long as compact fluorescents (CFLs). If you like the idea of never changing a bulb, LED lighting fixtures have great appeal: commercial-grade products must last 35,000 hours or 35 times longer than incandescents to earn the label. What's different here is that you aren't installing a bulb, but a fixture, which requires no replace-

ment until the end of its useful life. The fixtures last over ten years,¹ use 75 percent less energy than incandescent bulbs to produce the same amount of light, and, unlike many CFLs, are compatible with dimmers and daylight sensors.² Residential LED fixtures that have earned the ENERGY STAR are also highly durable so they won't break like bulbs, and they're suitable for renovations and new construction. They are also guaranteed to provide excellent light quality that remains constant over the rated lifetime without flickering, dimming, or shifting color.

On February 1, 2009, ENERGY STAR added the following types of products to the original list of seven:

More Bright Ideas

To get energy use as low as possible, Leafy recommends that facility managers focus on hallway lighting first, where lights are often left on 24 hours for security. "You'll get bigger savings there than in offices, where lighting is on typically 9 hours a day." Leafy is using 2 x 2 linear fluorescent fixtures with 2 T-5s, placed 24 feet on center (max), and dropping light levels down to IESNA standards.

"We're running anywhere from one-quarter to a third of a watt per square foot and we're putting in lighting that gives us at least 6 foot candles. One-quarter to one-third of a watt—there are few buildings that are able to get that right now."

That one-quarter to one-third of a watt is achieved during the middle of the day when hallways are at full brightness. Leafy has also installed step dimming ballasts in those fixtures, which give either 50 percent or 100 percent light output. Using digital lighting relays through the campus' central monitoring system, the university turns the lighting down to 50 percent after hours. "We're squeezing out as much energy as we can."

Residential Applications

1. Surface and pendant-mounted downlights
2. Ceiling-mounted luminaires with diffusers
3. Cove lighting
4. Surface-mounted luminaires with directional heads
5. Outdoor pole/arm-mounted decorative luminaires

Commercial Applications

6. Surface and pendant-mounted downlights
7. Wall-wash luminaires
8. Bollards

DOE is waiting for LED technology to mature before qualifying additional products. In the meantime, quite a few LEDs are on the market that come with wildly exaggerated claims, and then flicker, dim, or shift color after less than a year of use. To prevent these poor performers from souring the market, DOE has introduced the Lighting Facts™ label to help purchasers find products that perform as promised. Luminaire manufacturers who take the SSL Quality Advocates pledge agree to accurately report on product performance in five areas: lumen output, efficacy, wattage, correlated color temperature and color rendering index. Purchasers can find a list of manufacturers who have taken this pledge and a list of products at www.lighting-facts.com. DOE is hoping that utilities and other efficiency advocates will use the Lighting Facts label to select products for their rebate programs. Facility managers can also use the Lighting Facts™ label as a basis for their own purchasing criteria.

ECONOMICS

LEDs save money on electricity and maintenance in the long run, but they often cost a good deal more than conventional fixtures. Leafly has tested one screw-in LED light source that cost \$80. "A big selling point is that you screw it in and never have to replace it," he says, "but you could buy a heck of a lot of compact fluorescents for \$80." As the university's criterion is a three- to four-year payback on all lighting upgrades, LEDs don't yet make the grade.

DOE expects demand to increase and prices to decrease with the new ENERGY STAR criteria, based on its experience with other ENERGY STAR products. Quality Advocates should also help purchasers feel more comfortable with LEDs and boost demand.

One way to lower the price of LED lighting is bulk purchasing. *QuantityQuotes.net* is a DOE-sponsored website that helps large buyers find suppliers of ENERGY STAR qualified



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LED APPLICATIONS

For colleges and universities, one of the best applications for LEDs is lighting that's hard to reach. "LEDs are great for those areas where you've got to use scaffolding or a crane to get to a light, like atriums," says Leafy.

There are tremendous savings to be had in outdoor lighting as well, where the greater durability of LEDs is an advantage. Here, purchasers can look for ENERGY STAR qualified wall-

mounted porch lights, step lights, and pathway lights.

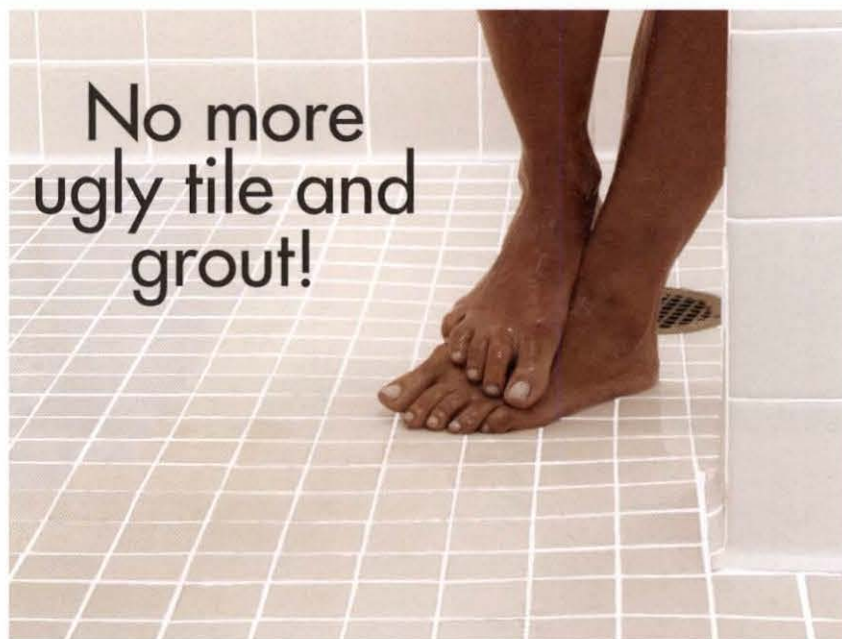
"We've got our hands full doing interior lighting retrofits now but this may work in our favor," says Leafy. "Once we can get to the outdoor lighting, maybe the technology and prices will have settled down."

Leafy, and his educational facilities colleagues will be watching. 

NOTES

1. Based on an average daily use of 12 hours per day, 5 days a week for commercial-grade lamps. Life expectancy for commercial-grade lamp is 4 years if lamps are left on 24 hours a day.
2. Check with the manufacturer for a list of approved controls for each fixture.

Susan Conbere, who can be reached at sconbere@drintl.com, writes about better building practices on behalf of ENERGY STAR, a program administered by the U.S. Department of Energy and the U.S. Environmental Protection Agency. Learn more at www.energystar.gov. This is her first article for *Facilities Manager*.



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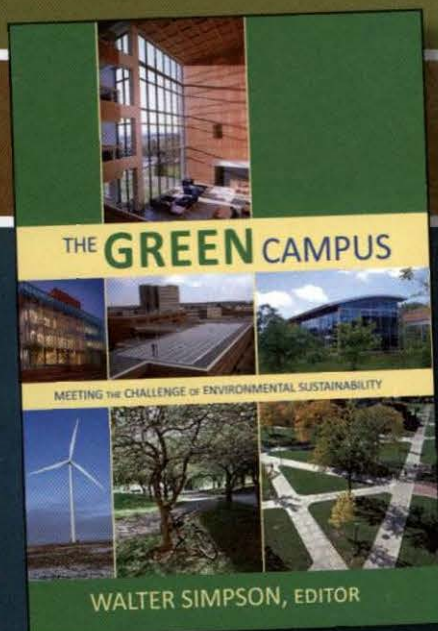


The Green Campus:

Meeting the Challenge of Environmental Sustainability

Edited by Walter Simpson

Published by APPA, *providing leadership in educational facilities*



The Green Campus anthology explores the meaning of genuine environmental sustainability—in global and local terms—while profiling excellent campus environmental programs. The book offers guidance and inspiration to campus leaders and advocates who promote sustainability within institutions of higher education, and addresses these fundamental questions:

- What does it mean to be a green campus?
- Is it possible for educational institutions to effectively reduce their sizable environmental footprints?
- How can individuals make a difference and successfully advocate more environmentally sustainable campus operations?
- Is the education community poised to create solutions to our most vexing environmental problems?



This comprehensive resource is a vital tool that administrators, faculty, staff, students, and concerned citizens can use to help the education community take a leadership role in environmental stewardship.

Contributors include:

David Orr
Tony Cortese
Jim Hansen
Judy Walton
Alex Wilson
Brian Kermath
Michael Philips & Andrea Putman
Will Toor
Karyn Kaplan
Dean Koyanagi
Jack Byrne & Nan Jenks-Jay
and many more!

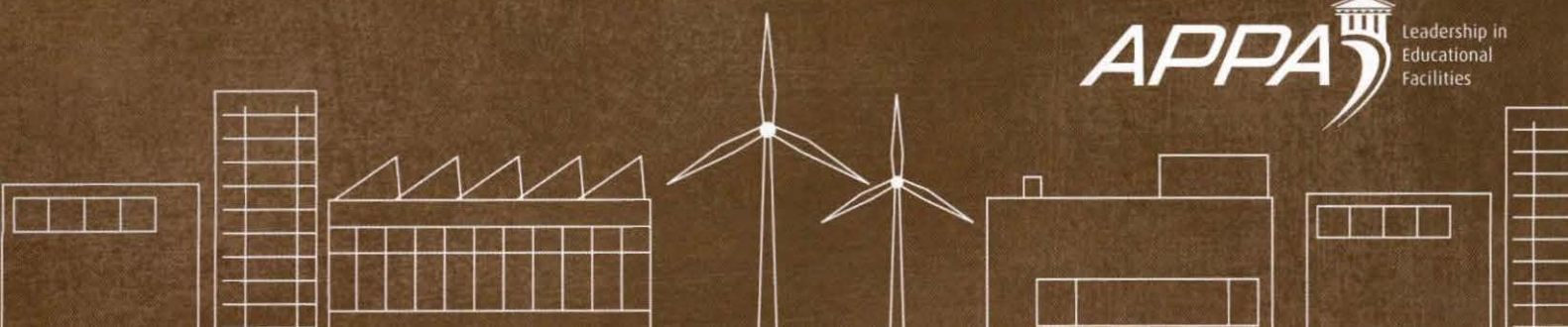
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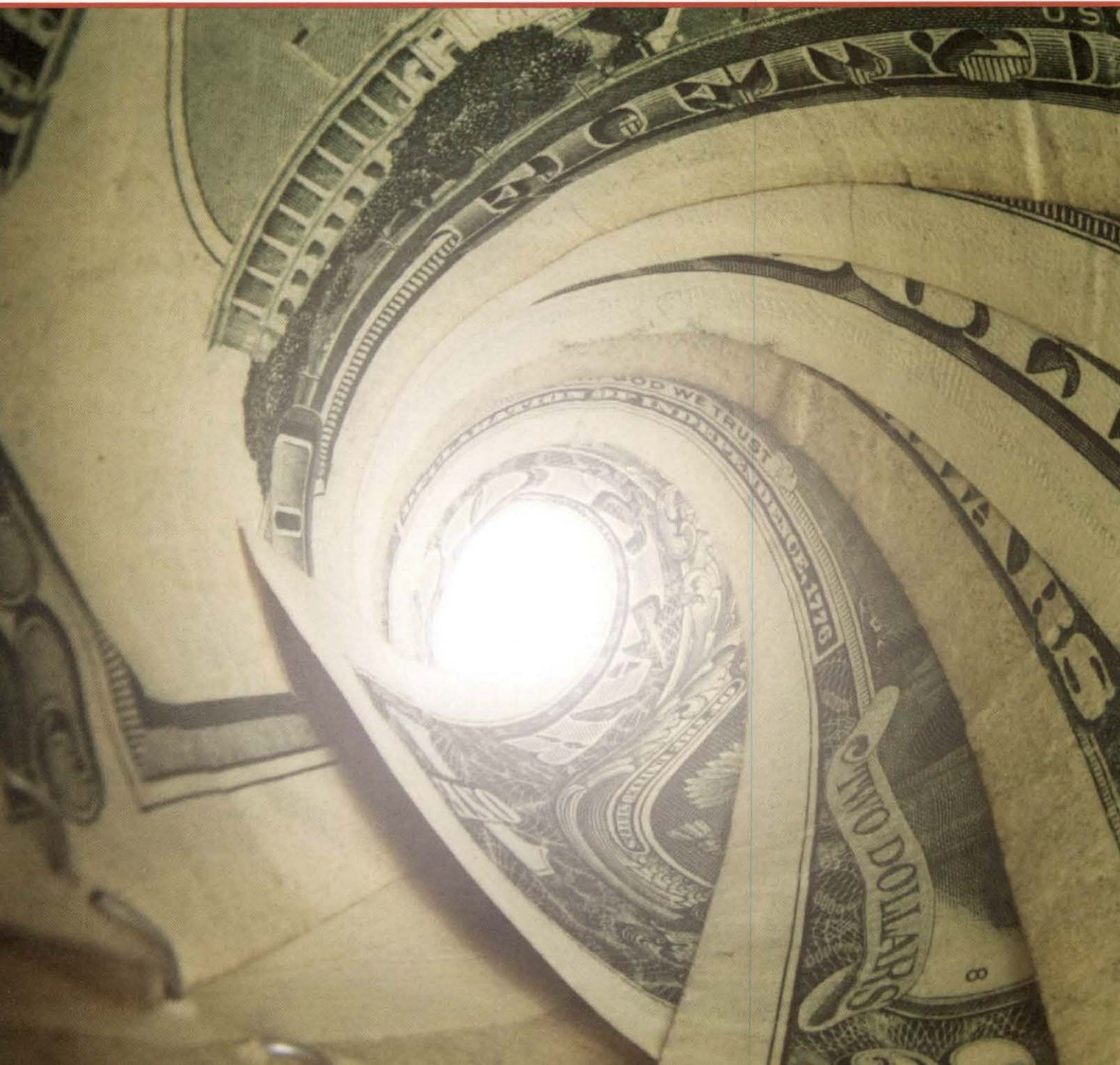
ISBN: 1-890956-46-5

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The background of the page features a close-up, slightly angled view of several US dollar bills. The bills are layered, with the top bill being a \$100 bill, showing the words 'ONE HUNDRED' and 'DOLLARS'. Below it, a \$20 bill is visible, showing the word 'TWENTY'. The bills are in various shades of green and yellow, with intricate patterns and textures visible. The lighting is soft, creating a sense of depth and highlighting the details of the currency.

Viability of Higher Education Buying Consortia

By Larry A. Isaak, Robert J. Trembath,
and James Sebesta

Many public and private higher education institutions continue to experience flat or reduced state budget allocations, coupled with tuition and fees that continue to exceed inflation. These factors continue to make higher education more difficult to afford by a larger percentage of potential students in this country. In addition, the current economic situation seems to be worsening. The nation faces probable future reductions in state allocations, declining values in endowments, and an ever increasing federal deficit. Finding proactive and innovative approaches to reduce costs without sacrificing quality of instruction and service is truly the challenge facing facility and business officers.

In November 2008, the Midwestern Higher Education Compact (MHEC) was awarded an \$800,000 grant from Lumina Foundation for Education to implement regional initiatives to improve higher education productivity for colleges and universities that face increasing costs for energy and utilities and for employee and student healthcare. The goal of this initiative is for institutions to realize financial savings in these two areas where costs continue to rise at a significant rate. Founded in 1991, MHEC has been incredibly successful in other areas of cost savings through collaboration among its member states and institutions.

To assure success of the program, MHEC is collaborating with APPA and the National Association of College and University Business Officers (NACUBO) to integrate with existing systems, data, and networks. The outcome of this collaboration will allow for improved results and a more effective dissemination of results across institutions outside the MHEC region.

PROJECT OVERVIEW

The project's overarching goal is to provide opportunities for colleges and universities to realize financial savings in two areas where costs are rising at a significant rate: 1) healthcare benefits and insurance for students and employees; 2) energy and utilities. The primary target population of the grant initiative is the public and independent college and university sector in the Midwest. However, depending on the specifics of the purchasing agreements that are eventually negotiated, benefits could extend to school districts and municipal governments as well as colleges and universities in states outside the MHEC region.

While other purchasing cooperatives and consortia exist, the complexities of the healthcare and energy/utility markets have made it very difficult to develop viable, scalable programs that enable colleges and universities to reduce costs in these areas. MHEC's governance structure as a statutorily created entity in each of the twelve MHEC states (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin) provides a unique advantage in bringing together educators, legislators, and industry leaders to develop mutually beneficial solutions to vexing problems.

HEALTHCARE AND ENERGY COSTS CONTINUE TO RISE

The project is critically important to pursue at this time. For several years the cost of providing health benefits to employees has grown at a rate far exceeding inflation—a rate of increase that is not expected to slow at any time in the near future. These continual rising costs drain institutional resources away from core educational functions. At the same time, employees are making larger co-payments for health insurance and physician care while the list of covered services narrows in scope. This limits the ability of colleges and universities to compete for talented faculty and staff and decreases morale—both of which eventually affect the educational experience of students.

Similarly, the cost of health insurance for even young, healthy undergraduates who are not covered by family policies can be out of reach, resulting in a

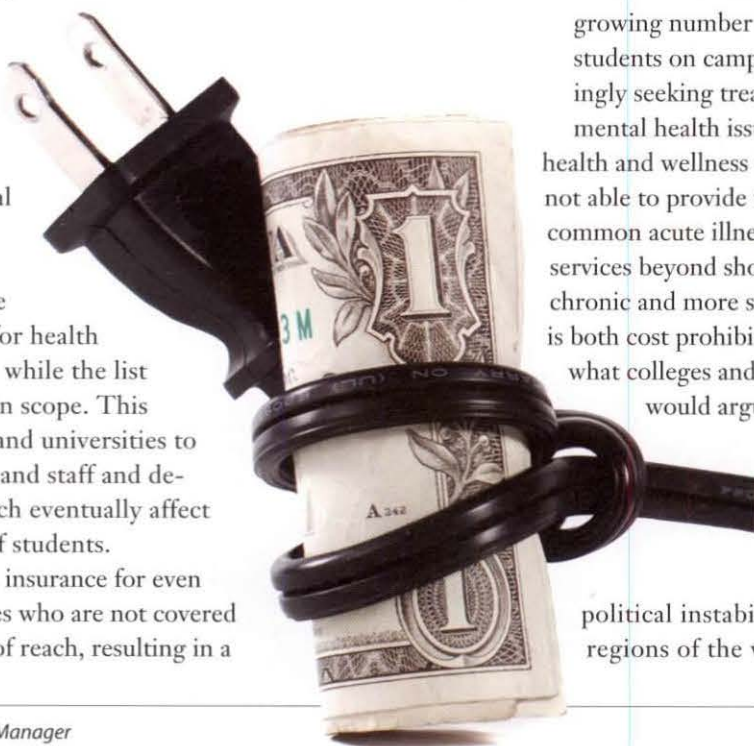


Headquartered in Minneapolis, MN, the Midwestern Higher Education Compact also has a variety of other programs to reduce costs, to increase student access, and conducts policy research and analysis. The Compact is governed by a board comprised of five commissioners from each member state, including legislators, governor's representatives, and higher education leaders. For more information on MHEC, visit www.mhec.org or call 612-626-8288.

Lumina Foundation for Education, an Indianapolis-based, private, independent foundation, strives to help people achieve their potential by expanding access and success in education beyond high school. Through grants for research, innovation, communication and evaluation, as well as policy education and leadership development, Lumina Foundation addresses issues that affect access and educational attainment among all students, particularly underserved student groups, including adult learners. The Foundation bases its mission on the belief that postsecondary education remains one of the most beneficial investments that individuals can make in its people. For more details on the Foundation, visit its website at www.luminafoundation.org.

growing number of uninsured and underinsured students on campuses. Students are increasingly seeking treatment for serious illnesses and mental health issues from college and university health and wellness centers. Many campuses are not able to provide treatment for anything beyond common acute illnesses or to provide mental health services beyond short-term counseling. Treating chronic and more serious illnesses and conditions is both cost prohibitive and beyond the scope of what colleges and universities can – and, many would argue, should – make available.

The cost of heating, cooling, and powering college and university campuses has also risen steadily. Rising demand for fossil fuels, political instability in energy-producing regions of the world, and environmentally-





based regulations and taxes will combine to make future prices volatile at best. Institutions will face increasing pressure to reduce costs by seeking lower prices for commodities, using less energy through improved efficiency and conservation, and increasing the proportion of the total energy used that is generated from renewable sources.

With flat or reduced funding from state governments and increasing popular and political pressure on institutions to hold down tuition, the growing proportion of college and university budgets devoted to healthcare and energy reduces concomitantly the funds available to support programs and services devoted to student access and success.

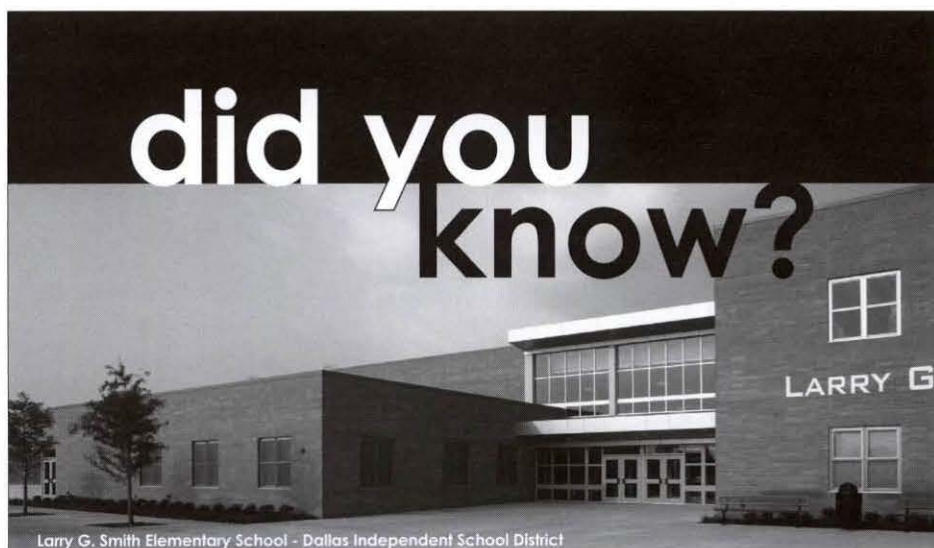
PROJECT OUTCOMES, OBJECTIVES, AND ACTIVITIES

By the end of the three-year grant period MHEC expects to have at least one group purchasing program in place in each of the two discussed domains—healthcare and energy—with enough colleges and universities enrolled to make each program viable. MHEC is striving to negotiate agreements with vendors of health insurance and energy enabling colleges and universities to obtain products and services at a lower cost than they would be able to obtain by acting independently or even within state systems or existing consortia. The extent of cost savings will be dependent on the nature of the programs that are developed and the terms of the agreements negotiated with service providers.

A related objective of the proposed initiative is to enable institutions to measure the extent of their savings and redirect these funds into programs and services designed to promote student success and reduce the institutions' overall operating cost per degree/credential. As such, this initiative will generate tools to assist colleges and universities in this endeavor and to track how the savings generated by MHEC programs are being used to enhance institutional productivity. This objective is consistent with the aim of Lumina's Making Opportunity Affordable initiative.

By the end of the three-year grant period MHEC expects to have at least one group purchasing program in place in each of the two discussed domains—healthcare and energy—with enough colleges and universities enrolled to make each program viable.

Given the potential scope of these initiatives and the specialized technical knowledge necessary for their pursuit and success, financial and human resources beyond the current operational capacity of MHEC are required. With support from Lumina Foundation, APPA, NACUBO, and other institutional associations, MHEC will build upon its existing infrastructure and relationships with institutions to:



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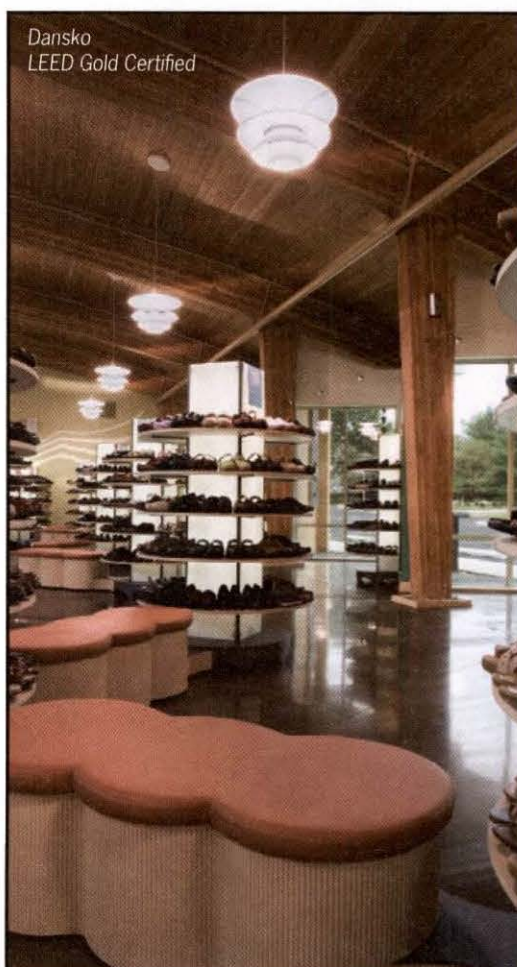


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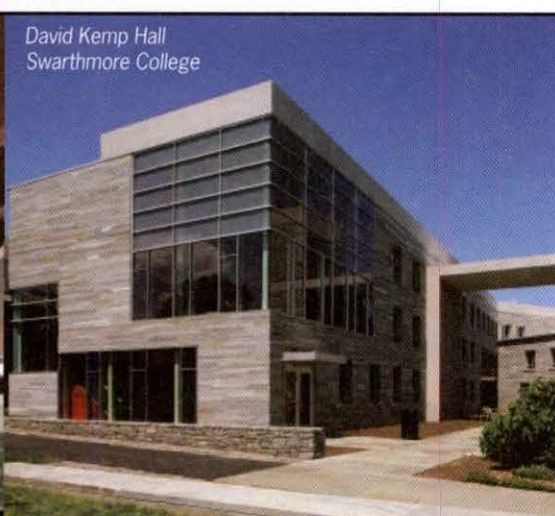
This initiative is critically important at a time when the costs of health benefits far exceed inflation, and the costs of heating, cooling, and powering the regions' campuses are also steadily rising.

- convene experts and establish advisory committees for both energy and healthcare initiatives, and hire consultants with extensive, industry specific experience to assist in the research and development of programs in energy and healthcare; visit institutions and association meetings in an effort to gain support and encourage participation in the programs;

- contract for legal and other services from individuals and firms with knowledge of the regulatory environment and expertise in negotiating and developing agreements in specialized fields, in particular energy and healthcare;
- enter into agreements with healthcare and energy/utility vendors on behalf of institutions in the region, establishing economies of scale that enable colleges and universities to save money that can be redirected toward core educational functions;
- market and promote the resulting programs by appealing to colleges and universities through various means such as mailings, institutional and system office visits, association partnerships, and conference attendance and presentations;
- develop tools to help institutions redirect savings to efforts designed specifically to promote student success and reduce overall cost per degree/credential; and



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By bringing together the resources of national higher education associations, MHEC has tremendous opportunities to develop programs which, when initiated will bring additional savings to MHEC member institutions, and provide cost savings models for the benefit of all of higher education.

- utilize and integrate with existing technology and survey services to develop sophisticated platforms needed for purchasing, program management, tracking of institutional savings, and monitoring how colleges and universities reinvest savings.

CONCLUSION

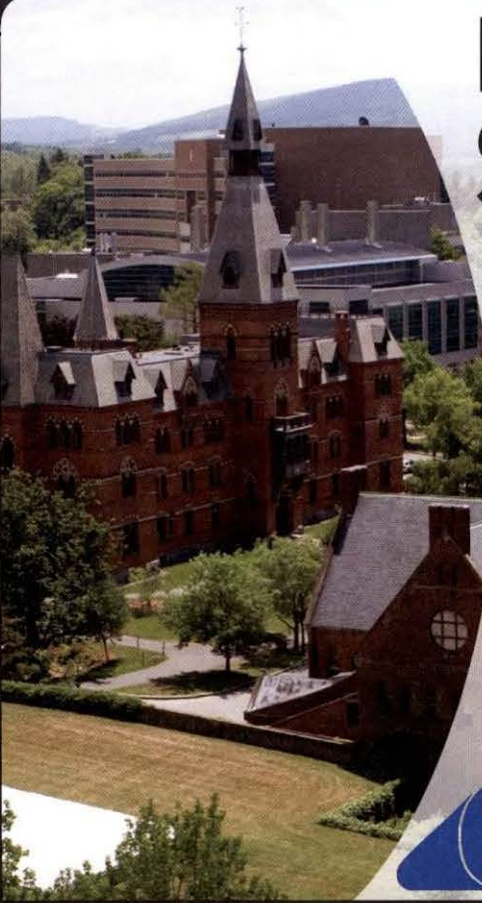
This initiative is critically important at a time when the costs of health benefits far exceed inflation, and the costs of heating, cooling, and powering the regions' campuses are also steadily rising. By bringing together the resources of national higher education associations, MHEC has tremendous opportunities to develop programs which, when initiated will bring additional savings to MHEC member institutions, and provide cost savings models for the benefit of all of higher education.

In the long term, the program will provide opportunities for higher education institutions to 1) enter into agreements with healthcare and energy/utility vendors in a new form that will be financially beneficial to the participants; 2) have access to training modules and tools to help institutions redirect savings to efforts designed specifically to promote student success; and 3) allow for more innovative initiatives to contract for technology services

using established platforms for purchasing, program management, tracking of institutional savings, and monitoring how the colleges and universities reinvest savings. 

Larry Isaak has been president of MHEC for five years. He has extensive leadership experience in higher education having served as chancellor of the North Dakota University System for ten years;


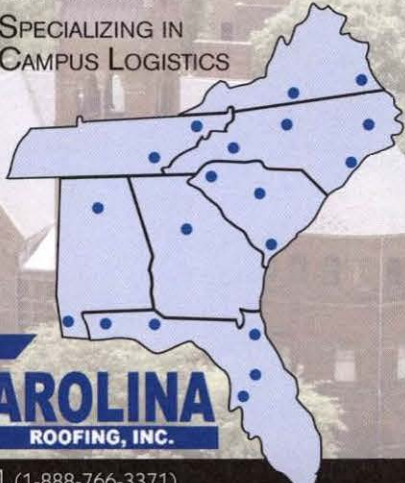
he can be reached at larryi@mhec.org. Rob Trembath serves as the vice president and general counsel for MHEC; he can be reached at robt@mhec.org. Longtime APPA member Jim Sebesta serves as grant administrator to lead the efforts for MHEC as defined in the Lumina Foundation grant. He can be reached at jims@mhec.org.



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The Predictability of Unplanned Failures

By Matt Adams, P.E.

There is predictability in what is called “unplanned failure” or “unplanned maintenance” (UPM). This concept implies our ability to control and manipulate planned maintenance (PM) and so directly indicates the “expected” amount of UPM a given facility will experience. Thus, UPM is in fact predictable. And, if it has a predictable characteristic we must also be capable of budgeting for it. This might seem intuitive, but in practice it requires some delineation in order to apply it to everyday life within a facility management environment.

Execution is characterized by high frequency (e.g., monthly) and low cost (e.g., \$100 time and materials.)

- **PM2** – more invasive preventive maintenance that involves shutting down a system, opening its chassis, conducting system and component testing as well as lubrication, expendable part replacement, such as belts, and significant adjustment of operating parameters. Execution is characterized by medium frequency (e.g., annually) and medium cost (e.g. \$500 time and materials.)
- **PM3** – most invasive planned maintenance characterized by system shutdown for extended periods and primary system overhaul involving significant component replacements. Execution is characterized by low frequency (e.g., every 5 years) and high cost (e.g. over \$5000.)

On the other hand, unplanned maintenance has a set of corresponding definitions that are related and most simply characterized as follows;

- **UPM1** – simple system performance difficulties that arise frequently and require system inspection and perhaps resetting or light adjustment (highest frequency, lowest cost.)
- **UPM2** – significant system performance gaps or even shut downs that require diagnostics, performance adjustments, and sub-component replacements, (moderate frequency, moderate cost.)
- **UPM3** – major system failure that involves failure of primary components of a system and requires long down times

The types of planned and unplanned maintenance that must be considered are more definitive than we commonly refer to them in the institutional facilities management industry. For Example, planned maintenance has at least three levels that are most simply characterized as follows:

- **PM1** – light preventive maintenance characterized by inspection, simple adjustments, monitoring.

for material procurement and corrective repairs or rebuilding of the system, (lowest frequency, highest cost.)

Assuming that we can model both PM and UPM in the same context, the actual relationship between the two yields our “predictability.” This is because we can reasonably research and compile the recommended planned maintenance costs and frequencies for most building systems. In fact, some system testing data by manufacturers and rating agencies is available that documents statistics for both “run-to-failure” operating modes as well as “optimally maintained” operating modes. From a mathematical standpoint there are two key variables that we must evaluate: cost (\$) and frequency (f). The proposed relationships are represented for Cost (\$) as:

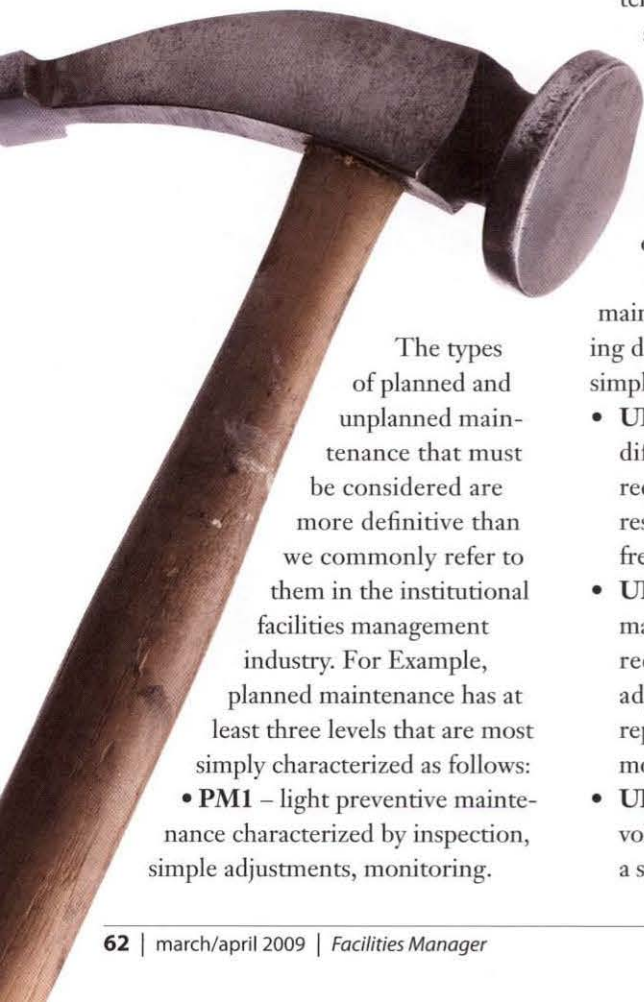
- $PM1\$ (UPM \text{ cost coefficient } 1) = UPM1\$$
- $PM2\$ (UPM \text{ cost coefficient } 2) = UPM2\$$
- $PM3\$ (UPM \text{ cost coefficient } 3) = UPM3\$$

Considerations for deriving UPM cost coefficients include: overtime pay, expedited parts delivery, collateral damage to systems, etc. Similarly the relationships for Frequency (f) are represented as:

- $PM1f (UPM \text{ freq. coefficient } 1) = UPM1f$
- $PM2f (UPM \text{ freq. coefficient } 2) = UPM2f$
- $PM3f (UPM \text{ freq. coefficient } 3) = UPM3f$

Considerations: PM and UPM frequencies are inversely proportional, optimal relationships might be defined by some manufacturers to allow extrapolation, industry heuristics suggest that 80 percent of manufacturers recommended PM frequencies is optimal and anything more frequent has diminished returns., given a static level of $PM(x)f$ over time the $UPM(x)f$ will increase until system death.

Using manufacturers, RS Means, and other sources for the costs and frequencies



of all planned maintenance (PM1, 2, & 3) represents the beginning data set for this predictability model. In effect this becomes a budget model for unplanned maintenance. Given good data for PM (f) and (\$) the formulaic relationship between PM and UPM is established by deriving meaningful coefficients for each of the six formula relationships. Research, trial and error, and experience all contribute to the determination of these coefficients, but the effort of creation alone has a positive diagnostic effect for the budgetary process. The basic definitions should look like the following:

- **UPM Cost Coefficient 1 = 1.8x** The cost includes both the time and materials for the activity as well as the labor cost of the PM1 not performed on another similar piece of equipment due to the loss of labor caused by this unplanned event (opportunity cost). It is assumed that labor is 80 percent of the PM1 cost. This assumes that all PM activi-


USING THE APPROACH TO MODEL UPM FOR PRODUCES BUDGETS THAT INCLUDE THE NEGATIVE "KNOCK-ON" COSTS OF UPM

ties are at "least" worth the cost of labor with respect to asset life-extension. In other words, a PM not executed results in UPM(x) that negatively impacts the integrity of a system with a cost at least equal to the labor of the PM(x) not executed. This becomes a rough empiracle measurement of what is commonly referred to as "asset consumption."

- **UPM Frequency Coefficient 1 = 1.5x** The frequency of UPM1 has a longer cycle than PM1 and that is part of the conundrum. This factor states that if quarterly inspections are required,

every 4.5 months, on average, we will experience an unplanned event of level 1. In all cases the assumptions should be conservative until proven otherwise.

- **UPM Cost Coefficient 2 = 1.7x** This cost is derived in a similar fashion to the first cost coefficient but assumes a 30/70 material-to-labor ratio for PM2(\$).

Using the approach to model UPM for produces budgets that include the negative "knock-on" costs of UPM assuming we are not fully executing our planned maintenance program at the time. In this budget modeling approach, simple depreciation schedules would no longer apply for estimating deferred maintenance. The capitalized cost of the opportunity lost valued by PM labor becomes the new deferred maintenance value. 

Matt Adams is president of FM², Atlanta, GA. He can be reached at matt@adamsfm2.com.



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

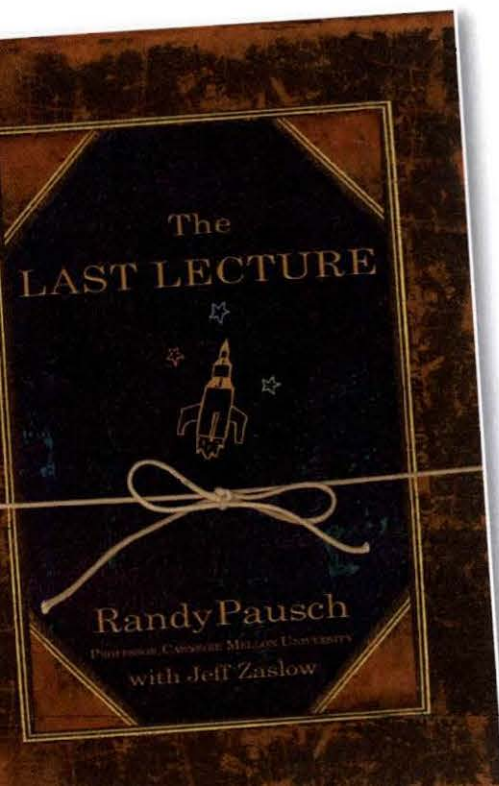
Much has changed in the

past year, and campus budgets are being squeezed like they haven't been for a decade or more. New federal leadership, installed after my deadline, may bring new perspectives and solutions to economic conditions or access to higher education. These will all mean changes to how we work and provide service to our campuses. While a good campus leader knows to fall back on internal resourcefulness and tested principles, assistance through external resources can prove helpful in addressing uncertain and changing futures. Here are two very different books that I think provide some valuable insights to help us through our current problems—*T.W.*

THE LAST LECTURE

By Randy Pausch with Jeffrey Zaslow, Hyperion, New York, 2008, 206 pages hardcover, \$21.95

The Last Lecture has been on the bestsellers list since before Randy Pausch's expected passing last summer.

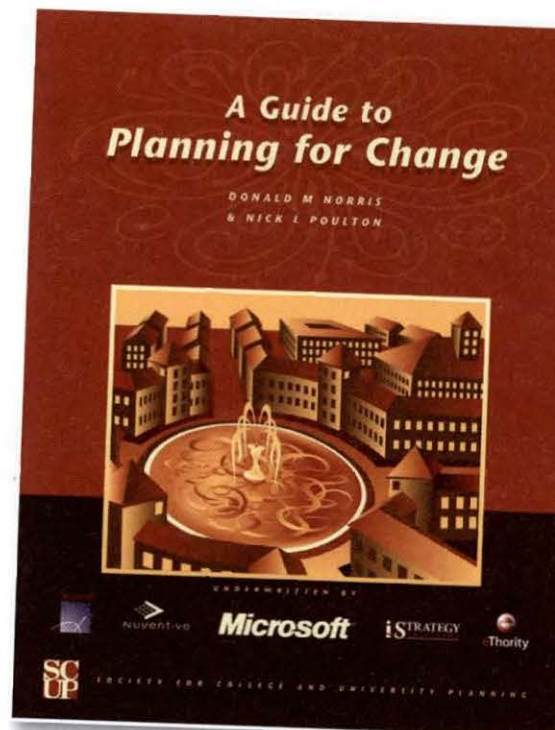


I couldn't help buying and reading it. The last lecture series at Carnegie Mellon University provided deep insight in their life's work, and a "farewell" message to students and peers. One would expect this faculty to be mostly near retirement or emeritus. But Randy wasn't interested in retiring. Instead, life circumstances—pancreatic cancer—had a way of making it inevitable. And, it was an opportunity for him to present an upbeat talk about what his life and research meant.

It isn't necessary to read the book, as *The Last Lecture* is available on YouTube. But, the book obviously covers more ground, and I bought the book with that in mind. It's small, about the size of a paperback, able to fit in a coat pocket. It was an easy read, except for the fact that it really was a last lecture.

What's important in life? What can one do to influence others? How is one's life influenced in return? What are the big things to fight for, and which ones are small and should be ignored? There are hundreds of books that have been written intended to answer each of these questions; some to answer all of them. *The Last Lecture*, while not going to as great a length as hundreds or thousands of leadership books, does a great job presenting how one person, an apparently well-liked professor, met life's challenges, achieved his childhood dreams, and handled them to his and many others' satisfaction, except one (life itself).

It's a moving book with personal thoughts and experiences by a young family man who had not reached the pinnacle of his career or even reached the normal halfway point. It's inspiring and thought provoking. While it's easy to set aside one hour and sixteen minutes to see the YouTube presentation, my recommendation is to get the book for a longer, yet quick-paced, contemplative read.



A GUIDE TO PLANNING FOR CHANGE

By Donald M. Norris and Nick L. Poulton, Society for College and University Planning (SCUP), Ann Arbor, MI, 2008, 132 pages, softcover, \$45; SCUP members \$35.

Change happens, but planning for it doesn't just happen; work is required. And not just work but assessment of the situation beyond the normal SWOT analysis. Norris and Poulton make that clear in their non-cookbook review of planning in higher education and elsewhere.

A Guide to Planning for Change discusses the real issues, ones I've experienced in numerous institutions. Things like: belief that good planning will make the change automatic; dealing with change through purely political means; planning for change as a bureaucratic exercise; and planning for change as a show of power. Included in the discussion about the styles of

planning are the resistance factors: fear, power, control, and lack of executive support. Planned changes have not occurred at numerous institutions because of the misapplication of change techniques, resistance that was not anticipated or ignored, or both. The authors spend several chapters discussing the what, when, and how to prevent failure of planned changes.


Planning for Change is not a cookbook, and after reading the book it is clear that there's nothing cookbook about change or development of an effective plan for change. We often refer to the implementation of changes in an organization as change management, but these authors suggest that change cannot be managed. Based on my experience I tend to agree.

There's something both chaotic and steady, frightening and comforting, unsettling and reassuring in change that tends to defy management. Yet there are numerous books written about change

WE OFTEN REFER TO THE IMPLEMENTATION OF CHANGES IN AN ORGANIZATION AS CHANGE MANAGEMENT, BUT THESE AUTHORS SUGGEST THAT CHANGE CANNOT BE MANAGED.

management; anyone who has accomplished changes in an organization has felt there have been management issues that made it successful.

The authors identify a large number of references, other authors of planning and change "management" books. They developed, without formulating, a matrix of techniques and applications for different change planning texts. If nothing else, their descriptions of change planning techniques, and the various authors of and for these techniques, is a valuable tool to determine which method(s) should be employed to help lead an organization through changes.

Whether your institutional inclinations for change are top-down, bottom-up, or sideways—whether you're looking to make changes to address technology, learning environments, space management, service delivery, sustainability, or 15 other topics—this book is an excellent reference for any type of planning. I'm making use of it now. 

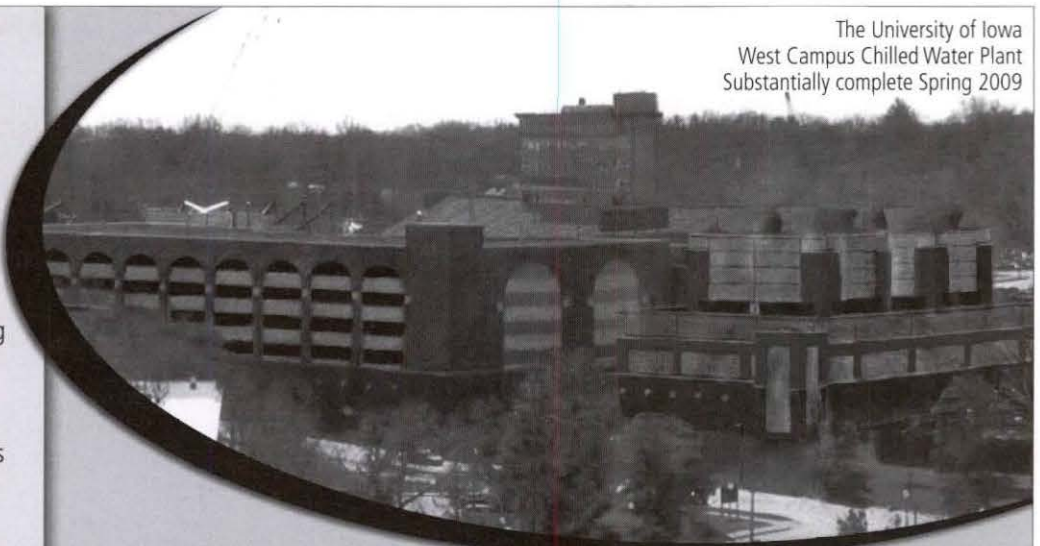
Ted Weidner is assistant vice chancellor of facilities management & planning at the university of Nebraska-Lincoln; he can be reached at tweidner2@unlnotes.unl.edu.



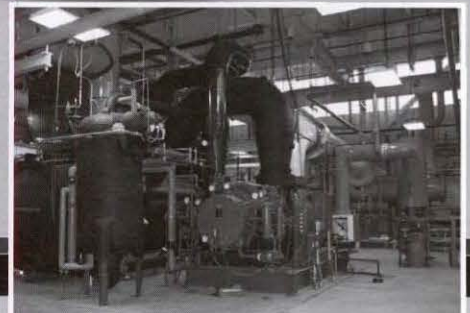
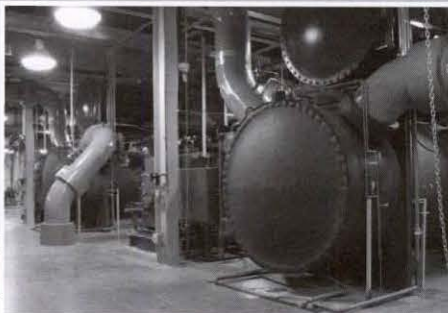
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Compiled by Gerry Van Treeck

Lochinvar Corporation issued a brochure on the new KNIGHT XL Commercial Boiler, a modulating/condensing unit with up to 94.6 percent thermal efficiency. Available in five models with 399,000, 500,000, 600,000, 700,000 and 800,000 Btu/hr inputs, the KNIGHT XL is the most advanced commercial boiler in its class. The full-color brochure includes information on the innovative features that make the high-efficiency KNIGHT XL the ideal "green choice" for today's environmentally focused market, including low NOx emissions and a fully modulating burner with 5:1 turndown. As the smartest choice for mod/con performance, the KNIGHT XL also offers Lochinvar's exclusive SMART SYSTEM™ operating control for unparalleled control and monitoring functions that are easy to understand and use. With the SMART SYSTEM, compact design and direct-venting up to 100 feet, KNIGHT XL promises and delivers incredible ease of installation and maintenance. For more information visit Lochinvar Corporation at www.lochinvar.com.



Eaton Corporation announced its new Pulsar M uninterruptible power supplies (UPS). In order to maximize energy efficiency, the Pulsar M, sold under the MGE Office Protection Systems brand, features a high-efficiency design that saves energy and prevents excess heat when installed

into a network rack. The Pulsar M is the first online double-conversion UPS in its class with an adaptable, multi-position, hot-swappable Power Distribution Unit (FlexPDU). The FlexPDU provides an innovative, space saving method of easily adding receptacles to the back, side or top of the UPS—freeing up much needed space in dense rack environments. In addition, optional universal HotSwap Maintenance By-Pass modules allow the UPS to be replaced, serviced, or upgraded without interrupting the supply of power. For greater detail visit Eaton Corporation at www.eaton.com.

UE Systems introduces the Ultraprobe 3000 ultrasonic detection system. A versatile inspection instrument for cutting energy waste and improving uptime while saving money, and improving the environment the Ultraprobe 3000 has been designed to promote quick, easy surveys with accurate results. The 3000 has also been labeled a "green" instrument for its ability to accurately detect energy waste, helping to reduce a plant's carbon footprint. Understanding the importance of energy efficient plant operations the 3000 will significantly impact energy conservation by locating compressed air and steam trap leaks as well as faulty steam traps, which can lead to millions of dollars in savings a year. This digital instrument, which is fully equipped with a wide, dynamic sensitivity range and "spin and click" sensitivity dial, has a 16-segment bar graphic display panel that showcases sensitivity level, storage location, storage location number, and battery level. For more information about UE Systems visit, www.uesystems.com.



Vi-Cas Manufacturing expands their line of rollers to include more sizes, varieties, and materials of construction than ever before. The broader line of rollers includes cushion rollers, solid versions, finned and drives roller designs. The expanded line-up is ideal for virtually any material handling and industrial applications. Finned rollers provide a softer grip for more gentle transport, while solid rollers provide an unparalleled service life. Long lasting polyurethane is commonly used, though other materials, including silicone for high temperature applications, are available to suit customer needs.



Durometers from A20 through D60 are available for stud or shaft mounting. For additional details visit Vi-Cas Manufacturing at www.vi-cas.com.




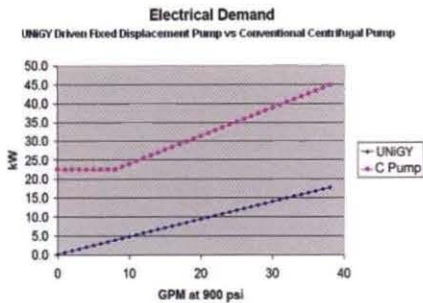
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Airxchange wheels recycle up to 80 percent of heating and cooling energy contained in exhaust air, paybacks, and ROIs are impressive. For more information about Airxchange visit www.airxchange.com.

Kadant AES, a global provider of fluid process solutions, offers the UNiGY® PhD (Pump-modeling hydraulic Drive™ technology) to improve energy efficiency for hydraulic pump

systems by providing hydraulic power on demand. The intelligent design reduces power consumption by up to 60 percent to assist in alleviating energy consumption in the industrial sector. The UNiGY

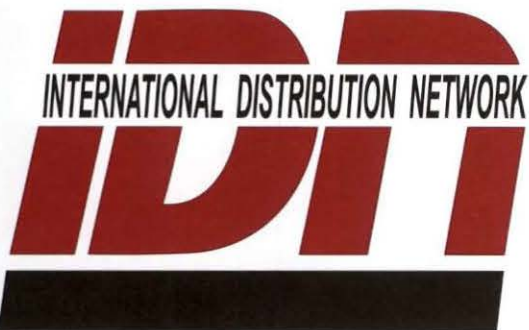
pump-control technology employs intelligent pump-control software to continually sense demand, energizing the pump only as required by the application. For further information visit Kadant AES at www.kadantunigy.com. 



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