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FACILITIES manager

SEP/OCT 2011

INTRODUCING
DAVID GRAY
2011-12 APPA
PRESIDENT

INSIDE

Jack Colby, APPA Fellow

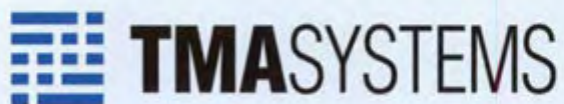
2011 Effective &
Innovative
Practices Awards

Cutting Custodial Costs

2011 Thought Leaders
Report, Part 1

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INTRODUCING DAVID GRAY 2011-12 APPA PRESIDENT



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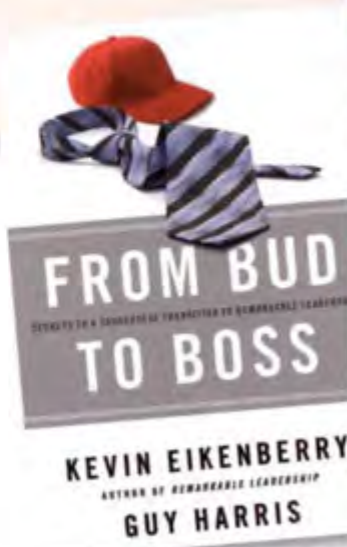
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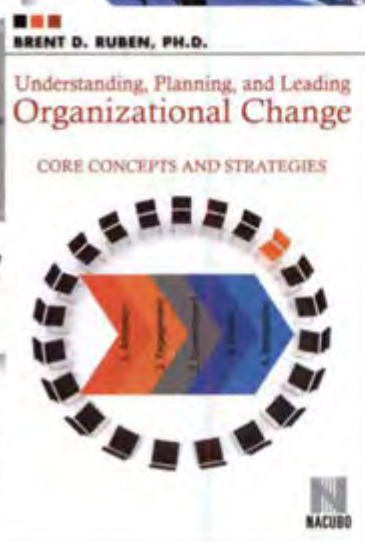
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PAST APPA PRESIDENT BILL MIDDLETON DIES

William D. Middleton, APPA's President in 1990-91, died July 10 in Livonia, New York. He had worked as the chief facilities officer at the University of Virginia from 1979 to 1993, after serving many years in the U.S. Navy. He continued writing, editing, and consulting well

into his "retirement" from U.Va.

Bill was a great friend and leader within APPA. He taught for many years at the Institute for Facilities Management—most often with courses in contracting for



Middleton

services, organization and staffing, and public relations and communications—and once said, "One of my longest and fondest personal involvements with APPA has been with the Institute." He firmly believed that there was no better way to learn about a subject than to teach it.

Bill served three years as APPA's Vice President for Educational Programs (now Professional Development) and was elected President in 1990. One of his key accomplishments was to develop and begin to implement a Long-Range Plan for the Association that had not been done before to such depth and breadth.

Before he became APPA President, Bill was program coordinator for the APPA delegation to the People's Republic of China in 1987, which included other APPA members and representatives from SCUP and NACUBO. Bill taught several mini-Institute classes at a number of Chinese universities during the trip. Bill received the Meritorious Service Award in 1985 and the President's Award in 1988.

But I knew Bill primarily as a writer and an editor. He wrote several excellent articles for *Facilities Manager*, and he was encouraging to others in their writing.

Bill served as the content editor for the Planning, Design, and Construction section of the second edition (1988) of *Facilities Management: A Manual for Plant Administration*, and moved into the editor-in-chief role for the thorough revision and expansion of the third edition published in 1997. The manual, and the subsequent digital Body of Knowledge (BOK), have served as primary content for the Institute core courses and the EFP and CEFP credentials. His work was always thoughtful, detailed, and far-reaching, and he was also a skilled photographer.

Anyone who knew Bill Middleton for any amount of time would learn that his lifelong passion was on the subject of railroad history and operation. He published more than 20 books, including an extensive encyclopedia, and approximately 700 articles for magazines and newspapers. He was a long-time writer for *Railway Age*, *Railroad Track and Structures*, *Railway Gazette International*, and *International Railway Journal*, as well as general publications such as *American Heritage*.

When asked back in 1990 why APPA was important to him as our new President, Bill stated, "APPA is the kind of organization that has an extraordinary willingness among its members...to aid and assist each other." Bill Middleton was always the first to answer that call whenever we needed him. ☺

Coming in Nov/Dec 2011

- Orchestrating Successful Leadership Change
- What FM Leadership Needs
- 2011 Thought Leaders Report, Part 2

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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 5,000 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

By Anita Dosik

NEW! 2011-2012 PUBLIC POLICY STRATEGY AGENDA: Standards and Code Issue Priorities of the APPA Code Advocacy Task Force

Now available on the APPA website, the 2011-2012 Public Policy Strategy Agenda provides APPA members with a structured overview of the work and accomplishments that the APPA Code Advocacy Task Force (CATF) has made within the past year. Also included in this document is a chart noting APPA position statements from 1997-2011.

Educational institutions that are members of APPA are encouraged to seek the expertise of the task force and its network of experts when in need of assistance with state, local, or national regulatory issues.

For a downloadable PDF of the agenda, go to www.appa.org/standardscatf.cfm. For more information about the CATF, contact Kevin Folsom at kfolsom@dts.edu.



APPA 2012: *Annual Conference and Exhibition*

SAVE THE DATE FOR APPA 2012

July 17-19, 2012 * Denver, Colorado

If you didn't make it to APPA 2011, you missed the profession's major go-to event for career enrichment and advancement, a chance to discuss current topics with other thought leaders in educational facilities community, and much more. Plan now to attend APPA 2012 to be held July 17-19, 2012 in Denver, Colorado. Work APPA 2012 into your professional development and travel budgets. Registration will open in December 2011.

APPA 2012 CALL FOR PROGRAMS: SUBMISSION DEADLINE IS NOVEMBER 4, 2011

We invite you to submit a paper for next year's conference in Denver, Colorado. Our programming committee will be releasing shortly the content areas for the APPA 2012 event. Mark your calendars to check back on the APPA website for additional details on the Call for Papers.

Presentations will be considered for review based on the following submission requirements:

- Program abstract title;
- Program abstract in a format of 5-7 sentence description;
- 3 learning outcomes;
- Bios for all possible presenters;

- Complete contact information to include full name, title, institution or company, phone, and e-mail address; and
- Business partner presentations should partner with an educational entity.

Submissions can be made by e-mail to callforprograms@appa.org. Submissions will not be accepted if the above items are not included.

If you have additional questions regarding submissions for APPA 2012, contact Suzanne Healy, director of professional development, at suzanne@appa.org or 703-542-3833.

The deadline is November 4!

TRAINING AND TESTING ON YOUR TERMS—APPA'S EFP AND CEFPP CREDENTIALING PROGRAMS

Innovation in Credentialing

Obtaining your Educational Facilities Professional (EFP) certificate or Certified Educational Facilities Professional (CEFP) credential has always been an excellent way to advance your career or invest in the success of the staff you manage. Recent innovations in APPA's Credentialing program make it even easier to access training and testing to obtain a career-advancing certification or credential.

APPA's online training and testing transformation means:

- Now, you can access online training materials as you study for your exam. Both EFP and CEFPP candidates access the APPA Body of Knowledge (BOK) online to obtain in-depth understanding of topics in the core areas of general administration and management; operations and maintenance; energy, utilities, and environmental stewardship; and planning, design, and construction.
- The application process is streamlined. You can easily complete your application and make your exam payment online. All online content is accessible immediately upon payment. Eligibility requirements and the Credentialing FAQ pages help you know instantly which level of certification or credentialing is best for you.
- You schedule the online exam when and where you need it. Instead of traveling for certification or credentialing testing, you can take your

exam at your home institution, with a qualified proctor, and also set your exam date and time. You can learn your results the day of the test.

- Take the EFP prep course to gauge your level of readiness for the EFP exam. The EFP prep course will help to narrow the focus of content material by providing more specific information on exam content breakout. The course provides you with key terms and definitions to prioritize as well as group exercises and sample test questions that closely mirror actual exam questions.

EFP Prep Course Offerings, Register Today!

- APPA U Institute and Leadership Academy, Ft. Lauderdale, Florida—Friday, September 23
- 2011 CAPPA Conference, Springfield, Missouri—Sunday, September 25
- 2011 MAPPA Conference, Cincinnati, Ohio—Wednesday, October 12
- 2011 SRAPPA Conference, Jackson, Mississippi—Saturday, October 15
- 2011 PCAPPA Conference, San Francisco, California—Sunday, October 16

<http://credentialing.appa.org>

SUCCESSFUL AMBASSADOR PROGRAM:

APPA 2011 Welcomes New Professionals

Thanks to the generosity of a number of our APPA business partners, APPA was once again able to offer the APPA Ambassador Scholarship Program. This program awards scholarships to facilities professionals based on demonstrated financial need and an expressed interest in pursuing professional development. Only first-time conference attendees are eligible. Congratulations to those who were able to participate in Atlanta, Georgia this past July, and expand their networking resources.

Gary Boyd
West Virginia University

Jeff Bucklew
Baptist Bible College

Curt Christiansen
Brigham Young University/Hawaii

Greg Clayton
University of Prince Edward Island

Steve Gooch
University of North Carolina/Chapel Hill

Kelly Kinnard
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Lisa Potter
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Scott Reed
Virginia Polytechnic Institute & State University

Timothy Sanders
University of Idaho

Jim Schreiber
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Sue Van Cleve
University of New Mexico

Juanita Williams
University of North Carolina/Chapel Hill

Mark Williams
Georgia Health Sciences University

Kim Wilson
University of Memphis

Thomas Wright
Cleveland State Community College

WELCOME TO THE FACILITIES CAREER CENTER!

The following three services are available on the APPA website for your convenience.

Job Express

Looking for a new employment opportunity? Scan Job Express for the latest job openings. Are you an employer seeking to post a position? Job Express is your best opportunity to reach qualified educational facilities professionals.

Resume Bank

APPA's career center offers a resume bank for job seekers and employers. Job seekers can post and maintain their resumes with APPA online where they can be conveniently found by prospective employers. Access to the resume bank is free of charge for employers who post position openings through Job Express.

Internship Listings

Students and individuals seeking hands-on experience in the field of educational facilities can visit APPA's Internship Listings to learn of available internship opportunities.

For any of these needs, visit <http://appa.org/careercenter.cfm>.

APPA 2012 AWARDS NOMINATIONS NOW OPEN

Deadline for Nominations is January 31, 2012

Nominations are now being accepted for the following APPA 2012 institutional and individual awards:

- Award for Excellence
- Sustainability Award
- Effective and Innovative Practices Award
- APPA Fellow
- Meritorious Service Award
- Pacesetter Award

NEW AWARD! APPA's new Sustainability Award in Facilities Management is designed to recognize and advance sustainability excellence in educational facilities. This is APPA's newest award and is reflective of APPA's Sustainability Statement and will be introduced for the first time in the 2012 annual award cycle. This award recognizes the facilities management department that has integrated sustainable policies and "green" practices throughout all facets of the organization and embedded them within the educational institution.

The deadline for consideration for the 2012 awards is January 31, 2012. Visit www.appa.org/recognition/ for award details and online nominations forms.

If you have questions about the award process, contact your regional representative to the professional affairs or awards recognition committee at <http://appa.org/committees/awardsrecognition.cfm> or Christina Hills at christina@appa.org.

APPA BOOKSTORE

Publications that Transform, Inform, and Inspire You and Your Institution!

Fill your shelves with resources from the APPA bookstore, and increase your knowledge of educational facilities management. APPA publications help you transform your institution with the most current, innovative, and relevant information available, including industry standards, best practices, creative solutions, and practical tools.

APPA's bookstore is your entry point to the largest, most relevant, and comprehensive knowledge bank in the field of educational facilities, including APPA's Body of Knowledge.

NEW! Pre-publication Savings on APPA's Operational Guidelines Trilogy

APPA is updating its popular Operational Guidelines trilogy of publications on Grounds, Custodial, and Maintenance. The new books will incorporate leading-edge topics related to technology, service innovations, benchmarking, outsourcing, and sustainability.

If you indicate your interest to order now, you will receive a 10 percent pre-publication discount when the books are published this fall. Just go to the APPA bookstore at www.appa.org/bookstore and add your e-mail address in the section indicated.



EVENTS

Oct 3-7 ACUHO-I/APPA Housing Facilities Conference, Orlando, FL

Oct 12 EFP Prep Course, Cincinnati, OH

Oct 15 EFP Prep Course, Jackson, MS

Oct 16 EFP Prep Course, San Francisco, CA

Oct 25 Drive-in Workshop, Lincoln, NE

Oct 26 Drive-in Workshop, Murfreesboro, TN

Dec 8 Drive-in Workshop, Boulder, CO

April 18 Drive-in Workshop, Cleveland, OH

REGION/CHAPTER EVENTS

Oct 2-5 ERAPPA 2011 Regional Conference, Halifax, NS, Canada

Oct 7-13 MAPPA 2011 Regional Conference, Cincinnati, OH

Oct 8-11 MAPPA Supervisor's Toolkit, Cincinnati, OH

Oct 16-18 PCAPPA 2011 Regional Conference, San Francisco, CA

Oct 16-18 SRAPPA 2011 Regional Conference, Jackson, MS

OTHER EVENTS

Oct 9-12 2011 AASHE Conference & Expo, Pittsburgh, PA

Oct 16-21 IEHA's 45th Annual Conference and Convention, Las Vegas, NV

Oct 26-29 PGMS 2011 School of Grounds Management & GIE+EXPO, Louisville, KY

Nov 3-4 Campus Heritage Symposium, Washington, DC

Nov 29-Dec 2 Women's Leadership Institute - 2011, Amelia Island, FL

Dec 5-9 Ecobuild America, Washington, DC

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

IN THIS ISSUE! THE 2011 THOUGHT LEADERS REPORT

Part 1 of the 2011 Thought Leaders report is available in the back portion of this issue of *Facilities Manager*. Look for Part 2 in the November/December issue, due out in mid-November 2011.

APPA's Thought Leaders Series assesses how higher education trends will shape campuses and poses strategies that leaders in the profession can use to address coming challenges. The ultimate goal is to help institutions prepare themselves and their facilities for the future.

For more information about the Thought Leaders Series, contact Lander Medlin at lander@appa.org or Steve Glazner at steve@appa.org.

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Report to the Membership

By E. Lander Medlin

The global economic downturn has eclipsed all other factors contributing more significantly than ever to the funding challenges we face at our institutions. The impact of these continued economic challenges on your budgets and your ability to travel for training and development remains a challenge for you, your staff, and APPA. Nonetheless, deferring professional development is no more an option for you and your staff than deferring facilities maintenance/renewal is for your institutions.

Indeed, APPA has also endured these economic challenges. However, I am pleased to report that we ended fiscal year 2010-2011 with a surplus balance of \$268,710. Targeted revenue enhancements and focused attention on daily expenses and event management contributed greatly to an improved bottom line. In addition, our operating and capital reserves increased to \$369,000 from \$245,000 last year, and the value of our headquarters building increased to \$2.2 million.

We have renewed clarity of focus and direction having just developed a NEW strategic plan. The forthcoming strategies and initiatives will sharpen and further crystallize ways to increase value to our members by providing a professional development career continuum and an institutional development pathway that is unparalleled in the industry.

APPA's role is to elevate educational facilities professionals into influential leaders in education who, in turn, create inviting and supportive institutional learning environments, thus increasing the credibility and influence of the facilities profession. Therefore, the desired outcomes of

competency, collaboration, and credibility of our members remain an integral part of our vision for the future.

COMPETENCY

The guidelines and standards established by your colleagues over the past several years remain invaluable tools for resource allocation and strategic planning. Most notable is the recent significant revision of the Operational Guidelines Trilogy – consisting of the maintenance trades, custodial services, and grounds management. The launch of the digital BOK (Body of Knowledge), which updated and replaced *Facilities Management: A Manual for Plant Administration*, remains noteworthy giving any and all individuals at your institution full access (24/7). In addition, your resource library should include our newest book *Strategic Capital Investment* and the Web-based 2009-10 Facilities Performance Indicators (FPI) and dashboards. The FPI tools and reports are available free to member institutions who participate in the data collection survey phase.

The availability and flow of relevant information regularly occurs via APPA's bi-monthly magazine, *Facilities Manager*; *Inside APPA*, our biweekly electronic newsletter; and our website, <http://www.appa.org>.

CFaR, APPA's Center for Facilities Research, is also resident on our website and fills a vital need by integrating the development, collection, and delivery of research in the education environment. Information you need to make knowledgeable and informed decisions for your institutions.

Finally, as part of our strategy to expand knowledge and research, APPA, with gener-

ous support from both UGL Services and Jacobs, delivered its sixth annual Thought Leaders symposium for 2011 this past April. In essence, a group of key higher education stakeholders consisting of chancellors, presidents, regents, business officers, IT professionals, student services administrators, facilities professionals, and representatives from the business community are assembled annually and engage in a day-long discussion of several drivers of change expected to shape the future of higher education and their impact on facilities.

It is through these research findings and thought-provoking symposia that will brand APPA as the "go to" resource for educational facilities questions, increase the awareness of the facilities profession with senior institutional officers, and enhance the credibility of the educational facilities professional.

The content and appeal of APPA's vast array of educational programs are now available practically under one roof now called "APPA U" consisting of the "core four" – Institute for Facilities Management, Leadership Academy, Supervisor's Toolkit, and the EFP Prep Course. These programs provide members with the professional career development and personal growth needed to compete and collaborate effectively in today's environment.

Our newest development are the Drive-In Workshops. These programs are offered locally and sponsored by the business partner community, so the visibility and exposure is unbeatable. What better way to connect with educational facilities professionals locally to "lunch and learn."

APPA's annual conference features best-of-breed panelists and speakers who focus on future solutions to our most pressing issues to prepare your organization for the next generation of facilities management practices. We also continue to deliver a distinct and successful program strictly

for senior facilities officers called the "SFO Summit". This one-day program is co-located with APPA 20XX as a pre-conference event.

To add to this continuum of professional development career opportunities and to complement our competency-based programs and services, APPA has developed and executed a credentialing and certification program comprising two credentials – the EFP (Educational Facilities Professional) and the CEFPP (Certified Educational Facilities Professional). Over 300 individuals have earned these designations. Both these credentials are essential for the future engagement of our emerging facilities professionals in APPA and the educational workplace and to increase the credibility of the facilities profession at educational institutions. We now offer the exams on-line.

COLLABORATION

Strategic collaboration and partnerships increase the depth and breadth of research and information and ultimately member value. Thanks to the funding received from ASHRAE, we have launched a major research project focused on the Total Cost of Ownership (TCO), which will engage members, organizations, associations, and agencies across the entire field of facilities management.

APPA's collective national and international strategic alliances and partnerships help APPA leverage its resources to provide cost-effective, focused research, information, and educational programming, ensure an increased information flow to our members, and provide opportunities for more meaningful engagement by young facilities professionals.

CREDIBILITY

Environmental issues and compliance concerns remain an important part of our public policy agenda which drove the establishment of a Code Advocacy Task Force (CATF) by the APPA Board. The group has already successfully advocated a variety of positions with the NFPA, NEC, and ASHRAE thereby avoiding additional costs and/or saving educational


institutions millions of dollars.

Through the vast array of educational offerings, print and electronic information, research, and publications, and this rich network of professionals, APPA can help you gain that competitive edge and enhance your professional image.

Certainly, the continued challenges we face as an association, as educational facilities professionals, and as an industry sector

will require our best collective and collaborative efforts. Your contributions will be key in helping to shape the future of education. APPA's contributions will be key as a significant voice on strategic institutional issues for the educational facilities profession. ①

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




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Simply Civil

By Joe Whitefield

One of the great challenges in any organization is maintaining a positive work environment that is productive, professional, and emotionally healthy. From my current readings, conversations, and personal observations, it appears that civility – consistently being nice to others – in the workplace and society is on the decline. Look around. How would you rate the civility of your organization?

One of the common reasons often cited for a decline in the “niceness” of people in the workplace is that they are under great levels of stress. You do not have to look too far to see an abundance of sources for the stress and pressures people feel today. When at work, employees deal with the normal job-related pressures involving deadlines, performance, work load, and relationships with customers and colleagues. Employees also bring to work their burdens of family stress, financial pressures, and health issues. While these stressors are real, it is not automatic that incivility should result. But for the purpose of this article, let’s connect the two and move on to the behavior.

Ironically, a lack of civility can itself be a major stressor in the workplace. It contributes to an unhealthy environment that becomes an incubator for the pressures and stresses that people seem to despise. In essence, uncivil encounters (from general rudeness up to and including hostility and harassment) between colleagues at work can create new personal problems as well exacerbate the typical productivity problems. Let’s face it; no one likes a poor work environment with a major morale problem.

WHAT YOU CAN DO

So, given the ever-present causes of stress and tension and the poor behavior that often accompanies them, how can we improve the work environment? Most often the process of improvement begins at the individual level with genuine *self awareness*. We should each step back for a moment and look at our typical behavior in certain situations. When do you get upset or moody? How do you talk to and treat others when you are in that state of mind? Take a realistic look in the mirror. Don’t make excuses for yourself or underestimate how abrasive you can be to others.

Once you have a picture of yourself, the next step is developing *self control*. Appropriate self control measures can include a wide variety of simple things. Take a breath. Pause before you speak. Sleep on it. It seems that the most

C Completion
O Organization
I Innovation
N Being Nice

be some negative words that you need to eliminate from your vocabulary as well as some positive words you should consider adding.

KNOW OTHERS

Once you have a realistic view of self, look at others in your organization. *Social awareness* begins with a desire to understand people better in order to foster a better relationship. What types and level of stress are they

ONE OF THE COMMON REASONS OFTEN CITED FOR A DECLINE IN THE “NICENESS” OF PEOPLE IN THE WORKPLACE IS THAT THEY ARE UNDER GREAT LEVELS OF STRESS. YOU DO NOT HAVE TO LOOK TOO FAR TO SEE AN ABUNDANCE OF SOURCES FOR THE STRESS AND PRESSURES PEOPLE FEEL TODAY.

regretful words are typically spoken in haste. Learn to hit a pause button to allow tensions to subside. Also, tone of voice and body language are the true communicators when tensions are high. Talk with a quieter voice and maintain an appropriate distance from others individual space. Finally, there may

under? How do they typically respond when pressures mounts at work or at home? When looking at our own behavior patterns it is easy to overstate the stressors and pressures (causes) and understate the negative behaviors (effects). This can be easily reversed when we evaluate the behavior of others.

TRUE LEADERS MUST TAKE THE LEAD. LOOK AT YOURSELF, SEEK TO UNDERSTAND OTHERS, AND SET THE EXAMPLE IN SPEECH AND ACTION. RAMP UP THE RESPECT, AND ADD A DASH OF COURTESY.

TAKING THE LEAD

The final step is to improve your *social interactions* with others. This is an area where you must take the lead. In a professional setting, don't focus on how much you "like" one another. Rather, focus on having positive interactions that are based on respect and common courtesy. Respect is the key to the whole thing. The issue of respect is quite comprehensive and involves areas such as:


- Respect for others as people
- Respect for positional authority
- Respect for the institution or organization
- Respect for yourself

When the element of respect is absent, all other social niceties seem phony. So, in order to have a healthy work environment, respect is a must. Add some common courtesy to the mix, and you might have the makings of a positive place to work.

In summary, a lot is being said today about the decline in workplace civility and the increase of stress and pressure people feel. Perhaps the decline in civility is more closely tied to the decrease in the respect people have for themselves and others. Our work environments can be places where emotions run high. Simply demanding everyone "be happy" or "get along" is not enough. True leaders must take the lead. Look at yourself, seek to understand others, and set the example in speech and action. Ramp up the respect, and add a dash of courtesy. This could go a long way to improving the morale of the organization and the productivity as well. As always, get help from Human Resources or others if situations dictate. In one episode of *M*A*S*H*, Frank Burnsw was complimented for being uncharacteristically kind to someone who had been kind to him. His response to this compliment

was, "It's nice to be nice to the nice." I think we can do a little better than Frank, and cultivate a positive environ-

ment for everyone in our organization rather than just a few.

Wouldn't that be nice? 

Joe Whitefield is executive director of facilities services at Middle Tennessee University, Murfreesboro, TN. He can be reached at joe.whitefield@mtsu.edu.

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Building
Consensus
Toward a

SHARED PURPOSE

A Profile of President David Gray

BY ALAN DESSOFF



One might say that David Gray's path into higher education facilities management was anything but traditional. Today, Gray is the assistant vice president of facilities services at Middle Tennessee State University. His professional career, however, actually began in banking. In 1993 he was working in Murfreesboro Tennessee. As a local banker and president of the Chamber of Commerce, he had become familiar with Middle Tennessee State University. It was MTSU's vice president of business and finance, Duane Stucky, who introduced Gray to the idea of working in higher education and ultimately in facilities management. The banking business was in flux, and "I felt I needed a career change," Gray says.

Gray was subsequently presented the opportunity to work at MTSU in various aspects of auxiliary management and facilities operations. A year or so later he transitioned into the

position of director of facility services – later upgraded to the assistance vice president position he holds today. It was during this time of transition when Gray was strongly encouraged to get involved in APPA.

Gray's introduction to APPA began with a professional connection with the University of Missouri-Columbia and Alan Warden, then vice chancellor of facilities and an active APPA member. This connection was the genesis for a serious facilities management education marked by peer-to-peer mentoring and exposure to various APPA technical programs. Gray credits Warden with getting him involved quickly and thoroughly in APPA. "I started going to APPA meetings. I'd have breakfast with Al, then go to sessions with Al, then have lunch with Al. He was the only person I knew in APPA at the time and I got to know him real well," says Gray.



"I remember him well," says Warden, now retired in Columbia, adding that he thought Gray showed promise in his new field.

"APPA does a great job with its training programs," Gray continues, "and I knew I had to take some of these programs to get up to speed. I knew a little about life—I wasn't a young person starting in this business—but I needed to know what other people in the facilities business were doing, and how this thing worked. I went to classes and studied and got the technology side of what I needed to know from APPA's training."

His platform as APPA's President-Elect stated that he would center on "a strong commitment to continue the technical, knowledge-based educational program offerings" of APPA with "a focus on equipping facilities professionals and personnel in the areas of leadership and communications—leading to increased credibility and greater influence within the critical decision-making processes on campus."

MORE WITH LESS

Gray put what he was learning through APPA to work at MTSU, where he began with a staff of about 200 on a campus with some 17,000 students. Today he has about 170 employees responsible for maintenance, operations, and construction activities on a campus with 26,000 students and a footprint of 4.9 million square feet.

He has fewer in-house employees, he says, because the economy has led him to outsource custodial duties. "People laugh about doing more with less. We just find better ways to do it, and we have good people. We work smart," he explains.

Gray sees economic problems underscoring the overall state of facilities management these days. "We're all hurting right

now. Many of our schools are state schools, and states that are short on money are making budget cuts. It's tough. It's all about stewardship," he declares.

"We have more resources to work with in the way of technology, with all that information out there about best practices, and we can talk with each other much more easily and go online and find help. But we have a problem with the economics. When there is a budget reduction, facilities services must take our fair share. We find the best ways to do things. This includes efficiency and productivity improvements. Many times, some form of service reduction is required. This is always done in a thoughtful way focusing on the university priorities." For example, Gray says, "It used to be that trash was emptied every night on our campus. Now, we still do the classrooms, general areas, and suite areas nightly, but offices are emptied once a week—including my own."

FOCUS ON THE MISSION

While economic realities have had an impact on facilities services, Gray commends the administrative and academic leadership at MTSU for their management of the university during difficult times. This is perhaps best illustrated in the *Positioning the University for the Future* initiative commissioned by MTSU president Dr. Sidney McPhee. This initiative sharpened the focus on the university's mission, reinforced priorities, and evaluated operations and services across the campus for effectiveness and best value. A strategic plan emerged that sets the direction for all campus departments including facilities. Gray works closely with senior vice president John Cothern to resource and execute the facilities portion of the strategic plan as well as the day-to-day operations. Gray feels that when decisions are made they are supported—particularly the tough ones.

"People laugh about doing more with less. We just find better ways to do it, and we have good people. We work smart."



When he started at MTSU, Gray says, “We did a lot of things for everybody and didn’t charge them, even if it really didn’t fall under the umbrella of maintenance. If somebody wanted a bookcase built in their office, we just went over and built it and didn’t charge for it. Now, if it’s something not in the purview of maintenance and operations, we have to charge for it. We don’t make a profit; we call it full-cost recovery. That’s working smart. We can’t subsidize others.”

“Auxiliaries like food services, parking, the post office, are supposed to stand on their own. As a state institution, we can’t spend our maintenance and operation dollars to subsidize things like that. We run it like a business and make sure we spend the dollars the best way we can.”

Gray adds that MTSU is 100 years old and the average age of its buildings is 47 years. “We’re a young campus compared to a lot of others, but we ask a lot of our buildings,” he says. He remembers what an APPA colleague at another school once said about that: “What do you call a hundred-year-old building? I call it new.”

STEWARDS OF OUR TIME

While he and other APPA members address the impact of the economy on their campuses, Gray wants to be sure they have the best resources available

through APPA, including using the full capabilities of the Internet. “When we used to talk about social networking, we usually meant going out to play golf or have a drink. Now, it’s people talking to each other on the Internet. We have more information

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The MTSU facilities leadership team. Clockwise, from David Gray, Joe Whitefield, J. Wallace, Kelly Ostergrant, Reggie Floyd, and Gerald Cau...

at our fingertips and I believe that technology-wise, we have more going for us right now that we've had in a long time. We have more information at our fingertips, more ways to communicate with one another and find the best practices and how to implement them into what we're doing at our facilities."

That's where APPA's membership demographics play a role, he maintains, including seeking younger members and getting them involved. He talks of "reverse mentoring—learning from somebody who knows how to use the latest technology. And this technology is changing like crazy."

"If you go to one of our caucuses, you'll see a lot of gray-haired guys sitting around. But we're just stewards of our time. The young people have to take over after us," he says. He notes that APPA's Strategic Plan for 2011-2014 addresses that by calling for development and implementation of plans to "create, engage, and replenish a future generation of leaders." Gray calls them "emerging facilities professionals" and says he has hired some "very good, young, professional engineers" on his campus.

While it's important to mentor younger members to become involved in APPA and become leaders, as Warden helped him, Gray says peer mentoring also is vital to maintain APPA's membership regardless of age levels. "We can come up with a lot of programs and do a lot of marketing, publications, e-mail, all sorts of things, but the way to grow our numbers is to talk to one another," he explains. "It's hard to do, because we're busy people, and it's hard to pick up the phone and talk to someone, or e-mail them, and say 'I appreciated seeing you at the last meeting and

hopefully you'll come to the next one.' We have to make sure they don't drop out of sight."

SUCCESSION PLANS

Gray, who turns 63 at the end of this year, says it's important to have a succession plan and he has one at MTSU. "I have a person in place who could take my place. He's progressing and getting up to speed," Gray says.

He is talking about Joe Whitefield, his executive director, who has worked with Gray at MTSU for 12 years. What he likes about Gray, Whitefield says, is that "he is an outstanding manager and leader, although he comes about it in a different way than you might expect in a facilities organization. You think of engineers with pocket protectors, that kind of stuff, and I am one." But Gray, with his banking background, and before that in the electrical wholesaling business, knows management and leadership,

Whitefield says. "He hires good people, he works to develop a form of trust with them so he can let them do their jobs. He's involved in everything but he's not a micro-manager. But he's always learning, studying, bringing new thinking. He asks a lot of questions, like 'What's a better way to do this?'"

"He hires very good individuals and his units respond quickly. When we have a problem, we call and usually get something in motion within a day. For higher ed, that's pretty amazing," adds K. Watson Harris, who manages space issues for the MTSU provost and academic affairs. "We're in different divisions that typically are at odds, but David and I have

"We have such good people in APPA who have volunteered and given so much. That's one of our key strengths."

not been. He's an easygoing guy. I play golf with him. Even during bad golf games, he's pretty good," she says.

In addition to golf—he plays with about a 14 handicap, Gray says—he likes shooting sporting clays, fly-fishing, and reading nonfiction. A native Tennessean, he holds a business degree in marketing and regional urban planning development from East Tennessee State University. He and his wife, Ellen, have been married 40 years. They have no children but adopted two kittens, a brother and sister, from a local pound. Because they have markings like bulls-eyes on their sides, Gray calls them Smith and Wesson, after the gun manufacturer.

APPA—AN OPPORTUNITY

Once he became comfortable with APPA, Gray began working his way up the leadership ranks as TNAPPA president, SRAPPA secretary-treasurer and representative to the APPA Education Committee, and APPA vice president for professional development before becoming president-elect. He received the "Unsung Hero" award for SRAPPA in 2009 and the APPA President's Award in 2010. He has authored articles for *Facilities Manager* and given presentations and participated in educational programs at many state, regional, and international APPA conferences.

Gray is excited about the opportunity his APPA presidency provides to underscore the importance of effective leadership in facilities management. "All of us are doing the same kind of thing. It's unbelievable how much in assets we're responsible for at our universities. We manage the people behind the scenes on our campuses, and to be able to make everything work, we have to be really conscious of what we're doing and how we're doing it. We have to be good stewards," he says.

He would like to elevate leadership in a different way at APPA's annual conferences by bringing in "the best people" from other industries as keynote informative and inspirational speakers. APPA tried that once, he says, "and then the economy hit us," and he

knows he won't be able to return to the practice during his term because of budget issues. Top speakers from outside "cost a lot of money," he says, but he would like to lay the groundwork to resume it in the future.

Meanwhile, there are other items on his agenda, including prioritizing the new strategic plan. "We'll stay focused on the priority items and try to get them accomplished," he says, also citing the APPA Thought Leaders Series publications that outline the challenges facilities managers face. "Some issues are technical in nature and some are managerial," Gray says. "We need to take another look at ourselves and determine what the most important things are."

He looks forward to the support of APPA's other volunteer leaders to help do that. "We have such good people in APPA who have volunteered and given so much. That's one of our key strengths. The old cliché is 'you get out of it what you put into it,' and I'm going to put a lot into it," Gray concludes. ☺

Alan Dessoiff is a freelance writer based in Bethesda, MD and a frequent contributor to *Facilities Manager*. He can be reached at adedit@verizon.net.

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JACK COLBY

*Continues Stellar Legacy of **APPA** Fellows*

BY RUTH E. THALER-CARTER

You could call him one of APPA's Energizer bunnies, but 2011 APPA Fellow **Jack K. Colby**, assistant vice chancellor for facilities operations at North Carolina State University, has a history of nonstop service to his profession and to APPA that makes that ever-active, never-stop rabbit look like a piker.

Like previous APPA Fellows, Colby could easily rest on his laurels of service to the association and profession, but instead continues to give generously of his skill and intellect to both. Asked why, he said, "I feel as if I have invested a great deal in APPA. The opportunity to serve the profession has been a labor of love. I have gotten much more than I've ever given, and I wanted to be considered with a group of people I respect a great deal. They represent the people now leading our industry and are in a position to influence people and help others."

DEMANDING CRITERIA

Being named an APPA Fellow reflects meeting a set of significant, stringent criteria that ensure that this designation remains APPA's most prestigious individual honor for a member of the association. The individual must:

- Be an active member of APPA for 10 years;
- Graduate from APPA's Institute for Facilities Management;
- Complete APPA's Leadership Academy;
- Complete an approved research project under APPA's Center for Facilities Research;
- Formally apply for the Fellow designation, including at least two letters of recommendation;
- Be reviewed and approved by APPA's Professional Affairs Committee; and
- Receive endorsement by the APPA Board of Directors.

A FORWARD-LOOKING RESEARCH PROJECT

Colby's research project for his APPA Fellow designation involved the development and implementation of the annual APPA Thought Leaders Series. In 2005 APPA embarked on a new strategic planning effort—the 7 Key Strategies—to revitalize the association and provide more focus on future facilities managers. The 7 Key Strategies emphasized using technology to make information readily available to the membership; developing young facilities professionals through education and professional credentialing; and—most importantly—reforming educational programs to prepare members for the challenges that they would face as the education community responded to driving forces.

In lieu of a typical research project, Colby chose to submit the Thought Leaders Series monographs.

"I felt strongly that there was a need to understand the driving factors changing higher education and translate them into issues that facilities managers will see at their campuses to help prepare them to cope," said Colby. "We also felt that we needed a tool to ensure that facilities managers have a seat at the leadership table.

"The TLS was originally conceived of as a five-year series," Colby said. "Each year, we dove more deeply into the current topic and added new aspects—federal issues, the collapsing economy, any scandals—to keep the material current."

Colby's research project is a little unusual in that it has been presented as a series of publications, rather than one document. "Each year, we have done a stand-alone monograph that is distributed to campuses and our sister organizations and associations," he said. That first monograph has evolved into a highly successful series that is now published in APPA's *Facilities Manager* magazine and posted on the APPA website. In addition, the TLS monographs serve as a component of CFaR, and provide the source material that supports educational programs and shapes the content of APPA's annual conference, as well as the Senior Facilities Officers (SFO) Summit. A Thought Leaders session is presented at each annual conference to highlight the content of the Thought Leaders symposium just completed.

At the end of the first five years, the TLS leadership took a "capstone" look at what had been achieved and what might be coming in the next five to ten years, and decided to keep the process going. The 2012 symposium is already being planned. Next spring, Colby said, the TLS leadership will pick a new set of topics, which could include a business model for higher education, effectiveness and productivity in supporting the institutional mission, or new innovations in technology.

The TLS is "a mechanism to convey education to our members, provide educational opportunities, and shape the national conference. It helps keep us focused on learning for the future and continually looking forward offers," Colby said. "I hope the Thought Leaders Series continues to be a vibrant part of what APPA offers."

All of this is thanks to Colby's dedication and leadership, and clearly sufficient grounds for his APPA Fellow designation—but only part of his immeasurable contributions to APPA and the facilities management profession.

A STELLAR RECORD OF ASSOCIATION SERVICE

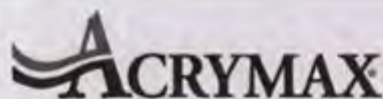
In his 34 years as an APPA member, Colby has held several key leadership positions in APPA, the most notable being that of President in 2005–06. He also served in two other major elected officer roles: as Vice President for Professional Affairs and chair of the Awards & Recognition Committee; and APPA Secretary-Treasurer and chair of the Membership Committee, which is unprecedented. He graduated from the Institute for Facilities Management in 1996 and the Leadership Academy in 2006.

In addition to his work with Thought Leaders and his many elected APPA offices, Colby currently serves as chair of the Certification Board, which directs, develops, and oversees APPA's credentialing and certification programs. As a result, the Educational Facilities Professional (EFP) and Certified Educational Facilities Professional (CEFP) designations are gaining in visibility and credibility within educational facilities.

CAMPUS CONTRIBUTIONS

In presenting the APPA Fellow award to Colby at the 2011 APPA annual conference, APPA Executive Vice President Lander Medlin reminded colleagues that, in addition to his extensive history of APPA service, "Jack has a day job! At NC State, he has created a highly effective and responsive facilities organization [that won] APPA's Award for Excellence in 2007; built three central plants; established credibility campus-wide;





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and invests heavily in his people and their development. One of his staff members said, "Jack is patient and supportive, always asking a lot of questions ... It's all about *you* and what *you* need!"

GLOWING RECOMMENDATIONS

To read colleagues' perspectives on Jack Colby is to see an APPA member and facilities management professional who has truly given above and beyond to APPA, the education community in general, and higher education facilities management in particular, and to understand why naming him an APPA Fellow was both an excellent and an easy decision.

"Jack, while serving as president, helped to shape the vision and goals that guide APPA today," said Gary L. Reynolds, P.E., associate director for facilities at the University of Colorado at Colorado Springs and an APPA Past President and APPA Fellow himself, in recommending Colby for this prestigious honor. Reynolds praised Colby's leadership throughout his many years of service at the state, chapter, and regional levels and on the APPA Executive Committee as "exemplary, with an unselfish commitment to the high standards that have helped make APPA the world-class organization it is today."

In Reynolds's opinion, Colby's leadership may be best seen in his "hard work on and commitment to APPA's new credentialing program," which Colby conceived and championed. In essence, said Reynolds, "it is appropriate that Jack be recognized with APPA's highest individual honor of APPA Fellow, as he truly embodies the excellence of APPA and its vision."

Phil Cox, APPA Past President and member emeritus, echoed

these sentiments in his recommendation, saying, "I cannot think of anyone more appropriate for the title APPA Fellow. He had the vision and determination to pursue one of our organization's most important strategic initiatives—adapting our services to match the needs of our younger generation. From this pursuit was born the certification process. Not only is Jack Colby a highly effective leader with clear vision, he is a tenacious, well-organized task master capable of getting great things done."

In presenting Colby with this important honor at the 2011 APPA annual meeting, APPA's Medlin quoted a long-time colleague, who said that "Jack's entire demeanor exudes professionalism. He dresses the part; he looks the part; and he acts the part—never off-purpose." Added Medlin, "Frankly, his commitment and dedication to the association and the educational facilities profession it serves is unmatched."

SHARING THE HONOR

Those who know Jack Colby will not be surprised to know that he intends to continue in service to APPA in general and the Thought Leaders Series in particular. He is also eager to see other APPA members strive toward the APPA Fellow designation. "I encourage anybody leaning toward this to go ahead and take the step," he said. "Do a research project that is stimulating to your interests and to our profession." The rewards of bringing an APPA career to this level are worth every effort invested in the process: "Being recognized as an APPA Fellow is the best part of being involved in the organization," Colby said. 

Ruth Thaler-Carter is a long-time contributor to *Facilities Manager*. Based in Rochester, NY, she can be reached at ruth@writerruth.com.

PAST APPA FELLOW RECIPIENTS

The APPA Fellows program began in 2004. Previous recipients of APPA's highest individual honor are (some years saw no award) are:

2010

Maggie Kinnaman
Mohammad Qayoumi

2009

Alan S. Bigger

2006

Christopher K. Ahoy
Donald J. Guckert
Gary L. Reynolds

2005

Edward D. Rice

2004

Douglas K. Christensen
William A. Daigneau
Jack Hug



PRACTICAL INNOVATIONS

MARK THE **2011**

Effective & Innovative Practices Award Winners

APPA's Effective & Innovative Practices Award continues to highlight the best of the most creative and practical programs and processes that enhance and transform service delivery, lower costs, increase productivity, improve customer service, generate revenue, or otherwise benefit an educational institution. The five 2011 award-winning programs featured here focus on LEED measurement and verification; energy management outreach; a roadways and walkways treatment process; cost-saving lean principles; and laboratory energy retrofits.

Up to five Effective & Innovative Practices Award submissions are eligible each year for a cash award of \$4,000, generously sponsored since the award's inception by Sodexo Campus Services. Entries are judged by APPA's Professional Affairs Committee and are based on: 1) institutional benefit; 2) innovation and creativity; 3) portability and sustainability; 4) management commitment and employee involvement; and 5) documentation, analysis, customer input, and benchmarking.

The five successful schools this year received special recognition and a check at the APPA 2011 conference in Atlanta last July.

The 2012 Effective & Innovative Practices Award is open, and the deadline for completed applications is January 31, 2012. Winning institutions will receive recognition at the APPA 2012 conference next July 17-19 in Denver, Colorado.





Georgia Institute of Technology

Georgia Institute of Technology

FACILITIES SMART M&V PROCESS

BY DONALD P. ALEXANDER, PE, CEM, RCDD

Don Alexander is institute engineer at Georgia Tech, Atlanta, GA. He can be reached at don.alexander@facilities.gatech.edu.

Georgia Institute of Technology, as a member of the USGBC with several LEED awards, has submitted its LEED's advanced measurement and verification (M&V) plan for each new building filed under the LEED certification program. Georgia Tech Facilities Division wanted to execute the (M&V) plan to validate the projected savings of the LEED energy conservation measures.

Georgia Tech Facilities discovered a wide variation between projected LEED energy savings and actual energy savings. The School of Mechanical Engineering requested topics for their graduate students to study for their thesis. These two needs came together to develop a true evaluation of the designed energy consumption against the measured performance of the building design, therefore yielding accurate energy savings.

The second objective was to develop a methodology process that would become a standard for an accurate comparison of energy savings as compared to the LEED projected savings. A continuous SMART M&V process would then be in place to revisit the energy savings evaluation on a cycle of every two or three years. This process would also provide an ongoing research platform for the graduate students and provide Facilities with continuous updated benchmarks as to how well the building was performing.

The third objective was to obtain energy usage metrics that passed the rigors of academic review for the Masters and PhD thesis defense yielding defensible energy savings.

INSTITUTIONAL BENEFITS

The SMART M&V effort has enabled Georgia Tech Facilities to move from non-verified energy savings to a reliable methodology process to evaluate real energy savings of projects of any size, from new buildings and completely renovated buildings, to renovated building zones.

The partnership between Georgia Tech Facilities and the School of Mechanical Engineering Graduate Studies has provided a rich environment for graduate class studies and graduate thesis work. Georgia Tech, like many research campuses, has an ever changing space requirements, and its use of buildings and

spaces change approximately every three to five years. Therefore, each re-evaluation of previously studied buildings has the possibility of a completely different set of new problems for the graduate students to address.

To implement the SMART M&V process, effective and accurate metering was required to capture the effects of actual operating conditions. The energy software simulations that will be/has been created will use actual data for the occupancy, weather, and changes in equipment. The metering requirements resulted in Facilities launching a campus wide building metering program. Metering was installed for all electrical, chill water, steam and natural gas lines in every building. The meters installed are SMART meters and have the ability to communicate over the internet to a central ION database. In addition to accurate metering, records of installed systems and verification of building automation controls were required.

The availability of historical building energy usage has been of tremendous benefit to Facilities Operations and Maintenance and the Georgia Tech research community, enabling other units at Georgia Tech to pursue additional research opportunities, track energy usage and plan for additional energy conservation projects.



INNOVATIVE, CREATIVITY AND ORIGINALITY

Over the past few years Mechanical Engineering's graduate students have been conducting energy studies for the Georgia Tech Facilities department under the guidance of the institute engineer. The building energy simulation group has worked together to gain a better understanding and working knowledge of the components necessary to accomplish our goals, namely accurate measurement and verification. To capture the effects of real building performance, eQUEST energy simulations use actual data for the occupancy, weather, and changes in equipment based on the recorded meter readings of a specific building.

Georgia Tech, like many large universities, purchases electricity, gas, and produces chill water via central chill water plants. Just as the axiom goes "You cannot manage what you cannot measure,"

GT Facilities developed a project to install building level metering in all buildings for electricity, chill water, steam, and natural gas. The system database reads all of the meters every 15 minutes and stores the data in an SQL database for later use.

Accurate weather was also required to evaluate the thermal effects of weather on energy usage. A weather station was installed in the central portion of campus and the meter reading database engine was used to record the weather by the hour.

The influences of occupancy have dramatic effects on energy usage. Electronic people counters are being installed on all new projects with the data being recorded by the meter reading database to further gain real data of building usage.

Because the data is Web-based, Facilities can quickly determine if an implemented energy conservation measure is yielding the planned results. The metering database has provided the opportunity for accurate utility billing of Auxiliary, Athletic, and non-state funded research facilities. The meter database has opened up additional research opportunities.

PORTABILITY AND SUSTAINABILITY

The process and methodology is completely portable and adaptable to other colleges and universities. This process provides the means to evaluate the LEEDs energy submittal and to provide accurate documentation of energy savings. Proposed designs of LEED buildings use theoretical assumptions of occupancy, plug loads and weather. This yields an approximation or best guess of what the energy savings of the final design is, as compared to meeting the minimum energy code. Comparing actual meter readings to these theoretical assumptions will yield faults, energy savings or over usage. For a true comparison of energy savings, the eQUEST simulation model has to be adjusted to the actual conditions for occupancy, weather, and plug loads during the same time period as the meter readings.

MANAGEMENT COMMITMENT AND EMPLOYEE INVOLVEMENT

Georgia Tech has demonstrated its commitment to the SMART M&V process by adding this requirement of the additional metering in the campus design standards (GT-Yellow Book) for all projects.

Georgia Tech Facilities Division has committed funding for energy metering which support the SMART M&V process as well as other Facilities operational requirements. The Office of the Senior Vice

President provides funding to the Georgia Tech School of Mechanical Engineering Graduate Studies Programs to support graduate students research opportunities. Graduate students perform the fundamental analytical analysis required for the energy simulation comparisons and the academic requirements for their thesis.

The School of Mechanical Engineering continually involves new candidates and other disciplines for studies of GT buildings through a wide variety of research projects. GT facilities engineers support Mechanical Engineering graduate students by providing guidance and wisdom on the implementation of new research projects related to building operation.

DOCUMENTATION, ANALYSIS, CUSTOMER INPUT, AND BENCHMARKING

The following two documents are presented as background, define objectives, and provide results of the process. The first document is a presentation to the Senior Vice President of Georgia Tech, documenting the achievements and to lay out the future of the program. The second document is a detailed report of a major renovation to a 1928 building that once housed the School of Civil Engineering for approximately 40 years. The building is on the National Historic Register. Recently, Georgia Tech renovated the entire building, renovating all of the

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electrical, HVAC, and communications systems. The remodeling provided new, advanced, classroom resources and offices. The renovations rejuvenated and kept the classic charter of the building and won a LEED Gold Certificate.

The Gold Certificate ratifies Georgia Tech's Design Standards as striving to achieve excellence. The performance of the SMART M&V process, confirms that savings can be achieved above and beyond the potential savings of the buildings LEED submitted savings.

1- "Research Conducted with Georgia Tech Facilities Department and Analysis of Old Civil Engineering Building"

<http://www.facilities.gatech.edu/dc/smart-m-v/smart-m-v-research-conducted-with-gt-facilities#2DPA.pdf>

2- "SMART M&V Research Conducted with GT Facilities Update"

<http://www.facilities.gatech.edu/dc/smart-m-v/research-and-activities-conducted-with-georgia-tech-facili.pdf>



Medaille College

THE MEDAILLE 100 – AN "EFFECTIVE AND INNOVATIVE" OUTREACH PROGRAM

BY NATHAN MARTON

Nate Marton is director of operations and facilities at Medaille College, Buffalo, NY. He can be reached at nrm26@medaille.edu. This is his first article for Facilities Manager.

As an extension to Medaille College's energy management strategic plan that has achieved 15 percent savings in less than two years, the campus developed *The Medaille 100*, an innovative program that engaged students, staff and faculty into the effort through a hands-on approach to monitoring and changing their energy use activities and habits.

Medaille's program successfully integrated energy management with student engagement and education to create a highly-interactive six-week energy competition leveraging social media and other engaging activities to produce results far beyond simple consumption reduction. Modeled on a Formula 1 race, *The Medaille 100* tracked real-time performance, communicated energy-saving tips, encouraged competition, and engaged students. Software programming tied real-time energy use to the acceleration and deceleration of the two race cars. The cars accelerated and decelerated based on the level of instantaneous savings compared to previous year's energy performance for the same time period. Each car could reach

a maximum speed of 270 MPH if a 15 percent savings was achieved. Similar to an actual race, when the caution flag is waived, the race car would be slowed to a constant 70 MPH when no energy savings was being achieved.

The main screen automatically updated to track real-time savings and number of laps completed by each race car. The Energy Dashboard converted the performance into readily understood measurements such as number of trees planted, gallons of gas saved, and emissions reduced. Automating this process was a technology feat in itself, given the excessive number of real-time data points that were continuously being collected and calculated.



STUDENT ENGAGEMENT

Equally important to the technological processes was the selection of a Pit Crew, made up of student volunteers to motivate, educate, and engage students during the competition. This crew managed a Facebook page accessed through the *Medaille 100* website, developed specialized programming to raise awareness, and motivated residents to reduce consumption and promote the Formula 1 race theme. The Pit Crew developed Pledge Posters, which students signed to show their commitment towards making small changes in their behavior towards saving energy and the environment. They also had the authority to award additional laps to residence halls that completed supplemental student engagement events, such as Dark Dorm Events, energy education booths, and number of students who made the pledge to reduce their energy usage.

In addition to having Pit Crews drive participation, the College developed the following interactive contests to elevate student interaction and engagement.

- YouTube video contest encouraged students to create and post their own videos and show peers the actions they were taking toward saving energy and the environment. See the winning video at <http://www.youtube.com/watch?v=uedLgKrbqo>

- T-shirt design competition that allowed students to develop a *Green* slogan. The winning T-shirt was given to students who lived in the winning residence hall.
- Twelve students directed a 3-minute informational video to inform their peers on strategies to help win the race. Video Link: <http://www.youtube.com/watch?v=S9D6Ua8qqeY>
- Weekly trivia contests on Facebook that had a sustainability focus.

Medaille adopted a holistic approach to the energy competition, with the goal of educating students, engaging them in the process, and ultimately modifying student behavior. The result was a level of participation, engagement, and excitement that has redefined the term *Student Energy Engagement* in Higher Education. The Program extends beyond passive student education to actively involve participants and create "buzz" throughout the campus community—appealing to existing and prospective students alike.

THE PROCESS AND OUTCOME

The *Medaille 100* was a team effort between the college's staff, faculty, students, and ARAMARK, the institution's facility-services group. Extensive planning and development was involved, which began four months prior to the launch of the event. Overall, the event was conceived, proposed, and executed by the Operations and Facilities departments, with input and support by a number of other campus constituents.

Conceived at one of the college's quarterly strategic energy planning meetings, the *Medaille 100* attempted to extend energy savings beyond the typical "that's the Facilities Department's job" approach that is typical at many campuses and organizations. Nathan Marton, Medaille's director of operations, Mike Beadling, ARAMARK campus manager, and John Mikulitz, ARAMARK director of engineering solutions, were the key personnel charged with the identification, development, and management of all aspects of the creative and implementation processes. Marton identified the appropriate internal staff resources required and successful strategic plan to take this from concept to reality within four months. In his role, Marton managed staff resources to ensure program success and maintained consistent collaboration across all college constituents. This was accomplished through the scheduling of weekly meetings and conference calls with staff and students leading up to and throughout the six-week event. During these meetings, the group reviewed proposed and upcoming activities, while actively resolving program issues. Kara Kane, Medaille's director of communications, led the management of all media activities and content, while Jason Perri, the college's director of residence life, managed the student pit crews and other social activities.

Enthusiasm for the *Medaille 100* built quickly and sustained for the entire six weeks, becoming a major topic of student conversation. Energy consumption during this six-week period was reduced by 7 percent over the same period during the previous year, equating to 158 metric tons of carbon emission reductions.

ABOUT MEDAILLE COLLEGE

With campuses in Buffalo, Amherst, and Rochester, Medaille College (www.medaille.edu) is a dynamic, private college committed to serving the higher education needs of western New York. Medaille is known for its flexible delivery systems, offering master's, bachelor's and associate degrees through day, evening, weekend, and online programs.

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Purdue University

BRINE & BEET JUICE APPLICATION SYSTEM

BY GARY K. EVANS

Gary Evans is the director of grounds at Purdue University, West Lafayette, IN. He can be reached at gkevans@purdue.edu. This is his first article for Facilities Manager.

The Purdue University Grounds Department uses an effective and innovative brine/beet juice solution and application system to treat campus roadways and walkways in advance of inclement winter weather. The liquid salt and sugar beet juice solution retards the accumulation of ice and snow during the early stages of a storm and allows for an easier removal process—making roadways and walkways safer for campus travelers. Due to the fact that Purdue's main campus in West Lafayette, Indiana receives an average of 23 inches of snow per year, this supplemental approach to traditional snow and ice removal strategies has resulted in significant, positive operational and customer service outcomes.

The utilization of the brine/beet juice solution and associated application system has yielded several benefits including labor savings, system customization and capital investment savings, enhanced sustainability of snow removal strategies, and positive customer feedback.

LABOR SAVINGS

The use of brine/beet juice solution is a proactive approach to addressing the removal of ice and snow. Grounds staff members apply the brine solution in advance of impending winter weather, minimizing the need for overtime by allowing labor costs to be absorbed during normal operating hours. When conditions are favorable (a temperature of at least 20 degrees, less than 1.5 inches of snow and sunshine), the application of the



SYSTEM CUSTOMIZATION AND CAPITAL INVESTMENT SAVINGS

Many universities have added brine solution application systems to their snow removal arsenals. The unique and innovative facet of the Purdue Grounds Department's approach to adopting a brine/beet juice application system is the fact that by drawing upon the expertise of staff members, the operation was able to fabricate a custom system that is specifically designed for compatibility with existing snow removal equipment and vehicles. This approach resulted in a significant capital investment savings and also allowed for the creation of a system that directly addresses the Grounds Department's particular needs.

In addition to building brine mixing tanks, Grounds staff members constructed the application tanks for two three-quarter-ton pick-up trucks and one small pick-up truck. All of the trucks have been equipped to apply the solution to the streets and walkways.

Senior management supported the development and fabrication of the brine/beet juice application system by authorizing the time and capital investment necessary to learn about and construct the brine application systems, locating the facility space to house the equipment, and supporting the redesign of snow removal efforts to include the proactive approach of applying brine prior to weather events. Employees have embraced the innovative approach of brine/beet juice solution application as the new standard and participate in the ongoing use of the system.

brine solution eliminates the need to call plow operators into service outside of scheduled working hours. Often, the brine/beet juice solution is effective in removing snow and ice without the need for further clearing. In the cases when additional clearing is required, labor times for snow removal are reduced and operators report the snow is easier to "peel" down to the surface (as compared to non-treated roadways and walkways) after the brine/beet juice solution has been applied.

ENVIRONMENTALLY FRIENDLY SOLUTION

Brine, which is a mixture of salt and water, is most effective at precisely 23.3 percent salinity. This ratio of salt to water gives the mixture the lowest possible freezing point of -5.8 degrees Fahrenheit. It takes only 2.8 pounds of salt per gallon to achieve the optimum solution. In comparison to rock salt, brine reacts more quickly and has a lesser environmental impact due to the fact that it stays in place on the roads and walkways to which it is applied. Conversely, rock salt bounces from the roadways into turf areas and storm sewer systems. Additionally, cost analyses have demonstrated that applying brine is 50 percent less expensive than applying the equivalent amount of rock salt.

Adding sugar beet juice to the brine solution increases the solution's effectiveness by an additional five degrees. The advantage of the environmentally friendly beet juice additive is the fact that it is a natural product that adds the



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stickiness to the brine solution. Beet juice-treated brine has less "bounce" upon application and will remain in place on the roadways for up to three days, as opposed to a single day for a normal brine solution.

POSITIVE RESPONSE FROM CAMPUS CUSTOMERS

Customer feedback to the adoption of the brine/beet juice application process has been very positive. The transition to the proactive approach of applying the brine/beet juice solution prior to winter weather events has been seamless to the university community and there have been fewer customer reports of extremely icy campus areas.

For more information about the brine/beet juice application system, please contact Gary Evans at the Purdue Grounds Department by telephone at 765-494-3087.



San Diego Community College District

LEAN ENTERPRISE PROCESSES IN FACILITIES MANAGEMENT

BY ANDREW SCHWEIZER

Andrew Schweizer is communications liaison for the Propositions S and N Construction Bond Program at Gafcon, San Diego, CA. He can be reached at aschweizer@gafcon.com. This is his first article for Facilities Manager.

As California's second largest community college district, the San Diego Community College District serves more than 142,000 students at three main colleges and six Continuing Education campuses. The District will complete a \$1.555 billion build-out by 2016 that will double its facilities from two million square feet to approximately four million square feet.

With the state's ongoing fiscal crisis, it is clear there are no means to double the custodial and maintenance budget, prompting the District to pursue strategies to reduce operating costs associated with the build-out while continuing to deliver value.

By applying lean principles to custodial and maintenance functions, the SDCCD eliminated the need to add 20 positions, shaving off \$813,000 in the first year of a seven year process.



Additional efficiencies implemented over the next six years will increase projected savings to \$20 million. At the time of the lean practices assessment, more than 85 percent of maintenance work was reactive – responding to requests for service as they came in. With the use of three key lean tools – a priority matrix, work flow processes, and a Computerized Maintenance Management System (CMMS), more than 87 percent of maintenance work can now be planned and scheduled.

By utilizing lean principles to identify causes of waste and improve processes, the SDCCD has:

- Benchmarked custodial square footage cleaned and targeted goals to increase square footage per custodian over a three-year period
- Reduced reactive work flow and leveraged a new centralized work flow process in conjunction with the CMMS to reduce the volume and aging rate of open work orders
- Established lean custodial practices including custodial beat load leveling; implementation of uniform cleaning standards; and benchmarking and progress metrics via Management by Walking Around (MBWA) data collection
- Established clear Service Level Agreements (SLA) with all stakeholders served
- Improved practices to increase technicians' time on tools guiding material/supply management by implementing the delivery of work orders via handheld wireless devices

In its quest to be "service oriented" the SDCCD previously had no formal work prioritization process. Work was reactive, with the list of open work orders exceeding 1,600 and a higher per-square foot cost for cleaning compared to industry benchmarks (APFA Facilities Performance Indicators).

In the first year of the program, the cleanable area per custodian has increased from 13,000 square feet to 17,000 square feet while cleanliness has improved. Under the previous system, work orders were open for more than 75 days on average. Under the new program, and despite a fourfold increase in volume, work orders are now closed out within 20 days.

The need to perform a thorough analysis of custodial practices created an unprecedented opportunity for the custodial team members to really study how time was spent. Supervisors found

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that over time, they performed services for faculty and staff that were not in keeping with their core mission. As an example, the study showed the custodial crew spent an inordinate amount of time responding to faculty and staff that needed doors opened. Concurrent with the development of the new Priority Matrix, the team developed a new Door Opening Policy that helped reduce door-opening tasks from 17 FTE days per month to fewer than two. Using APPA's "Five Levels of Cleanliness," new Cleaning Standards were adopted which led to renewed value for cleanliness and higher levels of customer service.

A maintenance priority matrix was developed based on the work requested and its impact on the district's core mission. Work flow processes were then developed to "map" the progression of a work order, assuring accountability for each step from initiation to closing-out. The Computerized Maintenance Management System (CMMS) replaced piles of work orders with no clear organization or priority assignment with a clear automated system that enabled team members to meaningfully plan, schedule and maximize efficiencies. Open work orders and aging work orders dropped dramatically. With the capability of the CMMS to cluster work orders together by priority, campus or project, maintenance trades found that their 'windshield time' was reduced dramatically, enabling them to improve delivery of services while improving time management. The Regional Facilities Officers overseeing each campus' custodial and maintenance operations are particularly pleased with the CMMS, citing the enhanced ability to track workers' workloads.

A new Management by Walking Around (MBWA) program was implemented that allowed Supervisors to perform focused and strategic inspections. The inspections focused on areas requiring attention within a space. Supervisors quickly found the inspections helped leverage the new Cleaning Standards to raise performance. The walk-around inspections also revealed that some problems were maintenance issues rather than custodial, such as a wall which may have required repainting rather than extensive cleaning.

Using the custodial load leveling, many custodians found themselves reassigned from first and second shift to third, where the allocation of resources was in greatest demand. For some employees, this was a difficult change. If the District had maintained its previous approach to custodial delivery, the custodial ranks would have grown from 104 to 187 by 2016, far exceeding available funding resources. With the lean processes in place, the custodial ranks will still increase (to 127 by 2016), a powerful motivator for the current custodians who know their part in practicing lean facilities management is a key to the District's saving \$20 million over the eight-year plan.

UNIVERSITY of CALIFORNIA IRVINE

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SMART LABS ENERGY RETROFITS

BY MATT GUDORF, LEED AP

Matt Gudorf is campus energy manager at the University of California Irvine. He can be reached at mgudorf@uci.edu. This is his first article for Facilities Manager.

The Smart Labs program is an integrated approach to laboratory energy retrofit and new construction projects. UC Irvine's Energy Team has developed a roadmap to look at each system and break it down into its basic components to reduce the energy used to operate that system by 50%. The energy savings are used to pay for the retrofit over time, but the emissions reductions are realized immediately ensuring that the university meets its greenhouse gas emission reduction goals. A distinct benefit of instituting the Smart Lab concept as a retrofit project is the impact the program can have on unfunded deferred maintenance projects. Replacing aging, worn, or neglected systems with new high efficiency components nets a maintenance and reliability increase. Energy savings that provide enhanced reliability result in increased safety for operations within the lab building. The decreased down time from failures increases productivity and ensures students and researchers are provided with the best possible facilities for their research and teaching mission.

UC Irvine has determined that deep energy efficiency programs, as opposed to the 20 to 30 percent typical savings of past retrofit projects, are the only currently feasible route to meeting our climate goals. "Low-hanging," fast-payback projects at most institutions are already completed and now more sophisticated retrofits usually exceeding payback of eight years are required. These projects are not without risk, and the Smart Lab design that has now been tested is being deployed across UC Irvine's lab inventory and can be repeated by other institutions to achieve similar results.

UC Irvine has assembled an Energy Team with representation and participation from all relevant units of the campus. The group meets regularly during the project development, construction, and analysis phases to ensure that safety and customer satisfaction are not compromised in the name of energy savings. Environmental Health and Safety experts and the Campus Fire

Marshal have thoroughly reviewed each component of the Smart Labs concept; recommendations have been made and procedures implemented to maintain the highest level of safety while challenging previous best practices.

The Smart Lab concept has many individual features that UC Irvine has piloted over the last three years before being incorporated into our design guide. In order to make the deep energy cuts that are required to meet a 50 percent savings goal, theories must be tested, perceptions changed and results evaluated.

- **Exhaust Stack Discharge Velocity Reduction (ESDVR)** looks to reduce laboratory exhaust stack velocity and eliminate bypass air by reevaluating the original building wind tunnel study and performing additional wind tunnel testing to avoid re-entrainment and contamination of occupied spaces. Exhaust stack height may be modified to allow for increased plume dispersion and decreased energy consumption. Resulting energy savings of 40 to 50 percent have been achieved.
- **Centralized demand controlled ventilation** looks at real-time indoor air quality in the occupied spaces and varies the ventilation rates accordingly. This allows for significant air change rate setbacks during times of low process activity and lab space non-occupancy. UC Irvine has adopted a 4 air changes per hour minimum occupied and 2 air changes per hour unoccupied standard versus the previous 6 air changes per hour. The fan energy, chilled water, and hot water energy reduction approaches 40 percent during occupied hours and 60 percent during unoccupied periods. In addition the system provides real-time feedback of lab air change rates, contaminant levels, and in the event of a chemical or particulate excursion in the lab notification to environmental health & safety personnel.
- **Smart lighting** in laboratory space with daylighting opportunities uses controls to reduce light levels when adequate natural light is available. Perforated blinds are used in these spaces to diffuse direct sunlight but allow for partial daylight penetration. Occupancy sensing is used in a bay-by-bay configuration for maximum segmentation while incorporating an auto on to 50 percent manual on to 100 percent auto off sequence. In addition all linear fluorescent lighting at UC Irvine has been re-lamped with 25 watt T8 lamps and reduced light output ballast.
- **Lab buildings campus wide** that are not Variable Air Volume with Direct Digital Controls are retrofit with lab air control valves, digital thermostats, and occupancy sensors. Office and support space within lab buildings air flows are reduced by 80 percent when unoccupied.
- **Air Handlers** are retrofitted with VFD drives, premium efficiency motors, static pressure reset control sequences, and low pressure drop filters. Sound attenuators are removed and in combination with the new filtration media required fan energy to meet static pressure requirements is reduced by 15 percent.
- **High performance fume hoods** allow for improved contain-

ment with the potential to reduce face velocity from 100 FPM to approximately 70 FPM based on a study conducted at UC Irvine in conjunction with CAL-OSHA.

- **UC Irvine purchasing policy** requires that new equipment be Energy Star certified. This includes freezers, refrigerators, ice machines, and copiers. All energy saving features are enabled to increase plug load savings. PC Power Management software is installed on desktops and in computer labs.

Smart Labs are also only as effective as the people who operate and use them. This is why as part of our Smart Lab concept at UC Irvine we have incorporated an extensive training program. The program consists of training for the building technicians that must work on the more sophisticated systems ensuring that they possess the skills required to troubleshoot and repair system failures. We also provide occupants training as they are the front line of defense not only when systems fail, but they also have the greatest impact on realizing the savings of the Smart Lab design.



The renovation and retrofit projects often take place in operating research labs throughout campus. UC Irvine Facilities Management has included students and staff throughout the process. Facilities Management conducts town hall meetings to share the Smart Lab concept with building occupants prior to construction. This not only keeps occupants informed of construction activities taking place in their lab it also opens a dialog that has led to additional energy savings. Lab users often locate energy waste in lab spaces that may go unnoticed until retro commissioning can take place.

After completion of a Smart Lab renovation or new construction project, building occupants are again contacted by Facilities staff with on-site training and handouts are disseminated throughout the building to provide occupants with information on how to use the newly installed features. Training leads not only to increased lab safety but carbon and energy savings through sash management, best lighting practices, and knowledgeable use of the HVAC system. ①

CUTTING COSTS and IMPROVING OUTCOMES for JANITORIAL SERVICES

By Jeffery L. Campbell, Ph.D.



Recent research reveals that janitorial services account for nearly 30 percent of facility budgets, which translates into billions of dollars annually. With janitorial services consuming such a large share of budgets, other industry findings are alarming. Most cleaning systems: 1) have no quantifiable standards; 2) are based solely on appearance; 3) have little or no method of measuring effectiveness and performance; 4) are not based on actual research; and 5) are driven by chemical and equipment manufacturers. In an industry that has been around as long as public buildings themselves, janitorial methods have seen little progress. As a matter of fact, most janitors today use the same tools and processes that were used 50 years ago.

With the current tight economy where every facet of business has had to become more accountable, the cleaning industry continues to lag behind. However, some innovative approaches are being introduced that efficiently manages janitorial services by utilizing measurable standards and up-to-date business practices. The following case studies highlight four universities that have implemented these practices. Not only have these universities improved their overall cleanliness, but they have experienced significant savings.



CASE STUDY 1

In 2008, the University of Massachusetts (UMass) was facing a \$46 million reduction in funding campus-wide. Ashoke Ganguli, director of auxiliary services at UMass contracted a cleaning industry consultant to test a system that would reduce costs while maintaining quality. This consultant does not sell products or equipment but utilizes best practices based on research and predicted outcomes.

Summary of Improvements:

- APPA Level of Appearance improved from Casual Inattention to Orderly Spotlessness
- Saved \$360,000 in the first year
- Lost work hours decreased 89% in first two years

The pilot building selected for the test was the 360,000-square-foot Campus Center (student union building), which houses meeting and conference rooms, a hotel, special events, catering, food service and food outlets, the bookstore, and a variety of other services for students and visitors. It is the busiest hub on campus with more than 12,000 to 15,000 people passing through each day. The high foot traffic made cleaning especially challenging. Current operations included 38 FTEs (full-time equivalent staff) based on a 7-day workweek. As a measure of cleanliness UMass used the widely accepted APPA Five Levels of Appearance (see chart below). *[Editor's note: The complete APPA custodial guidelines can be found in the newly published Operational Guidelines for Educational Facilities: Custodial, third edition, available through the APPA Bookstore.]*

Prior to the test, the Campus Center was consistently scoring at Level 3-Casual Inattention.

APPA Levels of Appearance	
Level 1	Orderly Spotlessness
Level 2	Ordinary Tidiness
Level 3	Casual Inattention
Level 4	Moderate Dinginess
Level 5	Unkempt Neglect

When UMass implemented the recommended engineered cleaning system, the first step was to perform a building profile. This profile determines exactly how much cleanable surface area there is, and what kinds of surfaces need to be cleaned. Research has shown there is a 10 to 40 percent difference in cleanable square feet than what is actually reported; this was the case for UMass. The next step was determining regular custodial functions. Because the Campus Center provides such a variety of

services it was easy for costs to be incurred from duties that are not regular custodial responsibilities such as the set up of meeting rooms at all hours of the day.

Next was to workload the cleaning assignments. This includes utilizing the team-cleaning concept which assigns specialized tasks and equipment to each team member. Team-cleaning allows for simplification of the cleaning process which results in a safer, healthier, and more productive work environment. An analysis of who, what, when, where, why, and how surfaces are cleaned was detailed. This analysis included an important research study titled *ISSA's Official 540 Cleaning Times* that identified the amount of time needed to clean all types of surfaces. Prior to implementing the engineered cleaning system, custodial functions required 1,560 hours of labor per week. After the work-loading stage was completed and tested, it was determined that the building could be cleaned with 31 FTEs and 1,240 hours per week based on a 7-day work week. This was a difference of 320 direct work hours per week, with annual savings of \$360,000, or a 20 percent reduction in cost.

"Cleaning is strategic to the university's mission."

A major concern with the campus budget cuts was whether the quality of performance could be maintained. After implementing the new system, cleaning improved dramatically from Level 3-Casual Inattention to 1.5-Orderly Spotlessness. This improvement was clearly apparent to students, staff and visitors. Not only did appearance improve, but there was substantial savings to the budget. Director Ganguli was able to return \$360,000 to the university the first year. Another benefit, not reflected in the cost savings, was the reduction of lost work hours due to accidents. Over a two-year period lost work hours decreased 89 percent.

CASE STUDY 2

In 2009, the department of Plant Building and Grounds Services at the University of Michigan faced deep budget cuts. Director John Lawter began to investigate how other universities were dealing with this challenge. Among best practices he identified were at UMass, University of Texas, University of North Carolina, and University of New Mexico. They had all saved considerable dollars while significantly improving levels of appearance from implementing the engineered cleaning system.

Lawter decided to implement the engineered cleaning system; the rollout began in July 2009. The scope of the project included 200 buildings comprising 15 million gross square feet. The three-year goal for the program is to cut 10 percent, or \$2.1 million of their budget. After the first nine months

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Summary of Improvements (after 9 months):

- Reduced 11 FTEs
- APPA Level of Appearance improved from Ordinary Tidiness to Orderly Spotlessness
- Facility quality assurance scores improved 30%; defects decreased 70%

(reported March 2010) their objective was to be achieve 10 percent of this cut. Surprisingly, they achieved 11 percent, which represented a reduction of 11 FTEs. In addition, the APPA Level of Appearance improved from 2.22-Ordinary Tidiness to 1.87-Orderly Spotlessness.

It is important to note that these scores take into account more than just appearance. When the independent auditors from the university's quality assurance department grade the space, they are not only looking at cleaning appearance but also maintenance issues (regardless of who is responsible). If a room scores a 4/5-Moderate Dinginess/Unkempt Neglect due to maintenance problems, it is considered a defect and must be investigated. The month before the rollout, 180 defects were identified. In month nine of the rollout only 43 defects were reported. Overall, after nine months, facility quality assurance scores improved 30 percent and defects decreased 70 percent.

CASE STUDY 3

In 2006, Dr. Michael Berry, an industrial hygienist and researcher at the University of North Carolina, tested the cleanliness of two adjacent halls that were being cleaned with two different systems. Carroll Hall was using the engineered cleaning system at an 80 percent audit level, and Dey Hall was using traditional zone cleaning. The tests included measuring dust removal, presence of fungal spores, restroom bacteria count, and indoor air quality.

The results were as follows:

- The engineered cleaning system in Carroll Hall showed a 31 percent reduction in carpet dust, 120 percent average reduction in hard floor dust, and 342 percent average reduction in counter dust. Dey Hall showed six times the carpet dust, twice the hard floor dust, and almost twice the counter dust.
- The engineered cleaning system produced a measurable cleaning result that is a factor of two to five times more effective in removing unwanted dust from the building envelope.
- Carroll Hall showed a significant fungal spore reduction from the pre-engineered cleaning system test of 15 to 3 percent after one month measurement of post-engineered cleaning system implementation. Overall, Dey Hall had higher levels of fungal spores.
- For the aerobic bacteria test in restrooms, samples were taken in both buildings. Bacteria samples taken from door handles, sink basins, sink faucets, and toilet seats rims showed that post-engineered cleaning system samples decreased by 94 percent. This score was 6.2 percent lower than Day Hall.
- Air quality was measured at approximately PM10 (airborne

dusts in the size range less than 10 microns). Both halls measured similarly, with Carroll Hall averaging 11-30 ug/m³ and Dey Hall averaging 15-40 ug/m³.

Amazingly, the restrooms had higher pathogen counts after the traditional housekeepers finished "cleaning" than before they entered the restroom. Dr. Berry observed they were actually polluting the area—not cleaning it. In the engineered cleaning system cleaned restrooms, the housekeepers left the area at healthy pathogen levels. Dr. Berry strongly suggests that janitors and cleaners be more concerned about indoor environmental quality, thus changing their mindset to consider themselves as healthcare workers. Dr. Berry feels cleaning for health must be more important than cleaning for appearance. Unfortunately, most cleaning processes pollute indoor environments more than clean them.



Summary of Improvements

- Chemical usage and repairs declined, saving thousands each month
- Reworks decreased 76% after nine months
- Janitorial Services began leading the university in sustainability and green practices


CASE STUDY 4

The University of Texas at Austin (UT) began working with the engineered cleaning system process in 2000. At the time, the university had a total population on campus of 74,366. Janitorial services cleaned 110 buildings consisting of 8.6 million square feet. As an initial step, UT implemented a new mindset towards their cleaning staff. They determined to treat all janitors like first-class citizens, and provide the right training, equipment, and environment in which they could succeed. Dr. Pat Clubb, UT's vice president of employee and campus services, championed this mindset change by stating that cleaning is "strategic to the university's mission as it has a large role in maintaining the physical environment of this world-class institution. It is the single largest service division; provides for the health, cleanliness, and safety of

university students, staff, faculty, and visitors; touches virtually all campus clients daily; has access to almost every part of the campus; is a highly visible group; and strongly supported by clients."

Next UT began to track progress and put measurable metrics in place. Chemical usage, equipment repair costs, and reworks (defects) by type, how often, and where were all tracked. All results showed significant improvement. Chemical usage and repair costs initially decreased dramatically then leveled out, ultimately saving thousands of dollars each month. After nine months, reworks dropped from 212 to 49, a 76 percent decrease. Other tracking included consistency of emptied trash, floors mopped, detailed cleaning, vacuuming, locking doors, restrooms, glass specialty areas, and chalk boards. One additional benefit was the department began to lead the university in sustainability and green practices.

SUMMARY

These four case studies provide a business model worthy of further investigation. They illustrate the benefits that can occur when janitorial services are carefully managed. By implementing a measurable cleaning system that is based on solid business practices, research, and engineering, businesses and educational facilities will eliminate needless costs and significantly improve quality. 

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EXCEED EXPEC

by John Cannon



ING TATIONS

Imagine that you attended an event such as a professional baseball game with your favorite team. Your college friends contacted you because they had free tickets with great seats for the game. It was going to be a fantastic night and the first time in a long time when you were able to spend time with these special friends. The game was great, your team won, and you went home happy.

Now, let's say that you were invited to the same game, same tickets, same friends, and you were told that you would get to meet some of the players after the game. You were elated and told many friends and family about the upcoming game. The game was great, your team won, but the players had to leave right away and you did not get to meet them. Do you think you would leave as happy as you did in the previous example where you did not expect to meet the players? I highly doubt it. You might have even left angry or felt as though you were cheated. How could this happen when everything you received was free and you enjoyed a great game with great friends? The explanation is that you had a picture in your mind of how everything was going to happen and anything less would be a disappointment.

Expectations play a major role in the lives of

everyone. In the second example, you simply had an expectation that was not met and human nature took over from there. Eventually you will hopefully realize how fortunate you were to be included in such a fantastic event and it can be a great memory for many years. To come to this realization, you must realize that if you never anticipated meeting the players, you would not have experienced the disappointment.

Awareness of expectations is so important in the facilities business. My experiences have taught me that it is essential to understand how expectations impact our lives as well as those for whom we provide services for every day. The following examples and ideas will provide insight and ideas to help you understand and manage expectations in your lives and in the environment where you work.

WHY SHOULD YOU CARE ABOUT EXPECTATIONS?

Take a minute to think about a day when you felt especially good about something that happened at work. There is a good chance that you felt this way because something exceeded an expectation in your mind. It could be that you just finished a project and it turned out better than expected. Maybe you received a compliment for work completed by you or your staff, or perhaps you just sat down for your annual review and it was very positive.

Now try the opposite and think of a day when you left work and wondered why you ever got into this business. (Yes, most of us love our occupations, but there are days when our patience and love for the facilities business is tested.) There is a good chance the day was bad because some expectation was not met. It might have been an unhappy customer or staff member, or it may have even been that a critical system failed. The day essentially went poorly when things happened that you or someone else didn't expect. This is especially difficult because we all strive to make things run smoothly. When they don't, most of us feel personally responsible, even if it was not entirely in our control.

THE IMPACT OF EXPECTATIONS

This discussion is not meant to change the way you look at the world, although it may happen. The important concept to understand in a service industry, such as facilities, is how this phenomenon impacts the happiness of your customers and staff. People arrive on your campus with a variety of backgrounds and experiences, and therefore, different expectations as well. Many new employees will arrive on your campus and bring their expectations from a previous campus. Maybe the facilities organization from their previous employer was funded at a significantly higher level than your department, and therefore they were able to provide additional services. This individual may be frustrated because they cannot understand why they are not receiving the same level of service. Of course, the opposite is true as well if your organization provides more services than their previous employer.

As a way to measure client satisfaction, many facilities departments today use surveys as a way to monitor and improve performance of their department. While surveys can be great tools, they must also take expectations into consideration. For example, have you ever answered this question: "Did the service meet your expectations?" Let's say that you answered "yes" to the question. All that means is that the individual completing

the survey is satisfied with the work. It doesn't tell you anything about how well the work was completed.

Let's say that a technician responded to remove a stain from a carpet. They arrived at the location armed with cleaning supplies and equipment and worked to remove the stain while the occupant watched. They scrubbed for a while with the smell of cleaning chemicals in the air. Most of the stain was removed but you could still detect that it was there. The occupant witnessed how hard the individual worked and was satisfied with the work because they concluded that the person did the best they could. If this

client was surveyed, most likely their response would be "satisfied," because their expectation of having someone clean the carpet stain was addressed right before their eyes.

Now, what if the client was not present to see the work being accomplished? There is a good chance that their expectations may not be met because the stain can still be detected in the carpet and they never witnessed the staff member working diligently to remove as much of the stain as possible.

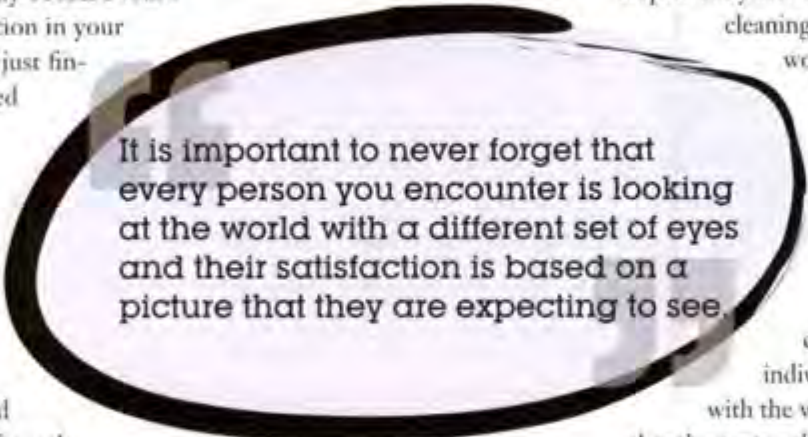
Looking at these two examples, you can easily see how the same issue and same work response may have two different outcomes depending on the client's observations and expectations.

Going back to the survey results, does a positive response to the survey determine if this person did a good job? What if the wrong cleaning chemical was used and the stain could have been completely removed if the proper cleaner was used? The occupant may not be happy if they had this piece of information as well.

Now let's consider the concept of exceeding expectations. A faculty member has a light above their desk that is flickering on and off. The problem is addressed in about two hours. The faculty member is satisfied if they expected the work to be completed in this time frame. However, they might not be happy if it took six hours to fix the problem. Additionally, if the problem was fixed in less time than originally stated, then their expectations would have been exceeded. Exceeding expectations in this example may be completing the work professionally *and* sooner than the faculty member expected.

HOW ABOUT STUDENT EXPECTATIONS?

Prospective students apply to numerous colleges and universities. They tour many campuses and enroll at your institution with high expectations for a positive experience. There is no doubt that all of us hope to contribute to this great experience, but it's hard to determine whether their expectations match the level of service we are funded to provide. Did they live in a situation at home with a shared room and bathroom? Do they



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have a housekeeper or cleaning service? Having a better sense of your student body will be helpful to you and your team in communicating and setting the expectations for those that your staff members come in contact with day to day.

Now that we understand how people have all different expectations, does this mean we eliminate customer satisfaction surveys? I highly encourage the use of surveys as long as these client expectations are considered when developing them. For example, in the carpet cleaning scenario you could ask; was the problem completely remedied, if not, is further service required? If anything, these surveys can help tell your customers that you care about their opinions but remember to keep your questions focused and the data you receive in context as you outline areas of concern or improvement.

SETTING EXPECTATIONS

So how do you survive in a world where we are always trying to exceed expectations? The first step is to try to help people adjust their expectations where necessary. The following are some suggested steps:

- *Utilize Technology*

Use the Web or your work management system to educate requestors and provide as much information as possible to

help them understand what to expect for service. For example, services provided, anticipated timing, procedures to request services, etc. Make sure you can meet the service level that is published! Remember, people are happy when the work is completed in an hour when they expected two.

- *Create Service Standards*

Create standards for your services. Train the staff to understand and follow these standards, then provide appropriate inspections to make sure the standards are being met. Make sure the standards are attainable at your current staffing and budget level. If an individual is not happy with your services you can determine if the appropriate standards were met only if you have specific criteria set. If expectations were met, you can help educate the unhappy individual on your team's standards for service. If you don't feel the work completed matched your set standards of service, then an investigation with the staff is warranted.

- *Customer Interaction*

Encourage your staff to make contact with requestors when possible and also provide immediate feedback if reasonable. This will tell the requestor that you responded and worked to remedy the situation quickly.



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• *Resolve Problems Immediately*

If you receive a complaint or find out you have an unhappy customer, it is important to understand and remediate the situation as quickly as possible to restore the faith in your department and to ensure the customer understands how important they are to your department.

• *Promoting Your Department*

Always take the opportunity to promote the professionalism and skills of your department. This can create an environment where people feel that if something is not done exactly when or how they expected, then there were other factors in play, because this is a great department. Also consider recognizing your team by applying for awards that reward facility departments who provide a high level of service and customer care. Receiving these prestigious awards of recognition will help create this client service environment, not only for your staff but also the clients that you serve.

• *Staff Education*

Educate your staff on the importance of promoting the department. This is most important between department divisions. For example, there may be natural conflicts/competitions between operations and construction. Any issues should always be resolved immediately, and never forget to promote a mutual respect between the groups. If you find that you have individuals that are criticizing others in your department, it must be dealt with immediately and with a clear explanation of how this type of behavior impacts the image of the whole department.

• *Communications*

Share and discuss this article with your staff. Use it as a training tool to help them understand their critical role of customer interaction and how a simple follow-up when something is repaired or corrected can make a big difference.

I am sure you can think of many other ways to set expectations and I encourage you to try new methods. It is important to never forget that every person you encounter is looking at the world with a different set of eyes and their satisfaction is based on a picture that they are expecting to see.

The more success that you have setting appropriate expectations for yourself and those around you will provide more of those days when you go home feeling good. And that is what life is all about! ①

Have you ever experienced the frustration of dealing with a disappointed customer when you knew you provided excellent service? How did you feel when that happened? Frustrated? Confused? Incidents like this are usually the result of misunderstood expectations. Expectations play a major role in our lives and are particularly important for those in the facilities profession. This article clarifies the role of expectations in customer satisfaction, and provides the framework for developing a plan to improve customer satisfaction which will enhance the reputation of your department. The guidelines are also provided to change your corporate culture and set the stage for a stronger department.

Five Key Words:

- **Exceed**
- **Expectation**
- **Customer**
- **Satisfaction**
- **Service**



John Cannon is associate director of physical plant at the College of the Holy Cross, Worcester, MA. He serves as treasurer of the Southern New England Chapter of APPA and can be reached at jcannon@holycross.edu. This is his first article for *Facilities Manager*.

Siemens Strengthens Texas A&M's Tradition of Energy Management

Of the many trends impacting U.S. colleges and universities in the next 10 years, two are converging at a rapid pace. The steady decline in the number of high-school age students, from 21.5 million in 2009 to less than 20 million by 2020, is dovetailing with the rapidly increasing value 18 and 19 year-olds place on global responsibility. To attract smart, young students, institutions are finding they need to be seen as leaders in energy conservation and other areas of sustainability. Texas A&M University is one institution that has taken this bull by the horns.

As one of the nation's oldest and largest universities, Texas A&M is recognized as a leader in all facets of higher education, from academics to athletics to scientific research. The university has also been a leader in campus energy management, dating back to 1893 when it first began generating a significant portion of its own electricity. Texas A&M continues to look forward, with a new \$15 million performance contract and the help of Siemens Industry, to upgrade the efficiency of over 20 campus buildings.

Decreasing Costs While Increasing Enrollment

Texas A&M's proactive approach to managing energy consumption on campus targets two important goals. It wants to further control energy costs and provide a greener, more energy efficient campus for a more environmentally-conscious student body. This effort, spearheaded by the university's Department of Utilities and Energy Management (UEM) team — led by Jim Riley, Director of Utilities and Energy Management, and Les Williams, Associate Director of Utilities and Energy Management — has been a proven success. Since 2002, Texas A&M has been able to reduce energy consumption by 25% despite the fact the campus' total square footage grew by 18%.

Staying Ahead of the Curve

Today, the campus is embarking on an ambitious upgrade of 24 campus facilities to further improve energy management.

To do this, it is leveraging a \$15 million performance contract made possible through ARRA stimulus funds secured by the Texas State Energy Conservation Office (SECO). The contract allows Texas A&M to fund facility improvements through a low-interest loan paid for by future energy savings.

To implement the performance contract, Texas A&M partnered with the Building Technologies Division of Siemens Industry, Inc. a global leader in building automation and energy efficiency solutions. Siemens was selected in part because of their past successes with Texas A&M energy management initiatives. Additionally, the university felt confident in the ability of Siemens to complete all project work by the end of 2011, a key condition of the funding, according to Riley.

Creating a Better More Efficient Campus

In defining key elements of the building upgrades, Siemens and Texas A&M identified solutions that both reduce energy consumption and create buildings that better meet the needs of its students, according to Williams. The final list of projects calls for improvements to 24 campus buildings. These improvements include:

BAS Building Optimization —

Optimization of the campus' building automation system (BAS) will improve energy efficiency and enable better HVAC control in buildings representing over 1.6 million square feet.

Occupancy Sensors —

Occupancy sensors will be installed in offices, classrooms and common areas to reduce energy consumption and eliminate the wasteful practice of conditioning and lighting spaces when not occupied.

Lighting Retrofits —

Replacing older inefficient lamps will reduce energy consumption dramatically. Texas A&M's 700,000 square foot library will benefit greatly from this upgrade as will campus parking garages, which must remain lit 24/7/365.



Top, Rudder Tower is one of 24 Texas A&M buildings undergoing energy efficiency upgrades.

Bottom, from the left: Jeff Murray, Siemens; Jim Riley, Director Utilities & Energy Management, Texas A&M; Jacob Richardson, Siemens; Les Williams, Associate Director Utilities & Energy Management, Texas A&M.

The Impact of Performance Contracting

Once the project is completed in 2011, these building improvements are estimated to generate \$1.1 million in annual operations and utility savings. The university and Siemens are working closely with an independent third party assessor, selected by SECO, to ensure performance and savings goals are met. The end result is a more efficient, sustainable campus benefitting the students, budget and the environment.

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Planning, Design, and Construction in the BOK

By William A. Daigneau

Many, many years ago someone told me that the value I brought to an organization was not that I had any better answers, but that I knew what questions to ask. Certainly I have tried many approaches to find the right answers to various challenges or problems, some with success, some with little or none. But over the years, while my quiver of the "right answers" has remained relatively small, my quiver of "right questions" has burgeoned! And with it has grown my skill at identifying those better solutions that just might possibly succeed, while avoiding those that would likely lead to dead ends, or worse yet, disaster. Some might label that ability as "knowledge" or "expertise."

The breadth of skill and knowledge required to be an effective facilities manager, let alone an institution's chief facilities management officer, is intimidating. We must not only have the prerequisite background to understand building systems and operations, but must also be good at human resource, financial, process, information, construction, energy, and customer relations management. Then there's that whole leadership thing. Since most people spend an entire lifetime focused on just one of the many areas in which a facilities manager is expected to perform, the dilemma of equipping an individual with high levels of skill in all these areas is quite formidable.

So in undertaking the updating and publication of APPA's fourth edition of its facilities management manual, the APPA *Body of Knowledge* (BOK), the focus has been on providing the

educational facilities professional with the essential information that leads to a complete solution. However, it does not provide exhaustive details on each subject. To perform exceptionally well in a specific area of expertise, one must either become more proficient in that area (for which the BOK provides reference material, as well as APPA's other educational resources), or the facilities manager must recruit and organize a team of professionals that possess that proficiency.

help you define where you are going and how to get there. For any facilities professional, a complete understanding of the elements of the planning process is a critical to their and their institutions' success.

Before a shovel hits the ground, an institution must consider the types and amount of space it requires to achieve its mission and if it is utilized productively. In the chapter **Space Planning and Administration**, Joe Bilotta, a

BASED ON THE MISSION OF THE INSTITUTION AND THE CONDITION AND PERFORMANCE OF ITS SPACE, THE IDENTIFICATION OF SPACE DEFICITS AND LONG-TERM NEEDS CAN BE DEVELOPED, LEADING TO THE NEXT STEPS IN FACILITIES PLANNING.

Thus the section on Planning, Design, and Construction (PDC) of the BOK is devoted to orienting the facilities manager on the fundamental information necessary to effectively manage and lead this area, and the key details of each subject that are essential for effective performance. It does not purport to educate an individual to the point that they would be able to deliver the required services themselves without further study or experience.

The PDC section is organized into three subject areas as follows:

PLANNING

As has been said, if you don't know where you are going, any road will take you there. Effective planning processes

higher education planning consultant, develops a holistic view of space management. His IOU approach (Indoor, Outdoor, Underground) helps facilities managers understand that space is an important asset and all aspects of it must be planned for and managed. Based on the mission of the institution and the condition and performance of its space, the identification of space deficits and long-term needs can be developed, leading to the next steps in facilities planning.

That next step is the development of a campus master plan. Robert Kitamura of California Polytechnic has led a team of exceptional planning professionals in writing the chapter on **Master Planning**. Their excellent work describes

both the critical elements of a master plan and the process required to prepare one. A complementary piece of master planning that is often overlooked by many institutions is a long-term infrastructure plan. How people will actually use a campus and rely on its network of utilities, roadways, parking, service access, and greenscape must be carefully considered and planned for. In the revised and expanded chapter on **Infrastructure Planning**, Frederick Mayer (retired) of the University of Michigan covers all of the details beyond the scope of most master plans, those necessary to build and operate a campus environment "that works!"

As a campus grows and obsolete facilities need to be replaced, plans for new buildings and infrastructure are developed. The initial step in constructing these new or renovated facilities is the preparation of a detailed description of the programmatic needs to be met and how programs will function in the proposed space. Ira Fink, the well-respected space-planning consultant, explains the importance of a comprehensive needs analysis in his chapter on **Programming**. Particularly helpful is his description of the skills necessary to help the programmer separate fact from fiction when defining needs versus wants.

Once the programming has been completed and the space requirements defined, building scope and location is determined with guidance from the master plan. The objective for the FMer is to fully understand the components necessary to achieve a fully functional building that meets the needs of the occupants as well as the institution. Joe Bilotta's chapter on **Site Planning and Development** illuminates those aspects of a project often overlooked, such as special soil conditions, regulatory issues, and other aspects that affect total project cost.

A reasonable estimate of the total cost of projects is used not only to guide project management but also for capital budgeting and financing. The chapter

on **Capital Budgeting** by Alan Matthews covers the identification, prioritization, and funding of an institution's total demand for capital. It is important for FMers to understand financing since there are a number of issues that may arise and restrict either the total available funding or impose specific requirements on individual projects.

With plans well established and funding secured, the next section of the PDC covers the elements of actual project implementation.

DESIGN AND CONSTRUCTION

The first important and necessary task in constructing facilities improvements is to organize the effort. David Allard, a well-experienced higher education architect, discusses effective project organization and project controls in his chapter on **Project Organization and Management**. The people that manage the projects and the tools they use to control cost and schedule often determine a project's success. This chapter is a must read before embarking on any project.

The second important task is the selection of the project delivery methodology. Today the FMer has a number of options, and Robert Smith of the University of Arizona covers those options in his chapter on **Project Delivery**, discussing their advantages and disadvantages. With a delivery method selected, a project moves into the design phase. Michael Haggans, a contributor to the last version of the manual, deals with the sometimes confusing and complex developmental design process in his chapter on **Design Management**.

Rounding out this section are informative chapters that cover the basics on managing the actual construction as well as the final commissioning and activation. The chapter on **Construction Management** by Jeffrey Gee of Swinerton, Inc. covers all the essentials but has a particularly good discussion on project communications and surety, two areas often left to others but with significant effect

on a project's success. Richard Casualt, a recognized expert in building systems commissioning, provides comprehensive coverage of commissioning in his chapter on **The Building Commissioning Process**. He makes a convincing argument that while commissioning may start near the end of a project, the initiation of commissioning activities should begin during the design phase to ensure maximum success.

While the Planning and the Design/Construction sections cover the most important essentials, there are a number of additional subjects important to the FMer. These are covered in the last sections.

SPECIAL TOPICS

One of the hottest areas for discussion amongst FMers is the emerging technology of Building Information Modeling (BIM). Why? BIM, already considered a valuable tool during the design and construction process, is now believed by many to be as important to future building operation and maintenance. Jim Jacobi, whose firm Walter K. Moore is on the forefront of BIM adoption, introduces this technology and explains how it can be a significant aid to both the design/construction professional as well as the project owner in his chapter on **Building Information Modeling**.

Then there is the whole topic of "green" in construction. The chapter on **Sustainable Design and Construction** by Andrew McBride at the University of Richmond is not exhaustive but gives the reader a good grounding by explaining the LEED criteria. Whether or not one seeks certification, the criteria are useful for considering all aspects of sustainable design and construction.

Got a problem with the project budget? **Value Management** by Steven Thweat of Emory University will help you get ahead of this problem by avoiding the most common pitfalls of value engineering, by looking at value in a more complete way. I myself learned a lot from his chapter.

Although construction of new build-

ings is episodic for most of us, renovating them is not. **Renovations** by Mark Thaler, an architect with the architectural/engineering firm of Einhorn Yaffee Prescott, reviews all the special circumstances and unique challenges encountered in building remodeling and renewal, based on his years of experience in this arena. Since much of the campus renovations may be performed with in-house staff, Robert Unrath at the University of Missouri covers both its advantages and disadvantages in his chapter on **In-House Design/Construction Services**. Those that have or are contemplating such services will especially benefit from his discussion on defining your "niche."

Of course, an important aspect of facilities management is acquiring or disposing of property, leasing space as a bridge to long-term facilities development, and providing ancillary facilities such as research parks, housing, park-

For more information about APPA's Body of Knowledge, go to www.appa.org/bok

ing, or retail venues sought by students. The key principles necessary to deal in this environment are covered in the chapter on **Real Estate** by Jeffrey Lipton (retired) from the University of Colorado. Does a deal sound too good to be true? Read his sections on Risk Management, Due Diligence, and Environmental Risks.

SUMMARY

Taken all together, the chapters in the PDC section of the BOK will give the FMer a comprehensive overview of planning, design, and construction processes. The chapters have been written by experts in their fields, reviewed for

accuracy by similarly knowledgeable experts, and come with a complete set of reference sources for more detailed information. While many of us rely on staff or consultants experienced in the details of PDC, we nonetheless are expected to ensure these functions are performed ably and professionally at our institutions. For the newly promoted or even the seasoned facilities manager, the PDC section will provide the base knowledge required to make sure that you are able to "Ask the right questions"! ☛

Bill Daigneau is vice president and chief facilities officer at the University of Texas M.D. Anderson Cancer Center, Houston, TX. He serves as the content coordinator for the Planning, Design, and Construction section of APPA's BOK, and he recently received the 2011 Rex Dillow Award for Outstanding Article in *Facilities Manager*. E-mail him at daigneau@mdanderson.org.

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Net Zero Energy Buildings by Innovation or Legislation

By David L. Handwork

Looking ahead 30 years, what will our buildings look like? Not in reference to architectural appearance, but in the context of energy consuming systems. A possible means of considering the future is to look back 30 years and review building science advancements.

In 1981, large building HVAC systems were controlled with pneumatics and consisted of constant air volume. Low emissivity (low-e) windows had not yet been introduced. Incandescent and T-12 fluorescent (with magnetic ballast) were the design norm. The most complex lighting control system was rheostat dimming. All plumbing fixtures were manual operation, with a typical toilet expending up to 3 gallons of water per flush. Even if building codes allow the use of these examples of building systems today, the advancements of technologies since 1980 have made these options economically obsolete.

Of course, current codes strictly prohibit these outdated technologies. Did the codes and standards drive the advancement in building technologies? Absolutely not. The codes and standards responded to federally prescriptive minimum efficiencies, industry best practices, and free market advancements in technologies. Codes and standards generally ensure irresponsible building owners and developers do not revert to outdated systems.

EXPECTATIONS FOR THE FUTURE

Therefore, looking ahead to the year

2040, what can we expect? That should be clearly be left to imagination. In 1980, could most building designers and engineers envision microprocessor base controls (accessible via the Internet), variable frequency drives, LED lighting, occupancy-based controls for lighting and power systems, and many other advances now taken for granted? Even so, it is reasonable to foresee buildings in 2040 equipped with systems that harness energy from sustainable resources such as solar, wind, biomass, and geothermal. This hypothesis is justified by thousands of successful building examples.

**THE CODES AND STANDARDS
RESPONDED TO FEDERALLY
PRESCRIPTIVE MINIMUM
EFFICIENCIES, INDUSTRY BEST
PRACTICES, AND FREE
MARKET ADVANCEMENTS IN
TECHNOLOGIES.**

Most of these buildings are classified as site Net Zero Energy Buildings (NZEBs), defined by integrated alternative energy systems that produce at least as much energy as is consumed. Due to the success of NZEBs, the building industry and building owners have started focusing on their feasibility with increasing interest. Unfortunately, the barrier to widespread or exclusive

construction of NZEBs is entirely economic. This author hopes—and dares to predict—that free market innovation will remove this barrier by 2040. As wide as the technology leap between pneumatic and Web-based DDC controls, building owners should expect at least an equal leap in renewable energy technology.

OTHER INITIATIVES

There are activities that may not rely on innovation solely to develop NZEB technology. Instead, these activities are proposing mandates via codes and standards to legislate NZEB construction. The most prevalent action is U.S. Senate bill SR 1000, titled "Energy Savings and Industrial Competitiveness Act of 2011." The bill establishes a goal for commercial and residential NZEBs by 2030, less than 20 years. The bill also gives the Department of Energy secretary authority to review existing energy conservation codes and standards, specifically ASHRAE Standard 90.1 and International Energy Conservation Code, providing input, and possibly directives, on revisions to achieve the 2030 NZEB goal. The secretary furthermore has authority to establish a DOE-produced national energy code if these documents fail to meet the 2030 goal. These two bill provisions alone create unprecedented federal legislation, if maintained and passed. Assuming the provisions are removed, the legislation would improve national energy efficiency standards and fund initiative for innovation.

Parallel to the federal arena, the American Institute of Architects (AIA) and American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE) have noble and ambitious goals of Zero Carbon Emission and NZEBs by 2030. Being composed of industry leaders and design professionals, both AIA and ASHRAE


ULTIMATELY, ALL BUILDING OWNERS SHOULD ASPIRE TO DESIGNING, CONSTRUCTING, AND OCCUPYING HIGHLY SUSTAINABLE BUILDINGS.

will pursue the 2030 goal primarily via innovation and advanced technology utilization. Unfortunately, the size and diversity of both organizations has

proven too slow and/or stall such pursuits with intrinsic bureaucracy.

Smaller and more focused organizations are arising to address the 2030 goals in support of the AIA and ASHRAE initiatives. However, the speed of advancement of activities with codes and standards, led by the smaller organizations, may be outpacing the current state of building industry innovation.

A recent example is the New Buildings Institute (NBI). NBI has been effective in developing high performance and NZEB design guidelines and promoting sustainable buildings. In 2010 revision cycle, NBI, with support of AIA and the Department of Energy, proposed revisions to the International Energy Conservation Code to advance energy efficiency more than 30 percent than the current IECC version. Part of the proposal removed any reference or alternate path using ASHRAE Standard 90.1, which is the most recognized building energy efficiency standard. Although this removal was rejected by ICC, it identified possible competing agendas for promoting ultimate building energy efficiencies. NBI is overt in their goal of promoting NZEBs as a basis for all new construction.

Ultimately, all building owners should aspire to designing, constructing, and occupying highly sustainable buildings. Someday, hopefully before 30 years, renewable energy and NZEBs will be as common as a digital thermostat. For the sake of cost-effective buildings, it is this author's hope that NZEBs are achieved through innovation and not legislation. 

David Handwork is director of planning, design and construction at Arkansas State University and a member of APPA's Code Advocacy Task Force. He can be reached at dhandwork@astate.edu.

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Retro-commissioning in a Campus Energy Efficiency Program

By Christopher Powell

By now we have all heard of retro-commissioning (RCx), but how many of us employ this strategy as a regular practice for minimizing energy waste in our facilities? It's easy to say that we should do it, but how do you get started. Many questions come to light:

- What exactly is retro-commissioning?
- How much should it cost?
- What are your expectation for savings and other benefits from conducting RCx?
- How do I select appropriate buildings?
- What financial criteria will you employ to decide on which opportunities to implement?
- How do I find a qualified contractor and/or do we have internal staff whom could be trained? If so, where are training programs offered?
- What documents do I need? An RFP/scope for hiring consultants, an outline of the RCx process, building descriptions to deliverables such as weekly progress reports, and the final RCx report.
- What should be included in the final report?
- Does my local electric utility or other entity have electricity or natural gas energy conservation programs and is can they assist with funding or other resources to help start your RCx program.

I'll try to do my best to answer these questions.

Many if not most institutions have some level of energy conservation program today to help control energy

usage. An RCx process can be a great addition, or can be the focal point of a program. It really depends on the condition of your building stock. How old are the systems? How much deferred maintenance exists? How well are buildings being maintained? Do you have existing buildings that have never been commissioned to restore them to optimal performance?

RCx is a systematic approach for conducting forensic evaluations of your buildings and its systems. This is accomplished through a documented and well-defined process that identifies low-cost operational and maintenance

RCx on 18 buildings encompassing approximately 2 million sq. ft. for an average cost of \$.36 per sq. ft. However, our scope included identifying both RCx measures (<2 year payback) and capital intensive measures to enable us to go beyond design along with energy modeling. **When combining all measures, our average internal rate of return has averaged approximately 40 percent as compared to an 8.5 percent IRR threshold.**

Identifying appropriate buildings for RCx is not as simple as it sounds. You might think the oldest buildings would have the best opportunities, but this is

IT'S ALSO IMPORTANT TO KNOW IF RENOVATIONS OR MODIFICATIONS ARE PLANNED AS THIS MAY LIMIT THE SCOPE OR DELAY THE TIMING OF AN RCX INVESTIGATION.

changes in existing buildings to bring your building back to original design standards at a minimum. It can also be expanded to include identifying technologies or practices to achieve better than design conditions. It should not be confused with new building commissioning services, which requires different processes and different expertise.


RCX COSTS AND SAVINGS ESTIMATES

Industry estimates¹ report costs ranging from \$.13/sq. ft. to \$.45 per sq. ft.. At Brown University we have completed

not always the case. New buildings can have major savings opportunities even when new building commissioning has previously been performed. Typically, the best way to start the process is to calculate the energy density — or Energy Utilization Index (EUI) of your buildings in (BTU/Sq Ft). This can be compared to similar buildings in your area or on your campus or compared to national data via the EIA's Commercial Buildings Energy Consumption Survey (CBECS) www.eia.gov/emeu/cbecs/contents.html.

However, even this is not perfect as your building could have some additional loads from research, computing or just additional hours of operation or additional outdoor air requirements among other things. In the end some combination of these steps along with interviews of building mechanics or controls technicians and users can help narrow down the prospective buildings. It's also important to know if renovations or modifications are planned as this may limit the scope or delay the timing of an RCx investigation.

Finding a qualified consultant can also be a daunting task. Talking to other institutions or your local utility company and finding out if they administer energy conservation programs is a great start. Additional resources can also be found through organizations such as the Building Commissioning Association www.bcca.org. If you are having trouble finding a qualified consultant, you can also send your own internal HVAC and controls mechanics and engineers to training offered by many organizations.

As far as documents and tools, the best source is the Portland Energy Commission (PECI www.peci.org/). However, many of their tools have been expanded by PECI for other organizations, most notably the California Commissioning Collaborative (www.cccx.org/resources/rcxtools/index.html) or the New York State Energy Research and Development Authority (NYSERDA) www.nyserda.org/programs/pdfs/retroccxhandbookfinal040704.pdf among others. These have all the tools and sample reports you will need to create a robust RCX program that is a permanent part of your institution's energy savings and greenhouse gas reduction strategy. 

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1. Mills, E., H. Friedman, T. Powell, N. Bourassa, D. Claridge, T. Haas, and M.A. Piette, "The Cost-Effectiveness of Commercial-Buildings Commissioning," Lawrence Berkeley National Laboratory.

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Christopher Powell is the director of sustainable energy and environmental initiatives at Brown University in Providence

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

I've been reading and reviewing e-books (mostly Kindle) for over two years, but can't stop there. Authors and publishers are recognizing the need for different modes of information exchange and now I'm able to provide perspectives on two publications. As I move out of my rut, these publications may help you make changes, too.

FROM BUD TO BOSS: SECRETS TO A SUCCESSFUL TRANSITION TO REMARKABLE LEADERSHIP

Kevin Eikenberry, and Guy Harris, Jossey-Bass, San Francisco, CA, 2011, 320 pages, hardcover, \$24.95, e-book \$11.99.

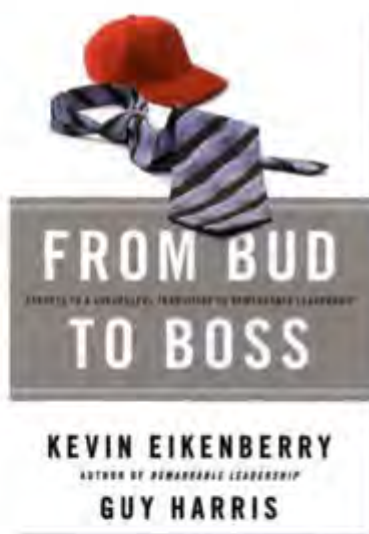
We all hope to advance and lead our peers. The trouble is that when we advance, they are no longer our peers, and we have to behave differently. *Bud to Boss* tackles the issues associated with advancing ahead of one's peers to becoming their boss.

Being a boss is nice. There's more control over the decisions. But at the same time, your former peers are looking to you for decisions that you may not be comfortable making. Or you may be criticized over a decision you've made. This is one situation addressed in the book; there are many more.

What separates this book from the hundreds of others with a similar focus on recommendations, is the way the authors highlight different recommendations, actions, or ideas. First is the "Remarkable Principle," which provides a brief, effective principle to follow. Second are the "Now Steps,"

which identify a way to use the principle. Not every principle is followed by action steps—and that's okay. Some principles don't need subsequent steps. Finally, the book reaches beyond its pages to make use of the Internet with online resources, "Bonus Bytes," and a community of online readers sharing issues and solutions.

From my perspective, the issues and solutions present are not new compared to many other books or presentations I've seen before (for example, Stephen Covey's *Seven Habits* book and presentations). Rather, the integration of the book (whether hardback or e-book) with an Internet-based social network



helps reach out to younger readers, who are new to industry and have already adopted many of the latest Internet tools or apps.

There are many ways to get the same message across. *Bud to Boss* takes advantage of communication techniques that are not traditional (books, lectures, etc.) and makes use of devices our new employees are more accustomed to. For that reason alone, you should give serious consideration to this book.

UNDERSTANDING, PLANNING, AND LEADING ORGANIZATIONAL CHANGE: CORE CONCEPTS AND STRATEGIES

Brent D. Ruben, NACUBO, Washington, DC, 2009, 178 slides, CD-ROM, plus 30-page guide, \$99 member; \$130 non-member.

In a prior column I reviewed *It's Only the Janitor*. In that book, the author identified five groups at a college or university and their response to change. In this book, there are three. Students accept change easily because they are temporary members of the academic community; the administration also accepts changes well. The

faculty, however, is resistant to change because they uphold the traditions of the campus and can have a life on campus five or more times longer than the students or the administration.

In *Understanding, Planning, and Leading Organizational Change*, Brent Ruben uses the 2006 U.S. Department of Education *Spellings Report* to highlight a couple issues facing anyone working to effect change at a college or university. First, identify-

ing the need for change, and second, implementing the change and making stick. The *Spellings Report* had six recommendations to address the need for "urgent reform." Overall, the report was poorly received in academe for several reasons, including that it appeared overly generalized, and tried to apply a "one size fits all" approach. In hindsight, those of us in higher education could have predicted the backlash from the academy. Ruben agrees but presents

STUDENTS ACCEPT CHANGE EASILY BECAUSE THEY ARE TEMPORARY MEMBERS OF THE ACADEMIC COMMUNITY; THE ADMINISTRATION ALSO ACCEPTS CHANGES WELL.


some substantive reasons why the backlash occurred and how to overcome it.

Ruben presents two sets of steps to find a solution and to manage the stages of change. These form a matrix framework of planned change. The framework can be customized to different situations and different parties to the change but are essentially the same. These are tools facilities officers can use when attempting to change procedures within the department or on campus. There are other factors introduced; there are tools and charts to help identify and execute organizational

change. These are some good tools and techniques to make change stick.

The presentation is done both with PowerPoint slides and slides with notes, similar to a standard text. There is a guide with the CD that describes the model further and provides a little more insight than the slides and notes offer. Overall, the package is a complete training package to help a leader effect change in his or her organization with a presentation and exercises. The notes and guide are still very brief and require the reader or presenter to spend a fair

amount of time to read between the lines. There are numerous references to help fill in the blanks, but it is not for the faint of heart.

I like the format of *Understanding, Planning, and Leading Organizational Change*, it's different from most the publications I review. It's another tool that may work better with our younger readers who are less accustomed to book-learning and more collaborative in their learning styles. As such, this is not a read-and-learn publication. It's more appropriate for a larger organization where there is a full-time trainer able to deliver continuing education to select teams, or the entire organization. 

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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Workplace Demographics and Technology: Challenges and Opportunities to the Campus Mission

Including the Top Facilities Issues

APPA
THOUGHT
LEADERS
2011

Part 1



Published by:



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Workplace Demographics and Technology: Challenges and Opportunities to the Campus Mission

Including the Top Facilities Issues

SECTION I: Executive Summary

It is not unusual in higher education circles to talk about issues affecting the campus. Experts might write about how shifting demographics are changing the campus, or say technology is becoming more pervasive on campus. What we rarely appreciate is the degree to which such statements are literally true. Higher education trends change the campus—the actual, physical built environment of buildings, grounds, and infrastructure. The campus itself evolves alongside pedagogical practices, technological innovations, student needs, and the mission of the institution.

The purpose of APPA's Thought Leaders Series is to assess how higher education trends will shape the campus. Its starting point every year is that both senior facilities officers and leaders across the campus need to understand significant trends and their predicted impact on classrooms, laboratories, residence halls, energy systems, building management processes, and all of the other myriad places and operations that constitute the campus. Along with a discussion of the issues, the series also posits strategies that college and university leaders can use to address coming challenges. The goal is to help institutions prepare themselves and their facilities for the future.

Trends in Workforce Demographics and Technology

Two major issues facing higher education identified in the 2011 Thought Leaders report are changes in the demographics of the campus workforce and the ever-evolving role of technology in higher education.

Workforce demographics. The data is clear: the workforce of the future will be more diverse than that of today. The Hispanic community, for example, is growing at a remarkable rate and by 2050 will make up more than 30 percent of the population. The workforce is also aging as the Baby Boomers reach retirement, although the impact of the recession and longer lifespans means that more older workers will stay on the job past age 65.

At the same time, competition is on the rise for critical professions. We are facing a sharp decline in available workers with the competency to perform the duties of skilled positions. According to the Bureau of Labor Statistics, the need for construction managers will increase by 2018 by 26.1 percent: 15.2 percent for carpenters, 15.3 percent for electricians, and 21.6 percent for plumbers and pipefitters. In the aftermath of the Great Recession, higher education is not in a good position to compete for these workers. Many institutions have frozen wages, reduced benefits and increased copays, deductibles, and/or the portion of monthly health insurance premiums paid by employees.

These demographic trends will have a significant impact on who cleans the campus, who keeps the lights on, and who designs the buildings. Colleges and universities need to be deliberate about recruiting employees, adopting strategies such as partnering with others in the community to create training programs, and promoting diversity in the workforce. Institutions also need to work more creatively to achieve its goals. Technology can help facilities departments spend more time accomplishing

critical tasks and less time handling paperwork and trekking from building to building. Outsourcing can save money by identifying specific non-mission-critical tasks and services that can be provided by vendors.

Technology. Technology is now everywhere on campus—students expect it, faculty need it, staff rely on it. The question going forward is not “Can we use technology to improve teaching and facilitate business operations?” Instead, it is “How do we make smart use of technology to improve teaching and facilitate business operations?” Critical information technology (IT) issues include those of planning, policy, and resources.

Data is also an issue of concern. Higher education has lagged behind industry in gathering, sorting, and interpreting data. Opportunities exist all around campus to make better use of data to inform business operations, student services, recruitment, and development. In addition, students and faculty arrive on campus with high expectations and a sense of entitlement about technology: they demand the fastest, best, most cutting-edge systems 24/7/365, and woe to the IT department that fails to satisfy them.

The campus built environment will continue to be affected by technology, which has become as expected a service as electricity. New facilities must incorporate the most advanced IT systems, and existing buildings require continual updating and renovation to ensure they are plugged into the network. Colleges and universities need to do a better job of aligning IT and facilities planning and operations to ensure the two units are not working at cross-purposes.

For example, IT can play an important role in reducing energy consumption on campus, but only if it is involved in energy planning, provided information about energy use and given incentives for reducing costs. Colleges and universities should also look to outsourcing or “cloud-sourcing,” where IT systems such as e-mail are turned over to vendors who operate remote servers to cut costs and improve efficiency.

In addition, online and blended education delivery strategies may actually change not only the way we use space but how much space we build. This issue will require the inclusion of Facilities, IT, and Academic leaders at the same table.

Top Ten Higher Education Facilities Issues

Drawing on the discussion of workforce demographics and technology, the Thought Leaders report includes a list of the top ten critical higher education facilities issues of 2011, along with key strategies to address these issues.

1. Establish a culture of innovation and collaboration.

Higher education needs to transform its culture to be more open to innovative thinking and collaborative processes. Institutions have typically operated in a top-down, rigid mode that makes them ill-equipped to tackle complex challenges. Senior campus leaders need to remove institutional barriers to allow for innovation and promote collaboration within the organization.

2. Improve productivity with level or decreasing resources.

Colleges and universities need creative and effective strategies to get more done with less. The economy may be improving, but budgets at colleges and universities are not; public schools in particular expect reduced support for the next several years. Managing with less will mean moving beyond short-term gains from travel bans and hiring freezes to looking at the structure of the organization for opportunities to improve services while improving the bottom line.

3. Leverage technology to improve decision-making.

Colleges and universities need to do a better job gathering and analyzing the data to make smarter business decisions. Institutions often have in-depth data available, but they fail to make use of it. To change the situation, campus leaders should look for opportunities to mine their data for insights and promote the concept of data-driven decision-making on campus.

4. Align IT and facilities. New technologies and new expectations based on personal/consumer technologies have led a number of campuses away from lecture-based classrooms, with an emphasis on the faculty member, to much more innovative learning spaces with an emphasis on student-focused active learning and blended learning. This has deep implications for facilities. Close coordination, both formal and informal, allows IT and facilities to better understand one another's challenges and needs.

5. Create a new budget model for IT and facilities.

Institutions need to coordinate not just IT and facilities planning but also budgets to ensure both groups are working toward the same goals. Often, the current budget model means IT must go against its own interests to accommodate facilities plans. A new system needs to be established in which the goals of the entire institution are carried through to the budgets of both IT and facilities, and both are incentivized to achieve those goals.

6. Confront shifting workforce demographics.

Institutions need to take active steps to prepare for an increasingly diverse workforce. The workforce will change—exactly how will depend on the region and institution—but smart managers will be prepared. Research shows that even organizations that do not think they have a problem with a diverse workforce benefit from cultural competency training that helps employees address differences in race, ethnicity, or culture.

7. Increase the flexibility of the workplace. Higher education HR policies and procedures need to become more flexible to adjust to a changing workforce. The workforce policies of the previous generation may have posed fewer problems, but today's employees want options for part-time and flex-time, more accountability and responsibility in their work, and a clear path to leadership positions.

8. Make smart decisions about outsourcing. Outsourcing will become an important tool for accomplishing necessary tasks—at the right price. However, a balance needs to be achieved between services outsourced to vendors and those that remain the sole responsibility of employees. A detailed evaluation process needs to be developed that takes into account the values, mission, and goals of the institution.

9. Improve emergency preparedness. Colleges and universities must take ongoing action to prepare the institution for a growing list of threats. Everyone in the organization needs to understand the campus emergency operations plan and his or her role within it. Steps should also be taken to mitigate risks, such as conducting security audits and planning for emergency backup power.

10. Manage the existing built environment. Senior facilities officers must take steps to ensure existing campus buildings and infrastructure can meet the needs of the institution. As the college or university changes, the campus needs to change as well—a daunting task, since dormitories and classroom buildings cannot be transformed overnight. Facilities leaders need to understand their institution's mission and vision and gain a sense of where their college or university is going, and then assess what will need to change in the built environment to make that vision a reality.

The Thought Leaders Process

The trends and issues discussed in the Thought Leaders Report are the result of an intensive process that draws on the wisdom and insight of higher education experts from the United States and Canada. At a two-day symposium, presidents, chancellors, and higher education experts (both in facilities management and technology and in operations from finance to administration to human resources) met to analyze issues, discuss the effect of these issues on the built environment, and propose strategies to prepare for the future. The yearly Thought Leaders Report summarizes the discussions at the symposium and provides additional context about major trends. The purpose of the report is both to inform and to prompt discussion. Campus senior facilities officers use this report as a resource both within their own academic departments and with their counterparts in administration.

Looking Ahead

The recession has made two facts abundantly clear. First, higher education is more important than ever. Enrollment at all institutions has soared even as the ability of individuals to pay for education has been strained. More people than ever believe that a college education is necessary to succeed in today's workforce—55 percent of Americans agreed with this statement in 2010, up from 31 percent in 2000, according to a survey by Public Agenda for the National Center for Public Policy and Higher Education. Second, the financial position of colleges and universities is more precarious than anyone believed possible. It would have been hard to imagine in 2006 or 2007 how substantial—and how frightening—the budget cuts could be.

In light of these revelations, higher education leaders need to take a hard look at their mission within the community and the way they run their campuses. Old assumptions must be reexamined. This analysis must extend to higher education facilities and the operations of the campus. Savvy facilities officers can be partners in the process of shaping the institution for the years ahead. They have valuable insights to offer on issues as diverse as how the campus generates electricity to how classrooms should be configured for the most productive teaching and learning.

Workforce demographics and technology will be important parts of the puzzle going forward. Assembling the right team of workers with the right skills is essential to keeping today's high-tech, smart buildings running at peak performance. Aligning the interests of IT and facilities can increase the effectiveness of both groups. By considering these issues and evaluating the proposed strategies for their potential application on individual campuses, higher education leaders can take one more step in preparing their institutions for the near future—and beyond.

SECTION II: Critical Issues Facing Higher Education: Workforce Demographics

Look at the staff of today's college and university campuses—those who fix the plumbing, check out the library books, process the invoices, administer the benefits and vacuum the hallways. This workforce is due to change. Whatever the mix of genders, ages, education levels, and ethnicities you see now, they won't remain that way for long. The United States is set for a major demographic transformation, and colleges and universities are on the front lines of the shift.

Critical demographic issues

Competition for employees in key sectors. Overall, the total employment base in the U.S. is expected to grow in the next seven years as the economy emerges from the recession. The Bureau of Labor Statistics (BLS) predicts a 10.1 percent increase in total employment by 2018, with the economy adding 15.3 million workers for a total of 166.2 million. However, employment growth will be concentrated in key areas, particularly in what are classified as "service-providing" industries, which include retail trade, finance and insurance, real estate, management, education and health services, food services, and healthcare and social assistance. Another job sector that will see increases is the construction industry, which is expected to gain more than 1.3 million jobs in the next seven years.

Higher education and many related jobs are among both the largest and the fastest growth industries:

Largest growth industries:

- Construction
- Architectural, engineering, and related services
- Colleges and universities (especially community colleges)
- Other educational services
- Employment services
- Services to buildings and dwellings

Fastest growth industries:

- Education services
- Management services
- Technical consulting
- Information services
- Facilities support services

The high demand for these jobs will put pressure on institutions, which will need to compete for these workers. Growth in the construction trade will be a particular challenge for college and university facilities departments. Demand for key trades will rise significantly, according to the BLS: by 2018 the need for construction managers will increase by 26.1 percent, 15.2 percent for carpenters, 15.3 percent for electricians, and 21.6 percent for plumbers and pipefitters.

Data Point: Increased demand for education

Working your way up is no longer an option

"The day when people left high school to go to work in the local industry and then worked their way up is disappearing. Starting out, straight from high school, on the loading dock or in the mailroom and climbing to the CEO's corner office is no longer an option. America needs more workers with college degrees, certificates, and industry certifications."

— Anthony Carnevale, "Help Wanted: Projecting Jobs and Education Requirements Through 2018,"
Georgetown University Center on Education
and the Workforce.

Increased demand for education and training. BLS research also reveals that the greatest job growth will be in fields that require certain levels of education. The fastest job growth will occur in occupations that require an

associate's degree. At the same time, half of all new jobs—and one-third of total jobs—will require a post-secondary degree. This is good news for colleges and universities looking for students but poses a problem on the workforce side: Where will institutions find these workers, particularly those with two-year degrees? Community colleges have been overwhelmed by the increased demand of the last five years, but the next seven will place even more pressure on these systems. For example, the California community college system, which has spent the last five years trying to cope with an enrollment increase of 12.6 percent, expects a further 12.3 percent increase above 2008 enrollment levels by 2019. In other words, fall term enrollment will rise from 2008's 1.81 million to 2.03 million in 2019. Today, California's community colleges serve more than 2 million students annually; beginning in the fall of 2016, they will need to serve more than 2 million every term. All this comes at the same time budgets are being slashed for community colleges: Governor Jerry Brown's 2011 budget called for a 6.5 percent cut that would eliminate \$400 million in state support and require tuition to rise from \$26 to \$36 per credit hour.

Even if colleges and universities can find potential employees with the right educational background, they will still likely need to provide at least some on-the-job training. The BLS predicts more than 30 percent of total job openings will require training. This poses a challenge for institutions that do not have such training programs in place.

More diversity in the workforce. The longstanding trend of increased diversity will continue through 2018. While about 81 percent of the population identified itself as white in 2000, that figure will fall to 74 percent by 2050. At the same time, individuals of Asian origin are expected to rise from 3.8 to 7.8 percent, and the category "other races," which includes American Indians, Alaska Natives, Native Hawaiians, other Pacific Islanders and those who identify with more than one race, will rise from 2.5 to 5.2 percent. Only the black population will remain relatively stable, rising slightly from 12.7 percent of the population in 2000 to 13.0 percent in 2050.

Meanwhile, growth in the Hispanic or Latino population will be dramatic. (The U.S. Census considers Hispanic or Latino origins as an ethnicity rather than a

race and counts this group separately.) In 2010, the Hispanic population accounted for 16.3 percent of the U.S. total; by 2050, it will reach more than 30 percent. That is an increase of more than 1.5 million per year. Hispanics are the nation's largest minority, and accounted for 56 percent of the nation's growth in the past decade. This growth is being driven largely by natural increase—i.e., births—rather than by immigration. About 60 percent of the growth in the Hispanic population since 2000 was due to births and 40 percent due to net international migration, according to the U.S. Census Bureau.

Gender diversity in the workforce will also grow in the next ten to fifteen years. Currently 59.2 percent of women—some 72 million—are in the workforce, up from 53.6 percent in 1984. Women are projected to account for 51.2 percent of the increase in total labor force growth between 2008 and 2018.

Workforce ages as baby boomers hold off on retirement. On average, the U.S. population is growing older, the result of lower birth rates and increased life expectancy. In 1950, the U.S. population over 65 was 8.1 million; in 2010 it was 40.2 million—an increase of roughly 500 percent. That number is projected to more than double by 2050, to 88.5 million. A larger percentage of this population will continue to participate in the workforce: The number of workers aged 55 and older will leap from 18.1 percent to 23.9 percent of the labor force between 2008 and 2018.

A number of observers have speculated that the recent recession has been behind the move toward delayed retirement, and it is certainly true that some workers have cited the decline in the value of their retirement portfolios as a reason to stay at the job. But the trend toward working longer began before the recession, and seems to have more to do with the desire of workers to stay engaged socially and economically. Another contributing factor is the move away from defined-benefit pension plans. For more than a century, labor force participation among U.S. men over age 65 fell, but at the end of the twentieth century this rate began to rise; as noted by the RAND Corporation, "The end of the 20th century witnessed a profound change in retirement behavior."

Data Point: The Graying of the Campus Facilities Workforce— Who'll keep the lights on?

"The men and women who make the lights come on, the toilets flush, and the air conditioning work are getting older. Sometimes only those people know that an old chiller in the administration building will run better with a swift kick to its side every now and then.

"Replacing idiosyncratic institutional knowledge is not easy under any circumstances. But several factors, including trends in the work force, perceptions among administrators, and even the economic downturn, have complicated their ability to attract and retain skilled labor in facilities departments.

"A recent human-resources analysis at North Carolina State University indicates that some 35 percent of staff members in the facilities department will be eligible for retirement in the next five to seven years, says Jack Colby, assistant vice chancellor for facilities operations. "That fell in line with what I had been reading and picking up in discussions with administrators from other institutions," he said.

"What troubles him are the demographic trends in the trades that facilities departments draw from. Over the past several years, construction-industry analysts have fretted over the shortage of skilled-trade laborers in the American market. *Electrical Construction & Maintenance*, a trade magazine, has predicted that the nation will need more than 734,000 electrical workers by 2014, 78,000 more than now work in that field."

— Scott Carlson, "The Graying of the Campus-Facilities Work Force: Who'll Keep the Lights On?", *The Chronicle of Higher Education*, July 27, 2009.

Employee salaries and benefits in higher education. The changing demographic landscape will pose challenges for all industries, but higher education in particular will struggle to respond. Institutions hit hard by the recession are in a poor position to compete for workers. According to research by CUPA-HR, more than half of

all colleges and universities reported budget cuts in 2011-12, with 65 percent of those cuts in the 5 to 10 percent range. Most institutions responded to those cuts in ways that affected personnel:

- Delayed hiring – 78 percent
- Wage freezes – 71.4 percent
- Voluntary separation programs – 23.1 percent
- Involuntary separation programs – 23.1 percent
- Reduced benefits – 18.7 percent
- Unpaid furloughs – 13.2 percent

In addition, almost 30 percent of institutions increased copays, deductibles and/or monthly health insurance premiums for employees.

While CUPA-HR reports some signs toward improved employment conditions—36 percent of institutions plan salary increases for next year—employee morale and competitiveness nevertheless have been affected by the dire financial situation. Colleges and universities will need to make massive strides to improve their competitiveness to find the workers they need in the next ten years.

Response from the Thought Leaders Symposium

The workforce challenges facing all of higher education, and facilities in particular, are daunting. However, participants at the Thought Leaders symposium focused on developing strategies that would enable institutions not just to find the workers they need but also to thrive in a new environment.

What are the most problematic facilities workforce issues today? Symposium participants began by identifying the most pressing issues confronting them today. They named five critical points:

- **Finding qualified staff.** Reflecting the broader trends identified in nationwide research, symposium participants struggle to find new staff with the necessary skills. The unique nature of college and university campuses means that facilities departments need staff who can handle both an aging infrastructure and the most up-to-date building controls. Facilities professionals at the symposium reported great difficulty finding new employees with the right knowledge and capabilities.

- **Managing retirement and knowledge transfer.** The facilities workforce is aging and many staff members are reaching retirement. Every employee that leaves takes with him or her years of accumulated wisdom about the quirks of campus systems and buildings. Not only must facilities managers wrestle with the loss of these workers, they also must find some way to preserve their institutional knowledge and pass it along to new staff.
 - **Dealing with HR policies.** Symposium participants expressed frustration with the human resources policies in place at most institutions. They found hiring practices slow and inflexible and proposed staffing levels inadequate. In addition, not enough training is provided to get new employees up to speed. HR departments are themselves overwhelmed and understaffed, limiting their ability to respond to facilities management needs.
 - **Getting a seat at the table.** Thought Leaders participants reported that facilities management too often does not have a role in institutional planning, strategy-setting and decision-making. The facilities department is expected to provide the infrastructure to meet long-term institutional goals, yet they only find out about these goals after they are set—when it's too late for facilities professionals to contribute to the discussion.
 - **Keeping up morale.** The last several years have been a long, hard slog for facilities staffs. Budget cuts, wage freezes and benefits reductions have all come along at the same time enrollment numbers have gone up. The pressure to do more with less has been relentless. At this point, employees are demoralized, and their managers are struggling to keep them engaged.
- What are the expected challenges in the next five to ten years?* Symposium participants turned their attention to the challenges to come:
- **Managing retirements and knowledge transfer.** If retirements are hard to handle now, they are only going to get worse. The need to capture institutional knowledge will grow more pressing.
 - **Addressing workforce diversity.** The nationwide trend toward an increasingly diverse workforce will challenge facilities departments accustomed to a more uniform population. Aging workers might want more flexible work schedules or part-time positions. Increased racial and ethnic diversity will require sensitive management; institutions in regions with large and growing Hispanic populations may need to address language barriers.
 - **Coping with an aging infrastructure.** Most colleges and universities have a mix of buildings in a range of ages from brand new to hundreds of years old. The systems used to run these buildings are not getting any younger—and the problems will only get worse in the coming years.
 - **Facing the challenge of advanced buildings.** At the opposite end of the spectrum from aging buildings are the highly technical buildings appearing on campuses. Biotechnology, physics, engineering and chemistry buildings require advanced training and thorough understanding of the workings of dozens of specialized systems.
 - **Competing for high-skill/high-pay workers.** Even when managing a relatively straightforward classroom building, facilities management is an increasingly complex task. Modern building systems incorporate complicated technology to manage energy, save water and maintain comfort. The workers needed to manage and maintain these systems are highly skilled technical experts—experts participants at the symposium believe will become harder and harder to find. Institutions will need to adjust their pay scales and become generally more competitive to attract and retain these workers.
 - **Improving efficiency through technology.** In a related challenge, no one at the Thought Leaders symposium expects the budget situation to magically reverse and money to start flowing to facilities departments. The pressure to keep costs low will remain. Operational efficiency will be critical—and the most promising tool to increase efficiency is technology. Facilities professionals will need to increase their technical skills as well as push for smarter buildings that incorporate advanced technical systems.

- **Turning to outsourcing.** If operational efficiency is critical and workers hard to find, a possible solution for facilities groups will likely include more outsourcing. By turning to outside firms with needed skills and expertise, colleges and universities can accomplish necessary tasks while keeping costs low. However, outsourcing comes with its own set of challenges, and senior facilities officers and their staff will need to master skills such as negotiating contracts and managing relationships with outside firms.
- **Keeping employees engaged.** Colleges and universities are comfortable thinking of themselves as highly valued workplaces no one would ever want to leave. Many facilities departments are staffed by older employees who expect to work at one job for the majority of their careers. The employees of tomorrow will have no such expectation—in fact, they anticipate changing not only jobs but also careers several times in their work life. Institutions will need to work harder at

keeping employees engaged and committed to retain valuable staff; they also need to consider strategies to accommodate new ideas about work and provide opportunities for employees to find satisfaction within the university setting.

How will different types of institutions be affected by these challenges? The wide range of higher education institutions means that the implications of growing trends will vary widely by campus. One major factor will be **union versus non-union environment**. Unions play a major role in some states and on some campuses. Participants at the Thought Leaders symposium noted that union shops, with their strict rules governing working conditions, have less flexibility to adapt to changing conditions. Unionized campuses will need to take additional steps to work with the unions to address continuing challenges.

Geographic location is another major factor affecting the ability of institutions to respond to future needs. Rural

Data Point: The challenge of aging infrastructure

Institutions struggle to keep up as facilities age

"Greg Williams is at war with water. And he is losing.

"Over the years, it has eaten large holes in a steel rain roof that protects the underground laboratories in the University of Minnesota's Civil Engineering Building, which Williams oversees as a district manager.

"The rain roof has a total of 115 holes — some stretching up to 3 feet — that cause leaks and mold. Fixing all the holes would cost \$6 million.

"It's definitely in the works. It just needs to get funded," Williams said.

"The Civil Engineering Building is one of 191 buildings scattered across the Twin Cities campus, many of which have their own maintenance issues.

"The University has about \$160 million in annual maintenance and renewal needs, but it currently only receives \$90 million in funding. Over the next 10 years, the University anticipates its infrastructure will

need \$2.3 billion for repairs — about one-third of the total value of campus buildings.

"The University has dealt with the funding gap in a variety of ways, including demolishing old buildings, finding new uses for aging ones and prioritizing maintenance projects. It's also seeking \$35 million from the Legislature in Higher Education Asset Preservation and Replacement funding to help tackle the backlog of projects.

"But short of a cash windfall from the state or private fundraising, the University's building maintenance is likely to continue operating at a deficit.

"In the interim, building managers like Williams work to apply "Band-Aid" fixes to keep buildings operating."

— **Conor Shine, "U's buildings have lots of leaks and not enough cash,"**
The Minnesota Daily, April 21, 2011.

Data Point: University visions and goals

Sample institutional planning challenges from various colleges and universities

Public Institutions

Doctoral Universities	Master's Institutions	Baccalaureate Institutions	Community Colleges
Budget shortfalls – 57.6 percent	Budget shortfalls – 57.7 percent	Budget shortfalls – 56.9 percent	Budget shortfalls – 34.5 percent
Changes in state support – 62.5 percent	Changes in state support – 54.8 percent	Changes in state support – 39.2 percent	Changes in state support – 37.9 percent
Maintaining the quality of academic programs – 28.8 percent	Maintaining the quality of academic programs – 24 percent	TIE: Rising tuition/affordability AND Maintaining the quality of academic programs – 17.6 percent	Remediation and student readiness for college – 27.2 percent
Rising tuition/affordability – 16.9 percent	Rising tuition/affordability – 24 percent	Increased competition for students – 13.7 percent	Limits on our ability to respond to rising enrollments/increased demand – 20.4 percent
Potential cuts in federal research support – 16.3 percent	TIE: Increased competition for students AND Student assessment/institutional outcomes – 13.7 percent	Student assessment/institutional outcomes – 13.7 percent	Rising tuition/affordability – 15.1 percent

Private Institutions

Doctoral Universities	Master's Institutions	Baccalaureate Institutions	Community Colleges
Rising tuition/affordability – 41.4 percent	Rising tuition/affordability – 45.4 percent	Rising tuition/affordability – 40.5 percent	Rising tuition/affordability – 42.1 percent
Budget shortfalls – 34.5 percent	Increased competition for students – 38.9 percent	Increased competition for students – 36.9 percent	TIE: Budget shortfalls AND Increased competition for students – 31.6 percent
Potential cuts in federal research support – 20.7 percent	Budget shortfalls – 29.6 percent	Budget shortfalls – 33.3 percent	Potential cuts in federal student aid programs – 21.1 percent
Maintaining the quality of academic programs – 17.2 percent	Potential cuts in federal student aid programs – 18.5 percent	Potential cuts in federal student aid programs – 26.2 percent	Limits on our ability to respond to rising enrollments/increased demand – 15.8 percent
Potential cuts in state financial aid programs – 16.7 percent	Potential cuts in state student aid programs – 12.3 percent	Financial support from alumni – 17.9 percent	

colleges and universities will have a harder time finding, attracting, and retaining qualified staff; these institutions might need to raise salaries, increase benefits, and invest in on-the-job training to get the right mix of staff.

Public versus private and large versus small will play a major role in the challenges facing institutions. Private colleges and universities generally have more flexibility to adapt to changes; on the other hand, recent declines in endowment values have made these institutions more dependent on tuition, which puts budgets at risk. Public colleges and universities must comply with more rules and regulations and continue to struggle with declining state support. Community colleges face particular challenges as their enrollments soar and local support plummets.

What strategies might be employed to respond to workforce challenges? Participants at the Thought Leaders symposium identified several approaches to address the coming challenges. The first was to **streamline processes**. Employees need to work in a way that eliminates wasted time and wasted effort. Senior facilities officers need to focus on their customers and then work backwards to ensure that all tasks have a customer-service purpose. Technology needs to be employed to automate routine processes, reducing paperwork and speeding up jobs.

Another key to success will be to **increase collaboration**. By reaching out to vendors, industry and other institutions, facilities departments can make up for reduced staff and tight budgets. Vendors can provide expertise, training, and even staff. Private industry has much to teach higher education about getting more done with less. Other institutions can share resources and knowledge; institutions in the same region or facing similar challenges should consider ways they can draw on one another's strengths.

Finally, institutions need to **develop retention strategies** for employees. What's missing from your work environment? Is technical training provided to keep up key skills? Are you investing in leadership training to promote from within? Is there a clear path to promotion so that employees can be confident they have a future with the organization? Retention should also encompass strategies to improve employee engagement. Staff need to feel that they are valued and that their input matters. Salaries and benefits are part of this equation, but only part. Discouraged staff who feel their contributions are ignored will not stick around long.

Facilities leaders respond to workforce demographic trends

Participants at the Thought Leaders symposium considered all of the trends and issues in workforce demographics and discussed ways facilities departments should respond.

How can innovation be applied to address workforce challenges? Innovation was a major theme of the Thought Leaders symposium, and participants considered ways facilities officers could apply innovative thinking to address workforce challenges. One suggestion was to **be deliberate about creating a diverse culture**. Diversity can happen automatically as new employees join the facilities department, but such an ad-hoc approach has its risks. Senior facilities officers might assume that workers are more comfortable with diversity than they really are, and small problems might develop into crises. A better strategy would be to take deliberate steps toward diversity, evaluating the reaction of employees along the way and providing whatever resources are necessary—training, new policies, and so on.—as needed. To get insight into how to create a diverse workforce, colleges and universities should look to other industries that have successfully increased diversity and learn what worked—and what did not.

A second suggestion is to **use technology to capture knowledge**. A major concern in the facilities workforce is the loss of critical organizational knowledge as older employees retire—employees who might be the only ones who know how to keep the boiler in the old gym running. Technology could provide a powerful solution—easy-to-use, widely accessible technologies are available that could capture and pass along this information. Why not create videos of staff maintaining critical systems? Take digital photos of what the right settings look like? Build a wiki of important details?

Next, participants propose **creating cross-mentoring and cross-training programs**. Increase the number of people on staff who understand the different systems that make up the campus. Well-rounded staff have better appreciation of how their jobs affect others; they also become prime candidates for promotion since they understand the big picture. Information silos can form within departments as well as across them, and these silos need to be torn down. True creative thinking

happens when staff can draw upon a wide range of knowledge and experience. A related goal is to **increase collaboration**. Systems should be less top-down and more integrated—a looser structure that encourages conversation and the exchange of ideas. Industry has been highly successful by tapping the knowledge of the workers on the front lines—those assembling cars or building computers—to improve the entire system. What do your plumbers, electricians and janitors know that the senior facilities officer does not? How can you create opportunities for that information to be shared?

Another proposal is to **add more flexibility and accountability**. Facilities organizations tend to be highly risk-averse; they focus on process and control. As you move down the organization chart, independence declines. Organizations need to look for ways to add flexibility and encourage increased personal responsibility. However, with flexibility comes accountability. As employees are given more power to make decisions, they need to be held accountable for those decisions. This practice may seem daunting for institutions accustomed to highly structured, top-down organizations, but employees who have more personal authority and accountability have more of an investment in their work—it's a way to improve both employee effectiveness and engagement.

How will the higher education facilities workforce operate differently in the future? Thought Leaders symposium participants looked at all of the trends and suggestions to come up with their best ideas about how the workforce would function in the years to come. They believe the workforce will have the following characteristics:

- **More diverse.** The trends are unmistakable. Although each institution will be different based on its location, size and needs, every facilities department will be more diverse in terms of gender, age, ethnicity, and race in the future. Savvy institutions that have prepared for this diversity will be in the best position to prosper.
- **More reliant on outsourcing.** The facilities department of the future will need to turn to vendors and contractors to supply key skills and provide critical knowledge.

Data Point: The lessons of innovation

Expert tips on how to increase innovation in your organization

Strategy lessons:

- Not every innovative idea has to be a blockbuster. Small or incremental innovations can lead to big profits.

Process lessons:

- Tight controls hamper innovation. The planning, budgeting and review applied to evolving businesses can hamper an innovation.

Structure lessons:

- While loosening formal controls, companies should strengthen interpersonal connections to promote innovation efforts and the business core.
- Game-changing innovations often cut across established channels or combine elements of existing capacity in new ways.

Skills lessons:

- Even the most technical of innovations requires strong leaders with great relationship and communication skills.
- Because innovators need connectors—people who know how to find partners in the mainstream business or outside world—they flourish in cultures that encourage collaboration.

—Rosabeth Moss Kanter, *"Innovation: the Classic Traps,"* Harvard Business Review

- **More independent.** Staff will have more flexibility in how they do their work and more power to make critical decisions. At the same time, they will be held more accountable for their work and their decisions.
- **More collaborative.** Look for teams and groups to make decisions, develop strategies and address challenges. Departments will make smarter, more creative choices by tapping the widest range of knowledge and experience.

- **More data-driven.** As discussed in the technology section of this report, institutions need to make better use of data. Facilities departments need to be among those gathering more data and using analytical tools to support critical choices. As more live information about building performance is available electronically—through a NOC, or network operations center—facilities staff would be able to oversee and monitor building operations much like traditional networks.
- **More dedicated to training and continuing education.** It will be hard for institutions to find employees with the right sets of skills, so colleges and universities will need to provide that training themselves. In addition, staff already on the job will need to constantly update their skills to keep up with changes in technology and advancements in building systems. Leadership training will be necessary to prepare future senior facilities officers, while supervisory training will satisfy an even more basic need for the critical facilities workforce.

The strengths and weaknesses of higher education when confronting workforce demographic challenges and strategies institutions should use to respond

The success or failure of institutions addressing workforce changes will depend greatly on the strengths and weaknesses of those institutions. Symposium participants analyzed those strengths and weaknesses and then developed a series of strategies that colleges and universities should consider when facing demographic shifts.

Strengths of higher education. Thought Leaders participants identified several key advantages that institutions can bring to bear on the challenge of workforce demographics:

- **Employee commitment.** Despite all their challenges in recent years, college and university employees largely remain engaged and committed. Many take pride in the institution they represent and consider themselves as contributing to the broad institutional mission.
- **Longevity of staff.** The staffs of many institutions have remarkably long tenures. They possess a depth of institutional wisdom that serves their employers well.
- **Skill level.** The level of technical skills of many higher education employees is high, allowing them to remain current with the changing technology needs and/or requirements of their positions.
- **Opportunities to add outsourcing.** When in-house staff are not available to meet a particular need,

Data Point: Revising HR policies

Implement simple, broad policies that focus on performance over standardization

Consulting firm Accenture reports numerous corporations have achieved success by adopting more flexible HR policies. Higher education institutions should consider these innovative approaches when addressing their own employment strategies:

- **Broadband compensation** collapses an organization's salary hierarchy into fewer, wider bands, allowing managers more freedom in determining pay based on an individual's unique situation and performance.
- **Value- or outcome-based competencies** are flexible, customizable skill-sets used to define jobs in a more adaptable way than traditional, organization-wide skill-based competencies.
- **Cascading performance goals** allow the broad goals of the institution to be applied to the individual. First goals are specified at company or unit level, with progressively more detailed and customized goals then set for groups and individuals.
- **Flexible work arrangements** focus on the "what" of a job instead of the "how." Organizations with these policies allow employees to fully customize when and where they work as long as they get their work done.

—Susan Cantrell and Nicole Di Paolo Foster,
*"Techniques for Managing a Workforce of One:
 Flexible Policies,"* Accenture Institute for High
 Performance Business, February 2007.

facilities departments have the option of adding outside staff with unique skills or experience.

Weaknesses of higher education. Participants identified several disadvantages common to many colleges and universities—disadvantages that could get in the way of successfully managing workforce demographic changes.

- **Institutional commitment.** Facilities departments will struggle to address workforce demographics if their institution lacks a commitment to positive change. Many colleges and universities are overwhelmed by competing interests and have failed to consider workforce challenges in their mission.
- **Lack of training.** Institutions often fail to keep up their employees' skills with training, frequently cutting training to save costs without realizing the long-term consequences. Without up-to-date training and skills, employees will struggle to address challenges.
- **Loss of long-term employees.** Committed, long-term employees provide a great benefit to institutions. But companies are at risk as this workforce nears retirement age. Without a cohesive system to capture this knowledge, it will be lost to the college or university.

- **Rigid HR policies.** Current human resource policies and procedures were developed in an era when competition was less and college and universities were highly valued by employees. Thought Leaders symposium participants believe it is time for institutions to modernize HR policies for greater flexibility and better understanding of a more diverse, more competitive workplace.

Strategies higher education can use to respond. Finally, symposium participants considered the best approaches to the coming workforce challenges.

- **Build on the brand of the institution.** Colleges and universities need to emphasize their mission and role within the community. When employees feel good about what their institution is doing and that their contributions to this effort are valued, their commitment to the institution grows.
- **Embrace technology.** Technology has the promise to mitigate some of the workforce challenges confronting higher education. Through effective use of technology, fewer staff can work smarter, institutional knowledge can be captured and training can be facilitated.
- **Create a positive place to work.** Institutions must strive to create a workplace where individuals in all their diversity are valued. They must also help staff feel a sense of belonging that will help them get through the inevitable tough times.



Look for Part 2 of this series in the November/December 2011 issue of *Facilities Manager*. Download the full report at www.appa.org/bookstore.

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