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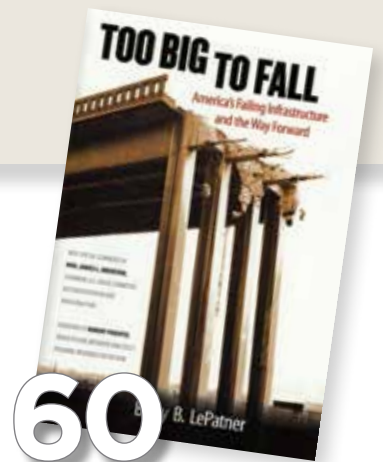
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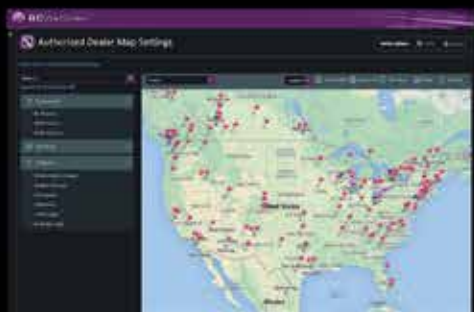
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GRITS Update: Energy Projects are Saving Money and Reducing Carbon Output

We have publicized the fact—

in recent issues of *Facilities Manager* and *Inside APPA*, as well as on the APPA website—that APPA and the Sustainable Endowments Institute (SEI) have launched a partnership that provides all APPA mem-



bers with free access to the SEI's **Green Revolv-**

ing Investment Tracking System. Since the October 19, 2015 announcement, more than 180 institutions have signed on to use the GRITS tool, for a total financial savings to date of more than \$66 million.

GRITS is a project-management Web tool that allows users to track and analyze the energy, financial, and carbon savings data from their energy- and resource-efficiency projects, as well as access a library of more than 1,400 projects completed by other GRITS users across the U.S. and Canada.


With this free version open only to APPA member institutions, users can:

- Access the GRITS Dashboard, which shows a snapshot of your project portfolio's energy, financial, and carbon savings
- Access the Project Details page to track project-specific details, including project type, cost, relevant transactions, performance, and measurement and verification
- Utilize the Project Overview feature to see all projects you have entered that have been completed, current, or proposed for the future
- View a limited version of the GRITS Project Library, which allows for filtering through projects from other institutions by project type, project cost, payback period, region, and more
- Track up to 20 projects and create two user accounts

Following are some of the preliminary findings gathered from data submitted by APPA members as of the first week of March.

- 182 total GRITS sign-ons (34 are from the 2015 pilot program)
- 815 completed projects entered (for which there is complete data)
- Total-to-date financial savings: \$66,013,574
- Total-to-date energy savings: 1,663,257 MMBTU
- Total-to-date emissions savings: 179,589 metric tons CO₂e
- Total project investment: \$59,641,514
- Average annual financial savings: \$15,336
- Average payback period: 4.6 years
- Median annual return on investment: 27.6%

SEI also offers an option to upgrade to GRITS Unlimited at a special highly discounted rate for APPA members. To be clear, APPA members who sign up for GRITS will receive 60 days of GRITS Unlimited at no cost. After 60 days, your account will be transitioned to the *free* GRITS-APPA version, unless you choose to upgrade to GRITS Unlimited. You will not be charged unless you opt to upgrade your service.

For more information about the GRITS partnership and to view a video on how the program works, visit www.appa.org/grits.cfm. To sign up for your free access to GRITS under the SEI-APPA partnership, please complete the brief form at <http://bit.ly/gritsappa>. And if you have questions about this new partnership or GRITS, send an e-mail to grits@endowmentinstitute.org. 

A handwritten signature in black ink, reading "Steve Glazner".

COMING IN MAY/JUNE 2016

- Academic program prioritization
- Total cost of ownership

FACILITIES manager

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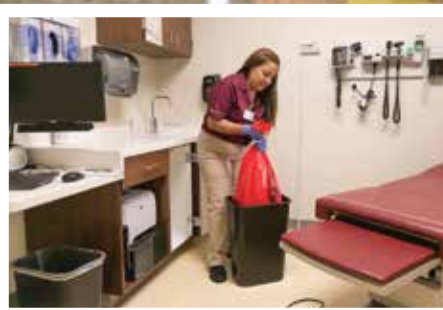
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APPA promotes leadership in educational facilities for professionals seeking to build their careers, transform their institutions, and elevate the value and recognition of facilities in education. Founded in 1914, APPA provides members the opportunity 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 more than 13,000 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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Candidates Announced for APPA Office 2016-2017

The APPA Board of Directors is pleased to announce the selected slate of officers for the 2016-2017 elections. The Nominating Committee was led by Immediate Past President Randolph Hare.

PRESIDENT-ELECT

- **Chris Kopach**, University of Arizona (RMA)
- **Viron Lynch**, Portland State University (PCAPPA)

Voting is now open to primary/institutional representatives. Those eligible to vote will be able to do so online or via paper ballot. The online ballot will include a link to a video statement from each candidate. **The ballots close at 11:59 p.m. Eastern time on April 19, 2016.**

Please note that the primary/institutional representative will have the option of having an associate member vote on their behalf via proxy (only one vote will be accepted from each institution). The associate member with proxy rights has been listed on the dues invoice.

To learn more about the candidates and to vote, go to www.appa.org/vote. If you have any questions, contact Anita Dosik at anita@appa.org or 703-542-3837.



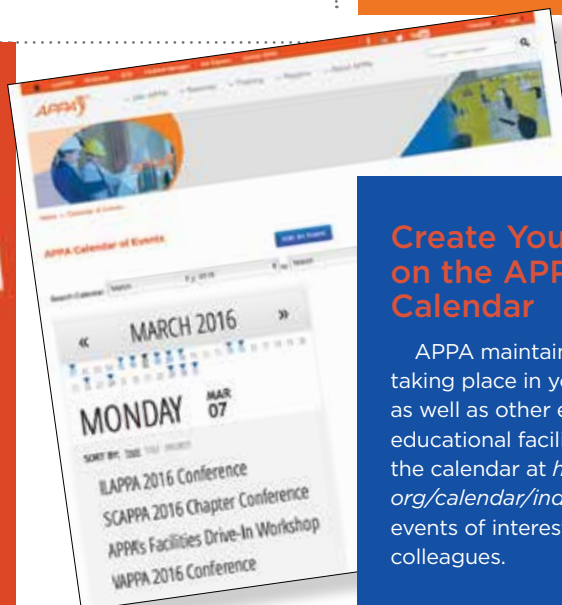
APPA 2016 Annual Meeting & Exposition

July 12-14 2016

Mark your calendar to attend next year's meeting and exposition. You won't want to miss this exciting gathering of fellow facilities professionals and exceptional speakers! Co-located with SRAPPA and TNAPPA 2016 in downtown Nashville, Tennessee.

APPA Dues are Due

APPA has sent membership dues invoices to all APPA members for the fiscal year April 1, 2016–March 31, 2017. Please pay your dues promptly to keep receiving APPA's many membership benefits. For more information, contact Kristin Witters at kristin@appa.org.



Create Your Own Event on the APPA Online Calendar

APPA maintains a calendar of events taking place in your region or chapter, as well as other events focused on educational facilities. You can view the calendar at <http://www.appa.org/calendar/index.cfm> and also add events of interest to your APPA colleagues.

Start a Conversation on APPA's Discussion List—or Join One!

1,040 subscribers and growing.

APPAINFO: Your Networking Link!

Access to the APPAINFO listserv is free—and is another tool to help you solve your campus' most formidable challenges. APPAINFO is an e-mail discussion list for educational facilities professionals, where you can find the answers to many of your everyday problems simply by posting a question to your peers, such as:

- How are you handling communications with your front-line workers?
- What business rules are you adopting for the use of mobile apps in a union environment?
- What strategies are my peers using to tell their facilities' stories to senior campus administrators?

Just ask! The possible topics open for discussion are endless. APPAINFO focuses on all campus facilities issues, regardless of size or type of school or organization. Read the list guidelines before joining, then subscribe. Subscribers are also able to search the list of archives on previous topics. Visit the APPAINFO discussion list today at <http://www.appa.org/discussionlists/index.cfm>.



APPA EVENTS

Apr 4-5, 2016

Smart and Sustainable Campuses Conference, Inner Harbor, Baltimore, MD

Apr 5, 2016

Drive-In Workshop, University of Colorado–Colorado Springs

Apr 12, 2016

Drive-In Workshop, University of Maryland

Apr 15, 2016

Drive-In Workshop, Auraria Higher Education Center

Jul 11, 2016

Emerging Professionals Summit, Nashville, TN

Jul 11, 2016

Senior Facilities Officers Summit, Nashville, TN

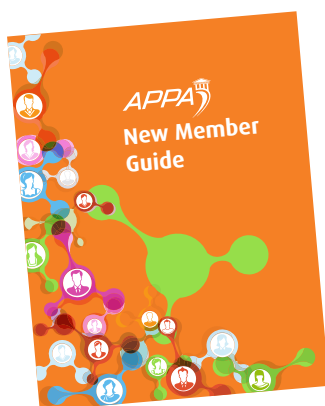
Jul 12-14, 2016

APPA 2016, Nashville, TN

Sep 11-15, 2016

APPA U, Orlando, FL

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



Access APPA's New Member Guide

A new Member Guide is now available to all APPA institutional members when they log in to myAPPA. The guide highlights the many benefits APPA membership makes available to you and your staff, and to your local peers who may not be APPA members. Get the most from your APPA membership! Take a minute to **log in today** and learn about the benefits of maximizing your involvement in APPA.

APPA's Online Membership Directory

APPA's online membership directory is updated on-the-fly, and accessed only by APPA members. You can search by name, company/institution, state/province, country, or full-time employee (FTE). Get the latest contact information for your friends and colleagues, and don't forget to update your contact information with APPA via myAPPA at www.appa.org/myappa.cfm.



APPA Congratulates CEFP & EFP Recipients

The following professionals have successfully completed the requirements for APPA's CEFP and EFP credentials, from November 10, 2015 to February 1, 2016. Congratulations on their personal accomplishments.



CEFP RECIPIENTS

Dennis Bailey, *Florida State University*

Terry Brown, *Kutztown University of Pennsylvania*

Michael Hodgkinson, *Kalamazoo College*

Martin Klein, *University of Alaska Fairbanks*



EFP RECIPIENTS

Beth Furraritti, *Cuyahoga Community College*

Dave Lampinen, *Michigan Technological University*

Christopher Maxson, *Michigan Technological University*

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- Modular
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- Practice exams
- Sample Q&A
- Knowledge checks

TESTING PLATFORM

The platform provides an exciting array of online testing options to suit test-takers' needs:

- At a local Kryterion testing center staffed with professional proctors; or
- On campus or at home, utilizing a webcam-enabled online proctor arranged by Kryterion.

CUSTOMIZED INTERACTIVE LEARNING (CIL)

CIL is a live and private Web event with peers and a qualified CEFP facilitator. Upon enrolling in the CEFP Curriculum, you will be assigned to a CIL Group and facilitator, and registered for customized learning sessions held monthly over a period of 90 days.

Your CIL sessions will enable you to track your progress through the Credentialing Curriculum, and also introduce you to a wealth of other resources including the CEFP version of the Body of Knowledge. CIL discussion boards, threads, live shared learning, and answered questions from your facilitator, and CIL Group peers will bolster your understanding and confidence. CIL will assist you greatly as you continue your journey toward completing the CEFP examination and attaining the CEFP credential.

Visit the APPA website to learn more about this exciting new option, and register to prep for your CEFP credential today! Questions? Contact Christina Hills at christina@appa.org or call 703-542-3844.

credentialing.appa.org

Welcome COAPPA AND VAPPA!

Join APPA in welcoming its latest state and local chapters:

- Colorado chapter (COAPPA)
- Virginia chapter (VAPPA)

Visit the Colorado chapter at <http://coappa.appa.org>. The Virginia chapter conference will be held March 7-8 at James Madison University in Harrisonburg. You'll be hearing more about these new chapters' upcoming meetings, conferences, seminars, and other activities on the APPA website.

The list of active APPA chapters can be viewed at <http://appa.org/regions/chapters.cfm>. To submit your chapter information, upcoming conferences, and other activities, please e-mail your news to Steve Glazner at steve@appa.org.





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APPA's Revised Strategic Plan 2020: Building a Robust, Sustainable Business/Membership Model

By E. Lander Medlin

Membership retention and recruitment (growth) is the foundation, the life blood of an association. It requires a focus on member needs (now and for the future), disciplined execution, and a passion for the work by and between the volunteer leadership and staff—all in support of the profession.

As former hockey great Wayne Gretzky, the NHL's leading point scorer, said when asked about the key to his success: "I don't skate to where the puck is, I skate to where the puck is going to be!" His success wasn't just the result of talent or strength alone; rather, it also came from being able to pick up on visual cues, having an enormous passion for the sport, and possessing the knowledge and experience that helped him anticipate what would happen next. This is instructive when we consider the elements for building a successful association business—hence a truly sustainable membership model.

THE EXCEPTIONAL EXPERIENCE

For example, when individuals think about engagement, they often recall exceptional experiences. In most cases, these experiences occur because they are interacting with an organization that understands their needs on a deeper level; that organization is able to anticipate their needs and provide relevant and meaningful solutions.

APPA's work this past year to gather feedback from focus groups, invest in a general membership survey, and perform an environmental scan of the external drivers of change has provided meaningful data and

information to help us not only respond to change but more important, to anticipate change. The revised *Strategic Plan 2020* strives to more effectively target member's needs today and to tackle the tough issues faced by future generations, and ultimately gain real, meaningful engagement for all over time. Indeed, we endeavor to assist members in staying up to date, saving money, avoiding costs and risk, improving productivity, increasing effectiveness, and advancing the profession—all important, valuable, and worthy membership benefits.

Yet, membership benefits are more than just a transactional exchange of programs, products, and services. Our organization must provide an opportunity for members to build meaningful relationships, support a cause, be stewards of a



reputation, and/or advance the profession, all while tapping into the needs and values of differing generations, exercising leadership, having relevance, and seizing opportunities.

STRATEGIC PLAN 2020

As we begin work on the Strategic Plan 2020, comprising five leading strategies and associated initiatives and actions, it is important that we provide context, meaning, and definitions for a few of the terms used throughout the document.

A new meaning for member engagement, or what is “engagement assessment”?—Engagement represents a relationship with an association that enables the member to do something they want to do in the first place, better than they would be able to do on their own. The association becomes a partner rather than merely a provider of benefits. Members choose to become engaged to achieve outcomes that matter to them. The move is from *participation*, which could be likened to a transaction (a sale, etc.), to a *connection* between what the association does and what is critically important to them. The focus is not selling and persuading; it's recognizing and fully understanding the potential connection points with members that is at the heart of retention and engagement. This approach elevates *relationships* over the delivery of goods and services.

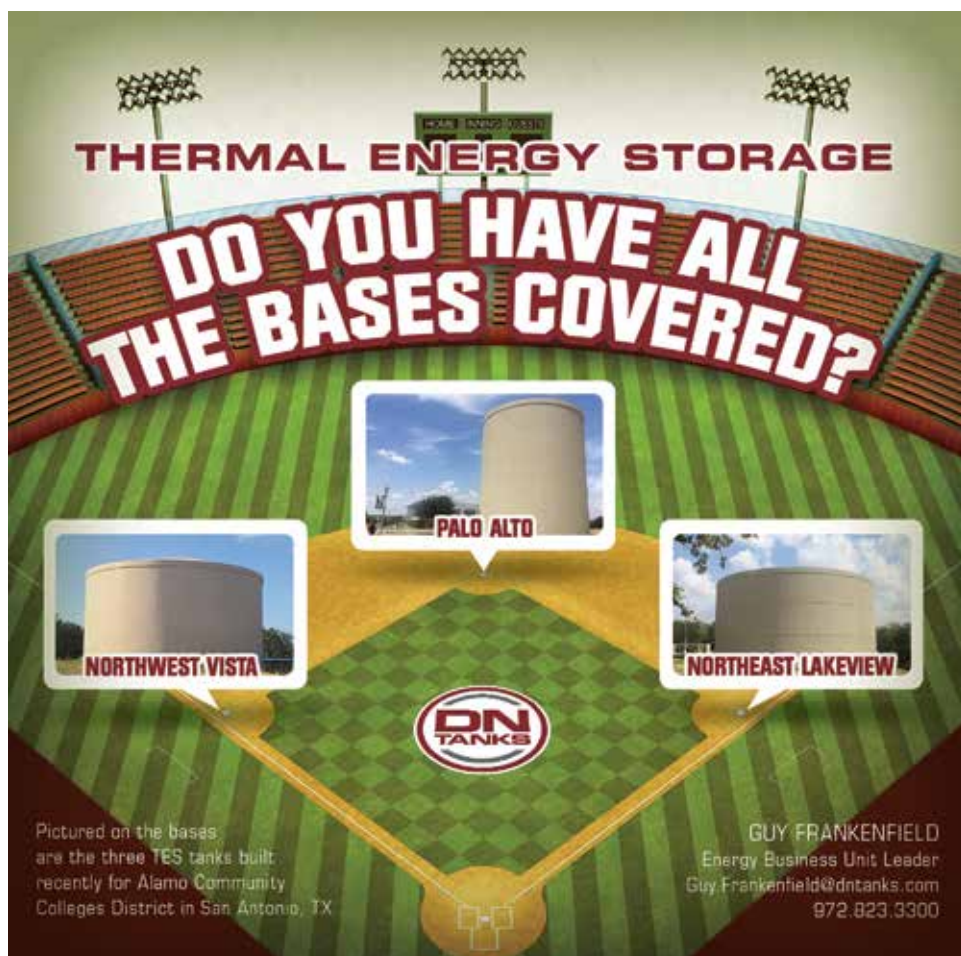
The association essentially becomes indispensable by building the organization around what matters most to members; hence, a relationship-focused engagement model is formed by:

- Understanding what keeps our members up at night.
- Seeing the work through members' eyes.
- Providing technology-enabled solutions.
- Creating a “community” culture (one of interactivity, collaboration, and meaningful two-way conversations).
- “Living” in members' spaces—in their “shoes.”
- Engaging in collaborative development of products and content.

The mindset moves from building an “audience” (one-way, more transactional) to building a community—two-way, highly interactive, participatory, with contributions that are mutually beneficial, where members feel valued and important.

Therefore, we must focus on intentional efforts to build long-term relationships, to foster a program that enhances ways to feel connected, to share opinions, experiences, and knowledge, and to use and provide searchable resources—relevant, archived information that will help members to find the solutions they need.

In order to know who the most engaged members are, we need to be able to properly “score” or measure member engagement. Scoring engagement in an association helps gauge the degree to which members are actively involved and aligned with organizational goals. Engagement measurement tools should provide the association with information to understand more about our members and when those relationships might need nurturing or enrichment.





The association management system (AMS) database we are in the midst of implementing should be well equipped to provide robust insight into just how an association functions and the value it creates for its members. For example, a simple measure called the “Net Promoter Score” (NPS) could be employed for that type of immediate, measurable, and meaningful feedback. The essence of the NPS is captured in one very important question: *How likely are you to recommend the organization, program, or product to someone else?* Therefore, the focus is on creating highly meaningful and exclusive experiences that will generate “off the charts” Net Promoter Scores.

Onboarding new members—The Wikipedia definition suggests that onboarding is a process of “organizational socialization”: It essentially means welcoming a newly recruited member into a new member community. Therefore, a *welcoming on-boarding process* should be in place, whether it includes an e-mail and a call, followed by a mailed package or an online package (webinar, video, podcast, flip book, etc.). However, it is also about creating a welcoming community that is personalized (e.g., a buddy system, mentoring program) so that more active members or volunteers reach out to and connect with the new folks and show them the ropes, explaining and offering personal examples of how they have benefited from being active members. In short, they need to know the WIIFMs (What’s In It For Me?).

Effective onboarding treats the new member as a *member first* and a *customer second*. The key to effective onboarding is first to identify the member’s motivation for joining, along with their needs, interests, and communication preference(s). The next step is to send targeted communications based on that information in order to move them into the appropriate engagement cycle.

Good onboarding involves a mix of selling, educating, and using products with minimal friction along the way. It also involves reminding new members about the impact of specific benefits or opportunities, showing them how to get started, and identifying and removing barriers. In other words, communicate, communicate, and communicate again.

Experiential learning methodologies—It is necessary to first define experiential learning:

“In its simplest form, experiential learning means learning from experience or learning by doing. Experiential education first immerses learners in an experience and then encourages reflection about the experience to develop new skills, new attitudes, or new ways of thinking.” (Linda H. Lewis and Carol J. Williams, “Experiential Learning Past and Present,” *New Directions for Adult and Continuing Education* 62, Summer 1994, p. 5).

The experiential learning methodology is not linear, cyclical, or even patterned. It is a series of working principles, all of which are equally important or must be present to varying degrees at some time during experiential learning. To that end, this list of characteristics should be present in order to define an activity or method as experiential. These characteristics include:

- A balanced mixture of content and process
- Absence of excessive judgment; a safe space to process self-discovery
- Engagement in purposeful endeavors; activities that are personally relevant
- Encouraging the big picture perspective; seeing relationships in complex systems and finding a way to work within them
- The role of reflection; bringing “theory to life”
- Creating an emotional investment; the learner must be fully immersed in the experience
- The reexamination of values
- The presence of meaningful relationships
- Learning outside one’s perceived comfort zone; being accountable for one’s actions and owning the consequences

Chapman, S., P. McPhee, and B. Proudman (1995). What is Experiential Education? In Warren, K. (Ed.), *The Theory of Experiential Education* (pp. 235-248). Dubuque, Iowa: Kendall/Hunt Publishing Company.

In essence, experiential learning has a quality of personal involvement, the whole person in both his or her feeling and cognitive aspects being part of the learning event. Furthermore, experiential learning exists when a personally responsible participant cognitively, affectively, and behaviorally processes knowledge, skills, and/or attitudes in a learning situation characterized by a high level of active involvement.


Experiential learning is participative, interactive, and applied. It allows contact with the environment and exposure to processes that are highly variable and uncertain. It involves the whole person; learning takes place in the affective and behavioral dimensions as well as in the cognitive dimension.

The experience needs to be structured to some degree—relevant learning objectives need to be specified and the conduct of the experience needs to be monitored. Participants need to evaluate the experience in light of theory and in light of their own feelings. And, process feedback needs to be provided to the participant to complement (and possibly supersede) the outcome feedback received by the participant.

THE PATH TOWARD IMPLEMENTATION

The terms and associated definitions provided above serve to further clarify and contextualize

their use in APPA's newly revised Strategic Plan 2020, as there are or certainly could be many varied viewpoints and perspectives.

Lack of clarity and general agreement at this critical juncture would only impede our progress down the path toward implementation rather than provide the opportunity to rapidly advance it. This clarification ultimately provides the focus for disciplined execution and achievement of our goals and objectives. Certainly this will be challenging, but we look forward to that challenge as we enter APPA's next 100 years. 

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



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Expanding Research at APPA

By Norm Young
Vice President for Information and Research



One of the five foundational strategies of APPA's Strategic Plan 2020 is to expand research, and the plan identifies two overarching goals to accomplish this. The first is to create an improved and more customizable interface for creation and gathering of information and research.

This will be accomplished largely by updating our website, developing apps, and providing other electronic means to enhance the retrieval and interactivity available with existing content through many sources, such as completed research projects, Body of Knowledge (BOK) chapters, Facilities Performance Indicators (FPI) data, and our extensive library of publications. The greatest impact will come from improving our website, and work on this significant and time-consuming

process has already begun.

The second goal includes targeting new research efforts that focus on the needs of our profession, and it is in this area that some recent changes in the research process have occurred.

RESEARCH THROUGH CFAR

APPA formed the Center for Facilities Research (CFaR) in 2002 to grow our knowledge base primarily through member-driven research. This has produced significant bodies of work that have provided content and best practices for all that we publish and teach. CFaR, through its directors and advisors, provides structure and guidance for researchers.

Until now, the process has relied heavily on individual members to develop ideas and propose research projects.

Recently, the Information and Research Committee developed a plan to proactively seek out topics and ideas for expanding our knowledge through targeted research. We will do this by mining the key issues developed in and through APPA's already established processes, forums, summits, and symposiums.

Potential researchers who have developed their own ideas and topics will still have the opportunity to submit proposals, and CFaR will continue to provide support. What's new is the concept of building a relevant and current topic list for consideration by would-be researchers, writers, and professional development providers.

RESEARCH INFORMED BY TLS

The starting point for the Information and Research Committee's task of topic mining has been the Thought Leaders Series (TLS), for which annual symposiums held since 2006 have produced a cornucopia of topics in the form of questions to be asked and issues needing solutions. Each year APPA, led by the TLS chairperson Jack Colby, brings together institutional leaders from colleges and universities across the United States and Canada alongside association leaders, industry consultants, and topical experts to discuss the future of higher education and the impact of that future on education facilities.

The 2015 symposium, *Facilities & Technology: The Transformation of "Campus,"* highlighted in *Facilities Manager* magazine (September/October and November/December 2015, available on the APPA website), has produced a robust list of topics that could potentially become the basis of research projects, professional development programs, and articles in various publications, all of which would add to our growing body of knowledge (the list can be found on the CFaR page of the APPA website.)

ENGAGING INDIVIDUALS

After reviewing the latest TLS monograph and disseminating the list of topics, each member of the Information and Research Committee has agreed to take the list to their respective regions and begin a campaign to distribute the list through their regional boards, committees, and junior/senior representatives. The goal is to identify individuals who may have an interest in taking on a topic, whether through a research project or at any level, including articles and questions posed on the APPAinfo discussion list.

In keeping with our theme of engagement, the committee members will then contact those that have been identified to offer assistance or guidance as needed. The list is also being circulated through established lines of communication between APPA, its business partners, and other associations as appropriate, as part of a collaborative process.


Early indications suggest there is a high level of interest to pursue targeted research topics developed through our well-regarded programs such as the TLS.

A process of using information gained through the TLS for professional development fodder has been in place for some time. This new practice of proactively mining topics for research has the potential to significantly broaden our

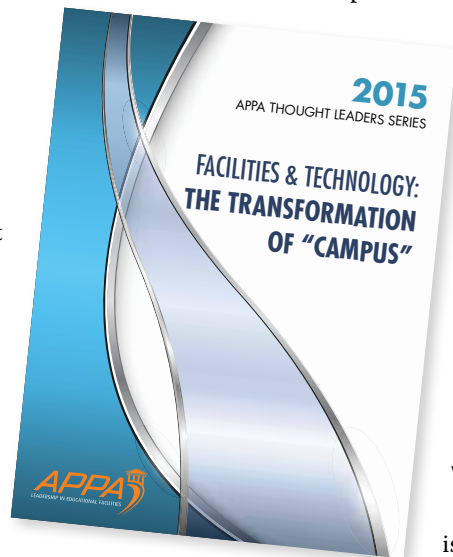
knowledge base. Ultimately though, we would like to expand the topic mining to include other discussion-based forums at APPA. Specifically, the Senior Facilities Officers (SFO) and the Emerging Professionals (EP) summits can be fertile ground for new ideas, and each may become a significant contributor to expanded research as well.

WHY EXPAND RESEARCH?

Expanding research at APPA is critical to our future success, as was anticipated during the thoughtful process that brought us the 2020 strategic plan. Our ability to intuitively search for and interactively access our existing body of knowledge through improved Web navigation and other electronic means is vital and is being addressed through a significant upgrade.

Equally vital is our ability to consistently leverage all the contributions our members, institutional leaders, and partners bring to us that help us remain relevant in rapidly changing times. New research, updated professional development programs, and timely publications are the result of capturing and disseminating those contributions. A focus on easily accessed, targeted research is one of the many ways APPA can help all of its members to remain influential leaders in the years to come. 

Norm Young is APPA's Vice President for Information and Research, and associate vice president of facilities management at the University of Hartford. He can be reached at young@hartford.edu.



Five Steps to Starting an APPA Chapter

By Winnie Kwofie

Chapters are becoming a pivotal means to grow the APPA family and to effectively engage members—a key success metric for the APPA organization. Chapters can serve as an effective means to recruit new members, retain current members, and keep them all engaged and active. Chapters provide opportunities for in-person networking events, meetings and trainings, and other knowledge-sharing and hands-on learning activities requiring limited or no travel and reduced room-and-board costs.

Most important, chapters can help build interprofessional relationships and personalized touchpoints that can serve as professional lifelines for members pursuing their careers. Each member has their own APPA journey to relate, with personal stories on insights and survival skills they've learned, or wisdom they've gained from an encounter with an APPA member.

IT TAKES VOLUNTEERS, TIME, AND EFFORT

Although there are many advantages to forming a chapter, it is by no means an easy task. Added to the excitement, passion, and zeal needed to get it started is the hard work of finding equally passionate and excited members to volunteer their time and effort. The amount of work required varies from chapter to chapter, with some chapters soliciting the services of an attorney and a certified public accountant to complete the entire registration. Such strategy requires financial commitment, but allows the founding members to focus efforts on programs and events for the chapter.

As happened in other chapters, the founding members of BAYAPPA in California volunteered their time and effort to complete the entire process. The challenges included: 1) finding dedicated members to serve in assigned founding board roles, 2) finding time to develop bylaws, 3) filling out all state, federal, and association registration forms, 4) finding reasonably priced legal and/or public accounting services to review all the paperwork

at zero cost, 5) submitting all the paperwork to complete registration, and 6) most important, developing exciting and suitable professional events and programs for members, because such activities are crucial to the long-term survival of the chapter. I strongly recommend that programs and events be developed simultaneously during the registration process, because membership participation and attendance at events, workshops, and other knowledge-sharing and networking programs are key measures of chapter success.

The registration process could be as short as four months, or take as long as two years to final registration once the idea to start a chapter is conceived. There is no need to start from scratch, because existing chapters are willing to provide guidance. My recommendation is to aim for a six-month time frame to keep the momentum going. Two key decisions that should be made quite early in the process include: 1) geographical boundaries for the chapter, and 2) names/acronyms for the chapter. These two decisions are required regardless of whether the registration is done by the chapter or by an outside agency. Setting a geographical boundary for the chapter could be challenging, so it is important to focus on mapping out a boundary that provides the best opportunities for reduced cost and time for in-person knowledge sharing and networking.

THE FIVE KEY STEPS

I have provided five key steps, including some tips from my own experience to assist others interested in forming a chapter:

Step 1—Founding Members

- Passion and zeal are fabulous attributes for founding members; however, it is critical to evaluate the time and commitment needed for the registration process and for program and event planning. The average number of founding members required for the board is five. Depending

on the level of commitment and responsibility, each member has to commit a minimum of ten hours toward the development and review of all documents.

Of course, the time commitment required will depend on the chapter's strategy for registration. One member should serve as the gatekeeper for all documents and correspondence to and from the proposed chapter board. Of the five members, the chapter should include one representative from the regional board and one representative from the regional business partners' pool. These representatives can provide the chapter with the benefits of knowledge transfer from board governance, chapter alignment with the regional board, and APPA and business-partner relations and protocols.

Step 2—Develop a Preliminary Outline to Validate the Need for a Chapter

When it is determined that a state or local area could benefit from a chapter, it is beneficial to develop a preliminary outline with dates and timelines to explore and validate the need for a chapter.

- Select a boundary that provides optimal opportunities for in-person networking, training, and knowledge exchange. Identify possible locations for events and networking with optimal proximity to targeted institutions within the boundaries. Identify possible obstacles such as long travel time and need for room and board, and how these could be minimized to encourage participation. The rule of thumb is to set the boundary to maximize transportation options for members so they can use part of their regular work schedule to attend events and also to travel back home after the events.
- Research and select names and acronyms that will help to brand the chapter and to align it with the geographical area. The chapter should verify from the Secretary of State's online database in their state to ensure the name is not already taken. The name search can be included in the services of the agency hired to complete the registration. Also check the list of existing APPA chapter names and acronyms to avoid duplication.
- If the need for a chapter is validated and the founding members agree to set one up, roles and responsibilities should be assigned with timelines for reporting progress.

Step 3—Seek Approval from the Regional Board and APPA

- The chapter would need to seek approval from the regional board and APPA. This approval from the regional board ensures the commitment of the regional board and APPA to support the chapter's development and success. APPA provides a memorandum of understanding (MOU) between itself, the regional board, and the chapter.

Step 4—Bylaws Development, Registration, and Documentation

- There is no need to reinvent the wheel. Members interested in setting up a chapter could start with the bylaws from either their regional board, from APPA, or from other existing chapters and revise the sections to meet their chapter requirements. The two key components of the bylaws are the board positions and voting procedures, which are different for each chapter or regional board. It is important to define the chapter board positions and their assigned roles, responsibilities, and voting requirements.
- Request a Federal Identification Number (EIN) at <https://www.irs.gov>.
- Request an MOU between APPA, the regional board, and the chapter
 - State registration forms
 - File the articles of incorporation.
 - File the initial registration form, the state Attorney General's Registry of Charitable Trusts.
 - File the Statement of Information with the Secretary of State.
 - Tax-exempt status—APPA will file the tax-exemption paperwork on behalf of the chapter after the MOU is signed by the chapter founding president and the regional board president.
- Find a legal and/or public accounting service to review all documents. This is an important service and could be expensive even for a nonprofit entity. I recommend you start with your institution's legal counsel or solicit referrals.

Step 5—Additional Tasks to Consider

- Open a business bank account: Choose the same bank as the regional board if fund transfer opportunities would be considered as part of the chapter operations.
- Request seed funds from your regional APPA, or from APPA if this is critical for the first event planning.

- Host a celebration reception and/or first event. It is easy to take a deep breath and relax after the registration process, but that may diminish your momentum in becoming a functional chapter. Try to have an event in mind while in the planning stages, at a minimum a reception to inaugurate the chapter and to network with members.
- Schedule monthly phone or in-person board meetings, preferably monthly phone meetings for more convenience.

These steps are my general recommendations to get your chapter started; however, they should not be considered as covering all aspects of the process or as the only strategy for registration. Please do remember that the process varies from state to state and even within counties and cities. Finally, I would like to emphasize that the APPA staff will be glad to provide guidance and support on the entire process. §

Winnie Kwofie is facilities manager at Cañada College in the San Mateo County Community College District. She is also president of APPA's BAYAPPA chapter. She can be reached at info@bayappa.org.

BAYAPPA

BAYAPPA was established in January 2015, and there was an engaging and participatory process to finalize the name and the boundaries. We hosted our first educational program in September 2015, with over 40 participants in attendance all the way from Southern California to Nevada. The participants were very eager for more knowledge-sharing events.



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APPA's Facilities Drive-In Workshop offerings are an excellent way for APPA member institutions to encourage networking and professional development among educational facilities professionals within their local vicinity. These workshops are ideal for professionals who might not normally have access to training and professional development opportunities, due to operating budget restrictions or similar constraints and are a great way to introduce these professionals to APPA, its regions, and chapters.

How are APPA's Drive In Workshops Planned and Organized?

Each workshop is organized with the support of APPA, an APPA Business Partner, and a host educational institution.

Responsibilities of the Host Institution:

- Provide adequate meeting space plus tables and chairs (conference room plus adjoining registration area, as well as separate seating in adjoining area for sponsored luncheon).
- Supply audiovisual equipment (typical requirements are a podium, one or two mics, a projection screen and LCD projector).
- Arrange for parking if needed for attendees.
- Provide menu options to the sponsor (if the host location site has a kitchen or works with required caterers). The sponsor picks up the cost of lunch and all breaks.
- The person coordinating on behalf of the host institution (typically the institution's facilities officer) is present during the workshop to welcome attendees and provide some introductory comments on APPA.

Responsibilities of the Sponsor:

- Works with APPA and the host institution to identify suitable session content and speakers, and firms up the program. This also ensures that the content is fully educational in nature, i.e., does not advocate a particular product or service.
- Manages on-site registration on the day of the workshop, distributes badges and distributes/collects evaluation forms.
- Pays sponsorship fees, cost of food/beverage at the workshop.

Responsibilities of APPA:

- Manages event promotions (produces flyer, email invitations and distributes these promotions).
- Creates list of prospective attendees (from both APPA member institutions and prospective institutions). Shares this targeted attendee list with the host and the sponsor.
- Creates an online registration link and sends regular attendee registration reports out to the sponsor and host prior to the event.
- Works with host institution's facility officer to prepare any comments, supporting materials, slides describing APPA, benefits of becoming involved with APPA, etc.

For more details about sponsoring or hosting an APPA Drive-In Workshop, please contact APPA's Professional Development Manager, Corey Newman at corey@appa.org.

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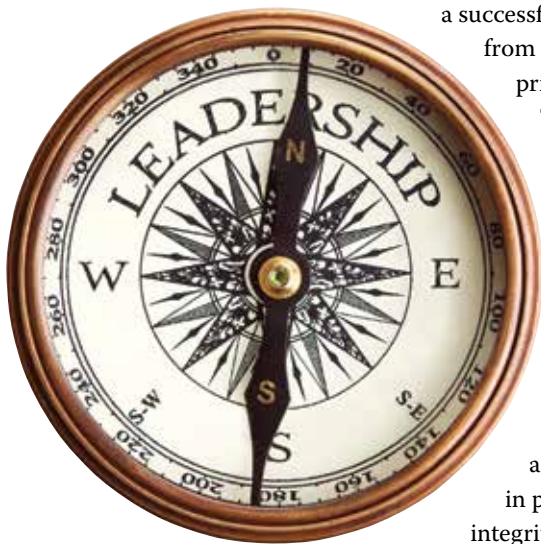
Leadership and Virtues—Prudence

By Joe Whitefield

Leaders at all levels within an organization face numerous challenges that demand responses—responses that must be both thoughtful and personal in order to be effective. They must be thoughtful in the sense that the ideas and initiatives behind them are smart, specific, feasible, and workable. They must be personal because, in many cases, the will and energy required to implement an initiative and shepherd it to a successful conclusion are drawn from the qualities that comprise the leader's character. This is why character is so very important when

not everyone agrees with these views. One person's health concern is another person's freedom concern and vice versa. These types of conflicts exist in abundance today. So let's consider ways for leaders to address these kinds of problems as we navigate the morality minefield of competing values.

I suggest one of the leading contributors to cultural problems is the devaluing of values themselves. There was a time when virtues—cardinal virtues if you prefer—were considered to be values of a higher order. A person exhibiting these virtues would be respected for his or her integrity even above intelligence (think statesman instead of politician).



“Often thought of as wisdom, prudence also encompasses discernment and a determination of actions that are appropriate for a given situation.”

we evaluate leadership and leadership potential in people. Intelligence and integrity are thought to be the winning ticket for leaders. Although that may be partially true, I think it is not quite that simple.

COMPETING VALUES

I have observed that intelligent people do not always share the same values. Or if they share the same values, they do not share them in the same measure or order of priority. These differences can lead to numerous conflicts and inconsistent messages, causing divisions within organizations and communities.

Take, for example, the difference between social perceptions of tobacco use versus recreational marijuana use. Cigarette smoking is more and more restricted because it is seen as a health issue, while marijuana use is becoming legalized in some states because it is seen as a freedom or rights issue. But

As a reminder, these virtues include prudence, courage, justice, and patience, if you add faith, hope, and charity you have the full list. When was the last time you discussed virtues within your organization? If rarely or never, now might be a good time for a review of them, and prudence may be a good place to start.

PRUDENCE AND DISCRETION

Prudence seems to have fallen out of favor with many people these days. No one really wants to be called a “prude.” Prudence was actually part of the punchline in the famously funny *Saturday Night Live* skits that satirized President George H.W. Bush, who often repeated, “It wouldn’t be prudent.” The diminished regard for this virtue is unfortunate. Especially when you consider what it entails.

Often thought of as wisdom, prudence also encompasses discernment and a determination of actions that are appropriate for a given situation. Civility and decorum also come to mind when I

think about prudence. It is more than simply having the right answers (intelligence) and pushing yourself to the front. Prudence considers the pushing process. It understands that progress, to be truly effective and long lasting, is better when others are persuaded rather than forced. Being right is not the same as being effective.

Prudence bridges this gap by asking questions. What is the wise thing to do? How should this be approached? What needs to be said? What doesn't need to be said? I hope you didn't miss the key element here: *discretion*. There are many instances in which discretion can do more to advance a cause than talking more can ever do. Just because you *think* something, doesn't mean you have to *say* it. I find discretion to be one of the most appealing qualities in others.


GIVING CONSENSUS A CHANCE

Prudence can be the antidote for many of our cultural battles. When prudence is absent, the environment can become overly political in its tone. Although you may have heard of political correctness running amok, when have you heard of prudence running amok? Prudence allows discussions to replace accusations and talking to replace shouting, thus giving consensus a chance.

To be sure, consensus is not always attainable. There are times when the proper response will require bold actions that are not popular. However, in these situations, prudence is still present and still the key to success. When the propriety of an action is considered along with its expediency—that is the definition of prudence.

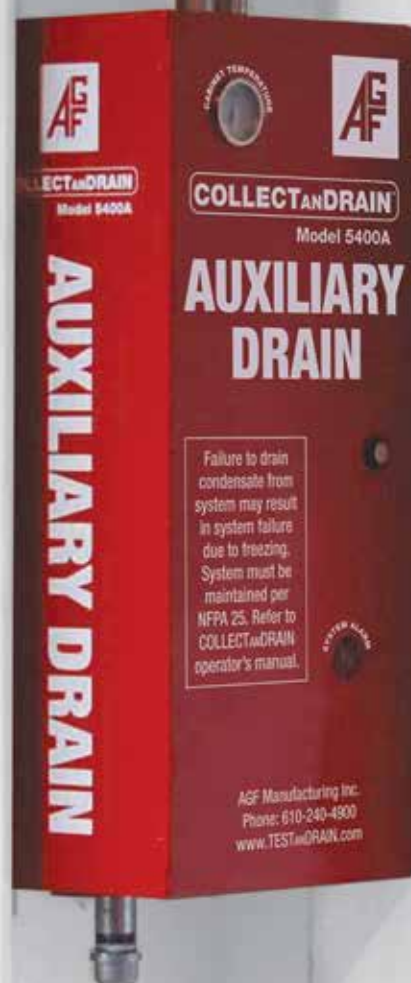
Leadership today demands character no matter how talented or intelligent the leader is. I submit that character should be more than a simple set of values that are promoted and adhered to on a situational basis.

Virtues are loftier. Because they are more properly displayed than declared, virtues are hard to fake. If you take them on, your leadership can be bolstered as your intelligence and

integrity will be more integrated, more consistent, and more effective. And, it would be prudent to start with prudence. 

Joe Whitefield is assistant vice president for facilities at Middle Tennessee State University, Murfreesboro, TN. He can be reached at joe.whitefield@mtsu.edu.

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Green Targets: Taking Charge of Recycling

By Ellen R. Delisio

The hodgepodge that is the U.S. recycling landscape is being overhauled by corporate groups needing reliable and plentiful sources of recycled materials.

“Recycling is very much alive and well in the U.S. because demand for the recycled materials has never been higher,” says Keefe Harrison, executive director of The Recycling Partnership, based in New Hampshire. “Recycling has a strong future with companies who are keeping an eye on material scarcity. We see a trend for companies to first shore up recycling within their four walls and then look outside their company buildings to assess how best they can improve community programs.”

NATIONAL RECYCLING TARGETS NEEDED

U.S. recycling rates lag behind those of most industrialized countries, largely because of a lack of uniform policies and limited, outdated infrastructure. There are no national recycling targets. For the most part, recycling is handled at the state level, with primary responsibility assumed by cities and municipalities, which often work in a vacuum.

“It’s fragmented,” says Paul Gardner, a recycling consultant. “There’s a lack of capital. There are cities next to each other with completely different ap-

proaches. There is a lack of recognition that recycling is part of another supply chain. There also are some places where garbage fees are very low, so people don’t care about recycling.”

REDUCE, RECOVER, RECYCLE OUR FOOD

American communities recycled and composted around 35 percent of municipal solid waste in 2013, diverting 87 metric tons to recovery, according to the U.S. Environmental Protection Agency (EPA). The average American generates 4.4 pounds of trash per day, resulting in about 254 metric tons of trash across the United States each year, notes the EPA.

At the federal level, the EPA is increasingly concerned about the large amount of food in the country’s waste stream. “More food reaches landfills and incinerators than any other single material in our everyday trash,” says the EPA. In 2013 alone, Americans generated more than 37 metric tons of food waste, with only 5 percent diverted from landfills and incinerators for composting. At the retail and consumer levels, food loss and waste totals \$162 billion, the U.S. Department of Agriculture (USDA) estimates. “There’s great potential for all of us to help reduce, recover, and recycle wasted food,” according to an EPA spokesperson.

The EPA and USDA have set a goal of reducing food waste and loss by 50 percent by 2030. This domestic goal aligns with a similar target in the new United Nations’ Sustainable Development Goals.

“As part of the effort, the federal government is working with charitable organizations, faith-based organizations, the private sector, and local, state, and tribal governments to reduce food loss and waste in order to improve overall food security and conserve our nation’s natural resources,” says the EPA.

LOCAL DIFFERENCES

Local recycling policies vary widely; 32 out of the 50 states require companies to take responsibility for discarded electronics, batteries, mobile phones, and other products. Legislators in the state of Rhode




Island recently introduced a bill that would require companies to recycle at least 80 percent of packaging by 2020.

"There are about 9,000 curbside recycling programs in the United States, which is good, but they are all different," says Conrad MacKerron, senior vice president of As You Sow, which uses shareholder advocacy and coalition building to encourage socially responsible behavior by corporations. The group has challenged Coca-Cola, PepsiCo, and Nestlé Waters to endorse higher recycling rates and adopt policies to meet them. "The collection rate for packaging is about 51 percent, and for bottles, cans, and polyethylene terephthalate (PET) plastic, only about 30 percent is being recycled and there is great demand for it," says MacKerron. "We know that recycled aluminum cans are incredibly efficient, but 60 percent are just going into landfills."

While some companies support end-of-production recycling, many are reluctant to take on the total cost of disposing of items, notes MacKerron, especially if not all companies participate. "They want it to be fair," he says.

AGGRESSIVE RECYCLING POLICIES

Consumer interest in recycling is also high, because many people think it the most practical thing they can do for the environment, says MacKerron. "Often they are dismayed when they find out a lot of items put in bins could be recycled, but there is no market for it." As part of its work, As You Sow has drafted proposals for shareholders to present to companies asking them to adopt more aggressive recycling policies.

But some corporations, tired of waiting for changes at the government level, have begun to take action. "The last few years I've seen more attention by retailers and consumer brands to recycling than in the past 20 years," says Paul Gardner. 

Ellen Delisio is a writer for The Ethical Corporation, London, United Kingdom; visit them at www.ethicalcorp.com. This is her first article for *Facilities Manager*.

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ENERGY EFFICIENCY— A Programmatic Approach



Chances are your institution has made some form of greenhouse gas reduction commitment and you're facing down interim greenhouse gas reduction goals embedded in that commitment. Maybe you've got students clamoring for fossil fuel divestment. These are just some of the pressures beyond the normal pressures to reduce operating costs that necessitate a smart and strategic approach to reducing campus energy use.

Every college and university has undertaken some energy efficiency work in recent years, whether as one-off projects or well-orchestrated programs. However, few institutions have taken optimal advantage of the opportunity to invest in their own campuses.

Most schools require that their energy efficiency projects provide quick paybacks, implying returns in the high teens (or better), yet they have no mechanism for accounting for ancillary benefits when evaluating projects. Compare this to endowment investments that typically provide single-digit, long-term returns; for example, endowment performance from 2005 to 2014 averaged under 7 percent annual return.¹ There is a disconnect and an opportunity here. But taking optimal advantage of the opportunities to invest in our campuses requires a significant shift in perspective, an intentional effort to capture those opportunities, and some good strategic thinking about how to get there.





BENEFITS

You can reap significant benefits by taking on these challenges and designing an effective, comprehensive energy efficiency program.

ADDRESSING DEFERRED MAINTENANCE

For starters, energy efficiency programs provide opportunities to take a bite out of growing deferred maintenance backlogs. Following are several approaches to leveraging energy efficiency programs to address deferred maintenance:

- *Life-Cycle Cost Evaluation*—Although there is much talk about considering life-cycle costs in project selection, most institutions do not do this in a systematic fashion. True life-cycle costing considers not only capital cost and energy savings but the remaining life of equipment, maintenance costs, and the inevitable cost of replacement. It also considers benefits (and costs) over the life of the installation in contrast to the more common approach of considering only capital cost and annual energy savings in a simple payback analysis.
- *Hybrid Deferred Maintenance/Energy Efficiency Programs*—Blending deferred maintenance projects with quicker payback energy projects can be an effective way to gain approval. This approach leverages quick payback projects to help pay for longer-payback deferred maintenance projects. Consider a \$200,000 chiller replacement project that reduces energy costs by \$10,000 annually (a 20-year simple payback)—not terribly attractive as an energy project. But if that chiller is at the back end of its useful life and requires increasing attention and cost to maintain, there may be good reason to replace it. Marry that chiller project with, say, a \$100,000 lighting project with \$50,000 in annual savings and you have a \$300,000, five-year payback package that should be easier to get approved.
- *Diverting Energy Savings into a Renewal Fund*—Rather than recycle energy savings into a revolving loan fund, Brown University first used their energy savings to pay off the “debt” (principal and interest) and then diverted remaining savings into a renewal fund.² In addition to providing a good use for the savings, this approach helped broaden the coalition of supporters on campus (facilities management personnel who were not responsible for energy budgets became more enthusiastic about the program) and has helped move the program forward. You can apply the same principle, diverting savings to whatever priority makes sense for your campus.

IMPROVING THE USER EXPERIENCE

Energy efficiency projects often improve the user experience of the building as well. Light-emitting diode (LED) lighting upgrades can save energy and enhance the visual environment. HVAC control system improvements and existing building commissioning (sometimes referred to as “retrocommissioning”) often lead to improved temperature control, enhancing occupant

comfort. A laboratory ventilation project with a localized hazard assessment can improve lab safety while significantly reducing energy use.

CAMPUS AS A LIVING LABORATORY

Energy efficiency programs can include opportunities to engage the campus community in energy conservation efforts. They also provide opportunities for real-world connections to a variety of academic disciplines, from science and engineering via the technical analysis of energy projects or the measurement of project performance, to economics via analysis of the program’s financial performance, to marketing and communications, among others. For example, Hampshire College recently generated three courses focused on the design and construction of their Kern Center, which is soon to be certified by the Living Building Challenge (<http://living-future.org/lbc>)³.

INVESTING VERSUS DIVESTING

Many schools have been under pressure from students to divest their endowments of fossil fuel holdings. Regardless of one’s opinion on divestment, a strong case can be made that investing in reducing your campus’ greenhouse gas emissions has more impact than divesting from fossil fuels. Williams College recently took this approach in announcing a new greenhouse gas reduction initiative. “We will invest, not divest,” said Williams College President Adam Falk in an announcement that indicated that the college would not pursue a formal divestment policy,⁴ but instead would invest \$50 million in greenhouse gas reduction initiatives.

FINANCIAL RETURN

Regardless of what you think of these various benefits, energy efficiency makes basic financial sense. With most energy efficiency programs providing double-digit returns to your campus, why wouldn’t you aggressively pursue these opportunities?



BARRIERS AND SOLUTIONS

There are plenty of reasons these opportunities don’t get pursued.

FUNDING

The traditional model for addressing energy efficiency involves competing with other annual budget priorities. There is never a shortage of urgent priorities laying claim to available funds, and—in a zero-sum game—energy efficiency programs are typically left with scraps from the table.

To move the needle on energy efficiency, we need to see it as an investment in our campuses that provides attractive financial returns and supports the educational mission. In that context it makes sense to take up funding of energy efficiency efforts out-

side of the normal budget process. Doing so will free up budget dollars in the medium to long term. But getting a significant program funded either inside or outside the normal budget process is challenging.

Green Revolving Funds—Revolving loan funds or green revolving funds (GRFs) have been touted as one possible solution. But GRFs still need to be funded. Although they can be (and are on many campuses) a great component of an effective energy efficiency program, they require significant seed funding to be impactful and thus don't solve the funding problem in and of themselves.

Fortunately, there are a number of funding/financing options available to most schools.

- **Endowment Funding**—Although endowment funds are generally not to be spent on campus operations, there are ways for endowments to invest in their associated campuses without running afoul of rules, regulations, and good practice. And there is precedent for this approach in both public institutions (such as Weber State University in Utah⁵) and private (such as the California Institute of Technology⁶ and North Central College⁷).
- **Debt**—Borrowing funds at low single-digit rates and using the proceeds from much higher-performing energy efficiency investments is a winning proposition for schools that have the debt capacity. This is the approach Brown University used to fund its \$20+ million program.
- **Carbon "Tax"**—A recent whitepaper out of Vassar College⁸ considers the prospect of a carbon charge at the college designed to approximate the "social cost of carbon." This is a great mechanism for schools to put their money where their mouths are. Is reducing global greenhouse gas emissions a priority? Is leading on this issue important to your institution's identity? Then considering the social cost of carbon only makes sense when evaluating projects that impact the institution's greenhouse gas emissions. Of course, considering the cost of carbon when evaluating projects is one thing, but implementing a mechanism to charge that cost through to departments

is a bit more challenging. The Vassar whitepaper makes a strong case for the benefits of tackling that challenge. Among those benefits is that it provides an elegant mechanism to fund an energy efficiency program or seed a GRF.

BANDWIDTH

Insufficient bandwidth is a huge, often unrecognized barrier to the success of a program. Many facilities directors believe they can achieve their ambitious energy efficiency goals within their

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departments. And many do have the capabilities and could implement an effective program if that was their primary function. However, many programs fail to gain traction because they get buried under other priorities.

The simple reality is that facilities departments are not staffed to run significant energy efficiency programs. Without an honest assessment of internal capabilities and capacity and a solid plan for addressing the gaps, a grand energy program easily devolves to one-off projects done on an ad hoc basis.

Whether it is an individual from your staff or an outside resource, having someone whose primary focus is the advancement and success of your energy program is critical to the success of any significant program. Without a capable and focused driver at the wheel, it will be difficult to keep the program on course.

EXPERTISE

There are a few areas of expertise that become important in executing an effective energy efficiency program.

- *Energy-engineering expertise.* Energy engineers look at building systems differently from design engineers. They focus on squeezing efficiencies out of existing systems.
- *Utility program expertise.* The best approach to maximizing utility incentives is to collaborate closely with a firm or individual who works with the utility programs on a regular basis. This marriage of your institution's client relationship with the utility and the program expert is the most effective combination for maximizing utility incentives.
- *Project management.* Many energy projects take place in functioning buildings. Managing projects in operating buildings is different from managing new construction or major renovations. Coordinating with building users and stakeholders and scheduling construction activities and access become much more complicated. It is best to include those with expertise in this type of work on your project management team.

LONG-TERM RESULTS

If your institution is going to invest in an energy efficiency program based on expectations of attractive returns, you need a plan to ensure that those returns persist over time. Modification of control sequences, hidden failures of small components, and drift from calibration of key sensors can all be detrimental to

WISDOM AND ADVICE

■ Taking optimal advantage of the opportunities to invest in our campuses requires a significant shift in perspective.

■ "We will invest, not divest."—*Adam Falk, Williams College president*

■ With most energy efficiency programs providing double-digit returns while offering a smart way to invest in your campus, why wouldn't you aggressively pursue these opportunities?

■ To move the needle on energy efficiency, we need to see it as an investment in our campuses.

■ "There are no magic bullets. It really requires a systematic and robust energy efficiency program to go after hundreds if not thousands of energy efficiency improvements to achieve significant reductions."—*Christopher Powell, Brown University*

energy savings over time and are difficult to detect with conventional means.

Thankfully, software analytics have advanced significantly in the last decade, making it possible to monitor building systems more thoroughly. A well-designed performance optimization system can catch a variety of these insidious hidden problems. This is done by monitoring key building automation system data points and running sophisticated diagnostics to detect anomalies and alert building operators. With an effective savings watchdog in place, you can proceed with confidence that the intended energy savings will persist year after year.

PROCESS

Perhaps the most frequent mistake made in implementing energy programs is to conduct them like all other business, without much consideration for how well "business-as-usual" operating procedures

support the program objectives. An effective

energy program will be complex, as indicated by Christopher Powell, Brown University's associate vice president for sustainable energy and environmental initiatives. "There are no magic bullets," says Powell. "It really requires a systematic and robust energy efficiency program to go after hundreds if not thousands of energy efficiency improvements to achieve significant reductions."

To start such a program, you need to scope out the opportunity and answer a number of key questions: How much money are we going to spend and when? What are our interim metrics and milestones? How thoroughly do we need to quantify the campus-wide opportunity before proceeding? What steps of the process are sequential versus parallel? And how will the program performance be measured and judged? Without addressing these types of questions, work will stall at every step along the way as the team pauses to figure out what comes next.

Conversely, clearly defining a process up front will enable smoother transitions between phases and components of the work. A well-thought-out process will save time by identifying work that can be done in parallel, and will facilitate smoother execution by defining decision-making authority and processes ahead of time, thus avoiding delays from sorting those issues out. Defining the criteria for project approval will accelerate work by providing the project team a clear target to shoot for—thus avoiding the need to go back to the drawing board on projects that miss the mark—and enable quick approval decisions when those criteria are met.

CONCLUSION

The benefits of an effective energy efficiency program are manifold. However, so are the barriers. A successful strategy for navigating those barriers requires shifting how we think about energy efficiency investments. Getting the program funded is a key and difficult hurdle, but it is by no means the last.

A successful program requires an honest assessment of internal capabilities and capacity for the variety of work comprising the program. Finding the right partners and clearly delineating their roles will help. With the right resources in place and a well-considered process for execution, you will be well on your way to a successful energy program that will generate dividends for your institutions for many years to come. ☞

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Students and Staff IMPROVE CAMPUS SUSTAINABILITY

THERE IS SO MUCH INNOVATION, COLLABORATION, AND SUCCESSFUL OUTCOMES OCCURRING TODAY WITHIN EDUCATIONAL FACILITIES.

We wanted to highlight a few campus projects that are leading the way and providing valuable, portable models to other colleges, universities, and schools throughout North America.

Following are 17 campus projects from 16 institutions, which barely scratch the surface of the thousands of energy and sustainability initiatives planned or underway every day at our campuses. Students, faculty, staff are alternately taking the lead or banding together to improve their campuses' energy efficiency, reduce costs, enhance the educational experience, and minimize the effects of their environmental footprint within the community. Also included is a description of LEED Lab, a project of the U.S. Green Building Council.



DEERFIELD ACADEMY

Deerfield, Massachusetts

Submitted by David Purington, Environmental Management Coordinator, Deerfield Academy



Chamber Hall.

WATER CONSERVATION: SUSTAINABILITY RESULTS YOU CAN MEASURE WITH A BUCKET

Deerfield Academy's sustainability mission statement reads in part that the school "will educate all its members on local and global impacts of personal and institutional choices, encouraging long-term thinking and modeling environmental best practices." Among our first initiatives was saving more water.

Our students are graduating into a world with a growing water crisis, and our classrooms routinely discuss this global theme. But we also know there are local implications. As a boarding school of 650 students in a small town, we are the largest user of our municipal water supply and wastewater systems. The majority of our water is pumped from a riverside well and travels several miles up to a hillside water tower far above the school.

For many reasons, we knew it was important to review our water usage, update our systems, and model best practices for our students and community. We hired a water conservation specialist to conduct an audit and help us craft a strategy for savings.

We are underway implementing recommendations from that audit, and over the past two years, Deerfield has lowered its demand by more than 2 million gallons per year—an impressive 15 percent. The majority of changes have been simple equipment substitutions and do not rely on behavior modification.

Here is what we learned:

- Frequently people think there is little room for further water savings. An expert consultant will help you find significant opportunities and strategies to show results fast.
- Many people are wary of high-efficiency fixtures and appliances. By doing our homework and testing different products, we found commercial-quality options that perform well, often while using less water than recommended by

the U.S. Environmental Protection Agency's WaterSense guidelines.

- There is still a lot of opportunity for savings by making some easy changes:
 - » **Pre-Rinse Spray Valves:** Dining-hall prep food areas have very different needs—gentle sprays are enough for the salad room cleanup, while hard-hitting chisel sprayers perform better in the bakery. Working closely with dining staff, we found name-brand replacements that use between 0.65 gallons per minute (gpm) and 1.07 gpm.
 - » **Shower Heads:** As we are a boarding school, we have hundreds of showers in student and faculty housing. Finding a good, commercial-grade, low-flow shower head was important. After testing many, we opted for a 2.0 gpm model, but we seriously considered a 1.75 gpm model. With a projected payback period of six months, don't forget locker rooms!
 - » **Faucet Aerators:** Faucet flows should vary based on their purpose and location—kitchen faucet flows (2.2 gpm) are different than public bathrooms (0.5 gpm), which are different than private bathrooms in housing (1.5 gpm). The audit found that about 60 percent of our faucets could be improved by retrofits, with payback periods ranging from one to nine months.
 - » **Pint-Flush urinals:** On newer WaterSense fixtures flushing at 0.5 gallons per flush (gpf), you can often change the flush valve to 0.125 gpf for a 75 percent savings. Payback on valve-only retrofits was projected to be about two years. Full-fixture replacements of older, higher-flow urinals were projected to pay back in six to ten years.
 - » **High-Efficiency (HE) Toilets:** In faculty housing, we now install toilets using only 0.8 gpf during renovations. We do not use these toilets in housing with rusted cast-iron sewer lines or long sanitary drain lines in isolated areas of buildings, because of worries about downstream clogs.
 - » We were surprised by the use of **water-cooled ice machines** (projected payback period less than 1 year), and also by the aged fleet of washing machines in our **student laundry**.
- **Some things don't make the list.** With a 96-year payback, replacing old dishwashers in faculty housing isn't on our to-do list.
- **Facilities-related savings** are available in heating/cooling systems, irrigation, pool operations, and more. Include them in your audit and your modifications.



BEREA COLLEGE

Berea, Kentucky

Submitted by Vicky Broadus, Big Ass Fans

GREEN COMFORT COMES TO COLLEGE

Kentucky's Berea College has been a pioneer in liberal arts education since its founding in 1855. In recent years, it's also been a pioneer in sustainable living.

In 2013, it pushed the limits of green design and construction with the opening of the Deep Green Residence Hall, an eco-dorm that serves as both living space and learning laboratory. With two LEED-certified buildings already on campus, Berea's design committee explored new certifications for Deep Green through the Living Building Challenge, a program of the International Living Future Institute.

Because HVAC accounts for about 35 percent of an average residence hall's energy use, Deep Green required innovative HVAC design and extensive energy modeling. The finished project features rooftop solar panels and a geothermal heating system, as well as high-efficiency windows and insulation.

Each dorm room and public space is also equipped with ENERGY STAR's highest-rated ceiling fan to provide cooling airflow in summer and to distribute heat in winter. The fans allow the students direct control over their personal comfort without cranking the thermostat.



Deep Green's Common Room.

Altogether, these innovations help Deep Green use half the energy of similar dorms and contribute to a healthy environment. The thoughtfully designed space, with abundant natural light and healthy air circulation, gives students a comfortable, sustainable place to live and study.



BLACK HILLS STATE UNIVERSITY

Spearfish, South Dakota

Submitted by Kimberly Talcott, BHSU

CAMPUS GARDEN INSPIRES COMMUNITY-WIDE FOOD INITIATIVE

Black Hills State University's campus garden has cultivated community connections along with fruits and vegetables. The garden, established in 2008 by students living in the residence halls, has grown through volunteer efforts of faculty, staff, and student organizations. Facilities staff working in the garden began connecting with local food producers throughout the Spearfish area.

BHSU continued its commitment to sustainability by bringing together local food producers, distributors, retailers, and consumers while engaging students in a new initiative—Spearfish Local. Spearfish Local provides work experience and research opportunities for BHSU students. After discovering barriers to local food purchasing in area cafeterias, including its own campus dining facility, BHSU devised a plan to overcome this distribution gap with a local food hub.

In fall 2015, BHSU received a \$100,000 U.S. Department of



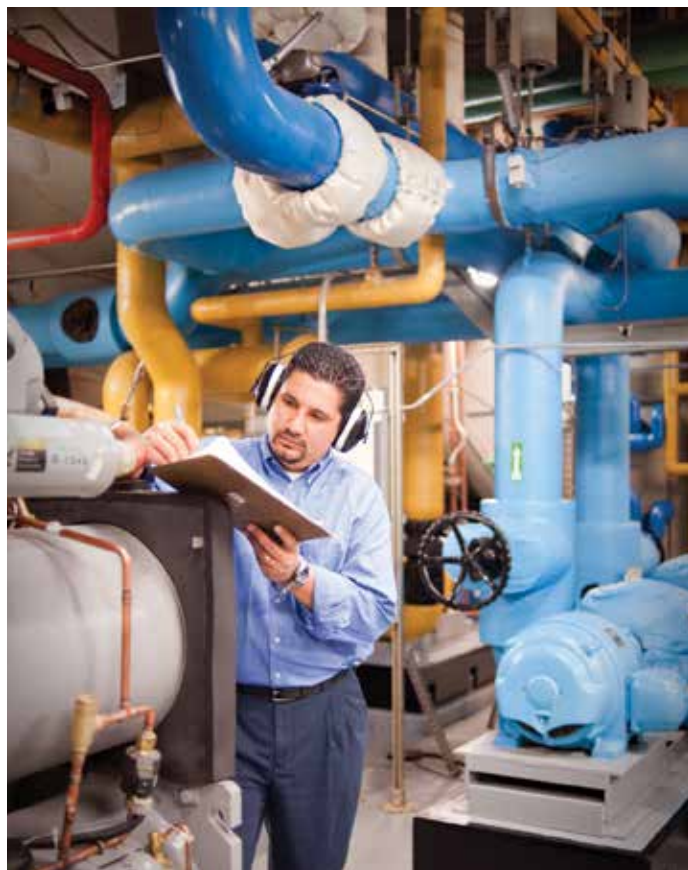
BHSU's campus garden team.

Agriculture (USDA) Local Food Promotion Program grant to incubate a local food hub serving the entire Black Hills region. The Black Hills Food Hub aims to use a farm-to-cafeteria distribution system at schools, hospitals, and nursing and retirement homes. The university is partnering with a local company, Cobblestone Science, to serve as a point of contact between farmers and cafeteria managers and will begin transporting local food to cafeterias in spring 2016.

UNIVERSITY OF MONTANA

Missoula, Montana

Submitted by Betsy Pahut, Course Organizer for the Montana Building Operator Certification program for NorthWestern Energy and the Intermountain Building Operators Association



The University of Montana's energy upgrades save the university \$500,000 a year.

OVERCOMING OBSTACLES: HOW TO REACH A SUSTAINABLE FUTURE FOR HIGHER EDUCATION FACILITIES

Just as students invest in education to reach their professional goals, higher education facilities must invest in new technology and innovative strategies to ensure their buildings run efficiently and are well maintained to decrease costs and expand system and building lifetimes.

According to a Schneider Electric survey, an overwhelming 96 percent of higher education facilities managers agree that energy efficiency is necessary to fulfill their facilities' core missions. However, development and organizational issues hinder many from reaching their efficiency goals.

To meet efficiency and sustainability goals, facilities managers can make improvements to the energy efficiency of their facilities, invest in the proper training for employees, and integrate multiple departments into efficiency programs. This all starts by identifying and addressing the issues at hand and by recognizing problems that hinder innovation and success.

DEVELOPMENT ISSUES

"If you're not learning in this industry, you're falling behind," said the recently retired Tom Javins, former associate director for engineering and utilities at the University of Montana (UM). Falling behind in the world of energy efficiency can mean missing the opportunity to save thousands of dollars and a significant amount of time—two highly coveted resources on every university campus. Investments in employee training and the most efficient building operations technology can help higher education facilities realize long-term sustainability.

The U.S. Department of Energy's Better Buildings Challenge reports that U.S. higher education facilities spend about \$14 billion on energy costs each year. An investment in employee development through opportunities such as a building-operator training program can create a sustainable system that helps reduce costs.

After 12 individuals, students, and staff joined together in the Building Operator Certification (BOC) training program, UM began making changes. An energy conservation project created to develop more efficient air handlers for the recreation center employed a variable speed drive to keep leaky dampers from freezing as they had in past years. This effort decreased the building's utility costs by 25 percent, saving electricity and steam heat that had been driving up energy costs.

Including students in UM's energy efficiency projects gave them an opportunity to learn about an issue they care about, which directly benefited the university's energy efficiency goals. The students at UM have advocated for energy efficiency on campus by voting to tax themselves to fund a revolving energy loan for energy conservation work, Javins said.

Thus far, the revolving loan has funded solar photovoltaic systems, pipe insulation, heating and air conditioning renovations, and more. The joint efforts of students and building operators show how an integrated university effort can improve energy efficiency on campus and help meet the university's strategic plan.

ORGANIZATIONAL ISSUES

When it comes to navigating organizational challenges, building operators can team up with their colleagues to create strategic solutions for implementing energy efficiency programs. According to Tara Canfield, Schneider Electric's segment director of education and commercial office buildings, "Steps need to be taken to streamline organizational processes and establish a clear definition of success among stakeholders to achieve each school's energy efficiency goals."

Building managers, technicians, and administrators joined forces at UM to learn more about energy efficiency options. The

cooperation among those with different areas of expertise allowed the campus to develop successful energy efficiency programs.

For example, bringing together two university heating and ventilating technicians resulted in a new development for the university's building automation system. Talking about energy efficiency together led these technicians to refurbish the main steam valve with electronic controls. This upgrade allows the building operators to have an occupancy schedule that prevents simultaneous heating and cooling in the summer.

Javins attributes UM's success to teamwork. "The value is

that no one person sees everything, and everyone brings their interest, their perspective, to the job," he said.

By investing in proper energy efficiency training and organizing colleagues to work together, the university has already seen results. After spending \$6 million on energy efficiency over more than three years, the university saves approximately \$500,000 a year on energy costs. With continuing savings on costs and time, there is only room for greater success in the future.



UNITED STATES GREEN BUILDING COUNCIL

Washington, D.C.

Submitted by Jaime Van Mourik, Director, Higher Education, USGBC



LEED LAB: TRANSFORMING CAMPUSES AND CAREERS

At the USGBC's Center for Green Schools, we believe that everyone entering a classroom should have the opportunity to learn in a green school. And we are actively connecting with campuses worldwide to change the way their buildings are designed, built, and operated. We work toward transformation for the built environment through our globally recognized Leadership in Energy and Environmental Design (LEED) green building program.

THE STATE OF SUSTAINABILITY IN HIGHER EDUCATION

Higher education institutions are committing to sustainability and climate neutrality on a daily basis and have shown tremendous leadership in the green building movement. Currently, there are over 6,800 projects participating in LEED, comprising over 657 million sq. ft. of space. But there is still work to be done, especially in existing buildings.

Since it can take up to 80 years to make up for the environmental impacts of demolishing an old building and constructing a new one, LEED for Building Operations and Maintenance (O+M) holds incredible promise for existing campus facilities. LEED O+M promotes the ongoing implementation of best practices in building operations with the goal of sustaining high levels of performance throughout the life of a building.

By employing these strategies and certifying a building to LEED O+M, campuses ensure that their building can maintain and improve current performance over time. The implementation of LEED O+M reduces the environmental

impact of buildings and grounds, has a positive effect on student, faculty, and staff health, and prepares students to be global sustainability citizens.

OUR SOLUTION: UTILIZING YOUR UNTAPPED RESOURCES WITH LEED LAB

With the goal of transforming existing campus facilities, USGBC sought to develop a clear vision for the future. LEED Lab, an innovative solution for integrating sustainable practices into daily campus operations and maintenance that is directly powered by students, is a critical part of our strategy. As an interactive, multidisciplinary immersion course, LEED Lab is designed to transform the academic environment by preparing students for 21st century careers in sustainability.

In the course, students learn the principles of LEED and assess the performance of existing facilities on campus, choosing one building where they will facilitate the LEED O+M process. Students lead the complete process of LEED O+M on a campus facility with the goal of certifying the facility. By participating in LEED Lab, campus sustainability officials and facilities managers can utilize untapped resources to achieve LEED O+M certification—students at their own institution—and, in doing so, bridge the building capacity gap on campus for sustainable integration efforts.

The campus environment serves as the perfect learning laboratory to engage students in projects that are experiential in nature, providing them with the knowledge, expertise, and skills needed to solve 21st century challenges. Our vision for campus sustainability is simple: to integrate LEED O+M strategies so that our campus buildings perform at a higher level and human health is prioritized and enhanced, and to train the next generation of sustainability leaders by engaging students in the process. Offer LEED Lab today at your institution and help us achieve green schools for everyone within this generation.



CHESAPEAKE COLLEGE

Wye Mills, Maryland

Submitted by John Jameson, ICF International

ENERGY EFFICIENCIES THROUGH RETROFITS AND UPGRADES

Although the Health Professions and Athletics Center at Chesapeake College is technically a retrofit, the building was completely overhauled before its reopening in August 2015. The building houses the health professions and wellness programs in renovated former gymnasium and pool space, along with newly constructed classrooms. Aiming for LEED Platinum certification, a 1.7-MW solar project has been installed over three acres of adjacent parking and six acres of nearby open space. The array will reduce campus fossil fuel reliance by one-third and will be accompanied by electric vehicle charging stations and a planned 500-kW battery to supplement grid interconnection. The building is expecting energy savings of 31 percent and cost savings of 56 percent.

This project is being showcased through U.S. Department of Energy's Better Buildings Challenge. As a partner in the Challenge, Chesapeake College has established itself as a



Health Professions and Athletic Center.

national leader by committing to reduce energy use across its entire building portfolio by 20 percent over 10 years. The Better Buildings Initiative was introduced in 2011 to cut energy waste in commercial buildings across the United States. Through the Better Buildings program, public and private sector organizations across the country are working together to share and replicate positive gains in energy efficiency.

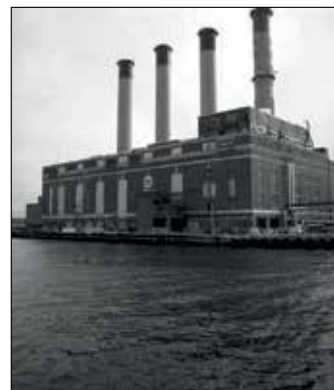


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EARLHAM COLLEGE

Richmond, Indiana

Submitted by Ian Smith, Earlham College

ADVANCING TO LEED

As late as 2012, Earlham College had no LEED-certified buildings on its 160-acre campus. Since then, Earlham has renovated two major buildings and built two others, all LEED certified and representing 14 percent of the college's square footage.

The campus sustainability plan guided this effort, and steering committees representing all affected departments led the design of each project. The college's director of facilities convened these committees. The four projects are:

- Stanley Hall (renovation of biology, chemistry, and biochemistry spaces), LEED basic certification;
- Tyler Hall (renovation of campus welcome center and new spaces for admissions and marketing/communications), LEED basic certification;
- Center for the Visual and Performing Arts (new construction for art, music, and theater), LEED Gold; and
- Center for Science and Technology (new construction for



Main entrance view, Center for the Visual and Performing Arts, Earlham College.

math, computer science, and physics), LEED Gold (pending).

The new buildings consume approximately half of the total annual energy per square foot in comparison with other major buildings on Earlham's campus. The Center for Science and Technology is also Earlham's first building to be heated and cooled by ground-source geothermal wells and is the first large-scale geothermal system in Wayne County.

MILLERSVILLE UNIVERSITY

Millersville, Pennsylvania

Submitted by Chris Steuer, Millersville University



A portion of the loop feed system.

ELECTRICAL INFRASTRUCTURE UPGRADE

Underpinning an effective energy management strategy is modern, reliable energy infrastructure. Millersville University recently completed a multiyear, \$11.5 million project to upgrade its electrical infrastructure to prepare for broader energy

management and energy reduction activities.

Specifically, the university converted an aged radial-feed electrical delivery system to a loop-feed system that connects over 40 campus buildings. The project entailed running over 42 miles of 15-kV electrical wire and installing 41 loop-feed switch boxes to upgrade distribution to each building and replace failing wire and terminations. The new loop-feed system greatly increases the flexibility, safety, and resiliency of the university's electrical system. "The loop-feed system provides redundancies that we didn't have before," said Greg Petruno, Millersville's project manager. "It will also allow us to take each building offline independently from other campus buildings. This will greatly enhance our ability to do preventive maintenance on our electrical equipment."

Millersville also used the project to install utility-grade meters on each building and tied the meters into the building energy management tracking system. "We can now track energy consumption at the building level to evaluate building performance and to identify opportunities for energy and cost savings," said Petruno.



SAN DIEGO COMMUNITY COLLEGE

San Diego, California

Submitted by John Casadonte, Cree, Inc.



LED lighting at SDCC.

HOW LIGHTING CAN PLAY A ROLE IN CAMPUS SUSTAINABILITY

Accounting for 40 percent of energy consumption in most buildings, lighting offers a significant opportunity to curb a

campus' energy costs. Light-emitting diode (LED) lighting is an energy-efficient solution for indoor and outdoor lighting, offering better light over traditional light sources, an attractive price, improved performance, and a long lifetime.

LED lighting can achieve an expected 50 to 70 percent energy savings, and can reach up to 80 percent savings when coupled with smart controls. With the extended lifetime virtually eliminating maintenance costs, LED lighting enables lifetime financial benefits and an exceptional return on investment. Many incentives and rebates are also available through utilities and government programs, accelerating payback and savings.

For example, San Diego Community College is saving about 75 percent of the energy used by incumbent technology with lighting control technology, meeting California's Title 24 energy standards, and generating over \$80,000 of rebates for instant savings. The college installed more than 1,200 wirelessly controlled LED light fixtures, each with a life expectancy of 75,000 to 100,000 hours.



TUFTS UNIVERSITY

Medford, Massachusetts

Submitted by Lauren Martin and CJ Ghanny, Tufts

TRANSFORMING TENNIS BALL WASTE INTO AN ACE GAME

In the summer of 2014, Tufts University partnered with Project Green Ball, a nonprofit organization that transforms recycled tennis balls into surfaces such as equestrian turf and donates them to organizations serving people with disabilities or life-threatening illnesses. Project Green Ball's website notes that of the 125 million tennis balls discarded each year in the United States, most are sent to the landfill where they slowly break down and take up unnecessary space.

Tennis ball recycling stations can be found on the indoor courts in the Gantcher Center during the winter and on the outdoor Voute Tennis Courts during the summer. Tufts was the first



Tufts tennis courts.

university to work with Project Green Ball on this initiative. In 2015, Tufts recycled 444 tennis balls, amounting to 55 pounds.

UNIVERSITY OF ALBERTA

Edmonton, Alberta, Canada

Submitted by Shannon Leblanc, UAlberta

FIRE PUMP-TESTING WATER CAPTURE AND REUSE

Every year the University of Alberta is required to test North Campus' 18 fire pumps at full capacity, a test that uses approximately 378,500 liters (100,000 gallons) of water. Although this is a necessary water expenditure, the university wanted to find a way to mitigate the impact.

Previously, all the water used for the testing procedure would drain to nearby stormwater drains. In 2013, UAlberta successfully began capturing fire pump test water and transferring the water to a 95,000-liter underground cistern for temporary storage. UAlberta's Grounds Department transfers the saved water from the cistern to a water truck to be used for irrigation and water features on campus.

Since the implementation of this innovative initiative in 2013, UAlberta has recovered approximately 500,000 liters of



Grounds staff reuse water from fire pump testing to maintain UAlberta landscape features.

potable water. This sustainability initiative is unique to UAlberta and, more important, saves water while still meeting fire code regulations.

UNIVERSITY OF BRITISH COLUMBIA

Vancouver, British Columbia, Canada

Submitted by David Woodson, UBC



UBC's new Campus Energy Center.

TRANSITIONING TO DISTRICT ENERGY

On November 20, 2015, UBC activated its new Campus Energy Centre (CEC). This marks a major milestone in UBC's transition from its legacy steam-heating infrastructure to the new hot water-based Academic District Energy System (ADES). The five-year, \$88 million project began in 2011 and is integral to achieving UBC's Climate Action Plan.

The project involves:

- Laying 11 trench kilometers of new hot water pipes
- Installing over 100 new energy transfer stations
- Construction of a 45-MW, natural gas-powered Campus Energy Centre (CEC)
- The demolition of the existing steam powerhouse and decommissioning of the steam distribution system

The ADES project is funded from an internal loan repaid through operational cost savings and avoided capital investments. The new hot water system is estimated to be 24 percent more efficient than the legacy steam system because of improved combustion and distribution of thermal energy. Commissioning of the new system will extend into 2017.

Despite providing only partial service in 2015, the new hot water system, combined with the Bioenergy Research and Demonstration Facility (BRDF), completed in 2012, and UBC's building recommissioning program, have achieved a 30 percent reduction in campus greenhouse gas emissions compared to the 2007 baseline.

UNIVERSITY OF VIRGINIA

Charlottesville, Virginia

Submitted by Jesse Warren, Sustainability Program Manager, UVA



Students learn about UVA's sustainability efforts.

OVERCOME FINANCING BARRIERS WITH A SUSTAINABLE BANK

College campuses large and small would like to lower their energy use, upgrade their facilities, and see tangible energy and financial savings. One major barrier at most college campuses is the need for capital for energy efficiency projects, because funding sources are typically not the same entities that capture resulting cost savings. As a partner in the U.S. Department of Energy's (DOE's) Better Buildings Challenge, we have committed to reducing building energy use on our campus by 20 percent by 2020. With this goal in mind we've had to find a way around this split incentive issue.

AN HISTORIC CAMPUS

The University of Virginia (UVA), located in Charlottesville, Virginia, serves over 39,000 students, faculty, and staff and comprises more than 500 buildings. Founded in 1819 by Thomas Jefferson, the campus contains a number of landmark buildings—as well as a UNESCO World Heritage site (UVA's Academical Village). Like many college campuses, many of our buildings brim with history and character but are in need of energy upgrades.

MAKE YOUR ENERGY PROJECTS PAY FOR THEMSELVES

UVA's energy team created Delta Force, a streamlined, soup-to-nuts program for getting energy efficiency done across the Grounds. Named after the difference, or "delta," between the original energy bill and the post-retrofit bill, this internal, cross-functional team manages and in some cases implements upgrades to some of our most energy intensive buildings.

A lynchpin of Delta Force is an internal "bank" that utilizes savings captured from previous project money to fund retrofits

of additional existing buildings, often with the help of our own UVA engineers and staff. When a project progresses far enough to generate savings, the energy management team from Delta Force compares pre- and post-retrofit energy use data to calculate the energy savings from each project on a monthly basis. Savings are then allocated to pay off the costs of the new project until 125 percent of the cost is recovered. The additional 25 percent recovery is used to fund future projects.

GETTING PROJECTS STARTED

Many campuses wrestle with deciding which project to tackle first. The Delta Force team targets the biggest energy consumers in the building portfolio, based on building-level energy metering. The team then performs an energy audit to determine which conservation measures will be the most effective in these buildings.

The energy management and in-house engineers pursue a number of energy efficient upgrades including:

- Lighting—replacing lamps with higher-efficiency versions and light-emitting diodes (LEDs)
- Insulation and windows—Sealing leaks in the building's envelope and repairing damaged and missing insulation
- Optimizing control settings—implementing schedules, resets, variable speed control, and other conservation measures for new digital controls

PUTTING SAVINGS TO WORK

Since 2007, Delta Force has funded over 20 projects using some of the university's \$15 million in avoided energy costs. Delta Force projects typically cost from \$100,000 to \$600,000 and last no more than two years. A UVA energy engineer oversees the whole process to ensure work quality.

Between fiscal years 2008 to 2014, almost \$6.4 million was invested in the Delta Force existing commissioning initiative. The dozens of projects that have been implemented provide added comfort and aesthetic improvements to UVA facilities—including a lighting retrofit at Campbell Hall (built in 1969), and modernizing and finetuning the HVAC at Thornton Hall, a 1936 building made up of engineering classrooms and offices.

STAFF BENEFITS

Many universities struggle to find and keep energy management professionals, losing them to the private sector and larger salaries, so an additional benefit of this program model is its appeal to qualified energy management staff. The revolving fund allows the team to remain relatively nimble and autonomous while sidestepping bureaucratic red tape. With a constant stable of upcoming projects, this positive work

environment attracts and retains high-quality staff because, according to our energy managers and engineers, they like to see the immediate impact of their work.

ABOUT THE DOE'S BETTER BUILDINGS CHALLENGE

The DOE's Better Buildings Challenge is working to share solutions used by U.S. universities like UVA and by K-12 schools. More than 250 organizations from the corporate, public, housing, and industrial sectors have already committed to reduce energy use by 20 percent portfolio-wide over 10 years and to share successful strategies with the public. To date, partners have shared energy data for more than 32,000 properties and are reporting energy savings of 20 percent or more at 4,500 properties, and of 10 percent or more at 12,000 properties.

Learn more about Better Buildings Challenge partner results and showcase projects and innovative solutions being shared with others at <http://betterbuildingssolutioncenter.energy.gov/>. Learn more about UVA's Delta Force at <http://betterbuildingssolutioncenter.energy.gov/implementation-models/delta-force>.



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UNIVERSITY OF CONNECTICUT

Storrs, Connecticut

Submitted by Eric Grulke, UConn

A SAFE PATH FOR UCONN WILDLIFE

UConn's new gateway road, opened in December 2015, was designed and built to ensure that the surrounding vernal pool complex and forested wildlife habitat will be protected. Wildlife will be able to cross safely beneath the road, bike path, and pedestrian walkway that links the Storrs campus to Route 44.

After UConn's amphibian studies identified migratory patterns between vernal pools located on both sides of the proposed roadway, it became clear that box culverts at three wetlands crossings would be insufficient to protect the area's wood frogs and spotted salamanders, not to mention larger wildlife passing through. Consequently, UConn constructed a 72-ft. clear span bridge, complete with wing walls and barriers to direct amphibians, and a 40-ft. long, 6-ft. tall culvert. Together, these structures added \$2 million to an \$18 million project budget.

These additions, along with a permanent conservation agreement prohibiting development around the vernal pools, add



Photo by Peter Morenus of UConn Photo

UConn's clear span bridge protects wildlife.

101-acres of preserved land to UConn's adjacent 64-acre Hillside Environmental Education Park. To enhance the habitat further, an additional 985 trees are being planted along the roadway by spring 2016.

Thanks to the extra care given throughout the design and construction process, UConn's wildlife will continue to be protected.



UNIVERSITY OF MARYLAND

College Park, Maryland

Submitted by Stefan Bangerth, UMD



Photo by John Consoli

McKeldin Mall.

STUDENT COLLABORATION PAYS OFF

When students and faculty work on sustainability projects on campus, they not only raise acceptance of these projects, but they can also be a valuable asset to facilities management. Under the guidance of Professor Michael Ohadi, students at the University of Maryland recently analyzed four high-energy consumption buildings on campus. They investigated the buildings' energy consumption profiles, including mechanical and electrical equipment, and the buildings' envelope energy efficiency. The

project was a win-win for the sponsor and the students, who benefited from working on a real-world problem.

Working with facilities management personnel, students and faculty arrived at energy saving opportunities ranging from 20 to 50 percent. One of the studies involved a dining hall that had recently achieved LEED Silver certification but consumed 58 percent more energy than the national average for this type of building.

The students found that the chief reasons for this lackluster performance were complicated building automation features and the lack of a systematic and regular maintenance program. With energy cost savings already in place from the initial implementations, the building is on course to cut its energy usage by nearly one-half once all the modifications are made, saving over \$170,000 per year.

UNIVERSITY OF MARYLAND

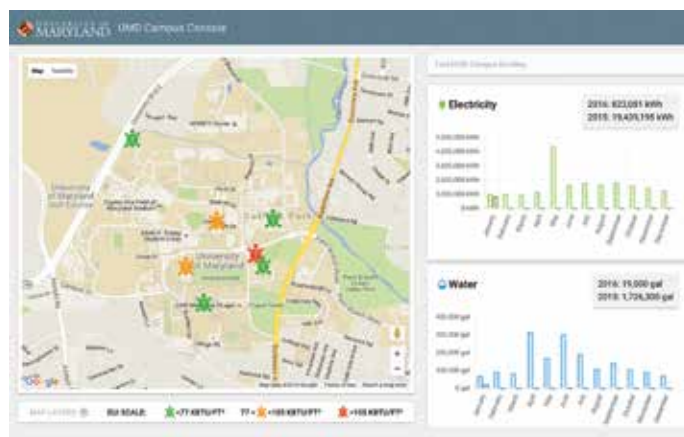
College Park, Maryland

Submitted by Nicholas W. Mattise, UMD

UNIVERSITY OF MARYLAND CAMPUS DASHBOARD

As part of ongoing integrations of sustainability principles and academic experiences, UMD's facilities management (FM) department is collaborating with CITY@UMD, a UMD research group, on a dashboard for energy commodities and water use. The dashboard, which utilizes existing meter databases at UMD maintained by FM, is able to collect, clean, and aggregate meters of varying energy types and intervals. The online dashboard is available to facility managers, faculty, and students with the goal of transforming the campus into a living laboratory where each group participates to create a more sustainable university.

Centered around a map view of campus, the dashboard quickly provides a visual overview of each building's energy use intensities (EUIs), along with monthly charts of utility usage for the entire campus. At the building level, the dashboard provides weekly, monthly, and yearly views of each meter belonging to



Prototype version of Facility Dashboard at UMD (as of 12/13/15).

a building; additionally, there are options for Excel exports of meter data and printable building utility reports.

The dashboard designs to aid users in monitoring utility usage at every level, from the entire campus to building submeters. The current version of the dashboard can be found at <http://code.buildsci.us/dashboard/>.

UNIVERSITY OF MINNESOTA TWIN CITIES

Minneapolis, Minnesota

Submitted by Annie Pottorff, U of M



Bi-level LED lighting.

LIGHTING EFFICIENCIES FOR PARKING STRUCTURES

The University of Minnesota has been making strides toward sustainable energy use with the It All Adds Up campaign, encouraging the university community to join in on energy conservation. Now, Parking and Transportation Services is adding to the university's list of accomplishments with the installation of high-efficiency lighting in all 16 parking structures on campus.

This project started with an assessment of campus parking structures. A test in one popular ramp with sensors installed on different light fixtures showed that these lights were at full output for less than 5 percent of the hours in a day. The result of the assessment showed that bi-level LED (light-emitting diode) fixtures and advanced lighting controls could provide a better solution for the institution. This approach enables the university to significantly reduce energy costs while meeting illumination standards.

Annual energy savings compared to existing energy usage is estimated at 52 to 58 percent and, when paired with newly installed motion and light sensors, there are less maintenance and replacement costs, making these lights a longer lasting, sustainable option.

These efforts resulted in the University of Minnesota becoming nationally recognized for its energy conservation through the Better Buildings Challenge Lighting Energy Efficiency in Parking Campaign.



UNIVERSITY OF MISSOURI

Columbia, Missouri

Submitted by Srinivasan Raghavan, MU

ADAPTIVE MATERIAL REUSE OF CONSTRUCTION WASTE

The University of Missouri's adaptive material reuse program repurposes construction waste from demolished buildings, helping to meet a sustainability goal. Recent projects have salvaged and stockpiled building materials for reuse in new construction.

Stafford and Cramer residence halls were built after World War II, when many soldiers and sailors returned home and took advantage of the G.I. Bill. Fast forward 50 years: To care for an influx of baby boomers, MU Health Care needed additional space.

Campus master planning efforts identified the fact that Stafford and Cramer sat on land better suited for the healthcare campus. The two halls were demolished in 2008, but not before Mizzou chose to preserve this part of MU's history by salvaging stone from the buildings to reuse in new construction.

Other projects have repurposed hardwood doors for interior wall cladding and repurposed limestone shower partitions for interior casework.

- **Patient Care Tower**

Stone was salvaged and recut for louvers on the exterior walls of the Patient Care Tower. Stone was reused and repurposed as a wall of the Healing Garden.

- **Gateway Residence Hall**

Stone was reused as a feature element in Gateway Hall.




Salvages stone used in retaining walls at Pershing Commons.

- **Pershing Commons**

Stone was reused as retaining walls on the Pershing Commons renovation and Patient Care Tower.

- **Wolpers and Johnston Halls**

Salvaged shower portions were used in interior casework construction. Salvaged hardwood doors are featured in new wall and ceiling elements. 

Steve Glazner is APPA's director of knowledge management and editor of *Facilities Manager*. He can be reached at steve@appa.org. Many thanks to the institutions and individuals who submitted their projects for inclusion, and to the Higher Education Associations Sustainability Consortium (HEASC), the Association for the Advancement of Sustainability in Higher Education (AASHE), the Association of College and University Housing Officers-International (ACUHO-I), and other networks for their assistance with this compilation.

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We will offer topical content in the following areas:

Preventive Maintenance for People

- Check Mate – Matching the Right People for the Right Job
- What Are You Worth? – Recognizing Your Value

Space: The Ever Changing Frontier

- Your Space, My Space, Our Space – Partnering With Academic Colleagues
- It's All One Big Sandbox – Best Practice In Flexible Space Usage

Economy

- Where Did My Tuition Go? – Funding Usage and the Impact on Facilities
- My Piggy Bank Is Full – Understanding the Benefits of Energy Credits

Innovations & Technology

- Impact of Facilities and the Student Experience
- Click Here – Technology What's Next & Are You Ready?

Future of the Built Environment

- Staying Ahead of the Curve – What's Next in Regulatory Codes?
- Dealing with the Rising Costs of Higher Education

Leave them Laughing!

APPA/SRAPPA/TNAPPA are pleased to announce our opening breakfast speaker **Dr. Stuart Robertshaw** will kickoff our 2016 historic event with the Healing Power of Humor. Dr. Robertshaw, Professor Emeritus of Psychology and Education at the University of Wisconsin-La Crosse and an attorney, will share his personal journey on the benefits of humor. He will also share what he has learned about the psychological and physiological benefits of humor and laughter as they relate to how we take care of ourselves, our friends, and our loved ones.



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PLUS BONUS PROGRAMMING

Emerging Professionals Summit (EP Summit) and our Senior Facilities Officers Summit (SFO Summit)

As APPA continues to ensure the strength of our organizations' future, we bring together our future and our legacy through the unique formatting of the EP Summit and SFO Summit. Programming this year for these distinct constituency groups will deliver messages specific to their needs as professionals while offering critical topics for crossover learning. The 2016 'Crossover Networking' opportunities are:

Remaking the Facilities Organization

Join us for our breakfast presentation as we discuss the realities of today's facilities organization as the world is rapidly changing around us. How will we meet the challenges/opportunities brought on by the changes in workforce demographics, innovative pedagogy, and even more rapidly changing technology? Is the current hierarchical organizational model still relevant? Will our emerging professionals embrace the same old way of doing business? This joint Senior Facilities Officers (SFO) and Emerging Professionals (EP) session will dive into the issues of the organization of the future. After the presentation, join in group discussions to further explore the topic and to share your thoughts with all summit participants.

BONUS: Jack Colby, APPA's Thought Leaders Chair, will deliver an Executive Update as a follow-on to this session.

Speed Mentoring

You have heard of speed dating, so join in as we make a twist to this phenomenon and spend time with the SFOs sharing lessons learned and gaining a better understanding of today's rising facilities professionals. This fast-paced knowledge transfer activity will not only be informative, but also a lot of fun. Come prepared to share your love of our profession and learn something unexpected.

Nothing is Certain but Change

Always a controversial topic, but worthy of continued discussion. Come join in a self-directed discussion with your colleagues on the best practices in change management. Are you a Change Champion? Share or learn about what works or doesn't in our rapidly changing profession.

Seats are limited for both these pre-conference sessions that will be held July 11, 2016 from 8am – 5pm.

We encourage you to register early. As a reminder, your registration for either summit will also provide you full access to the APPA/SRAPPA/TNAPPA 2016 Annual Meeting and Exposition.

Visit www.appa.org today to register!

APPA's HALL OF RESOURCES

The APPA/SRAPPA/TNAPPA 2016 Annual Meeting & Exhibition will be held in Nashville, Tennessee with our hall of resources activities taking place at the Nashville Music City Center. A perfect location for programming, exhibiting, and networking with colleagues while reminiscing with old friends. APPA/SRAPPA/TNAPPA's 2016 annual meeting and exhibition will be a fantastic event full networking—this is where you need to be!

Research has shown that nothing compares to exhibiting at a conference where you will have the ability to meet many potential clients face-to-face. Studies have also shown that exhibiting at conferences and meeting with attendees is one of the most effective ways to acquire new clients.

The APPA/SRAPPA/TNAPPA annual meeting attracts top decision makers in the facilities arena. If you want to do business on a college campus, your product or service should be in front of our attendees.



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- APPA's After Party
- APPA's Resource Center
- Conference WiFi
- Exhibit Hall Lunches
- Portfolios w/Pens
- Senior Facilities Officers (SFO) Summit

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- Fun Run & Walk

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For reservations please call 615.255.8400 and mention APPA to receive the special conference rate.



Leadership and the Theory of Constraints

By Matt Adams, P.E.

Leadership is a major focus of APPA, and will continue to be for the foreseeable future. Every aspect of the educational facilities maintenance business environment is changing, and the theory and application of leadership is no exception. In fact, the APPA Leadership Academy and its four levels are a testament to this dynamic.

The assumption in this industry that we will continually be called upon “to do more with less” is here to stay. This directly affects leadership theory and our professional lives as leaders and administrators in the FM environment. In the past, leaders might have encountered the challenge of increased responsibility in the context of relative reductions in resources with a redoubling of efforts.

In other words, to meet the increasing demands of the institution we had to work harder and longer. That situation has now become the reality. However, is this really sustainable? If we acknowledge that more with less is the new fixed paradigm, then at some point will we as leaders run out of capacity? Twenty years from now, will each of us have to work 90 hours per week, completely stressed, and still just barely get by?

LIMITED RESOURCES

With respect to staff, I propose that there are two limited resources within our institutions, and that each must be managed with great respect and consideration. The first is our employees: Both numerically and philosophically speaking, the single biggest resource each of us leads is our people. Faculty salaries and utilities aside, they are also one of the greatest resources of the FM environment as a whole. Given this fact, we must acknowledge that our best and most promising path to organizational success is through our people. This resource is limited, and therefore how we invest in and utilize it is of the utmost importance.

On the other hand, there is another limited resource that is almost as important, and in fact it might be even more important to each of us—our

time as leaders. Consider the work day, week, month, and year. Regardless of whether you work long days and take limited vacations, there is still a limit to your time. In other words, there is a limit to how much of “you” there is to devote to your department as a leader. There is a finite amount of “you” to go around and it could be called upon to deliver more each year from now on. From a management point of view, this means that “you” are a limiting constraint on your organization.

THEORY OF CONSTRAINTS

The “goal” doctrine is based on the Theory of Constraints (TOC). In every organization there are constraints or bottlenecks that slow services delivery. Rigorous analysis and identification of bottlenecks is exercised routinely. Constraints are ranked, and the most impactful is targeted for elimination (this five-step process comes from Eliyahu Goldratt’s book, *The Goal*.)

Given the assumption that our capacity for leadership is a constrained resource, it is logical to apply the TOC to our leadership activities. The idea is to eliminate the bottlenecks in our individual business environment to free up more of our leadership resources and thus to be able to invest those resources into our organizations.

CATEGORIZING ACTIVITIES

As leaders of departments or organizations, we perform many activities. These activities should be divided into at least two categories:

- An activity I perform that becomes a bottleneck for my staff (e.g., purchase approvals), and/or
- An activity that provides value to the department that only I can provide (a “lean” concept)



These two simple classifications identify required changes to reduce constraints. The options for any activity are:

Scenario	Required Action
1. Bottleneck with no unique value provided by me	Build system to leverage leadership
2. Bottleneck with unique value provided by me	Free up my personal resource to invest more time into this activity
3. No bottleneck with no unique value provided by me	Build system to leverage leadership
4. No bottleneck with unique value provided by me	No change until next evaluation

In the **first scenario**, we must assume that not only are we slowing our organizations by creating a bottleneck, but that we are not providing unique value to the process. For example, is it a good use of our limited leadership resources to personally sign purchase requests? Can this be done another way, thereby freeing up time for something more valuable to our organization? This is where “systems” come into place. Good leaders understand systems and their benefits to an organization.

A system is like a process but much better (a process is not as good as a system, because it still requires some of our leadership resources. A system is autonomous and will still function while we are on vacation.) A system executes a repeatable activity but also collects data each time and makes adjustments. It is a closed loop.

As leaders we design a system to include combinations or people, templates, information



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technology, and procedures. We carefully measure one to three metrics of the system's performance so that we can review that performance and make adjustments if the metrics suggest misalignment. It is paramount that these systems operate independently from us as leaders, and that they free up all the time we once spent performing this activity ourselves (creating a bottleneck.)

The **second scenario** is of particular interest. There will be activities that we as leaders execute with great value, but that also create a bottleneck to our organization. This is the reason for the self-analysis. We must free up our precious and limited time as leaders to invest in these organizational growth activities. If the bottleneck continues, we must continue to apply Goldratt's Theory of Constraints to find more of "me" as a leader to perform this highly valuable activity.


The **third scenario** requires either replacement by a system or delegation to a staff member. The staff member can also evaluate this activity using their own TOC. This is not good use of our limited leadership resources.

Finally, in the **fourth scenario**, there are activities that only we provide and that offer great value, so we have allocated enough precious time to complete them. These remain unchanged until analysis indicates a change in value or constraint to our organization.

INVESTING IN YOURSELF

We should always be ready to design and introduce systems to remove ourselves from low-value activities. There will never be enough of "us" as leaders unless we are thoughtful and deliberate in our assessment of leadership activities—in terms of both value and constraint on the organization. Ongoing review will identify new constraints or bottlenecks that must be removed.

For our organizations to thrive, we must ensure that time spent on ourselves as leaders is invested without constraint to those unique value-added activities that only we can best

provide. In this manner, we can meet the increasing demands on our organizations and ourselves in the future. 

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



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APPA's BOK: Enhancing Knowledge and Reducing the Learning Curve

Part 2—Operations and Maintenance

by Chris Kopach, CEFP

We are required to have a solid understanding of a vast number of facilities-related topics to reduce operational costs and become more efficient in running our institutional facilities operations. To assist in this requirement, APPA offers its members a number of great tools to enhance the facilities professional's knowledge and reduce their learning curve. One such gem is APPA's Body of Knowledge (BOK.) Divided into four sections, it is the "Holy Grail" for facilities professionals. The BOK is made up of topics that harness the best practices of operations and maintenance professionals everywhere.

USING OUR NETWORK


By making use of its professional network, APPA has been able to harness the knowledge of APPA's past presidents, APPA Fellows, business partners, and its members, thus providing cutting-edge knowledge on a number of complex topics. Authors such as Harvey Kaiser, Douglas Christensen, Steven Thweatt, Gary Reynolds, Alan Bigger, and others are some of the "rock stars" of our facilities field, and they have provided their insight and knowledge to help reduce the learning curve of our members.

In these days of tight budgets, reduced staffing, and additional square footage, APPA's BOK provides a great resource that is only a click away on your computer. The comprehensive coverage of important topics allows us to understand how our facilities departments play a key role in aligning with our universities' overall strategic missions.

The true facilities professional is always learning, and the BOK assists our chief financial officers in making key business decisions based on knowledge, metrics, and best practices regarding facilities operations.

BOK IS AN APPA FOUNDATION

Additionally, the BOK plays a key role in supporting other outstanding APPA services that expand our knowledge and allow us to network with fellow APPA members. These include the APPA Institute for Facilities Management and the online APPA Credentialing Program to become an EFP (Educational Facilities Professional) or CEFP (Certified Educational Facilities Professional). These certifications are a must for facilities leadership professionals who want to grow their career and take on more responsibilities at their campus. The BOK provides the content and curriculum for the APPA Institute and for these credentialing programs.

As we continue to update the BOK chapters with the most recent and cutting-edge practices, we ask our regions, senior and junior representatives, and our members to get involved by assisting with updating chapters and serving as a resource. If you have a passion for a certain topic within the operations and maintenance section of the BOK, please contact me to learn more about editing or writing a chapter. 

Chris Kopach is the content coordinator for the BOK's Operations and Maintenance section and is assistant vice president of facilities management at the University of Arizona, Tucson, AZ. He can be reached at ckopach@email.arizona.edu.

BOK, Part 2, Operations and Maintenance, comprises the following four sections:

■ Plant Management

- Capital Renewal and Deferred Maintenance
- Emergency Preparedness and Business Continuity
- Facilities Condition Assessment
- Recapitalization Management
- Work Management

- Building Mechanical Systems

- Elevator Systems

■ Plant Services

- Custodial Services
- Facilities Maintenance and Operations
- Grounds Maintenance and Operations
- Solid Waste and Recycling

■ Building Systems

- Building Architectural and Structural Systems
- Building Control Systems
- Building Electrical Systems
- Building Fire Protection
- Building Interiors

■ Campus Services

- Fire Prevention on College and University Campuses
- Campus Security
- Environmental Health and Safety

BOK

Body of Knowledge

Hear Ye! Hear Ye!

APPA is Looking for BOK Authors!

- Are you a good writer and editor, and well organized?
- Are you passionate about the field of educational facilities?
- Do you have a desire to share your knowledge and ideas with your peers?
- Do you want an opportunity to “give back” to the APPA community?

Consider becoming a BOK author, and adding *your* wealth of information to the APPA Body of Knowledge. Your thoughts, insights, knowledge, and experience will be appreciated by everyone using the BOK to do their jobs even better than before.

The Body of Knowledge is built on the foundation of the four core competency areas identified by APPA:

Part 1 – General Administration and Management

Content Coordinator: Victoria Drummond, victoria.drummond@montana.edu

Part 2 – Operations and Maintenance

Content Coordinator: Chris Kopach, ckopach@email.arizona.edu

Part 3 – Energy, Utilities, and Environmental Stewardship

Content Coordinator: Darryl Boyce, darryl_boyce@carleton.ca

Part 4 – Planning, Design, and Construction

Content Coordinator: Steve Maruszewski, sxm37@psu.edu

If you are interested in becoming an author for APPA's BOK, please contact the content coordinator in the core area that best fits you. We are always looking for authors to write, update, or edit chapters. We are also open to adding new subjects and covering new areas of educational facilities management.

We look forward to hearing from you!

APPA U Class of January 2016 Celebrates in New Orleans

By Corey Newman

APPA U just wrapped up in New Orleans, Louisiana, showcasing another successful professional development gathering of the Institute for Facilities Management and the Leadership Academy. Colleagues from around the globe came together to learn, network, and collaborate.

We are grateful for the dedicated faculty who make these offerings such a success. A special note of thanks goes to Institute Deans: **Mary Vosevich, Jay Klingel, Lynne Finn, and Don Guckert**; and our Academy Faculty: **Glenn Smith, Michelle Frederick, Shawna Code, Lindsay Wagner, Matt Adams, Viron Lynch, and Chuck Farnsworth.**

Throughout the week, students had opportunities to interact with experts who brought their knowledge and experiences from vast backgrounds and provided a rich environment for all attendees. Approximately 500 facilities professionals from

across the United States, Canada, Mexico, and Egypt attended. We welcomed 94 first-time attendees, proving that APPA's popularity in the profession continues to grow!

As the week drew to a close, we celebrated with graduation ceremonies for the class of January 2016 (including 83 new alumni).

A big kudos to all of those institutional leaders who supported the professional development of their staff! The professional development of any individual must be as customizable as the individuals themselves, and APPA is here to help everyone achieve their personal, organizational, and institutional goals. Please visit www.appa.org for more on all of APPA's program offerings. ☺

Corey Newman is APPA's associate director of professional development and can be reached at corey@appa.org.

ACADEMY AND INSTITUTE GRADUATES



Photo by Rhonda Hole

ACADEMY GRADUATES

In alphabetical order; not all graduates are pictured.

Oscar Aguila, *Portland Community College*
Ben Boslaugh, *Missouri State University*
Greg Bechtold, *Medicine Hat College*
Donald Borkowski, *Bowdoin College*
Gary Chorn, *Missouri State University*
John Clark, *Missouri State University*
Wilfredo Colon, *Lehigh University*
Gary Cook, *Johnson County Community College*
Sharon Cunningham, *San Diego State University*
John Duvall, *Carnegie Mellon University*
Theresa Fleming, *University of Rochester*
Michael Gardner, *Sewanee: The University of the South*
Robert Grimm, *Lehigh University*
Kathy Junior, *University of Regina*

Christopher Kopach, *University of Arizona*
Alton Looney, *New Mexico State University*
Karen Maxwell, *Portland Community College*
Shane McKechney, *University of Regina*
Steve Peary, *University of Vermont*
Michael Randall, *Colorado State University*
Luis Rocha, *University of Arizona*
Claudia Runciman, *University of Guelph*
Ron Sautner, *The Banff Centre*
Jonathan Terry, *Quinnipiac University*
Jim Thomas, *Hood College*
Julius Williams, *University of Maryland College Park*
Paul Wurster, *Monroe Community College*
Willy Yamamoto, *North Carolina State University*

INSTITUTE GRADUATES

In alphabetical order; not all graduates are pictured.

Augusto Acosta, *Butler University*
Librado Alejandro, *Mountain View College*
Chris Asprion, *Southeastern Louisiana University*
Kirk Bird, *Utah State University*
Jessica Bradley, *University of Colorado Boulder*
Calvin Brown, *San Jose State University*
Laurel Brown, *Portland State University*
Alan Burcham, *North Carolina State University*
Michael Carmagnola, *University of Texas at Austin*
Conal Carr, *Pennsylvania State University*
Cynthia Chong, *Sonoma State University*
Emanuel Dasilva, *Foothill-De Anza Community College District System Office*
Tim Dobson, *New Mexico State University*
John Doctor, *San Mateo County Community College District*
Anita Eberhard, *Michigan State University*
Mark Eklund, *North Dakota State College of Science*
Vanessa Ennis, *University of Alabama in Huntsville*
Traci Ferdolage, *Humboldt State University*
Wilfred Ferwerda, *University of Guelph*
Angela Gaines, *Southern University and A&M College*
Jimmy Gresham, *Dallas County Community College District Office*
Ginger Hitts, *Vanderbilt University*
Matt Hoekzema, *Calvin College*
Jeffrey Hoepfl, *University of Pennsylvania-Philadelphia*
John Hopkins, *Whitman College*
Gregory Hough, *Western Washington University*
Larry Kiesler, *St. Olaf College*

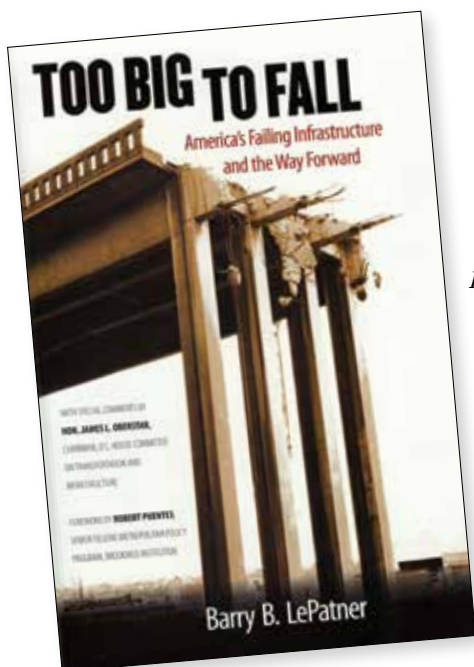
Scott Kyes, *Michigan State University*
Austin Longacre, *Dallas County Community College District Office*
Millicent Magiera, *University of California, San Francisco*
Samuel Martinez, *Salt Lake Community College*
Candace Mastel, *Montana State University*
Travis Mawyer, *University of Virginia*
Benjamin Mayeux, *University of Nebraska - Lincoln*
John McInerney, *University of Central Florida*
Paul Mesman, *University of Guelph*
Mario Molina, *Texas State University*
Ron Nagle, *Pennsylvania State University*
Chuck Nerger, *Seattle University*
Stephen Peay, *Wake Technical Community College*
Donald Perrin, *Plymouth State University*
Sophie Racine, *University of Ottawa*
Mary Rue, *University of Iowa*
Kimberly Sherr, *York College of Pennsylvania*
Duane Siemen, *University of Central Florida*
Anton Sonkin, *Florida State University*
Rodney Stacy, *Northern Kentucky University*
Daniel Stevenson, *Montana State University*
Clint Swearingen, *Florida State University*
Tommy Tafoya, *University of New Mexico*
Russell Taunitas, *Florida State University*
Edward Warner, *Wake Technical Community College*
Meqqa Washington, *California State University-Long Beach*
Tyree Woodard, *Texas Tech University*
Mike Zavaglia, *University of Rochester*

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

Although this may seem like a broken record, we never get enough funding for capital renewal needs (and APPA members are not the only ones with the complaint.) The federal government temporarily “solved” the problem in December 2015 by passing the Fixing America’s Surface Transportation (FAST) Act. Unsurprisingly, they didn’t solve much.

For decades, those of us in educational facilities have been talking about the growing problem of deferred maintenance, now called “accumulated capital renewal” (ACR) by APPA. Beginning in the mid-1980s, Harvey Kaiser wrote about the topic extensively and developed a manual to determine capital renewal needs for a building or campus. In 1997, Matt Adams studied and described nine different approaches to addressing the problem in *Successful Funding Strategies for Facility Renewal*. Then in 2010, Harvey Kaiser and Eva Klein wrote *Strategic Capital Development: The New Model for Campus Investment*, which described six principles for facility stewardship and which they applied in a highly successful program for the University of North Carolina system. Despite all this great writing, the problem hasn’t been solved. We continue to talk about the deferral (or ignorance of) maintenance by others that we identify as both a “ticking time bomb” and a threat to our education delivery system.

In general, higher education has been fortunate. Deferred maintenance has, for the most part, been viewed as an issue of image and very seldom resulted in major injury or loss of life. These organizations, with limited resources and a much larger primary mission (teaching, research, and public service), have been able to avoid the sort of catastrophes described in *Too Big to Fall*. Needless to say, the problems are similar and ongoing.



TOO BIG TO FALL: AMERICA'S FAILING INFRASTRUCTURE AND THE WAY FORWARD

Barry B. LePatner, Foster Publishing, New York, NY, 2010, 185 pp., hardcover, softcover, and Kindle.

Previously, I reviewed LePatner’s *Broken Buildings, Busted Budgets*, which described and attempted to analyze the problems associated with the construction industry. In that book, he claimed problems and cost overruns arise in large part from an industry that has not seen fundamental changes in how its product is delivered for millennia. He recommended the use of the design-build (DB) project delivery method to control project costs.

The DB has become more common in public settings. But DB should not be the only tool one uses to control construction costs—there are other tools.

As educational facility professionals know, the accumulation of capital renewal over time is a result of Mother Nature wearing out what architects and engineers design, constructors build, and occupants

use. It is a complex problem requiring sophisticated solutions.

In *Too Big to Fall*, LePatner presents in extensive detail, with a very nice set of footnotes and references, the challenges the U.S. bridge and highway infrastructure faces. There are some significant parallels between this infrastructure and higher education facilities.

These problems are not new. LePatner uses a great deal of information from state departments of transportation and the American Society of Civil Engineers (ASCE), which has produced a regular report card of public infrastructure including roads and bridges for many years. Their reports present the same enormous, unmanageable costs to address infrastructure needs that APPA members have presented with the same results: “The costs are too great, the infrastructure is working well enough anyway, there are other things to spend money on; it’s not a priority.” It’s the same story, just on a different scale.

Interestingly, LePatner cites inspection proto-

cols as an area in need of significant improvement. While some states have developed and acquired sophisticated systems to assess road surfaces, the method to inspect bridges where a catastrophic failure has resulted in significant loss of life is still often handled by nonprofessionals (and in LePatner's opinion) using insufficiently scientific methods. Maybe APPA and its members have a leg up on local DOTs and can provide some assistance.

LePatner provides several recommendations to solve our road and bridge infrastructure needs. Although the need for additional funds is mentioned repeatedly, the recommendations also include protocol improvements for inspections, identification of problems, development of a national database of problems (to learn from the failures of others), and increased professionalism in highway departments. These are all logical and needed recommendations. Unfortunately, I think he misses one important recommendation—in an area where APPA has taken a lead role.

Politicians, like trustees and donors, like having their picture taken at a ribbon cutting, but they usually stop being involved when renewal costs are needed.

As described in *Buildings...The Gifts That Keep on Taking* (Rose et al., 2007), the cost of new building construction is less than one-third the cost of having the facility available for its intended life. Though I know of no similar study of road and bridge ownership costs, the total cost of ownership (TCO) should be discussed before a new road or bridge is approved and constructed—just as some APPA leaders have advocated TCO be considered before a building is approved.

There may be limited use of *Too Big to Fall* for most facility officers; there are few campuses with extensive road networks and a small number have bridges. Given that LePatner has only written about two major public infrastructure types, I'm waiting to see if he tackles other infrastructure that has similar problems with decay and lack of funding: dams, levees, marine structures, water distribution, collection, and treatment systems, and other systems that serve the public and economy but which are ignored (out of sight, out of mind) until the system fails. Maybe he's working on the topic already.

If you're looking for a well-written but somewhat tedious book on infrastructure, particularly if you're a facility officer who has many or all of these systems in your purview, read *Too Big to Fall*. Get scared, consider the implications of non-building deferred renewal needs, and then start thinking of solutions that will solve your problems. ☹

Ted Weidner is an associate professor at Purdue University and consults on facilities management issues primarily for educational organizations. He can be reached at tjweidne@purdue.edu.

If you would like to write a book review, please contact Ted Weidner at tjweidne@purdue.edu.

The advertisement features a background image of hands working on architectural blueprints. Overlaid on this is a large, bold, black text graphic that reads "FACILITY MANAGEMENT METRICS". In the top right corner, there is a logo consisting of a white square with a black border, containing the letters "fm" in a stylized font with a superscript "2". Above this logo, the text "COMPREHENSIVE FACILITY EXPERTS" is written in a smaller, bold, sans-serif font. At the bottom of the advertisement, contact information is provided: "888-887-9995, ext. 201", "www.adamsfm2.com", and "info@adamsfm2.com".

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A hybrid model includes both Rset and graphical user interface (GUI) programming, and a T5 model includes Rset programming with built-in step dimming. Thomas Research Products manufactures solid-state lighting power solutions. The key advantage of the LED55WPG1 constant-current driver is hybrid programming. For simple programming with no computer workstation required, plug in the appropriate resistor. Or for more advanced control, try programming software interfaces with the driver through the USB



connection. Output current is selectable from 100 mA to 1,500 mA. The driver includes 0-V to 10-V dimming, which can be disabled via the GUI programming option. This design also provides an auxiliary 12-V output. Configuring either way can be done on the production line. It offers original equipment

manufacturers (OEMs) a flexible, easy way to reduce complex parts inventory. For more information on Thomas Research Products visit <http://trpssl.com>.

VIEGA introduces double-drop elbow fittings that maintain water quality by reducing stagnation. The elbows are designed to keep fresh water close to each fixture. The new flow-through style fittings, designed with threaded fixture connections and integrated mounting brackets, are used in series or ring installations and can be used in hot or cold water systems. Flow-through fittings allow water distribution systems to be designed in new ways to reduce stagnation with configurations that allow the use of a single fixture to generate flow through many fixtures up to the point of connection. This type of system also minimizes dead legs between tees and wall penetrations. For more information regarding Viega visit www.viega.us.




SHERWIN-WILLIAMS announced the launch of Paint Shield, the first EPA-registered microbicidal paint that kills greater than



99.9 percent of Staph, MRSA, *E. coli*, vancomycin-resistant *Enterococci* (VRE), and *Enterobacter aerogenes* after two hours of exposure on a painted surface. Able to kill these infectious bacteria on painted surfaces, Paint Shield is an important solution for the healthcare market, athletic facilities, schools, daycare centers, senior care communities, residential housing, and

hospitality settings. For further information on Sherwin-Williams products visit www.sherwin-williams.com.

RGF ENVIRONMENTAL GROUP, INC., an environmental products manufacturer, has introduced their latest product for the HVAC/indoor air-quality industry. The patent-pending BLU QR UV-C lamp device was designed with input from contractors in the

field and features our new quick-release replacement lamp, which allows for no-tools lamp replacement. It comes standard with four mounting options in the box, including the easy-to-install magnetic mount and multiple through-plate mounting styles. The BLU QR is priced economically and provides ultraviolet light disinfection and protection to the AC coil surfaces from bacteria, virus, mold growth, and odors, resulting in a cleaner, more efficient energy-saving system. For more information on RGF Environmental Group products, visit www.rgf.com. 



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