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Campus Case Studies

Sustainability Through  
Space Utilization

GRITS and Michigan APPA

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# features

## RECENT SUCCESSES IN **CAMPUS SUSTAINABILITY**

### **14** Harvesting a New Crop of Sustainability Case Studies

*Compiled by Steve Glazner*

From Ball State to Western Michigan, we are highlighting innovative and exciting sustainability initiatives at 27 educational institutions across North America. Solar, recycling, smart growth, bike programs, food production, academic connections, and much more are included.

### **30** Improving Campus Sustainability through Space Utilization

*By Brian Fancy, FMA, and Michael Chapman, P.Geo, MEnvMgt, BSc*

Space utilization has proven to be a substantial piece of the puzzle that is often neglected when considering sustainable building use. This article outlines Nova Scotia Community College's work to improve campus sustainability through better space utilization.

### **34** GRITS and MiAPPA *By Stephen L. Hocquard*

Developed by the nonprofit Sustainable Endowments Institute, GRITS (Green Revolving Investment Tracking System) is a web-based platform that tracks investments in energy efficiency and other resource conservation projects and enables datasharing through a project library. The author describes the use of GRITS by the Michigan chapter of APPA and his own institution, Saginaw Valley State University.



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## Learning and Networking Opportunities Abound

For the third year now, APPA and ACUI (the Association of College Unions International) are co-presenting the **Essentials of Facilities Management Training Seminar**. This foundational professional development program is designed for college and university facility administrators of student unions, activity centers, and other campus auxiliaries and facilities. The seminar will take place May 22-25, 2017, hosted at Colorado State University in Fort Collins.

Facilities professionals who are new to facility management or are transitioning into responsibilities of overseeing facilities should attend this seminar. Included will be a keynote speaker, numerous concurrent educational sessions, campus tours, and an optional session on the Introduction to the Incident Command System (ICS 100) for Facilities Management.

Learn more and register at [www.appa.org/training/EFMSeminar](http://www.appa.org/training/EFMSeminar).

APPAs chapters are thriving and are an integral part of the APPA engagement continuum that continues at the regional and international levels. We invite you to attend these **upcoming chapter conferences**:

- March 29-31: **New Jersey** (Galloway Township)
- April 8-9: **Texas** (Fort Worth)
- April 9-10: **West Virginia** (Flatwoods)
- April 11-12: **Keystone/Pennsylvania** (Lancaster)
- May 15-16: **Tennessee** (Knoxville)
- May 17-19: **North Carolina** (Durham)
- May 27-29: **Georgia** (Jekyll Island)
- July 21-23: **BayAPPA**/in conj. with APPA and PCAPPA (San Francisco)

APPAs **Certification and Credentialing program** has been growing significantly over the past several months. All six regions are providing no-cost or heavily discounted subsidies to their members for registering to take the preparatory classes and exams for the Certified Educational Facilities Professional (CEFP) or Educational Facilities Professional (EFP) designations.

The numbers of credentialed APPA members have increased as well. In fact, as of this writing, more than 50 facilities professionals have already earned their CEFP or EFP since January 1. This includes 17 from MAPPA, 14 from ERAPPA, and 9 from CAPPA.

Part of this growing success has been due to our expansion of testing options available for students pursuing their credential:

1. Kryterion Testing Center\*
2. Webcam Proctored\*
3. Campus Testing Proctored\*
4. APPA Group Exam\*\*

\* Offered as single or group exam.

\*\* Offered only as a group exam at specific times and locations.

The APPA **Credentialing Group Exams** are just one of four ways you can take your CEFP or EFP exam. We currently have the following group exams scheduled in the coming months:

- TNAPPA Conference, Knoxville, TN—May 15, 9:00 a.m.
- GAPPA Conference, Jekyll Island, GA—May 31, 1:00 p.m.
- APPA/PCAPPA/BayAPPA Conference, San Francisco, CA—July 23, 1:00 p.m.
- MAPPA/CAPPA Conference, Saint Louis, MO—September
- SRAPPA Conference, Charlotte, NC—October

For more information on APPA's credentialing program, visit <http://credentialing.appa.org> or contact Kelly Ostergrant, credentialing coordinator, at [kelly@appa.org](mailto:kelly@appa.org). ☎



### COMING IN MAY/JUN 2017

- Creating a Service Culture
- More News on GRITS
- Utility Infrastructure Renewal/Business Models

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### About APPA

APPA promotes leadership in educational facilities for professionals seeking to build their careers, transform their institutions, and elevate the value and recognition of facilities in education. 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](http://www.appa.org).





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## Candidates Announced for APPA Office—2017-2018

The APPA Board of Directors is pleased to announce the selected slate of officers for the 2017-2018 elections. The Nominating Committee was led by Immediate Past President Peter Strazdas.

### PRESIDENT-ELECT:

- Gerald J. (Jerry) Carlson, *Butler University*
- Don Guckert, *University of Iowa*

### SECRETARY-TREASURER:

- Lowell Bromander, *Hamline University*
- Anthony (Tony) Guerrero, *University of Washington Bothell*

### VICE PRESIDENT FOR PROFESSIONAL AFFAIRS:

- Daniel J. Bollman, *Michigan State University*
- Tony Ichsan, *Portland Community College*

The ballots close at midnight Eastern Time on April 25, 2017. To learn more about the candidates and to vote, go to [www.appa.org/vote](http://www.appa.org/vote). If you have any questions, contact Anita Dosik at [anita@appa.org](mailto:anita@appa.org) or 703-542-3837.

### CREDENTIALING GROUP EXAMS

- **TNAPPA**—Knoxville, TN May 15, 2017
- **GAPPA**—Jekyll Island, GA May 31, 2017
- **APPA/PCAPPA Annual Conference**—San Francisco, CA July 23, 2017

Registration for study course coming soon.

## New Technology Helps Measure Performance and Benchmark Green Building Projects



Arc is a new venture from the U.S. Green Building Council that allows any project — whether a single building, a community, or an entire city—to measure improvements and benchmark against itself and projects around it. Designers of LEED-certified buildings can use Arc, along with its partner, Green Building Certification, Inc. (GBCI), to improve and benchmark against other certified buildings in the same area.

For more information, contact at USGBC at <http://www.usgbc.org/>.



## Save the Date

### APPA/PCAPPA/ BayAPPA 2017 ANNUAL MEETING & EXPOSITION

2017 Annual Meeting and  
Exposition

Hilton San Francisco

July 21-23, 2017

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!







## APPA Hosts AUDE Executive Officer

The APPA staff was recently honored to host Jane White, executive officer of our strategic alliance partner the Association of University Directors of Estates (AUDE). Hosted by EVP Lander Medlin and AVP John Bernhards during her visit, Jane met with the APPA staff to discuss specific department and program areas, sat in on a Board of Directors call, and learned more about APPA's business model.

The AUDE annual conference, traditionally attended by the current APPA President, will take place April 10–12, 2017 in Manchester, England, and hosted by Manchester Metropolitan University.

## DID YOU KNOW?

### Leading Causes of Fires in Dormitory Type Properties



Most fires started in the kitchen and cooking area.

**86%** of the reported structure fires involved cooking equipment. The vast majority of fires were specifically reported as contained or confined to cooking equipment.



Structure fires in dormitories, fraternities, sororities, and barracks are more common the evening hours between 5 pm and 11 pm, and on weekends.

Source: NFPA Research Division

## APPA Events

**Mar 26-28, 2017**

**Smart and Sustainable Campuses Conference**, University of Maryland, College Park, MD

**May 11, 2017**

**APPA Drive-In Workshop**, University of Minnesota, Minneapolis MN

**May 22-25, 2017**

**Essentials of Facilities Management Training Seminar**, Colorado State University, Fort Collins, CO

**Jun 6, 2017**

**APPA Drive-In Workshop**, Quinnipiac University, Hamden, CT

**Jul 20, 2017**

**EP and SFO Summits**, San Francisco, CA

**Jul 21-23, 2017**

**APPA/PCAPPA/Bay APPA 2017 Annual Meeting and Exposition**, San Francisco, CA

**Sep 10-14, 2017**

**APPA U**, Providence RI

## Regional/Chapter Events

**Jul 21-23, 2017**

**PCAPPA 2017 Conference (joint with APPA and BayAPPA)**, San Francisco, CA

**Sep 17-21, 2017**

**Joint MAPPA/CAPPA 2017 Conference**, St. Louis, MO

**Sep 18-20, 2017**

**RMA 2017 Conference**, Jackson, WY

**Oct 25-28, 2017**

**SRAPPA 2017 Conference**, Charlotte, NC

**Oct 29-Nov 1, 2017**

**ERAPPA 2017 Conference**, Washington, DC

For more information or to submit your organization's event, visit [www.appa.org/calendar](http://www.appa.org/calendar).

## APPA Dues are Due

APPA has sent membership dues invoices to all APPA members for the fiscal year April 1, 2017–March 31, 2018.

Please pay your dues promptly to keep receiving APPA's many membership benefits. For more information, contact member services at [membership@appa.org](mailto:membership@appa.org).

## Add Your Own FM 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.



## BOK Authors Needed!

*APPA's BOK Authors Publish Key Information about the Facilities Management Industry*

### YES, YOU! YOU KNOW MORE THAN YOU REALIZE

Those with industry knowledge, and a desire to share their expertise in a key facilities management areas are needed to write and update chapters for APPA's Body of Knowledge (BOK). You know more than you think you know, and others in the field will benefit from you knowledge, insights, suggestions, and alternate ways of handling issues at their institutions.

### YOU WON'T GO IT ALONE

A support network is in place for writers interested in publishing a chapter in the BOK. Authors work with content coordinators and articles undergo editing and a peer review before publishing.

Potential authors should contact the content coordinator in their area of interest, and discuss potential new chapter topics, or chapters they are interested in evaluating or updating.

#### PART 1: GENERAL ADMINISTRATION AND MANAGEMENT

**Content Coordinator: Victoria Drummond**

[victoria.drummond@montana.edu](mailto:victoria.drummond@montana.edu)

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[ckopach@email.arizona.edu](mailto:ckopach@email.arizona.edu)

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#### PART 4: PLANNING, DESIGN, AND CONSTRUCTION

**Content Coordinator: Steve Maruszewski**

[sxm37@psu.edu](mailto:sxm37@psu.edu)

Be sure to check out the BOK at [www.appa.org/bok](http://www.appa.org/bok) and log into myAPPA. From there, go to myAPPASpace and then myEAccess.

The Content Coordinators are waiting to hear from you!

**BOK**  
Body of Knowledge



## New PGMS Publication: A Guide to Grounds Management Best Practices

The Professional Grounds Management Society (PGMS) has released "A Guide to Grounds Management Best Practices" to its members. This guide will serve as a primary source of best practices in the green industry, including examples of specific practices and advice on how to implement them. Initially, the guide will only be available to PGMS members through the PGMS website, and used by PGMS as part of its expanding Landscape Management and Operations Accreditation program. Go to [www.pgms.org](http://www.pgms.org).



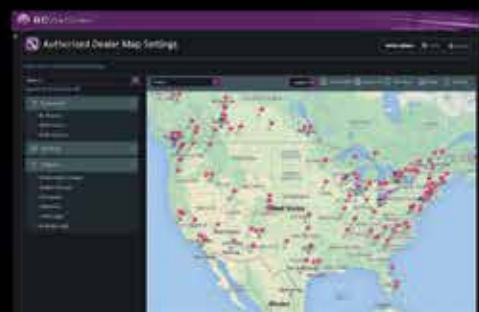
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## What's in Store for the UK Higher Education Sector in 2017?

By Trevor Humphreys

*Association of University Directors of Estates' (AUDE) Chair Trevor Humphreys, director of estates and facilities at the University of Surrey, discusses the challenges and opportunities currently facing the UK HE sector. AUDE is a Strategic Alliance Partner of APPA.*

**T**he British higher education sector continues to face uncertainty as a result of the UK's decision to leave the European Union, as well as changes to the funding relationship between universities and government and the imminent Higher Education and Research Bill. Throughout this, the sector continues to strive to improve its student offer, to drive research excellence, and to provide robust management and efficiency strategies. However, the future remains uncertain and directors of estates need to consider three key factors as they plan for the year ahead and support their respective institutions.

### BREXIT

Brexit is set to affect the sector considerably, but its impact is yet to be determined. Undoubtedly, it's likely to affect our student demographic, our workforce, our costs, as well as research funding. According to the European University Association, the UK has the largest number of participants in the EU's research programme and is currently the biggest destination for European students heading to study abroad.

From 2011-2012 international revenues amounted to nearly £5.7 billion from student fees, representing over 20 percent of all university income. UK universities are estimated to get 2.6 percent of their total income from the EU funding and around 16 percent

of their research income.

The ability to continue to access European funding for research is a key concern for the higher education sector in Britain and for politicians. Additionally, the expansion of UK universities and investment in campuses is largely dependent on continued access to these students, so with Brexit on the horizon it will be interesting to see how this affects international links. It may be prudent for British universities to focus on the appropriate structure to maintain their credentials as European universities in the lead up to this change.

A large proportion of academic and support staff originate from the EU and their ability to remain in the UK post Brexit remains uncertain. Changes in how EU citizens can choose to live and work in the UK will have a significant impact across higher education institutions, where there are many staff working in estates and facilities and working for contractors too. A skills shortage in the construction industry is already well known, and many of the existing workforce are EU migrants. To cut this supply off, or to severely restrict the supply, could have damaging effect on contractors' ability to deliver projects together with upward pressure on tender prices.

### HE WHITE PAPER

The future continues to remain uncertain as we try to plan for the impact of the HE White Paper



currently in its second reading in the House of Lords. The bill is wide-ranging in scope, and there are a number of sector concerns including, retention of institutional autonomy and academic freedom, the coherence of the proposed regulatory framework, the relationship between the planned Office for Students (OfS) and the UK Research and Innovation (UKRI) office (integrating the existing seven research councils), and the importance of the interrelationship of teaching and research. Universities UK (an umbrella group similar to the American Council on Education) and the Higher Education Funding Council for England are particularly keen to ensure that there is clarity of responsibility for the OfS, UKRI, and where joint responsibility lies. Individual institutions will need to consider their own response to the various aspects of the Bill.

From an estate and facilities perspective, there will be a need to ensure that there remains strong focus on quality, efficiency and value for money. We need to continue to create environments in which students learn, study, live, and where staff work, that we can be suitably proud of, as there is a clear link between student choice of institution and the quality of the estate.


#### THE EFFICIENCY AGENDA AND DRIVING VALUE

In February 2015 UUK published its "Diamond" report on Efficiency, Effectiveness, and VfM (Value for Money). Almost two years on, universities are delivering on many of the aims of that report. AUDE recently published some excellent examples of how estates directors in the UK are leading the way on this agenda—but are we doing enough? Many would argue that they are, and we are seeing some great examples of British universities working more closely with business and communities to drive local and regional economic growth.

However, we would do well to look at the very challenging HE funding environment in Scotland and Wales, where cuts have been faster and deeper. Estate directors have had to work incredibly hard to work within extremely challenging recurrent and capital budgets. In England we may well be facing similar challenges

in 2017 and beyond, and we must work harder at exploring solutions that colleagues have developed at their respective institutions.

Undoubtedly the future remains challenging and there is a need for universities to continue to control costs and drive efficiency in their operations. Universities continue to be more business-focused, working with their local and regional partners to secure both their economic future and that of the wider region.

2017 will be an interesting year in defining the future of higher education; AUDE will continue to support and promote excellence within the sector. 

Trevor Humphreys is director of estates and facilities at the University of Surrey and is AUDE's chair. He can be reached at [t.humphreys@surrey.ac.uk](mailto:t.humphreys@surrey.ac.uk). This is his first article for *Facilities Manager*.

For more information please visit

[www.aude.ac.uk](http://www.aude.ac.uk)



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# RMA Launches New Website for its Members

By Rachel Stone

**T**here is nothing more uncomfortable for mechanically minded facilities professionals than facing the construction challenges of the digital world. It's a world that most of them wouldn't dare venture into—even wearing a hard hat!

Websites are a blessing, but can also be a curse. Their flashy images, colorful GIFs (Graphic Interchange Format), and blocks of informative text are imperative if you want to lure users to your site, but the terrain in the digital environment is always changing. How do facilities professionals rise up to meet the challenge of being technologically savvy in an ever-changing landscape of web design? RMA was willing to meet this challenge head-on.

## MOVING TO A 21ST CENTURY WEBSITE

When Rocky Mountain APPA (RMA) sought to undergo a complete redesign of their website, many factors had to be considered:

1. What digital tools were facilities professionals using in their daily lives?
2. What kind of information were the region's membership looking for with regard to RMA?
3. How could RMA's website interact with its members in a valuable way?
4. How could RMA's website be designed for longevity and ease-of-use on the backend?

In 2016, the RMA Board felt it was time to embark on a complete overhaul of its website, which had been in use for several years. There is no concrete answer as to how often a website should be redesigned, but overwhelmingly experts agree that a site should receive a facelift when it no longer meets the needs, objectives, or expectations of the organization or its users. This was certainly true of the RMA site; it had minimal graphics, hard-to-read events lists, and no accessible way to display news.

Dave Turnquist, RMA Past President, describes the Board's rationale in early 2016 regarding a website update:

"I do remember thinking and expressing that the old website may be adequate, but far from new and uplifting. We wanted to encourage RMA members to use the website, and to make it easier to find information and maintain now and in the future. We wanted to move from a 20th century site to a 21st century site."





## KEEPING INFORMED AND CONNECTED

We have all seen the boom of handheld devices hitting our campuses, and the RMA site wasn't designed in a "mobile-friendly" way. Small text and links made it impossible to easily navigate this "antique" site on a cellphone or tablet. According to a 2013 report titled *Internet Trends* (Kleiner, Perkins, Caufield, and Byers), people check their mobile phone up to 150 times a day—another reason why RMA needed a new site to accommodate the membership using this digital platform for email, news, and website perusal.

It was important to RMA for the membership to be able to access information quickly, easy, and effortlessly.

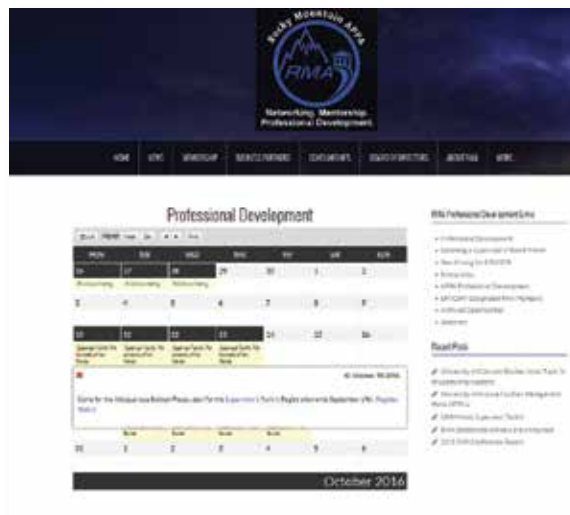
The APPA regional websites have traditionally been used to share information or engage the region's membership, to keep them informed of professional development opportunities and networking, and just to help them stay connected.

“One of the challenges within RMA is keeping the membership connected to one another. We are a huge region spread across many western states, up into Canada, and now into Mexico. Our site needed to be a place where our members could feel connected through easy access to information,” says Lisa Potter, current RMA President and associate director of facilities operations at University of Colorado Boulder.

## PITCHING A DIFFERENT IDEA

Construction of the new website began in January 2016. Rachel Stone, RMA Communications Coordinator, and Nathan Acosta from the University of New Mexico, began analyzing the content, conceptualized the look of the new site, and brainstormed navigation ideas. The team began to build the site fully in HTML (HyperText Markup Language), or in layman's term "code," while utilizing Bootstrap so it would be mobile-responsive.

Months into the project, it became clear that building a website using HTML only would be a maintenance issue over time—only the best IT



people know the inner workings of HTML; facilities professionals usually don't. Six months into the project with the site 75 percent built, Stone went to the RMA Board to pitch a different idea.

It was hard to say to the Board, “We’ve been working for six months on our new site, which we all love,

but we think it would be best for the organization to scratch the work we've done, and essentially start over." Our idea was to use WordPress, mainly because of the easy maintenance of the site and the user-friendly nature of that platform.

Nobody understands the importance of strategizing the long-term maintenance of a project more than the facilities professional. The RMA Board agreed with us, despite the setback. Because

WordPress is a more intuitive website-design platform, most people with a basic understanding of how to use a computer and software like Microsoft Word or PowerPoint can learn how to create websites with it. Acosta found the template that would work best for the site's overall design and functionality, and built the framework for the site. Stone was then able to easily add content, including images to the pages within the template. From beginning to end, the new site was built in three short months.

## GIVING BACK

The new RMA site is graphically beautiful, mobile-responsive, and features a news section that organizes articles, ultimately archiving them in a way that is user-friendly. There is also a calendar that gives the user an at-a-glance view of upcoming events—click on the event, and more information pops up with links to registration, fliers, and even a map.

RMA has always been dedicated to giving back to and supporting its membership—and this site also demonstrates how RMA “lifts as we climb.”

To see the RMA site, visit [rma.appa.org](http://rma.appa.org). 

Rachel Stone is communication & outreach specialist at the University of New Mexico, Albuquerque, NM. She can be reached at [racheld@unm.edu](mailto:racheld@unm.edu). This is her first article for *Facilities Manager*.



# HARVESTING A NEW CROP OF SUSTAINABILITY CASE STUDIES





Compiled by Steve Glazner

To celebrate the 2017 Smart and Sustainable Campuses Conference, held March 26-28 at the University of Maryland College Park, we are highlighting innovative and exciting sustainability initiatives at 27 educational institutions across North America. This is an increase from the 16 we featured last year and includes entries from 19 states and province, and from both private and public colleges and universities, as well as a preparatory academy.

You'll find a wealth of great programs and ideas here—from sustainability literacy to learning gardens, from bike strategies to recycling, and much in between. What is inspiring is that these two-dozen-plus case studies barely scratch the surface of the thousands of sustainability and energy initiatives that are planned or underway every day on our campuses.

To that end, APPA is planning to produce a compilation of as many campus case studies as we can highlight in an attractive publication that can serve as a valuable resource to your work. If you are interested in having your campus included, please contact Steve Glazner, APPA's director of knowledge management, at [steve@appa.org](mailto:steve@appa.org), using the Subject line *Campus Case Studies*. We'll publish specific instructions later for submitting your entry.



## BALL STATE UNIVERSITY

### Muncie, Indiana

*Submitted by Robert J. Koester, Professor of Architecture & Director, Center for Energy Research/Education/Service*

#### GEOTHERMAL YIELDS CARBON-REDUCTION CREDITS

Since 2012 Ball State University has generated revenue by piloting and employing carbon market methodologies to transact the carbon-reduction credits associated with its district-scale geothermal project. This closed loop, ground source heat-pump-chiller cooling and heating system (which is the largest in the U.S.) enabled the university to not only replace its inefficient chiller plant equipment but also to take multiple coal-fired boilers offline; significantly eliminating Scope 1 and Scope 2 greenhouse gas emissions.

As the system has become more fully managed the university's total CO<sub>2</sub>e emissions continue to fall. The geothermal system currently cools all 47 campus buildings and heats 37; when remaining connections are completed all 47 campus buildings will be online for *both* cooling and heating.

Through Second Nature's Carbon Credit and Purchasing Program, Ball State has been able to turn its Scope 1 and 2 emissions reductions into carbon credits, which are then sold for revenue on the voluntary carbon market. In addition to this carbon revenue, the project saves Ball State \$2 million annually in operational expense. The aggregated operational and carbon capital has enabled Ball State to advance its target of campus-wide carbon neutrality from 2050 to 2030. ➡



## BRANDEIS UNIVERSITY

### Waltham, Massachusetts

*Submitted by Sarah Horn, Borrego Solar Systems*



#### SOLAR ENERGY COMPANIES COLLABORATE TO INSTALL 1.3 MEGAWATT VIRTUAL-NET-METERED SOLAR ARRAY

Four solar project partners—Competitive Energy Services, Kenyon Energy, Borrego Solar Systems, and AEW Capital Management—have developed a collaboration with Brandeis University on a solar energy system that will directly reduce Brandeis' electricity costs. The system is expected to be operational in spring 2017.

Under the program, Brandeis will purchase solar energy from a 1.27 megawatt (MW) system installed on the roof of a property in Somerville, Massachusetts. Through the utility billing mechanism known as virtual net metering, Brandeis will receive credits on its utility bill for every kilowatt hour (kWh) produced by the remotely located installation.

"We hope this is the first of many opportunities to support new solar developments in Massachusetts, and hedge against the volatile, fossil fuel-based electricity market," said Mary Fischer, Brandeis' sustainability manager. "While we continue to investigate long-term, on-site solar for our campus, this agreement is an immediate opportunity to demonstrate our commitment to sustainability and fiscal responsibility." Fisher said that the system is expected to reduce Brandeis' energy bill by an estimated \$70,000 in the first year, and up to \$2 million over 20 years. ➡



## COLLEGE OF CHARLESTON

Charleston, South Carolina

Submitted by Todd LaVasseur, Director, Quality Enhancement Plan



### PROMOTING SUSTAINABILITY LITERACY

The College of Charleston is set to embark on an innovative campus-wide enhancement of student learning on sustainability literacy. Sustainability literacy is the entire focus of the college's forthcoming Quality Enhancement Plan (QEP), beginning in academic year 2017-2018, titled "Sustainability Literacy as a Bridge to Addressing 21st Century Problems." Part of the college's reaffirmation with the Southern Association of Colleges and Schools Commission on Colleges includes generating a new QEP. The college leadership's decision to support this QEP topic recognizes the importance of sustainability for navigating the many challenges that CofC graduates will have to address and solve in the coming years and decades.

Through this QEP project, CofC students will be exposed to systems thinking, interdisciplinary teaching and research centered upon the triple bottom line, and be provided a plethora of curricular and co-curricular opportunities to learn about sustainability and how to become advocates for resiliency. An exciting institutional innovation within which the QEP will be housed and administered is the creation of a Sustainability Literacy Institute (SLI). The college is excited to see how the SLI and the QEP help embed sustainability literacy as an academic pursuit at CofC. ➡

## COLLEGE OF WILLIAM & MARY

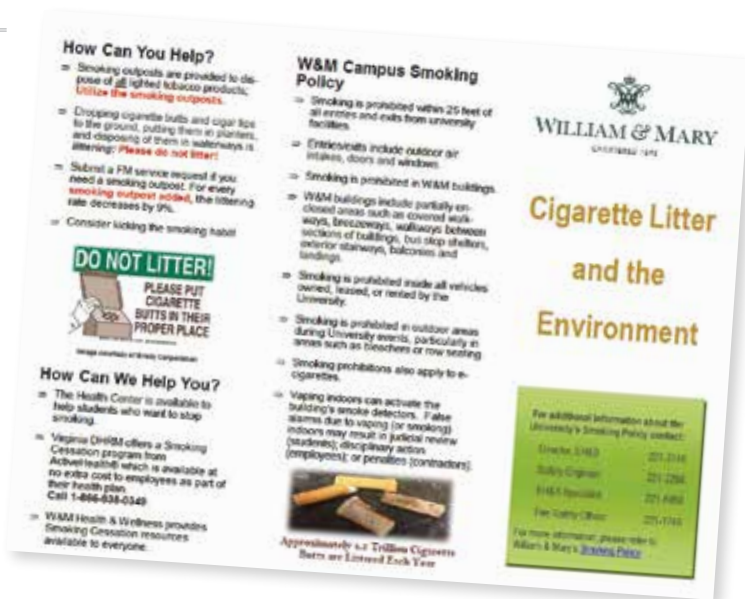
Williamsburg, Virginia

Submitted by Sandra Prior, Director Environment, Health & Safety

### REDUCING HARMFUL ENVIRONMENTAL EFFECTS OF CIGARETTE-BUTT LITTER

William & Mary EcoAmbassador, Kacey Schwartz '16, worked with Facilities Management to mitigate the negative effects of cigarette-butt litter on campus. Schwartz's project supported W&M's stormwater management efforts in Public Education and Outreach by focusing on one of the university's high-priority areas—plastics diversion—because the filters consist primarily of cellulose acetate, a plastic that takes approximately 8 to 15 years to degrade. The filters also contain chemicals that leach into the local waterway and harm marine life because they mistake the filters for food.

The project began by creating a detailed map of campus smoking outposts followed by identifying those positioned less than the required 25 feet from university buildings and those needing replacement/repair. Schwartz then made recommendations for additional outposts and relocation of others to optimize their use. She also identified areas of excess litter, noting their proximity to existing outposts and contacted the Environment, Health and Safety Office to collect and recycle the cigarette-butt litter through TerraCycle's Cigarette Waste Brigade. Schwartz then developed an educational brochure to communicate cigarette-butt litter hazards and the university's prevention efforts. The outpost analysis and education outreach resulted in reducing campus cigarette-butt litter and identifying a sustainable solution for its disposition. ➡





## COLORADO STATE UNIVERSITY

Fort Collins, Colorado

*Submitted by Carol Dollard, Energy Engineer*



### COMMITTING TO CLIMATE REALITY AND RENEWABLE ELECTRICITY

Sustainability is a core tenant at Colorado State University. CSU has earned many accolades for our progress to date, including the distinction of being the only institution to attain a Platinum score through STARS (AASHE's Sustainability Tracking, Assessment & Rating System), the most recognized and comprehensive assessment of campus sustainability. While CSU has had a Climate Action Plan in place since 2010 and has committed to climate neutrality by 2050, we wondered, "How do we up our game?"

The answer? Colorado State University has become the first Research 1 University to sign the Climate Reality Project *100% Committed* Pledge to utilize 100 percent renewable electricity by 2030! This journey began with a student campaign. While the proposal was being vetted through the President's Sustainability Committee, the students submitted a petition with over 4,000 signatures.

Facilities Management staff supported the campaign with an analysis that weighed the positive financial and environmental impacts of renewable electricity. In a signing ceremony on January 25, 2017, CSU's President Dr. Tony Frank signed the Climate Reality Pledge alongside the students who had worked so hard for it. This pledge is not taken lightly and now, with renewed passion, we will work to realize this goal. Go RAMS! ➡

## DREXEL UNIVERSITY

Philadelphia, Pennsylvania

*Submitted by Rosemarie Fabien, Fabien Communications*

### PROMOTING SMART GROWTH AND COMMUNITY REVITALIZATION

Drexel University was the inaugural recipient of the Joanne Denworth Founders Award by the 10,000 Friends of Pennsylvania, a nonprofit organization supporting smart growth, public transit, urban infrastructure, and community revitalization that exemplifies sound land-use principles. Drexel President John A. Fry accepted the honor and delivered keynote remarks at the Commonwealth Awards celebration on the evening of January 24, 2017 at the Academy of Natural Sciences of Drexel University in Philadelphia.

"Under John's leadership, Drexel University is transforming our region," said Caroline Boyce, 10,000 Friends' Board Chair. "Through creative partnerships with the City of Philadelphia, University City District, and other development partners, the University is reshaping and revitalizing Philadelphia in bold, strategic ways. We are delighted to celebrate these game-changing, smart growth initiatives through the annual Commonwealth Awards program." ➡





## FURMAN UNIVERSITY

Greenville, South Carolina

*Submitted by Laura Bain, Associate Director of Sustainability Assessment*

### FURMAN'S LAKE RESTORATION PROJECT

The Furman University Lake Restoration Project is a tangible example of Furman's commitment to sustainability. This 28-acre campus centerpiece was constructed in the mid-1950s and provided a variety of recreational opportunities for many years. Over time, sediment accumulated, waterfowl populations multiplied, and stormwater runoff increased, all contributing to algal blooms and high bacteria counts. In 2006, Furman created a Lake Restoration Master Plan and began implementing changes designed to improve the quality of the lake, including vegetated buffers and rain gardens to slow stormwater, removal of excess waterfowl, and educational signage.

The next phase of restoration is underway, funded by a \$95,000 grant from Duke Energy's Water Resources Fund. A dike was removed and replaced with a pedestrian bridge, and a series of floating marsh islands was installed on either side of the bridge. The marsh islands will eventually take root, aiding in nutrient uptake while providing excellent wildlife habitat. The pedestrian bridge will include observation benches and educational signage for students and the surrounding community. The lake continues to serve as a living learning laboratory for Furman students, lending itself to an array of academic studies that highlight the effects of restoration efforts on water quality. 🍃

Photo credit: Suresh Muthukrishnan



## GEORGIA STATE UNIVERSITY

Atlanta, Georgia

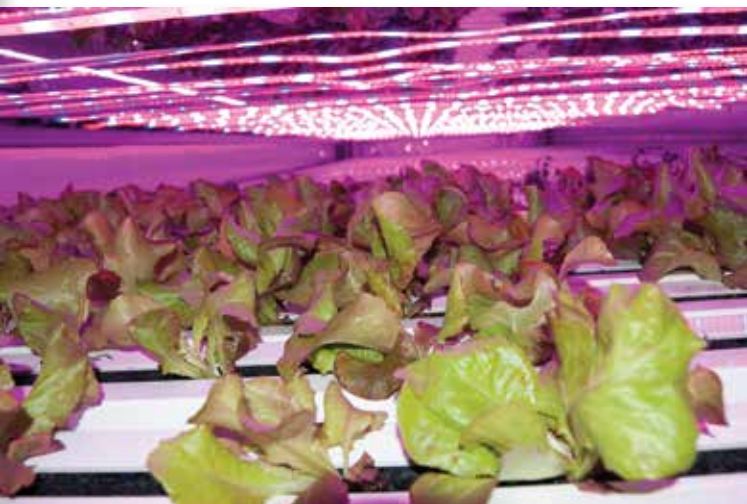
*Submitted by Nicole M. Galonczyk, Public Relations Specialist, GSU PantherDining*

### HYDROPONIC PRODUCE AND THE LEAFY GREEN MACHINE

Growing sustainable produce at one of the largest urban campuses in the U.S. may seem like a daunting feat, but Georgia State's PantherDining was up for the challenge. Through sustainability fees, the university purchased a one-acre farm fashioned out of an upcycled shipping container, named the Leafy Green Machine, hailing from the Boston-based company Freight Farms.

Inside the futuristic farm is a series of environmental sensors measuring climate conditions that communicate with the in-farm controller to maintain optimal 365-days-per-year growing conditions. The windowless farm is also equipped with over 125 LED lighting strips that mimic the sun's natural light via growth-optimized blue and red hues. After three weeks in the seedling station, the plants are transplanted into vertical hydroponic growing towers where emitters drip nutrient-rich water down the vertical grow tower using only ten gallons of water daily to grow over 4,500 plants. The water that isn't consumed by the plant flows out the bottom of the tower and is then recirculated right back to the water tank.

Since its implementation in July 2016, PantherDining grows about 500 heads of lettuce per week—harvesting Green Leaf, Butterhead lettuce, wasabi arugula, basil, thyme, and Swiss Chard with no pesticides, bugs, or soil. The produce is then served at PantherDining's catering events and retail outlets, with plans in the future to serve it in its dining halls, giving patrons the ultimate farm-to-table dining experience. 🍃





## LOYOLA UNIVERSITY CHICAGO

Chicago, Illinois

*Submitted by Aaron Durnbaugh, Director of Sustainability, LUC, and Patrick Brawley, Principal Landscape Architect, SmithGroupJJR*

### TURNING ST. IGNATIUS COMMUNITY PLAZA INTO A NET-ZERO WATER PEOPLE-STREET

Loyola is informing more sustainable global citizens by educating the university community of ways to conserve natural resources and build conservation practices into daily behaviors. As a neighbor to Lake Michigan, Loyola understands its responsibilities to the region's most precious resource, and is an exemplar in smart water management. The success of these initiatives have sparked the creation of a whole channel of the university dedicated to environmental stewardship, the Institute of Environmental Sustainability.

This project enriches the campus and community with an environment that embraces walkable communities with pedestrian safety and transportation options. An existing roadway was transformed into an open pedestrian mall to provide unimpeded access to academic buildings, student housing, and café market spaces. More importantly, the plaza helps divert 1.2 million gallons of rainwater away from the city sewer each year.

Using signage at its Lake Shore Campus and a comprehensive sustainability website, the project communicates to students, staff, neighbors, and visitors the value and responsibilities of their proximity to Lake Michigan, and the steps Loyola University is taking to make sustainable development a keystone to the creation of a 21st century campus. ➤



## MONTANA STATE UNIVERSITY

Bozeman, Montana

*Submitted by Susan Borda, Digital Technologies Development Librarian, and Aurélien Mazurie, Bioinformatics Specialist*

### STUDENT DATA COMPETITION PROVIDES INPUT ON BIKE PARKING ISSUES

Bicycle parking is a challenge on any university campus. Along with stakeholders in the offices of Sustainability, Facilities Services, and Campus Planning Design & Construction, we found a unique way to address bike parking issues at MSU. We designed a competition in which students used available data about bikes on campus to analyze the parking issues and propose solutions.

The competition team chose the bicycle-parking theme in spring 2016 and spent the following summer collecting datasets including digital campus maps and an earlier census of bike rack usage. Forty contestants worked as individuals or groups on their solutions for two weeks following a kick-off session in early October. All were required to submit a 5-page document and 5-minute video detailing their solution. The competition designers reviewed all the submissions and announced the winners at an awards ceremony in November. Three winning teams shared \$2,000 in cash prizes.

Overall the organizers were pleased with the level of participation and the outcomes of the competition. "While there were many good individual solutions, the challenge also revealed consensus that an organized and intentional approach not only increases functionality but also acts as a tool to change culture and, therefore, behavior and support," said E.J. Hook of Facilities Services. ➤





## NORTH CAROLINA STATE UNIVERSITY

Raleigh, North Carolina

*Submitted by Carla Davis, Communications Coordinator, University Sustainability Office*

### BUILDING DECONSTRUCTION DIVERTS 95% OF WASTE

An intentional waste diversion strategy resulted in an impressive 95 percent diversion rate of non-hazardous materials during the 2016 deconstruction of a 123,000-square-foot building on NC State University's campus. The deconstruction of 55-year-old Harrelson Hall, the first circular building on a college campus, came after studies determined the building was too costly to renovate and bring up to current code.

The goal was to divert 90 percent of building waste through recycling and salvage, including saving reusable items for another use on campus or donating to Habitat for Humanity. These items include desks, chairs, chalkboards and whiteboards, doors, security cameras, and some electric metering and fire protection equipment. All other non-hazardous building material went to a local facility that specializes in construction and demolition waste and recycling.

Hazardous materials within the structure—including asbestos, which was widely used around the time of the building's construction—were abated and properly disposed of prior to deconstruction.

After deconstruction, the footprint of the building transitioned into is green space and footpaths, which will improve stormwater management in the area. A new classroom building, which is already on the university's list of potential capital projects, could be Harrelson's ultimate replacement. ➡



## OHIO STATE UNIVERSITY

Columbus, Ohio

*Submitted by James Filipovich, Abby Whaley & Scott Holmes, Department of Recreational Sports*

### CLEANING SOLUTION REDUCES HARMFUL CHEMICALS INTO ENVIRONMENT

The Department of Recreational Sports and Office of Student Life at OSU has adopted Orbio, which uses on-site generation technology to create an effective cleaning and antimicrobial solution. Water, electricity, and salt are all that is needed to create the products used on all fitness equipment and facility spaces at different buildings. One of the benefits of moving to this product is that it has allowed the department to reduce the number of different cleaning products purchased.



In addition to simplifying the number of products, this also simplifies training and reducing storage space. After the initial investment to purchase the equipment for on-site generation, the only product needed is salt—so significant annual cost savings are seen. Most importantly, the environmental impact is reduced as the solutions created by Orbio offer equal or better results without the harmful health effects (i.e., VOCs) and deterioration of equipment (i.e., surfactants) that are seen in many conventional cleaners. ➡



## PORTLAND STATE UNIVERSITY

Portland, Oregon

*Submitted by Jenny McNamara, Sustainability Manager*

### PORTLAND STATE UNIVERSITY TRAVEL OFFSET PROGRAM

At Portland State, business travel is responsible for approximately 6,009 metric tons of carbon emissions, or 1,265 cars on the road, each year. Acknowledging that travel is mission critical and is not likely to decrease, PSU's Campus Sustainability Office created an offset program designed to mitigate this notoriously difficult source of emissions for universities.



The voluntary travel offset program directly supports the goals of PSU's Climate Action Plan. It works by assessing a 2 percent fee to travel expenses for participating departments. Contributions are then routed to the Green Revolving Fund, which finances campus energy efficiency projects, reducing our carbon footprint and offsetting travel impacts.

Many organizations purchase third-party carbon offsets to address travel emissions, costing anywhere from \$10 to \$50 per ton of carbon emissions. These prices are estimates of what it costs to reduce an equivalent amount of emissions through carbon reductions or sequestration elsewhere. The 2 percent in PSU's travel offset represents a charge of approximately \$30 per ton, based on recent

travel emissions. PSU's travel offset is an innovative, homegrown solution that further solidifies a commitment to climate action. Offsetting travel impacts is pivotal to reducing carbon emissions and creating a more resilient and sustainable PSU. ➤

## PRINCETON UNIVERSITY

Princeton, New Jersey

*Submitted by Caroline Savage, Campus as Lab Manager, Office of Sustainability*

### CAMPUS AS LAB

Students Ben Sorkin '17 and Kirk Robinson '17 knew that there had to be a more sustainable option for the Princeton University crew team's fleet of coach boats. Inspired by the auto industry's desire to reduce fossil fuel emissions through fleet electrification, Sorkin and Robinson tapped into Princeton's Campus as Lab program to seek funding and support for bringing their concept of a long-range electric motor boat to life. The student researchers have since produced a model that can achieve 47mph and is "performance capable, robust, low-maintenance, safe, and reliable," says Robinson.

This project is one of many supported by Princeton's Campus as Lab program, which engages students, faculty, and staff in solving real-world sustainability problems using Princeton's physical campus as a learning tool. The Campus as a Living Lab approach is defined as the campus-based intersection of operational, educational, and research activities that result in the advancement of sustainability problem-solving. "How can we use the physical campus as a way to engage the academic community in research about big global problems?" asks Shana Weber, director of the Office of Sustainability.

"Campus as Lab really shows us the difference between doing research for academia versus doing research for applications that can make a tangible difference in whatever environment in which you are working," said Sorkin. ➤





## SLIPPERY ROCK UNIVERSITY

Slippery Rock, Pennsylvania

*Submitted by Scott Albert, Assistant Vice President, Facilities & Planning, and Paul Scanlon, Director of Sustainability*

### COOPERATION CREATES GIS MAP PROMOTING SUSTAINABLE CAMPUS FEATURES

As part of a class project, a Parks and Recreation faculty member wanted to create a map of campus hiking trails, only to find multiple campus groups had “taken over” undeveloped areas, causing conflicts among different outdoor activities and damage to environmentally sensitive areas. The Sustainability Office wanted to promote sustainable features of our campus, including 150+ acres of Audubon Sanctuaries and sensitive wetlands. Facilities staff wanted the ability to quantify basic campus grounds information, and the Geography, Geology, and the Environment faculty were looking for real-life experiences for its GIS mapping class students.

The result? Cooperation among these entities yielded a “Campus Sustainable Features Map” promoting sustainable features on campus, with descriptions of each type of feature and its benefits to SRU and the environment printed on the backside. The map also serves to remind campus users of environmentally sensitive areas that require a land-use approval. Facilities received multiple layers of data that can be used to quantify mowing and snow removal areas, and to analyze potential steep-slope no-mow zones, among many other applications. Student workers gained valuable experience, and campus departments can now access map layers that locate specimen trees, outdoor classrooms, and more.

The next step—creating a smartphone app to allow users to view sustainability-related information as they walk the campus. ➡



## THAYER ACADEMY

Braintree, Massachusetts

*Submitted by Emily Schweitzer, Senior Project Manager, Coalesce*

### WEIGH THE WASTE CAMPAIGN

Food waste diversion is a priority at Thayer Academy, an independent co-ed day school located in Braintree, Massachusetts. Thayer’s Sustainability Committee implemented a composting program in the Dining Hall in spring 2016. At the onset of the project, the committee recognized that student and employee education and engagement were critical to the program’s success. Therefore, a week-long “Weigh the Waste Campaign” was organized, during which all who ate in the Dining Hall sorted food waste into uneaten food, compostable waste, and landfill, then weighed each, and reported findings to the entire school.

The program generated great excitement; however, compost bins were not able to be installed for a few months, leading to a bit of confusion around the status of the program. Lessons learned: logistics of installing the compost bins must be timely, and communication with the waste hauler around frequency of pickups, number of compost totes needed, and the cleaning of the totes is critical. A clear and shared understanding of the management of food waste and cleaning of totes ensures longevity of the program. Thayer continues to divert food waste from its Dining Hall and kitchen and engage students in the improvement of this initiative. ➡





## UNIVERSITY AT ALBANY

Albany, New York

*Submitted by Mary Ellen Malia, Director of Sustainability, and Indumathi Lnu, Energy Officer*

### BALANCING CARBON REDUCTIONS WITH ACADEMIC NEEDS

The university, like many of its counterparts, has expanded its built environment and increased staff and student enrollment. Despite an 8.5 percent increase in square feet growth, we have been able to reduce our overall carbon emissions by 14 percent since 2005. This reduction increases to 27 percent when adjusted for the increased space. This achievement is mainly a result of a decline in heating by 11 percent and electricity by 9 percent.

The key to success in realizing carbon reduction despite growth is instituting a systems thinking approach to building renovations, new construction and efficiency measures. This includes:

- Establishing high-performance building guidelines ensuring that new construction and major renovations achieve LEED certification with an emphasis on energy efficiency, quality building envelopes, and sustainable HVAC and lighting systems.
- Enacting key conservation measures including temperature set points, behavioral campaigns, and aligning building system schedules to class schedules.
- Simultaneously pursuing efficiency projects that counteract the carbon effect of new buildings. For example, the electrical savings realized from the upgrades to our main library air handlers offset 100 percent of the new School of Business' annual electricity usage.
- Pursuing alternative energy options where feasible, including solar photovoltaic and geothermal systems.

Moving forward, the university is striving to meet a 20 percent carbon reduction goal by 2020 through the implementation of a comprehensive energy master plan that includes combined heat and power, large-scale efficiency, and renewable energy projects. 🍃



## UNIVERSITY OF ALBERTA

Edmonton, Alberta, Canada

*Submitted by Lauren Hall, Sustainability Coordinator*



### UNIVERSITY OF ALBERTA LAUNCHES PILOT TO TACKLE PLUG LOADS

About a third of energy use for an average office building is the energy used by devices powered by AC plugs, known as plug load. A significant portion of that energy use occurs during evenings and weekends, often when equipment isn't being used. To learn more, the Energy Management and Sustainable Operations department launched a pilot project to determine the potential effectiveness of a plug load management platform on campus.

At the end of October 2016, 23 devices were installed in the General Services Building to measure plug loads and remotely schedule off hours for periods of non-use. Devices were installed on a variety of equipment including workstation computers, multi-function devices, smart classroom equipment, and television displays. Baseline electricity

use data was collected for two weeks, and then for the following two weeks we implemented a schedule for monitored equipment.

Extrapolated data shows that the implementation of a plug load management platform for the equipment included in the pilot alone could save 2.7 million kWh of electricity and \$198,494 in utility costs annually, which is a 46 percent reduction from the pilot baseline. After this successful pilot, plans are in the works to expand the implementation of this technology on campus, as there is the potential for substantial energy savings. 🍃



## UNIVERSITY OF GEORGIA

Athens, Georgia

*Submitted by Andrew Lentini, Communications & Outreach, Office of Sustainability*



### (RE)CYCLE: BICYCLE REFURBISHING AND REDISTRIBUTION

"Sometimes, there are just too many bikes locked to a bike rack," says Jason Perry, UGA sustainability specialist. This is usually a great problem to have...but some of these bikes are in long-term disrepair. Well-intentioned students bring bikes to campus and discover they do not prefer to ride them.

A partnership between Transportation and Parking Services, Facilities Management Division, and the University Police reduces the amount of dilapidated bikes chained to campus racks. Once a bike is identified, a tag is affixed to the bike for 90 days, letting the owner know that UGA believes it to be abandoned. When the 90-day period has passed, the bike is impounded for an additional 90 days. After this 180-day period, any unclaimed bicycles that still have life left in them are separated from those that are destined to become scrap metal.

UGA employees strip the useful bikes of broken parts and rebuild. A campus agency refers UGA students and staff in need of affordable transportation and, after a short application process, those individuals are gifted with a refurbished bicycle.

The University of Georgia tackles the most pressing issues of our time, inspiring those who will lead, discover, and serve on a relentless pursuit to improve our world. The (re)CYCLE Program is one way the University of Georgia takes care of its family and meets strategic sustainability goals. ➡

## UNIVERSITY OF NEBRASKA OMAHA

Omaha, Nebraska

*Submitted by Farrah Grant, Project Coordinator, Center for Urban Sustainability*

### CAMPUS BIORETENTION GARDEN: A LIVING LABORATORY OPPORTUNITY

The UNO Welcome Center Bioretention Garden is a result of collaboration amongst biology professor and landscape architect Steve Rodie, UNO staff and students, a local landscape architecture firm (Big Muddy Workshop), and the City of Omaha Stormwater Management Program. The garden functions as a stormwater best management practice and since its inception, has provided ongoing hands-on educational opportunities for design and environmental studies students. Completed in the fall of 2012, the garden is maintained by UNO Landscape Services and has shown significant plant maturity in four years.

Recently, soil moisture sensors, temperature sensors, data loggers, and cameras were installed. The sensors will provide a better understanding of how moisture moves through the soil during a given year and over the long term. Two live web cameras will provide insights into how the garden performs during a rain event and also provide a visual assessment of how the plants perform within the garden. Collected data will be displayed online as well as on a real-time kiosk to be installed in the Durham Science Building and online. Multiple classes will also utilize the data to understand the functional attributes of green infrastructure and stormwater management in general. ➡





## UNIVERSITY OF NEW MEXICO

Albuquerque, New Mexico

Submitted by Matt Cherrin, Energy Conservation Specialist, Lobo Energy, Inc.

### IN-HOUSE PROGRAMMING OF BAS CONTROLS SAVES THOUSANDS

The University of New Mexico has building automation controls installed throughout six campuses across the state in order to ensure the most optimal learning and working environment for students, staff, and faculty. UNM primarily uses Delta Controls and Automated Logic Controls, with a few buildings still with INET-7.

While many organizations have building automation systems installed in their buildings, UNM is unique in that a team from the Physical Plant Energy Services Department installs and programs all of the systems in house, which has saved the university thousands of dollars in expenses. The Energy Services Department also has a team that commissions HVAC and lighting controls regularly to ensure that all the systems are running the way they were originally designed.

Without these efforts, the university would not be able to implement many of the energy conservation measures that have helped lead to a 23.3 percent cost avoidance in utility expenses since May 2008. Energy Services help resolve comfort complaints and equipment malfunctions in efficient time periods that help optimize maintenance response time and minimize operations inefficiencies. They are also responsible for implementing building-setback schedules that helps reduce energy consumption when buildings are unoccupied. ➤



Photo credit: Tommy Tafuya

## UNIVERSITY OF TENNESSEE KNOXVILLE

Knoxville, Tennessee

Submitted by Preston Jacobsen, Sustainability Manager

### SUSTAINABILITY FOCUSED EXPERIENCE LEARNING: A MARRIAGE OF ACADEMICS AND OPERATIONS

UT Knoxville has a rich history of operational sustainability dating back to 2007 with an ever-growing infusion into academics, be it research, internships, or hands-on learning. This evolving collaboration with academics has benefited sustainability efforts on campus and the surrounding community, with an emphasis on energy efficiency technologies that provide economic and GHG emission reductions.

The Office of Sustainability adopted the experience learning model in 2014, using student environmental initiatives fees to deploy the Student Design & Research Fund, which provides monies to students and faculty to conduct sustainability focused projects that

have an economic and/or GHG emission reduction benefit to UT. Projects range from a 3D Energy Model for all campus buildings to battery storage technology research focused on reducing peak energy charges. The projects allow students to conduct research using a hands-on approach, and through this model Facilities Services is exposed to leading-edge technology solutions that will inevitably reduce operating cost, increase efficiencies, and provide a never before seen insight into our campus operations.

In tandem with behavior change programs, UT has avoided over \$5 million of energy cost since fiscal year 2009 by adopting the experience learning model, and there seems to be no end in sight. We look forward to future proposals and are proud to serve our student population in a manner that makes UT a more sustainable place to live, learn, and work. ➤





## VILLANOVA UNIVERSITY

Villanova, Pennsylvania

*Submitted by Liesel Schwartz, Sustainability Manager*

### CONSOLIDATING EFFECTIVE RECYCLING CENTERS

Recently, Villanova University took steps to improve its recycling problem. It was common practice to have only trash bins in the classroom and recycle centers in the hallway. The best way to encourage recycling is to always have the two bins next to each other. Adding more bins to our classrooms was a non-starter with the custodians, as it would double their daily workload. After hearing of a successful program that pulled trash bins out of the classroom and increased recycling centers in public spaces, we decided to test the idea ourselves.

Working with a senior environmental science student, we outlined a two-phase implementation plan across the College of Engineering. This would allow us to test the program's effectiveness before rolling out the improvements across campus.

The new program was implemented in two of the three engineering buildings at the start of the 2015-16 academic year. After two months of use, a waste audit was conducted by the environmental science senior as part of her thesis work. The audit showed a 7- to 12-point improvement in the recycling rate from the control building. The program has now been implemented across all of Villanova's academic buildings. 🍃



## VIRGINIA COMMONWEALTH UNIVERSITY

Richmond, Virginia

*Submitted by Erin Stanforth, Director of Sustainability*



### THE VCU LEARNING GARDEN

The VCU Learning Garden works to combat food insecurity for both the city of Richmond and VCU students and works to improve access to fresh food. One of two gardens maintained by the Office of Sustainability, donated nearly 500 pounds of fruits and vegetables from its first growing season to our partners at on-campus food pantry RamPantry and the Center for Healthy Hearts, a local nonprofit that provides healthcare to low-income, at-risk individuals. The Garden also welcomed over 300 volunteers, some of whom participated in garden work as part of service-learning coursework.

The garden was funded in part by a grant from the VCU Division of Community Engagement, and hosts 10 raised garden beds constructed entirely from reclaimed materials. Plans to expand the garden include the addition of wheelchair accessible,

table-top style beds, an outdoor classroom pavilion and a rain barrel water catchment system.

In addition to its Learning Garden, VCU maintains an on-campus community garden close to its student center. Any VCU student, staff, or faculty member—or a group of them—can rent a plot for a semester or the entire year for growing food and flowers for personal use.

Increasing student and community engagement with both gardens is one of the 17 goals articulated in VCU's Sustainability Plan. The plan was developed in 2015 with input from VCU stakeholders at two town hall events and from community members involved in five neighborhood associations. 🍃



## VOLUNTEER STATE COMMUNITY COLLEGE

Gallatin, Tennessee

*Submitted by William J. Newman, Senior Director of Plant Operations*

### SEEING THE LIGHT: LED OUTDOOR UPGRADES

Ensuring effective and efficient projects that support real sustainability efforts is difficult at times. Each college and university must ask themselves, what sustainable initiatives result in actual cost savings and support long-term sustainability efforts? At Volunteer State Community College, each campus improvement project is reviewed in an effort to ensure that sustainability is taken into consideration.

Recently the college elected to replace existing high-pressure sodium lamps with more efficient LED fixtures. The old fixtures were over 30 years old. Overtime they had been retrofitted and repaired but they were very inefficient. Each lamp was 150W and used a coil ballast that required 1.25amps. The expected life of the lamp was less than 24K hours.

The new LED fixtures were matched to the campuses long-term site plans. Maximizing efficiency while not compromising safety and security was paramount. The LED selected was a 65W lamp that had a 50K-hour life. It used only .23amps per fixture, and the foot candle output was nearly double that of the old fixtures.

Once installed, the nightly kWh consumption was monitored to verify results. The areas where the LEDs were installed saw an immediate 46 percent reduction in kWh. The replacement of just 62 fixtures is projected to save \$4,000 the first year! We plan to complete the second phase of LED upgrades over the next two years. Once complete, the college is projected to save nearly \$12,000 per year in site lighting. 🍌



## WAKE FOREST UNIVERSITY

Winston-Salem, North Carolina

*Submitted by Daniel S. Fogel, Director, Sustainability Graduate Programs and Graduate Research Professor in Sustainability*

### SUSTAINABILITY GRADUATE PROGRAMS

The Center for Energy, Environment and Sustainability and the WFU Graduate School of Arts and Sciences offer sustainability graduate programs to working professionals and exceptional recent undergraduates. The Master of Arts in Sustainability is an innovative and distinctive one-year program allowing students to emerge as sustainability change agents. Further extending the program's reach, two dual-degree options with the School of Divinity and School of Law are offered. WFU also offers students the opportunity to earn a Graduate Certificate in Sustainability by completing four sustainability foundation courses.

The Sustainability Graduate Program seeks to educate the next generation of leaders in sustainability. Through coursework and research with faculty experts across disciplines, students graduate equipped to tackle some of the world's most intractable problems.

CEES and the Sustainability Graduate Programs place significant value on experiential learning opportunities tailored to specific student need and interest. By developing immersive experiential learning opportunities, our program empowers students to engage with committed partners both local and global. For example, students have developed approaches to sustainable cotton sourcing for Wrangler Jeans, energy models for Walmart, and master plans for wildflower preserves managed by land conservancies. With a keen focus on career enhancement, the program provides contact with sustainability practitioners and experts in a small, intimate setting. This focus on career readiness, experiential learning, top-tier research, and academics is exemplified by a one-to-one student-to-faculty ratio. 🍌





## WESTERN MICHIGAN UNIVERSITY

Kalamazoo, Michigan

Submitted by Chris Caprara, Energy Administration Specialist

### UPGRADED STEAM METERING AT WESTERN MICHIGAN UNIVERSITY

Knowing how and where energy is used is fundamental to any successful energy management program. This is especially true when balancing the energy needs of an 8 million square foot campus and facilitating accurate utility chargebacks between departments.

While electric metering has been in place for decades on Western Michigan's campus, steam has been a more challenging utility to accurately meter. Steam flow metering historically required multiple meters and generous upstream and downstream straight runs of pipe. Both of these challenges proved to be either financially or technically infeasible in many existing facilities.

Due to these challenges condensate return metering using magnetic flow meters became the primary form of thermal metering on campus for two decades. However, this presented its own challenges such as dumped condensate, direct steam humidification, and existing pipping issues.

Through the use of the Veris Acecelebar, a flow meter that combines two differential pressure technologies, WMU has been able to install steam meters in both new and existing facilities that accurately and reliably measure steam flow over a wide range of turn downs and require no upstream or downstream straight run piping. The meters are also able to be remotely monitored and data logged through the existing building automation infrastructure with several common communication protocols. 🟢



Steve Glazner is APPA's director of knowledge management and editor of *Facilities Manager*; he can be reached at [steve@appa.org](mailto:steve@appa.org).

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# *Improving* CAMPUS SUSTAINABILITY *Through* SPACE UTILIZATION

BY BRIAN FANCY, FMA, AND MICHAEL CHAPMAN, P.GEO, MENVMT, BSC

Aerial view of the NSCC Waterfront Campus in Dartmouth, Nova Scotia. Skyline of the city of Halifax in the background.

All photos are taken and owned (credited) by NSCC.





NSCC proudly waving its flags at the NSCC Waterfront Campus.

**S**ustainability serves as a core value in the Nova Scotia Community College (NSCC) Strategic Plan. Tracking the progress toward more sustainable operations ensures that NSCC's sustainability goals are met. Resource management strategies including infrastructure changes have led to improved building efficiencies at many of NSCC's campuses in recent years.

However, if a room is empty or at far less than capacity, then how efficient is it? Space utilization has proven to be a substantial piece of the puzzle that is often neglected when considering sustainable building use. This article outlines NSCC's work to improve campus sustainability through better space utilization.

### THE CORE VALUE OF LEADING BY EXAMPLE

Nova Scotia Community College's mission statement is "Building Nova Scotia's economy and quality of life through education and innovation." This statement goes beyond classroom education—it is embedded in all that we do, including how we manage our building space.

Every institution in the postsecondary sector has an opportunity to lead by example and have significant influence on both the future workforce, as well as the communities that they serve. For over 15 years, sustainability has been a driving force for the College. It is a core value in our strategic plan, and is one of the many arenas in which we strive to lead by example. Over the past eight years, NSCC has reduced energy consumption by 23 percent, reduced greenhouse gas emissions by 31 percent, and our water consumption by 40 percent. In addition, 75 percent of the waste that we generate has been diverted away from landfill.

These improvements were achieved largely through infrastructure changes such as lighting upgrades, improved waste management systems, and building envelope improvements. However, something we learned along the way is that in order to optimize building performance, infrastructure upgrades, and space utilization are interdependent of each other.

### ANALYZING THE USE OF SPACE

It started with a simple thought: we can have the most efficient buildings systems available, but if a room is sitting empty or at far less than capacity, then how efficient is it? To answer this question, we conducted a space utilization analysis across our 13 campuses and discovered there was opportunity for improvement. The analysis also impacted how we looked at operational cost. The efficiency of buildings is often measured by cost per square foot. We adopted another perspective: cost per student.

First we needed to *change the ownership of space*. The results from the data analysis largely showed that spaces that were dedicated to serving the needs of a particular academic program or specific function achieved lower utilization rates than those rooms that served multiple groups.

To capitalize on this finding, we introduced scheduling and space utilization software, which simplified the development of efficient schedules, and tracked the use of the spaces. This resulted in real energy savings as the College no longer needed to heat and cool spaces that were empty. Since implementing this new software, the College has seen utilization improvement rates at several of our 13 campuses jump from 40 to 70 percent.

Second, we *addressed our physical footprint*. Utilizing infrastructure funding from the Province of Nova Scotia, we evaluated the ability of our existing traditional learning spaces to meet the requirements of the College's high-quality program delivery needs, as well as to support its mission statement. We found that



Students making use of common learning spaces at the NSCC Waterfront Campus.

there was, again, room for improvement. Rather than creating additional traditional learning spaces, we implemented an innovative design approach to space management. The design approach was based on three pillars: 1) Reducing our footprint, 2) Flexibility, and 3) Engagement.

Building on the findings of the space analysis, we conceptualized spaces that were both smaller, and could serve multiple groups. This started by challenging ourselves to work with a reduced footprint, while still providing the program excellence NSCC is known for. This included learning spaces (e.g., trade shops) that were as small as a third of their typical size.

To work within this smaller footprint meant working as a team to change the way our programming was delivered. We designed open concept spaces that could be flexible and quickly adapted for various programs. A detailed material handling process was

technical experts for innovative building systems projects and to access the latest in energy research and technologies.

This building looks and feels unlike any other trades and technology building in Nova Scotia or the rest of Canada. In addition to its minimal ecological footprint, the CBE provides a unique learning experience for students in 13 programs within the academic school, and represents a huge step forward for the College in sustainable design. Embedded in the curricula for all programs delivered in the space is an ecological theme that goes hand-in-hand with the College's environmental goals.

Upon reflection, it is clear that there were several factors that aided in the success of this project, and would be recommended for any similar, future undertaking. Engaging staff and students from the start is important, making sure that they have a say, that they understand what the goals are, and how the changes



NSCC Waterfront Campus front entrance, located in Dartmouth, Nova Scotia.

put in place to cut down on the need for fixed equipment, and overhead doors were installed between shops to support this flexibility. Adopting more portable and scaled-down training aids and specific infrastructure supports were also required—such as drop-down electrical connections and high-density racking systems.

Third, to make this work and to better understand the variety of demands on the space, it was also *important to have all stakeholders engaged* from the conceptual design phase through to construction and operations. We struck a team that included academic chairs, curriculum development staff, facilities staff, construction managers, and an industrial process engineer.

### THE CENTRE FOR THE BUILT ENVIRONMENT

While still ongoing, a product of this work was the creation of the Centre for the Built Environment (CBE) at our Waterfront Campus. Constructed in 2010, the CBE is dedicated to the School of Trades & Technology. It is a dynamic and interactive learning environment for academic and research programs focused on more sustainable practices for the building industry. The CBE brings together trades and technologies students with

may impact them. It also helps to make the project part of your brand. We branded our sustainability focus to help generate support and buy-in from our community. Setting goals and creating accountability are other important tools to ensure success. We set aggressive goals and policies related to sustainability, including space utilization.

### ESTABLISHING MEASURES FOR ACCOUNTABILITY

Accountability means that senior leaders support the efforts and provide ongoing supervision to ensure the work stays on track. This can include annual auditing and reporting responsibilities. In addition, focusing on flexibility when purchasing space assets can have a big impact. Furniture, which can meet multiple users' needs, will play a key role in whether a space/room is used or sits empty.

The benefits of optimizing sustainability of building operations are multifaceted. Through our work, we challenged the operational status quo. An example of this was reducing the number of parking spaces at some of our campuses. We wanted to influence a behavioral change and increase staff and students use of alternative transportation. Also, as a publicly funded insti-



tution, we are required to develop business cases for much of the funding we receive.


In our business cases, we highlight the long-term sustainability of investing in our infrastructure, which, to date, has been a very successful approach for us. It ensures that money invested in the College provides best value. The efficiencies introduced in our buildings through infrastructure changes and more efficient space utilization save the College over a \$1 million each year. These recovered funds are reinvested into building upgrades in an effort to continuously improve and

extend the life of the College's buildings by addressing critical and deferred maintenance. By increasing the efficiency and capabilities of our buildings, we have built additional capacity within the same walls that did not exist before. For the College, this has resulted in an ability to grow our program offerings and increase the number of students at our Campuses.

Finally and most importantly, NSCC strives to lead by example. Sustainability is part of how NSCC does business and serves as a core value in our Strategic Plan. The College operates under a board-approved sustainability policy, and sustainability is embedded in all aspects of the learning experience. We create buildings that can be used as learning tools that enrich curriculum, foster research, and promote better understanding of responsible building practices for students and faculty, industry partners, and the public at large.

In addition to the curriculum and training tools, students are learning ways to efficiently and sustainably run an operation. This will help them as they enter the workforce and implement these lessons learned. The College's sustainability work also bolster student awareness, and ultimately encourages behavioral changes that are essential to continually improve not only the College's, but the community's sustainability performance overall.

This year, NSCC is set to begin its next phase of major renovations. We do not want to build new buildings because it is the exciting thing to do, we want to continue to leverage and maximize what we have. This journey has helped us develop a new way of approaching space design that will allow us to work through similar

integrated design approaches, as we continue to develop and improve our space utilization processes. 

Brian Fancy ([brian.fancy@nscc.ca](mailto:brian.fancy@nscc.ca)) is facilities manager, and Michael Chapman ([michael.chapman@nscc.ca](mailto:michael.chapman@nscc.ca)) is manager, infrastructure, sustainability & space planning, in the Facilities & Engineering Department at Nova Scotia Community College, Dartmouth, NS, Canada. This is their first article for *Facilities Manager*.

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**T**he Energy Engineers group of the Michigan chapter of APPA (MiAPPA-EE) was founded approximately five years ago. Our intention was to create a way to effectively share information about what each of our schools were doing for energy conservation.

The EE group, since its inception, has grown to 36 colleges and universities (14 public universities, 10 private colleges and universities, and 12 community colleges), with over 60 individuals that represent these schools at biannual meetings. Interestingly, many of the individual members are not energy engineers. Several are facility directors, energy managers, or architects like myself—but in our work, we all share a focus on energy conservation.

#### **MIAPPA DATA COLLECTION AND SHARING**

Information-sharing drives MiAPPA-EE's efforts, and we have developed several ways to communicate with each other. We have a shared member contact list, a listserv for email discussions, and what we call our Energy Conservation Measures (ECM) Activity Chart. This consists of a spreadsheet that lists school names along one side and a large number of possible ECMs listed along the other.

ECMs range from occupancy sensors in classrooms, variable frequency drives (VFDs), and LEDs in parking lots to solar photovoltaics and geothermal heat pumps. We now have more than 81 project types on the list. Numbers in the chart's cells indicate which schools are undertaking each ECM and roughly how much experience they have with it. The ECM Chart is hosted by the University of Michigan in a Google Doc format, and Washtenaw Community College hosts the listserv for our group.



This level of sharing, combined with two day-long meetings for our entire group per year, boosted energy conservation efforts for many of our members. However, we wanted to dig in deeper and become more quantitative. We wanted to better understand the impact of each ECM, tracking how much it cost and how much it saved. A few years ago we formed an ad hoc committee to come up with a system we could all agree upon to calculate return-on-investment (ROI), payback period, energy savings, and carbon savings. After several discussions, without identifying any tools that could meet our needs, our search was put on hold.

### WORKING WITH GRITS

In the spring of 2014, our quest for quantitative information picked up again when we learned about GRITS. Developed by the nonprofit Sustainable Endowments Institute (SEI), GRITS (short for the Green Revolving Investment Tracking System) is a web-based platform that tracks investments in energy efficiency and other resource conservation projects and enables data-sharing through a project library. We contacted SEI and, after several discussions between our organization and SEI, MiAPPA-EE adopted the platform.

For three years now, GRITS has allowed our members to maintain an ongoing calculation of the energy, financial, and carbon emissions savings from our projects and easily share that data with one another. GRITS also allows us to develop excellent charts and presentations with little work. Many of our members have also included many projects from prior years into their GRITS portfolios.

Because the GRITS program has so much information in one place and is so intuitive, it can be readily used by each organization's administrators and faculty as well as the facility staff. In many ways, it can speak to everyone on campus that has a stake in resource conservation.

### OVERVIEW TO GRANULARITY

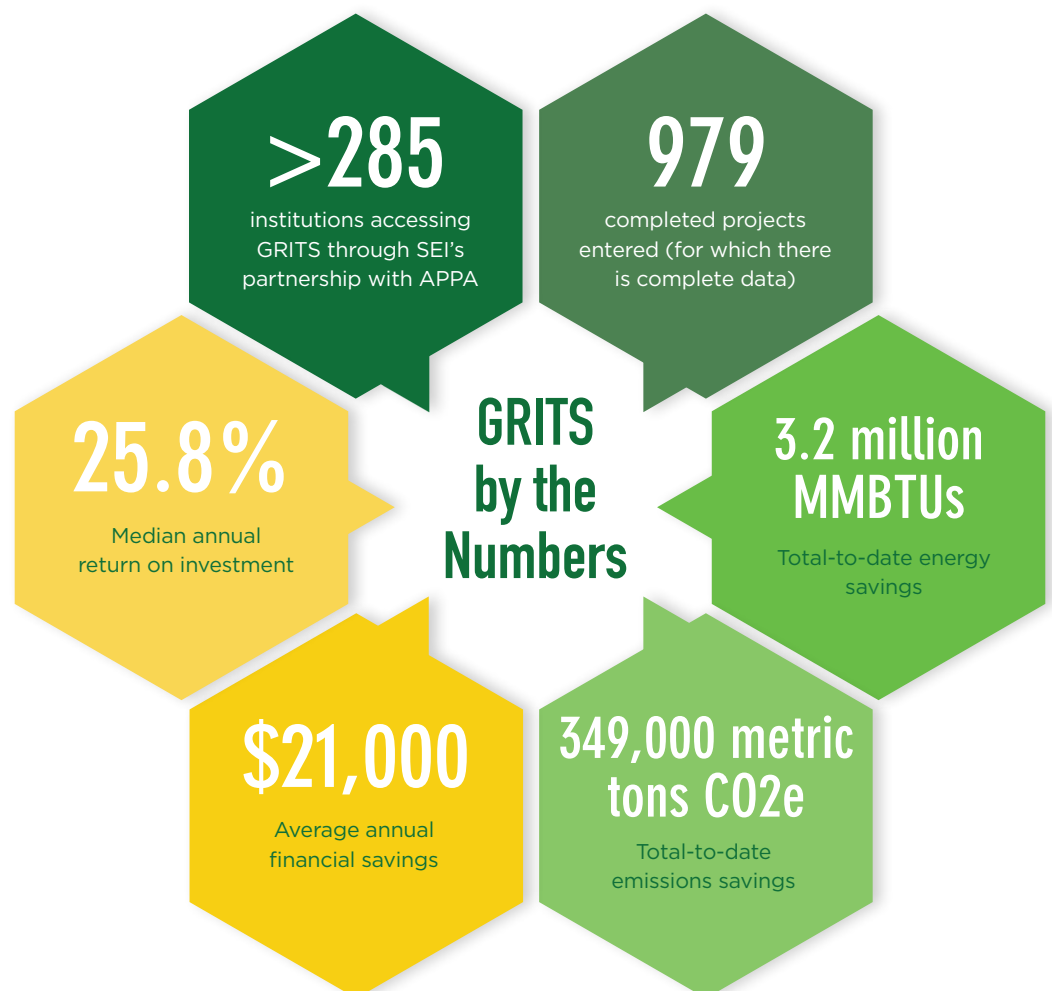
One of the best thing that GRITS does, in my mind, is describe and track energy conservation projects at a granular level. It will tell you whether the project is electrical or HVAC, whether it is a VAV project or a VRF project, LED or fluorescent

lighting, etc. Your project can be labeled as one of 14 different types and one of over 120 different sub-types of ECMs. The fuel type, cost of the project, the payback and carbon savings, what building it is in, the age and use of the building, are all tags that help describe and identify your project. You are able to sort your organization's energy project history by building, type of project, or type of fuel.

The GRITS library features more than 2,000 completed projects (from all sectors) and continues to expand rapidly. This sort of information gives us a database that can be mined to give direction and confidence to engineers, owners, and investors. Data from the library provides a list of priority projects with estimated costs and paybacks for almost any type of ECM project we wish to pursue.

### THE GRITS PARTNERSHIP

The partnership we formed with SEI reduced the price of access to GRITS as more of our members joined. MiAPPA's pooled funds have paid the cost of our members' subscriptions to GRITS over both of the past two years. Fifteen MiAPPA-EE



—Aaron Karp, Sustainable Endowments Institute

member institutions began using GRITS in our first year. In our second year, 25 of our 36 schools are now using the platform.

Based on our experience and success, we pushed for the use of GRITS across APPA. In particular, we emphasized the value of building a huge database of viewable project data. Following several discussions with APPA's leadership, a new partnership was formed in late 2015 that provided APPA members with basic access to GRITS for free. In late 2016, nearly 300 APPA-member institutions have signed up to use the platform, and the data in the library has continued to grow.

It is my hope that not only will all colleges and universities in APPA use GRITS, but that K-12 schools, also in need of support for their resource conservation projects, begin to use it as well. Because private engineering firms are so often relied upon to implement these projects at both K-12 schools and higher education organizations, we're beginning to reach out to these firms in Michigan and ask them to use GRITS to track and share this data.



## CONCLUSION

If colleges and universities across North America want to help lead the way to energy savings and environmental sustainability for others, we need to build the road map for them to follow. An engineering professor whose class I took years ago used to tell me, "If you can't put numbers to it, you don't know what you are talking about."

It follows that if we don't give others detailed and quantified information about the resource conservation work we are doing, they won't know what we are talking about either. Using GRITS is one good way to help us reach the goal of creating

a way forward for all of us.

APPA member institutions can sign up for free access to GRITS by visiting [www.appa.org/grits.cfm](http://www.appa.org/grits.cfm). §

Steve Hocquard is the associate vice president for planning and construction at Saginaw State Valley University, University Center, MI; he can be reached at [shoc@svsu.edu](mailto:shoc@svsu.edu). This is his first article for *Facilities Manager*.



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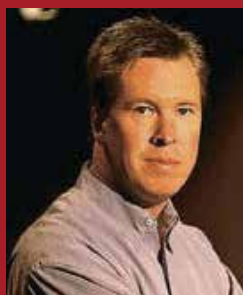
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### Opening Keynote Speaker

#### John Jenson - The Clarity Imperative



APPA/PCAPPA/BayAPPA are pleased to announce our opening keynote speaker, John Jenson, who will kick off three days of innovative programming this July in one of CNN's highest rated innovative cities—San Francisco, CA!

What makes a team, department, or organization stand out? Typically, it's things like clarity of purpose, a strong culture, and alignment around where the group is headed. As John Jenson points out, it's not about creating a mission statement or slogan, it's about getting real with who you are, identifying

the meaning in what you do, and ensuring that you can bring your strengths and values to bear in every situation.

John A. Jenson is an expert on how to present yourself and represent your organization at the highest possible level. He has helped thousands of professionals and has written five books on the subjects of change, perspective, and influence. John provides insight from his own experiences to show the importance of "consistent messaging." He emphasizes that organizations, such as past clients Target Corporation, Hunter Douglas, Verizon Wireless, Johns Manville, and Qwest Communications to name a few, prosper when there is a consistent understanding of "what we do," "our culture," and "our direction." John hones in on everyone's own purpose and meaning to the organization to highlight their strengths to bring out the best in them.

#### Innovative & Top Notch Breakout Programming

APPA/PCAPPA/BayAPPA 2017 had a record response to our call for programs. Here is just a sampling of what you will have to pick from July 21-23!

##### Remaking the Facilities Organization

- Big Data's Big Impact on Facilities Operations and Organizations
- Hiring to Transform Your Organization
- The Hidden Power of Lean

##### Future of Built Environment

- Creating a Dynamic Capital Construction Plan
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- Branching Out—Growing Employee Talent
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##### Space: The Ever Changing Frontier

- A Return to the Sandbox
- Road to a Sustainable Energy Supply
- Removing Academic Learning Silos

#### Innovations & Technology

- Components of an Intelligent Campus
- Driving Operational Intelligence with Data
- Technology: What Is Next and Are You Ready for It?

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## **PLUS BONUS PROGRAMMING**

### **Our Emerging Professionals Summit (EP Summit) and Senior Facilities Officers Summit (SFO Summit)**

**A**s 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 message specific to their needs as professionals, while offering critical topics for *cross-over* learning, as well.

#### **Emerging Professionals Summit (EP Summit) programming will touch on such topics as:**

**An 'Outward Mindset' Organization -** Incorporating research by the well-known Arbinger Institute and APPA's Thought Leaders outcomes, participants will develop best practices on supporting the academic community enhancing the cross-campus relationships and improving departmental motivation.

**Diversity and Inclusivity -** Participants will establish and discuss the differences of these realities. Develop best practices to utilize them in a proactive manner and see what can be done to create an inclusive work environment.

### **Senior Facilities Officers Summit (SFO Summit) & Emerging Professionals Summit (EP Summit) colleagues will explore 'cross-over' content such as:**

**BE YOUR BEST -** Our health and continued personal growth is critical to a strong team. If you are not at your best, how can you be your best for your colleagues? Participants will access tools and discuss how to utilize to set a personal and professional intention.

**We are your LEGACY -** Change is constant and a moving target like none other. Emerging Professionals Summit participants will develop for discussion innovative ideas about a new organizational structure for open discussion with the Senior Facilities Officers Summit participants. Establishment of true take-aways on how facilities management can best support the transitional success.

Seats are limited for both these pre-conference sessions that will be held July 20, 2017 from 8am - 5pm, and we encourage you to register early. As a reminder, your registration for either summit will also provide you full access to the APPA/PCAPPA/BayAPPA 2017 Annual Meeting and Exposition.

**A special thanks to CLUB CAR as the  
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### APPA's HALL OF RESOURCES

The APPA/PCAPPA/BayAPPA 2017 Annual Meeting & Exhibition will be held in San Francisco, California, with our hall of resources activities taking place at the Hilton San Francisco Union Square. It's a perfect location for programming, exhibiting, and networking with colleagues while reminiscing with old friends.

APPA/PCAPPA/BayAPPA's 2017 annual meeting and exhibition will be a fantastic event full of networking—this is where you need to be!

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# The Good News about LOTO

By Theodore J. Weidner, Ph.D., P.E., CEFP, AIA

**M**any facility officers may be unaware of OSHA standard 1910.147(c)(6)(i), which requires employers to “conduct a periodic inspection of the energy control procedure at least annually to ensure that the procedure and the requirements of this standard are being followed.” It seems to be saying simply that a facility organization must have an annual training refresher on the importance of **lockout/tagout (LOTO)**. Unfortunately, it’s not that easy.

The standard directs that any energy-using equipment has to be checked to make sure the people performing maintenance on that equipment know and can perform appropriate LOTO procedures, and can be observed doing so, on an annual basis. In other words, those servicing every piece of equipment that operates with energy (steam, electricity, fossil fuel, or potential energy) must be observed doing the LOTO procedures annually. On the surface, it appears that you must have an observer tag along during the annual preventative maintenance (PM) of every piece of equipment to make sure the mechanics de-energize the equipment correctly; and that even if there was no annual PM planned, it’s still necessary to go through the LOTO steps to make sure the equipment can be de-energized correctly!

A first glance at the rule makes it sound as if it’s necessary for those managing a facility with thousands of pieces of equipment to hire at least three or four people just to observe and document that the mechanics know how to turn it off correctly. Most managers can’t afford to perform even the necessary PM, and now the government is telling you that you have to use employee time to “play act” de-energizing equipment and not necessarily do anything to increase the life and/or reliability of the equipment.

## THERE ARE OPTIONS

However, a strict reading of the rule provides a number of options to reduce an initial overwhelming

regulatory mandate that does very little. It isn’t necessary to have an inspector observe every employee LOTO every piece of equipment safely and then file the paperwork. Here are some measures that can be taken to avoid that headache.

I’ll first assume there is a complete inventory of all equipment at the facility (I know, big assumption). The next assumption is that all like equipment (similar in function, size, and operation) is known. Third, all employees are similarly trained in LOTO



procedures and are available, at least once each year, to talk with the inspector about LOTO procedures in your facility. The last provision is the easiest, because it can happen in a relatively short time, at a single location, and is somewhat similar to a training session.

Next, let’s look at how to handle observing and documenting LOTO procedures for all equipment. Separate LOTO procedures for similar equipment, which utilize the same or similar types of control measures, can be grouped together and still comply with

the regulation. That is, if there are 100 air handlers, each equipped with similar devices to control energy flow, and the procedures for these similar units are the same, then the inspector may observe the LOTO procedures for 1 unit instead of 100 units. In addition, as mentioned above, a representative group of employees may be observed doing the LOTO procedures—every employee is not required to perform the LOTO procedures in front of the inspector.

#### THE GOOD NEWS

The good news is that it's not necessary to hire several inspectors just to document your employees performing the LOTO on each and every machine throughout the facility. However, there still has to be an annual demonstration of competence in LOTO procedures for all fundamentally different machines.

So, what do you do next to make sure you are compliant and not at risk for being fined by OSHA?

1. Make sure you know what equipment must have LOTO procedures in place for the safe maintenance of that equipment.

2. Refine the list of equipment so similar LOTO procedures are known.
3. Identify all the unique LOTO procedures and identify the employees who must be familiar with LOTO procedures to do their job safely.
4. Estimate the time for each LOTO procedure; the sum of the times for the list in No. 3 becomes the total time needed for the inspector to observe the minimum number of procedures annually to ensure compliance.

As each procedure is performed, the inspector observes and records compliance (use an easy form from [oshatraining.com](http://oshatraining.com)) to certify that the procedure was followed and is appropriate. §

Ted Weidner is an associate professor at Purdue University, West Lafayette, IN, and consults on facilities management issues primarily for educational organizations. He can be reached at [tjweidne@purdue.edu](mailto:tjweidne@purdue.edu).



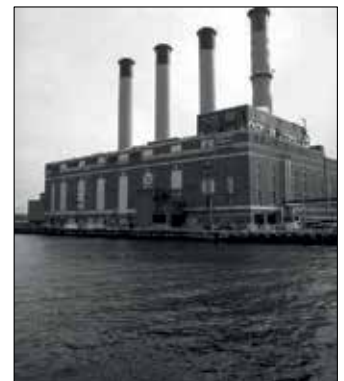
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By William A. Daigneau

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The reason why most management theories don't work is because they don't connect the dots. This book is an attempt to do so.



Bill Daigneau is a Colorado-based consultant and writer who retired in 2012 from the University of Texas MD Anderson Cancer Center in Houston, Texas, where he served as vice president and chief facilities officer. He is an APPA Fellow and a four-time recipient of APPA's Rex Dillow Award for Outstanding Article.



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# Props to the Unsung Heroes of Our Institutions

By Febin Bellamy, Georgetown University student

**W**hen I started attending Georgetown University in the fall of 2014, I had a rough transition, like many first-year students. I would often stay up until 3-4 a.m. in the business school, trying to catch up on homework and balancing a ton of extracurricular activities. During those late nights, I would often see the custodial staff walk through the empty hallways, take out the trash



in the bathrooms, vacuum the floors, and clean the offices and rooms that I used to study in.

Over time, I saw many of the other facilities staff who also play an important role in keeping our university running behind the scenes—each with their own personal story to tell. They include custodial, auxiliary, maintenance, and construction personnel, grounds maintenance crews, security guards, sanitation workers, and bus drivers, among others.

I made it a habit to always greet them if I passed them in the hallway. This included those who maintain the heating/cooling and electricity for every building on campus, as well as those who stay on campus for days during a snowstorm—away from

their families—just so that our streets are safe to walk on.

## A SHOW OF APPRECIATION

Oftentimes, students, alumni, and professors receive a lot of recognition and appreciation, but I saw that appreciation for the facilities staff, who play such a vital role at our universities, was not as forthcoming. Yet, the institution would not be operating without these unsung heroes.

As I continued to get to know the facilities staff at Georgetown, I started taking notes on our conversa-

**“Over 40 universities have reached out to start up their own chapters of Unsung Heroes!”**

tions. I wanted to give back somehow, and as I got to know them on a personal level, I thought about sharing their stories with the rest of the Georgetown community.

Throughout the year, I interviewed over 100 of these men and women, and learned about their amazing stories. Many of them shared their experiences immigrating to the United States in hopes of a better life and opportunity. When asked about their most memorable moment at Georgetown, many of them would say that it was the one time when a student bought them a cup of coffee as a token of appreciation, or thanked them after they had spent 10-11 hours in the freezing cold, shoveling snow and cleaning up the streets.

Most importantly, I tried to highlight the life moments that brought these facilities workers to the



campus in the first place, and to learn more about what motivates them to come to work each day. The reasons are many—from paying for a child’s tuition, to their love for students, and serving others.

### THE UNSUNG HEROES PROJECT IS BORN

From these efforts, Unsung Heroes [[www.unsung-hero.org](http://www.unsung-hero.org)] was born, promoting awareness and appreciation for the facilities staff on college campuses who keep their universities functioning behind the scenes, but are often unrecognized and unappreciated. Our goal is to break the ice by sharing their stories through photography, videography, and dialogue—in hopes of creating a stronger bond within the university community.

Also, by raising awareness and highlighting their dignity through their stories on social media, we encourage the community to give back to them in several ways, like service projects and crowd funding, which helps them to achieve their personal dreams. We aim to unify the campus community by inspiring others to get to know the individuals who play such an important—but often unknown—role in maintaining their institutions.

### MAKING A REAL IMPACT

Over time, we have found that this project has had an impact on our school and opened the door for communication, appreciation, and a glimpse into the human spirit.

- We have reached millions of viewers through our numerous press features, and are inspiring people around the world to acknowledge and appreciate the unsung heroes in their communities. Even a simple handshake or a thank you can go a long way.
- Over 40 universities have reached out to start up their own chapters of Unsung Heroes! They include the University of California Los Angeles, New York University, University of North Carolina Chapel Hill, University of Notre Dame, University of Maryland, Howard University, George Washington University, Columbia University, and Harvard University.
- Facilities staff are benefiting from the events and stories we share on our social media sites. Some say that they become like mini-celebrities after the story gets shared. People are starting to acknowledge them and thank them for their service to our communities. This kind of response is



An Unsung Heroes Appreciation Breakfast is well received and attended.



what really inspires me to keep on going with the project.

- In the process of featuring Umberto “Suru” Ripai, a food service worker who swipes our meal cards at the Georgetown Dining Hall, we learned that he hadn’t visited his home country, Sudan, in over 45 years. After students heard his story, we set up a GoFundMe account to pay for a round-trip ticket so he could see his family, and raised over \$5,400 in just a few days. This story has been shared over 1,000 times on Facebook and received over 1,500 “likes.” (<https://www.gofundme.com/Unsung-Heroes>)

The Unsung Heroes website is full of photos and testimonials attesting to the growth and warm reception this project has had.

### BREAKING BARRIERS AND MAKING CONNECTIONS

When we published our first posts on social media in April 2016, we received great feedback from students on campus who were thankful to us for raising awareness. Many of the students empathized with the stories, especially those about the men and



Founder Febin Bellamy (far left) joins students offering their thanks to the Unsung Heroes at Georgetown University.

women they interact with on a daily basis. Student groups began to reach out to us to request collaboration projects, and we received tons of positive emails and messages of support from students, parents, administrators, and alumni alike.

This approach allowed us to break the barrier between the worker and the student. It resonated with people by capturing the worker's humanity through a compelling photograph, or a quote about something that reflected who they are as individuals.

Regardless of skin color or socioeconomic background, people connect to stories. Even if we share a story with a person who doesn't have a similar background to the worker, we often still manage to strike an emotional chord by virtue of our shared humanity. 💡

Febin Bellamy is a business management student at Georgetown University in Washington, DC, and the founder of Unsung Heroes. He can be reached at [fjb35@georgetown.edu](mailto:fjb35@georgetown.edu), this is his first article for *Facilities Manager*. For more information about the Unsung Heroes Project, visit <https://www.facebook.com/unsung.heroes.organization>.

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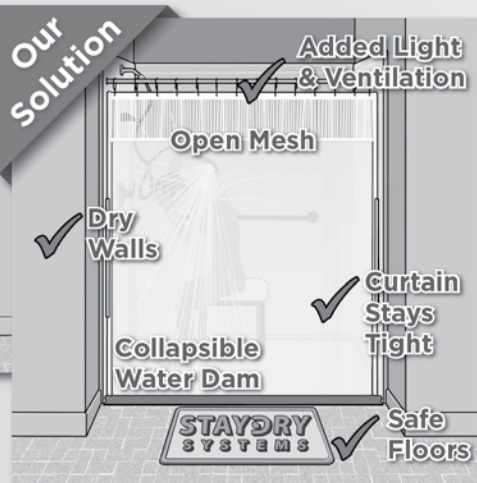
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# Outsource Contracting Skills Required

By Matt Adams, P.E.

**A**lthough outsource contracting skills may not be in the job descriptions for your department's management slots, it should be. Contracting is one more tool at the disposal of facility managers, and it is here to stay. The only unknown is how you apply it to your campus, but proactively is preferred. Not since the massive contracting of facility operations at Penn in the 1990s has contracting been given such attention. With large outsourcing contracts of various forms recently in the news for Texas A&M, Residence Life of the Georgia Board of Regents, and the State of Tennessee, many wonder what is on the horizon for higher education facilities contracting. With few exceptions, the facts associated with the contracting of facility services largely remain the same. However, the days when facility managers can make every attempt to avoid all forms of contracting are long gone.

## THE ARTFUL AND RESPECTFUL APPROACH TO SOURCING

Facility managers are continually called upon to be better business people, accountants, negotiators, communicators, and life coaches (yes, millennials have different needs). The technical requirements that allowed you to move up the organization's ladder quickly fade when you become a leader. With respect to "sourcing" (sometimes called "right sourcing" or traditionally called "outsourcing"), leaders of the next generation serve their institutions well when they are skilled sourcing managers.

Either extreme—100 percent outsourcing or zero percent outsourcing—has proven to be troublesome. So the hybrid is ideal for most, and the artful leaders who know what to "make" and what to "buy" in order to best serve the institution. But this is only half of the skillset. These new leaders must also learn how to effectively craft contracts with vendors. Simply offloading to the purchasing department won't suffice.



The new approach to working with contracted service providers is one of mutual respect. When properly pre-qualified, these firms are every much as professionally qualified as APPA professionals and when we treat them that way the business relationship has its best chance to thrive. This is not unlike the conversations we have at APPA events regarding culture. If we desire a transparent culture of communication and respect, this should be extended to our service providers and business partners. After all, it is likely that they will be working with our campus customers as much as we do.

## CONTRACTS A MUST

There are two basic types of contracts used in the industry and each has pros and cons. The first is the traditional **"fixed fee" contract**. For years, this has been considered the best contract format for less complicated service arrangements where cost savings is the priority. It absolutely requires careful pre-qualification of vendors. A less qualified vendor that under bids will create an unworkable situation for both.

On the contrary, a qualified firm with a high degree of communication and transparency can often save money while maintaining service levels. Rather than forcing the vendor to perform in a very precise

manner, the more modern approach is to specify the outcomes of the service. Measure what you receive and not how it is provided.

The other approach is the “**cost-plus**” contract. In this format the labor, material, and other costs are passed through the vendor at cost and reimbursed by the institution. The same accounting that would normally take place for an in-house operation is used for the costs and then the contractor proposes a fee or profit above that amount. Some feel that this approach discourages cost savings by design. However, it can be modified to allow for performance goals with fees placed at risk. In addition, the contract can offer shared savings arrangements for both parties that are achieved by the vendor. In both cases the success still depends on the posture of both parties.

Much has been reported recently about outsourcing contracts that provide an upfront cash payment to the customer. These contracts are complex and often rely on a variety of aggressive accounting practices by the vendors. Ultimately these contracts require that the vendor not only secure a cash flow that meets their profitability requirements but also one that provides enough cash flow (annuity) to convert to a present value amount.

In other words, this suggests that there is enough excess budget for both profit and an off-balance sheet loan to the institution paid off over the life of the contract. Some of this cash flow is realized by the distinctly different account practices of a private contractor versus a nonprofit educational institution, but not all. For most APPA members this is not a practical approach, despite the temptation of the upfront payment. Without sophisticated contract oversight, this contract is at its best on day one, when the big check passes hands. From there it can only get worse because it has become a lose-lose relationship.

#### **YOU WON'T BE THE ONLY CUSTOMER**

The contracting marketplace is very large and vendors have many potential customers. Understanding this, the APPA market should reflect on those attributes that it has that are of value to potential vendors. New leaders realize that the best vendors can pick and choose where they do business. Some benefits that our industry might offer or promote in solicitations are predictability/stability. Unlike some industries that have large economic swings we are relatively predictable. This is of value to vendors.

Furthermore, vendors communicate and have their own professional networks. We want our institution to have a reputation (culture) for fairness and equity.


There are always unforeseen situations and the expectation that our institution will work in partnership with vendors to solve problems is attractive.

From another standpoint is the accounts payable policy and procedures. Nothing reinforces the negative stereotype of our industry more than excessive aging of payables and reams of paperwork. Simple and fast payment will attract the finest vendors. The cost of not aging payables is not recognized by our institutions, in any case.

#### **SUCCESS VIA COMMUNICATION**

Many of the basic elements of success for contracted services are the same as for in-house departments. It's all about communication. Many of our peers have well run departments but have a negative customer satisfaction perception due to a flawed or inadequate culture and system of communication. David Edmondson, vice president of Southeast GCA Services, offered what he and his firm believe are the two most important elements of the contracting relationship.

- Provide as much valid information as possible in solicitations, including a candid evaluation of current service levels. Avoid trying to protect either feelings or organizational status. This includes what is being told (i.e., initial explanations, updates) to existing staff, if possible.
- Bring full participation to the contracting process continuously and do not leave it to subordinates. We find that over time, as the relationship evolves, clients tend to lose the desire to meet regularly for business reviews (we call them Joint Review Committee meetings—JRCs). In our minds, it is imperative that the client makes the commitment—from the very start—that they will remain engaged and participate in regularly scheduled reviews, throughout the life of a contract. If this occurs, communication remains open and issues will not be avoided and/or forgotten.

The contracting of services within our industry is here to stay. Striking effective win-win business arrangements is a highly desirable skill needed by facility managers in education for the foreseeable future. Become an expert and build a reputation for your institution as one that the best vendors will value. 

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Matt Adams is president of Adams FM<sup>2</sup>, Atlanta, GA. He can be reached at [matt@adamsfm2.com](mailto:matt@adamsfm2.com).



# Adding Real-World Numbers to the FPI Journey

By Ernest R. Hunter Sr., P.E., ACP, MOS (Master)

**T**hose of you who know me professionally know that I have been a fan of the APPA Facilities Performance Indicators (FPI) program since joining the University of Texas at Austin facilities management (FM) team in 1999. After 26 years as a naval officer managing facilities for the United States Navy, with access to a wealth of standards and written documentation for managing Navy facilities, it was a relief to learn that there was a keeper of a higher education FM body of knowledge in the form of APPA. I was particularly relieved to learn that a source of performance indicators populated with real-world data existed in the form of the APPA FPI Report.

Long after retiring from the Navy and from my position as physical plant director at the University of Texas at Austin, I remain an FPI fan and continue to use it when conducting FM assessments for colleges and universities. So I when I read Jim Cowell's article, "Cal Tech's FPI Journey" (*Facilities Manager* November/December 2016), I couldn't help but be pleased with the encouraging story about his institution's experience with the FPI and the compelling case he made for every institution in the country to participate.

## THE VIEW FROM 10,000 FEET

While it is not possible to improve upon Jim's article, I would like to give you a broader perspective as we climb to "10,000 feet" and look at the data for all of the FPI participating institutions as a whole, adding some real-world numbers to your knowledge base. We will pose some high-level questions and answer them using numbers from the currently published FPI Report.

Let's start by examining the FM budget for the 292

institutions that participated in the latest FPI Report. What is the average amount of funding expended at the institution (the FPI refers to this as the "Adjusted Gross Institutional Expenditure" or "GIE")? How much of the GIE is expended on operating and maintaining the facilities, excluding purchased utilities (Annual Facilities Operating Expenditure or AFOE)? What is the current replacement value (CRV) of the facilities being maintained by the facilities organization? What is the total number of gross square feet (GSF) of building space the facilities services organization is responsible for maintaining (Total GSF Maintained)? And what is the total number of gross square feet of buildings owned and rented (Total Building GSF Owned & Rented)? The answers for all the FPI participants and the average for a large variety of summary groups are at your fingertips within the FPI Report. Table 1 below, taken directly from the "Detailed Data Reports" area of the FPI, answers the above questions for the overall average for all participants.

While raw data as shown in Table 1 is useful to provide a perception of scale, more useful questions revolve around the APPA FPI "Ratios and Measures" section of the Detailed Reports, which contains the performance indicators. What is the ratio of funds expended on facilities operations and maintenance compared to the current replacement value (AFOE/CRV)? What is the ratio of funds expended on operations and maintenance compared to total operating funds expenditure by the institution (AFOE/GIE)? And what is the operating and maintenance cost per



Table 1.

Significant Supporting Data	Annual Fac Op Expnds (AFOE)	Adj Gross Institutional Expnds	Current Replmt Value	Total Bldg GSF-GSM Maintained	Total Bldg GSF-GSM Owned & Rented
Overall for All Participants	\$18,661,968	\$523,849,215	\$1,217,293,650	3,194,278	4,168,067

**Table 2.**

Ratios and Measures	AFOE/ CRV	AFOE/ GIE	AFOE/ GSF-GSM
Overall for All Participants	1.37%	5.80%	\$5.00

**Table 3.**

Significant Supporting Data	Engy Total GSF-GSM	Purch Utilities	MMBTUs
Overall for All Participants	3,143,243	\$7,345,825	489,613

**Table 4.**

Ratios and Measures	PU/ MMBTU	PU/ Engy Total GSF-GSM	PU/ Student FTE	Engy BTU/ Engy Total GSF-GSM	MMBTU/ Student FTE
Overall for All Participants	\$19.47	\$2.04	\$601.91	120,201	39.79

gross square feet (AFOE/GSF)? Table 2, from the FPI Report, answers all of the above questions and provides normalized data you can use to compare with that from your own institution.

Keep in mind that while in this article I am asking questions at the 10,000-foot level and providing answers that apply to overall averages of all participants, you can do the same for individual institutions and for virtually any summary group you wish to construct. Since I am not a celebrity and this is not a

TV commercial, I won't ask you "What's in your wallet?" but as an FM professional at your institution, it is probably wise for you to learn about your institution's AFOE/CRV, AFOE/GIE, and AFOE/GSF.

#### THE TIP OF THE ICEBERG

The above series of questions were chosen from only a single module of the FPI Report, for illustration purposes only. And they represent only the tip of the iceberg—there are an almost unlimited number of



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relevant questions you can answer with the FPI. The report contains 16 sections representing the core FM functions (Administration; Construction/Renovation/Architecture and Engineering; Custodial; Energy/Utilities; Landscape/Grounds; Maintenance) and other FM areas.

Since this issue of *Facilities Manager* highlights sustainability, let's ask a few questions from the report that relate to that subject. We all know that energy consumption is one of the key considerations in determining an institution's sustainability performance (the FPI "Energy/Utilities" section). So let's ask how many MMBTUs are consumed? How many GSF of space are being provided with energy and how much does it cost? The answers from the FPI Report are found in Table 3.

Having answered questions about energy to give you a perception of scale, let's now ask some questions that will allow you to see how your institution compares with the overall APPA FPI participant group. How many BTUs are consumed per gross square feet (BTU/GSF)? How many MMBTUs are consumed per student (MMBTU/Student FTE)? How much do purchase utilities cost per MMBTU (PU/MMBTU)? How much do purchase utilities cost per GSF (PU/GSF)? How much do purchase utilities cost per student full-time equivalent (PU/Student FTE)? The answers from the FPI Report are in Table 4.

Of the performance indicators referenced above, the two with the most implications for sustainability are BTU/GSF and MMBTU/Student FTE. Obviously if these two indicators are significantly higher for your institution than the average for appropriate summary groups, you would be wise to ask and answer additional questions that might contribute to energy consumption reduction and enhanced sustainability.

#### THE DESCENT TO GROUND LEVEL

In closing, using the FPI Report you can descend from 10,000 feet all the way down to ground level. You can ask and answer an almost inexhaustible number of pertinent FM questions about your institution, any other participating institutions, and

any summary subgroup you wish to construct. These answers will contribute significantly to your ability to add value to the FM operations at your institution. ☎

Ernest Hunter is president of Hunter Consulting and Training, Austin, TX. He can be reached at [ernesthunter@gmail.com](mailto:ernesthunter@gmail.com).

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# January 2017 APPA U in Dallas!


By Corey Newman

**A**PPA U recently wrapped up in Dallas, Texas, showcasing another successful professional development gathering of the Institute for Facilities Management and the Leadership Academy. Colleagues from around the globe were welcomed 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, Chris Smeds, Lynne Finn, and Don Guckert**; our Academy Faculty, **Glenn Smith, Michelle Frederick, Shawna Code, Lindsay Wagner, Matt Adams, Viron Lynch, Ana Thiemer, and Chuck Farnsworth**; and our Graduate Program instructors, **Chuck Scott and Jim Jackson**.

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

Approximately 450 facilities professionals from across the United States, Canada, and Mexico attended. We welcomed 79 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 2017 (including 87 new alumni).

A big kudos to all of those institutional leaders who supported the professional development of their staff! The professional development of any individuals must be as customizable as the individuals themselves, and APPA is here to help everyone achieve their personal, organizational, and institutional goals. Please visit <http://www.appa.org/training/trainingcalendar.cfm> 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](mailto:corey@appa.org).



<< ACADEMY GRADUATES

INSTITUTE GRADUATES >>



Photos by Rhonda Hole



## ACADEMY GRADUATES

*In alphabetical order; not all graduates are pictured.*

Christopher Adams, *Capstone Management*  
Lee Beard, *University of North Carolina at Charlotte*  
Pete Beaulieu, *Illinois State University*  
John Bernhards, *APPA*  
Dennis Coakley, *University of Vermont*  
Kirk Conger, *University of Nebraska—Lincoln*  
Danielle Cranston, *Virgin Islands Water and Power Authority*  
Chip Fehr, *University of North Carolina at Chapel Hill*  
John Fields, *East Carolina University*  
Kellie Fletcher, *Savannah State University*  
Brenda Flores, *California Baptist University*  
Jim Ganieany, *Illinois State University*  
Brett Garrett, *The Ohio State University*  
Maggie Hamilton, *Iowa State University*  
Rusty Hamilton, *San Diego State University*

Lilian Hamoush, *American University of Beirut*  
Luce Hillman, *University of Vermont*  
Thomas Hockensmith, *University of Maryland Baltimore*  
Michael Hodnefield, *University of Regina*  
Jeffrey Loss, *Bucknell University*  
Jeff Marcinkowski, *Grand Valley State University*  
Markus McEaddy, *American University*  
Angela Meyer, *Southeast Missouri State University*  
Angie Mitchell, *Southeast Missouri State University*  
Sandra Montgomery, *University of Michigan—Ann Arbor*  
Robert Ramirez, *Texas Woman's University*  
Kenneth Riebert, *University of Maryland College Park*  
Donia Schauble, *University of North Carolina at Charlotte*  
Joe'lle Webster, *Virgin Islands Water and Power Authority*

## INSTITUTE GRADUATES

*In alphabetical order; not all graduates are pictured.*

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Jeff Anderson, *University of Puget Sound*  
Mark Barcus, *University of Illinois at Urbana—Champaign*  
Sondia Barner, *Emory University*  
Erik Cagle, *Pennsylvania State University*  
Douglas Calder, *Fanshawe College*  
Mark Carmody, *Montgomery College*  
Christopher Cox, *University of Colorado Boulder*  
Robert Crowder, *Emory University*  
Lisa Curley, *Pennsylvania State University*  
Kendra Davis, *East Carolina University*  
Joe De La Rosa, *Pima Community College*  
Alvaro De Sousa, *California State University—East Bay*  
Steven DellaBetta, *University of Iowa*  
Debra Di Meo, *University of Texas at Austin*  
Raymond Doner, *University of Vermont*  
Michael Enos, *University of Vermont*  
Seth Gilmore, *Weber State University*  
Becky Guelig, *University of Wisconsin—Madison*  
Dustin Hill, *Miami University*  
William Jalbert, *Temple University/Housing*  
Garth Jones, *University of La Verne*  
Anthony Khalil, *Delta College*  
Rob Kleisinger, *University of Regina*  
Alice Maxwell, *University of Maryland Baltimore*  
Jonathan Meendering, *South Dakota State University*  
Constance Meyer, *University of Texas at Austin*  
Alexis Michaud, *University of Ottawa*  
Barry Mielke, *South Dakota State University*

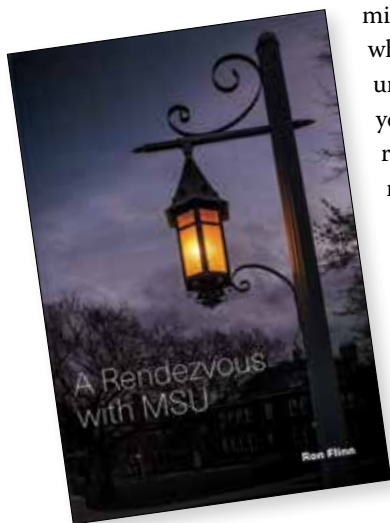
Aaron Minnis, *Michigan State University*  
Shirley Mitchell, *University of New Mexico*  
Jesus Ojeda, *Glendale Community College/Arizona*  
Paul Patterson, *University of Alabama in Huntsville*  
Kris Pruismann, *Iowa State University*  
John Reilly, *Michigan State University*  
Ken Revell, *Florida State University*  
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Steve Yeadon, *Reed College*

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

**H**igher education has a profound influence in the United States in the way it responds to and shapes the nation's needs. It responds to the demands of the populace for a variety of reasons. What drives the education industry and how it responds are presented in the two books reviewed in this issue.

### A RENDEZVOUS WITH MSU

Ron Flinn, Michigan State University Press, East Lansing, MI, 2016, 152 pp., hardcover, \$24.95.



Those working in higher education are familiar with long-term employees; it's a field where 40 years of service is rare but not unusual. Very few people spend over 50 years with an institution, particularly when rising to the top of the administration of a major public research institution. Fewer still write about what occurred over those 50-plus years. Fortunately, Ron Flinn fits into the category of attending, working, and rising through the ranks, as well as writing about the physical growth of Michigan State University. It is a firsthand account of the growth of higher education facilities, which has been more broadly described in the works of Harvey Kaiser.

Beginning in 1855, Michigan Agricultural College became the first land-grant institution following the passage of the Morrill Act of 1862. MSU developed gradually over 100 years, as it served the residents of the state and others. By 1957, when the author arrived on campus, Michigan State College had become Michigan State University (formally the Michigan State University of Agriculture and Applied

Science). *A Rendezvous with MSU* covers one-third of the physical development of the MSU campus. It was, and remains, a dynamic institution.

A past APPA President and long-time APPA member, Flinn chronicles the physical growth and operating challenges of a major research university under the leadership of John A. Hannah, and as it continued with subsequent campus leaders. The challenges of budget, temporary facilities, utilities, energy efficiency, staffing, and minorities are just some of the topics covered and described from a personal perspective. He also chronicles his relationships with a wide range of colleagues at the campus, including faculty, staff, neighbors, and business people: who succeeded, who struggled, who behaved well, and who suffered from poor treatment. These stories make the book memorable and help avoid an otherwise dry listing of buildings and dates.

*Rendezvous* may initially have limited appeal to people unrelated to MSU. If so, it will be their loss. While specifically written about a single campus, *Rendezvous* presents many stories familiar to facility officers and describes the human/humanitarian elements of the job and campus life.

### THE RACE BETWEEN EDUCATION AND TECHNOLOGY

Claudia Goldin and Lawrence F. Katz, Harvard University Press, Cambridge, MA, 2008, 496 pp., hardcover, softcover, e-book, from \$9.

Nearly every facility manager struggles with the changing demands of the primary organization (the customers) and the tools needed to support the facility operation and primary organization. In 1975, Gordon Moore predicted the doubling of computing power every year or so, which still seems to be holding true.

That often means that as soon as a new PC is installed and working smoothly, it is already out of date. Nevertheless, we have come to rely on this increase in computing power to increase our overall productivity.


Those same facility managers struggle with the expectation for productivity increases (or at least value

increases). The construction industry has the same problems; productivity in construction has changed little. The gap between overall productivity increases and those of the facility industry simply increases pressure on facility managers to “do more with less.” As we attempt to find ways to increase productivity and value, we must also understand some of the root causes of this situation.

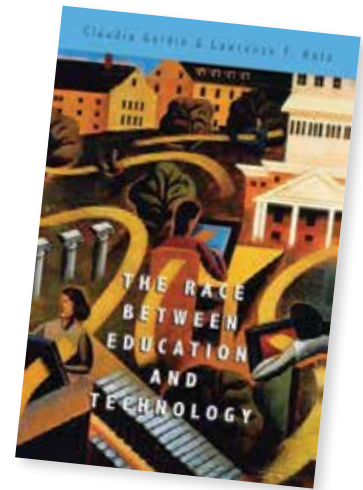
One element contributing to those root causes is described in *The Race between Education and Technology*. The authors develop their analysis from data beginning in colonial times by considering societal expectations for minimum educational attainment to be employed in a job that puts one in the middle class. In a preindustrial, agrarian society, elementary education was considered sufficient. The United States was unique in its provision of free elementary education to residents, which powered its advances in economic strength prior to World War I. As the country made greater economic advances, society demanded secondary education to achieve or maintain a position in the middle class.

Similarly, although further propelled by the GI Bill of 1944, society began to expect (at least some) postsecondary education as a requirement for personal economic advancement. The increasing demand for postsecondary education was reflected in the rapid increase in facilities to serve that demand, as documented by Harvey Kaiser and others. Now, we also see a political compulsion for completion of postsecondary education (BA/BS) and some interest in postgraduate attainment to maintain a position in the middle class. What will this mean for education facility managers? Barring the discussion about “free higher education,” will there be more facilities to construct and maintain, or will other solutions be found? This question is unanswered.

As mentioned above, *The Race* is an in-depth study about education in the United States. It is not a soft or quick read; it is a significant research effort that looks at the economic ties between the U.S. education system and its societal drivers. It may not be appropriate for the majority of readers here, but those who are interested in the subject, or those who want to see how researchers tackle data, should find it very interesting.

Predicting the future of higher education facilities from this or any economic study is difficult. But it is useful to understand how we got here, and some of the expectations society places on the education industry—of which facility managers are an integral part. 

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](mailto:tjweidne@purdue.edu). If you would like to write a book review, please contact Ted directly.



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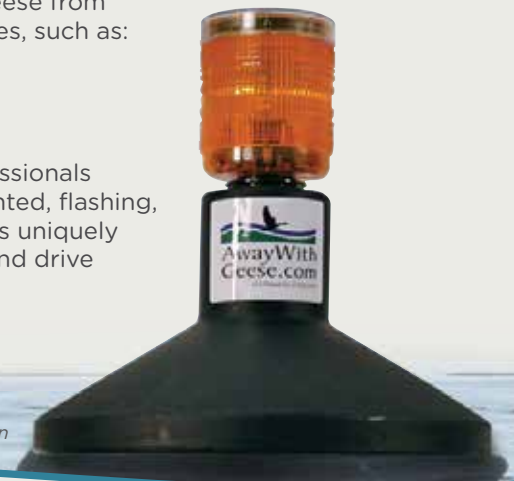
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**ATLAS COPCO'S** LF forward plate compactors excel in soil compacting and asphalt patching applications due to productivity-enhancing features. Integrated water distribution systems and vibration-reduction handles help operators achieve maximum efficiency, while their lightweight bodies contribute to high maneuverability. The three models—LF60, LF75, and LF100 — feature vibration-reduction handles and are lightweight, optimizing ease of operation on soil and asphalt applications. The units' rounded-plate design, along with a tubeless watering system, helps prevent asphalt from sticking to the bottom of the plate. For greater detail on all Atlas Copco products visit [www.atlascopco.us](http://www.atlascopco.us).



**JOHNSON CONTROLS** announces two platforms of high-efficiency chillers available with low GWP (global warming potential) options. Extending its portfolio of YORK chillers to include two key product families that use the refrigerant alternative R-513A—the YORK YVWA water-cooled screw chiller and the YORK YMC2 magnetic bearing water-cooled centrifugal chiller. The offering covers a broad range, from 433 to 1,055 kW (120 to 1,000 tons) for water-cooled applications. This represents Johnson Controls' continued commitment to choose solutions that will best meet the needs of its customers and the environment based on safety, efficiency, reliability, availability, and cost. For more information on Johnson Controls products visit [www.johnsoncontrols.com](http://www.johnsoncontrols.com).



**DUR-A-FLEX, INC.**, a manufacturer of commercial, industrial, and institutional resinous floor and wall systems, has expanded its Accelera Fast-Track Flooring family of fast-curing, low-odor products with the introduction of Accelera EXT. This unique formulation offers all the benefits of the popular Accelera product line with the added benefit of an extended working time. With a working time of up to



50 percent more than the standard formulation, maintaining a longer wet-edge during the installation now makes large-square-footage projects feasible without added staffing. The increased working time of Accelera EXT now gives applicators more time to pour, spread, roll, and broadcast—reducing the amount of hands needed on a big project. Like all Accelera products, Accelera EXT is supplied in premeasured mix-in-pail kits consisting of a resin and hardener. For additional information on Dur-A-Flex visit [www.dur-a-flex.com](http://www.dur-a-flex.com).

**CHEMTRONICS**, a supplier of cleaners, coatings, and electronic rework tools, has introduced Tri-V High Performance Solvents




to replace toxic chemicals like n-propyl bromide (nPB) and trichloroethylene (TCE). These solvents offer safer solutions without sacrificing cleaning performance and increasing cost. Tri-V is nonflammable, can be used on energized equipment, penetrates to clean hard-to-reach areas, evaporates quickly, and leaves no residues. Aerosol and

bulk packaging is available for benchtop cleaning, immersion cleaning, or in a vapor degreaser. Tri-V is stabilized and safe for metals such as aluminum, magnesium, titanium, and brass. For further information on Chemtronics visit [www.chemtronics.com](http://www.chemtronics.com).

**TRIMBLE** introduces its Telog 41 Series of wireless, battery-powered sensors for water monitoring applications. These new Internet of Things (IoT) sensors use innovative, low-power, long-range (LoRa technology) wireless communications to remotely measure and monitor water, wastewater, and groundwater systems including water pressures, flows, levels, and rainfall



volumes. As part of a smart water infrastructure, the Telog 41 wireless sensors work in combination with Telog cloud-hosted and on-premises software to allow utilities to more easily and economically deploy wireless monitoring. The sensors extend across a utility's existing monitoring programs for better tracking, measurement, and reporting of water usage, combined- and sanitary-sewer overflows (CSO/SSO), and flooding, leakage, and non-revenue water (NRW). For more information on Trimble visit [www.TrimbleWater.com](http://www.TrimbleWater.com). 

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