

FMJ



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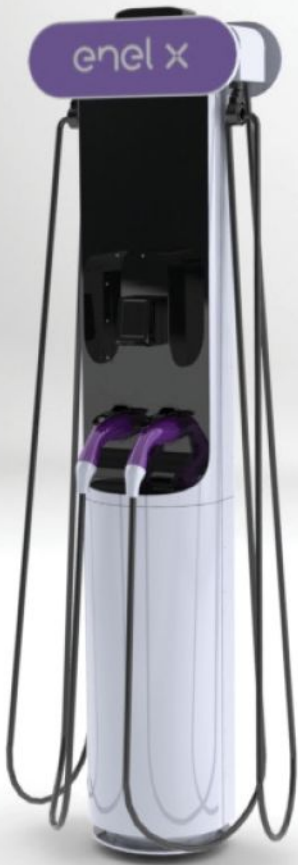
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Right sizing waste

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ABOUT IFMA IFMA is the world's largest and most widely recognized international association for facility management professionals, supporting 24,000 members in more than 100 countries. This diverse membership participates in focused component groups equipped to address their unique situations by region (136 chapters), industry (16 councils) and areas of interest (six communities). Together they manage more than 78 billion square feet of property and annually purchase more than US\$526 billion in products and services. Formed in 1980, IFMA certifies professionals in facility management, conducts research, provides educational programs and produces World Workplace, the world's largest series of facility management conferences and expositions. For more information, visit www.ifma.org.

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PROBLEMS ARE INEVITABLE.

DISASTER ISN'T.

Jesús is a maintenance technician at a sprawling railroad fueling facility in New Mexico. Given the site's size and complexity, the team there regularly trains for the unexpected.

This preparation was recently put to the test when the facility lost power during a late-night storm—a potentially crippling blow to a high-stakes 24/7 operation. Always on call, Jesús rushed to the site from his home, quickly assessed the situation, and applied his technical know-how to restore power to the facility and reactivate its fuel pump system. He then stayed onsite well beyond the immediate emergency to make sure everything was running properly.

Who takes care of your facility?

Online

ON THE GO?

FMJ can be viewed on your mobile device, so you can get your FM content fix anywhere, anytime.

FMJ Extras

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IN CASE YOU MISSED IT ...

The July/August 2019 issue of FMJ focused on workplace design. Our most-read article was “Opening Minds to Open Space Concepts” by Jo Sutherland. Learn more about how open space concepts change employee experiences as well as the physical and virtual infrastructure. <http://bit.ly/2KNIXAW>



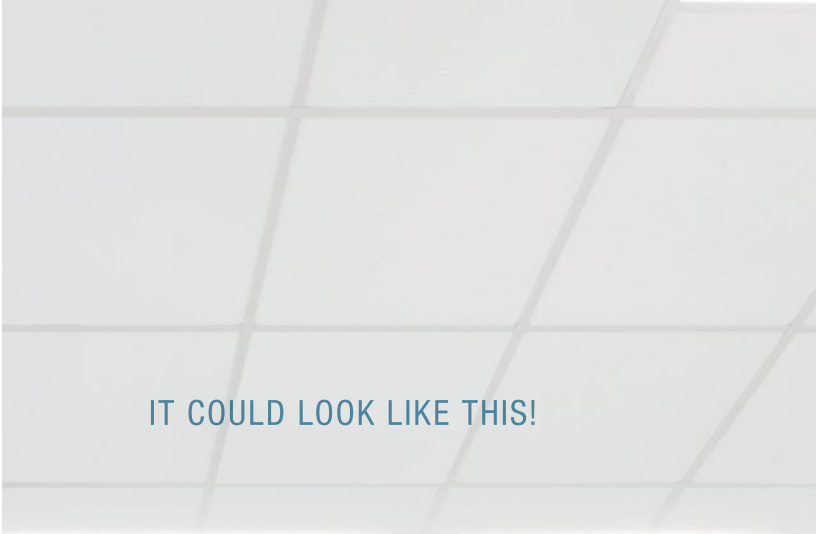
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Editor's Note Bobby Vasquez

Do you remember who gave you the best piece of advice you've ever received? What did it change? Did it give you the courage to tackle the challenge ahead of you or the courage to walk away for the greater good?

So much happens when we engage each other. Reaching out to someone as a relative, friend or coworker can change their day, their outlook or even their life. That's what makes opportunities like the ones at World Workplace 2019 so exciting.

As the community gathers in Phoenix, Arizona, USA, opportunities for FMs of all experience levels and backgrounds will emerge. It's the opportunity to share what works and what doesn't. It's a chance to reminisce about the days before IoT and look forward to how IoT is changing the world in ways we could not have imagined back then.

After the last flights leave Phoenix and we return to our regular workplaces, what information did you learn that you will use to improve your facility? What information did you share with a fellow FM professional who sought insight into a challenge you've encountered before?

Your FMJ is written by workplace professionals, by workplace professionals and we take great pride in that. We're engaging with you to do more. We want more from you. We're curious ... What is the biggest challenge your facility has faced and how did you and your team solve it?

And while we're at it, tell us about you and your facility. We focus so much on the major triumphs and challenges, but what about the every day nuances that make your facility unique? What sets your facility or campus or portfolio apart from others? How do you or your team orbit around the building envelope to create the best possible space for your tenants?

We want to hear from you. Send your responses to fmj@ifma.org and we'll feature some of them in upcoming issues of FMJ. Don't worry about penning the next great novel. Just remember, you never know who's job you make easier by sharing what you know.

We're looking forward to reading YOUR stories.

Cheers!

Interested in writing for FMJ?
Email bobby.vasquez@ifma.org article ideas to be considered for future issues of FMJ.

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**JOHN
CARRILLO**
CFM, IFMA
FELLOW

*Chair, Board of
Directors*

From the **Chair**

In the last issue of FMJ, I mentioned that our industry is changing and we must prepare ourselves for the future. The top trends impacting facility management include: The effects of digital technology on our FM systems and built environment tools; workforce productivity with integration of HR factors and social connectivity; the aging FM workforce and integration of an upcoming diverse and millennial workforce; and the need to continue engaging global partners to provide the best value proposition of FM work content, education/training and networking opportunities to our members.

During the July meeting of IFMA's global board of directors in Houston, Texas, USA, our new directors agreed that we must "change the FM conversation." Consistent with the association's strategy to provide long-term stakeholder value, we have created a focus on five strategic themes for 2019-2020 that tie into our vision, mission and credo.

1. Membership growth and retention stability:

Board and staff members are collaborating with IFMA components – chapters, communities and councils – to share best practices, improve membership retention, significantly increase membership and market/promote our content value proposition to the FM community.

2. Expand professional development globally:

Continue growth of the CFM®, FMP®, SFP® and Essentials of FM programs. We will be translating some of our professional development programs into Chinese, Spanish and Portuguese. Efforts are underway to grow our educational offerings on new/trending and technology topics, offering corporate training/educational platforms.

3. Expand global awareness of the World Workplace brand:

The development of a global marketing/communications strategy plan is underway. We will continue to increase our partnerships with other international FM associations on educational/training content and networking opportunities. IFMA plans to offer three World Workplace brands this year: World Workplace – The America's, World Workplace –Europe/Middle East/Africa (EMEA), and World Workplace – Asia-Pacific. IFMA continues to seek out like-minded organizations and vertical markets to grow exhibitor and attendee participation at our three marquee events.

4. Become a global voice on the future of innovation, technology and sustainability:

Continue to enhance benchmark and built environment technology publications and interactive summits. Collaborate and create global partnership platforms of industry standards, sustainability and technology offerings.

5. Enhance marketing and communications efforts:

Engage stakeholders and strategic partners in defining future trends in the FM industry. Evaluate web-based platforms to enhance socialization tools and collaboration throughout the industry. Develop a marketing/communication strategy plan to be rolled out by World Workplace 2019.

Attaining these goals will require an all-hands-on-deck approach as we lay the groundwork not only for the future of IFMA, but for future FMs as well. Our accomplishments will not be completed overnight, and their effect will not be felt immediately. However, through our collaborative efforts, they will sustain our industry and organization for generations.

IFMA Membership enables, empowers and equips FMs to solve today's workplace challenges.



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Gain field-tested strategies for elevating facility performance



Keep pace with cutting-edge FM best practices

Find out which membership benefits will take you, your team and your organization to the heights of FM success.

“

IFMA is a true asset for FMs worldwide. I find value in the networking and plethora of resources that help me find solutions to the FM challenges I face. It's comforting to know that the FM professionals I meet through IFMA are international peers and help me find solutions, improve processes, decrease operational expenses, improve health and safety and overall maximize your facilities' potentials. I find IFMA to be a “must” for any FM out there.

Carlos Rodríguez

*Santo Domingo, Dominican Republic
IFMA Member since 2016*

Learn more at

www.ifma.org/membership/membership-benefits.



World Workplace® Europe returns to Amsterdam in 2020



IFMA and its alliance partner Facility Management Netherlands (FMN), the Dutch professional association for the facility sector, have announced that next year's World

Workplace® Europe will again be held at the Kromhouthal in Amsterdam, 18 to 20 March 2020. Each association brings a unique approach and level of expertise to the event program, creating a valuable educational and networking experience specifically geared toward facility management in Europe.

The 2019 event was a milestone for IFMA and FMN in Europe, and the atmosphere in the Kromhouthal was exhilarating. Once a manufacturing facility for large marine engines, the Kromhouthal is now a leading destination for a range of events in Amsterdam.

"The success of this year's event benefitted our members and helped leverage our profession in Europe," said Jos Duchamps, chair of IFMA's European Advisory Board and member of IFMA's global board of directors. "IFMA's global perspective and FMN's connection to local professionals is an extraordinary mix that will stimulate FM professionals to discuss, learn, interact and share experiences in 2020."

World Workplace Europe is the gold standard for discovering new ideas and technologies impacting the European FM industry. Educational sessions will be categorized under topic tracks, including Research and Development, Business and Education. Sessions will be relevant to all facility professionals, and each participant can personalize a learning agenda based on individual concerns, needs and interests.

"I am proud that IFMA and FMN will continue their cooperation to create again an innovative and exclusive event for the strategic playing field of the FM industry. With inspiring keynotes and several social events, we not only organize an event, but also give the opportunity to accelerate personal growth," said Natalie Hofman, chair of FMN.

Visit worldworkplaceeurope.ifma.org

IFMA's Engage celebrates 2 years as top knowledge-sharing resource

Introduced in 2017, IFMA's online Engage platform allows members to benefit from the expertise and insights of colleagues, share best practices, comment on industry trends and access resources to address real-world challenges that facility professionals face every day. Join the conversation at engage.ifma.org.

SINCE ITS LAUNCH:

- » New threads created: **1,839**
- » Total discussion posts: **7,891**
(includes new threads)
- » Unique logins: **15,766**
- » Total logins: **93,362**

TOP DISCUSSION POSTS:

- » Introduce yourself – **393 replies**
- » Add, move and change policy – **173 replies**
- » Sit/stand desks for everyone? – **89 replies**

TOP LIBRARY RESOURCES:

- » Strategic Facility Planning (SFP) – **283 downloads**
- » Facility Condition Assessment – **221 downloads**
- » How does your salary compare to other FMs – **180 downloads**

IFMA's FM Research and Benchmarking Institute (RBI) presents monthly webinars that cover the most-discussed Engage topics.

Attend live, receive the recording or download later from IFMA's Knowledge Library.
Visit research.ifma.org/webinars

UPCOMING EVENTS



World Workplace 2019 Conference & Expo

Oct. 16-18
Phoenix, Arizona, USA
worldworkplace.ifma.org



World Workplace Europe 2020

March 18-20, 2020
Amsterdam, The Netherlands
worldworkplaceeurope.ifma.org



IFMA's Facility Fusion 2020 Conference and Expo

April 14-16, 2020
San Francisco, California, USA
facilityfusion.ifma.org

U.S. transportation secretary announces US\$495 million in infrastructure grants to 327 airports

In June, U.S. Department of Transportation Secretary Elaine L. Chao announced the Federal Aviation Administration (FAA) will award US\$495 million in airport infrastructure grants, the second allotment of the total US\$3.18 billion in Airport Improvement Program funding for airports across the United States.

A total of 358 grants will be awarded to 327 airports in 46 states and the Pacific Islands. Selected projects include runway reconstruction and rehabilitation, construction of firefighting facilities, and the maintenance of taxiways, aprons and terminals. The construction and equipment supported by this funding increase the airports' safety, emergency response capabilities, and capacity, and could support further economic growth and development within each airport's region. According to the FAA's most recent economic analysis, U.S. civil aviation accounts for US\$1.6 trillion in total economic activity and supports nearly 11 million jobs.

AI IS A PRIORITY FOR ORGANIZATIONS, BUT FEW HAVE IMPLEMENTED AN ENTERPRISE-WIDE STRATEGY

A recent International Data Corporation (IDC) survey of global organizations that are already using artificial intelligence (AI) solutions found only 25 percent have developed an enterprise-wide AI strategy. At the same time, half the organizations surveyed see AI as a priority, and two thirds are emphasizing an "AI-first" culture.

IDC surveyed 2,473 organizations globally that are using AI solutions in their operations – either developing them in-house, using commercially available off-the-shelf products or a combination of both – finding that the primary drivers behind implementing AI initiatives were to improve productivity, business agility and customer satisfaction via automation, plus faster time to market with new products and services. The main factors holding back the implementation of AI technology include the cost of AI solutions, a lack of skilled personnel and bias in the data.

Other key findings from the survey:

More than 60 percent of organizations reported changes in their business models associated with their AI adoption.

IT operations is the number-one business area for employing AI, followed closely by customer service and fraud/risk management.

Nearly 50 percent of organizations reported having a formalized framework to encourage considerations of ethical use, potential bias risks and trust implications. Close to 25 percent have established a senior management position to ensure adherence.

Most organizations reported some failures among their AI projects, with a quarter reporting up to 50 percent failure rate. Lack of skilled staff and unrealistic expectations were identified as the top reasons for failure.

Advanced energy design guide demonstrates that zero-energy office buildings are attainable

Developed by ASHRAE, the American Institute of Architects, the Illuminating Engineering Society and the U.S. Green Building Council, with funding from the U.S. Department of Energy through the National Renewable Energy Laboratory, the "Advanced Energy Design Guide for Small to Medium Office Buildings: Achieving Zero Energy," provides direction for designing and constructing zero-energy office buildings in all climate zones.

Focusing on buildings that are ready to accept renewable energy systems to meet low-energy loads, the guide offers user-friendly directions for the design/construction of new, low-energy, small-to medium-size office buildings, as well as retrofits of existing buildings, depending on the depth and breadth of the retrofit. Strategies for reaching zero, including energy-efficient targets and how-to recommendations are also presented.

"This guide provides a pathway to zero energy and presents design teams with strategies for achieving energy savings goals that are financially feasible, operationally workable and readily achievable," said Paul Torcellini, project committee chair.

Achieving zero energy is defined as a building that, on an annual basis, produces as much renewable energy on site as it consumes. Presenting practical advice for owners and designers to successfully achieve a zero-energy building, the guide covers:

- » Specific energy targets for office buildings by climate zone
- » Recommendations for conceptual phase building planning and siting
- » Plug load control and management plans to reduce energy consumption
- » Recommendations on lighting configurations
- » Sizing and designing HVAC systems to achieve maximum energy savings
- » Strategies for the effective use of roof space
- » How to use energy efficiency as a strategy for resiliency and grid alignment

Download the guide for free at www.ashrae.org/freeaedg.

MOST EMPLOYEES PREFER TO SPEND SOME TIME IN AN OFFICE OVER BEING FULLY REMOTE

The traditional office is not dead, despite the rise of remote working. That's according to a Clutch survey of 503 full-time employees across the U.S., which found that employees still value working in an office, even if they have the option to work remotely.

Gauging what employees want and value in an office space, the survey found 83 percent of employees want to spend some of their working time in an office. In-office work helps employees collaborate with coworkers and feel included in the company's culture. But despite an increasing trend toward open floor plans, more than half say they prefer a private office over an open floor plan or cubicle.

"The trend toward open offices continues and is in high demand in spite of employee objections," said Bethany Babcock, owner of Foresite Commercial Real Estate in Texas. "The most common complaint from open office users is frequent interruptions. If a person is in a position that requires focus, it can be irritating and counterproductive."

Michael Arnold, a certified speaker, coach and trainer, works in a cubicle office. "We are supposed to be able to collaborate, but there is no privacy, so everyone wears headphones and no one talks," Arnold said. "Everyone can see anything I bring up on my dual monitors. My current layout has reduced my creativity, privacy and ability to effectively work."

The average worker needs to accomplish tasks that are both individual and collaborative, and offices should cater to those needs. The Clutch report suggests that businesses should create multiple types of places to work, accommodating employees who need to get work done quietly and those who need to interact. Businesses with an open floor plan should designate space in the office for one-on-one meetings, individual work or phone calls.

Surveyed employees reported that 74 percent of their offices have personal spaces for employees, 56 percent have large meeting rooms, 53 percent have small collaborative spaces, 51 percent have lounges or break rooms, and 41 percent have quiet spaces.

Employees value coming to work to a space that's "theirs." Nearly all surveyed employees (98 percent) have an assigned space at their workplace, be it a desk, private office or cubicle. "The value is in having something that's your own," said Commercial Real Estate Broker Steamer Pease. "Space [to] 'zen' out into [your] work."

Clutch is a B2B ratings and reviews firm based in Washington, D.C., USA. Read their full report here:

clutch.co/real-estate/resources/what-employees-want-office-space

IFMA, ISSA look forward to continuing partnership following successful Canada event

Joining ISSA, the worldwide cleaning association, and MediaEdge Communications to support the debut of ISSA Show Canada this past June, IFMA anticipates co-hosting the trade show and conference in Canada again next year.

Held concurrently with the REMI Show at the Metro Toronto Convention Centre, ISSA Show Canada welcomed more than 1,000 guests on the trade show floor and offered a variety of speakers and educational sessions covering topics such as infection control, culture change and leadership, business growth and evolution, and green building and sustainable practices.

"IFMA appreciates the importance of interorganizational cooperation to meet

the increasing challenges of the smart building revolution," said John Carrillo, CFM, IFMA Fellow, Chair of IFMA's Global Board of Directors. "It takes a team of uniquely skilled individuals to provide seamless support of the entire built environment landscape. We're excited to work with ISSA again to bring these skilled individuals together for the benefit of cleaner, greener and more energy-efficient facilities."

Supporting IFMA's critical goal of unifying the global built environment industry and furthering ISSA's commitment to promote cleaning as an investment in human health, the environment and an improved bottom line, ISSA Show Canada is an extension

of the associations' shared mandates for strategic growth.

"By partnering with the REMI Network and IFMA, we have taken this trade event to the next level and are making great strides in our efforts of uniting the industry," said ISSA Canada Executive Director Mike Nosko. "We look forward to organizing an even bigger and better trade event in 2020."

Have relevant FM industry news to share?

Submit your news to be considered for inclusion in the Industry News section of the next issue of FMJ. Send us an email at communications@ifma.org

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Building Value

How FM Standards Pave the way to a Sustainable Future

BY LAVERNE DECKERT AND CASEY MARTIN

Although the theme of this FMJ issue is focused on sustainability, meaning “green” initiatives, this article will take a slightly different approach to the term sustainability. We want to consider the impact FM standards have in sustaining an organization.

First, let’s level-set our understanding with some terminology that is key to understanding the role of standards in building a sustainable future for the FM industry:

CONTINUITY:

1. the unbroken and consistent existence or operation of something over a period of time.
2. a state of stability and the absence of disruption.
3. a connection or line of development with no sharp breaks.

FACILITY MANAGEMENT:

Organizational function which integrates people, place and process within the built environment with the purpose of improving the quality of life of people and the productivity of the core business.^[1]

RESILIENCE:

Adaptive capacity of an organization in a complex and changing environment.^[2]

STANDARD:

A document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose.

TO SUSTAIN:

1. cause to continue or be prolonged for an extended period or without interruption.
2. strengthen or support physically or mentally.
3. uphold, affirm, or confirm the justice or validity of.

SUSTAINABILITY:

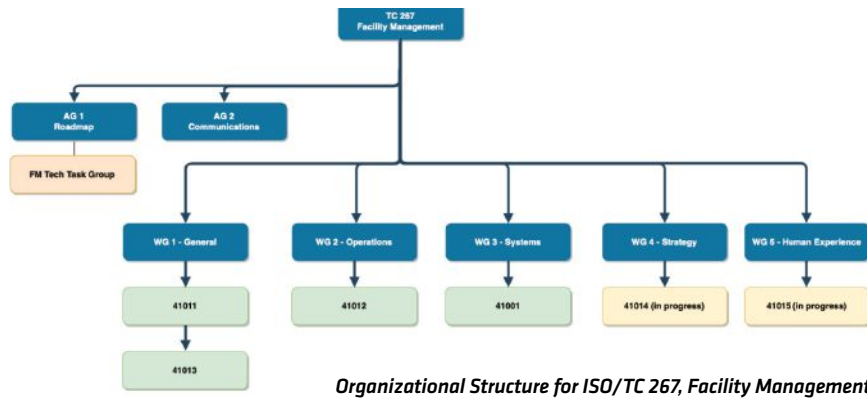
1. the ability to be maintained at a certain rate or level.
2. meeting the needs of the present without compromising the ability of future generations to meet their needs.

Facility managers are responsible for developing policies, processes and procedure to support the productivity of the core business of the demand organization^[3] regardless of the industry sector. It is no secret that FM requires a broad spectrum of expertise to be successful. Common areas of expertise include asset management, business acumen, risk management, energy and environmental management and more.

However, in an ever increasingly global world, the practices and understanding of FM are advancing at disparate rates within different markets. Added to that, more than half of today’s FM practitioners are expected to retire over the next 5-15 years. A 2017 joint industry report from IFMA and RICS states, “A shortage of skilled Facility Management talent is the most significant challenge identified by both the survey respondents and the executives who were interviewed directly. Facility Management is not attracting enough new talent to replace its retiring professionals.”^[4] This impending exodus of experienced FM practitioners will also result in the loss of knowledge of proven practices in the profession.

The standards being developed by the International Organization for Standardization’s technical committee for facility management (ISO/TC 267, Facility management) provide a common foundation for the FM discipline to sustain a uniform definition and scope of FM service delivery across international boundaries, global cultures and markets and a multigenerational workforce. With an established baseline for the FM discipline and FM practices, “a state of stability” from which service delivery and processes can be assessed and measured can be realized.

To date, ISO/TC 267 has three published standards, including ISO 41001, Facility management — Management systems — Requirements with guidance for use. This achievement is significant as these standards will represent how the FM profession and practices will be presented, communicated and understood in a consistent manner.



The work of ISO/TC 267 is summarized below:

PUBLISHED:

ISO 41011:2017 Facility management – Vocabulary brings a common understanding to FM terminology.

ISO 41012:2017 Facility management – Guidance on strategic sourcing and the development of agreements is aimed at ensuring that the important aspects of establishing long-term and sustainable working relationships between businesses partners are robust and fully considered at the outset.

ISO/TR 41013:2017 Facility management – Scope, key concepts, and benefits provides an introduction and awareness of some of the many benefits and influences that a structured, FM approach will bring to the demand organization. At the same time, it provides an insight for those individuals who may be considering a career in FM.

ISO 41001:2018 Facility management – Management systems – Requirements with guidance for use enables organizations to organizations will be able to certify their FM systems against an internationally recognized standard much like ISO 9001. ISO 41001 encompasses the management of the activities and how they should be structured and enabled to achieve optimum efficiency, effectiveness and value.

IN PROGRESS:

FM Task Group (FMTTG) has a mandate to develop a recommendation and road map to understand technology solutions to modern FM challenges by exploring the issue of FM and technology, defining the many aspects of technology in relation to FM, and developing a recommendation for a way forward to navigate this domain.


ISO/AWI 41014, Facility management – Development of facility management strategy will be a valuable tool for identifying those areas of alignment and developing policies and processes to incorporate them into the daily routines of the workplace environment. The standard will outline the ways in which facility managers can significantly influence the main decision makers of their demand organizations and can establish communication with them regarding the role of FM in the long term.

ISO/AWI 41015, Facility management – Influencing behaviors for improved facility outcomes and user experience will pave the way for aligning organizational culture and occupant stakeholder/behavior with FM practices to support the corporate mission, achieve better facility outcomes/outputs and demonstrate the impact of efficient operations to ensure they meet desired operational performance requirements and outcomes.

Learn more about the work of ISO/TC 267, Facility Management at <https://committee.iso.org/home/tc267>

These standards provide operational guidance and tools to streamline processes for both evolving nations as well as new FM professionals. They will ensure continuity in service delivery across geographic borders and age groups by capturing the knowledge from proven practices through a consensus-driven process and turning that knowledge into action. They will enable resilience within the demand organization by providing a framework within which organizations can address the ever-changing demands of the

workplace, be it from evolving expectations from stakeholders or technological advances.

Sustainability, whether it be a “green” initiative or a culture of continuity and resilience, is an organization-wide strategy and program that is directed by either top-down or bottom-up initiatives — a model facility managers are accustomed to managing. FM standards support facility managers by providing a framework to document business policies, procedures, and practices in a closed loop system for continuous monitoring, measuring and improvement. The function of FM is inherently a mission of sustainability as the FM perspective continually evaluates today’s tradeoffs for the longer-term impacts of tomorrow. These future impacts include social, economic, and financial considerations, as well as internal affects to the business. As an evolving profession and industry, FM will require exploration, pioneering and some risk-taking. FM standards provide the clarity and framework to sustain the industry as through its evolution. 

- [1] ISO 41011:2017 Facility management – Vocabulary
- [2] ISO Guide 73: Risk Management – Vocabulary
- [3] ISO 41011:2017 Facility management – Vocabulary
- [4] RICS, 2017. Raising the Bar Executive Summary. March 2017. http://www.rics.org/Documents/Raising_the_Bar_3_Exec_Summary_130317_IC.PDF



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Casey Martin is a Program Manager for the Buildings, Infrastructure and Advanced Facilities group of Jacobs Engineering, where she specializes in facility and asset management strategic consulting services. Martin is the current chair for the ISO 41000 U.S. Technical Advisory Group, developing the new standards for Facility Management.

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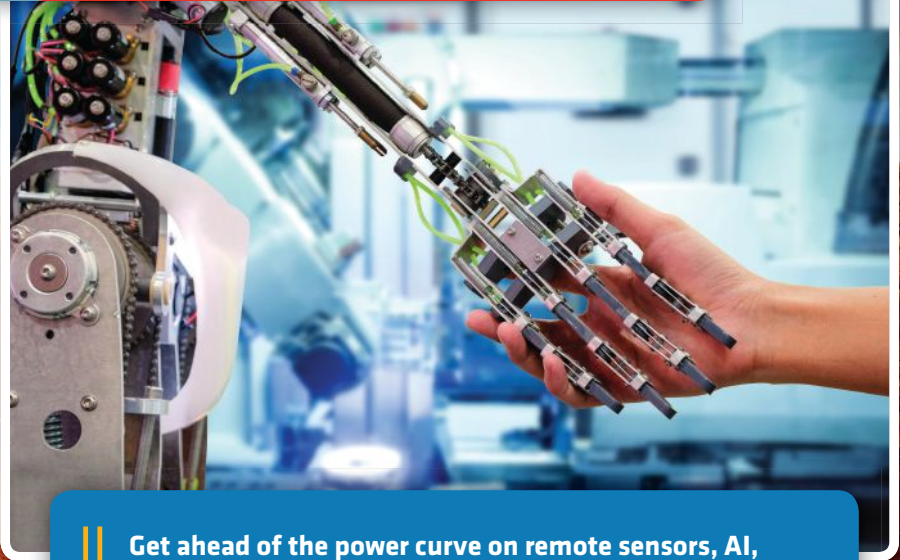
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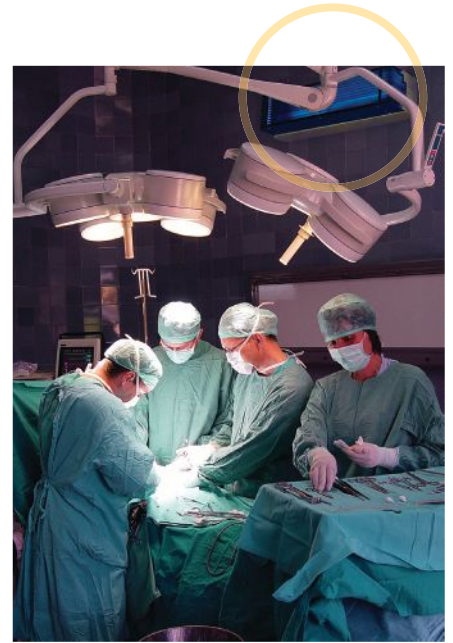
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ABOVE:

Using high-mounted UV-C fixtures to disinfect airborne pathogens

BY DANIEL JONES

As the threat of measles and other infectious diseases continue making headlines, building and facility managers are searching for ways to reduce the threat posed by contagious airborne pathogens.



Since the 1940s, many hospitals have relied upon Ultraviolet Germicidal (UVGI or UV-C) energy to control airborne infectious diseases. Use waned with the arrival and proliferation of antibiotics. In the 1990s, demand for the technology returned following a resurgence of drug-resistant infectious microorganisms; as science has not found any microorganism that can withstand the destructive effects of the UV-C 254-nm germicidal wavelength, including superbugs and other antibiotic-resistant germs. In other words, there is no way for microbes to develop a resistance to UV-C, and repeated exposure to the germicidal wavelength renders microbial replication impossible.

One means of deploying UV-C systems against infectious agents is upper-air/room systems, which are designed to kill airborne infectious agents as they rise into the upper region of most any space. Upper-air/room systems are installed in waiting rooms, classrooms, cafeterias, gymnasiums, locker rooms, childcare centers — anywhere infectious agents may exist. Coil-irradiation and air-stream-disinfection systems are installed within HVAC air-handling units and duct runs in all building types. Some applications combine upper-air/room UV-C units to kill airborne microorganisms along with UV-C

lamps installed within HVAC systems to provide supplemental airstream kill ratios and irradiate all plenum surfaces.

Typically, wall mounted at a height of seven-feet or above, the UV light fixture employs louvers to direct the radiation upward and outward to create an intense zone of the UV-C wavelength in the upper-air while preventing dosage in the lower (occupied) portion of the room or area. As convection or mechanical air currents lift communicable airborne agents, the pathogens are exposed to the germicidal wavelength and killed. UV-C breaks the bacteria or virus DNA chain rendering it incapable of reproducing.

DROPPING INFECTION RATES

The current scare over the measles virus, one of the most contagious diseases known to man, is a good case-in-point. Nearly a century ago, Harvard University sanitary engineer, William F. Wells, discovered that germicidal ultraviolet energy killed airborne microorganisms, including measles.

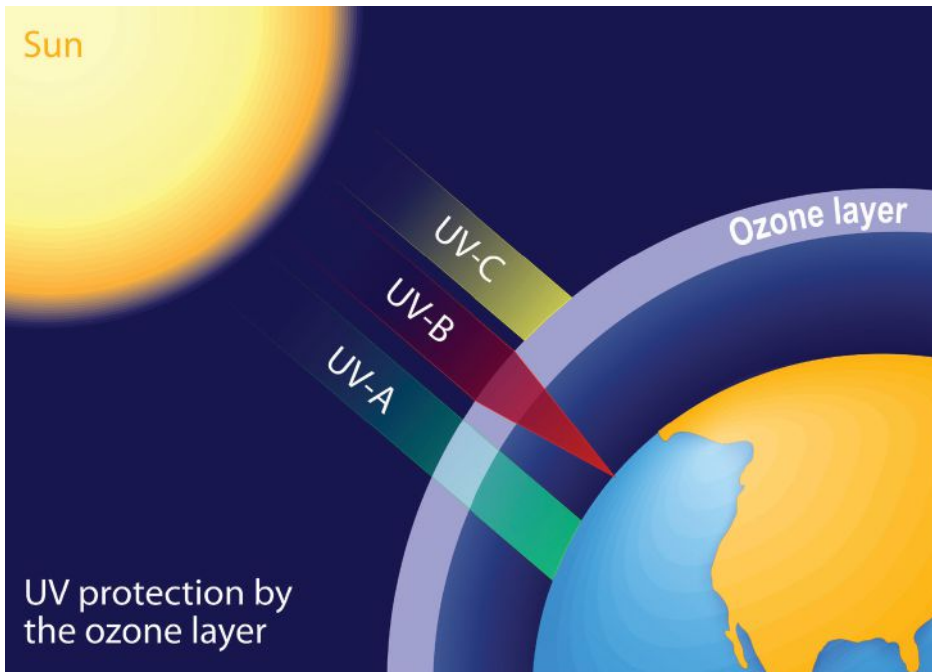
Wells installed UV-C lamps in suburban Philadelphia day schools to combat the spread of measles and compared infection rates. The schools without the germicidal UV-C fixtures saw contamination rates nearly four times greater than those that

employed the ultraviolet technology (53.6 percent vs. 13.3 percent).

Around the same time, in 1936, Dr. Deryl Hart experimented with germicidal UV-C to disinfect an operating room at Duke University Hospital. He reported an 11.38 percent reduction in the rate of postoperative infection rates. Throughout the next few decades, UV-C was applied in schools and hospitals across the country, proving its ability to inactivate microorganisms and bacteria.

Compared to germicidal fixtures used in these previous studies, today's fixtures provide greater UV-C fluence (dosage/output) and coverage, use less power and are less expensive.





HOW IT WORKS

UV light comprises a segment of the electromagnetic spectrum between 100 and 400 nm, corresponding to photon energies from 3 to 124 eV. The ultraviolet segment has four sections, labeled UV-A (400 to 315 nm), UV-B (315 to 280 nm), very high energy and destructive UV-C (280 to 200 nm), and vacuum UV (100 to 200 nm).

We all are familiar with the harmful effects of UV transmitted by sunlight in the UV-A and UV-B wavelengths, giving rise to UV inhibitors, or blocking agents, which are found in sunglasses and suntan lotions. We are also familiar with products engineered to withstand the effects of UV radiation, such as plastics, paints and rubbers.

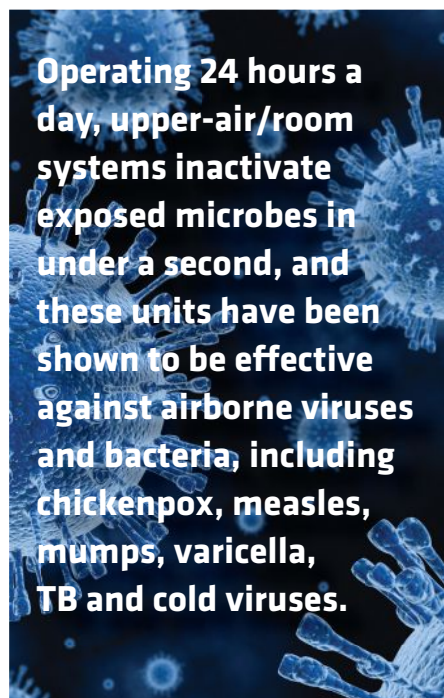
However, unlike UV-A and B, the UV-C wavelength has more than twice the electron volt energy (eV) as UV-A, and it is well absorbed (not reflected) by organic substances, adding to its destructiveness. It owes these effects to the biocidal features of ionizing radiation, that is, UV-C does far more damage to molecules in biological systems than can temperature alone.

Sunburn, compared to the sensation of warmth, is one example of that damage. Sunburn is caused by sun striking and killing living cells in the epidermis. The redness and “heat” from a sunburn is merely a byproduct of that destruction, which is reflecting the increased blood flow to remove the dead cells.

Ionization drives UV-C’s power to alter

chemical bonds. It carries enough energy to excite doubly bonded molecules into a permanent chemical rearrangement, causing lasting damage to DNA, ultimately killing the cell.

The Centers for Disease Control and Prevention Healthcare Infection Control Practices Advisory Committee finds that ultraviolet energy helps to control disease transmission: “As a supplemental air-cleaning measure, UV-C is effective in reducing the transmission of airborne bacterial and viral infections in hospitals, military housing, and classrooms...”



EFFICIENT EFFECTIVENESS

The primary objective of upper-air/room UV-C placement is to interrupt the transmission of airborne infectious diseases where people congregate, especially in high-occupancy settings such as schools, childcare centers, airports, cafeterias, homeless shelters and emergency rooms.

All these spaces can be effectively and affordably treated with UV-C. Airborne droplets containing infectious agents can remain viable in a well-ventilated room for as long as six minutes. Operating 24 hours a day, upper-air/room systems inactivate exposed microbes in under a second, and these units have been shown to be effective against airborne viruses and bacteria, including chickenpox, measles, mumps, varicella, TB and cold viruses.

Although germicidal systems have been used for nearly 80 years, their application in infection control settings has waxed and waned. Given the growing desire to prevent the transmission of infectious diseases in facilities ranging from schools, to hospitals to international airports, facility professionals should examine ultraviolet germicidal technologies as one possible safeguard against infectious agents. In particular, upper-air/room UV-C systems combined with systems that irradiate interior surfaces of HVAC air handling units can greatly reduce pathogen concentrations in a highly reliable and cost-effective fashion. **FMJ**



Daniel Jones, *President and co-founder of UV Resources, is an ASHRAE Member and a corresponding member of the ASHRAE Technical Committee 2.9 and ASHRAE SPC-185.2, devoted to Ultraviolet Air and Surface Treatment. He may be reached at daniel.jones@uvresources.com.*

Facility managers in a variety of roles have selected upper-air/room germicidal ultraviolet (UV-C) technology to reduce the threat of contagious diseases. Following are some of the unique facilities where UV-C has helped reduce the concentrations of airborne pathogens:

PROTECTING PETS

A pet boarding, daycare and grooming business in North Carolina, USA recently added hospital-grade, infection-control fixtures to its 5,000-square-foot facility. The business utilized a hospital-grade disinfectant to sterilize its kennels, floors and surfaces, but because so many diseases are spread through the air, business owners wanted to fill a gap in their infection-control strategy.

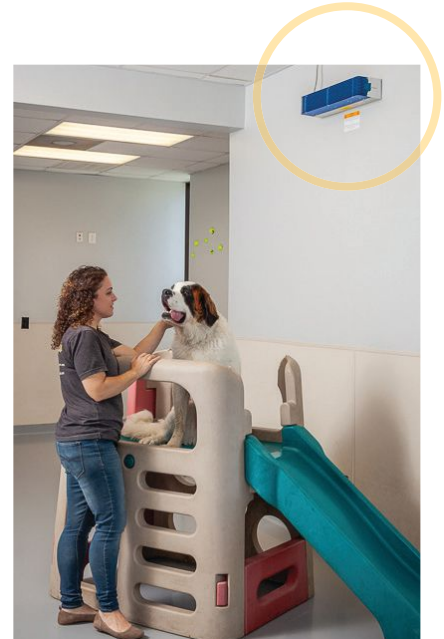
The project team implemented two separate UV-C applications to ensure the greatest practical control of microbes and airborne microorganisms: 1) upper-air/room UV-C disinfection units in pet common areas and the building lobby, and 2) UV-C fixtures in the HVAC supply air units to clean airstreams and cooling coils.

"Animals can acquire some upper respiratory infections by simply passing one another

on the sidewalk," said owner Josh Donahue. "Because animals can spread a disease before anyone knows they are contagious, large-scale outbreaks can quickly spread and take weeks before the contagion is completely eliminated."

In the age of YELP and Facebook, poor reviews and word-of-mouth can make or break a local business, especially in a close-knit community where residents routinely look to social media for business endorsements.

"If your pet becomes sick at a new center, not only will you find another provider, but your impression of that facility will forever be negative," he said. "Why wouldn't a business invest in keeping customer pets safe and do everything possible to demonstrate its care and compassion?"



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HEALTHIER FACILITIES



Seeking an additional layer of protection against airborne bacteria and other contaminants, managers at a Texas-based medical infusion laboratory added UV-C to its HVAC system and upper-air/room fixtures to its laboratory.

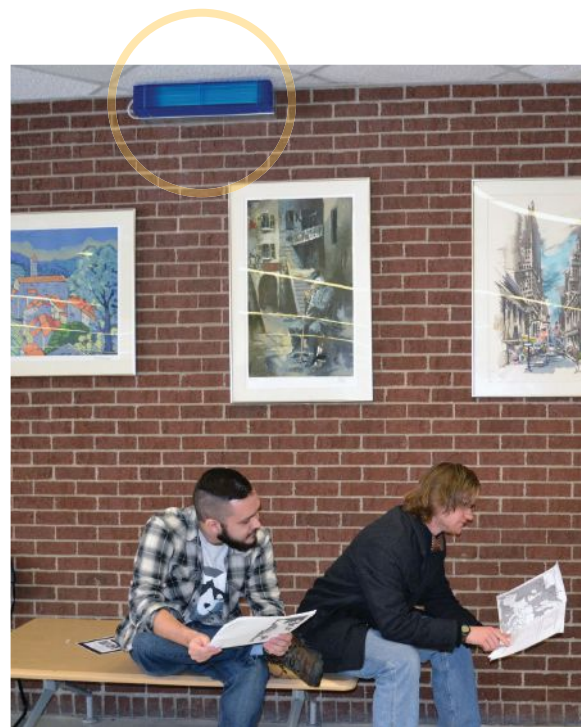
Facility managers at the laboratory, which prepared intravenous treatments and conducted testing, selected two UV-C technologies to control microbes and bio-aerosols: 1) upper-air/room UV-C disinfection units in the center's laboratory and anteroom and 2) UV-C fixtures in the HVAC supply air units to clean airstreams and cooling coils.

The four GLO™ conventional upper-air/room fixtures from UV Resources, deliver the industry's greatest ultraviolet dosage – up to 350 percent more irradiance than conventional upper-air UV-C systems. This increase in irradiance levels translates to greater germicidal coverage, enabling infection control specialists to treat more square feet with fewer fixtures, saving both cost and energy.

Along with supplemental filtration, the UV-C fixtures were determined to be an integral part of the medical center's successful microbial control program.



SAFER AIR, SAFER STUDENTS



At Schenectady County Community College in New York, Director of Facilities, Alan Yaune turned to UV-C to provide on-the-spot infection control around campus areas where the estimated 6,500 students gather.

"It really wasn't a hard sell to persuade Administration to pay for UV-C once they understood the indoor air quality benefits it could yield," he said. "We installed between five and eight upper-air UV-C units in the daycare center alone because young children tend to be ill more frequently and their close interaction increases transmission rates," said Yaune.

Units were also installed near the security desk, the cafeteria, the student forum and lounge.

A member of the Association of Physical Plant Administrators, Yaune said although most FMs are probably not as germ-conscious as he is, it's a good trait to have.

"Anywhere you put thousands of people in close proximity, be it a hospital, airport, large office building or college, it's advisable to try to eliminate disease transmission as much as possible. Otherwise, the money you save will be lost to absenteeism and poor indoor air quality," asserts Yaune.

As disease outbreaks grow in scope and frequency, facility professionals should examine ultraviolet germicidal technologies as one possible safeguard against infectious agents where people congregate, especially in high-occupancy settings such as schools, childcare centers, airports, cafeterias, homeless shelters and emergency rooms.

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POOL PLAY

Keeping IAQ from taking a dive

BY RALPH KITTLER, P.E.

Indoor swimming pools are great methods of recreation, however when their indoor air quality is improperly designed or maintained, they can also adversely affect the human condition.

Like many commercial buildings, natatoriums can suffer from Sick Building Syndrome, a phenomenon IAQ experts blame on tight, energy-conserving construction techniques combined with subpar ventilation designs.

An Internet search can reveal a list of ailments caused by indoor pools. Lifeguard lung (granulomatous pneumonitis), for example, poses health risks for facility employees, who spend the majority of their work hours in natatoriums. However, asthma and other respiratory irritants can also be exacerbated by poor IAQ indoor pool environments.

Even swimmers with less exposure time than facility workers are not immune to poor IAQ. During the 2013 USA Winter Junior National Championships, future Olympic gold medalist Caeleb Dressel was transported to an emergency room with breathing difficulties from facility IAQ problems, according to a report by *Swimming World Magazine*. Competitive swimmers often pack inhalators with their swimming gear because it's never known what airborne contaminants are at an indoor pool.

Indoor Pools: A Short History

Indoor pools built prior to 1975 typically didn't suffer this degree of IAQ problems. Ventilation systems were supply and exhaust with little or no recirculation, therefore the entire space had a complete air change in a relatively short time. Unfortunately, all the heat generated from space and pool water heating was wastefully exhausted too, which made these facilities extremely expensive to operate.



The advent of the mechanical indoor pool dehumidifier in the late 1970s changed indoor pool design methodology. This technology also offered a solution complementing that era's budding energy conservation goals while providing better control of the space temperature and relative humidity. Instead of exhausting all the air, dehumidifiers recirculated a majority of air while using refrigeration coils to condense moisture out for better relative humidity control and occupant air comfort. Like today's models, the dehumidifiers could dehumidify, cool and heat the space more efficiently than preceding methods.

They also efficiently used refrigeration circuit compressor waste heat to provide free pool water heating. Later models energy-efficiently recovered heat from exhaust air to preheat increased amounts of incoming outdoor air recommended for commercial buildings by the American Society of Heating, Refrigerating and Air-Conditioning Engineers Standard 62.1 *Ventilation for Acceptable Indoor Air Quality*.

The main factor causing indoor pool breathing problems is chloramines. Chlorine sanitizes pool water, but when it chemically binds to body waste such as

sweat and urine, it converts to a heavy gas called chloramines that stratify on the water's surface in the swimmers' breathing zones, according to The Centers for Disease Control and Prevention.

The CDC recommends an HVAC system to move fresh air across the water's surface, exhaust chloramines and bring in more outdoor air. Many indoor pool ventilation designs or their mechanical dehumidifier main-

tenance routines fall short when chloramines stratify for extended periods.

Recruiting a Winning Swim Team with IAQ

The U.S. Environmental Protection Agency and Occupational Safety and Health Administration are looking for answers to Lifeguard Lung and other indoor pool respiratory health issues. The lead counsel of the U.S. Senate Environment and Public Works Committee, Washington D.C., met last year with Jeff Dugdale, the men's and women's swim coach of Queens University, a small 2,300-student private college in Charlotte, North Carolina, USA. The committee, as well as the EPA and OSHA, have shown an interest in QU's nine-year-old pool and why its IAQ is reportedly one of the nation's best.

Dugdale helped spearhead the 7,500-square-foot pool's design when QU built its US\$30 million, 144,000-square-foot Levine Center for Wellness and Recreation. He uniquely uses the QU pool's IAQ as a recruiting tool for one of the NCAA's most successful swim programs.

IAQ is subjective, but Dugdale's swim team record is factual. Although it's a



Division II school in the Blue Grass Mountain Conference, QU successfully uses IAQ to recruit Division I level swimmers from around the world. Visiting parents of recruit candidates from across the globe, especially those who regularly used inhalators at their high school swim meets, immediately notice QU's superior IAQ and great water quality inside the pool area, according to Dugdale.

How QU Created the Ultimate IAQ

The 33-meter stretch pool's IAQ was designed by Lea Burt, P.E., CEM, president of Mechanical Contractors Inc., of Charlotte, the design/build HVAC contractor for the entire Levine Center.

While many engineers may never design an indoor pool, Burt had previously designed several natatoriums. That experience was what Dugdale and Troy Luttmann, AIA, campus architect and associate vice president of design and construction, needed to build what's arguably one of the world's best indoor pools today.

A SUCCESSFUL NATATORIUM ENVIRONMENT WITH GOOD INDOOR AIR QUALITY IS BASED ON FIVE PRINCIPLES:

- 1) PROPER BUILDING MATERIALS AND BUILDING ENVELOPE DESIGN;
- 2) EFFECTIVE AIR DISTRIBUTION;
- 3) THE RIGHT MECHANICAL HVAC EQUIPMENT,
- 4) SOURCE CAPTURE OF CHEMICAL GASSES AT THE WATER SURFACE; AND
- 5) POOL WATER CHEMISTRY.

The latter discipline is more of a facility operations and maintenance issue than design concern. Good natatorium design is easily accomplished, according to Burt, if the design team follows the recommendations and precautions of Chapter 25 (“Mechanical Dehumidifiers and Related Equipment”) in *ASHRAE’s Systems and Equipment Handbook*.

Knowing the dangers of poor IAQ, the design team insisted during construction meetings that cutting costs on critical items was not optional. Anti-corrosive building materials, expanded supply and return air distribution coverage, source capture and state-of-the-art mechanical equipment would help create the ultimate IAQ. The team made several educational presentations during the project’s value engineering period to point out why certain building materials, designs and equipment were essential for project success and also used evidence of IAQ failures in other pool designs.

Building Envelope & Materials

Burt collaborated with the project architect on the choice of building materials and assured certain installation techniques were applied properly. For example, Burt lobbied against the use of glass in the design, which adds a nice aesthetic, but attracts condensation. Another architectural precaution is assuring the vapor barrier envelopes the entire building pool area to prevent moisture migration. The contractor must install it without tears or broken seams, which can allow moisture exposure to attack the building’s structural materials.

Air Distribution

Air distribution is equally important, because conditioned air must be dispersed down to the breathing zone at deck level and pool surface level. Ideally, ductwork must be positioned approximately one foot away from exterior walls and windows

to assure proper coverage that will prevent condensation. Return air is critical too. Burt recalls design committee value engineering conversations that would consolidate return air coverage, which can result in air stratification and short circuiting.

Source Capture

Burt minimized chloramines accumulation at QU by specifying six volumetric air changes per hour of supply air and combining it with a source capture exhaust device that’s integrated into one side of the pool gutter system. The 4,500-CFM source capture exhaust system draws chloramines off the water surface and exhausts them through a heat reclaim system Burt custom designed. The system extracts energy from the source capture unit’s energy-rich exhaust airstream just prior to exhausting outdoors. The recovered energy is then used for pre-heating outdoor air. Because the heat reclaim system also uses

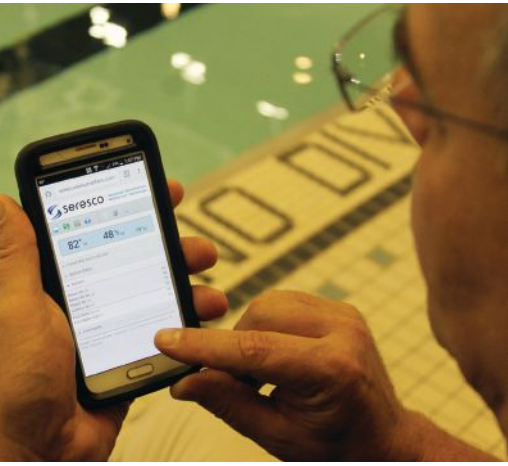


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Equipment Sizing

Any natatorium project needs proper sized HVAC equipment. Knowing the pool's future activities was critical for Burt's equipment sizing. Dugdale, who is also QU's associate athletic director, head swim and aquatic director, requested 54 percent RH supplied by a dehumidifier. He also wanted a heat recovery dehumidifier with free pool water heating to 80 F, while also cooling or heating the space to 76 F. That four-degree differential is quite a deviation from ASHRAE's recommended two-degree differential between water and space temperature to minimize evaporation rates. These unorthodox set points certainly work, but result in higher evaporation rates that must be planned for during the design phase to properly size the mechanical equipment and maintain a space that's comfortable for both swimmers and spectators.

In QU's case, it uses two 24-ton dehumidifiers that were purposely configured to be piggy-backed together for cramped mechanical rooms. This makes staging easier and energy efficient, whether there's a swim meet with hundreds of people or just an off-hours practice with a few swimmers. Specifying two units also offers redundancy. Dugdale said his teams have never missed a practice due to a natatorium shutdown.

Pool water chemistry is typically a facility operations and maintenance issue, rather than a design consideration, but the consulting engineer should always monitor what water sanitization devices are implemented in the design. For example, UV water purification technology or other secondary water sanitation alternatives for reducing chlorine use and subsequently chloramines, could be suggested as part of the pool support equipment. Dugdale is so tuned into the IAQ, he instills a "culture of IAQ" which even emphasizes swimmer personal hygiene in and out of the pool, to help maintain a healthier IAQ. Showering before entering the pool not urinating in the pool all give the pool water chemistry a head start to work properly.

Another tip from Burt is keeping combustion equipment, such as back-up pool water boilers, separate from chlorine equipment. If there is free chlorine in the

air that boilers use for combustion, premature corrosion can occur. Close attention should be paid to ventilation air in mechanical rooms and the elimination of chlorine-base product storage and chlorine equipment, according to Burt.

Finally, Burt recommends focusing on condensate management and chlorine corrosion in a natatorium's design phase and paying close emphasis on every detail of those issues during construction and commissioning.

Designing a good pool environment is only half the task. Burt also specified a dehumidifier that incorporates internet access, remote monitoring and analyzation through web-based browsers. Therefore, factory service professionals can access the equipment for adjustments, recalibration or troubleshooting to keep the unit operating efficiently and maintain the natatorium air comfort via PCs or smartphones. Factory technicians through remote monitoring can also help Burt's service technicians troubleshoot when service issues arise.

Properly designing and maintaining a natatorium is critical to presenting a healthy recreational facility environment. **FMJ**



Ralph Kittler, P.E., is vice president of sales at Dehumidified Air Solutions Montreal, Quebec.

Kittler is the co-founder and former vice president of sales/marketing at Seresco Technologies, an Ottawa-based mechanical dehumidifier manufacturer brand of DAS. Kittler, is an ASHRAE Distinguished Lecturer and the reviser responsible for Chapter 25 ("Mechanical Dehumidifiers and Related Equipment") for ASHRAE's 2012 Systems and Equipment Handbook. Kittler recently created a video that qualifies as a Professional Design Hour (PDH) continuing education credit for HVAC engineers, facility managers and contractors. The video is based on a publication he authored, Natatorium Design Manual. Both the video and the manual are free and available for download at www.serescotechnologies.com.

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SUSTAINABILITY

as an Integration Tool

BY BILL CONLEY



Facility management not only should be run like a business, but is, in fact, a business unto itself. Like any industry, FM needs effective means of communication, a solid marketing plan to tout their successes and talent.

FINDING AND KEEPING PROFICIENT EMPLOYEES IS A COMMON CHALLENGE

THROUGHOUT THE BUSINESS WORLD. FACILITY MANAGEMENT IS NO EXCEPTION.

By the nature of the profession, the value of FM is twofold. The sustainability initiatives implemented by a Facility Manager lays the foundation for a successful business application of environmental practices. By creating and maintaining a healthy, efficient building, they are attracting the right kind of prospects to the company. Secondly, FMs set an example for workers who truly want to make a difference, enticing them to join the profession.

FMs play a large role in creating a viable, productive atmosphere which serves as a recruitment tool for the profession and/or the company. FMs are responsible for providing more natural light, better air quality, optimum temperatures and improved acoustics. These ambient attributes lead to a happier and healthier workforce, which improves employee productivity. The positive effect of a sustainable office on employees' output can range from a 6 to 16 percent increase in productivity.

With environmental concerns being an important aspect of Corporate Social Responsibility, a company can create the reputation as a destination of choice. This can lead to opportunities of attracting top talent and like-minded partners and customers.

In a world of growing diversity, this issue has become more pronounced. Globalization is introducing different nationalities interacting around the world, breaking culture and language barriers. Age diversity is even more prevalent in the workforce, which features energetic and idealistic newcomers to experienced battle-tested veterans, conceivably spanning five generations.

LOOKING FORWARD

With the vast age range in the workforce, it can be difficult to describe how generations feel about sustainability in the workplace. A good starting point could be to frame

a possible future. FMs and business leaders need to create assumptions and propose ideas so they can be tested to see if they might be true. They are generally constructed before any applicable research has been done, based on empirical evidence. A supposition is posited and background information can be accrued, but a resolution can never be certain until after the fact. Assumptions are not new to the FM world as the profession has developed through trial and error. Even strategic plans are based on 'What if?' scenarios. At this point, FMs have insufficient evidence to provide more than tentative suppositions about how sustainability is regarded. It may be expected as the new status quo; a defining factor in a person joining a company or it may be met with apathy.

It could be assumed that younger generations coming into the workplace would be concerned about the environment, climate change and the impact commercial buildings have on the planet. After all, it is their future and their quality of life are aspects that will be affected most. However, what must be considered is their attraction to social media. This might prove to be a challenge because a person can only absorb so much information. Depending on the sources of that info, perceptions of sustainability could differ substantially.

However, FM is also built on networking, and the use of social media on a constant basis affords younger generations those networking opportunities. Ideally, this back-and-forth directs these users to embrace environmental causes.

FMs are faced with creating, proving and enhancing the perception through social media and other marketing venues where they have the most influence on the environment by virtue of their resource management efforts. Sustainability can be used to engage, recruit and retain quality talent in the workplace. Just as the Triple Bottom Line (People, Planet, Profits) inspires varied audiences in the business world, sustainability can be presented through focused messages that appeal to different generations.

Clean and healthy workplaces are aspects of a company that can lead to accumulating superior talent in the workplace, through the retention of existing employees and hiring quality personnel.

How can a company attract people from the multiple generation pool? Each age group has its own characteristics, experiences, upbringing, and overall attitude regarding professional values. Each generation wants to be engaged and has unique strengths that can be utilized in a stakeholder group.

**SUSTAINABILITY
CAN BE USED TO ENGAGE,
RECRUIT AND RETAIN
QUALITY TALENT
IN THE WORKPLACE.**



GENERATIONAL TRAITS

Traditionalists have respect for authority and expect respect for their experience. For the most part, traditionalists are out of the workforce now, but those who remain are rife with wisdom based on their tenure. It is doubtful they would be looking for a change in employment, but having them on hand for mentoring and willingness to support company directives will help in retaining valuable employees. If they embrace sustainable actions, it paves a positive road for their successors.



Baby Boomers believe in large causes and are convinced they can change the world. They are open to new ideas. Sustainability leaders need to leverage these experienced Boomers before they exit the workforce. They are skilled in organizing large groups of people around a mission and then creating a strategic plan to make it happen. They aren't afraid of hard work and are tireless in pursuit of their goals. They are unique in their ability to balance profit and prosperity motives with a social one.

Much has been made of the loss of institutional knowledge and experience that will occur when Boomers retire, but many are looking for new career opportunities. Part of their make-up is they need to feel needed and valued for what they can contribute. Sitting in a rocking chair on the front porch won't satisfy their work ethic for long.

They are transformational, wanting to make a difference, perhaps to do something great for a second curtain call. They can be enlisted by catering to their desire to leave a better world for future generations. Sustainability programs align to their social values, and leadership roles within sustainability initiatives would be a perfect fit. They can facilitate sustainable progress while guiding new leaders. Their idealism can be used to drive change. Their enthusiasm and energy will help to rally others around sustainability, achieving measurable results that benefit the Triple Bottom Line. Boomers are generally driven by intrinsic motivation, wanting to do good for its own sake.

As sustainability leaders, they need to try and harness the strengths of Gen Xers and Millennials. These younger professionals will be working together for years to come, and their collaboration will be vital for the long-term success of initiatives.

Generation X sometimes seems surprisingly disengaged, dismissive or doubtful about whether global climate change is happening, and they don't spend much time worrying about it. The key here is to make them care. They are more extrinsically motivated, believing in the value of working hard but only if they get monetary benefit from it. However, their 'what's in it for me?' attitude can be directed toward sustainability, given the right messaging. They are results driven, always on the lookout for meaningful work and thrive on being creative.

This generation is good at meeting short term goals and problem solving. Interestingly, many say they want to work for companies that care about their impacts. They can be engaged by focusing on their resourcefulness. They are independent and innovative, and they will find ways to improve a company's environmental performance given the right guidance and direction. Xers have no issues with letting go of "how things used to be done." They value the differences others bring to the team and genuinely believe diverse views are important in achieving results.





Gen Y/Millennials are the most environmentally conscious group in the mix. Millennials need to feel a connection to a company's mission beyond profit. They feel personally responsible for making a difference in the world. They are motivated to work harder when they know their efforts add value to the company and the planet. The key to this generation is to group them with other creative people and mentors with the common focus of sustainability. They are eager to go to work for organizations where they want, not need, to show up. They respond to competency rather than titles and they respond poorly to

authoritarian figures who feel they are entitled to respect and compliance. Mentoring by committed and proven sustainability practitioners will make a major impact.

Millennials can easily spot inauthenticity. They are concerned about the environment and filter job selection choices with their green mindset. There will need to be more than a few recycling bins in the office to call a workplace green. They are more attracted to the company's mission, purpose and sustainability practices which needs to prove it has a desire to change the world.

Millennials will be enthusiastic supporters of change initiatives. They are goal and success driven. They're optimistic, independent and overeducated. They believe in transparency, free-flowing information and inclusive decision-making. They prefer a company that sets goals and allows for meaningful collaboration in decision making, followed by rewards for those who make it happen. Employees who are asked for their best with challenging new assignments are more likely to stay. They want to grow and benefit from exposure to cross-company leadership, learning how to apply their green metrics in a business-centric way. This will ensure them job satisfaction and help businesses succeed.



Generation Z represents the policy-makers, industry leaders, technical experts and consumers of tomorrow. This is an audience with whom the wider energy and sustainability community must engage to realize a more sustainable future. They are constantly thinking about their own aspirations and plans for the future. These emerging leaders also see their own behavior as particularly important when it comes to supporting sound environmental practices. Many of these young people seem to be interested in working or studying in an area related to sustainability.

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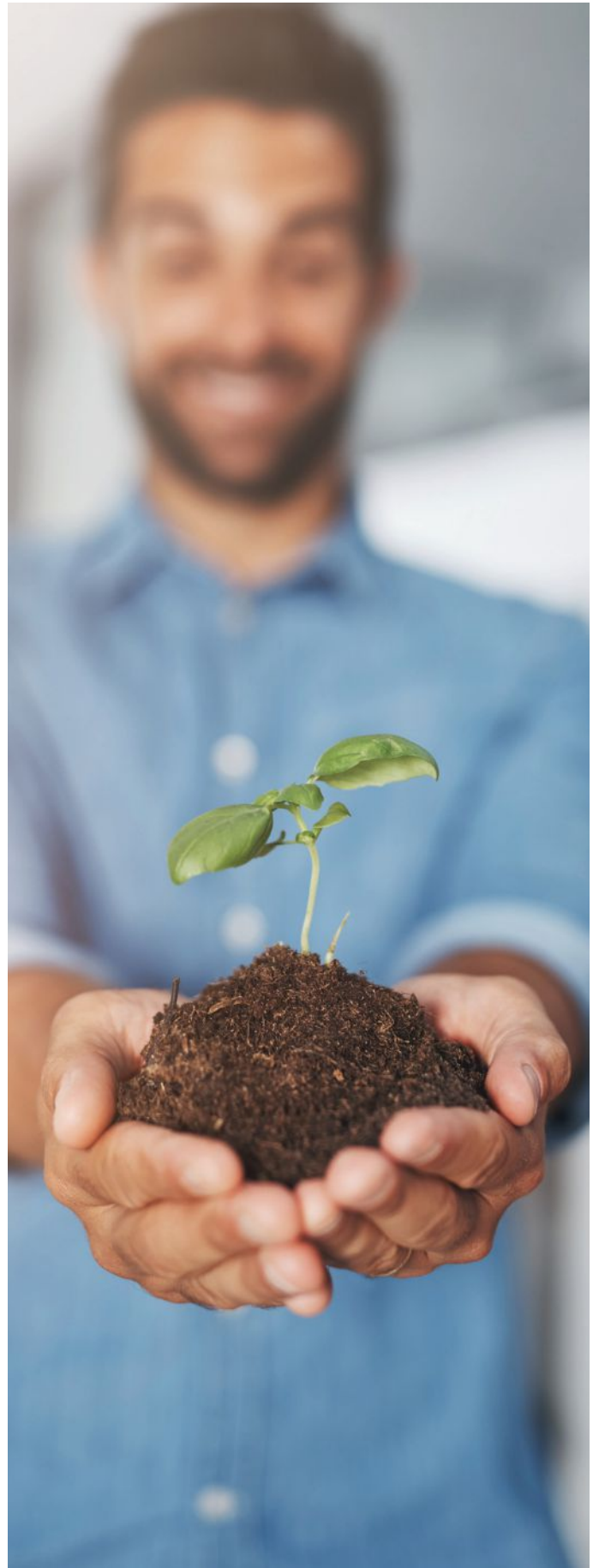
The ability to attract and retain quality employees is always a top-of-the-list business objective for any employer. People like to be associated with the positive, especially younger generations raised on a steady diet of environmental protection messages. They do not want to be linked to companies implicated in ecological disasters and social welfare scandals. A company should be recognized as respectful of the environment and of its employees.

Sustainability is not generationally specific. The precepts that lend themselves to success in recruiting and retaining quality employees rely on the attempts to integrate the generational differences that are extant in the workplace into a common focus, encompassing safe and sound environmental practices. Those targeted prospects and employees need not have the experience necessary for an instant start but should have interests and passions that meet the needs of the company or, more particularly, FM. In the case of environmental concerns, each generation has its own agenda to fulfill.

Tapping into the needs or desires of all employees and encouraging their will to succeed in the sustainability arena provides an extra incentive. Empowering personnel to concentrate on environmental issues that can be addressed and mitigated in the workplace is a powerful tool that can lead to the attraction and retention of valued workers. These are the types of employees who will make a world of difference, for the company and for the planet. 



Bill Conley, CFM, SFP, FMP, LEED AP, IFMA Fellow, is a facility manager at Yamaha Motor Corp. in Cypress, California, USA. Prior to that, he served as owner and chief sustainability officer of CFM2, a facility management company. Conley has more than 40 years of experience in the facility management profession and has been a proponent of sustainable operations for more than 20 years. Conley has served on the IFMA board of directors, is a recipient of IFMA's distinguished member of the year award and has received the association's distinguished author award three times. He has been a regular contributor to FMJ for more than 20 years and has authored more than 70 FMJ articles.



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Right-sizing commercial waste services

How to recognize efficiencies while meeting sustainability goals

BY DAN STUDER

THE INTERNATIONAL STATISTIC OF THE YEAR FOR 2018 WAS

90.5% ^[1]

Most facility managers won't be surprised to learn that number is the amount of plastic waste that has never been recycled. Globally, around 6,300 million metric tons of plastic have been disposed of, according to a 2017 study published in *Science Advances*. Of that waste, 79 percent ended up in landfills (or the ocean), while another 12 percent was incinerated.

Sustainability efforts and ambitious recycling goals have been implemented to address the global waste problem. But how do facility managers know they're getting the right size solution for their campus or real estate portfolio? And how has the 2017 China recycling ban factored into environmental regulations, the cost of waste disposal, and internal corporate responsibility goals?

The “hidden costs” of waste

Anyone who's been in the facilities industry for more than a few years knows the garbage and recycling market can fluctuate wildly every decade or so. Some years haulers offer rebates for recycling, while other years disposal costs spike. In the past, these fluctuations were often written off as the cost of doing business.

However, the latest recycling ban has caused many FMs to re-evaluate their waste generation and trash solutions. Recycling costs have risen as much as 70 percent in areas with steep envi-

ronmental fees, and landfill tip fees have gone up more than 6 percent across the United States since 2018. The national average rose from \$51.82 in 2017 to \$55.11 in 2018—and those fees are passed on to facility managers. Globally, the situation isn't any better.

“Reduce, reduce, reduce” has been the mantra in the facilities industry for the last five or so years—with good reason. Environmental regulations seem to change every year, and it helps to have a waste solution partner who understands the complexities of changing waste disposal fees and regulations. Reducing waste is the first line of defense for cutting disposal costs.

FMs know all too well the amount of garbage generated within the walls of their facilities. The Frontier Group, a policy research organization, estimates people throw away seven pounds of materials—per person—every day in the United States. Multiply that by the number of workers in an office complex or residents in a housing facility, and that is a lot of garbage.

¹www.rss.org.uk/RSS/Get_involved/Statistic_of_the_year/RSS/Get_involved/Statistic_of_the_Year_.aspx



Right-sizing disposal

Whether an FM manages one location or 500, trash collection is often a trade-off between paying the high cost of a major waste service company (and not knowing if you're paying for the right size dumpsters), or having to navigate a maze of multiple local vendors, plus one or more trash contracts, and the sometimes imprecise art of calculating how many dumpsters are needed to meet demand.

With most garbage contracts, the cost is calculated based on the size of the dumpsters and the frequency of pickup. But what happens when the dumpsters are regularly overflowing, and high overage fees show up on invoices? This is especially true now that more recycling is deemed contaminated, rejected by recycling facilities, and it ends up with the regular waste stream.

Even if a garbage hauler accurately predicted the amount of waste for a building a year or five years ago, there are other considerations to keep in mind.

... what happens when the dumpsters are regularly overflowing, and high overage fees show up on invoices?

First, take a look at the building's location. Some locations are prone to illegal or after-hours dumping. If the facility is in a remote area, or if it's near other retail or restaurant establishments where employees might throw garbage in the wrong dumpsters — that's extra volume that will likely end up on the invoice.

A waste solution provider should do more than provide a questionnaire. A tour of the location and a waste audit will provide the right number and size of dumpsters and the right collection schedule for the location.

Or, sometimes just as bad, the opposite can happen. What happens if a large tenant decides to offer telecommute or flex-time to employees, or there's a major build-out scheduled and parts of the facility will be vacant? Now half-empty dumpsters are being emptied, but the invoice hasn't dropped a penny.

The same will be true if a building's occupants successfully implement waste reduction programs that lower the amount of garbage generated. For example, investing in glass and ceramic dishware cuts down on paper and plastic waste. Depending on the facility, balers and compactors can also be used to help cut down on waste volume. These programs have a positive effect on the amount of waste generated —but is the waste contract keeping up with these new volumes?

Audits and cutting costs

When a waste disposal contract is signed, there's usually a questionnaire and a quote and that's the end of the relationship between FM and hauler. However, it's more beneficial to stay in touch with a waste specialist or someone involved in the waste industry who provides service for a lot of different types of properties. A customer-oriented waste provider can point out location and waste reduction considerations, but they can also help navigate changing environmental regulations and fees.

Take recycling fees. Only a couple of years ago haulers offered deep rebates for recycling. That led to a boom in recycling efforts that were good for the environment and created new opportunities for corporate social responsibility initiatives. Recycling programs became mainstream and contamination was rarely, if ever, mentioned as a problem.


Now, FMs around the world are struggling to keep up with the drastic rise in recycling costs. "Commodity Adjustment Fees" are rising as high as 75 percent more than last year in some regions. This doesn't mean companies are abandoning recycling, but it does mean it helps to have a waste partner to help navigate these fees. It also means FMs have to find ways to offset those costs.

The U.S. Environmental Protection Agency offers the following steps to reduce commercial waste and help keep costs under control:

- Track waste and recycling to get a baseline of how much waste the facility is generating. In other words, conduct a waste audit. (See sidebar.)
- Create a waste reduction team to plan, design, and implement a waste reduction program.
- Set short- and long-term goals.

- Gather and analyze data related to activities.
- Secure support from management and key leadership.
- Offer incentives and create rewards.
- Monitor and report program results to management and employees.
- Use the program results to improve waste prevention practices.

Taking these steps will identify areas where waste can be reduced. Even a small reduction in the waste stream across multiple properties can lead to significant overall savings on waste and recycling services.

Finally, consider re-evaluating the current waste contract, especially if it was signed prior to 2018 when the recycling ban really began to affect recycling costs. The market has changed significantly in the last year, and there may be other options available to lower the cost of disposal and recycling. 

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HOW TO PERFORM A WASTE AUDIT

A waste audit, or waste assessment, will establish a baseline for future waste reduction efforts. Use past records and walk-throughs to create a thorough evaluation of how waste is managed in the building. For pre-made PDFs to document your findings, visit www.epa.gov/smm/instructions-conducting-waste-assessments.

1. EXAMINE WASTE RECORDS.

- a. Review waste hauling and disposal invoices, recycling contracts, supply invoices and operating and maintenance logs.
- b. Identify costs associated with each phase of collecting and removing waste.

2. WALK THROUGH THE FACILITY.

- a. Observe where waste is produced and where it ends up.
- b. Talk with members of each function area or department to find out what type of waste is produced and where it's taken.

3. CONDUCT A WASTE SORT.

- a. Physically collect, sort and weigh one day's worth of waste.
- b. Decide how to quantify the waste—typical categories include paper, plastic, metal, organic material.
- c. Determine which materials can be exchanged, sold, reused or recycled.

RESOURCES

Production, use, and fate of all plastics ever made. Geyer, Roland, et.al. Science Advances, July 2017. <https://advances.sciencemag.org/content/3/7/e1700782.full>

Frontier Group: Trash in America <https://frontiergroup.org/reports/fg/trash-america>

Environmental Research & Education Foundation: Analysis of MSW Landfill Tipping Fees, April 2018 <https://erefdn.org/bibliography/datapolicy-projects>

World Bank: Trends in Solid Waste Management http://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html

U.S. Environmental Protection Agency WasteWise Program www.epa.gov/smm/wastewise



Dan Studer started in the waste and recycling industry in 2002 and spent seven years in local and regional operational roles for top-tier waste companies. As a major account executive in both the Chicago and Houston markets, Dan has worked with industrial and commercial clients to analyze and “right-size” waste streams for large-scale facilities and multi-property portfolios across the country. He specializes in creating custom service plans for major commercial clients. Dan is the division manager for commercial waste at ZTERS Waste Solutions, www.zters.com.

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A man with a grey beard and blue eyes, wearing a brown blazer over a blue striped shirt, is the central focus. In the background, a woman with blonde hair and glasses is smiling. The background is a blurred office setting.

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- John Pivik, SFP & CFM, JTP Consulting LTD



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*According to the IFMA sponsored research report, "Evaluating the Value: International Facility Management Association (IFMA) Facility Management Credentials"



BY JON BIAGIOTTI

HEALTHY MACHINES



Machines are the foundation for all aspects of modern living. Yet, machine health remains a blind spot in numerous industries ranging from water treatment to manufacturing to power generation and beyond. Industrial and commercial buildings are no exception. In an industry where margins are often inconsistent year-to-year due to equipment failures that affect critical building systems, it's counterintuitive to ignore machine health.

When critical equipment fails it can be sudden, disruptive and costly on multiple fronts. There's the monetary cost of fixing the machinery and the negative impact on occupants, whether it's

tenants or the building owner's own employees. Many machine failures within a commercial building only become noticeable after occupants complain. This is often the unavoidable byproduct of monitoring

through manual inspections on a monthly or quarterly basis — after what may have been a minor fault has progressed into a major issue.

The solution to avoiding these failures altogether is continuous diagnostics. With this strategy, sensors create a continuous stream of data from critical assets that can be accessed via the web and allow stakeholders to visualize machine health in real-time. Instead of having a reactive, fire-fighting strategy, facilities managers and building engineers can use continuous diagnostics to minimize unexpected downtime and maintenance costs while improving overall equipment reliability. Below are a few benefits that will drive the adoption of continuous diagnostics as a machine health solution within industrial and commercial buildings.



Capitalizing on the Falling Price of IoT and Emergence of AI

It is often the largest technology companies that set the pace for the rest of the market, trickling over to industries they didn't intend to change. IoT technology is beginning to become widespread across nearly all industries and is also becoming ingrained in consumers' day-to-day lives. This technology is only going to get more affordable and commonplace as the investment in IoT is not expected to slow down any time soon.

IoT is the key to unlocking a new generation of smart buildings. Digital twinning, or creating a virtual representation of physical assets, has been a hot topic within the building sector. However, this concept has been hard for many buildings to implement. Often building owners are left with fragmented ecosystems of IoT sensors within their building that are generating high amounts of raw data that then need to be manually sifted through to be of any value. This data is also mostly basic telemetry: knowing when a machine is on or off, its temperature and pressure readings and other raw sensor data. However, there are countless cases where the control panel shows that a piece of equipment is fine, but there is an underlying issue that can't be seen with raw data.

Continuous diagnostics and a focus on machine health can address these issues, as it can generate value right away. Continuous diagnostics leverages IoT with AI to create actionable insights from machine data, going beyond the basic readings of a control panel. AI driven processes gather data and identify patterns and anomalies at a rate that just isn't possible manually. Once a fault is identified, it is compared to a database that then provides the best recommendation of how it can be fixed. This streamlines response and repair times, instead of creating additional responsibilities to diagnose machines. The industry is

moving away from raw data and towards data-driven insights as it continues to become more sophisticated.



Overcoming the Industry Knowledge Gap

The talent pool for facility managers is shrinking as a workforce comprised mainly of Baby Boomers continues to march towards retirement. Smart building technologies have largely been relied upon to help fill the gap and automate processes. Continuous diagnostics focused on machine health is no different. This is a good thing, as buildings have become exponentially more complex and sophisticated from a technology standpoint. Continuous diagnostics can easily be scaled from a single facility to a campus to facilities across the globe. With clear insights into machine health and the ability to predict faults, resources can be properly deployed, and technology can be used to partially fill the knowledge gap that a retiring generation is leaving behind.



Shifting Away from an Ownership Mindset

Across different industries, people are becoming more receptive to the idea of opting for subscriptions over ownership and large capital outlays. Subscription models have disrupted plenty of traditional institutions within personal lives. Many choose renting homes over buying, streaming services instead of purchasing individual movies or songs, and now even major automotive companies are preparing to offer

subscription options as an alternative to owning or leasing. These events are showing people are losing their appetite for large capital expenditures and prefer fixed expenses that provide peace of mind. This same mindset is occurring in the built environment as stakeholders seek "as-a-service" models to mitigate risk.

By implementing diagnostics-as-a-service, facilities managers and building engineers do not need to become IoT and data scientists overnight. Through a service model, technology is deployed by experts, wireless connectivity is optimized by experts and insights are delivered by experts. This strategy lets a building benefit from continuous, risk-free diagnostics and ensures that the other large capital assets that a building has invested will remain in good health.

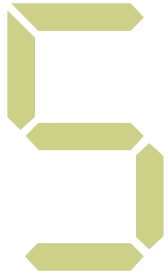


Shifting Preserving a Brand & Productivity

Commercial and industrial facilities are no longer just geared toward getting work done. The architecture and design of buildings is increasingly becoming a reflection of a company's brand and marketing strategy. However, no matter how aesthetically pleasing a facility is, it can leave a negative impact if critical infrastructure equipment isn't working properly. This can have serious repercussions if a faulty facility is the first impression that is created for a potential business partner, customer or even new hires.

The health of critical assets in a building can also impact employee productivity. Take temperature as an example. The U.S. Department of Commerce sites that overly heated workplaces can cause fatigue and irritability in employees. Studies from Cornell University have shown that workers that struggle to stay warm also are more prone to mistakes, which can lead to a 10 percent spike in labor costs. This all


underscores the importance of preventing downtime of and faults within buildings systems through continuous diagnostics.



Cutting Costs

Continuous diagnostics can reduce operating costs, even within facilities that were previously deploying preventative maintenance programs. This was the case for a healthcare facility that decided to make the switch. By using diagnostics-as-a-service, the facility was able to start monitoring 70 critical machines throughout the fa-

cility in real-time. Among those machines were two domestic hot water pumps which serviced 90 percent of the building's hot water. It was instantly discovered that there was a significant misalignment between motor and pump. The facility was able to proactively replace the coupling and perform alignments on both pumps. This prevented US\$29,000 in repair costs per pump and a total \$500,000 in repair costs were avoided across the facility.

With continuous diagnostics, buildings can implement a risk-free solution as a service, dramatically cut operating costs and downtime, and capitalize on cutting-edge technology innovations. And while a facility can take advantage of all these benefits, it doesn't come at the expense of overburdening its staff of facilities maintenance and building engineers. Instead, it augments their abilities and allows them to focus on the most impactful functions of their jobs. 



Jon Biagiotti, Product Marketing Manager at Augury, consults with industrial facilities looking to implement machine health solutions. Prior to Augury, Jon was an engineer at IBM's 300mm semiconductor fab where he worked across a dozen process work areas to implement product improvements and lean six sigma practices. He has a degree in Electrical Engineering from Yale University and a MBA from Harvard Business School.



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EMPLOYING DATA FOR PRODUCTIVE, SUSTAINABLE BUILDINGS

BY VINEET SINHA

Data is everywhere and its unlimited potential is becoming a large focus for building management at an increasing rate. But what exactly is data? In short, data is factual information that, when in its digital form, can be extracted and analyzed from building systems to help provide guidance for improvements. When it comes to data, one of most applicable quotes comes from Jim Bergeson, president and CEO of Bridgz Marketing Group, when he says,

**Data will talk to you if
you are willing to listen to it.**

This is especially true as the era of connectivity proceeds, it's important to remember the crucial role data plays in ensuring optimized operations. Read along to learn more about how data can help improve productivity, cost savings and building sustainability.

THE DANCE OF DATA AND SYSTEMS INTEGRATION

Advanced solutions are prominent in smart buildings — that's often why they are considered "smart." These solutions, like intelligent lighting controls and video analytics, generate vast amounts of data which is helpful to elucidate building operations and environments. When these systems are integrated, they can communicate more seamlessly with one another, compiling even more data. For example, lighting controls can provide insight into how often they are used, but when they are integrated with occupancy sensors and building management systems (BMS) the systematized data can show not only how often they're on or off, but also how frequently, during what times and which occupants are utilizing them.

However, when the variety, velocity and volume of data exceed the bandwidth of the analyzer, building managers are often left with disheveled data — otherwise known as a Big Data problem. This can happen when an overload of data is being analyzed through a manual process. With the implementation of machine learning and artificial intelligence (AI) technologies, data collection can be organized and automated for seamless analyzation, providing more frequent and accurate analytics.

Building managers can use data analytics for proactive reconditioning in the form of actionable insights. When AI is implemented, it can identify patterns within the data and recommend actions to building managers to increase efficiencies and solve problems, most importantly in predictive and pro-active ways. To revisit the integrated lighting controls example above, if the data is showing that a conference room's lights are consistently in use even when the room is unoccupied, AI will offer a suggested approach to limit that energy consumption — such as reconfiguring the controls to ensure that lights are automatically switched off when the room is unoccupied; luminosity levels are adjusted based on occupancy and natural lighting; the HVAC is adjusted to optimize the temperature and air quality. Doing this helps to limit the building's energy consumption and associated costs, while delivering a more efficient and comfortable environment. The same approach

can be taken with HVAC controls across different spaces to ensure a more comfortable, productive workplace for occupants while they are onsite.

As more systems are connected — from security systems, fire alarms and AV assets to enterprise systems — it's crucial to confirm that system data is being collected and analyzed thoroughly and consistently. Converting data from the building into an actionable resource opportunity offers building managers a more proactive approach to optimizing the building environment, including its sustainability.

DATA'S ROLE IN SUSTAINABILITY

With the growing number of energy regulations and certifications, smart buildings are playing a large role in energy consumption reduction. There are even initiatives being deployed that allow building owners to donate their data to help further research on energy consumption. These programs are helping to revolutionize sustainability efforts. The collection of data from a building's energy-based assets — like lighting, HVAC, elevators and more — can provide building management teams with insights into how and when systems are operating, including the amount of energy they're consuming, which can be used to help improve energy efficiency.


Monitoring building usage, whether it be by equipment, time span, floor or employee, is more seamless and accurate with the use of AI and analytics. AI can sort through data to identify patterns and trends relating to building use and energy consumption, which can then be utilized to make predictions about future energy demand. From accounting for changes in weather, utilization of space or operating conditions of major equipment, AI can consider all factors when generating faults, areas of opportunity and recommended actions with managers. This information can help address current operations or ensure adaptation for predicted occurrences.

Countries, states and cities are implementing sustainability standards within the built environment. The Building and Construction Authority in Singapore is one such agency enforcing stands to help combat climate change and improve energy efficiency. With AI pulling a variety

of internal and external factors to help enterprise management systems analyze, predict and optimize energy consumption, building owners and managers can utilize these smart technologies — including data analytics — to help ensure benchmarking standards for efficiencies are met.

As sustainability efforts continue to ramp up in the building industry, it's important to remember that sustainability is more than just monitoring energy usage — it's about caring for the environment and delivering a better occupant experience. Occupants are more concerned than ever before about the environment and are looking to work or rent from places that share the same values. Utilizing data to support sustainability efforts offers insights into energy usage, emissions, conservation resources and weather, which can lead to increased resiliency.

A SMARTER FUTURE FOR BUILDING MANAGEMENT

Smart buildings are sustainable, mobile, actionable, resilient and transparent — and using data can help enhance these qualities and, in turn, help management improve productivity and efficiencies while reducing operational costs. Integrating systems for a more holistic approach contributes vast data insights as the systems can communicate for greater self-awareness and regulation. Enhancing decision making for building management and optimization with data is the first step in improving sustainability efforts and maximizing ROI. Introducing a more connected infrastructure not only helps improvements today but sets the stage for the future. 



Vineet Sinha is Director and Product General Manager in the Digital Solutions business of Johnson Controls. His current responsibilities include Connected Equipment & Service, Enterprise Management and Assurance Service solutions. In his role, Vineet is responsible for product management, engineering, sales, technology development, customer engagement and marketing initiatives for his portfolio.

A photograph of a busy warehouse or distribution center. In the foreground, several cardboard boxes are on a conveyor belt. One box has a shipping label that reads "EXPRESS PACKAGE YHI" and "CVB". In the background, three workers wearing yellow shirts are visible, some handling boxes. The scene is brightly lit, and the overall atmosphere is one of active logistics.

SUCCESSFUL SUSTAINABILITY

BY BRIAN BERNSTEIN

Like any typical day in your facility — the building is filled with busy employees, the hum of machinery, and you are on the move, checking in on production, maintenance, and projects-in-progress. While sitting in an afternoon meeting, an important email hits your inbox: it's a request to help establish more aggressive sustainability goals, along with a roadmap for success. What concrete steps can you put in place to help make this happen and, given all your other responsibilities, how can you do it as efficiently as possible?

Sustainability is a broad term that refers to a variety of earth-friendly efforts such as recycling programs, eco-friendly packaging, the reduction of a company's carbon footprint through energy conservation, renewable energy initiatives, and more. To become more sustainable, many companies opt to better manage and minimize usage of important utilities like water, air, gas, electricity, and steam (WAGES). However, because each utility is used in different ways throughout all types of facilities, it can be challenging to accurately assess usage, and frustrating to know that improvements could be made, if only you could better identify the opportunities.

The good news: you're not alone. Even organizations with the best intentions can struggle with sustainability initiatives. According to a 2018 survey report from Bain & Company, of 297 global companies surveyed, only 4 percent say they fully succeeded in achieving their sustainability goals, compared with 47 percent who say they failed. Despite of the low success rate, 81 percent of respondents said sustainability is more important to their business today than it was five years ago, and 85 percent believe that it will be even more important in five years. That means that whether it's better (or different) tools, more (or better) data, or other factors, plenty of organizations need to reassess their sustainability strategy. So, what steps can you take to avoid joining the 47 percent?

With the Industrial IoT (IIoT), a variety of applications created through a network of smart sensors and connected devices, you can gain facility-wide visibility and identify opportunities to decrease utility usage. IIoT-compatible smart sensors and devices capture data trends and anomalies, then transmit the data across the network to secure, easy-to-use software applications where facility managers can customize data collection settings, create threshold-based alerts, analyze the findings, run and share reports, and more.

Recently, the IIoT has become so popular in businesses across the globe that by 2020, the discrete manufacturing, transportation and logistics, and utilities industries are forecasted to spend US\$40B each on IIoT solutions. The real value in the IIoT is data, which can be used to monitor sustainability goal progress, uncover incidents of waste and overuse, and identify new opportunities to conserve utilities.

Here are three ways the IIoT can help to achieve your company's sustainability goals:

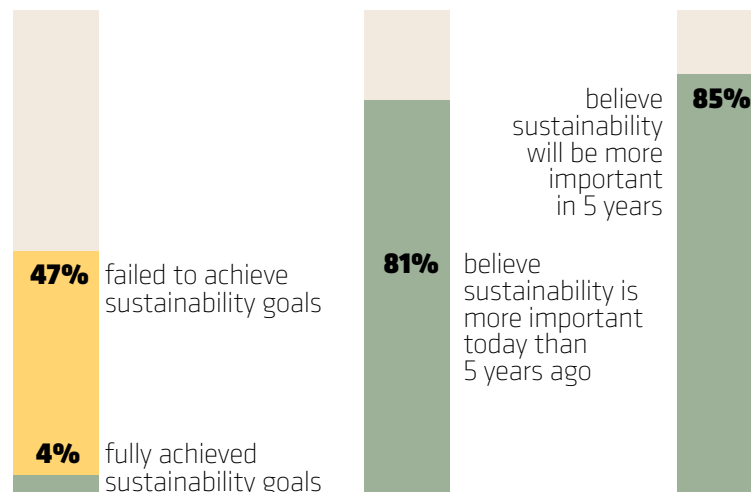
1. Automate Collection & Verification of Critical Facility Data

"If you can't measure it, you can't improve it," is one version of an oft-cited quote regarding business efficiency, attributed to author and business thought leader Peter Drucker. Most facility managers are on the right track with a method (or, more

likely, several methods) to measure facility performance and track progress against every KPI, including sustainability goals. But are those methods efficient, and truly reliable? In many cases, measurement involves a member of the team walking around the facility with a clipboard or tablet to record the latest data by hand. Manually tracking your facility's utilities data can be a drain on productivity. At a glance, it may not seem like a big deal to spend 20 minutes a day on data collection but, over the course of a year, it adds up to 80 hours or two 40-hour work weeks. What else could an individual achieve or contribute in those two weeks? Manual tracking efforts also risk human error, and those errors can be as harmful as they are seemingly innocent; the daily routine of logging what appear to be, day after day, approximately the same numbers or readings can inspire shortcuts or assumptions that save time but, when something goes wrong, can cost a facility in any number of ways.

When smart sensors work in tandem with IIoT software, real-time and historical data can be automatically and accurately collected,

OF 297 GLOBAL COMPANIES SURVEYED





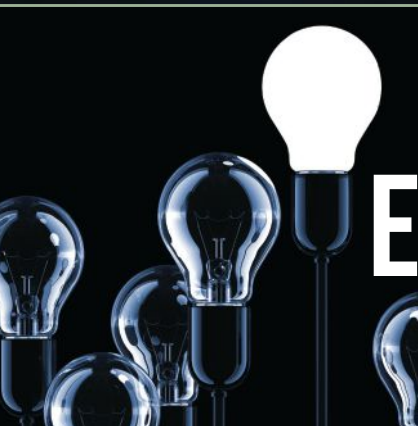
WATER



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STEAM

verified, and stored in one centralized place in the cloud. The automated collection of critical facility data through smart sensors that are active at any time day or night removes the risk of inaccurate data due to human error, and eliminates man-hours squandered on rote, manual tasks. Instead, accurate, facility-wide data is available at any time (and, through mobile applications, from anywhere), whether you need to see temperature trends in the storage facility or compare how much electricity was used to run HVAC over the last year, last month, or last week. With the data in a central place, cross-functional identification of and collaboration on sustainability goals becomes much easier as team members can easily pull ad-hoc reports, track progress, and identify new opportunities to introduce savings and efficiencies.

Once you've leveraged the IIoT to smooth a path to consistent, reliable data collection, you can start thinking about how and where you might apply opportunities to collect that data.

2. Optimize Utility Use through Monitoring and Metering

When facilities span tens of thousands (or hundreds of thousands) square feet and, often times, a variety of environments and areas such as manufacturing, warehouses, and offices, it can be tough to document and report on the exact what, where, when, and why of utility usage and, especially, utility waste.

Smart sensors and IIoT software can help track virtually all utility usage no matter what pipe, tank, switch, or hose they run through. With IIoT-based monitoring and metering, utility waste can be identified and proactively investigated so that sustainability goals aren't thrown off course.

With real-time and historical reporting made possible through IIoT software applications, facility managers can more easily monitor and observe utility use across the entire building or site. Any deviation from an established trend or pre-identified benchmark can signal an issue worthy of investigation.

In one example, a facility manager might monitor daily water use through his IIoT dashboard, which populates and graphs data from strategically-placed sensors. Typically, production requires approximately 100 gallons of water each day, but this morning the

dashboard shows that, in the last 24 hours, 130 gallons exited the primary water storage tank. With this information, a quick inspection of all workstations with hoses and the pipes leading to the water tanks, reveals that a crack is the problem. A replacement is quickly installed, and everything is back on track.

Without those smart sensors and the IIoT, that same, quickly-sourced leak may not have been revealed until the tank was entirely empty, or perhaps until there was noticeable damage to the tank or surrounding area; instead, the water loss is capped at 30 gallons.

Similarly, metering and especially submetering of utilities allows facility managers to not only track top-level or master utility consumption patterns, but also assign them to specific lines or areas. With submetering in place, the process to identify warning signs or opportunities to improve line-level performance that doesn't align with other, similar lines can be sped up significantly and therefore minimize waste that might otherwise compromise both production and sustainability goals.



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3. Manage Lighting-Based Energy Costs

It's no secret that lighting can make up a meaningful portion of facility energy costs. Light is, of course, a non-negotiable requirement, for both safety and productivity. It is also, perhaps, the easiest area to address in pursuit of improved operational sustainability. If your facility has not yet transitioned to LED lighting, that update alone can generate in the neighborhood of 40 to 50 percent savings in lighting-based energy costs. LED lighting also offers the advantage of basic control, through simple occupancy sensors, as well as advanced control, through smart sensors and the IIoT. That means that you not only realize massive savings by virtue of converting fluorescents or HID lamps to more efficient LED fixtures (up to 90 percent in the case of intelligent, IIoT-based LED lighting control systems), but also gain the ability to customize and automate light settings that ultimately result in even greater energy efficiency as well as a safer, more productive facility.

With the proper perspective and an IIoT-friendly approach, lighting projects can often pay for itself in terms of both sustainability and, with some intelligent lighting networks and platforms, the opportunity for the introduction of additional, IIoT-based benefits to a facility without the need for an entirely new, different, or costly infrastructure.

You need only speak to a few people to understand that the path to a successful sustainability program is a challenging one, and that there is no single, one-size-fits-all solution. However, a good first step is, as Drucker suggests, to put in place the means to reliably measure what's happening within your facility. Through sensors, software, and the IIoT, you can do just that, and automate the collection of reliable data, identify performance benchmarks to inform both goals and anomalies, as well as monitor and manage activity in a way places sustainability goals within reach. 



Brian Bernstein is VP Product for Digital Lumens, an Osram business, which designs energy-efficient Industrial Internet of Things (IIoT) applications for manufacturing, cold storage, food processing, and other industrial environments across the globe. He has previously held leadership positions in sales, marketing, and product groups at global companies ranging in size from startups to multi-billion dollar enterprises; in industries including power, textile, waste water, pulp and paper, lighting, semiconductor, electronics assembly; and for offerings including IoT, enterprise software, data and analytics, as well as complex hardware and software systems for applications from lighting to manufacturing automation. Bernstein holds a BSE in Chemical Engineering from Princeton University.

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THE FUTURE OF COMPLIANCE: ENSURING DATA PROTECTION THROUGH SECURITY EVOLUTION

BY JASON PELSKI

Companies use thousands of security assets from numerous vendors including video cameras, intrusion sensors, access control readers, servers and controllers. They amass enormous amounts of data that are vital to conducting business. While these assets are typically interconnected to a single IT network, their data remains separate, and it can take hours and countless resources to make sense of what is happening in various facilities in order to act.

Compliance Risks

Proper security compliance protocols provide assurance that network and devices are safe. Cyber-attacks on security networks have drastically increased. According to ITRC¹ there were 1,244 breaches in 2018 which exposed 446 million sensitive records. The risks and fallout for businesses becoming a victim are greater than ever. Hackers' motives are wide ranging from selling PII (personal identifiable information) which can be monetized and exploitable on the dark web, to holding businesses and municipalities hostage with ransomware. State-sponsored hackers have notoriously penetrated businesses seeking trade secrets and using cyber-hacks as a political weapon. Regardless of the type and motive of attacks, a common theme has emerged, and attacks have become more numerous and sophisticated over the last seven years. Growing threats influence the need for better compliance, which in turn drives better solutions to combat those threats.



Compliance Fallout

It's an unforgiving position to be a key stakeholder responsible for keeping a security network safe, only to find out the network was hacked. At any point in time, 5 to 8 percent of physical security devices like cameras, access control, door contacts and motion sensors are non-functional. Multiply that statistic across a large enterprise with 50,000 devices, and that's 2,500 to 4,000 devices offline or in a state of non-compliance. Out-of-compliance devices add risk which could manifest into cameras and recorders missing vital evidence such as perpetrators conducting nefarious activities.

Another important consideration are network vulnerabilities created by unknown attached devices and ensuring all devices are accounted for and that security protocols such as penetration testing have been conducted. Without accountability for every device on the network, how do FM's know vulnerabilities don't exist and that the network is secure? Most companies can't account for all their devices. This includes knowing the type, make, model, working condition or their location of devices. A proper security device data management platform is the first step in securing overall security posture, and selecting the right data schema is the foundation for their digital transformation journey.

Digital Twin Transformation

No one disputes companies want better security to protect their property and people. There's an overwhelming opportunity to help companies realize the value of organizing and collecting metadata to build data models and digital twins of their devices for the next evolution of compliance. The concept of the digital twin was presented by NASA nine years ago in their technology² roadmap. Many leading tech companies like GE and Microsoft have used the term to market their products. For NASA, their digital twin use case was a predominate way to replicate and test space flight control maneuvers from the ground before sending commands to spacecraft.

Think of a digital twin as every physical security device's avatar representing itself

in the virtual cloud domain. For security devices, this has practical and evolutionary advancements for improving security and smart building compliance. A digital twin is a replication of the device's attributes in a data management platform which acts as virtual risk scenario planning tool. For example, an enterprise security system can send hundreds of thousands of events. Simulations are run throughout the network topology to ensure 100 percent compliance all the time, every time. The combination of events sent (or not sent) paint vivid insights into the health and performance of the system that directly impacts compliance KPIs.

Digital twinning should be considered a required step in a digital transformation journey, allowing artificial intelligence and machine learning to help improve performance and security compliance. A comprehensive asset inventory of all connected devices is the first critical step in creating a digital twin asset repository. Using a similar analogy to security networks, simulations and testing of various attack vectors can be run checking for vulnerabilities in the virtual system before verifying in the physical system. Also, event processing of each individual device can immediately identify device health issues and trace the root cause through the hierarchy of parent/child relationships. The result can predict preventative maintenance and thus minimize costs and out-of-compliance risks. Once a discrepancy is identified, the system automatically creates a work order ticket and follows the service operations workflow until resolution, keeping track of the progress until compliance conformity is satisfied.



Redefining Compliance

New monitoring technologies are generating “always-on” compliance to ensure network and device health performance. The sheer complexity of keeping the plethora of security devices and network operational in the most performance-efficient and cost-effective way is challenging. The security market is mature and fragmented, with thousands of hardware and software vendors in a competitive market. Integrating with leading manufacturers of access control, video platforms and IT network systems is critical for overall compliance performance. Regardless of integration, digital twinning is a system-agnostic model that unlocks value and reinvents the definition of compliance performance.

For example, compliance auditing is an activity which typically happens once or twice a year and involves manual processes of verifying every device works as designed. Manual auditing is a resource intensive activity, and exponentially compounded when a company acquires another company, leading to integration of two security networks as part of a corporate mandate. It’s also impacted by the natural decommissioning and upgrading of equipment over time – a 15-20 percent continual change impact year-over-year. By reconstructing the needs of the organization and applying digital transformation best practices, much of the repetitive compliance audits can now be automated, adding insight into device health, asset lifecycle management and system operational performance.

Whether a company uses integrators to manage the service workload or is a self-maintainer, without a device compliance data management platform in place and proper governance models, the traditional inefficient break/fix model still

reins. The problem with the break/fix model is it’s still dependent on security personal to find non-functional devices, hidden vulnerabilities and report discrepancies by creating work order tickets. New compliance platforms use machine learning to identify non-functional devices by scanning the system and automating service tickets which can be directed to a predefined integrator or internal owner. Since virtual audit scanning is conducted in real-time with high accuracy compared to a human manually stumbling upon a non-compliance device, it dramatically improves the cycle time or “case-condition” period, thus greatly reducing the time devices remain in non-functional/non-compliant state.

Digital Transformation Journey

It is an FM’s responsibility to keep up with latest threat trends and propose solutions and budgets to keep the environment and network safe. Physical security networks are comprised of access control, cameras, door locks and motion sensors, and are meant to keep unauthorized people out. It’s also the first line of defense in protecting access to data, people and property, and unfortunately takes a lot of resources to keep in working compliance. A data management compliance platform using Brick³ data schema, digital twins, machine learning and AI can dramatically improve your overall compliance and reduce overall operating costs by 15-30 percent.

The journey starts by creating a device inventory using geospatial mapping. Next, device monitoring is configured for every accountable device and scans the system for any device or network health issues. Any device abnormalities are compared against a constantly learning AI engine

which decides which actions to take. The device AI engine reports on a host of compliance metrics and risk ratings for future considerations.

The benefits of a data management compliance platform can be used for an expanded portfolio of security offerings. For example, Converged Cyber-Physical Security (CCS) platforms have emerged to converge asset device compliance with other threat intelligence data sources such as social media, news and weather to provide contextual awareness of threat risk by geographic location. It receives geospatial floorplans and mapped device data to provide tools for real-time collaboration in order to speed the dissemination of threat data using advancements in standard operating procedure (SOPs). All of these technologies lay the digital groundwork for a semantic aware virtual security operating centers (VSOCs), which are expected to replace traditional security operating centers (SOCs) in the near future.

Next Steps

The rise of cyberthreats and even the proliferation of IoT devices in building systems is a growing security threat. Doing the research and taking the time to find a solution that can help tackle this problem by centralizing security asset management and remotely monitoring equipment is critical to future success and security of your data and assets. FMI

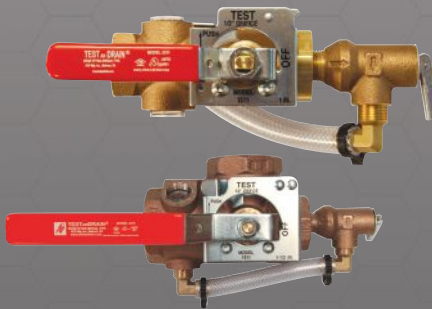
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- 2 https://www.nasa.gov/pdf/501321main_TA11-MSITP-DRAFT-Nov2010-A1.pdf
- 3 <http://brickschema.org/>



Jason Pelski is Director of Product Management for Assurance Services, a security asset health monitoring and service compliance platform which provides the right data to the right person at the right time to reduce risk to people and property. Assurance Services helps customers manage their asset data portfolio for improved cyber security, operational performance, and compliance.

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OTIS

CSP LEVEL Gold | CSP SINCE 2019 | WEBSITE www.otis.com

FMJ What innovations are being developed at Otis?

OTIS Otis is reinventing itself as a digital industrial company to meet the needs of customers in the digital economy and the era of intelligent buildings, smart cities and hyper connectivity.

The launch of our Otis ONE IoT service platform exemplifies this. Our approach to service includes a commitment by the entire Otis team to combine movement and connectivity in new and exciting ways through technology and the Internet of Things. We're using IoT and data from the largest service portfolio in the world to enhance our ability to actively monitor and predict maintenance needs for each individual customer — across a single site or an entire portfolio by leveraging our 30 years of experience connecting elevators.

When mechanics are on site, they have digital tools and proprietary Otis apps to do their job more efficiently, to fix issues before they cause shutdowns and to get elevators back into service faster when they do shut down, resulting in reduced downtime. Our customers benefit

from enhanced reliability, efficiency, stronger communication and real-time equipment updates.

FMJ What do you see on the horizon for FMs and technology?

OTIS New technologies are transforming the way we move, and rapid urbanization have made elevator and escalator technologies more critical than ever. At the same time passengers have new expectations for their residences, workplaces and recreational spaces. As a result, our customers need service that is faster, more customized and more digital.

In today's smart cities, everything is tracked using the IoT. In our industry, we are uniquely positioned to understand traffic patterns inside the walls of a building. We collect lots of data to understand how buildings operate, how buildings are used, how people actually move through buildings; so, we can get them to their destinations quickly, safely and comfortably.

Data can move between walls, but people cannot. How we utilize this information as an industry is something we're focused on.

FMJ What do clients say about Otis?

OTIS Otis ONE was created using customer input and feedback to specifically address issues they said are most important to them. The platform offers transparency with easy access to information on equipment data and performance. We can notify our customers when there's an issue and provide faster service. And predictive maintenance can offer improved equipment uptime and fewer unexpected shutdowns.

FMJ Tell us about your commitment to the community.

OTIS Otis gives back to communities around the world through contributions, in-kind donations and countless employee volunteer hours. For example, Otis volunteers support Special Olympics in the U.S., France and Japan. We sponsor Little Engineer programs in Hong Kong, elevator safety programs in China and Korea and orphanages in India. These are just a few examples of our global commitment to make the world better.

Otis is the world's leading manufacturer and maintainer of elevators, escalators and moving walkways. Founded more than 165 years ago by the inventor of the safety elevator, Otis offers products and services through its companies in nearly 200 countries and territories. Every day, Otis moves more than 2 billion people through the world's urban landscapes.



COMPANY NAME C&W Services
EXPERTISE Facility Services
CSP LEVEL Gold
CSP SINCE 1991
WEBSITE www.cwservices.com

FMJ What research or product innovations is your company currently working on that will help facility managers be more successful in their roles?

C&W We're excited about our work with Prescriptive Maintenance, also known as RxM, which provides another layer of reliability excellence and uptime management. Where Predictive Maintenance (PdM) seeks to identify anomalies, trends, or readings that exceed a parameter, RxM identifies impending situations and then seeks to provide solutions or alternatives to technicians to resolve the problem. Essentially, RxM identifies the problem and then provides a potential solution.

As RxM matures it will become as common as Predictive Maintenance. Early adoption of this new strategy allows facilities to begin the machine learning process and to take advantage of all the benefits it brings.

FMJ What's on the horizon in your field/industry, and how is your company meeting those challenges and opportunities?

C&W As IoT has become an increasingly pervasive part of both life and work, we've made sure that we're at the forefront of IoT application in facilities. This has led to the addition of numerous efficiency-boosting tools at our client sites, including robotics and sensors for cleaning, control programming, and predictive technologies.

We've been especially interested in performance tracking of facility assets like HVAC, lighting units, and elevators, as the technology allows for maintenance work orders to be triggered automatically. With 30 percent of planned maintenance activities being carried out too frequently and 40 percent of assets having a limited impact on facility uptime, there are real opportunities to drive cost savings through a targeted approach.

FMJ What has been the most positive feedback you've received from clients?

C&W Some of the most positive feedback we've received from our clients involve our efforts to draw new people into the facilities services industry and expand the talent pool.

One way we're doing that is by investing in our apprenticeship program. This two-year program provides participants with rigorous on-the-job training and tuition assistance to attend a local trade school. Additionally, we've leveraged our numerous partnerships to provide a structured program using an established curriculum.

We've also begun partnering with local high schools to open students' eyes to the opportunities that a career in facilities can provide. As part of these efforts, we're giving students a behind-the-scenes look at a number of our facilities and organizing opportunities for them to speak with our team members.

FMJ Tell us about your CSR efforts or projects. How have these contributed to the community?

C&W Over the past several years, we've invested in programs to address the trade skills gap. Programs for veterans have been particularly successful. In fact, in 2018 we hired 140 veterans in North America, exceeding our goal. Other programs include apprenticeships, scholarships, mentoring programs, and engaging with social enterprises.

One such social enterprise is Cara, a social enterprise agency that seeks to take people out of poverty by training them for and connecting them to meaningful work. In our inaugural project with Cara, 10 Cara clients went through a week-long C&W Services' training program to learn to be safe, effective, and professional janitorial employees.

We documented the training in a three-minute video that gives voice to the Cara clients' feelings about the importance of autonomy, hope, and change. It's sincere, straightforward, and effective. How effective? After being passed along to company executives, the \$1,500 video was promoted by a related social enterprise agency, which resulted in a \$1 million donation to Cara. In a tight labor economy, we need to develop a skilled and committed workforce. Our reason to engage with Cara was practical; who knew the outcome would be magical?



COMPANY NAME ARC
EXPERTISE Facility Software Solutions
CSP LEVEL Silver
CSP SINCE 2014
WEBSITE www.ce-arc.co

FMJ What research or product innovations is your company currently working on that will help facility managers be more successful in their roles?

ARC Powerful and easy mobile apps are driving facilities teams to greater success. Apps are so easy to use that teams embrace them. We developed the ARC Facilities app to provide instant access to building and equipment information, such as shutoffs, as-builts, O&Ms and emergency information. Like Google or Uber, building information is available in seconds from any location through search, clickable maps and QR codes.

FMJ What's on the horizon in your field/industry, and how is your company meeting those challenges and opportunities?

ARC Given cost, time, risk and emergency response pressures, facilities teams must work smarter and faster and have instant access to information in order to drive productivity. Powerful and easy mobile apps are a minimum requirement, as is the ability to integrate with other systems. Making older buildings smarter requires the ability to auto-organize old paper plans and binders as well as new digital closeout packages. ARC Facilities provides all this in a powerful and easy-to-use app.

FMJ What has been the most positive feedback you've received from clients?

ARC To impress the importance of mobility, Rich Steiger, Manager of Facilities Management at Orange County Government in Orlando, Florida USA, said: "Mobility is important because you need information at your fingertips. In an emergency, the last thing you want a technician doing is hunting for information. In critical situations it's all about how fast you can respond and prevent damage." Tim Edsell, Mechanical Systems Supervisor at Lodi Unified School District in Lodi, California, USA echoed those sentiments by saying: "Having it available on mobile devices is key. It's a huge savings in time. Within minutes you are looking at the page you want to look at."



COMPANY NAME FREEAXEZ
EXPERTISE Cable Management System | Access Floor
CSP LEVEL Silver
CSP SINCE 2015
WEBSITE www.freeaxe.com

FMJ What research or product innovations is your company currently working on that will help facility managers be more successful in their roles?

FREEAXEZ Gridd® by Freeaxe is a cable management system that is revolutionizing the raised floor industry. FreeAxez is proud to announce the launch of Gridd® Mobile in 2019. Gridd Mobile is a natural extension of Gridd and Gridd Power systems, 2 previous award-winning Technologies. Gridd Mobile is an app for smart devices which incorporates Augmented Reality (AR), and all the information needed about a facility's cable and power management system; increasing the ease of use and flexibility the Gridd systems offer. The power of change just got easier!

Typically, when a facility project completes, it's turned over from the builder and sub-contractor to the occupants and facility managers. The occupants move in, and the architects, builders, and installers move onto their next project. This often leaves in-house teams unaware of the systems beneath the floor.

Gridd Mobile provides augmented reality (AR), technical support, as-built drawings, how-to videos, original site pictures, inventory management, and product information which is conveniently accessible on a smart phone or tablet. This innovation provides an "x-ray" view of power and data cabling beneath the floor covering—all without opening an access panel. Location of all IT and power infrastructure underneath are precisely identified, eliminating guess work and unnecessary labor.

FMJ What's on the horizon in your field/industry, and how is your company meeting those challenges and opportunities?

F Industry changes such as the technological explosion, office design trends, and millennial influences of a working lifestyle place an increasing demand on facility managers to create a built environment that can easily adapt. Today workplace collaboration, connection and community are most important. Open office concepts and company growth frequently means shuffling around the floor plans, adding workspace and redirecting the flow of power and data. Over the past 20 plus year's FreeAxez has facilitated this change with its product developments. The FreeAxez Gridd® and GriddPower® access floor systems maximize flexibility for the challenge of evolving technologies. Backed by a 'can do' attitude and commitment to our clients, FreeAxez is redefining how successful companies manage the changing needs and stay competitive in a evolving landscape.



COMPANY NAME IBM
EXPERTISE FM Software Solutions
CSP LEVEL Silver
CSP SINCE 2019
WEBSITE www.ibm.com/internet-of-things/solutions/facilities-management

FMJ What’s on the horizon in your field/industry, and how is your company meeting those challenges and opportunities?

IBM Today, it’s all about the workplace experience. So many factors are driving this: a tightening labor market, the influx of younger, more digital savvy workers and their expectations about the workplace, and the need to accommodate workforce mobility or the “work from anywhere” model. Add to all of that some of the simple facts of office life. For example, we spend a third of our days in meetings, and trying to find a space too often drags down employee productivity. That’s why we’re so focused on the occupant environment and how IBM TRIRIGA can help customers create more engaging workplace experiences. Our solutions allow users to address the three key components of that experience: space management, workplace services and user interactions. Starting with space, TRIRIGA helps you create the optimal plan, then delivers the insights you need to better understand space utilization and real-time occupancy. Next, TRIRIGA helps you deliver the right mix of easy-to-use services to simplify common tasks, like scheduling catering and meeting rooms, reporting and requesting maintenance issues and controlling comfort settings. Finally, TRIRIGA helps you deliver a better user experience through customizable apps, responsive design and better calendar integration.

FMJ What research or product innovations is your company currently working on that will help facility managers be more successful in their roles?

IBM FMs are tasked with meeting the high expectations of a modern workforce. After all, it’s not just millennials who expect more frictionless – and consumer-grade – technology interactions in the office. That’s why we’re excited about TRIRIGA Virtual Assistant. This technology lets us bring the power of Watson to the workplace in the shape of a building concierge. It’s similar to the at-home experience with which users are already familiar while giving building operators a way to deliver a more differentiated, customized, conversational experience. An organization can train a concierge to be an expert on topics that they deem most important, like a particular property or event, and learn from each interaction to deliver even better responses as time goes by.



COMPANY NAME SCLogic
EXPERTISE FM Software Solutions
CSP LEVEL Silver
CSP SINCE 2018
WEBSITE www.SCLogic.com

FMJ What research or product innovations is your company working on that will help facility managers be more successful in their roles?

SCL We are incredibly excited about incorporating machine learning into Intra. One of the biggest advantages of machine learning is that the computers never stop learning; the more data they collect, the better they get at analyzing and streamlining processes. The algorithms are constantly being fine-tuned to execute workflows more efficiently. With the help of machine learning, databases can recognize datasets faster and come to predetermined decisions sooner, freeing up facility managers and their employees for more labor-intensive tasks.

FMJ What’s on the horizon in your field/industry, and how is your company meeting those challenges and opportunities?

SCL We have provided our Intra in-building logistics solutions for over two decades. During that time, countless emergent technologies were invented, adopted and replaced. What we’ve learned along the way is that an unwavering focus on our users is the key to Intra’s agility and longevity.

Intra is an ever-evolving platform built and continually engineered for the people tasked with the often-thankless work that makes campuses, facilities and auxiliary services run. We talk to our users daily. It’s these conversations, equaling hundreds of man-years of listening, that fuel Intra’s development, refinement, and continuous innovation. As we evaluate new platforms, devices and ways to interconnect systems, we always ask ourselves if “this” will this make our users’ day better and their job more secure. Be it demand for a broader micro-services architecture, an integration to a robot, a driverless campus or simply the logic and urgency of sustainability, Intra will be there.

FMJ Tell us about your CSR efforts or projects. How have these contributed to the community?

SCL SCLogic is a proud participant in the Meaningful Day Program at Bello Machre, a local organization that provides homes and support to children and adults with developmental disabilities. The program’s goals are to provide supported employment to enrich and promote the individual’s personal and/or professional growth to experience a meaningful day.

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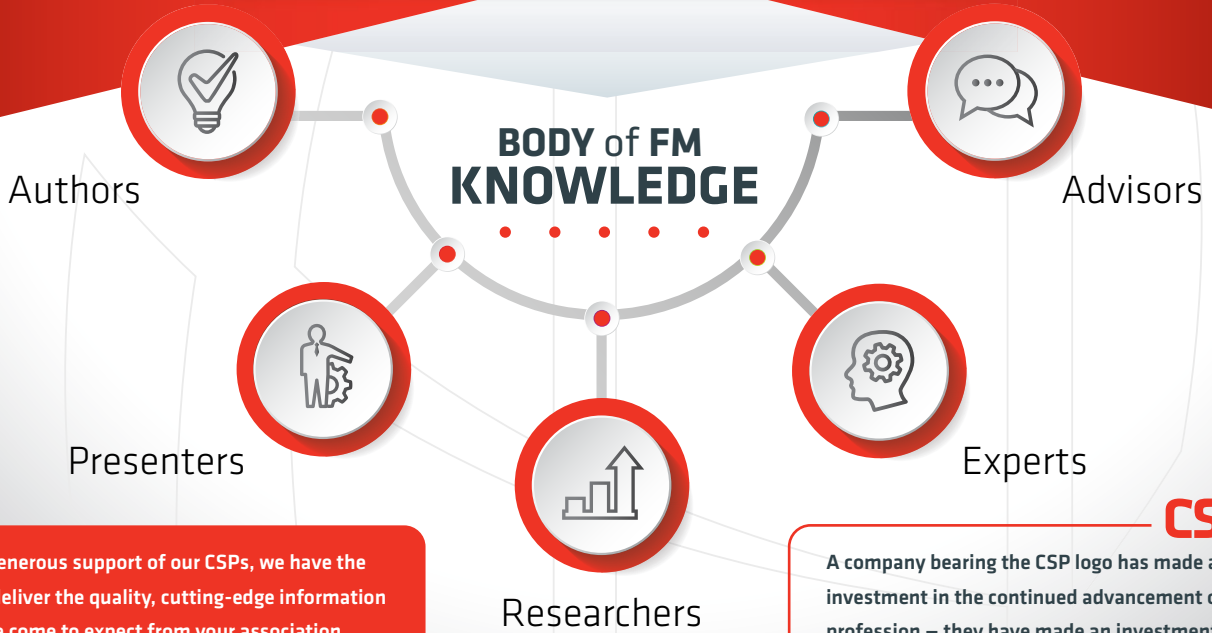
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MANAGING THE EMOTIONAL WORKPLACE

BY EDDY FINCH

Metaphorically speaking – gardener or carpenter?

In a complex industry like facility management there is a need to call a spade a spade. Today there is an unambiguous definition for the profession using robust words including “integration” and “functionality.” But sometimes a definition doesn’t tell the whole story. It says what FMs do but not how FMs do it.

Explaining the profession is not easy. People’s eyes seem to glaze over. Even amongst other design team professionals, the concept of facility management is often misunderstood. Architects like to see themselves as ‘yes, and...’ thinkers able to draw on their creative juices. Pitched against them, the facility manager is often perceived as the less creative ‘yes, but...’ thinker that has boundless reasons why something does not pass health and safety regulations. Why are words so important? Not only do they influence the way that others see the profession – they crucially affect how FMs see themselves in the job.

Metaphors can transform our understanding of a profession. A metaphor is a figure of speech in which a word or phrase is applied to an object or action to which it is not literally applicable. The right metaphor can provide a powerful way of explaining a difficult concept in a rich insightful way. The wrong one can suffocate our self-understanding and those of others.

A metaphor for facility management

The master of metaphor, William Shakespeare, in his play “As You Like It” (1599) suggested that the world is a stage and humans are actors that enter and exit the stage. Nearly 400 years later, the same metaphor was adapted by one of the founders of facility management, Frank Duffy. His ingenious portrayal of modern-day facility management relied on the ‘scenography’ metaphor with the artefacts of ‘shell, services, scenery and sets’ — each with their distinctive lifecycles^[1]. It’s revealing to see how metaphor rather than industry definitions have opened eyes to an understanding of facility management.

There are good metaphors and misleading ones. When Oppenheim wrote his book explaining the art of questionnaire design, he noted:

“Some people still design questions as if the process of interviewing or filling out a questionnaire were rather like unloading a ship, with every item of cargo

labelled according to its contents and marked with a specific destination, so that it can be lifted out of the hold and set down as and when required. In reality, questioning people is more like trying to catch a particularly elusive fish, by casting different kinds of bait, at different depths, without knowing what is going on at the surface.” ^[2, pp. 120–121]

Facility management is about asking the right questions. Stakeholders are always keen to provide a long list of wants at the programming (briefing) stage. Translating these wants into real needs can be challenging. Similarly, at the post-occupancy stage, the facilities manager has to adopt an almost forensic approach to uncovering issues and successes. Trying to catch a fish almost seems like child’s play in comparison.

Parenting

Perhaps a workplace metaphor might be found in the world of ‘parenting’. In a recent book “The Gardener and the Carpenter”^[3] developmental psycholo-



gist Alison Gopnik suggests that modern parenting is all wrong. Parents do too much for their children and do not give them the freedom they need. In one experiment she describes how two groups of children were provided with two very different play environments. One group was instructed by the teacher about how to use the toys available. In the other ‘accidental’ group, the children were encouraged to experiment. Children that had been taught how to use toys by the teacher, tended to play in a repetitive and un-exploratory way. In contrast, the ‘accidental’ group that were allowed to play freely with toys were able to discover many novel and unforeseen possibilities.

Parents can feel under tremendous pressure to do the right thing so that everything turns out alright in the end. The carpenter metaphor describes the parent who seeks to mold the child by relentlessly chiseling away with a particular outcome in mind. In contrast, the gardener does not believe that they are single-handedly capable of creating the ideal flowers or vegetables. Instead, the gardener works hard to create the right growing conditions: they accept that their

plans may not be realized. Rather than trying to mold, the parent that is like a gardener will seek to create a safe space in which the child can flourish.

Metaphorically speaking, should facility managers be more like carpenters or gardeners? The carpenter describes the more traditional facility manager. Just like in the parenting model, the traditional facility manager is assumed to be active, whilst the building user is always passive. They seek to create order from the chaos that users inevitably bring to the workplace (promoting lean 5s tools or office etiquette). The workspace is simply a tool, enabling users to complete a succession of tasks. Success is measured in terms of output and satisfaction.

In the modern workplace, managed by the gardener, it is no longer about fulfilling predictable tasks — but is instead about allowing the interplay of activities, rather like a dance (pardon the mixed metaphor). It has more agile rather than lean characteristics. Evolvability is the outcome of a messy environment akin to the process of natural selection. Variable environments produce variable employees (neurodiversity).

Reverting to type

From the time that building users enter an unfamiliar office environment, they engage in sense-making. They pick up cues about who they are and how they fit in an organization just by immersing themselves in a space. With the advent of New Ways of Working (NWoW) the office environment presents many diverse choices for the user: choices about where to work, when to work and with who. The introduction of Activity-Based Working has exploded the choice of work settings available to office users. The diversity of work environments in ABW offices enables users to migrate from one setting to another during the course of the day - matching their current workplace needs to their task. These choices are both liberating and bewildering. When presented with multiple settings with different technical and physical attributes, building users may demonstrate an initial willingness to try out unfamiliar settings. But over time, users often go back to their old ways. The frequency of switching to different settings becomes minimal, despite the evident productivity gains from matching task to setting^[4].



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In this complex ecosystem, the role of facility manager as gardener becomes more evident. Rather than instructing, the facility manager takes on a nurturing role. They use physical artifacts in the work environment to nudge users to vary their behavior. An illustration of this is the use of Sit-Stand Desks. In a study in the Netherlands^[5], a simple intervention involving returning the desks to a standing position at the end of each day, encouraged users to mindfully consider both the sitting and standing options when returning to work in the morning. As a result, the switching frequency rose significantly in the subsequent study period.

Emotional traction

The way in which people, place, process and technology combine in the modern office is remarkably different from the past. Organizations do not want a plug and play solution — based on mutual indifference with co-workers. Instead, organizations want to provide emotional traction. This allows employees to understand their role in an organization and to find personal identity. Organizations are hemorrhaging good staff due to a lack of trust, loyalty and learning opportunities. The design of the workplace can redress this imbalance. Rather than look to the intelligent building as a savior, the emotionally intelligent building may have some answers.

An emotionally intelligent building describes “the sum of emotional feedback that can be perceived, discovered, or learned as a result of being in and engaging with a work setting — both individually and as groups. This intelligence enables sensemaking as a result of interaction with space and artefacts within the space, using one of three dimensions: instrumentality, symbolism or aesthetics.”^[6]

The book, ‘Creating Emotionally Intelligent Workspaces’^[6], examines whether the contemporary office was more than simply an instrumental tool? Could it be used to enhance emotional intelligence — the capability of individuals to recognize their own emotions and those of others. Leading practitioners in the UK and Australia shared their expertise and the book looks at current research in relevant areas (e.g. environment-behavior, psychology, linguistics and anthropology). The book also spotlights three key dimensions —

with a particular focus on the more intangible non-instrumental concepts:

- instrumental
- aesthetic
- symbolic

Instrumental

An instrumental view of the workplace considers it as simply a tool for getting the job done. Success is measured in terms of interchangeability, productivity and compliance. Standards, service level agreements and measurement tools provide the necessary armory to ensure requirements are met.


Aesthetic

Workplace aesthetics allow FMs to engage people’s senses. The ‘look and feel’ of the workplace affects everyday well-being and decision-making. Unlike the static experience of visiting an art gallery, aesthetics in the workplace involves dynamic interaction and interplay. Developments in neuroscience and specialist research in neuro-architecture and neuro-aesthetics are providing fresh ideas about interaction with the workplace at the biological level. The FM world is starting to understand the significance of ‘naturalness’ in surroundings — allowing FMs to find emotional traction (biophilia suggests that we all have an innate and genetically determined liking for natural things).

Symbolic

A symbol can be defined as “something that stands for something else.” Unlike a sign, a symbol has meaning at several different levels. Organizations use symbols as a branding device in the work environment in order to foster organizational identity. But symbolism is also important at the individual level — as a means of self-expression. Personal artifacts are often used by employees as symbolic identity markers - family photos or keepsakes on the desk. Symbols evoke emotions and meaning that are culturally learned. Likewise, people attach meaning and memories to surroundings. The hot-desking environment and the clear desk policy often prohibit personalization, but employees continue to find ingenious ways to express themselves in the workplace by the use of un-sanctioned symbols.

Providing a protected space

The relationship between the modern-day facility manager with users and stakeholders has to be “more thoughtful and less divisive, more complex and less tortured, more nuanced and less simplistic”^[3] (quoting the observations by Gopnik on parenting). The gardening metaphor serves a useful purpose. Relying solely on the instrumental approach to workplace management is unlikely to offer the freedom for employees to flourish. Nor will it encourage the creative ‘yes... and’ talents of the facility manager. Understanding how the physical environment can create emotional traction will be the challenge in forthcoming decades. More than ever, the workplace “provides the next generation with a protected space in which they can produce new ways of thinking and acting that... are entirely unlike any that we would have anticipated beforehand.”^[3] 

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Eddy Finch is co-author of “*Creating Emotionally Intelligent Workspaces: A design guide to office chemistry*” that is published in October 2019. He obtained his Ph.D. from the University of Reading in 1989 and was full Professor in Facilities Management at Salford University, UK (2008-2011). He acted as editor-in-chief of the *Academic Journal Facilities* for 15 years.



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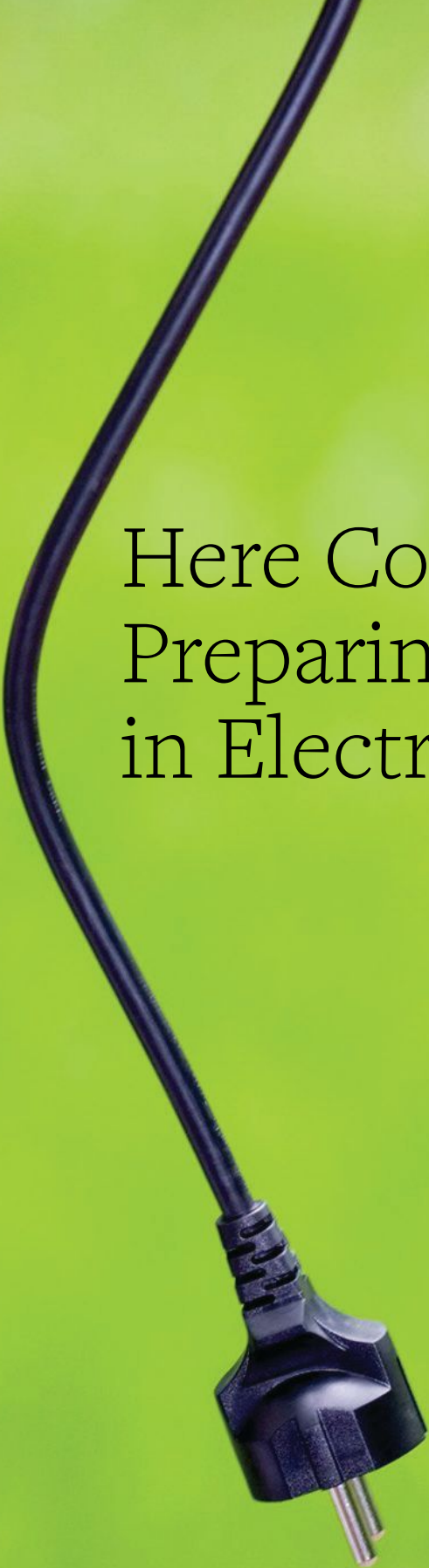
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Electric vehicles may be silent, but the buzz is growing louder for electric mobility as more drivers experience the benefits of driving an electric car. To date, there have been over 1.2 million plug-in electric vehicles sold in the United States. EV sales saw an 81 percent year-over-year growth from 2017 to 2018 with a 22 percent compound annual growth rate expected from 2019 through 2024. The Tesla Model 3 was the top-selling luxury vehicle in the United States last year and continues to dominate the US EV market, making up over 45 percent of 2019 total US EV sales as of the end of June. With more EVs hitting city streets, commercial properties such as workplaces, apartments, and shopping malls are looking to satisfy the growing charging needs of electric car drivers.

Driving an EV offers both environmental and lifestyle advantages over internal combustion engine vehicles. With 40 percent lower greenhouse gas emissions on average and zero tailpipe emissions, EVs help improve local air quality because there is no harmful particulate matter like black carbon emitted and other contaminants like volatile organic compounds. While these environmental benefits make the transition to electric mobility fundamental to building a sustainable future, many EV drivers find that the lifestyle advantages are the true prize of EV ownership. EVs offer smoother and quieter acceleration, better handling, and generate instant linear torque, allowing them to outperform traditional gasoline-powered vehicles. All this without the frequent and expensive visits to smelly and dirty gas stations. Then there are the savings accrued to EV drivers from avoided trips to the mechanic and service station, which typically add up to thousands of dollars over the course of several years. Many regions also offer EV drivers access to carpool lanes, reduced tolls, reserved parking, and free public charging. With these combined benefits, more than nine out of 10 EV drivers report they would never go back to a gas-powered vehicle.

The workplace is the second-most frequent parking location behind personal homes. For EV drivers who commute, this makes the workplace the second-most important place to charge. Consequently, the availability of workplace charging has an enormous impact on an employee's choice to drive an EV. A DOE survey found that employees were six times more likely to drive an EV when workplace charging was made available. Employers who take this step are appreciated by their employees - according to the same study, 90 percent of employers receive positive feedback from staff on their workplace charging programs. Given that 74 percent of plug-in electric vehicle drivers express strong interest in workplace charging, stations can be offered as an amenity or perk such as free charging to attract and retain talent and increase employee satisfaction in the workplace.

While many EV drivers invest in a home charging station, workplace charging is especially important for employees that live in an apartment or condo and cannot necessarily install a charging station at home due to restrictions at the property or lack of a dedicated parking space. For these drivers, access to a workplace charger can serve as a primary charging location and relieve range anxiety with a convenient place to reliably charge. In urban areas where many people live in apartments or multifamily unit housing, workplace charging can mean the difference between whether it is realistic for a person to drive an EV or not.

Apart from satisfied employees, companies that invest in EV charging equipment see a wide range of additional benefits that make EV charging a worthwhile investment. With EV sales nearly doubling last year in the U.S., many businesses see an opportunity to differentiate their company from competitors, attract and retain talent, and add value to their properties by adding EV charging infrastructure.

Whether a property is designed for office use, retail or multifamily housing, offering EV charging can be a great way to increase the value of a property by offering a highly valuable amenity. Providing EV charging demonstrates a commitment to sustainability and can help earn LEED certification through credits provided for installing charging stations. Also, smart EV charging stations offer energy management optimization to keep electricity bills low, and payment collection mechanisms to generate new revenue from EV charging sessions.

Businesses that offer public EV charging to customers and visitors are quite literally putting their properties on the map. EV drivers use smartphone apps to find EV charging stations to "top up" their vehicle's battery and will typically stay parked for an hour or more while they shop or run errands. By attracting new customers and increasing "dwell-time," businesses can increase operating income - not to mention the additional revenue stream that can be generated by collecting payment for station usage. EV drivers tend



to be loyal customers who return repeatedly, and once a business becomes known as a charging hub in the local community the word will spread to other EV drivers in a virtuous cycle that keeps customers coming back.

Businesses are also investing in EV charging stations because of the availability of incentive money. There are billions of dollars available to businesses across the United States to fund commercial EV charging equipment. The three main sources of funding are utility-provided incentive programs, state and local government incentive programs, and funds from the Volkswagen “Dieselgate” emissions scandal. Before investing capital in an EV charging project, it is always prudent to speak with a trusted expert in the space to learn whether a project may be eligible for funds that cover all or part of the costs of an EV charging installation.

Where the “carrot” of generous financial incentives does not prompt the desired investment, states and local governments are also using regulations to mandate the development of EV charging stations.

Across the United States in places such as California, Seattle, and Miami, minimum requirements are being put in place for the inclusion of EV charging stations in new real estate development. California’s CAL-Green building code, for example, includes a provision requiring 6 percent of parking spaces in commercial buildings and 3 percent in multi-unit dwellings be EV ready. This is a trend that is gaining traction across the country, largely because it is cost-effective to install EV charging stations when a property is being developed.

So how can a business take advantage of the buzz around EVs and reap the benefits of investing in EV charging equipment? Here are some best practices to maximize an investment in EV charging station equipment.

TAKE ADVANTAGE OF INCENTIVE FUNDS WHILE THEY ARE AVAILABLE

Today, there are generous EV charging station incentives available to businesses across the United States, but these funds are capped and may not be renewed after the EV market matures. In some areas it

is possible to stack as many as four or five incentive programs to get EV charging at low or zero cost.

MAKE USE OF “SMART CHARGING” CAPABILITIES TO MINIMIZE OPEX

One of the most important considerations when selecting EV charging stations is the ability of the IoT software to intelligently manage electricity use and reduce the operational costs of the charging station. Select a station that comes with smart charging software to help manage the cost of providing this amenity with features like scheduled charging, load balancing and demand charge management.

GROUP STATIONS CLOSE TO EXISTING INFRASTRUCTURE

EV charging stations need access to electrical infrastructure, so cluster the EV chargers together, preferably close to the electrical distribution panels for the most economical EV parking locations. Tearing up pavement and laying conduit is expensive and not always necessary, so it pays to save by grouping stations.

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UNDERSTAND POWER REQUIREMENTS AND DON'T OVERSIZE

It is common for businesses to believe that the best EV charging solution for their property will be the station that provides the most power, but this is often not the case. Survey employees and visitors to understand how drivers will use the charging stations. Unless visitors are driving long distances to arrive at a property, they likely only need to “top up” their vehicle rather than fill it completely from empty. Think about how long visitors tend to be parked - is it an hour or more? If so, a level 2 smart charging station will likely be sufficient to top up their vehicle and make it home. The table below shows the approximate number of miles added by the amount of time parked at different types of charging stations.

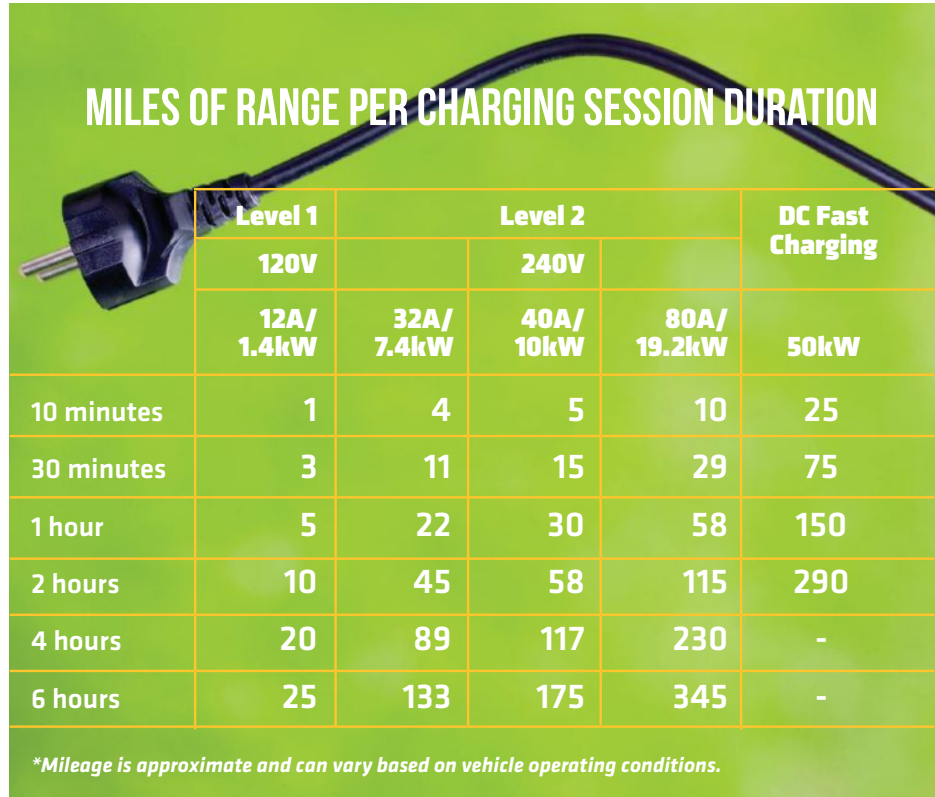
STRUCTURE THE CONTRACT TO MAXIMIZE AVAILABLE PROGRAM FUNDS

Review the terms of any incentive program being used and include all relevant costs that are eligible to be covered by the incentive program. Often these programs will cover not only the cost of the chargers, but also additional services required such as installation and software fees. Where possible, install extra electrical capacity during the EV infrastructure “make ready” phase while funding is available to allow for future expansion. Bundle multi-year software or network charges in the contract to maximize the use of program funds left over after purchase and installation.

CONSULT WITH AN EXPERT

An EV charging installation is a multi-faceted project that can span a range of knowledge domains. It is always best to team up with an EV charging expert while scoping and implementing a project to ensure all details have been considered and best practices are followed.

Facilities are taking advantage of available EV charging infrastructure incentives and saving thousands of dollars in the process. For example, a retail mall in Los Angeles, California, USA took advantage of an incentive, which offered \$5,000 per charging station, and saved \$200,000 with 100 percent project costs covered by the



	Level 1		Level 2		DC Fast Charging
	120V		240V		
	12A/ 1.4kW	32A/ 7.4kW	40A/ 10kW	80A/ 19.2kW	50kW
10 minutes	1	4	5	10	25
30 minutes	3	11	15	29	75
1 hour	5	22	30	58	150
2 hours	10	45	58	115	290
4 hours	20	89	117	230	-
6 hours	25	133	175	345	-

**Mileage is approximate and can vary based on vehicle operating conditions.*

rebate. The mall wanted a low-cost solution without high recurring yearly network fees, so the property installed 40 JuiceBox Pro 40C14 smart charging stations.

Electric vehicles are taking off and investing in charging stations is one of the best ways that any company can capitalize on this trend. Convenient and accessible charging options are needed by EV drivers, and companies that install charging infrastructure for their customers or employees are truly helping to advance the spread of clean, electric mobility. Providing EV charging in the workplace empowers employees to make the switch to an EV and offering public charging to customers and other visitors can help mitigate range anxiety while also establishing a business as a local hub for EV drivers.

Between the explosive growth of EVs and the billions of dollars available through incentive programs, there has never been a better time to invest in EV charging equipment. Electric vehicles will soon take over the roads. Now is the time to prepare for the charge.

Preston Roper, General Manager, North America, Enel X e-Mobility, brings more than two decades of experience forming and growing innovative marketing, sales, and operations teams at high-growth technology companies, including Honeywell, NetDynamics (acquired by Sun Microsystems/Oracle) and Synopsys (IPO). In addition to renewable energy, he brings expertise in SaaS, business intelligence, and enterprise software.



Roper holds a Bachelor of Science in Mechanical Engineering, a Master of Science in Hardware-Software Co-Design from Stanford University, and a master's in business administration from Stanford University.

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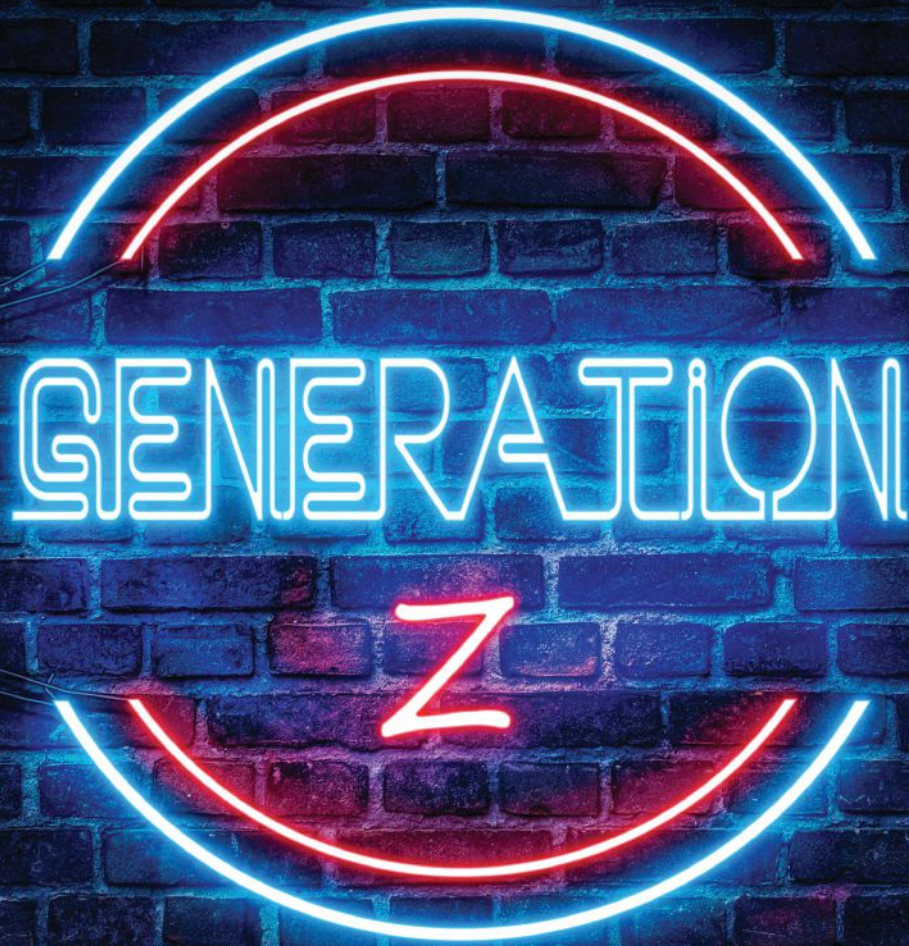
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RECRUITING



INTO THE FIELD OF
FACILITY MANAGEMENT

BY SCOTT SHERMAN AND DIANE LEVINE



There is a new generation of talent emerging in the workforce today referred to as Generation Z and this is good news for the field of facility management.

Generation Z includes those individuals who are born after 1994 and they will account for 20 percent of the workforce by 2020^[1]. Facility Industry leaders predict a significant talent shortage as more than half of FM leaders will be retiring by 2032^[2]. Companies who are taking proactive and strategic action to recruit early talent from Generation Z will be poised to win in the challenge of hiring FM talent.

There are many exciting characteristics and trends regarding Generation Z that make facility management an attractive career option. Industry leaders must help make those connections and recruit this generation into the field. To do that, it's important to know Generation Z's thought processes.

ORGANIZATIONAL LOYALTY

Generation Z is indicating that they expect to stay with companies for longer tenures than their millennial predecessors. Research indicates that 60% of Gen Z is willing to stay with a company for more than 10 years³.

FULFILLING WORK AND A COMMITMENT TO SOCIAL RESPONSIBILITY

Original research by Sodexo surveyed members of Gen Z about their specific expectations for the workplace to better understand the most critical drivers of engagement. At 43%, respondents overwhelmingly identified having a fulfilling role as their number one priority. This was followed closely (at 33%) by a desire to work for organizations with a strong commitment to corporate social responsibility (CSR).

DIVERSITY

Generation Z represents the largest group of multi-racial/multi-ethnic individuals to come of working age in the United States⁴.

THEY LIVE TECHNOLOGY

Generation Z is highly savvy in digital technology and they expect it in the work environment. Research carried out by leading generational demographer Claire Madden with Australian Gen Zers mirrors a demand that is echoed globally among their peers. They will not accept anything less than a fast network and a functional workplace. One of the top downers for Gen Z is slow wifi.

Clearly Generation Z will be an incredible addition to the field of FM and the industry is excited for the advancements this generation will contribute. However, what strategies and tactics should facilities leaders deploy to engage and recruit this generation into the facilities career path?



1 Illustrate career growth opportunity and commitment to employees.

Facility leaders need to showcase the career paths within their companies and the longevity available. Additionally, longevity cannot mean stagnation, but continual learning and development. Career growth and training is one of the top motivators for any generation. When combined with the long-term opportunities available within FM, that is a clear attractor for Generation Z.



2 Showcase meaningful work and examples of social responsibility.

FM work is meaningful and has a tremendous impact on individuals and communities. Companies who make a connection of FM work to its impact on consumers within the built environment will be at an advantage with Generation Z.

- In a corporate or business and industry environment, showcase how FMs help

increase productivity and improve the quality of life and wellness in the work environment.

- In a school environment tell the story of how the FM work is helping to provide a clean, safe and enhanced learning environment for students. Demonstrate how savings realized through strong facility management is money that can be reinvested into education.
- In a healthcare setting, show examples of how FMs are impacting patients, improving the environment of care and contributing to healing patients.



3 Diversity and inclusion must be integral to who FM companies are.

First, FM companies need to greatly expand their diversity outreach to attract a more diverse talent pool. According to IFMA research, the average facility manager is a 49-year-old Caucasian male. When you compare to Generation Z, as one researcher^[6] put it: "Nearly half of Gen Z is non-Caucasian and 81 percent of Gen Zers said they have friends of a different race. Noting this new generation's multicultural demographic allows companies to understand that valuing diversity is not simply a cause Gen Zers advocate, but rather, multiculturalism is a criterion of who they

are.” Additionally, according to Sodexo research⁴, “Race and ethnicity, however, are not the only triggers for developing social groups. Gender, sexual orientation, sexual identity, disability and other factors are equally important when analyzing group identity and its interplay with quality of life in the workplace.”

Second – The outreach is important, but day to day operating principles are even more critical. Generation Z is multi-cultural and racially diverse as part of who they are. Companies need to reflect that in who they are in terms of diversity of the workforce, but as important is the inclusive cultures they build and instill within their corporate DNA.



Showcase technology as central to the future of FM.

FM is competing with multiple fields for Generation Z's attention. Facility Management is subject to being upstaged in the developing talent pool by more visible careers in Information Technology and Engineering. However, the built environment is becoming highly digitalized. With innovations in digital technology, IoT and big data, the built environment needs digitally smart talent to effectively manage assets but also to effectively communicate and influence stakeholders.

FMs need to showcase how technology is regularly used and how it is advancing in the field of FM. They also need to demonstrate how FMs engage, utilize and advance technology in the built environment and how that will impact consumers, tenants and those passing through our facilities every day.

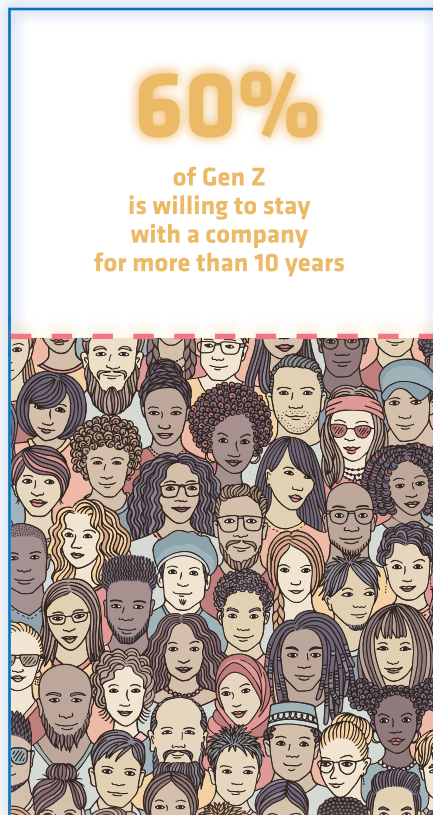
Organizations such as the IFMA Foundation are doing some amazing and ground-breaking approaches to make FM a career of choice. Through the Global Workforce Initiative, the IFMA Foundation is working to fill the talent gap by connecting, educating and investing in the future.

This initiative connects with communities to inform students, parents, teachers, guidance counselors, community organizations, economic development and government agencies about exciting and prosperous career opportunities in FM. The Foundation educates students and incumbent workers through programs offering IFMA courses, academic certificates, and the FM accredited degree programs at higher education institutions. And, working with Sodexo, the Foundation invests in the

future by providing new career opportunities through scholarships, internship programs, job shadowing and IgniteFM! student competitions.

The Foundation is able to attract Gen Zers to community college and four-year programs in facility management by showing how this field can make a difference in the daily lives of people and the strategy and sustainability of an organization. The “Save the Planet, Become an FM” campaign demonstrates how Gen Zers can impact the planet and the UN 2030 Sustainable Development Goals. The Foundation found that Gen Zers are more apt to enroll in a college FM program once they understand the societal impacts they can make as a facility manager.

Gen Zers particularly enjoy the diversity of the IFMA Foundation IgniteFM! competitions. Through these competitions, which can be watched at IFMA conferences, students are paired in teams with their peers from different cultures and countries to solve complex FM problems. During IgniteFM! competitions, Gen Zers demonstrated that they are not only able to quickly engage with strangers but can also develop and present viable solutions in short timeframes. These competitions show how rapidly Gen Zers can connect, work in diverse teams, collaborate, and create innovative



answers to difficult built environment problems.

The FM field aligns extremely well with the key factors important to Generation Z when selecting a career. As an industry that has a workforce trend of its talent exiting the field at a much higher pace than it is entering the field, FMs must take the lead in attracting and recruiting Generation Z into Facility Management. They must align what the field has to offer Generation Z, expose early talent to these opportunities and tell the FM story through effective media, communication strategies and forums that will connect with and inspire them to choose FM as a career. FMJ

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Scott Sherman is a former Senior Director of Talent Acquisition at Sodexo where he oversaw recruitment in the US for all Facilities Management and Technical Services.

He also represented Sodexo on the IFMA Foundation’s GWI Advisory Council. Scott has since moved to QAD, an ERP Software Company where he is the Global Program Director, Talent Acquisition.

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TSS integrates aluminum, acrylic, polycarbonate, fiberglass, plastic laminate and hand-crafted wood into a security system that blends into your space, making your staff and customers feel both safe and comfortable.

VISIT the TSS Bulletproof Download Center at tssbulletproof.com/bulletproof-download-center for eBooks, tip sheets and case studies.

A holistic approach to human-centric lighting

The impact and scope of human-centric lighting – that which creates more comfortable, welcoming and engaging environments for people – has been widely discussed in the building, design and facility management industries.

Lutron Electronics, a leader in lighting controls and automated shading solutions, believes lighting should promote comfort, enable enhanced well-being and foster engagement, and that high-quality, human-centric lighting creates extraordinary experiences, helping companies attract and retain talent.

The Lutron HXL approach combines four elements of lighting design to allow people to be, work and feel their best:

- » **Quality light:** Lighting can make occupants feel engaged or detached. With tunable white control and high-performance dimming, Lutron-quality light technology helps create unforgettable experiences.
- » **Natural light:** The HXL approach maximizes daylight with dynamic shading solutions, which let light in while mitigating glare. Ketra solutions provide light that emulates daylight in interior spaces.
- » **Connection to the outdoors:** Biophilia has become a central component of architectural design. The Lutron HXL strategy emphasizes window views to fulfill people's inherent desire to connect with nature.
- » **Adaptive and personalized control:** With smart technology, people can shape their spaces to create flexible, dynamic environments that support efficiency and help save energy.

Reinforcing the innovative design choices that are being made in commercial and academic spaces, Lutron's HXL approach helps reduce energy costs, embraces elements of the natural world, and contributes to design supporting WELL and LEED standards.

VISIT www.lutron.com



As part of the Steelcase Inc. family of brands, Coalesse products are globally accessible through a network of over 800 dealers.

Lagunitas Focus Nook: Space optimization within the open plan

In today's work environment, personal spaces for heads-down work are just as important as open areas for collaboration. The first individual work alcove in the category-defining lounge collection by Toan Nguyen, the Lagunitas Focus Nook offers refuge for focused work in a traditional or open-plan office.

The freestanding nook provides users with a touch-down destination for performing focused tasks, allowing them to stay centered and free from distraction. The Focus Nook offers warm, enriched color in knit or fabric. Place a single nook next to a social area or a row of nooks adjacent to collaborative spaces to create a modern work mix.

- » Screens in fabric or 17 knit colors
- » Worksurface available in laminate or veneer
- » Wire management brackets and optional tray neatly route cords to the floor
- » Power modules available for easy access to power in a variety of configurations and colors
- » Light grommet conveniently routes on-surface light to power source

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AAMA document delivers design guidelines for exterior shading devices

The American Architectural Manufacturers Association (AAMA) recently released a new technical information report providing design considerations for exterior shading devices such as aluminum sun shades, glass awnings, deep snap-on covers and louvered shading devices with outriggers.

AAMA TIR-A16-19, "Design of Exterior Shading Devices," was developed to offer design considerations for manufacturers, architects and other members of the design team, as well as present important information for those responsible for facilities maintenance.

Items in the scope of this document include but are not limited to: impact loading on exterior shading devices, combined loading, new construction/renovation, window washing considerations, thermal bridging, glazing and more. Items not within its scope include interior light shelves, window wells and other considerations.

AAMA TIR-A16-19 may be purchased from AAMA's online store.

VISIT aamanet.org

Digital move estimator is a game-changer in commercial logistics

A common pain point for corporate customers is the lack of modern technology in the moving business; however, North American moving company Suddath® has revolutionized the way companies experience major office and commercial moves, improving efficiency and visibility, reducing risk and helping clients get back to work sooner.

Since its launch in 2018, Suddath's Estimator commercial move estimating system has saved more than 100,000 printed pages and countless on-site visits with clients. The unique technology earned a 2019 Digital Edge 50 Award, which recognizes 50 digital-centric businesses worldwide each year for digital transformation projects that achieve significant, measurable business impacts.

Estimator's patented technology significantly improved the customer experience while simultaneously reducing the company's administrative costs by more than 20 percent and shrinking its carbon footprint.

- » Client requirements are documented digitally and shared throughout the move process
- » Inventory is captured digitally by an employee, area or floor for effective move planning
- » Services are documented with specific manpower and equipment commitments
- » Accurate and guaranteed pricing with digital contracting

Estimator is part of Suddath's comprehensive approach to providing sustainable solutions for clients. Its award-winning Tracker technology enables customers to digitally inventory and track individual items during a corporate relocation. The system lets clients know when inventory has been delivered and set up, so managers can know exactly when their employees can get back to their workspaces.

VISIT suddath.com/business-office-mover/commercial-moving-storage/proprietary-technology/



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– Ashish Saini

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“This is a great way to stay updated!”

– Jorge Forero

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“Please don't miss this!”

– Abdul Rauf Qamar

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RICS Modus: Putting the Built Environments Climate Commitments into Practice

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“Great resource. Good content.”

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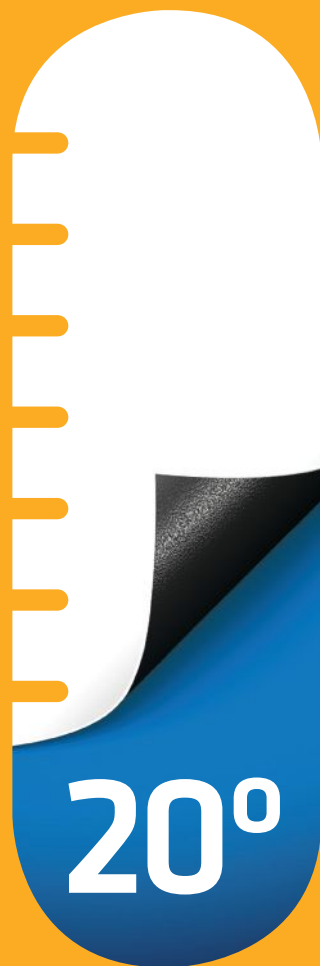
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Ask the Experts

In each issue of FMJ, IFMA's Facility Management Consultants Council shares some commonly asked FM-related questions accompanied by advice from top FM consultants. The questions and answers presented in this section align with IFMA's core competencies following the themes outlined for the given edition of the magazine. While the following answers are intended to be helpful, these responses should not be deemed complete and are limited in context by the space allocated. Please contact the individual consultants directly for further explanation of the opinions expressed. The theme of this edition of FMJ is **"Sustainability."**

CONTRIBUTED BY



The Facility Management Consultants Council (FMCC) represents more than 300 FM consultants from various countries around the globe. Its mission states, "The FMCC is the resource and voice for facility management consultants worldwide to leverage our collective expertise to benefit IFMA members, and the facility management profession."

Do you have a question for Ask the Experts?

Mark Sekula

IFMA Fellow, CFM, FMP, LEED AP

President of Facility Futures, Inc.

msekula1@wi.rr.com

Outback Software, a five-year-old technology company located in Sydney, Australia, has outgrown their current space and decided to engage a developer to build and lease back a 23,225 square meter (250,000 square foot) office building to suit Outback's space needs into the near future in a corporate office park on the outskirts of Sydney.

Outback will be the single tenant. The architect has been hired and the design of the building has already proceeded to the design development stage. Just recently, Justin Blake was hired to be Outback's first facility manager. In the first week of his new job, Justin reviewed the plans and noticed that sustainability has not been addressed in its design. He feels it is important to incorporate sustainability in the new Outback building to the extent that it would be equivalent to the Green Building Council of Australia's Green Star rating (Similar to LEED Certification in the U.S.), although actual certification will not be sought. Justin estimates that this will add approximately AU\$500,000 (US\$343,713, €308,015) to the building's budget.

Justin mentioned his intentions to senior management and received very little support.

Justin has hired you as a consultant to help him develop a business case to help sell his idea to management. What key recommendations would you make for Justin to prepare a sound, compelling and convincing case to gain funding approval from senior for the sustainability initiative?



Justin must demonstrate a suitable business case framed around ROI on an investment of AU\$500,000 to be included in a capital plan. Direct returns include energy and water, as expected, and the attractiveness, market value and liquidity of the property as an asset, in case changing business circumstances make rental/lease or sale helpful options. He must research those numbers. Indirect returns include the desirability of working in a Green Star certified building, and the impressions of customers, and community impressions, and competitive effects. GBCA shows Green Star certification covering 37 percent of office space occupied by 5 percent of the national workforce daily. Frame these into inducements to include GBCA under the Outback brand, enhancing reputation to stakeholders. The time is right. Staff who are moving to the new building will be pleased to know of the green initiative.

You persuaded your boss to take a risk and have you present to the executive committee. They were impressed and asked for specifics prior to final approval. The CFO expects detail and cash flows — a budget — to make your plans specific for final approval. The COO wants to be sure that complications and delays are not a significant risk. It's time to get assistance from GBAC about certification goals in the time available to commissioning and after, and to work with construction plans if any alternations are due now, before construction. Possibly, changes in plans now will reduce construction time and costs.

David Reynolds, CFM FM-CONSULT-CREATE

David Reynolds focuses on FM strategic management, FM performance, and risk mitigation. He is a founding partner in the Global Facility Management Alliance. David is President of the IFMA Facility Management Consulting Council, FMCC and a member of the Facilitathon core team.

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A

Working for a software company is a very fast market place and senior management teams tend to think short term instead of long term because of the way the market works and the rate of change with technology. However good FM and sustainability go together, so you need to press on.

May I suggest that you never talk about cost but start with the short-, medium- and long-term benefits. Cost to very busy senior management teams is usually the wrong approach and will immediately trigger negative thoughts before you get an opportunity to explain the reasoning and long-term issues.

Initially, as you have been hired well in advance of construction completion it should be for you to work with the designers and developer, who is the ultimate owner, to introduce sustainability as product selection and specification at this very early stage does not necessarily mean additional cost.

I do not see any reason why you cannot get the benefits you suggest at an initial cost of US\$343,713 when you are looking at a relatively large building of 2,152,782 square feet over the long term. Do remember that if you have a building designed and built with say a 25-year lease the actual capital cost of construction can be as low as 5 percent with the running and capital replacement costs taking up the other 95 percent over time. There are some very good examples of this style of lease in Australia and the UK.

Suggest that as well as working with the local consultant that you create a good relationship with the developer and try to get inside the head of your senior management team to see what makes them tick and concentrate and harmonize your activity with their goals and objectives. Good luck — sound like a fun opportunity.

Mike Liddle, Business & Facilities LLP

Mike Liddle runs Business & Facilities, an independent real estate and facility management consultancy operating in EMEA. His experience includes the control and coordination of multi-million-pound projects involving all aspects of FM, real estate, design and construction. After managing the merger of Merck Sharpe & Dohme and Schering-Plough in 17 countries he has specialized in large scale outsource programmed on an EMEA basis for companies such as, AstraZeneca, Microsoft, Imation, Telefonica, Oracle, Kings College London and is working and advising on a major leading-edge Free Zone Technology Village in Abuja, Nigeria. He served as President of IFMA UK, President of European IFMA and is a past President of IFMA's global Facility Management Consultants Council.

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A

As an experienced green building facilities manager, Justin can provide a strong case for the benefits associated with obtaining a recognized green certification. By seeking assistance from a consultant specializing in Leadership in Energy and Environmental Design (LEED) during the early stages for building design, the full potential benefits of a green building can be incorporated into the design. Facilitating the long-term economic, social and environmentally responsible use of resources while leveraging the secondary benefits. Justin's engagement of a consultant team can assist him in preparing an automated dash board reporting system that links efficiencies directly to value added to financial performance, employee satisfaction surveys and timely issue resolution. Secondary benefits include potential health care savings from workout facilities, healthy food options and work-life balance. Even more intangible is the correlation to workforce recruitment and retention.

Please note the key recommendations below to provide an outline for supporting his process to engage management.

1. Analyze, monetize and correlate the benefits of the organizations with the green certification.
2. Link the benefits of the green certification to the corporate mission, goals and marketing strategies.
3. Determine the cost benefit analyst.
4. Access the payback period.
5. Outline the program tracking lessons learned associated with the green savings based on Justin's previous work in a green building. Including monetizing the monitoring reporting from systems outputs to support the integration of smart system.

Daniel Goldsmith and Patricia Hensley

Daniel Goldsmith is the principal of Daniel M. Goldsmith Consultancy, LLC, a consultancy specializing in Management and Facility Management. He holds a Doctor of Business Administration from Argosy University, and his earlier degrees are an MBA from Strayer University and bachelor's degree in business from the University of West Florida.

Daniel is an adjunct faculty member at Strayer University. He is a contributor in the FM arena within the federal government and holds professional memberships in the Institute of Management Consultants — National Capital Region Chapter, the American Statistical Association, the International Facility Management Association and the Society of Human Resource Management.

Patricia Hensley, CPA MBA Veteran founded PHdash, Inc. in 2008. As the principal, she has worked with Small Business Administration as a consultant on various financial projects and given presentations. She has previously held financial, operational, and project management positions focusing on the triple bottom line — Profit, People & Planet. Patricia earned her undergraduate degree in accounting from California Polytechnic University of Pomona, California and a master's in business administration from Chapman University of Orange, California. As a California Certified Public Accountant, she has broadened her knowledge base by becoming International Organization for Standardization— ISO – certified.

daniel@dmgmc.com | Phdashinc@gmail.com



A Developing a business case with a good chance to be accepted by senior management must be supported by real numbers and proved case studies. My first recommendation and collaboration with Justin would be working on solid proofs of sustainable initiatives. Having this in mind, Justin and I would closely focus on regional and industry leading competitors — how they address sustainability in their corporate policies regarding their buildings to benchmark Justin’s company.

Once we prepare a necessary background about applicable best practices in sustainability, we must demonstrate synergies among single measures. Many design solutions, if not all, should be compared to the triple bottom line. One of my favorite tools is a simple matrix where measures are assessed using an impact-based scale (positive/neutral/negative) to people, planet and profit. Cost estimates would be included as the total cost of ownership or using the return on investment predictions. Selecting the right measures is a critical exercise. Only identified synergies may assure good results and fulfill sustainable goals.

My last key recommendation to Justin would be stressing added values by adopting sustainability for their new office building:

- healthier indoor environment for occupants resulting in higher productivity and lower absenteeism
- more effective energy and water management
- responsible usage of materials and resources
- positive attitude to climate change which can be likely used for positive public relations.

**Martin Vaclavik FM Consultant,
Bureau Veritas LEED O+M AP, WELL AP**

Martin Vaclavik is a civil engineer and works as an FM consultant. His specialization is sustainability which he also respects in his everyday life. Martin mainly focuses on effective building operations & maintenance and healthy workplaces. Martin graduated from the Czech Technical University in Prague. He also holds credentials of LEED AP, WELL AP. Martin happily shares his knowledge with master’s degree students at the university as a lecturer.

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A For Justin to sell his ideas to management, it's important for him to identify sustainability initiatives that will have a substantial return on investment. The long-term savings far outweighs the up-front costs to implement certain sustainability measures. For example, investing in smart glass windows as part of the initial build can reduce ongoing energy costs by 20 percent. Purchasing LED bulbs and adding daylight harvesting components to light fixtures will have a definite ROI and provide continued savings on utility costs. In preparing the business case, I would also want to understand if there are any government incentives for sustainability programs and take advantage of those. The last area I would highlight as part of the business plan, is the positive impact investing in sustainability has on a company's reputation. "Doing the right thing" is a big part of our culture today

and companies that can show how they are implementing and investing in sustainability practices attract customers who want to do business with them. Sustainability is important to people and we all want to work for a company that is actively involved in caring for the environment.

Kimberly R. Snow, FMP, CFM, ABCP
Manager of Workplace Services, TJX Canada

Kimberly Snow has more than 10 years in the FM industry working with a number of different companies managing renovation and expansion projects, space and move management, business continuity and general building operations. She acquired her FMP and CFM credentials as well as her ABCP for business continuity.



Components in Focus

JIM DESTEFANO



Berwyn, Pennsylvania, USA, resident Jim DeStefano is a senior vice president at his commercial security company, which assists clients with IP video, access control, intrusion detection, fire, integration, managed services, system health monitoring and cyber security. With more than 30 years of security experience under his belt, he has held different roles assessing and providing security needs. He says his position has allowed him to meet FMs across the country. In his spare time, Jim is active in the Elks Lodge where he helps raise funds for special needs children, veterans and other charitable causes.

HARRY HONER



Senior Project Manager for Global Workplace Experience Harry Honer has been in FM for 20 years. He says he looks forward to different challenges and new projects every day. In addition to his work in FM, the Malvern, Pennsylvania, USA, resident also had the distinction for cooking for the late US President Gerald Ford.

ERIC MARVIN



"FM chose me!" That's how Redwood City, California, USA, Eric Marvin got into the FM world. He's the director of workplace services for his technology company. A 30-year veteran of FM, Marvin says he has worked in seven different industries over the years.

ERIC SANCHEZ

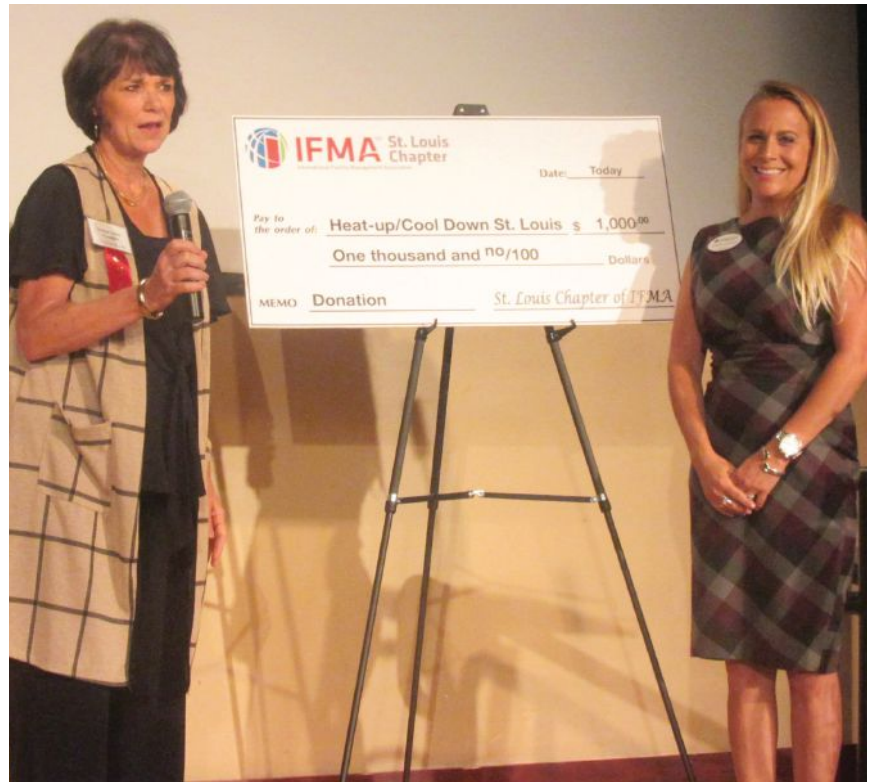


After spending eight years working in Division I college football, Eric Sanchez moved from the gridiron to FM. He serves as the academic facilities manager/academic operations specialist in the office of the provost & executive vice-president for academic affairs at the University of New Mexico. He says FM is crucial to his university's mission where well-managed buildings help students, faculty and staff work at their highest levels.

WANT TO SHARE YOUR MEMBER OR COMPONENT NEWS?

Reach out and share your chapter news with other members and FMJ readers. Send details and photos (if available) to bobby.vasquez@ifma.org with the subject line: Components in Focus.

We look forward to featuring your chapter in an upcoming issue!

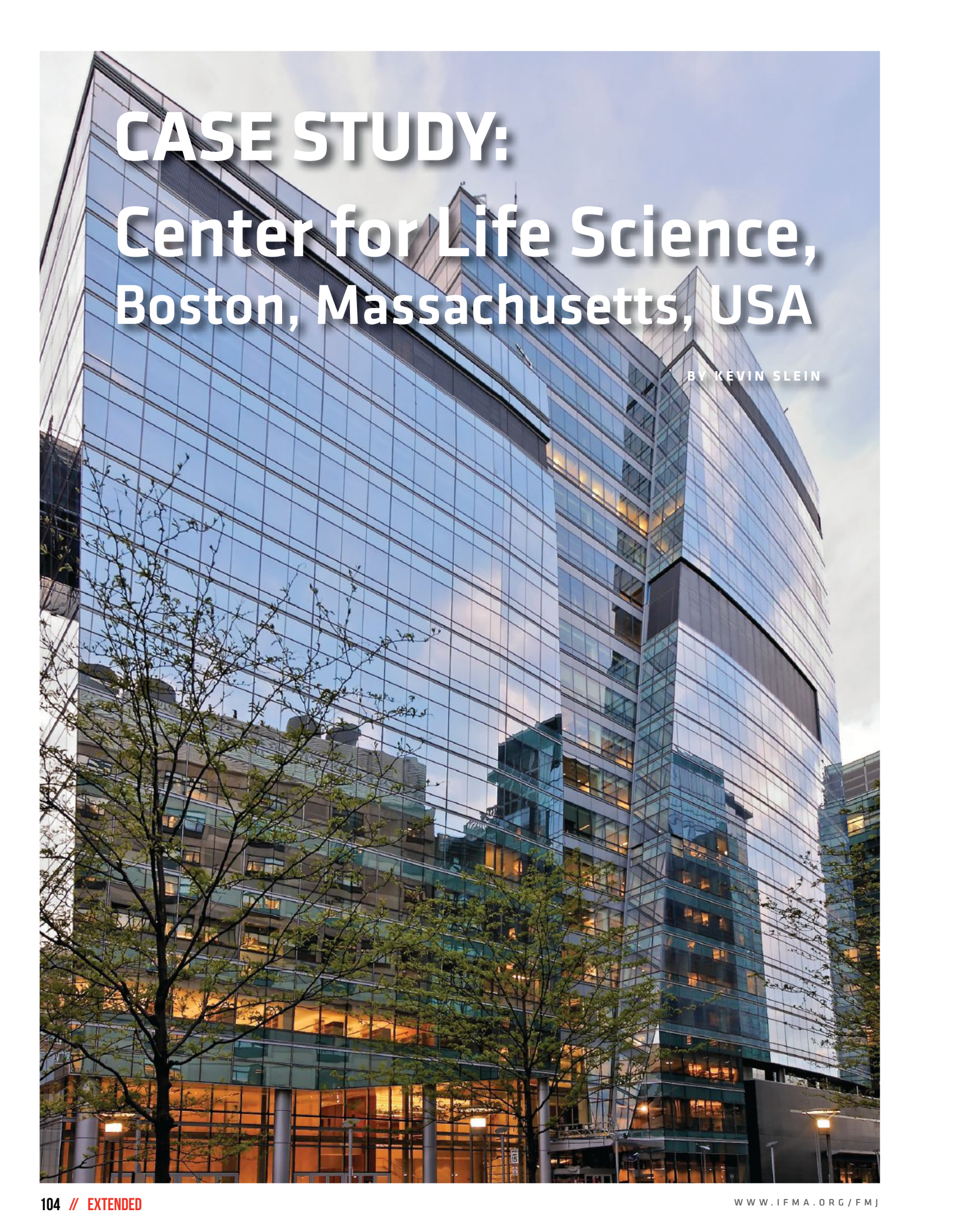


IFMA ST. LOUIS SUPPORTS COOL DOWN ST. LOUIS

The St. Louis Chapter of the International Facility Management Association donated US\$1,000 to Cool Down St. Louis. The nonprofit organization builds awareness and provides resources to help those in need avoid heat-related illnesses and deaths, especially the elderly and disabled, and needy families with critically ill children.

Representing facility managers and suppliers who maintain the region's commercial buildings, the organization presented a check for US\$1,000 to Cool Down St. Louis during IFMA St. Louis' (Missouri, USA) celebration of National FM Day in June. Jennifer Johnston, IFMA St. Louis chapter president, presented the check to Denise Liebel, president of Heat-up/Cool Down St. Louis.

IFMA St. Louis also funds the organization's Heat Up St. Louis, which provides services and support to keep residents warm during the region's winter months. IFMA St. Louis has supported the weather-related assistance programs during the winter and summer for the past six years. More than 300,000 area residents have received energy assistance since the programs' inception in 2000.



CASE STUDY: Center for Life Science, Boston, Massachusetts, USA

BY KEVIN SLEIN

Life science buildings are high energy users, and with Boston, Massachusetts, USA, being the world's largest life sciences market, companies are searching for energy efficient solutions. The Center for Life Science | Boston is a 700,000-plus square-foot research center in the heart of Boston's Longwood Medical Area and home to Boston Children's Hospital, Harvard University and Pfizer, Inc. Late last year, the owner and manager of the building studied and installed a state-of-the-art new exhaust system as a sustainability and energy savings measure for the building and its tenants.

To reduce Boston's pollution-levels and carbon footprint and strengthen city-wide environmental protection efforts, companies like Biotech Realty that owns CLSB have been actively seeking energy efficient savings opportunities. Traditional lab by-pass exhaust systems can account for up to 30 percent of a laboratory's energy consumption. In most labs, there are typically only a few active fume hoods in the system emit-

ting limited levels of contaminants. These contaminants are significantly diluted by the relatively clean air that is connected through a manifold from other locations. In order to introduce clean air into the system without impacting performance, the exhaust fan systems constantly run at high exit velocities (e.g., 3,000 ft/min or higher). As a result, exhaust systems frequently operate at much higher total flow rates than required using significantly more energy than necessary. SmartStack reduces excess exhaust fan energy by using technology to continuously sample the air stream to control for hazards and thereby lowering energy consumption when the system does not require it.

To increase efficiency at CLSB, BioMed Realty used SmartStack technology to ensure dilution criteria are met so that concentrations of hazardous materials are at safe levels, while maximizing energy savings. The technology's active sensing system monitors the cleanliness of lab exhaust air and provides a signal to the fan controls or building automation system to index the exit velocity of the exhaust fans accordingly. As a result of the continuous monitoring technology, the fans speed up and slow down instead of taking bypass air and running the fan at a continuous speed, thereby generating tremendous energy savings by lowering the exhaust fan exit velocities when the lab exhaust air is clean.

Ahead of installation, BioMed Realty launched a technical study with an energy consultant and the local utility, leveraging energy efficiency incentives available for the project as part of the state's energy efficiency initiative. During the study, CLSB's managing team looked at the proposed savings and found SmartStack reduced energy usage in the building by 8 percent, which could be passed on directly to the tenants at CLSB.

Within the first month of installation, CLSB's electricity use dropped by 24 percent while performance remained the same. Based on the initial improvement, the expected energy cost savings is nearly US\$400,000 per year with a carbon reduction of more than 1,300 metric tons per year.

"By their very nature, life science buildings are high energy users because of significant HVAC requirements that keep

facilities operating at peak efficiency and safety," said Pete Damiano, director of facilities at BioMed Realty. "At the Center for Life Science | Boston, we have implemented a technology and a solution that is simple and low capital cost to achieve significant results. We saw immediate results, and we want to communicate across the facility management network in Boston and throughout our core markets that this technology has produced compelling results — for both energy efficiency cost savings and the environment."

Research centers similar to CLSB are currently under evaluation in the Boston/Cambridge market to determine where this technology may be applied. As public ordinances to disclose energy usage continue to evolve, such projects and undertakings are essential to keeping buildings efficient and meeting carbon neutrality.

"The goal of our efforts is to help life science buildings use innovative technology to drive significant energy savings in lab exhaust systems and to reduce their carbon footprints," said Steven Graves, president of Measured Air Performance, manufacturer of the SmartStack technology. "We were able to work the Center for Life Science | Boston to aggressively drive energy savings." **EMJ**



Kevin Slein is the senior vice president of facilities for BioMed Realty. He has been with the company since 2010, and leads efforts to upgrade BioMed's building and facilities services throughout the portfolio with a passion for eco-friendly and cost-effective solutions. Prior to joining BioMed, he served as executive director of site operations at The Kraft Group, where he was responsible for day-to-day operations of a large mixed use/sports and entertainment complex in Foxborough, Mass. From 1998 to 2004, Slein was responsible for facilities operations at Intel's Hudson, Mass. microelectronics factory. He began his engineering operations career as a licensed engineer in the U.S. Merchant Marine onboard various cargo, freight and oil tanker vessels from 1985 to 1993. He received a B.S. in Marine Engineering from Massachusetts Maritime Academy.

LEADING THE WAY TO A SUSTAINABLE

The role of the building industry is rapidly changing, mirroring the way advances in technology are driving change in society. Buildings and building construction together are responsible for 36 percent of global energy consumption and nearly 40 percent of total direct and indirect carbon dioxide emissions. This is greater than either the industrial sector at 30 percent, or transportation at 29 percent. The impact of buildings on the environment and therefore their potential contribution to sustainability is significant.

BY GEORGE DENISE, CFM, RPA-HP, LEED-AP

FUTURE



The major sources of anthropogenic carbon emissions globally are lime calcination (primarily through the manufacture of cement), deforestation, and the burning of fossil fuels.

The production of cement is responsible for about 5 percent of total, man-made carbon emissions. The cement industry is working on improving energy efficiency while increasingly using substitute materials in the production of cement that do not release large amounts of carbon dioxide. At the same time, builders are increasingly specifying usage of alternative materials in cement, which is also helping to bring emissions down. This source of carbon emissions will continue to shrink as technology advances.

Deforestation, the net loss of forests worldwide, is responsible for approximately 12 percent of carbon emissions; however, the rate of deforestation has slowed significantly over the last several decades. This slowing is due to the increasing awareness of damage to the planet through mismanaging forests, and the growing demand for wood products that have been harvested from sustainably managed forests.

Many countries are now planting more trees than they are harvesting, including India, United States, Brazil, Russia, China, Vietnam and Mexico to name just a few. One recent projection suggests that at current rates, total global forest area will actually increase by 2050. Others suggest that forest cover will still be declining, but at an ever increasingly slower rate. Global partners need to work to ensure that progress continues to be made in this area by specifying only wood products certified as harvested from sustainably managed forests.

However, the much larger threat is the refining and burning of fossil fuels. Fortunately, it is a threat that mankind can control.

The refining and the burning of fossil fuels are both the major sources of carbon dioxide emissions and the sources that most need to be addressed: the burning of coal, oil and gas are the principle emitters of anthropogenic carbon dioxide, and the building industry is the principle user. Renewable energy sources now account for about 17 percent of energy generation in

By 2021, in the U.S., green building activity is expected to grow, with those developers who build the majority of their projects with green methods and products increasing from 32 percent to 45 percent. That's just two years away.

the U.S., and, similarly, about 18 percent globally (as of 2016). Renewables accounted for about 68 percent of all new power-generating capacity globally in 2017; about 43 percent of all new power generation in the US.

According to the U.S Green Building Council, green buildings reduce energy use from 24 percent to 50 percent, and carbon dioxide emissions from 33 percent to 39 percent. The International Energy Agency projects that on average, buildings in 2040 could be nearly 40 percent more energy efficient than today. These numbers are conservative; reductions in energy use and carbon emissions in buildings of from 50 percent to 65 percent are not unreasonable, or uncommon.

Technology is evolving rapidly. Forty percent of all commercial properties in the U.S. now benchmark with Energy Star, and according to the Environmental Protection Agency, 84 percent of all buildings that benchmark implement energy conservation measures. By 2021, in the U.S., green building activity is expected to grow, with those developers who build the majority of their projects with green methods and products increasing from 32 percent to 45 percent. That's just two years away.

This is in part driven by concern for the planet and corporate image, but as has been pointed out repeatedly in this publication, as well as in many others, when undertaken carefully, operating buildings sustainably actually reduces operating

costs, with average payback less than two years, which is an acceptable return on investment for most owners.

While buildings are operating more efficiently, the power that is the source of this energy is increasingly clean and renewable. For example, in 2017, 33 percent of PG&E's electricity came from renewable resources, including solar, wind, geothermal, biomass and small hydroelectric sources. Also, 78.8 percent of PG&E's total electric power mix is from GHG-free sources, including nuclear, large hydro and renewable sources of energy. PG&E is the principle energy utility in Northern and Central California.

Since 2010, the share of global solar energy has increased by an average of more than 50 percent per year, and it is accelerating. In 2016, 39 percent of all new electricity generation was solar, more than any other source.

In 2017, solar generated just 2.09 percent of global power, however, that was a 95 percent increase over the previous year.

China lead the world in solar photovoltaics generation, with the total installed capacity exceeding 100GW as of the end of 2017. Germany, Japan, and the U.S. follow in that order; the US now has more than 50GW of installed capacity.

A report by research and publishing firm Clean Edge and the nonprofit Co-op America found solar power contribution could provide 10 percent of total power

Buildings are positioned to have an enormous impact on the environment and climate change. At 41 percent of total U.S. energy consumption, buildings out-consume the industrial (30 percent) and transportation (29 percent) sectors.

needs by 2025. Solar power is expected to become the world's largest source of electricity by 2050, providing a projected 27 percent of total global consumption.

CALGreen, or the California Green Building Standards Code, is the first statewide "green" building code in the U.S. California is also requiring all buildings more than 50,000 sf to benchmark with Energy Star and disclose annual energy consumption. In the U.S., 13 states and 16 cities now have

the 100,000 mark. A relatively modest, but significant benchmark. In 2017 global plug-in sales passed 3 million units. Sales of electric vehicles achieved a 1.3 percent market share of new car sales in 2017. This is a small percentage, but significant that it is up from 0.86 percent in 2016 and 0.62 percent in 2015. US sales of electric vehicles grew an average of 32 percent annually from 2012-2016 and 45 percent over the year ending June 2017.

In the United States alone, buildings account for almost

40 percent of national carbon dioxide emissions and out

consume both the industrial and transportation sectors, but

LEED-certified buildings have **34 percent lower** carbon

dioxide emissions, consume **25 percent less** energy and

11 percent less water, and have diverted more than

80 million tons of waste from landfills.

benchmarking policies and many more are in the process of developing their own.

The California Public Utilities Commission has set as its goal to have all new residential buildings be Zero Net Energy by 2020, and all new commercial buildings ZNE by 2030. That is, all new buildings will have to generate on-site and off-, through clean, sustainable means, as much energy as they use.

In addition, California has set a goal of 50 percent of existing commercial buildings to be retrofitted to ZNE by 2030; and 50 percent of new major renovations in state buildings to be ZNE by 2025.

As of May 2019, the New Building Institute database shows 580 buildings that are either certified, verified, or emerging ZNE projects, a 700 percent increase since 2010.


Progress in the building industry are happening so fast, most of the public is not even aware of them, and building owners and managers must run to keep up.

Outside the building industry, things are evolving just as quickly. In 2010, annual global sales of electric vehicles passed

The government of India has proposed that all new vehicles coming onto its roads be electric by 2030.

Chinese consumers are on track to buy more than 1 million electric vehicles (EVs) this year after sales grew 53 percent in 2017. China's leadership has set a goal of 2 million annual EV sales by 2020 and a complete ban on internal-combustion engines projected by 2040.

Industry is making similar advances in using energy more efficiently and in developing advanced technologies that reduce emissions even more.

Globally, there are tremendous advances in conserving energy use and using cleaner sources of energy. Society is rapidly advancing into a new era of operating efficiency and usage of clean, renewable energy, and soon, a Zero Net Energy World. Based on current trends, within 25 years, most of the world's electricity will come from clean, sustainable sources, and most cars will be electric and autonomous. While society will still be dealing with the effects of climate change, it will no longer be contributing significantly to it. 

Additional Reading:

1. <https://www.iea.org/topics/energyefficiency/buildings/>
2. <https://new.usgbc.org/press/benefits-of-green-building>
3. <https://www.iea.org/topics/energyefficiency/buildings/>
4. <https://www.oecd.org/env/indicators-modelling-outlooks/49897175.pdf>
5. <https://newbuildings.org/hubs/zero-net-energy/>



George Denise, SR., CFM, RPA, LEED-AP, recently retired, is former director of operations and sustainability for Oracle Corporation, overseeing management of their headquarters campus in Redwood City, California. Prior to Oracle, Mr. Denise was managing director for Cushman & Wakefield, overseeing facilities management services for Adobe Systems Incorporated.

An advocate for high-performance building operations, Mr. Denise's focus has been on operating efficiency, energy management and sustainability. Buildings under his management have earned the IFMA Sheila Sheridan award for Sustainability, the BOMA Earth award, and 26 LEED certifications, 17 at the platinum level, among other recognitions.



Designing for
**WORKPLACE
WELL-BEING**

BY KENNETH FREEMAN

Office and workplace are constantly evolving to meet the needs of the times, all in the midst of a workplace design revolution. Grounded in research that explores the connection between employees and their workplace environment, a renewed focus on employee health and wellness is at the forefront of this wave of innovation and change. Although many employers offer traditional wellness programs such as yoga classes and standing desks, many of these offerings focus on employees' physical health. An important pivot has taken place where employers are now shifting their focus from employee wellness to well-being which enhances the quality of the overall workplace experience. Thus, facility managers are charged with the upkeep and optimization of office spaces and resources.

Well-being is the state of the body, mind, spirit and soul. The workplace environment is proven to have a substantial impact on how people feel, perform and interact with others. So, designing a space that promotes the well-being, creativity and productivity of employees has become a global imperative. Now more than ever before, employers are looking to see how a building's value is measured in terms of whether it enhances or hinders occupant productivity. For facility managers, biophilic design is a sustainable design solution that offers such an opportunity.

UNDERSTANDING BIOPHILIA AND BIOPHILIC DESIGN

Biophilia was first coined and popularized by American biologist and naturalist Edward O. Wilson in 1984. Wilson believed humans have an innate desire to be connected to nature. The concept of biophilic design is the application of this connection that enhances when we integrate the organic patterns and forms of nature in our surrounding environment. By incorporating plants, scenting and nature-inspired elements into the space, it reinforces the human-nature connection.

But, biophilic design is more than just adding plants to indoor spaces. Research has proven that by bringing the outdoors in, incorporating nature into the built environment, there is a positive impact on the psychological and physical health and wellness of humans, particularly in office interiors where employees spend a large



quantity of time. Thousands of case studies and pilot programs have shown adding biophilic elements to the workplace can boost productivity and reduce absenteeism, two factors that substantially impact a company's operating costs and the bottom line.

BENEFITS OF BIOPHILIC DESIGN

Properties incorporating biophilic design elements provide benefits for all. From the boardroom to the reception desk, biophilia makes an immediate impact on the organization. Buildings inspire and motivate, creating enriched and empowered environments that unequivocally improve business outcomes. Now, creating a na-

ture-infused workplace isn't as simple as buying a few thousand ferns. Biophilic design expands beyond that and explores and implements existing strategies in a much savvier way. There are various design elements and spatial patterns in biophilic design and when properly balanced in a space, today's workplaces can reap maximum benefit. Using natural light, vegetation, living walls, textures, materials and views of nature enrich the workplace and provide a healthy impact. These biophilic elements effectively promote a positive response as if people were exposed to the natural stimuli. Employees have experienced benefits including improved health, increased mood and feeling of well-being, improved productivity, increased em-

ployee engagement, reduced stress levels, mental restoration and reduced fatigue. As an additional benefit, plants naturally contribute to air quality and humidity which can help reduce energy costs.

It has become increasingly demonstrated that biophilic elements have real, measurable benefits relative to such human performance metrics as productivity, emotional well-being, stress reduction, learning, and healing. Amazon and Google are high-profile, forward-thinking examples of businesses already implementing nature-friendly design in the workplace. Each understands the importance of creating a work environ-

ment their employees would benefit from being immersed within daily. Google tested biophilic elements ranging from plants, terraces, water features and the inclusion of organic patterns in carpeting to design a workplace that creates a positive impact and makes a lasting impression. Located on Amazon's main campus, the Amazon Spheres are three biophilia-inspired spherical conservatories which house more than 40,000 plants of 400 species, "living walls" adorned with 200 plant species, and implement automatic adjusted artificial light to supplement natural light as needed throughout the day.



SIX TRENDS FOR SAVVY BUSINESSES: BRING THE OUTDOORS IN

In collaboration with an elite team of design experts, Ambius, the world's largest interior landscaping company, has identified six trends in biophilic design that have staying power.

TREND 1: Sustainably-Sourced and Reclaimed Woods

Wood may be the most popular of the biophilic design construction elements. From simple aesthetic flourishes to large-scale architectural installments, wood is central to the biophilic revolution.

TREND 2: Eye to the Sky

Ceilings are having their moment in the design spotlight. From hanging plants and skylights to statement ceiling designs and circadian lighting installations, the ceiling is the next frontier for interior designers and architects.

TREND 3: Green Integration

Data suggests that architects and designers are increasingly integrating plants, green walls and large green installations into designs during pre-construction and renovations, rather than adding them post-completion as secondary aesthetic choice.

TREND 4: Biodynamic Lighting

Biodynamic lighting is the next evolution of commercial lighting. This trend introduces lighting systems into the workspace that mirror natural sunlight conditions to help regulate the human body's natural circadian rhythm.

TREND 5: Divide and Prosper

Green wall dividers, a revolutionary new space-enhancing element that provides resolution to many of the challenges facing open office environments everywhere, are agile and adaptable for dynamic workspaces while also incorporating a natural biophilic component at minimal cost and invasiveness.

TREND 6: Flooring and Restoring

Designers are incorporating natural textures into flooring such as natural stone, wood, forest floors, and more with the goal of creating similar qualities and esthetic to nature itself, further implementing biophilic design characteristics in the space.

HOW IT IMPACTS FACILITIES MANAGEMENT

Many building managers and business owners report cost-saving benefits from implementing biophilic design. Biophilic design is an economic investment that pays dividends in the long run, both environmentally and financially.

The movement towards sustainable design has largely led to standardized methods of lowering energy consumption and using resources and building materials more efficiently. By integrating specific biophilic design elements, buildings can create efficient spaces through reduced heating, cooling and lighting costs. For example, installing green walls or other plant features can create an appealing environment while helping to maintain the air quality, converting carbon dioxide to oxygen. Another example is a well-designed natural lighting space which uses zero electricity while generating minimal heat gain.

But it's investing in people where facility managers stand to cover ground on their financial objectives. Real estate investments which boost employee satisfaction often result in the biggest reward by supporting employees and improving officewide morale. Furthermore, these investments may benefit companies from a budgetary perspective.

If there isn't a budget for a big office design project or permanent additions to the building such as a living green wall or a water feature, there are small biophilic changes that can easily be made to channel the outdoors and improve employee well-being. A simple rearrangement can improve the space, and facility managers can see a return on investment. Whether it's repositioning desks to be closer to natural lighting, creating small nooks with potted plants or including nature-inspired artwork in the entryway, minor enhancements can help support a more positive workspace environment. The addition of plants into an office environment has been proven to increase productivity by 15 percent. Biophilic design is often about thinking smarter, not working harder.

LEED vs WELL vs FITWEL

Rating and certification systems such as LEED, the most widely used green building rating system in the world and globally recognized as a symbol of sustainability achievement, WELL Building Standard, a building performance rating and certification system, and Fitwel (Facility Innovations Toward Wellness Environment Leadership), a certification system designed to assess and support healthier workplace environments, help promote and identify energy-efficient spaces which enable a healthier, more productive workforce. While LEED focuses on the design, construction and operation of high-performance green buildings, both WELL and Fitwel focus on the health and well-being of a building's occupants.

These three certification systems highlight the benefits of biophilic design by assessing the buildings sustainable and health-oriented elements. Each system analyzes a different component of the building and showcases the unique results, as follows:

LEED (Leadership in Energy and Environmental Design), from the U.S. Green Building Council, certification requires a facility must meet specific standards to demonstrate the steps taken to reduce energy consumption, conserve water, improve indoor air quality, lower operating costs, and more, which reduces the facility's overall environmental footprint. By creating healthier environments with LEED protocols, 11 percent of workers now have fresher air, 23 percent have improved lighting and access to views and 18 percent have access to daylight and windows, making workers more productive and more satisfied at work than ever before.

WELL, from the International Well Building Institute, focuses solely on human well-being and performance rather than environmental sustainability. In order to be WELL certified, a facility must meet seven core concepts that measure, certify, and monitor the health in a workplace environment – air, water, nourishment, light, fitness, comfort, and mind. Under each of these concepts is a more complex list of certification “Features” or

metrics. WELL Features are categorized as either “Preconditions” – necessary for baseline WELL Certification – or “Optimizations” – optional enhancements. Biophilia is only one of the many Features addressed through the WELL Building Standard.

Fitwel, from the U.S. Centers for Disease Control and Prevention, can also be used as a roadmap to design new buildings being constructed. Eligibility for certification is evaluated by the Fitwel Scorecard which measures health within 12 areas of design and operations. Points are given to each of the Fitwel strategies based on how the concept impacts health and wellness and how they correlate. For example, when a company implements biophilic design solutions in an office environments, points are given in the “outdoor spaces” and “workspaces” scorecard sections for providing a restorative garden amenity accessible to all regular occupants, natural daylight in a majority of the workplace, and providing views of nature from a majority of workspaces

Today's business leaders have a tremendous opportunity—and obligation—to design the ideal office environment for their most valuable assets. By placing a strong emphasis on workplace design and employee's well-being, it creates a healthier, empowered and productive workplace that benefits everyone - and that's good for business. FMI



Kenneth Freeman is head of innovation for Ambius, the world's largest interior landscaping

company. He has been involved in research and development in interior landscaping for many years and has an interest in combining interior horticulture with the application of evidence-based design and the scientific study of workplace well-being.

Vendor Profiles

The following product and service providers offer solutions for your everyday and specialized facility management needs.

ACOUSTICAL/SOUND MASKING

Biamp Systems

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www.logison.com | +1-866-LOGISON

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www.Powering-America.org | + 1- 727-463-1100

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www.ServiceMasterRestore.com | +1- 855-646-8988

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Enel X North America, Inc.

Enel X is the leading provider of grid-connected electric vehicle charging stations with over 50,000 smart stations across the world. The company's JuiceNet® platform provides smart management of EV charging, which is used by thousands of drivers, global automakers, commercial businesses and utilities. In North America, Enel X has ~3,400 business customers, spanning more than 10,400 sites, representing approximately 4.6 GW of demand response capacity and 20+ battery storage projects.

<https://evcharging.enelx.com> | +1-844-885-5850

Vendor Profiles

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AGF Manufacturing, Inc.

AGF is the designer and manufacturer of the most reliable and versatile line of inspector's test and drain valves, auxiliary drains, corrosion monitors, air venting valves, and accessories for the Fire Sprinkler industry. AGF provides the best products, backed by a strong commitment to customer service, to help manage fire safety systems more efficiently, resulting in more reliable systems that save resources. Our product line includes: TESTANDRAIN®, COLLECTANDRAIN®, CORRINSITE™, PURGENVENT™, REMOTETEST®, INSPECTOR'STEST™, RISERPACK™, and TESTANSAVE™.

www.agfmanufacturing.com | +1-610-240-4900

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Kee Safety Inc.

Kee Safety is the leading global supplier of safety solutions and fall protection systems that separate people from hazards. Kee's OSHA-compliant products include rooftop access point protection for hatches and ladders, skylight screens and guardrail, non-penetrating rooftop perimeter guardrail, rooftop walkway and cross-over systems, weighted anchor systems and horizontal lifelines. All Kee Safety fall protection systems are third-party tested to exceed OSHA regulations and provide safe, dependable, corrosion resistant solutions for people working at height. Ask about a complimentary Rooftop Safety Audit to evaluate risk on your rooftop today!

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www.buyXcluder.com | +1-847-495-4730

Vendor Profiles

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Miracle Method refinishes existing tile, porcelain, fiberglass, cultured marble, acrylic and laminate surfaces. The company is a major resource to facility managers looking for an alternative to expensive and time-consuming removal and replacement renovation and restoration for public and private restrooms, locker rooms, guest rooms, and food services areas for office buildings, warehouses, convenience stores, hotels, colleges, and healthcare facilities.

www.miraclemethod.com/commercial | +1-888-741-3511

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usa.sarnafil.sika.com | +1-800-576-2358

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SECURITY/SECURITY SYSTEMS

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