FMJ | OFFICIAL MAGAZINE OF IFMA | NOVEMBER/DECEMBER 2020 | THE SUSTAINABILITY ISSUE

FMJ

IFMA™

WWW.IFMA.ORG/FMJ | NOVEMBER/DECEMBER 2020

inside

Sound masking is more than a product. It's a service provided by professional technicians who know the effect isn't achieved from the moment they power the system, but by tuning the sound to an independently-proven curve. Designed right, tuned right—that's our motto. And the result is more consistent, comfortable and effective sound masking.

LogiSon® ACOUSTIC NETWORK ©

www.logison.com

Ready to sit for your CFM® exam?

Practice applying your FM knowledge and critical thinking skills with IFMA's Virtual CFM® exam prep.

IFMA's Virtual Certified Facility Manager® exam prep provides an overview of the 11 competencies of the facility management body of knowledge.

- Enhance your knowledge in FM areas you may not encounter in your current position
- Review core competency areas
- Stay on track to meet your CFM® goal
- Review the overall methodology of the CFM® Exam
- Practice applying FM knowledge and critical thinking skills with sample exam questions

IFMA

CFM

Certified Facility Manager®

IFMA's CFM® - Earn the *most respected* credential in facility management.

Learn more at ▸▸▸ fm.training/cfm-preparation-resources

Features

Sections

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 (142 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.

FMJ FMJ (ISSN 1059-3667) is published six times a year (January/February, March/April, May/June, July/August, September/October, November/December) by the International Facility Management Association, 800 Gessner Road, Suite 900, Houston, Texas 77024-4257 USA. Periodicals postage paid at Houston, Texas and at additional mailing offices. One electronic copy of each issue is supplied to IFMA members. Printed copies are available to members at an additional US$48 per year. Nonmembers can purchase a subscription for US$84 per year. To receive a subscription, mail a check to FMJ, attn: Subscriptions; 800 Gessner Road, Ste. 900; Houston, Texas 77024-4257 USA or visit www.ifma.org/fmj/subscribe. For advertising rates call +1-281-974-5674 or email diana.maldonado@ifma.org. FMJ is printed in the United States. FMJ reserves the right to edit any articles received or solicited for publication. This right includes the discretion to select titles, artwork and layout. Opinions expressed in articles are those of the authors, not necessarily those of FMJ staff.

POSTMASTER Send address changes to: FMJ, 800 Gessner Road, Suite 900, Houston, Texas 77024-4257 USA.

PLEASE RECYCLE

MIX Paper from responsible sources FSC® C132124

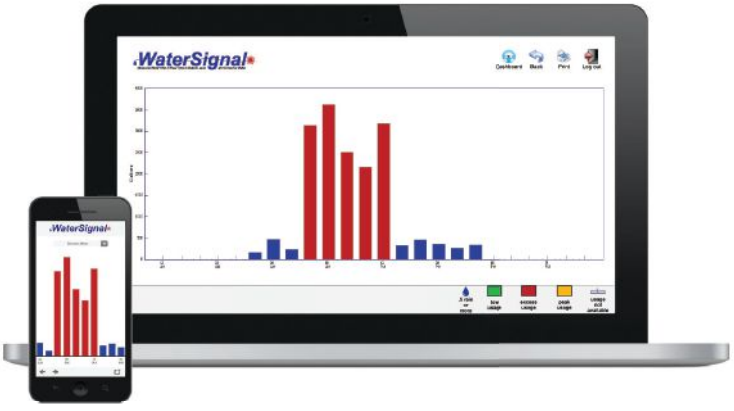
With the goal of minimizing our carbon footprint, FMJ is printed by an FSC®-certified company.

VACANT BUILDINGS ARE FILLING UP WITH SILENT WATER WASTERS

With real time leak alerts, actionable insights and remote access, WaterSignal puts you in control

WaterSignal

Measures Water Flow In Real Time to Detect Leaks and Conserve Water



Features include:

- 24-hour access to data and analytics
- Email and SMS alerts
- Provides valuable peace of mind
- Helps to prevent costly water damage

watersignal.com | 844.232.6100

Online

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

FMJ Extras

The online version of FMJ features extra resources like videos, podcasts, white papers and more to enhance your reading experience. Click on the FMJ Extra icons that appear in the digital magazine to link to additional sources of information to learn more about topics covered by articles in this issue.

035 Resource
More on in-dumpster cameras
www.recyclingproductnews.com/article/30079/compologys-in-dumpster-cameras-and-contamination-score-provide-path-to-sustainable-efficient-waste-collection

044 Resource
The Expert's Assessment:
The Workplace Post-Covid-19
ifma.org/marketplace/bookstore

048 Webinar
3-D Printer Safety
attendee.gotowebinar.com
recording/1451959390971478543

053 Resource
Third-party Certifications
healthygreenschools.org/resources/third-party-certifications

FMJ Extended

Check out the online issue of FMJ for a special section that follows the end of the print magazine and includes additional articles not available in the print edition. Read the extra articles listed below for contributions from councils and communities, and other supplementary content.

The hard work of getting safely back to work. (Made easier with SpaceIQ tech.)

Let's get your employees safely back into the office. SpaceIQ is the modern AI-powered platform that helps with scenario planning, solves capacity restrictions, and centralizes HR and seating-chart data. With the right tools, maximum employee safety and productivity are 100% compatible. SpaceIQ will get you through the current crisis and whatever else the future may hold. **Schedule a deep-dive demo today at spaceiq.com/demo.**

SpaceIQ®

Editor's Note Bobby Vasquez

As 2020 comes to a close, it's hard not to reflect on what we endured and what we overcame; how we anguished and how we pulled through; what we learned and what actions we took in response.

While we are still faced with doubt and disquiet, we as a people are determined to persevere. We as a profession are equally resolved to carry on, as evidenced by our drive to keep moving forward even as the world stood still.

This year has forced us to face hard realities and ask tough questions of ourselves, our communities, our leaders and our organizations. Many far-reaching issues have weighed on our minds this year; but for the facility management industry, keeping buildings functional, occupants safe, workforces supported and businesses buoyed was paramount. We are problem solvers, fixers and doers. As our facilities' doors closed, our minds opened.

We were thrown into a global work-from-home experiment and in many ways we're still learning how to fly that plane while we're putting it together. But in the short time since the pandemic began, we're already learning how FM will influence the workspace.

Through a comprehensive Delphi survey, FM experts weighed in on how new ways of working will develop when societies return to normal (Page 43). Conducted with more than 248 globally recognized subject matter experts (SMEs), the study points toward significant shifts in how organizations will operate post-COVID-19.

How will these shifts affect sustainable development goals? Sixty-seven percent of SMEs believe that COVID-19 will spur a significant transition toward sustainability. Will the pandemic experience change organizations' and workers' practices? According to one SME, "it has to."

This issue of IFMA's FMJ focuses on various aspects of sustainability, from how to have an organization use renewable resources to navigating through and taking action on terms like regulations, mandates and laws.

One highlight of this issue is the unveiling of IFMA's Forty Under 40 list of spectacular young FM professionals. Some of the recipients fell into the FM profession, some learned about it while doing something else and others naturally gravitated to it. However, they are all bright, eager, selfless and ready to take the reins of the profession and pass knowledge, encouragement and enthusiasm to the next generation of FMs.

Sustainability in the FM industry is not just greener buildings, products and practices. It's also growing the next generation of FMs, and the ones after that and so forth. One of the Forty Under 40 recipients said FM is the best-kept secret. Hopefully in the years to come, the world will know the magic and importance of the FM industry.

Continue to stay safe, stay positive, keep innovating, and get ready to flip the calendar toward better times ahead.

Cheers!

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

From the **Chair**

PETER ANKERSTJERNE

MBA, COP, FRICS, IFMA FELLOW

Chair, Board of Directors

COVID-19 has inspired FMs to recommit their efforts to keep buildings safe. But another public health crisis requires our attention and action: climate change.

In my last column, I declared now our professional moment to forge positive change in the enterprises we serve, particularly for the benefit of the people we are entrusted to keep safe. As we move toward the end of this demanding year, let us bring the same urgency and determination we've shown in tackling the pandemic towards helping our communities adapt to and mitigate climate change.

From increasing storms to rising sea levels, climate change is already affecting everyday life. It's critical that we adapt our buildings to these impacts for the sheer purpose of protecting public safety, as well as for supporting longer-term property value. As we learn to adapt, we must also actively work to reduce future impacts by removing carbon from the equation. A recent McKinsey Global Institute report states that holding warming to 1.5 degrees Celsius above preindustrial levels could help limit the most dangerous and irreversible effects of climate change.

One powerful way FMs can support this dual mission is by helping their institutions move toward electrification, and away from fossil fuels. For example, McKinsey reports that electrifying space and water heating in residences and commercial buildings where it is feasible could reduce their overall heating emissions by 20 percent by 2050. Simpler solutions abound, too, such as improving fabric insulation, or reducing glazing areas to minimize heat loss. If you haven't conducted one lately, the best place to start is with a climate change risk assessment.

Our work as FMs can play an invaluable role in achieving Paris Agreement goals for net zero carbon delivery, particularly when you consider that real estate accounts for nearly 40 percent of total carbon emissions. Creating climate-friendlier buildings can also support our organizations' bottom lines in many ways. For instance, JLL findings that more sustainable buildings can have increased rental value of 6-11 percent and lower void periods.

Together, we have the power to affect positive change.

Making bold moves on a facility level is never easy. But perhaps now more than ever, we have the collective will to make meaningful progress. With COVID-19 forcing fundamental questions about the way we live and work, companies are prioritizing their most valuable asset – their people – more than ever. On a site level, FMs are playing critical roles as they adopt an evidence-based, tech-fueled approach to delivering wellbeing for the people and communities they serve.

Moreover, COVID-19 has exacerbated existing inequalities, heightening demands for a fairer, more inclusive society. Making our buildings and properties safer for the diverse people who live and work in and around them is part and parcel to an organization's ability to lead with social purpose, and to create more resilient communities that reflect core values of equality and inclusion.

During the pandemic, the global FM community has moved closer together. We have witnessed both the fragility of our systems, and the incredible warmth of community spirit. We must take advantage of the opportunity and use this time to learn lessons and rebuild our businesses and communities for the sustainable and just society we all want – not only for ourselves, but also and especially for the generations to come.

To that end, I am proud to report that IFMA has been enhancing its tools to help our members in the quest for a net-zero emissions future. Our Environmental Stewardship, Utilities and Sustainability Community (ESUS) is responsible for driving the sustainability agenda of FM at a global scale. We are also currently upgrading our Sustainability Facility Professional® (SFP®) credentials as a next generation program that improves the learner experience and is available in more languages. Watch for this to debut in Summer 2021.

By the way, my fellow IFMA board members and I are by no means the only ones focused on resiliency planning for the future. As of June 30, 2020, I'm proud to report we've seen a historic 20 percent increase in SFP Credential holders in the last year, the highest increase ever.

Our shared mission to deliver healthy buildings and places has become more vital than ever. Let us meet this important moment, together.

From the **President**

DON GILPIN

President & COO
IFMA

Forty years ago, 16 men and women who believed that the job of facility management needed to be more than just an occupation – it needed to be a profession – founded our association. Through the vision, passion and action of these pioneers and those who followed, facility management leapt from obscurity to indispensability. IFMA grew from 250 members to more than 23,000. Starting with one chapter, IFMA now has 142. In the story of FM's evolution, IFMA is at the center. Our community has authored it, narrated it and brought it to life.

IFMA has made significant strides in serving and supporting FMs around the world. We're monitoring public policy objectives around the world and expanding global channels for IFMA's products and services. Sharing knowledge with other industries, other associations and other nations, fuels our growth. We're living and working in a networked world. IFMA is not a closed society. Our partnerships strengthen us.

Look where IFMA is now. We are leaders, influencing the built environment and shaping the places where people congregate. Within this pandemic, it is our expertise that is safely reopening our world. FM matters because people matter.

I want to thank the trailblazers who brought a once invisible job to the forefront, paving the way for FM to become the pivotal role that the C-Suite relies on for guidance as we return to the built environment.

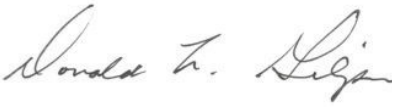
Forty years is a significant milestone, but our work is just beginning. We must ensure that all of the hard-working people in the FM industry have support, guidance, education, advocacy and recognition into the future.

We can make a difference by bringing younger professionals into FM. We can invite them to join the IFMA community. Thanks to the IFMA Foundation, more students are discovering that a career in FM is not only achievable, but fulfilling.

We must continue to reach out to high schools, community colleges, trade schools and universities, introducing FM as a rewarding career, open to students of all backgrounds. FM is poised to be one of the world's most important industries for the next 100 years. Asset management coupled with human factors, technology, and sustainability will be key areas of knowledge moving forward. We need bright young people to author future pages of the FM story.

Thanks to the dedication of members to engage the next generation of FMs, more students are entering the job market with hands-on experience and a passion for the profession. And thanks to the commitment of IFMA chapters and councils to actively support higher education FM programs, more students are entering the profession with degrees, which further elevates FM as a career of choice.

Mentors, sponsors, advisers and volunteers are needed. Volunteers who will take the message of FM into high schools. Volunteers who will find exciting and inspirational ways to engage, encourage and employ Next-Gen FM. It's time to pay it forward. It may take a village to raise a child, but it takes chapters, councils, sponsors, students, teachers and mentors to raise the next generation of FMs to carry this industry for the next 40 years and generations to come.



IFMA WORLD WORKPLACE®

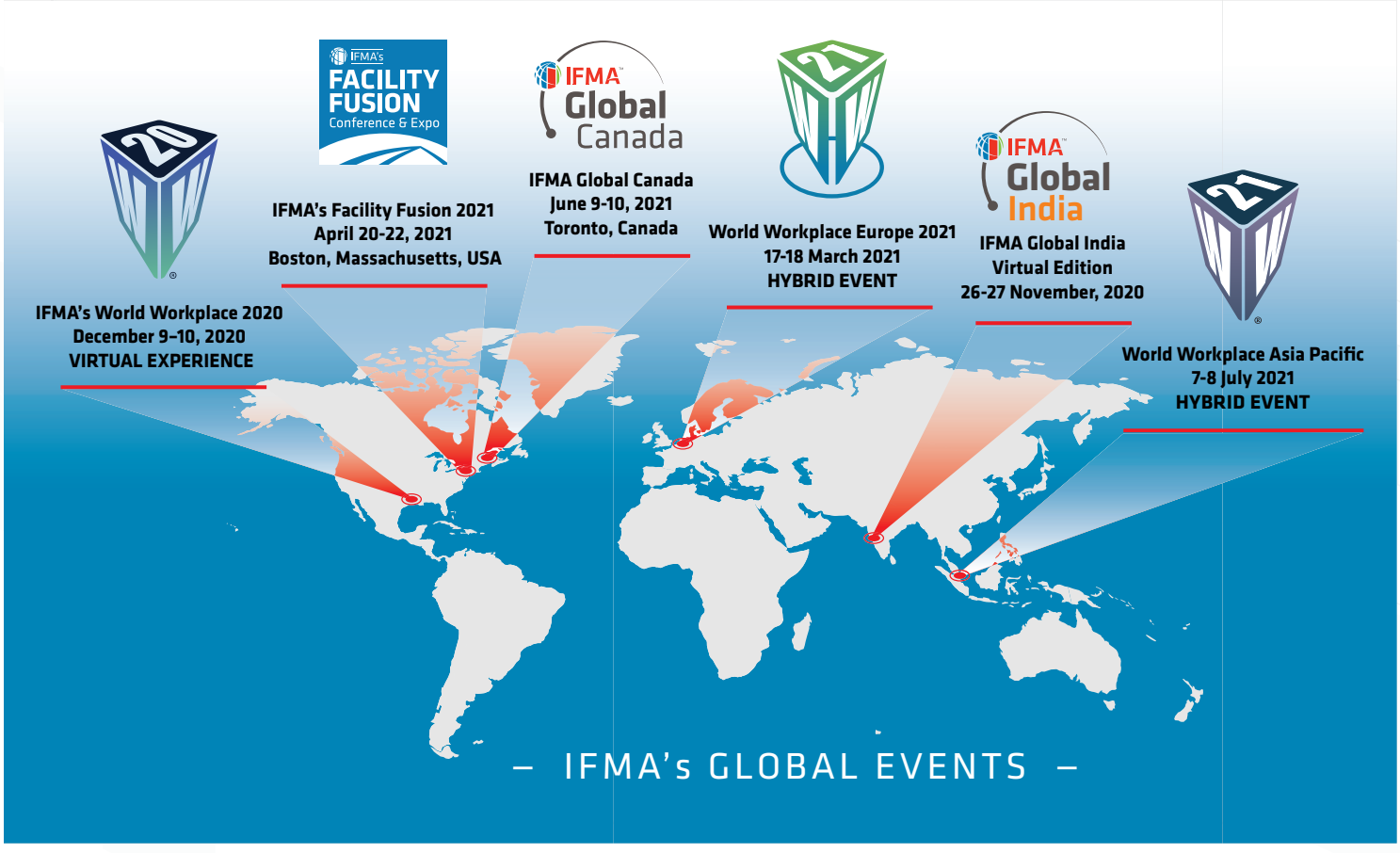
BUILDING THE FUTURE

BUILT ENVIRONMENT | SUSTAINABILITY | HUMAN EXPERIENCE

Virtual Experience

DECEMBER 9 - 11, 2020

40 YEAR ANNIVERSARY



IFMA'S FIRST-EVER VIRTUAL ADVOCACY DAY UNDERSCORES IMPORTANCE OF BUILDING SECTOR

In view of ongoing COVID-19 precautions and restricted travel, IFMA's Advocacy Day 2020 was presented as a live virtual event on Sept. 16, which opened the opportunity for more members and guests to attend. Welcoming more than 200 registrants, five members of U.S. Congress and the Director of Energy and Sustainability Programs for the Architect of the Capitol, the three-and-a-half-hour event facilitated discussions on pandemic response, FM as an essential workforce and the globally shared challenges of managing facilities in the current climate.

Typically held in Washington, D.C., USA, IFMA's annual Advocacy Day and Public Policy Forum is an opportunity for IFMA members to engage with U.S. policy makers – not only learning about legislation impacting FM, but also empowering members and chapter leaders as subject matter experts on issues that impact the built environment, including energy efficiency, sustainability, tax policy, disaster preparation and recovery, worker safety and smart buildings.

"Most of us don't fully appreciate the scope of Congressional activity during the pandemic," said IFMA Executive Director, External Affairs Jeffrey Johnson. "Recent legislative decisions have huge impacts on buildings and the FM industry. FM remains a key component in meeting the challenges of the pandemic and also in bringing people back to work in a safe and sustainable manor. Congress continues to show an interest in the role and impact of FM in the building sector and this year's virtual format allowed greater engagement and understanding of that process."

In addition to legislative updates, the event featured training on how to be an effective virtual advocate. IFMA encourages all members to get involved in its advocacy efforts, sharing their expertise to help shape policy decisions impacting the industry.

For more information on IFMA's advocacy program, please contact Jeff Johnson at jjohnson@ifma.org.

IFMA's World Workplace 2020 Conference and Expo shifts to a virtual platform

Despite efforts to relocate this year's World Workplace Conference and Expo to a self-contained facility with health and safety protocols imposed, IFMA determined that the safest, most effective way to host this year's flagship event is virtually.

Held Dec. 9-10, the immersive online event will include five hours of programming and activities each day, offering more than 25 educational sessions with the opportunity to earn CEUs and CFM® maintenance points. Attendees will have a dedicated timeframe to participate in the virtual expo, featuring live chats with vendors and a chance to win prizes playing the expo scavenger hunt.

Special networking activities include IFMA's 40th Anniversary Celebration and Welcome Reception on day one and a Virtual Happy Hour on day two. Attendees can also experience events traditionally held during World Workplace, including IFMA's Awards of Excellence, the induction of the 2020 Class of IFMA Fellows, the presentation of the Chair Citation and the IFMA Foundation's IgniteFM! student competition. Recipients of the new Forty Under 40 awards will also be recognized.

IFMA has already brought three of its annual events to online audiences this year, including a highly successful virtual World Workplace Europe, which was organized and presented just two months after the in-person event was cancelled due to growing coronavirus concerns.

"We knew it was important to deliver World Workplace, one way or another, this year," said IFMA President and COO Don Gilpin. "It's our chance, as colleagues, friends, mentors, students and business partners, to talk and learn about topics of concern and interest that directly impact or inspire our work, both now and in the future. It's where we celebrate the year's achievements and deliberate what new challenges we can overcome moving forward. Providing a virtual experience comparable in educational and networking value to our flagship event enables everyone to attend, safely and conveniently."

Learn more at worldworkplace.ifma.org

Building Envelope Campaign is the latest in a series of Better Buildings Alliance technology campaigns

A collaborative effort between the U.S. Department of Energy (DOE) and its organizing partners – the American Institute of Architects (AIA), the International Facility Management Association (IFMA) and the International Institute of Building Enclosure Consultants – the Building Envelope Campaign (BEC) helps building owners and managers create more energy-efficient buildings by improving the performance of building envelopes in both new and existing buildings.

A building's envelope has long been an overlooked area of energy savings in commercial buildings. The envelope (windows, walls, roofs) accounts for approximately 30 percent of the primary energy consumed in commercial buildings; therefore, playing a key role in determining the comfort of the building and how much energy is required to heat and cool the space.

Providing guidance, resources, technical support and a free building envelope performance assessment to determine available energy savings, the BEC helps owners and managers set goals for building envelope performance and determine available energy savings.

Joining the BEC as a participant allows organizations to access campaign resources and technical expertise in evaluating envelope options, gain recognition and participate in case studies. Manufacturers, energy service companies and researchers invested in the outcome of the BEC but do not manage buildings themselves can join as supporters to access technical expertise regarding envelope technologies.

Visit ec.ornl.gov

Green Seal now certifies safe and effective hand sanitizers

"Green Seal certification gives consumers confidence that they are buying a hand sanitizer that has been independently verified to the highest standard for health, safety and effectiveness."

– Green Seal CEO Doug Gatlin

The leading non-profit authority on safer, more sustainable cleaning and facility care products, Green Seal, is certifying alcohol-based hand sanitizers that meet the highest standard for health and safety in the marketplace amid growing consumer concern about toxic products.

With the COVID-19 pandemic spurring many first-time producers to enter the market, the FDA has warned consumers to avoid more than 200 hand-sanitizer products due to incorrect formulations and high levels of hazardous ingredients including methanol (wood alcohol) and the contaminant 1-propanol. Even when properly formulated, hand sanitizers available on the U.S. market can include hazardous ingredients linked to cancer, allergies, skin and eye irritation and other harmful health effects, even if they have an ecolabel.

Created with input from public health and industry experts, Green Seal's new hand-sanitizer certification standard screens 100 percent of the product formula for carcinogens, reproductive toxins, skin irritants, phthalates, parabens and contaminants. All Green Seal-certified products must meet strict performance testing requirements to ensure effectiveness.

This certification standard is the non-profit's latest initiative to harness its expertise to provide products, services and guidance that help protect people from both COVID-19 and negative health impacts from toxic chemicals. Green Seal Guidelines for Safer Cleaning and Disinfection for schools and workplaces have been adopted by commercial cleaning companies servicing more than 1 billion square feet of space. More than 30,000 Green Seal certified products are used in offices, schools and homes each day, including cleaning products and hand soaps critical to de-contaminating buildings and protecting people.

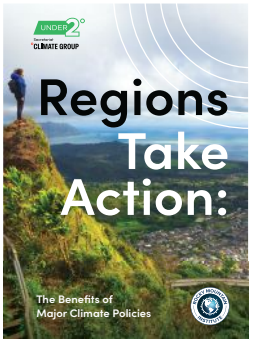
Visit greenseal.org/hand-sanitizer

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**

"Climate champions alone can't be responsible for acting on climate change. We need to see a combined effort across all areas of government, including transport, housing, education and agriculture."

– Libby Ferguson, Director of Policy and Knowledge, Under2 Coalition Secretariat



New guide shows climate actions benefit states and regions, providing blueprint for governments to replicate

In October, Rocky Mountain Institute and the Under2 Coalition – a global community of state and regional governments committed to ambitious climate action in line with the Paris Agreement – released a handbook detailing five transformative actions regional governments can take to limit the effects of climate change while bringing other beneficial impacts to society.

"Regions Take Action: The Benefits of Major Climate Policies" uses case studies from India, Brazil, Europe and the United States to show how climate-friendly policies can create better outcomes across society. It looks at economic development, air quality, public health, equity and resilience to provide a model for how regional governments around the world can implement similar actions in their own areas.

Developing and using low-carbon technologies and strategies is critical to tackling greenhouse gas emissions; however, research now shows that benefits derived from low-carbon solutions extend far beyond environmental gains. For example, one study estimates that decreased air pollution resulting from climate action to meet a 1.5°C warming scenario could lead to around 153-million fewer premature deaths worldwide. In the U.S. alone, the economic value of the avoided deaths is estimated at US$37 trillion.

The Regions Take Action guide illustrates five key climate actions regional governments can take across different sectors that will also benefit other areas of society:

• Clean electricity • Carbon-free buildings • Healthy transportation • Innovative industry • Sustainable land use

Case studies give clear examples of where regional climate actions have made a tangible difference in various parts of the world, including:

The National Capital Territory of Delhi, India, is improving air quality with electric vehicles. The August 2020 policy calls for 25 percent of all new vehicles to be battery operated by 2024 to address the fact that 30 percent of particulate matter in Delhi is emitted from tailpipes.

Hauts-de-France, France, is dramatically increasing local jobs as it invests in reinventing its industrial base. The region has more than 700 projects building a new industrial base around digital solutions, renewable energy and low-carbon materials.

Mato Grosso, Brazil, is developing diverse partnerships to tap a growing global market, while preserving land and supporting local businesses and communities – this has presented a way for farmers to create economic growth without resorting to deforestation.

The Regions Take Action guide complements two books previously released to help governments act on climate: "The Carbon-Free Regions Handbook" and "The Carbon-Free City Handbook."

Go to under2coalition.org/news/regions-take-action to download the full guide or the section(s) most relevant to your work.

PROJECT DEMONSTRATES WHAT'S POSSIBLE WHEN INDUSTRIES WORK TOGETHER TO PRODUCE MORE SUSTAINABLE OUTCOMES

The result of a unique cross-industry collaboration between Avista, McKinstry, Katerra, Michael Green Architecture and Eastern Washington University, the five-story, 159,000-square-foot Catalyst building opened its doors in September, serving as a real-world prototype for sustainable development. It is one of the largest zero-energy buildings in North America and one of the first zero-carbon buildings to be certified by the International Living Future Institute.

Anchoring the South Landing Eco-district in Spokane, Washington, USA, the Catalyst building employs integrated systems for on-site renewable energy generation using photovoltaic arrays, heating, lighting, and exhaust heat and gray water recovery, as well as Internet of Things sensors to optimize operation. Locally sourced mass timber products used extensively throughout the building as both structural and design elements help to collectively offset approximately 5,000 metric tons of carbon, equating to 1,100 cars off the road for a year.

Starting as a vision to create "the five smartest blocks in the world," the district itself has become a real-world model for sustainable, efficient and forward looking development in which smart buildings work together to actively manage energy loads and balance on-site energy demand, generation and storage in real-time to reduce the impact on the grid. A centralized heating, cooling and electrical system reliably, sustainably and affordably serves the energy needs of current and future buildings in the development.

"Catalyst and the South Landing Eco-district are more than just another smart building Project – they are the cornerstones of a fully integrated neighborhood that will serve as a living laboratory for new sustainability technologies, materials, construction techniques and operational practices," said Dean Allen, McKinstry CEO.

Learn more at catalystspokane.com

Facility managers are choosing Ethosource as their preferred furniture dealer.

Join the companies across the country who are benefitting from...

...a local dealer feel with a national dealer presence.

...custom solutions that match budget and aesthetic.

...a partner who handles every aspect of your project.

Choose Ethosource. **A better way to furnish your office.**

fmj.ethosource.com

ethosource
OFFICE FURNITURE

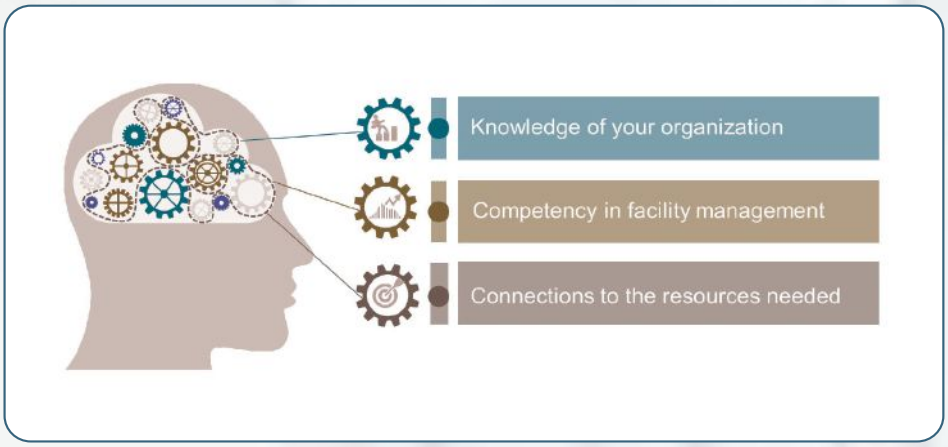
The influence of FM

BY **CASEY MARTIN**

It has long been predicted that the next generation of FMs will be inundated with new data, technology and workplace innovations. However, today's FMs face an unprecedented test of agility and adaptability while responding to the changing work environment and occupant expectations.

In the rapidly evolving new normal for how people interact and work within the built environment, the FM holds tremendous ability to influence how people intersect place. In the midst of daily new discoveries for managing a pandemic, FMs are doing far more than managing — they are leading.

PLAN	DO
People	
Who is affected and what is the desired outcome?	***How will stakeholders be kept informed during implementation?***
*Establishes the **objectives** of the plan by identifying decision-makers, establishing drivers (the need for the plan), assessing risk, determining team composition, and communication protocols.*	*Communicates **required actions, behaviors or compliance** of stakeholders to create desired outcomes.*
Process	
How does the desired outcome affect the FM function?	***What actions are needed?***
*Establishes the **actions needed** from the facility perspective to achieve the desired outcome of the plan by managing the FM functions of:* • *Health, safety, and security in the facility* • *Management of physical space* • *O&M processes* • *Management of operational risks* • *Management of procurement and budget*	*Implements **processes and procedures** that align with the desired outcome and success criteria.*
Place	
What is affected?	***How are facility changes made?***
*Establishes **changes** to physical space and operations and maintenance practices.*	*Implements **changes** to physical space and operations and maintenance practices.*



Understanding how FM can influence occupant and organizational behaviors is the topic of the next standard to be delivered by the ISO technical committee for FM (ISO/TC 267) "Influencing Organizational Behaviors for Improved Facility Outcomes." This guidance document will provide insight on how FM can significantly influence operational efficiencies and performance in alignment with the organizational mission. This concept can be applied to the COVID-19 pandemic that is imprinting new social norms on the workplace and the expected behaviors of the occupants.

ISO 41001 Facility management — Management systems — Requirements with Guidance for use and the accompanying suite of FM documents provides a baseline for implementing a management system standard. This means that the facility manager will know how the FM organization fits within the context of the demand organization, and they will already have alignment with the mission and objectives of the broader organization. These foundational elements will serve FMs well as they are catapulted into facility leadership roles in the new workplace norm.

Influence behaviors.

The need to influence occupant behaviors has never been greater. The changing workplace, the adaptive transportation industry, the overwhelmed healthcare system and vacant entertainment venues have mandated changes to the intersections of people and place. FMs are at the frontline for setting a new course, facilitating change and aligning people and place to the organizational objectives.

CHECK	ACT
What are we learning by implementing the plan?	***What changes are needed to improve success measures?***
Reports plan progress *to stakeholders and communicates measured results.*	*Communicates* ***changes*** *to practices, policies, procedures that lead to improved outcomes.*
How is the plan measured and monitored?	***What plan adjustments are needed?***
Establishes ***how the plan is measured and monitored .*** *Determines metrics and links to KPIs for:* • *Creating a safer environment* • *Creating a healthier environment* • *Enhancing the productivity of stakeholders* • *Enhancing the resilience of the facility or the business* • *Improving the cost-effectiveness of the FM response*	***Adjusts practices and procedures*** *based on assessment of metrics and KPIs.*
Did the changes meet organizational needs?	***What plan adjustments are needed that impact the physical environment?***
Determines if the changes ***met the organization's need*** *related to capacity, how space is used, or how it is operated and maintained.*	*Determines* ***if further changes are needed*** *to enhance the physical environment.*

Set the course.

Managing facilities through the current accelerating rates of change — from technology and innovation to global pandemics — is the daily life of today's FM. Leaders must have a vision of the future and understand how to move the FM organization in that direction. Creating a clear path involves understanding the context of the organization, the corporate culture, and the complexities of interested parties. Paving the path for the future is not for the faint of heart, but with guidance from this new standard, the FM has access to a framework for decision-making, a plan for mitigating the risk required to advance the organization, and a plan to get there.

Facilitate change.

Whether it is reshaping the workplace or responding to local market shifts — facility leaders are catalysts for change. A management system standard provides a systematic approach for navigating change. With this foundation in place, facility leaders can clarify purpose, intent and the change needed to achieve both in an evolving environment. Communicating new expectations and motivating people to change is paramount to invoking new behaviors and inducing adaptive and rapid change.

Leaders align to organizational objectives.

Responding to change and adapting to new market drivers requires facility managers to be fully aligned with the demand organization's mission and objectives and have the ability to facilitate change through the existing corporate culture. Not only do leaders need to align with the organizational objectives, but they also must be able to align building occupants and end users to those objectives. This requires understanding the complexities of the stakeholder minefield and leveraging that understanding to foster occupant engagement.

The employee experience is equally as important as the customer experience.

The changing environment exposed by the post-pandemic outbreak, has spotlighted the need to protect all building end users. This means prioritizing the employee experience just as much as the customer experience. If employees don't feel a critical sense of engagement within a protected environment, they can't deliver the organizational objectives. Organizational objectives drive work processes. Work processes drive facility decisions. The facility leader facilitates work process change and supportive facility decisions that improve both the employee experience as well as the customer experience.

The 41000 suite of FM standards can support the leadership roles of facility managers through periods of uncertainty and change. They provide a systematic framework for implementing, evaluating and improving the facility management organization and consequently the demand organization. The intersection of people and place is the heart of most organizations, underpinning productivity, collaboration, and the workplace experience. FMs influence both people and place. They influence work processes and occupant behaviors. FMs already have the broad skillset to set a new course, facilitate change, and improve the user experience for all occupants. With a management system in place, change can be implemented much quicker and much more far reaching to respond to the speed and depth of ongoing workplace changes.

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. In this role, she consults with private and U.S. federal agencies, providing full life cycle perspectives throughout all project development stages. Her approach considers important long-term views such as total cost of ownership, knowledge management practices, operational strategies, processes and policies to align asset and facility management with the business mission and objectives. Martin is the current chair for the ISO 41000 U.S. Technical Advisory Group, developing the new standards for Facility Management.*

Antron®. Long-Run Sustainability.

Antron® high-performance Nylon Type 6,6 fibers are designed based on the belief that the longer our product lasts, the more sustainable it is. After all, carpet should be durable, not disposable.

Learn more at antron.net/better-living/sustainability

antron®

a higher standard of carpet fiber

Specify Antron® fiber at your favorite carpet mill or look for running line styles with Antron® fiber at Bentley Mills, Mannington Commercial, AtlasMasland and Tarkett

Sustainability Reporting: The Human Angle

BY ELENA BONDAREVA

Across sustainability standards and tools, human outcomes have experienced the biggest change. Human rights, health and wellbeing have not been central to the "green building" movement. Some condone prioritizing anything besides the climate change emergency while others argue that buildings are inherently about people. Amidst lively disagreements about priorities, there is mounting and indisputable evidence that the spaces affect short- and long-term health as well as well-being and performance. The lifetime of the built environment makes it a natural lever.

"The decisions we make today regarding our buildings will determine our collective health for generations to come"

Allen, Macomber. Healthy Buildings. 2020.

Furthermore, the seismic shifts already in play at the time of the pandemic may have helped it to forever fuse buildings and health in the public consciousness.

The evolving definition of "sustainability"

Several megatrends are shifting both the operating environment and the vernacular, and several definitions of sustainability co-exist today.

Besides the environmental impact, sustainability is increasingly expected to address:

RESILIENCE

It enables the weathering of whatever shock or stress comes next. Specifically, climate change preparedness became an explicit responsibility of Australian Company Directors in 2016.

"Health and resilience in the face of natural disasters, pandemics, other incidents — it is what investors and insurance companies want to know because they have calculated the costs and don't want to incur them," said Jenna Rowe, a director with the Green Building Initiative. "How reliable is the grid? Is the building reliant on the community or does it contribute back? How resilient is the building? How prepared are the occupants beyond an occasional fire drill? Yes, some may be motivated by reducing the insurance premiums, but the outcomes are real."

EQUITY

By shedding a floodlight on structural injustice, the pandemic has catapulted equity to the top of the sustainability agenda because how could society claim sustainability if it favors the privileged? Equity of access has also claimed its stage as society seeks to destigmatize disability and cultural differences.

"The current pandemic has taught us that the human aspects of sustainability and business resilience are inextricably linked. Whatever their circumstance or trade, the pandemic has demonstrated that we cannot afford to take the health of employees for granted." said David Hemming, CEO, Northern Hemisphere Group with CETEC.

ETHICS

The limits on human endeavor continue to recede, but as the adage goes, "just because we can, doesn't mean we should." Robust interdisciplinary and cross-sectional deliberations over the justified use of power — and over accountability for its use — are set to define the next decade.

HEALTH AND WELLBEING

Its inclusion in the United Nations Sustainable Development Goals (UNSDGs) cements the central role of health and wellbeing in sustainability. Even amidst the pandemic, 1,542 new organizations have signed onto the Sustainable Development Goals in 2020[1].

RE-FRAMING AND RE-MAKING

Rather than patching up systems built on outdated assumptions, the focus of sustainability is increasingly on reinventing how FM operates, envisioning and implementing new models.

"It is no longer just about the building as the end product but about everything that comes into it: the labor, the supply chain equity, how they are operated and maintained, and the toxicity in extraction, production and what happens on the other side," said Rowe.

Managing an international portfolio

In addition to local building codes and ordinances, a patchwork of international rating tools address occupant health, wellbeing, and performance. Most tools (LEED, Green Star, BREEAM, Green Globes) address occupants (e.g., via the Indoor Environment Quality (IEQ) category) to helpensure that the pursuit of resource efficiency doesn't automatically yield sick buildings and helps the business case: people demand more of what they like.

"What is universally a priority has changed with the pandemic. Ventilation wasn't a huge concern for most and now — it is all about ventilation and HVAC systems," said Rowe.

The main rating tools, science-based, specifically focused on assessing the potential of a space to protect and advance occupant health and wellbeing are:

1. WELL[2] operates globally and addresses individual buildings or portfolios through actions across ten concepts: air, water, nourishment, light, movement, thermal comfort, sound, materials, mind, community, and innovation. With 4,435 projects across 63 countries and accounting for 632M sq. ft. — adding a million sq. ft. per day during the pandemic — WELL is the most rapidly growing of these tools.
2. Fitwel[3] operates globally, with 1840 projects across 40 countries. Its main differentiator from WELL is requiring no on-site verification.
3. National Australian Built Environment Rating Scheme for Indoor Environment (NABERS IE)[4] addresses only offices, operates in Australia and is being launched into the UK.

"In navigating this landscape, any organization should look at what is globally applicable, regionally relevant and locally beneficial. Certification needs to contribute to the company's goals while complying with regulatory requirements and benefiting the occupants," said Rowe.

In 2015, the World Green Building Council stated, "With the widespread use of rating tools globally, we believe there must be quality standards to ensure that the green building rating tool used is robust and positively contributes to environmental sustainability. Therefore, WorldGBC has launched the Quality Assurance Guide for Green Building Rating Tools to guide new, emerging and established rating tools to ensure that their development and implementation is robust, transparent and to a good standard."

The biggest differences between these tools are the scope (with WELL reaching the furthest) and whether they verify performance. The lack of this requirement has been one of the biggest criticisms of green building tools: it should only matter how a building performs, not how it was intended to.

However, that assessment is not quite fair. Ample daylight, operable windows, and commuter facilities are indeed design outcomes that are difficult to retrofit operationally. What actually matters is verifying the features subject to operational uncertainty: a robust HVAC system may be essential but not sufficient for good air quality, and both WELL and NABERS IE require regular verification by an independent test. Occupants, investors, and insurers increasingly expect this unbiased verification, especially in the context of safe (re)entry.

A selection of international reporting frameworks

GLOBAL REPORTING INITIATIVE (GRI) pioneered sustainability reporting in 1997 and with 93 percent of the world's 250 largest corporations using it to annually report on their sustainability performance, GRI is the most widely adopted framework, increasingly required by policymakers and regulators or admissible as an alternative compliance path.

UNITED NATIONS PRINCIPLES FOR RESPONSIBLE INVESTMENT (UNPRI): With 3,311 signatories accounting for more than US$8 trillion in assets under management[5], PRI is the second-most used global reporting framework for responsible investment.

GLOBAL REAL ESTATE SUSTAINABILITY BENCHMARK (GRESB) is specific to the property industry. With more than 100 institutional and financial investors reporting on US$5.3 trillion in real estate and infrastructure globally, it is formidable in steering investment towards a more sustainable future.

These frameworks help control for "greenwash:" in June, the GRI benchmark was revised to no longer allow goals that fall short of the global agenda, making feasibility an illegitimate excuse for failing to address time-bound global goals. Unlike rating tools, these frameworks are pursuing alignment and interchangeability, in part to make it easier for organizations to start the journey and be acknowledged for meaningful, continual progress.

Regional differences

Across the more than 170 WELL Performance Verifications, air and municipal water quality are universally pursued (these are WELL preconditions) and are the most location sensitive: pre-pandemic, breathing outdoor air in New Delhi was equivalent to smoking 50 cigarettes per day. Indoor air quality (IAQ) is also impacted by local materials (through emissions) and techniques, so a portfolio holder focused on IAQ may prioritize particulate filtration in India, absorbent filtration for formaldehyde in Singapore, and strategies that minimize infiltration of ozone in the Netherlands. Similarly, while the science-based targets for lighting, noise and thermal comfort are universal, the approach will vary greatly between climates and local construction techniques. Furthermore, if local cleaning expectations are lower, levels of particulate matter can quickly exceed benchmarks, and poor municipal water may lead to corrosion and deterioration of plumbing components, making it harder to maintain a target in some places.

"With an international portfolio, it is always advisable to set, informed my regional constraints and drivers, holistic goals and targets because it makes measuring the impact across the whole portfolio simpler," said Hemming. "That said, how those goals and targets are achieved locally — from the culture to the certification one may pursue — has to be informed from the ground up or it will not get traction where it matters."

The gaps

- **We don't know our buildings**
  The way each asset functions will be unique and yet in the face of the pandemic, all seem to have the same shopping list to make it more resilient. If the asset is thought of as a person, how does an FM know its vitals at rest (low occupancy)? At full occupancy? Does the FM monitor the parameters that determine what is needed to keep the system balanced and optimised — and are there controls to swiftly act on anomalies?

  "A clear rationale for occupant focused investment can come from the ratio of the initial investment to its O&M costs over its predicted life to the business operating costs such as salaries; research shows 1:0.4:12 is an average ratio," said Hemming.

- **Existing buildings remain the "elephant in the room"**
  "The most sustainable buildings are the ones that already exist," said Rowe.

Most projects with the highest ratings are new builds. It is easier to start with a clean slate, so it will require an industry commitment — aided by government incentives — to uplift the existing building stock, and FMs wield unparalleled influence.

- **We don't yet measure health outcomes**
  Energy modeling made prescribing window orientation unnecessary, but so-called health tools today are where green building tools were 15 years ago: rewarding inputs, not outcomes. Wellbeing is viscerally important, but a rating cannot yet confirm whether occupant outcomes are actually better.

- **Acceptance of unnecessary risk**
  Quality spaces are seen as a perk, not as a basic right. In Australia, a violent murder of a woman in a domestic violence incident in 2010 was deemed, on appeal in 2020, a "workplace manslaughter" because she was working from home and her employer failed to provide a safe workplace. While extreme, this example illustrates that taking a job shouldn't compromise one's health — or life expectancy.

What's next

- **Healthy buildings as a basic right**
  What if, realizing that buildings determine their future, people started to refuse unhealthy buildings, growing the demand for healthy schools, workplaces, hotels and grocery stores?

- **Regulation for health**
  Even as voluntary schemes lift the ceiling of what is possible, it is regulation that equitably raises the floor for all. Standards, local ordinances, and building codes will inevitably mandate healthy buildings, progressively rendering the laggard market obsolete.

- **Transparency about IEQ**
  Occupants will increasingly measure air and water quality via apps and determine whether they are safe enough to work. This will drive a proliferation of real-time sensor systems backed up by expert diagnostic, forensic and intervention expertise.

  "A small cohort of staff stated it was unsafe to work due to construction work on the exterior. Luckily, I had engaged an independent testing organization to measure the building's IEQ before and during, demonstrating that whilst certain levels were elevated to a 'nuisance/ irritant' level, they were not above acceptable exposure limits," said Hemming.

- **Companies delivering on health outcomes**
  Asset owners will undoubtedly overcome both technical and privacy hurdles and begin measuring the actual impact of their spaces, with the FM profession central to making this happen.

Embarking on a "healthy buildings" strategy

How does an FM team shape an IEQ strategy that fits organization's assets like a glove and yet is scalable if needed?

1. **Get informed.**
   Don't let discomfort with a new topic dissuade meaningful action. Because WELL is today's most robust tool for occupant health and wellbeing, read the introduction to WELL's 10 Concepts, view a video online, or request a training course by a faculty member.

2. **Understand the baseline.**
   Conduct a diagnostic for the assets against the WELL scorecard — what is "in the bag," what's a stretch, and what appears out of reach — and consider how the FM team can discover the buildings' normal, through routine testing, a system of sensors, or other means.

3. **Clarify the galvanizing goals**
   A sense of duty doesn't go far enough for long enough. What would make it worth it for acompany to invest in occupant-focused operations? Is it staff satisfaction? Talent attraction? OpEx? Better health outcomes? Try to set the metrics.

   "The benefits of post-occupancy surveys (POEs) should not be underestimated: I have found them invaluable in gauging the underlying issues," said Hemming.

4. Understand your risk profile

Risk and confidence operate according to the law of diminishing returns: each additional degree of confidence is exponentially harder. A one-off independent review may validate implementation, but it may take ongoing monitoring to claim that occupants are not at greater risk in the building.

5. Fasttrack the non-negotiables

Focus on the core tenets: If air quality a must-have, what is the most cost-effective thing am FM can do? Is it to increase the amount of outside air or to install a higher efficiency filter?

"Sometimes simple math conveys impact. One hundred people making an average of $55k a year is an overhead of $5.5M per year. If the poor building performance reduces the team's productivity by 15 percent (only losing one hour, seven minutes, 30 seconds of proper focus per day), that would be a loss of 33.45 days and $789,592 per year," said Hemming.

6. Identify your priorities

Consider what assets have the greatest impact on the occupants. If they work in a sealed lab, not only air quality but lighting, ergonomics and mobility may be key. If occupants have weakened immune systems, it might be air direction and VOCs. Or, if the space serves the broader community, the top priority may be physical and linguistic accessibility.

"A building certification is also a stakeholder engagement element: it is a visible representation of your brand. In Seattle, people expect to see a LEED plaque but here in Indianapolis? Not necessarily. It is all about finding the appropriate tools that speak to your place, its compliance requirements and social expectations, in way that also allow for streamlined global goal setting and reporting," Rowe said.

7. Change management

Decisions don't change things — implementation does. Understand what precise changes across people (motivation and capability), technology, and systems (protocols, incentives, feedback loops) must support occupant health and wellbeing, and advocate for the realignment. Be prepared to educate co-workers and occupants on the benefits.

8. Avoid the most common mistakes

- Don't reinvent the wheel. None of the rating schemes in the market are perfect and the costs can be a deterrent, but unless everything above is "old news," delegate to an existing verification system until/if an internal capability that surpasses it is developed. If the organization's brand is big enough, try to secure special provisions, such as cross-portfolio documentation or bespoke innovation points.
- Do not grow dependent. Good consultants make themselves obsolete. Shadow to develop replicable internal capability and outsource if it is wanted, not because is needed.
- Don't forgo intellectual property.
- Whether it is a BIM model of the intelligence behind a sensor system, create an internal capacity to own it, and never be blindsided by consultants. FMJ

David Hemming (UK), experienced in managing expansive and international portfolios for the UK government, universities, and the British Armed Forces.

Jenna Rowe (US), until recently the Global Product Manager, Sustainability for JLL, experienced in helping global asset holders navigate sustainability pursuits and reporting.

Elena Bondareva *(MA, Adv. Dip. Facilitation, WELL AP & PTA) is Vice President: Growth at CETEC, an international scientific consultancy specialized in optimizing occupant health, wellbeing, and performance, with a current focus enabling and validating safe (re)entry.*

1. https://www.unglobalcompact.org/what-is-gc/participants. Extracted on September 1, 2020.
2. www.WELLCertified.com. Extracted: September 2, 2020.
3. https://www.fitwel.org. Extracted: September 2, 2020.
4. https://www.nabers.gov.au/ratings/our-ratings/nabers-indoor-environment. Extracted: September 2, 2020.
5. Extracted on September 1, 2020. https://www.unpri.org/signatories/signatory-resources/signatory-directory

Advance your career, maximize efficiencies & streamline operations to boost your triple bottom line with IFMA's SFP®

Individuals pursue the SFP® to enhance performance in their current roles and build a strong career path for the future:

- **INCREASED EARNING POTENTIAL**
  The average five-year return on investment of IFMA credentials is 15:1.*
- **GAIN EXPERTISE**
  Attain the ability to assess, strategically plan and lead sustainable operations.
- **IMPROVED WORK PERFORMANCE**
  Maximize efficiencies and streamline operations to boost your triple bottom line: people, planet, and profit.

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

IFMA

sfp

Sustainability Facility Professional®

Gain knowledge & skills today that you can use to implement facility-wide change tomorrow with IFMA's Sustainability Facility Professional.®

Learn more at ▸▸▸ fm.training/credentials/sfp

GETTING THERE

CREATING A SUSTAINABLE FACILITY

BY THOMAS RICCIARDELLI

When it comes to greener sustainability, FMs are pretty much in agreement that it is desirable to be greener and to run a sustainable operation. Yet many come to that conclusion without a complete understanding of what that means. It is very similar to wanting to be rich. Sure, who wouldn't like great wealth? The real question lies in what must be done to achieve that. The same holds true with achieving sustainability.

DOES ANYBODY REALLY CARE?

When it comes to views on sustainability, FMs tend to fall in one of a few camps. FMs enjoy being green if it means being energy-efficient and translates into cost savings. If sustainability and green initiatives cost a little extra — or a lot extra — interest wanes.

Conversely, there might be FMs who do not care at all about sustainability. It is all about running their building or operation as efficiently and cost-effectively as possible.

Finally, there are FMs who are all in, who see sustainability as the way to do business today and going forward.

What the first two camps must understand is the far reach of sustainability and how it impacts an organization, whether the company actively engages in it or not.

So what defines sustainability?

WHAT IS SUSTAINABLE?

From a materials perspective, sustainability refers to materials made from renewable resources. This means the product is made from a natural material that will biodegrade when disposed. Materials made of bamboo, natural rubber, cork and hardwood are excellent examples of sustainable items.

Those materials are not only sustainable but can be designated as rapidly renewable. As the name suggests, this means the material grows rapidly and replenishes itself quickly after it has been harvested.

Biodegradable is another term that falls in the highly desirable category within sustainability. Clearly, biodegradable items lend well to sustainability as they can be disposed of with minimal impact to the environment.

Another variable that might not be on the radar of FMs is the origin of the product. A locally harvested product—made from materials produced locally—will have the additional benefit of being more sustainable. How? Simply by the carbon footprint in getting the more sustainable product to the facility being far less than a product made of similar material from outside the region or outside the country.

HOW WAS IT MADE?

Material type is important. How that material was made also contributes to its sustainability quotient. For example, were non-toxic materials used in the manufacturing? Was formaldehyde used in its production or any low-VOC or low-emitting materials?

What about the operating procedures of the manufacturing plant itself? Do they follow green manufacturing practices such as minimizing waste and using renewable energy such as solar or wind?

When considering a product's sustainability, all things are considered from conception to the time it enters a facility.

CARBON FOOTPRINT

Another consideration is the carbon footprint of the product. That starts with the collection of the raw materials needed to create the product. What machinery was required to attain those materials and how much energy and exhaust did that effort create?

The same measures can be applied to the production of the item. The amount of electricity or the energy source used in that production is part of the product's sustainability data.

Invariably, transportation is involved in the creation of a product. How were the raw materials extracted and then delivered to their next destination for manufacturing? Once completed, how did the finished product meet its next destination? Truck, ship, plane or train? The energy consumed to get the item to a place where it could then be purchased all factors into sustainability, as does the cost to get it to the end-consumer.

Once delivered, the product must be installed. How much of a footprint does that leave behind? Installers may be workers at the place of business. Outside installers may need to be called in. All use some form of transportation to get there and that adds to the footprint.

Additionally, there probably is machinery involved with the installation, at the very least electricity for light or tools. This is also part of the carbon footprint.

HOW IS A PRODUCT USED?

Flooring tiles are part of the fabric of a facility. The impact extends to business operations and staff. There is a certain effort in maintaining those tiles. Who does that maintaining? Do employees of the company maintain the flooring or is an outside vendor brought in for maintenance? How do those professionals get to and from the facility to perform that work?

Taking that a step further, what type of product is used to maintain the flooring? How is that made? Where did it come from and how did it get to the facility?

PRODUCT REMOVAL

This is where the proverbial rubber meets the road when it comes to carbon footprint. Removal of a product does involve labor and labor's footprint (e.g. equipment to remove, energy required for removal, transportation of staff or vendor). Most importantly, removal calls for disposal. Where many products fall short on sustainability is whether a product can be re-used or recycled. This is why part of the research for capital improvements, an investigation of the manufacturer and if they offer a buy-back or recycling program is important.

From a big picture standpoint, using recycled materials to make new products offers huge benefits compared to using virgin materials. Because recycling materials does not require extracting additional ingredients from the planet and the process of grinding, cleaning and reusing a material generally requires far fewer resources than creating new materials from raw ingredients, there is much less impact on the environment. The graphic to the right summarizes the savings on global warming, acid rain, and smog from the recycling of plastics for use in new products versus making new plastics for use in new products.

Some manufacturers will offer a Life Cycle Assessment or LCA of their product. This demonstrates how long a product will actually last. For manufacturers that offer a buy-back and re-use program, the LCA of a product can be considerable.

HOW TO RANK SUSTAINABILITY

LEED (Leadership in Energy and Environmental Design) is the world's most widely used green building rating system[1]. It accounts for LCA, grades products and projects and creates a score. Goals of the LEED program include:

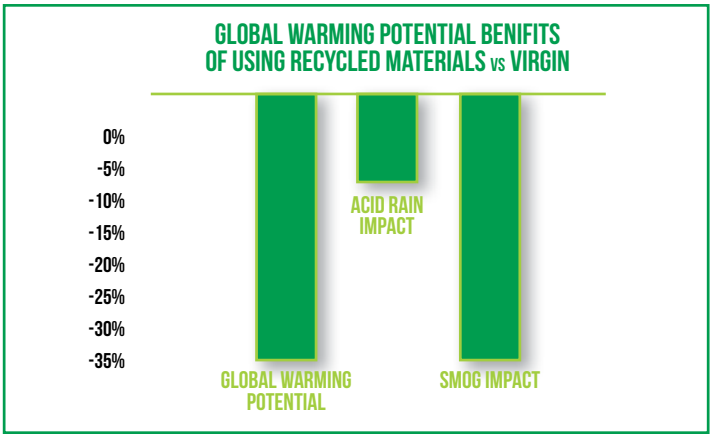
- Reversing the contribution to global climate change
- Enhancing individual human health and well-being
- Protecting and restoring water resources
- Protecting, enhancing and restoring biodiversity and ecosystem services
- Promoting sustainable and regenerative material resources cycles
- Building a greener economy
- Enhancing social equity, environmental justice, community health and quality of life

To achieve LEED-certification, a building and the materials within it must meet criteria in one of three options, typically referred to as Building Product Disclosure and Optimization – Environmental Product Declarations (EPD). Those options are:

OPTION 1 — Use at least 20 products from at least five manufacturers with EPDs.

OPTION 2 — For 50 percent of the cost of project's installed materials, reduce three LCA criteria below the industry average. Locally sourced products (within 100 miles) count twice as much. If 50 percent represents 40 products,of those 40 products, 20 must be from at least five manufacturers who meet the following criteria:

- Greenscreen® Benchmark at 100ppm with no No. 1 hazards
- Cradle-to-Cradle® v2 Gold/Platinum; v3 Silver/Gold
- International Alternative Compliance Path REACH Optimization



OPTION 3 — Product manufacturer supply chain optimization. This calls for using at least 20 products from at least five manufacturers with documented, validated robust health and safety programs, 99 percent documentation of ingredients and verified by a third party supply chain.

Using a point system, the LEED scorecard provides an idea of how green or sustainable a facility might be—or how close it is to becoming sustainable.

The more points, the higher the reward. With LEED, there are many rewards, ranging from healthier spaces to buildings that save money and resources. The number of points a project earns determines the level of LEED certification it receives. There are four levels of certification:

- Certified (40–49 points)
- Silver (50–59 points)
- Gold (60–79 points)
- Platinum (80+ points)

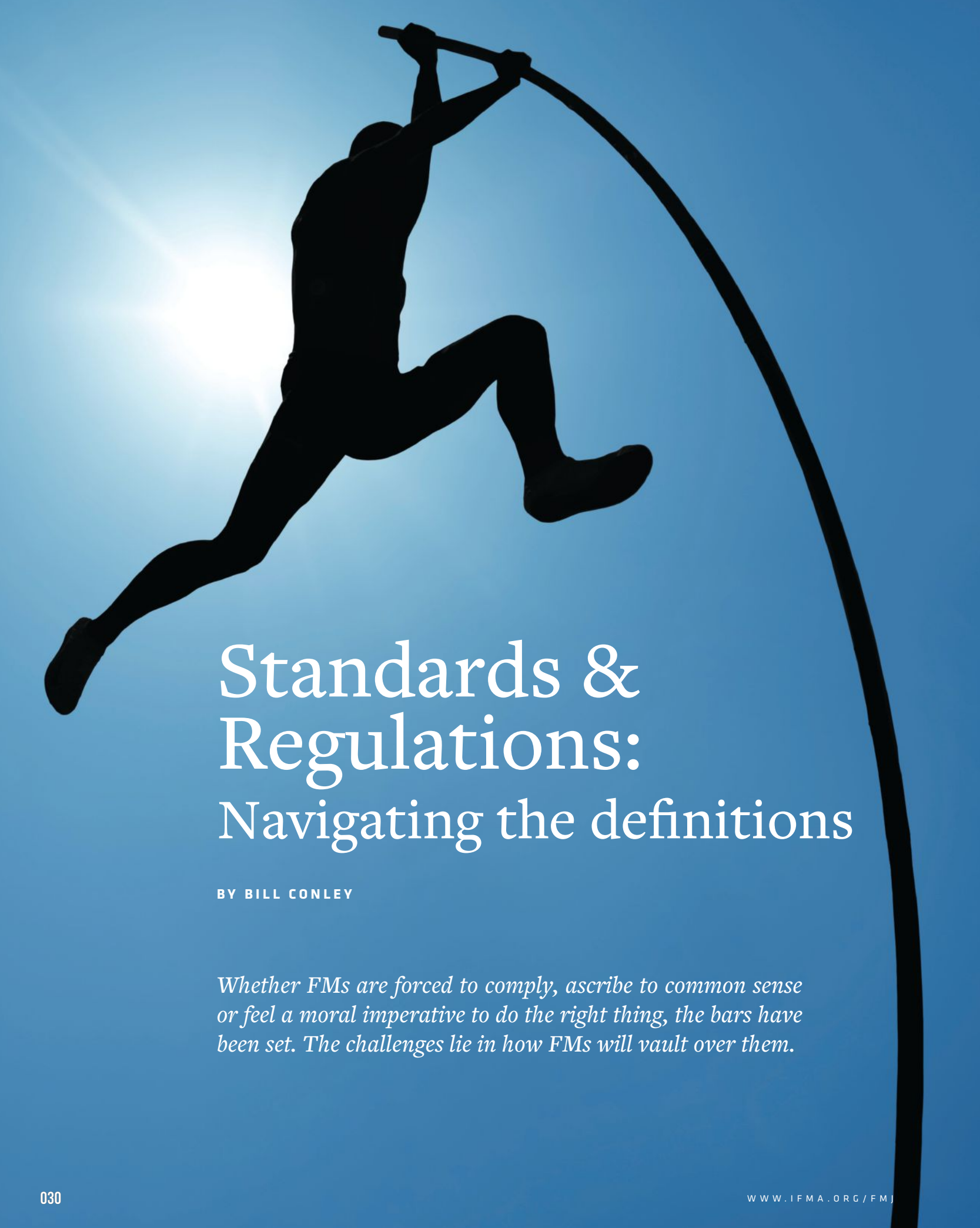
The LEED criteria tends to separate those companies who are looking at green alternatives as a cost-reducing function rather than a more global, long-term initiative. This is why organizations serious about sustainability will look at companies that offer products made from mostly recycled products with a lifetime expectancy of more than 10 years with a buy-back program to recycle the material being replaced.

CONCLUSION

Sustainability is a desirable goal for all facilities. It doesn't have to happen overnight. It can take place incrementally with each capital improvement project. By doing some research and finding out the where and how of the products and materials purchased, a facility can make great strides towards sustainability. FMJ

1. usgbc.org/leed

Thomas Ricciardelli *is the president of SelecTech, Inc., a leader in the manufacture of innovative flooring products from recycled materials.*



Standards & Regulations:
Navigating the definitions

BY BILL CONLEY

Whether FMs are forced to comply, ascribe to common sense or feel a moral imperative to do the right thing, the bars have been set. The challenges lie in how FMs will vault over them.

When it comes to the law of supply and demand, it seems the demand is more prevalent in the world of FM. It is up to FMs to provide the supply. A relatively new term in the business world depicts an overall company as the demand organization. It does not take much imagination as to which group in the facility is most affected by this concept.

One demand that is either implied or mandated is the implementation of sustainable initiatives. If an FM is moral, ethical or practical, the supposition that taking care of the environment is an integral goal of operations. This focus encompasses activities that provide benefits on multiple levels: namely, activities centering around the triple bottom line. However, should an FM need guidance or further incentive, there are legislative mandates, regulations, standards and guidelines available to help them navigate the world of sustainability.

Laws

First, and most importantly, are the laws that have been created to dictate performance and outcomes for the preservation of the environment. Much like FM, legislation has been viewed as a combination of science and art. Environmental laws often relate to issues such as the pollution of soil, air, or water; global warming, the depletion of natural resources such as fossil fuels, and the ecology. They can be comprised of a complex combination of state, federal and international treaty law pertaining to the environment and protecting natural resources.

Environmental law is increasingly an international issue, due to the cross-border issues of air and water pollution, and man-made climate change. It is an ever-changing and constantly expanding challenge. When decisions and collaborations occur across international boundaries, disputes inevitably transpire because of trade implications for the respective nations, safety concerns and cleanliness of environmental resources among shared borders. Problems with enforcement regarding liability under agreements or treaty provisions relating to the environment can also arise.

This area of international law includes a multitude of environmental issues. Future issues regarding population growth and supporting those people, the challenges of biodiversity, global climate change, ozone depletion and preserving the Antarctic regions are major concerns. Maintaining the integrity of natural resources means controlling the movement of toxic and hazardous substances, as well as vessel-based pollution and dumping waste on land and sea. The conservation of marine living resources, trans-boundary air and water pollution, desertification and nuclear damage are other dangers to the environment that have international implications.

United States environmental law concerns legal standards to protect human health and improve the country's natural environment. The country remains an important source of environmental legal expertise and experience, despite criticism at home and abroad on issues of protection, enforcement and over-regulation.

Environmental sustainability laws in the U.S. include the Clean Water Act; Clean Air Act; Endangered Species Act; Insecticide, Fungicide, and Rodenticide Act; and The Food, Conservation, and Energy Act of 2008, to name a few. FM advocates, through IFMA's Government Affairs Committee have tried for years for Congress to enact an updated comprehensive energy conservation bill.

Legislation refers to the laws enacted by the legislature or a law that is in process of being enacted. They are directives proposed by a legislative body to direct particular actions. Regulations, meanwhile, are the process of monitoring and enforcing a law as well as the document that contains the details of a written rule. A regulation is a specific requirement within legislation and details how legislation is enforced. These two are inextricably intertwined but are different from each other.

A regulation refers to a specific requirement that can take on both broad and specific forms. it is how legislation is enforced by regulators and they support the requirements of the legislation. In industry, they specify the formal (legal) requirements to be followed by organizations, workers and employers. Regulations address product safety, consumer protection and other factors in the public interest. At times, FMs receive visits from regulators (such as from the health department, fire marshal, water quality/storm water management or waste diversion).

The next level of external support for efforts in sustainability and FM are industry standards focusing on health, indoor environmental quality and resource management. Standards are principles considered a basis of comparison or a model approved by an authority or general consent. Standards are the distilled wisdom of people with expertise in subject matters and are fully conversant with the needs of the organizations they represent.

Numerous standards have been developed globally in recent

years to address issues of social equity, environmental quality and economic prosperity. Despite the common denominators regarding sustainability, there are some significant differences in terms of their target groups of adopters, historical development, scattered geographical differences, and varied emphasis on environmental, social or economic issues.

One of the major differences between standards is their level of strictness. Some standards set the bar high for a sector, attempting to promote the strongest social and environmental practices while working with the top performers to constantly increase sustainability expectations. Other standards are more concerned with the elimination of the most detrimental practices and have practitioners operate at more of an entry-level to incrementally improve their operations. Strategies are also developed to move producers through a progression of ever-evolving sustainability initiatives. Standards can be developed and applied internationally, with mechanisms built in to ensure local relevance. Other standards are developed entirely with a regional or national focus.

ISO is the International Organization for Standardization and covers a broad scope of business practices, including product quality, environmental activities and risk management. ISO 14001 sets out the criteria for environmental management systems and interested parties can be certified through it. It maps out a framework that a company or organization can follow to set up an effective environmental management system. Applicable to any type of organization it can provide assurance to company management, employees and external stakeholders that a business' environmental impact is being measured and improved.

While ISO 14001 provides requirements with guidance for use that relate to environmental systems, other standards focus on specific approaches such as audits, communications, labelling and life cycle analysis, as well as environmental challenges such as climate change.

FMs should also take interest in the newly published ISO 41000 series: Standards in Facility Management. ISO 41001:2018 guides the implementation and operations of any FM organization and refers formally to the FM organization as an organ of any enterprise which makes use of facilities. The business entity is defined as the demand organization and this is one area in which that term has taken root.

ISO 41001 specifies the facility management system requirements when an organization wants to demonstrate the efficient and effective FM delivery supporting the objectives of the demand organization. It was created to assist companies meet the needs of interested parties and to meet applicable requirements, and operating sustainably in a globally competitive environment.

Other members of this standards family include

ISO 41011 which defines FM vocabulary;

ISO 41012 which provides guidance on strategic sourcing and the development of agreements; and

ISO 41013 which outlines the scope, key concepts and benefits of FM.

The Global Reporting Initiative (GRI) is an international standard generated by the United Nations Environmental Programme(UNEP). GRI helps businesses and governments understand and communicate their impact on critical sustainability issues such as climate change, human rights, governance and social well-being. This enables real action to create social, environmental and economic benefits for everyone. The GRI Sustainability Reporting Standards are developed with true multi-stakeholder contributions and are rooted in the public interest.

ASHRAE

Other standards that can be referenced have been published by ASHRAE (the American Society of Heating, Refrigeration and Air Conditioning Engineers).

ASHRAE Standard 55-2017 provides a systematic approach to help architects and engineers analyze design alternatives that integrate suitable combinations of enclosure, fenestrations, constructions, terminal HVAC technologies and space layouts and dimensions and meet or exceed function-specific thermal environmental requirements for occupancy. Furthermore, Standard 55-2017 provides methods and metrics to support the evaluation of thermal comfort in existing buildings using subjective occupant surveys, objective environmental measurements and the use of a building automation system.

Standard 62.1 can be used to guide the improvement of Indoor Air Quality (IAQ) in existing buildings as it outlines minimum measures intended to provide IAQ that is acceptable to human occupants and minimize adverse health effects

Standard 90.1 has been a benchmark for U.S. commercial building energy codes and a key basis for codes and standards around the world for more than 35 years. This standard provides the minimum requirements for energy-efficient design of most buildings, except low-rise residential buildings.

Guidelines

A guideline is a statement by which to determine a course of action. It aims to streamline processes according to a set routine or sound practices. In concept, a guideline is never mandatory. One way in which to consider standards and certifications such as those offered by BREAMM, LEED, or CASBEE is to treat them as guidelines or best practices of a sort.

FMs can review and attempt to follow the specifications in a certification program to the best of their ability, or the capabilities of their buildings. These programs relate what needs to be done for certification, and an FM can opt to achieve ABC (All But Certified) status for their operations.

Measures aimed at improving the built environment have been established around the world.

The BREEAM® assessment was introduced in 1990 by the British Research Establishment (BRE) as the world's first comprehensive green building rating system for office. It has reached strong market recognition and is recognized by construction and property sectors as the benchmark for best practice in environmental design and management.

LEED (Leadership in Energy and Environmental Design) is the most widely used green building rating system in the world. Developed in the United States it is available for virtually all building types. It provides a framework for healthy, highly efficient, and cost-saving green buildings.

CASBEE (Comprehensive Assessment System for Built Environment Efficiency) is the green building management system in Japan.

Taking Action

The case for sustainability is no longer an argument. It is based on statements of fact. Much of FM is reactive, taking care of problems as they arise. This is not the time for that. FMs must be proactive by implementing proper measures now. There are many motivators for sustainability, from mandates to voluntary efforts. There are legislation and laws that are ostensibly aimed at the public good that are enforceable and binding. There are regulations, enforced by agents with a rule book and advice in one hand and a fine schedule in the other.

There are standards and guidelines designed to make facilities safe, healthy workplaces with decreased impact on the environment and the bottom line. There are business cases galore, proving savings through cost avoidance. Savings are evidenced through energy efficiency, water conservation, waste diversion and improved productivity in the workplace. Or, it could be the prevention of fines or finances aligned with remediation. The proof is easy to see, and the tools are there. Benefitting the triple bottom line is no longer a catchphrase, but a realistic set of objectives. Whether FMs are forced to comply, ascribe to common sense or feel a moral imperative to do the right thing, the bars have been set. The challenges lie in how FMs will vault over them. FMJ

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. Conely 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.*

Getting Out from Under the (Garbage) Pile

HOW WASTE TECHNOLOGY IS LIGHTENING THE LOAD

BY DAN STUDER

FMJ EXTRA
Resource

More on
in-dumpster cameras

In July 2020, garbage started piling up outside many strip malls and shopping centers that contained multiple restaurants. The restaurants were closed to dine-in traffic due to local pandemic regulations, but their take-out business was booming and suddenly there was an overflow of boxes to be recycled and mounds of trash generated from take-out orders. Even a few weeks earlier the business owners couldn't have guessed they would need more recycling pickups, and there was no way to gauge (other than guesstimating) how to keep up with service fluctuations.

On the opposite end of the spectrum, facilities that sat empty for months were still paying to have near-empty dumpsters emptied each week. In both cases, there was a breakdown in communication with waste vendors who weren't able to adjust service schedules to make them more efficient.

In just one example, a commercial real estate company went from a volume of 11,000 yards of waste down to 4,300 yards of waste in less than two months. After six months the volume leveled out at about 6,300 yards, but that was still far less than the 11,000 yards they'd originally contracted for.

How can facilities move quickly to make waste service efficient — especially when circumstances are uncertain? The CRE and their waste vendor turned to technology.

Getting a feel for volume

In the past, the waste industry had very few accurate methods for quantifying the amount and types of waste being generated. Manual audits were common, and even recommended, to identify efficiencies in a facility's waste and recycling service schedule.

Manual waste audits are time intensive and require several steps. In this system, the property manager or facilities team dedicates many hours of manpower or contracts with a vendor to conduct a survey over weeks or even months. The process includes:

- Physically monitoring where and how waste and recycling is disposed across all areas of the facility
- Surveys, interviews, and focus groups to discover breakdowns in the waste stream (such as identifying areas of persistent recycling contamination issues)
- Weighing or guesstimating the weight of each type of waste produced on a daily and weekly basis
- Tracking waste volume over time to discover seasonal trends
- Identifying stopgaps or permanent solutions that will improve efficiency
- Creating a more cost-effective service schedule and educating occupants on new, more efficient waste processes

In an ideal world, there is time to fully analyze a facility's waste stream and identify out-of-the-box waste initiatives like company composting programs or recy-

Benefits of Dumpster Camera Tech

During unexpected business disruptions — whether it's a natural disaster or a global pandemic — camera technology can remove some of the guesswork from waste volume estimates.

1. Reduce spend by as much as 30 percent and reduce recycling contamination fees
2. Reduce unnecessary pickups — fewer trucks on the road means a smaller carbon footprint
3. Support Zero Waste goals with waste volume data
4. Service verification — know whether the pickup happened even when no one is on site
5. Reduce contamination — up to 98% accurate at identifying common contamination categories

cling challenges to improve waste disposal efficiency. However, when extraordinary business disruptions happen, this just isn't possible.

Emerging technology

The waste vendor found a solution that would help bring costs under control. The vendor decided on Compology camera technology, because it would allow them to monitor waste volume from within the dumpsters themselves. And over time, they could build up a history of data to identify trends and contamination issues across multiple facilities.

Installing cameras in dumpsters seemed like an obvious solution. Not only does the camera monitor the level of dumpster fullness, but it can also help catch contaminants before the recycling truck arrives on scene.

Granted, it is still difficult to get someone to run out to the dumpster to remove contaminated items before the recycling is picked up, but at least the issue can be addressed. If recycling contamination fees are a pain point, camera technology makes it easier to see what type of contaminants are being thrown in the dumpster (and to identify repeat offenders). The property manager can then send out reminders to follow recycling rules.

The technology is still evolving, but for the time being, it's a major step up from manually standing outside and guesstimating average waste volume over time.

When business is in flux, or extreme events are creating unknown variables, collecting waste data now may help make better service predictions in the future. For the vendor, installing cameras on all their dumpsters has created a wealth of waste data that will likely help companies adapt faster in future downturns (and to help prevent garbage pileups).

Once the cameras were installed in the dumpsters, the vendor was able to get a better sense of actual waste volume each week and adjust pickup schedules accordingly. While it is not yet an automated process, it did save the CRE from paying for nearly twice the yardage than they were actually producing.

Communication is key

Many property owners and facility managers don't have to think about their garbage and recycling service very often. Service contracts tend to be long, and unless something drastic happens to disrupt the building, very little changes from month to month as far as waste is concerned.

However, when a disruption does hit, having good communication with a waste vendor can lead to finding mutually beneficial solutions. Many facilities can easily find themselves in the situation where either they are paying for empty dumpster pickups or they have garbage overflowing in their alleys from unanticipated waste.

Technology can't solve everything, but it can help a facility adjust to rapid changes. In the future, the data collected through dumpster camera technology could help automate waste audits based on the size and nature of a facility. It could help facility managers automatically adjust their service schedules (and their waste budget) by predicting ebbs and flows in advance.

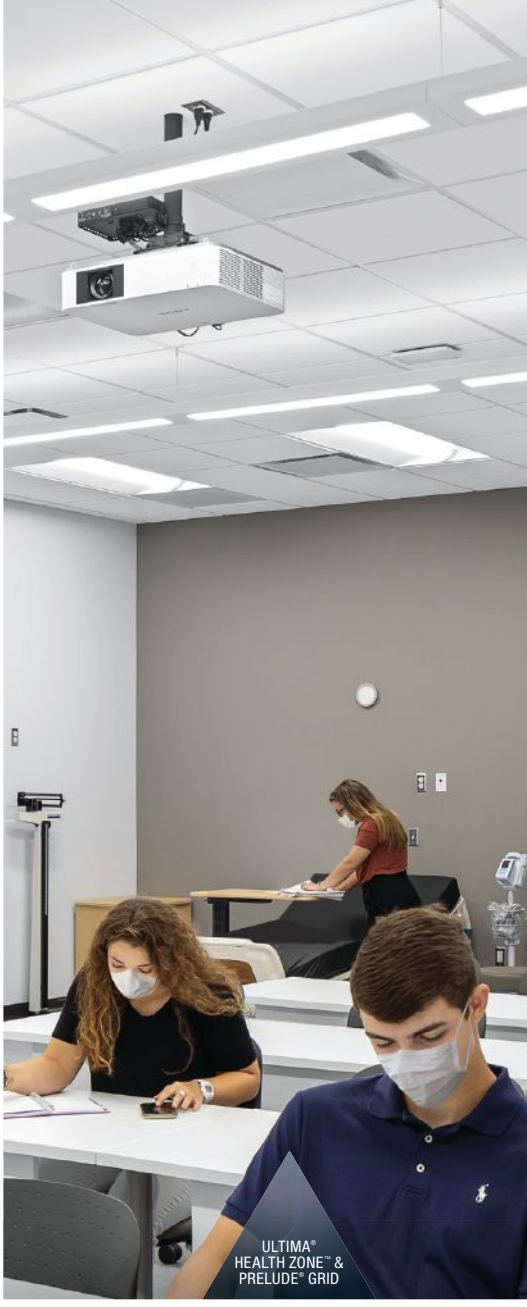
The tech isn't quite there yet, but that doesn't mean it won't get there eventually (and possibly soon). For the time being, dumpster camera technology is proving to be key in helping property owners and facility managers stay on top of fluctuating trash volumes. FMJ

Dan Studer *helps companies implement camera technology to right size their waste. With more than a decade experience with top-tier waste companies, Dan has worked with large facilities and multi-property portfolios across the country. He's the commercial waste division manager at ZTERS Waste Solutions.*

HEALTHIER, SAFER SPACES

Flexible, adaptable, cleanable Armstrong® ceiling systems and partitions can make a difference for retrofits and renovations. Armstrong solutions are designed to contribute to cleaner, quieter, and healthier spaces, all of which are important attributes to help address evolving needs. To learn more about creating healthier and safer spaces to work, learn, heal, and play, go to **armstrongceilings.com/healthyspaces**

INFUSIONS™ RESILIENT PARTITIONS



ULTIMA® HEALTH ZONE™ & PRELUDE® GRID

CLEAN ROOM™ PANELS & CLEAN ROOM™ GRID

INFUSIONS™ RESILIENT PARTITIONS

Inspiring Great Spaces®

Armstrong®
CEILING & WALL SOLUTIONS

MORE THAN SPRAY & WIPE

Cleaning Green in the Age of COVID-19

BY MICHAEL WILSON

In June 2020, an article in Bloomberg Law caught the attention of several leaders in the professional cleaning industry and possibly those in FM.

The article, "Rush to Disinfect Offices Has Some Environmental Health Experts Worried," discussed how businesses and building managers are taking a variety of steps to ensure their facilities are not only clean but also thoroughly disinfected.

The article states cleaning is typically performed once per day in most facilities, in the evening, when the building is closed. However, in larger locations, lobbies and such amentities as elevator buttons and other high-touch areas may be cleaned and disinfected every three hours. Restrooms might be cleaned and disinfected every four hours (twice during the day) and again in the evening.

Now, however, because of the COVID-19 pandemic, cleaning and disinfecting frequencies in all these areas have been considerably ramped up. These and other surfaces are being cleaned and disinfected up to eight times per day.

The use of large quantities of disinfectants has undoubtedly resulted in a boom for many chemical manufacturers in the professional cleaning industry. Just as it was hard for consumers to find household disinfectants once dealing with the pandemic became a reality, many of these chemical manufacturers found they could not keep up with the demand for many types of cleaning solutions, most specifically, disinfectants.

This is understandable. There were many uncertainties about the virus in March and April of this year. FMs were doing everything possible to protect the health of building tenants and keep their doors open and their facilities operating.

However, as the Bloomberg article stated the use of all these disinfectants can have several negative ramifications on cleaning workers, building users and the environment.

These are "hugely toxic chemicals," said Claudia Miller, an immunologist, allergist, and co-author of the book Chemical Exposures: Low Levels and High Stakes.[1] "We're creating another problem for a whole group of people, and I'm not sure we're actually controlling infections."

To understand what Miller means, lets it is important to take a closer look at what disinfectants are. First, there are no "green" disinfectants available in the U.S. In Canada and some other countries, disinfectants can be green certified if they meet specific criteria and standards, verifying that they have a reduced impact on the user and the environment when compared to traditional disinfectants.

Not so in the U.S. Instead, the Environmental Protection Agency (EPA) "registers" disinfectants. Independent testing verifies the product's ability to kill the pathogens they are designed to kill or deactivate if used as instructed by the manufacturer. While the disinfectant's impact on the user and the environment is noted, it is not the primary consideration of the testing.

The EPA categorizes disinfectants as pesticides. Pesticides kill, and that is what a disinfectant is designed to do. Further, this categorization applies to EPA's new N-List of disinfectants. These are disinfectants that have been tested — or retested — and proven to be effective against SARS-CoV-2, the pathogen that causes COVID-19.

"These chemicals [disinfectants] have passed tests to show they are effective against the pathogen, but this doesn't mean that they have been approved because they're considered safe with regard to human health," according to scientist Lesliam Quirós-Alcalá, an assistant professor at Johns Hopkins Bloomberg School of Public Health.

This is putting many FMs in a quandary as they have opereated their properties using environmentally preferable cleaning products and systems for years. Most want to stay green and wonder what their options are to remain a green facility.

FIRST, IS DISINFECTING NEEDED?

Before investigating this predicament, FMs must explore the bigger question: Is disinfecting necessary?

The answer, quite unfortunately, is yes and no.

When it comes to high-touch areas in a facility — those touched by many people during the day — then yes, these surfaces need to be cleaned and disinfected.

FMs are dealing with germs that can cause disease. According to the Centers for Disease Control and Prevention (CDC), this can include feces (both human and animal), salmonella, E. coli, norovirus and the germs that can trigger different types of infections. The CDC stated that, "a single gram of human feces — which is about the weight of a paper clip — can contain 1 trillion germs.

These high touch surfaces do need to be cleaned and disinfected. However, many, if not most other surfaces do not. The CDC also stated:

"Most, if not all ... surfaces need to be cleaned only with soap and water ... depending on the nature of the surface and the degree of contamination. The actual physical removal of microorganisms and soil by wiping or scrubbing is probably as important if not more so-than any antimicrobial effect of the [disinfectant] cleaning agent."

Also, on May 7, 2020, the CDC stated that, "most surfaces and objects just need normal, routine cleaning to ensure they do not promote the spread of disease." Moreover, as to the coronavirus specifically, the CDC added:

"So, for those areas not classified as high touch, disinfectants may not be necessary or at most, need only be used sparingly."

GREEN CLEANING OPTIONS

What options are available to help kill germs and pathogens and still protect the environment?

Continue using green-certified cleaning solutions. These are tried-and-true products have proven effective and have a reduced impact on the environment. However, how they are used and applied is essential. If using microfiber cleaning cloths, be sure the cloth is changed frequently. If floor mops are being used, either flat or traditional mop heads, make sure the cleaning solution and mop heads are changed frequently, as often as after each room is cleaned.

Consider Spray-and-Vac. A term coined by International Sanitary Supply Association (ISSA), these are also referred to as "no-touch" cleaning systems. Most are made to use green-certified cleaning solutions. They apply the solution to all surfaces to be cleaned then pressure rinse the area to remove soils from surfaces. Some machines then vacuum up the soils along with the rinse solution. With others, surfaces must be squeegeed dry.

Tests have found that some of these machines can remove soils and pathogens from surfaces even without the use of chemical agents. While that would be the ultimate in green cleaning, all manufacturers of this systems recommend using cleaning agents.

Look into biotechnology. One of the biggest advances in green cleaning is referred to as biotechnology. Also known as enzymatic cleaning solutions, this is a technology that uses biological systems and living organisms to create or develop products used for many purposes, including cleaning. This biotechnology has been around since the 1970s, however, it was not until the 1990s that they were used in professional cleaning.

When applied to surfaces, these products can break down soils, grease, and oil, essentially eliminating them. However, in the process, they have little impact on the environment, either as they are used or manufactured. Further, they help eliminate odors, and, like most enzymatic cleaners, continue to work for several hours after application. Plus, because they are typically made from agricultural-by-products, they also help promote sustainability.

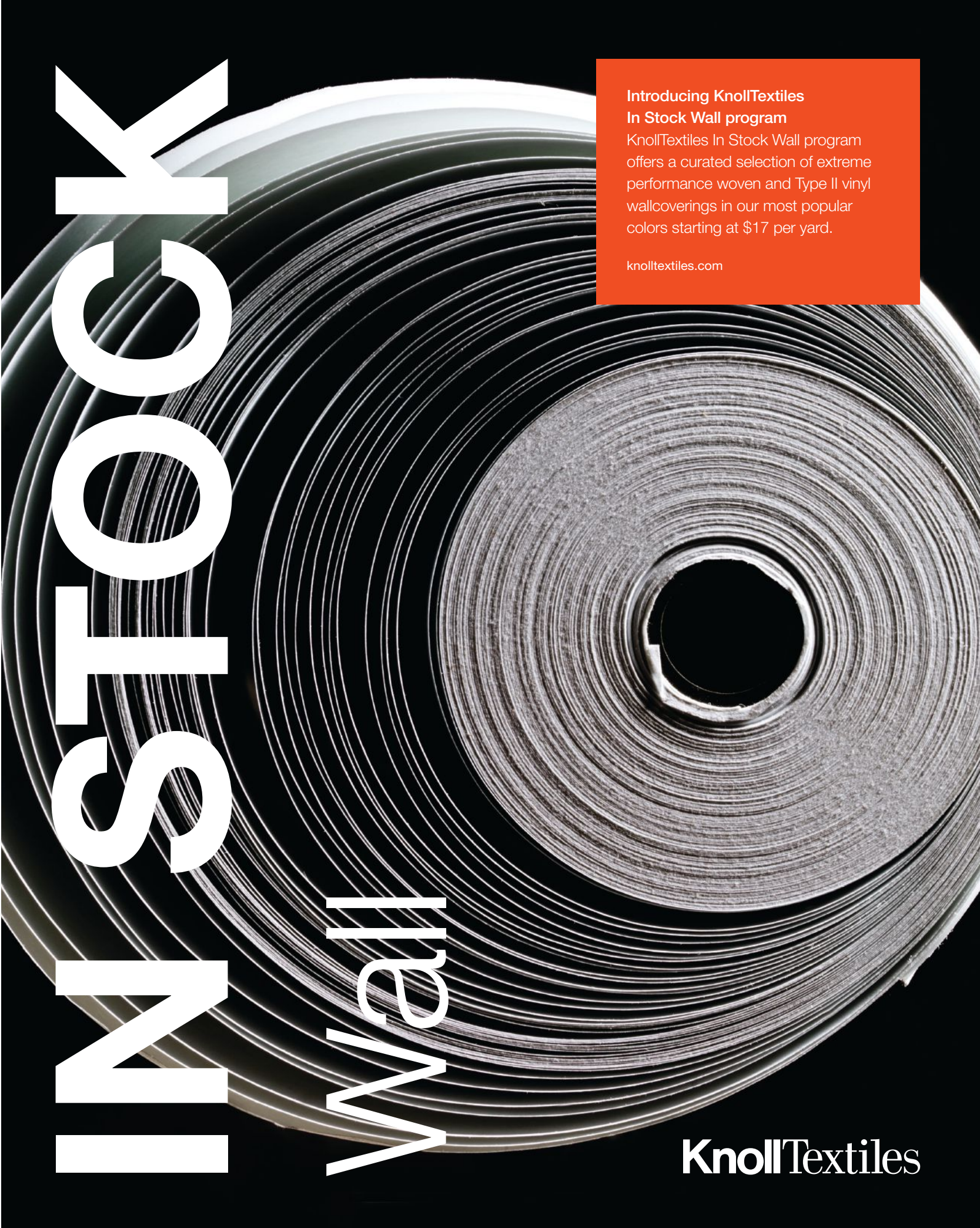
Other products stemming from biotechnology are also under development and include those that can be used to target specific viruses, potentially those that cause COVID-19. These also should have negligible impact on the user and the environment.

FMs are in incredibly challenging times. They want to keep their facilities open and keep the people using them healthy, but not give up all the advances they have made in the past two decades at eliminating some of the more harmful aspects of traditional cleaning.

In time, it is possible that this overuse of disinfectants was essentially a knee-jerk reaction to the coronavirus. FMs can now step back, evaluate cleaning options, and determine where disinfectants are necessary and where they are not. Ultimately, this can help stop the spread of the infection as it protects building user health and the environment. FMJ

1. Publisher: Wiley-Interscience; 2 edition (January 8, 1998)

Michael Wilson *is vice president of marketing and packaging for AFFLINK, a global leader in supply chain optimization, packaging, and developers of ELEVATE, providing clients with innovative process and procurement solutions to drive efficiencies in today's leading businesses.*



Introducing KnollTextiles In Stock Wall program

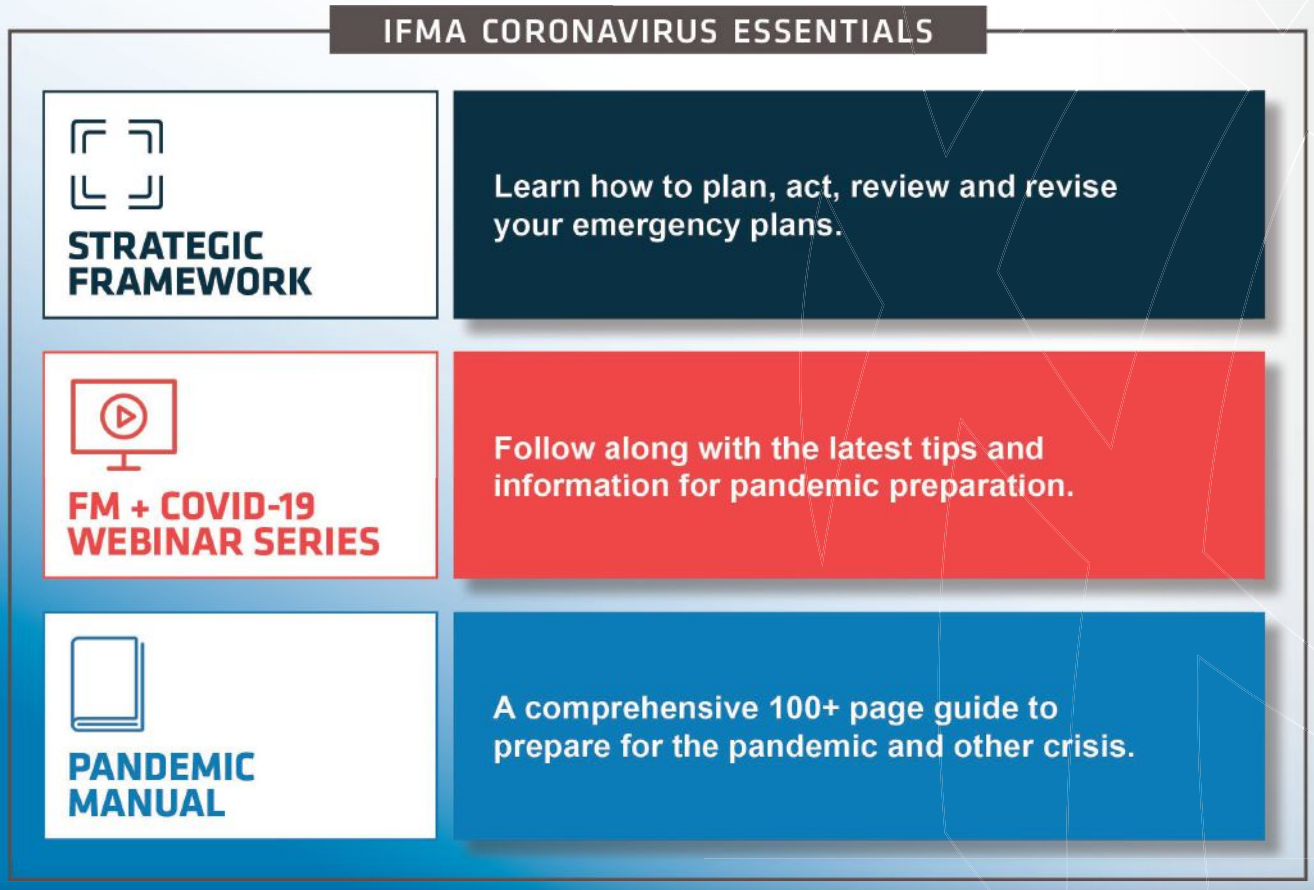
KnollTextiles In Stock Wall program offers a curated selection of extreme performance woven and Type II vinyl wallcoverings in our most popular colors starting at $17 per yard.

knolltextiles.com

KnollTextiles

IFMA's COVID-19 Resource Center Provides the **Answers FMs Need Now**

Find resources to help you and your facility develop strategies to manage the COVID-19 crisis during the various stages of the pandemic. **www.ifma.org/coronavirus**



The Experts' Assessment:

THE WORKPLACE POST-COVID-19

Helping FMs prepare for new ways of working post-COVID-19

BY JEFFREY SAUNDERS

FMJ EXTRA
Resource

The Expert's Assessment: The Workplace Post-Covid-19

The COVID-19 pandemic caught organizations and workers unprepared and altered many ingrained business practices overnight. The pandemic has yet to introduce entirely new ways of working. However, it was a catalyst that accelerated many existing trends and turned industry debates (e.g., remote working at scale) into challenges that needed to be solved immediately.

The proximate impacts wrought by the crisis have been quite profound. On average, 40 percent of all workers in high-income economies have jobs that realistically permit them to work from home.[1] In the United States, surveys conducted by Stanford University indicated that in June 2020, 42 percent of the labor force was working from home full-time.[2]

But what are the long-term consequences of the COVID-19 pandemic on work, the workforce and the workplace? Have the FM and corporate real estate industries just been slapped in the face with a "cold fish" and now face a situation where offices and facility managers are obsolete? As the Sept. 12, 2020 cover article from The Economist argued, "Around the world, workers, bosses, landlords and governments are trying to work out if the office is obsolete — and are coming to radically different conclusions."

IFMA and its sponsors EPOS Audio and JLL sought to bring clarity to this debate and establish an industry-wide baseline through an experts' assessment of the challenges and opportunities facing FM and CRE using the real-time Delphi methodology. This methodology was chosen because how work happens once societies return to normal will depend upon choices, the organizational policies developed now and how organizations and workers adapt.

PURPOSE OF *THE EXPERTS' ASSESSMENT* STUDY

***The Expert's Assessment: The Workplace Post-COVID-19* study:**

- Assesses the current challenges and future priorities to help organizations prepare for a new status quo.
- Harvests and analyzes the curated insights from the industry-leading subject matter experts (SMEs).
- Presents SME's perspectives on 24 key questions facing the industry. These findings are synthesized and expounded upon in six thematic sections.

The study is designed to:

- Develop organizational readiness and resilience by presenting how industry-leading SMEs are preparing their organizations or clients for the future post-COVID-19 and the reasons behind their choices.
- Present critical priorities for the industry through six thematic sections.

The findings point towards a significant shift in how organizations will operate in the future, which will require complex adaptations within organizations. For example, 81 percent of respondents expect that at least 26 percent of workers will work remotely most of the time post-COVID-19. These adaptations will require that leadership, FM, human resources and information technology departments develop new ways to collaborate. Ultimately, many will fuse into new departments responsible for total workplace experiences.

SIX THEMATIC SECTIONS

The six thematic sections present analytical assessments of SMEs' perspectives as they answered, debated, and refined their responses. The six thematic sections, along with their short summaries, are:

- **Facilities in demand:** Individual organizations' demand for facilities will decline as companies reduce their footprints. Organizations will also divert demand for offices away from Class C to Class B, Class A, co-working and hybrid spaces. This change will have profound implications for urban and suburban markets.
- **Workplace strategy:** Workplace strategy is the intentional alignment of the workplace to an organization's goals, vision and culture, requiring an integrated, multi-disciplined approach. FM, HR and other support functions will either compete or collaborate as the workplace transforms. According to the panel, HR should lead the formulation of workplace strategy, while FM could be responsible for delivering and shaping workplace experience across workplace settings.
- **Organization & productivity in the workplace:** Trust and management by results are essential competencies and skill sets in increasingly distributed workplaces. There is a central tension surrounding trust as organizations intensify their application of workplace — and health-monitoring technologies (aka "bossware"). The increased use of remote work could improve diversity and inclusion efforts, especially for disabled and neurodivergent workers.
- **Technology development & the workplace:** SMEs expect a shift toward improving employee digital experiences and technologies over physical workplace investments.

- **Employee well-being & benefits:** SMEs expect that organizations' responsibility and accountability for remote workers will increase as investments in digital tools, equipment and training expand.

- **Sustainable development goals & the workplace:** SMEs hope rather than expect that organizations and workers will change their practices following the COVID-19 pandemic. This transition will require significant investments in efficiency improvements; it is debatable whether this change will occur.

THEMES AND CHALLENGES FACING THE INDUSTRY

Analysis of SMEs' quantitative answers and comments point towards several cross-cutting themes and challenges. Cross-cutting themes include responsibility for remote workers, budgets and FM's new role. Challenges include worker protection and privacy, data ownership and digital divide.

CROSS-CUTTING THEMES

Organizational responsibilities for remote workers: The explosion in the number of remote workers and the expectation that many of them will work most of the time from home or a third place poses new challenges for organizations and workers. Sixty-seven percent of SME participants cite stress and mental health issues and social and professional isolation (65 percent) as the most significant health and well-being challenges facing remote workers. Who bears responsibility for providing suitable work environments for remote workers to ensure that remote workers are doing well? Who sets the policies and how do (or should) organizations ensure that workers adhere to them?

These challenges are especially pronounced when considering gig or contingent workers. As one SME commented, "I believe more in the provision of training and attestation than in the provision of equipment. I believe the global workforce will continue shifting to gig or contract workers who must 'bring their platform' so to speak. That is, if a company frequently engages with contingent workers, with whom there is an expectation of providing their own workplace, it will be hard to justify providing so much more for full employees."

Budgets — workplace, technology, and sustainability: Fifty-six percent of SMEs expect organization budgets will shift from the physical workplaces toward improving employees' digital experiences, support better use of remaining space and facilitate remote work. Questions remain as to whether budgets will be sufficient for the rightsizing workplaces to new work realities. While 54 percent of SMEs believe budgets for sustainability improvements will increase post-COVID-19, establishing viable business cases for these efforts will remain a challenge as organizations shrink their real estate portfolios.

FM's new role? Organizations' increased reliance on remote work and hybrid work strategies will transform FM's role, as blended physical and virtual work environments cannot be managed through traditional silos. There will be a series of debates as the industry decides on its future trajectory — becoming work experience facilitators or increasingly specializing in building management. "Facilities management is absolutely critical, but they are not necessarily responsible at this time for total work experiences," said one SME. "I think other departments will be more responsible for the working conditions, but I'm not sure who will come out on top of managing at-home work experiences."

To take a leading role in the work experience revolution, FM, as an industry, will have to be proactive in communicating and executing a new vision. If the industry transitions towards work experiences, it would require a shift from a facility focus to a more human-centric one.

CHALLENGES

Worker protection and privacy: Technologies for monitoring employees' health and productivity proved controversial topics among SMEs. SMEs could not reach a consensus on monitoring for health or productivity. Concerns over ensuring worker protections and privacy were the critical points of contention. Those who supported increased monitoring believed that these issues would be resolved in the next few years.

Data ownership: Fragmented data ownership remains a critical challenge as FM attempts to provide integrated solutions and experiences across work settings. According to SMEs, organizational barriers and varying levels of technological maturity lead to fragmented data initiatives and ownership. The complex and numerous relationships among stakeholders in value networks makes it increasingly difficult to negotiate access to, who can claim ownership, exert control and generate revenue from it. Currently, stakeholders all create or generate data that they then "use, compile, select, structure, re-format, enrich, analyze purchase of, take a license on or add value to the data."[3]

As one SME commented,

"We tend not to have good cross-functional integration in most organizations. Silos protect the data their systems develop, rarely letting it be integrated and analyzed with data from other parts of the organization."

Digital divide: Although digital access is improving, the digital divide remains an issue that will impact people's ability to work remotely in many countries worldwide. For example, 6 percent (21 million people) of the US population does not have high-speed access. Thirteen percent of Australians and 22 percent of Europeans lack broadband access.[4] Consistent broadband access also remains a challenge, as 157 million Americans do not access the internet at broadband speeds, according to Microsoft's research.[5] Lack of access to broadband connections typically affects minority communities, which hurts their ability to participate in a work-from-home economy.

METHODOLOGY AND EXPERT DEMOGRAPHICS

The Expert Assessment: The Workplace Post COVID-19 study used the real-time Delphi methodology. IFMA and its six communities of practice invited industry-leading SMEs worldwide to engage in a month-long consensus-seeking debate, using quantitative and qualitative questions. The survey ran from July–August 2020, and 248 SMEs participated.

The real-time Delphi method is designed to help leaders and organizations deal with complex and uncertain topics concerning the future when quantitative forecasting methods fail. Using the real-time Delphi methodology and an online digital platform to facilitate an asynchronous debate among geographically and professionally diverse SMEs, decision-makers can explore experts' consensus views and divergent opinions.

A vital element of the real-time Delphi is the SME participant and composition of the SME panel. SMEs provided 2,494 comments and revised their answers 1,486 times based on the comments, feedback and the emerging consensus. On average, SMEs returned to the questionnaire three times per participant. IFMA and its communities of practice invited SMEs from a diverse professional, discipline, and geographical backgrounds (*see figures*). FMJ

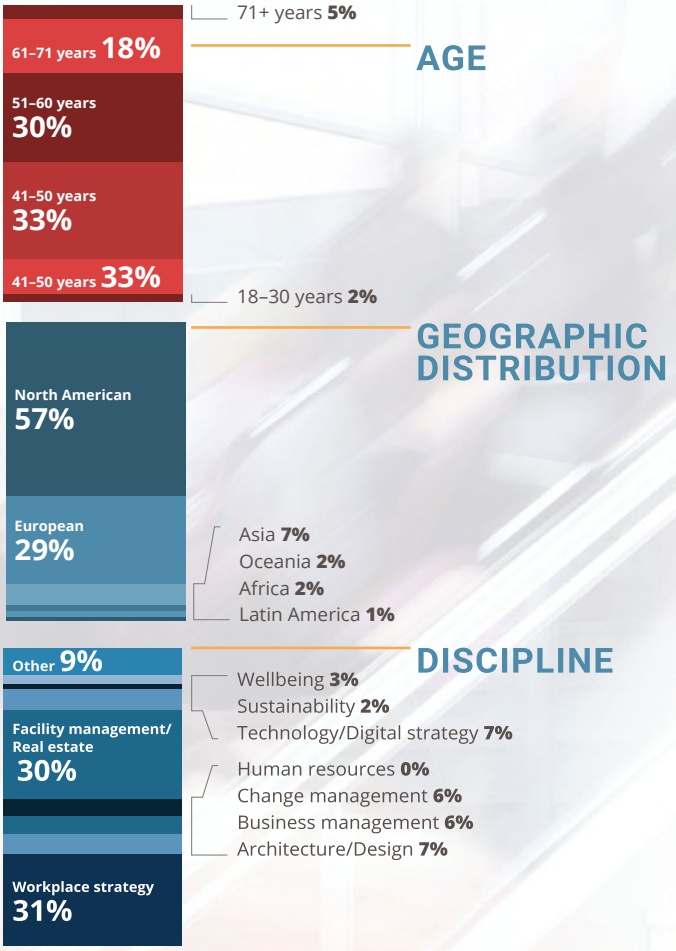


Figure 1 Participant Demographics
(Source: *The Experts' Assessment: The Workplace Post-COVID-19*)

Jeffrey Saunders *is an expert in strategic futures studies and foresight. He is CEO of Nordic Foresight and Associated Partner, Behavioural Strategy. Jeffrey formerly served as Director, Copenhagen Institute for Futures Studies, Chief Consultant and Head of SIGNAL Arkitekters Workplace Analytics team, and as a former advisor at the Office of the Secretary of Defense, Stability Operations. He has both strategic and practical experience in helping organizations translate strategic ambitions into workplace strategies. He has authored many studies and articles on the future of work and the workplace for organizations around the world.*

1. Mark Travers (2020). "What percentage of workers can realistically work from home? New data from Norway offers clues" 24 April. Forbes. https://www.forbes.com/sites/traversmark/2020/04/24/what-percentage-of-workers-can-realistically-work-from-home-new-data-from-norway-offer-clues/#5a27239778fe
2. May Wong (2020). "Stanford research provides a snapshot of a new working-from-home economy" 29 June. Stanford News. https://news.stanford.edu/2020/06/29/snapshot-new-working-home-economy/#:~:text=We%20see%20an%20incredible%2042,working%20from%20home%20full%2Dtime.
3. Benoit Van Asbroeck, Julien Debussche, Jasmien César (2019). "Big Data & Issues & Opportunities: Data Ownership" March. Bird&Bird. https://www.twobirds.com/en/news/articles/2019/global/big-data-and-issues-and-opportunities-data-ownership
4. Douglas Broom (2020) "Coronavirus has exposed the digital divide like never before" 22 April. World Economic Forum. https://www.weforum.org/agenda/2020/04/coronaviruscovid-19-pandemic-digital-divide-internet-data-broadband-mobbile/. and European Union (2020), Digital Economy and Society Index (DESI) 2020.
5. Shelley McKinley (2020), "Microsoft Airband: An annual update on connecting rural America." Microsoft. March 5. https://blogs.microsoft.com/on-the-issues/2020/03/05/update-connecting-rural-america/

See What's Coming from Connectrac

Learn more at
connectracflex.com

CONNECTRAC®

1.877.480.5637

PRINTING HAZARDS

Managing 3D Printer Emissions for Safety & Health

BY DR. MARILYN BLACK

As the world repopulates office buildings, schools, hotels and other facilities in the midst of the COVID-19 pandemic, maintaining good indoor air quality (IAQ) must be a key objective. Years of research proves designing, operating and managing buildings with a focus on good IAQ results not only in healthy, productive building occupants, but also in protected property investments and reputation.

The fundamentals of providing quality indoor air include effective ventilation with a supply of clean outdoor air; distribution of that clean air within occupied spaces; filtration of the air to remove particles and chemicals; routine cleaning and disinfection; and proper control of moisture and other sources of indoor pollutants.

Common indoor pollutants include dust particles and hundreds of different volatile organic compounds (VOCs) that can run between two and 100 times higher than those found in outdoor air. VOCs can be found in furniture, flooring materials, paints, common cleaning solutions and even popular electronics.

This includes 3D printers. While this technology is rapidly progressing in many industry sectors and is propelling workplace and educational opportunities to new heights, recent research conducted by Chemical Insights — an Institute of Underwriters Laboratories — and Georgia Institute of Technology is shedding light on the harmful IAQ impact coming from the release of ultrafine particles (UFPs) and VOCs into the air during their use.

The risks of using 3D printers in enclosed spaces, and how to minimize them

Chemical Insights and Georgia Tech discovered many desktop 3D printers generate large numbers of UFPs and VOCs while in operation, which can then be inhaled and penetrate deep into the human pulmonary system to trigger lung irritation, respiratory and chest discomfort and asthma. Long-term exposure can even lead to respiratory and cardiovascular diseases.

These health concerns are particularly worrisome when 3D printers are used in small or poorly ventilated rooms. For example, an office or healthcare practice may have a 3D printer in an enclosed personal workspace with little air flow, or even in an available closet with no ventilation. In these situations, the levels of UFPs can reach pollution values equivalent to sitting beside a major freeway with heavy vehicular traffic.

In a larger facility where numerous 3D printers are dispersed throughout, ventilation efficacy is key. This means confirming space meets ventilation rates according to ASHRAE 62.1 and ensuring a well-mixed outdoor air supply and returns that vent contaminants to the outside.

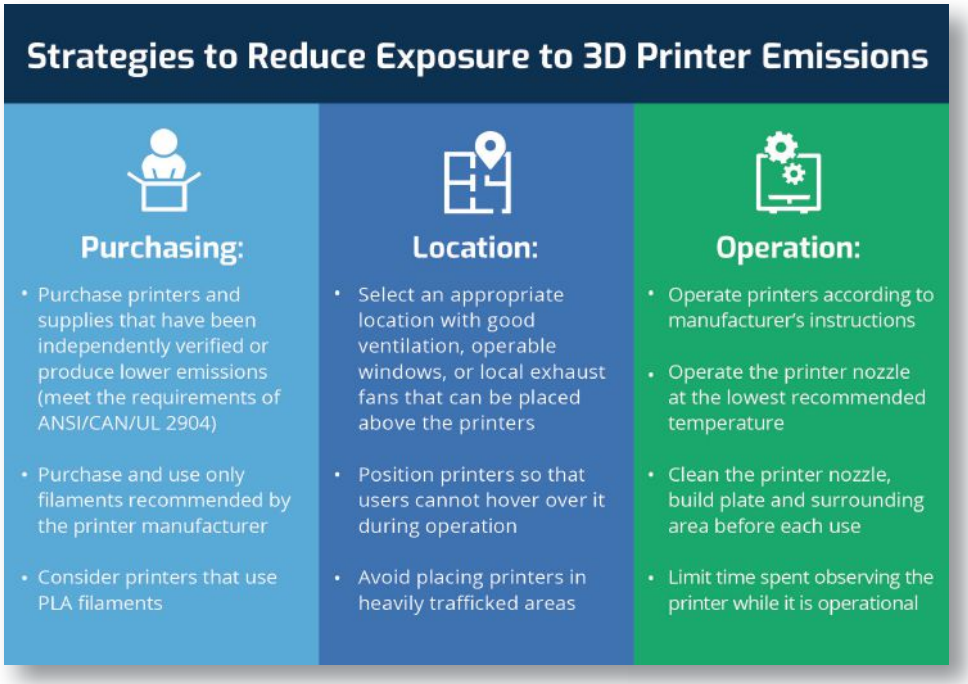
There are ways to mitigate potential IAQ issues caused by 3D printers. Consider

- placing 3D printers away from air vents,
- locating 3D printers near operable windows,
- installing local exhaust over 3D printers and
- placing 3D printers in an area with direct exhaust to the outside or within enclosures containing high-efficiency particulate (HEPA) or charcoal filtration.

Steps to take to mitigate health risks while operating 3D printers

To keep building occupants safe and mitigate risks while 3D printers are in use, FMs should confirm only those who have been properly trained to operate these machines are operating them. Chemical Insights recommends FMs ensure these occupants are:

- setting the nozzle and base plate temperatures at the lowest recommended settings that produce the desired print quality,
- limiting time spent observing the 3D printer while it is operating,
- wearing protective safety glasses when near an operating 3D printer,
- never leaving an operating 3D printer unattended and
- using PLA filaments if possible.



In addition, FMs can instill best practices for cleaning 3D printers and their surroundings, including:

- cleaning the nozzle before each use and the build plate after each use,
- dusting all surfaces frequently with a disposable wet cloth,
- vacuuming floors and surfaces frequently with a high-efficiency particulate (HEPA)-filtration vacuum and
- washing hands after operation to avoid hand-to-mouth transfer of chemicals and particles, especially before eating.

Consider safety when procuring a 3D printer

With hundreds of choices on the market, FMs should suggest tenants looking to purchase a 3D printer first access the Standard ANSI/CAN/UL 2904, which contains measurement and health assessment protocols for emissions that can be released from print applications with 3D printers and print media.

The standard was developed by Chemical Insights and a range of stakeholders for testing and assessing particle and chemical emissions from 3D printers. Although the research focused on fused filament fabrication technology, methods presented in the standard are also applicable to other printer types. While it applies to the printers typically found in schools, homes, offices, libraries and other non-industrial indoor spaces, the impact on indoor air in facilities of any size could also be similar.

In addition to observing the guidelines offered by the standard, FMs should also ensure tenants do the following when looking to purchase a 3D printer:

- Require compliance with the standard in the bidding/purchasing process.
- Purchase the filament brand specified by the printer manufacturer.
- Consider printers that use PLA filaments.

Ensure proper 3D printer protocol to enhance productivity and safety

3D printers are not going away, nor should they. The forecasted average annual growth of the 3D printing market for the next five years is 24 percent, according to the 3D Printing Trends 2020 report by 3D Hubs.[1] Further, the total value of 3D printed parts increased by 300 percent in 2019.

The 3D printing market penetrates nearly all industries, are transforming how objects are built and have opened numerous design and manufacturing possibilities.

The opportunities afforded by 3D printers are significant, so taking steps for a safe and healthy environment will help advance facility modernization while increasing creative and productive environments for building occupants. FMs should familiarize themselves with the potential health hazards associated with 3D printer usage. It is equally important to adapt facilities for ensuring safe 3D printer work areas, and to establish protocols for operator safety. Lastly, before investing in a 3D printer, make sure it adheres to the standard to guarantee it's safe enough to bring inside a building — and does not pollute the indoor air. FMJ

Dr. Marilyn Black *is vice president and senior technical advisor for Underwriters Laboratories, leading its research institute Chemical Insights. She is the founder and former chairperson for both UL Air Quality Sciences and the GREENGUARD Environmental Institute. She is also the founder of the Khaos Foundation, a non-profit organization dedicated to protecting the health and well-being of children through education and research. Dr. Black is an active participant in national and international scientific organizational initiatives, research projects and community outreach programs, and has presented and published more than 200 papers on IAQ and environmental exposure. She received a Ph.D. from the Georgia Institute of Technology, M.S. from the University of Florida and B.S. from the University of Virginia.*

How to Reduce Re-Opening Risk in Your Water Systems Following COVID-19 Shutdowns and Low Occupancy

BY BRIAN PAWLIK
MARKETING MANAGER,
NALCO WATER

Today, your building or facility is likely among the thousands operating at anywhere from zero to low occupancy due to COVID-19. As occupancy rises through phased business operations and returns to normal, critical measures are needed to address the safety of everyone entering your facility.

In their re-opening and re-occupancy plans, Facility Management and Corporate Real Estate leaders must consider both how to mitigate the risk of COVID-19 exposure and transmission on-site, and how to keep up with guidance from the CDC and other organizations. Both factors are key to protecting occupants, maintaining healthy business operations and delivering a healthy work environment.

With such a strong focus on COVID-19, it's easy to overlook another risk of prolonged low occupancy: the increased potential for *Legionella* outbreaks via domestic water systems. Low occupancy can reduce the flow and usage of domestic water by as much as 80-90% across all building water systems, resulting in a dangerous combination of declining levels of treatment plus elevated levels of waterborne bacteria, including *Legionella*.

Legionnaires' disease is a serious lung infection caused by inhaling water mist or droplets containing *Legionella*. Based on data from the CDC, 1 out of 10 people who contract Legionnaires' disease will die. This is a very serious issue for facilities that must be addressed; the World Health Organization estimates the average cost of a *Legionella* outbreak at $2.6 million, with an added brand reputation impact of up to $8 million.

Nalco Water highly recommends that all facility managers and building owners review the CDC guidelines and implement water management plans for all at-risk water systems. The best approach to manage water safety risk is to:

- Implement best practices of water systems
- Implement a water management plan
- Test and validate

Prior to re-occupying a facility, water systems should be tested for *Legionella* in addition to conducting risk profiling. Proper flushing of water systems is recommended, but testing will confirm and validate the condition of the water preceding re-occupancy. A contingency response plan should also be defined, which may include hyperchlorination to ensure your building water systems are safe for returning occupants, and ready for you to continue working toward normal or phased business operations.

No company is immune to elevated *Legionella* risk, even if you've never had an issue in the past. Recently, the CDC had to close several of its own buildings in Atlanta due to positive *Legionella* tests in their water systems following the prolonged shutdown.

If it can happen at the CDC, it can happen anywhere. Ensuring you are taking all the right steps to manage your water systems is critical for the health and safety of your building occupants. Regular *Legionella* testing enables you to not only confirm the condition of your water systems, it can also validate the efficacy of your water management plan and help you plan for remediation if necessary.

Addressing *Legionella* risk should be part of every company's corporate re-occupancy plans. Whether you currently outsource your Facility Management or self-perform these activities, water safety should be top of mind as you prepare for re-occupancy. Failure to execute best practices for water management and re-occupancy due to COVID-19 shutdowns can lead to serious consequences.

"WE DO NOT WANT TO TRADE A COVID-19 SITUATION WITH A *LEGIONELLA* EVENT WHEN WE OPEN UP"

– Vice President of Engineering, Nalco Water Customer

Nalco Water can provide support on a mitigation strategy that includes *Legionella* testing, risk profiling your facilities prior to re-opening, and developing long-term water management strategies. For more than 25 years, Nalco Water has been the global leader in water safety. We've developed more than 15,000 water management programs worldwide, customized to the unique needs of each customer. Nalco Water is the only company that uses in-house certified professionals to deliver all components of a water safety program to help you manage the risk associated with waterborne pathogens and help you safely re-open your facility to normal occupancy.

For more information regarding water management in your facility, visit us online at ECOLAB.COM

NALCO Water
An Ecolab Company

greener products

IT'S THAT IMPORTANT

BY GARY BAUER

Since the 1970s, the world has transitioned to using safer cleaning products. However, it's only in the last 20 years that the market has been able to access green cleaning products that are both effective and easy on the wallet. Now, numerous products are green certified, with part of their certification being to prove their performance and safety.

While the concept of a green product varies depending on whom you ask, the overarching theme is usually the same. At the highest level, a green product is the product that can accomplish the task at hand — whether that's cleaning an entire office space or the dining room table before dinner, while having the lowest possible impact on those who are using and/or exposed to the product in their environment and the environmental life cycle of that particular product. Furthermore, there are additional levels of green depending on the certification the product has received — and some have stricter standards than others.

green certified

The main players in the green certification game are Green Seal, Safer Choice and EcoLogo. They have different standard requirements, but are third parties that focus on assisting consumers in finding safer, greener cleaning products for their facilities. Safer Choice is the EPA's designation indicating the product has been designed for the environment.

Green Seal has a cleaning product standard of GS-37, and certifies a wide variety of items, services and business — anything from a coffee filter to a business can be Green Seal certified. Ecologo also certifies a wide variety of items, from building materials to office products and electronics. Their cleaning product standard is UL 2759 — which covers varying standards for products such as disinfectants and hand care. Both organizations' key requirements include:

Product performance testing — the product must perform as well as or better than similar nationally-recognized counterparts.

Limited oral/dermal toxicity

Minimal VOCs

No carcinogens

Reduced carbon footprint through chemical concentration

changing for the better

It is worth mentioning that green and greener products have come a long way in the last decade — what may have been a non-practical solution 10 years ago is now a very practical solution thanks to changes in chemistry and production processes. It is a practical solution on multiple fronts — not just in effectiveness, but also from an environmentally-friendly cost perspective. Thanks to improvements in chemistry and technology and how the they are used, green products often times are better alternatives to products used in previous years.

Within the last decade, offering green cleaning solutions was an industry differentiator. However these days offering green or greener cleaning solutions is a cost of entry in the industry. Many companies have been pushed to greener practices mainly because their product manufacturers and suppliers focus on providing green products, systems and practices.

it's that important

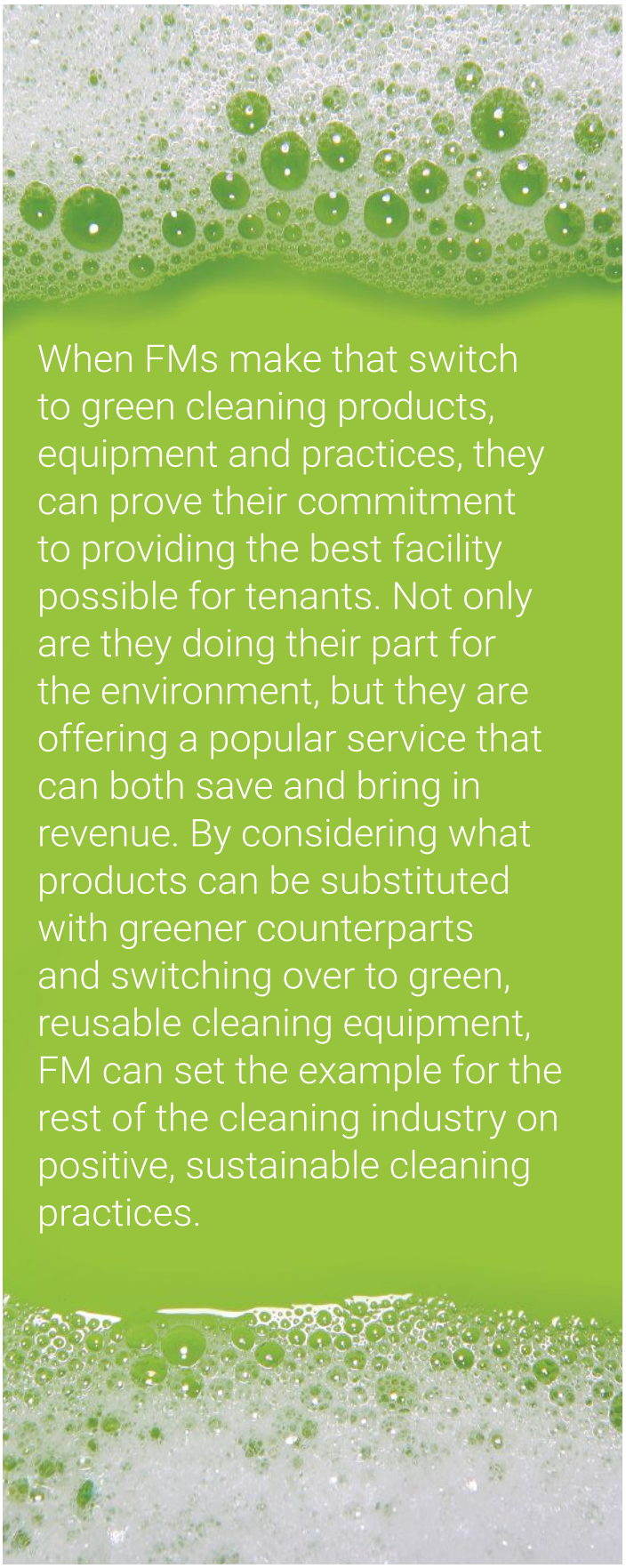
Although implementing green cleaning practices may have been a necessity to survive for some businesses, others have yet to make a switch. From a business perspective — it is the right thing to do, especially if quality cleaning can be accomplished with a cost-effective alternative that is better for both employees and the environment. While many businesses strive for 100 percent green cleaning practices, this isn't always possible.

Even if business owners are unable to go completely green, there are steps they can take to reduce the use of hazardous cleaning products. For cleaners out there, these products are better than the products they were using five or six years ago. The label will always include use directions, safety precautions including PPE and often indicate any green certifications the product may have. Taking a step in the direction of a greener approach is better than taking no step at all.

making a difference

Reducing the use of harsh cleaning products is not always easy. Those running small businesses and having their workplace cleaned by employees may not have the resources to research green cleaning products or train employees in eco-friendly cleaning practices.

One of the best ways to implement these practices is to train janitorial staff in efficiency-focused cleaning methods. Efficiency-focused cleaning methods allow cleaners to achieve the same level of coverage while minimizing the amount of water and cleaning products used. By doing so, any harsh or hazardous cleaning products can be used in lower volumes. Without proper training, it's easy to use excessive amounts of water, detergent and disinfectant when performing cleaning duties. This can easily double or triple



When FMs make that switch to green cleaning products, equipment and practices, they can prove their commitment to providing the best facility possible for tenants. Not only are they doing their part for the environment, but they are offering a popular service that can both save and bring in revenue. By considering what products can be substituted with greener counterparts and switching over to green, reusable cleaning equipment, FM can set the example for the rest of the cleaning industry on positive, sustainable cleaning practices.

the ecological footprint of the organization's janitorial cleaning practices.

One of the easiest ways to reduce water usage is to switch from traditional cleaning materials — like cotton — and use microfiber materials instead. Microfiber cleaning cloths and mop pads require far lower volumes of water than any other type of textile used in janitorial services, making them ideal for green commercial cleaning.

Despite using less water than other materials, microfiber textiles do a much better job of trapping dust, dirt and bacteria. However, it is essential to ensure there is no cross-contamination between cloth usages. Some cleaners use a color-coded system that determines which microfiber cloths and mop pads are used for each room, and each cloth or pad is only used once and is professionally disinfected afterwards. A microfiber cloth with just a small amount of water often works better than a cotton cloth loaded with cleaning chemicals. However, if business owners want to reduce the volume of cleaning agents and water used to clean their facility, it is not enough to use greener cleaning methods. They will also need greener cleaning equipment.

Green cleaning equipment is reusable and minimizes the use of chemical or other cleaning products — making them higher performance pieces in comparison to their not-so-green counterparts. Green cleaning equipment such as microfiber cloths, mop heads and dusters pick up more soil and grime, keep that grime from re-depositing itself along other surfaces by trapping it within the fibers and can be laundered and used repeatedly. Equipment like vacuum cleaners should be certified by the Carpet and Rug Institute's Green Label Testing Program. Battery-powered equipment should be using environmentally friendly gel batteries and any power-cleaning equipment should be researched for its ergonomics and noise levels. These two aspects should be addressed to minimize health concerns for cleaning staff and tenants. Both groups can benefit from the usage of cleaning equipment that is designed to trap dust and other fine particles rather than re-pollute the surrounding areas.

green cleaning products and their place in a global pandemic

Granted, in today's climate, nobody is laser-focused on green. Consumers are asking, what is the best disinfectant out there and how can they kill off germs and bacteria. By nature, most disinfectants are not very green to begin with. Disinfection is one of the biggest challenges faced by green commercial cleaning providers. Most commercial disinfectants rely on chemicals such as chlorine bleach to kill bacteria and germs. While these chemicals are incredibly effective as disinfectants, using them comes at a cost. Fumes generated by these chemicals can threaten workforce health, while chemical runoff can harm the environment.

Many businesses depend on these disinfectants because they believe greener options are not available or as effective. Although that may have been true 10 years ago, it is no longer the case. Advances in cleaning chemistry and new equipment offerings have changed the ability of commercial cleaners to deliver effective results and

be responsible stewards of health and the environment. There are many truly 100 percent eco-friendly, effective disinfection systems used by commercial cleaning systems available.

Another environmentally friendly practice businesses can adopt is the use of HEPA filtration systems, which are incorporated into some vacuums and aid in improving air quality. HEPA filters trap airborne particles as small as .3 microns in diameter and prevent vacuums from spewing these pollutants into the air. In addition to positive environmental impact, HEPA filters have a positive impact on the workplace as studies have shown that workplace air quality improvements help increase productivity and reduce sick days. In areas with vulnerable populations such as the elderly, people with compromised immune systems or the young, these advances in cleaning technology can make a real difference in overall health.

From a business perspective, green products may make a better economic case than ever before. Products that deal with dispensing systems such as dilution systems have cut down on packaging and shipping costs — and that all factors into how green that particular product is. From material acquisition to production waste and packaging, there are many of aspects that make a product greener than its counterparts in the industry.

When FMs make that switch to green cleaning products, equipment and practices, they can prove their commitment to providing the best facility possible for tenants. Not only are they doing their part for the environment, but they are offering a popular service that can both save and bring in revenue. By considering what products can be substituted with greener counterparts and switching over to green, reusable cleaning equipment, FM can set the example for the rest of the cleaning industry on positive, sustainable cleaning practices. FMJ

Gary Bauer *is an accomplished franchise leader in the consumer services sector and is the brand president for JAN-PRO Bauer also has more than 25 years of experience with ServiceMaster franchise brands, including operations and franchise sales, senior vice president and COO. Other previous roles include CEO of BDry Waterproofing and Foundation Repair, as well as Operations Manager for Orkin Pest Control. Gary attended Coe College in Cedar Rapids, Iowa, USA.*

MY FACILITY

>>>>>>>>>>>>>>>

FREDRIK CORNELL

Friends Arena
Stockholm, Sweden

With the ability to hold up to 65,000 visitors and a retractable roof, the Friends Arena in Stockholm, Sweden is one of Scaninavia's most versatile venues.

Opened in 2012, the home of the Swedish national soccer team also hosts numerous concerts and other events. The stadium, which is named in honor of an organization against bullying, also boasts 17 million different color schemes on its lighted façade.

Fredrik Cornell and his FM team oversee the Friends Arena.

Photos Courtesy of the Friends Arena

FMJ: ***Tell us about yourself and how you got into FM.***

CORNELL: I am the CEO of the facility management company that owns Friends Arena in Stockholm, Sweden. My background is in management roles within property management and aviation security.

FMJ: ***Tell us about your facility.***

CORNELL: Friends Arena is a multipurpose stadium/arena with a seating capacity of 50,000 and a total capacity of 75,000 visitors. It opened in October 2012 and is the largest stadium in Scandinavia.

It is an indoor facility with a retractable roof where the opening is the same size as a soccer pitch.

For soccer games we have a natural grass pitch.

FMJ: ***What is day-to-day life like at the Friends Arena?***

CORNELL: Friends Arena is the home stadium of the Swedish national soccer team as well as the local club AIK, which is one of the top Swedish soccer clubs.

The national team plays around five games a year at Friends Arena, while AIK 20-25 games. We also host international games such as in 2017 when Friends Arena hosted the Champions League Final between Ajax and Manchester United.

Friends Arena also host large concerts with artists like Bruce Springsteen, Eminem, Celine Dion and more. The arena will host concerts with more than 50,000 attendees a few times a year. We also host s some smaller concerts with about 25,000 including the Swedish Eurovision Song Contest finals.

We also host trade shows, the Swedish International Horse Show as well as large company events.

FMJ: ***Why is your facility unique and what kind of unique challenges do you face managing the facility?***

CORNELL: Friends Arena is a modern facility so our challenges are to a high extent based upon the nearby infrastructure, such as the municipal road system that gets very congested before our events. It is especially bad after our larger events as we have 50,000 people leaving at the same time. This is also related to a limited amount of parking facilities close to the arena. There are also issues around the non-regulated taxi industry in Sweden which tends to congest the whole area around the arena after events.

MY FACILITY

>>>>>>>>>>>>>>> FREDERIK CORNELL

Friends Arena
Stockholm, Sweden

Another challenge we face is keeping our natural grass turf at a high level throughout the season. As our opening in the roof is the same size as the pitch below the amount of sunlight on the pitch is far too limited. We are also very far up north in Europe and on the same latitude as Anchorage, Alaska, USA. One of my top priorities is finding a lighting system that will make the grass grow better.

FMJ: ***How much space do you manage and how is it used?***

CORNELL: There are a number of different types of areas in Friends Arena:

- Around the arena on the ground level, we manage a garage, loadings docks and an outside staging area.
- Public access is on the third floor (on top of garages and stating areas, basically three stories up) and around the arena is the "entrance plateau" where all doors and staircases are. It is 30-50m (approximately 100-164 feet) wide and circles the arena with wide staircases out to the surrounding areas.
- Three public levels (all reached from the entrance plateau) with food stands and restaurants leading to the three grandstands that seat approximately 20,000, 10,000 and 20,000 respectively.
- Beneath the third floor (the first public level) and the first stand are all indoor staging areas, locker and storage rooms, etc. We have four large bays with truck access to the pitch as well as a two-lane staging road around the arena on the inside.

FMJ: ***What kind of challenges do you face with accommodating so many visitors at your events?***

CORNELL: When 50,000 visitors leave the arena at the same time, there is a lot of congestion – both in the public transport network as well as on the roads. This is gradually getting better, but these are by far our biggest problems.

FMJ: ***Tell us about your FM team.***

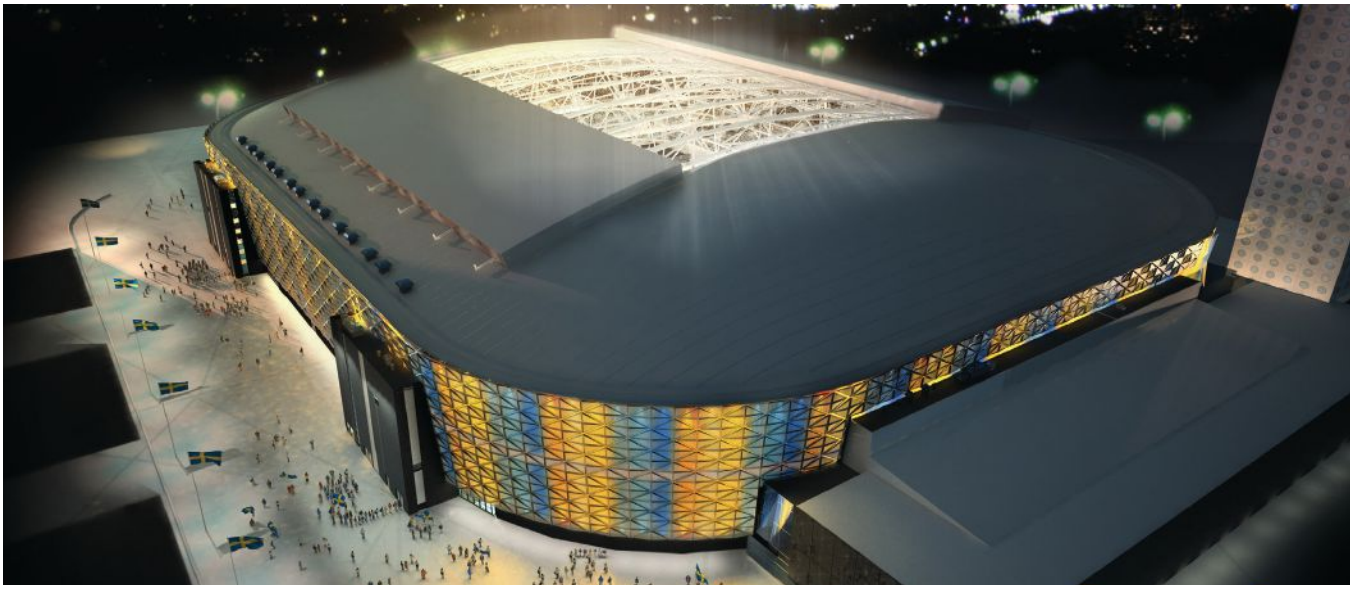
CORNELL: The FM team consists of electricians, grounds men (taking care of the pitch), a plumber, a painter and a couple of general technicians as well as IT technicians.

FMJ: ***How is your facility and FM team meeting and exceeding sustainability initiatives?***

CORNELL: Sustainability is one of our three focus areas. Through a focused program we are continuously lowering our energy costs and carbon footprint. We also became certified as a sustainable building, rating Very Good in the BREEAM standard system.

FMJ: ***What is the biggest FM challenge you have faced and how did you find a solution?***

CORNELL: Ensuring the quality of our natural grass pitch. We have a very focused program in testing and evaluating growth lights to find a sustainable solution that works.



FMJ: ***What are some FM challenges you face at that are common across the FM industry?***

CORNELL: Like other FM programs, our challenges are in hiring, developing and keeping the best staff available. With an extremely low staff turnover, I do believe that we are doing a good job!

FMJ: ***What do you like best about what you do?***

CORNELL: Coming to work with my team at Friends Arena each morning with a smile on my face is a fantastic feeling. I know I have a great job after spending 35 years in different industries and at different jobs.

This makes the COVID-19 situation hard on my whole team as we now have restrictions on how to meet and when, who works with who, at what time and other challenges. But riding this storm out, I believe that my team and I will come out even stronger!

IFMA™ Credentials

The following people were awarded the Certified Facility Manager® (CFM®) certification in JULY 2020:

Sam Elshafei, CFM, FMP
Toronto, ON, Canada

Jeevan Koshy, CFM
EFS Facilities Services
Dubai, United Arab Emirates

Akram Elzoubair, CFM
Markaz Real Estate Co.
Riyadh, Saudi Arabia

Elrasheed Alsamani, CFM
Thimar Electronics Co.
Riyadh, Saudi Arabia

Leena Elzubair, CFM
Dubai, United Arab Emirates

Pamela Stubberfield, CFM
Federal Reserve Bank of Chicago
Chicago, Illinois

Kurt Klein, CFM, FMP
Complete Building Services
Chevy Chase, Maryland

The following people were awarded the Sustainability Facility Professional® (SFP®) designation:

SHUANG Anita REN, CFM, SFP
JLL
Beijing, China

Ganesh Patil FMP, SFP
Jacobs Engineering
Navi Mumbai, MAH, India

Raphael Ciano, SFP
West Palm Beach VA Medical Center
West Palm Beach, Florida

Travis Dodson, CFM, FMP, SFP
The American Board of Pediatrics
Chapel Hill, North Carolina

Ghissou Rosala, SFP
Waimanalo Health Center
Waimanalo, Hawaii

Earl Thomas, FMP, SFP
Fredericksburg, Virginia

Robert Bouffard, FMP, SFP
North Bay, ON, Canada

Emilio Fontdemora, SFP
European Intellectual Property Office
Alicante, Spain

John Winson, FMP, SFP
Brooklyn, New York

Jonathan Scotson, FMP, SFP
San Diego, California

Grant Russell, SFP
Arnprior, ON, Canada

The following people were awarded the Facility Management Professional (FMP®) designation:

Justin Artam, FMP
Cushman & Wakefield
Livermore, California

Dan Crawford, FMP
Los Angeles Unified School District
Los Angeles, California

Beth Hazel, FMP
Scioto Services
Columbus, Ohio

Nellisa Lockley, FMP
Janssen
Los Angeles, California

Kyle Moase, FMP
Maple Leaf Foods
Mississauga, ON, Canada

Omodolu Mustapha, FMP
Cadillac
Calgary, AB, Canada

Cherish Nice, FMP
Gusto
Denver, Colorado

Philip Ross, FMP
161 Internet Inc.
Chesterbrook, Pennsylvania

Cesar Torres, FMP
Volterra
Fremmont, California

Christopher Carlson, FMP
Seminole Electric Inc.
Tampa, Florida

Ibrahim Alnami, FMP
King Saud University
Riyadh, Saudi Arabia

Tariq O'Brien, FMP
Commonwealth Bank
Nassau, Bahamas

Binu Sulochanan, FMP
Kollam, KER, India

Michael Svoboda, FMP
CBRE
Seattle, Washington

Peter Christensen, FMP
Litens Automotive
Innisfil, ON, Canada

Anthony Dolezal, FMP
Overland Park, Kansas

Terence Fletcher, FMP
GenOn
Frederick, Maryland

Mazen Hasan, FMP
Dahl Architects and Engineering Consultant
Atlanta, Georgia

Brad Ireland, FMP
Ingram Micro
Mississauga, ON, Canada

Ben Morgan, FMP
Knaresborough, United Kingdom

Laura Ross, FMP
Farmers Insurance Co.
Middleville, Michigan

Carlos Santos, FMP
AstraZeneca
Gaithersburg, Maryland

Johnny Villagomez, FMP
U.S. Army
North Carolina

Sattam Alshaalan, FMP
Seder Group
Riyadh, Saudi Arabia

Sandeep Arora, FMP
BSI
New Delhi, DEL, India

Sam Avila, FMP
University of Denver
Denver, Colorado

Abdullah Ahmed Baaween, FMP
Muscat, Oman

Amit Bhatia, FMP
WeWork
Gurgaon, HAR, India

Isaac Luke Enyenu Eyoku, FMP
Baylor College of Medicine Children's Foundation Uganda
Kampala, Uganda

Steven Fieler, FMP
GEICO
Renton, Washington

Anthony Gulino, FMP
Ocoee, Tennessee

Blake Henderson, FMP
Dahl AECI
Atlanta, Georgia

Desi Jackson, FMP
Winnipeg, MB, Canada

Ankit Jain, FMP
Yug Facilities
Noida, UTT, India

Joshua Mincher, FMP
Austin, Texas

Jeyakumar Thanabalan, FMP, SFP
Green Coast Facilities Management LLC
Dubai, United Arab Emirates

Joel Velasaquez, FM
CBRE
Roanoke, Texas

John Winson, FMP, SFP
Brooklyn, New York

Joe Ng, FMP
Blackrock Advisors Singapore Ltd.
Singapore, Singapore

Cui Hao, FMP
Beijing, China

Wael Abed, FMP
EFS Facilities Services
Kuwait, Kuwait

Joseph Aina, FMP
Alpha Mead Facility and Management Services
Lagos, Nigeria

Baderal Twairqi, FMP
Saudi Aramco
Dahran, Saudi Arabia

Khalid Alferaidi, FMP
Hilton
Madinah, Saudi Arabia

Ahmed Alhajji, FMP
Saudi Aramco
Abqaiq, Saudi Arabia

Ahmed Alharbi, FMP
Riyad Bank
Jeddah, Saudi Arabia

Lina Alrammah, FMP
Saudi Aramco
Dhahran, Saudi Arabia

Tariq AlRubaiee, FMP
King Fasial University
Al-Hasa, Saudi Arabia

Hussain Alsahhaf, FMP
United Facilities Management
Kuwait City, Salhiya

Turki Alyahya, FMP
King Abdullah bin Abdulaziz University Hospital
Riyadh, Saudi Arabia

Kok HuaAng, FMP
JLL
Singapore, Singapore

Youssef Charkieh, FMP
SNC Lavalin O&M
Riyadh, Saudi Arabia

Monday Esene, FMP
Africa Finance Corp.
Ikoyi, Nigeria

Ashish Gaonkar, FMP
Mahindra & Mahindra
Bangalore, KAR, India

Octavio Gonzalez, FMP
Cushman & Wakefield Asset Services
Calgary, AB, Canada

Catherine Grant, FMP
St. Robert, Missouri

Moustafa Ibrahim, FMP
International Capital Trading LLC
Abu Dhabi, United Arab Emirates

Vijay, FMP
Kochi, KER, India

Balaji Kurapati, FMP
RELX India Private Ltd.
Chennai, TAM, India

Sivaprasad, FMP
Dubai, United Arab Emirates

Chima Nwogu, FMP
Chevron
Lagos, Nigeria

Adejumo Olaide, FMP
International Real Estate Partners
Lekki, Nigeria

Mohit Sharma, FMP
Compass India Support Services
Gurgaon, India

Sharon Spina, FMP
Siemens Healthcare Diagnostics
Flanders, New Jersey

Osman Syed, FMP
EFS
Riyadh, Saudi Arabia

Corie Toussaint, FMP
Servus Ltd.
Port of Spain, Trinidad and Tobago

Thandi Twala, FMP
Sasol
Mpumalanga, South Africa

Raymond Vega, FMP
Macy's
Lake Worth, Florida

Ryan Fuerst, FMP
CBRE
Yukon, Oklahoma

Vanessa Young, FMP
Curvature
Charlotte, North Carolina

Weill Casey, FMP
Jacksonville, Florida

Zachary Harlow, FMP
SONOS Inc.
Santa Barbara, California

George Hauenstein, FMP
Equinix
Elmsford, New York

Tariq Safrah, FMP
AWJ Holding
Jeddah, Saudi Arabia

Thomas Woollet, FMP
City of Novi
Novi, Michigan

Abdallah Abu Daqa, FMP
Rekeep Saudi Ltd.
Riyadh, Saudi Arabia

Abdulrhman Almalki, FMP
EMMCOR Facilities Service
Makkah, Saudi Arabia

Mohammed Baqader, FMP
Saudi Arabia

Mannu Bassi, FMP
Amdocs
Gurugram, India

Madhavi Jadhav, FMP
MSCI Services Ltd.
Mumbai, MAH, India

Vivek Kappatta, FMP
India

Russell Kinkade, FMP
Acceleron Pharma
Cambridge, Massachusetts

Susanta Sahu, FMP
Optym India Ltd.
Bangalore, KAR, India

Wayne Adams, FMP
Value Drug Co.
Duncansville, Pennsylvania

Matthew Bauer, FMP
FSMG
Melbourne, Florida

Jacob Cherevka, FMP
Port Authority
Pittsburgh, Pennsylvania

Lisa Emory, FMP
ABM Onsight Services
Louisville, Kentucky

Arick Gale, FMP
San Juan Capistrano, California

Chris Grootendorst, FMP
Canada

Jason Hachey, FMP
Bond Brand Loyalty
Mississauga, ON, Canada

Nora Hennig, FMP
Jacksonville, Florida

Marylou Holly, FMP
George Mason University
Arlington, Virginia

Darshan Lal, FMP
Calgary, AB, Canada

Jan Menard, FMP
JAA
Jacksonville, Florida

Randy Nejbauer, FMP
South Metro Fire Rescue
Centennial, Colorado

Leslie Yardman, FMP
BOK Financial
Albuquerque, New Mexico

Alexander Attalla, FMP
West Lake, California

Eric Chung, FMP
New York, New York

Nickolaus DeSimone, FMP
CBRE
Langhorne, Pennsylvania

John Lowdermilk, FMP
Frontier Health
Gray, Tennessee

Anna Christina Ribeiro, FMP
Payments Canada
Ottawa, ON, Canada

Dale Slater, FMP
United Kingdom

Julia Wang, FMP
Google
Mountain View, California

Merhawit Woldu, FMP
Oakland, California

Abdullah Alqahtani, FMP
King Abdullah Financial District Co.
Riyadh, Saudi Arabia

Jahanzaib Anwer, FMP
Marriott
Jeddah, Saudi Arabia

Jonathan Charles, FMP
United States Air Force

Sean Donnelly, FMP
BGIS
Markham, ON, Canada

Sherif Emad, FMP
Contrack Facilities Management .S.A.E
Cairo, Egypt

David Goeman, FMP
Northwestern Mutual
Milwaukee, Wisconsin

Izzat AliKhan, FMP
EMCOR Facility Management
Riyadh, Saudi Arabia

Lori Mapes, FMP
Vertafore Inc.
East Lansing, Michigan

Adil Masroor, FMP
Tatweer Buildings Co.
Riyadh, Saudi Arabia

Roger Storie, FMP
Oklahoma

Mohamed El Chemi, FMP
DMG
Cairo, Egypt

IFMA™ Credentials

The following people were awarded the Certified Facility Manager® (CFM®) certification in AUGUST 2020:

Elaine Gomez, CFM
Bouygues Energies and Services
Surrey, BC, Canada

Ehsan Setork, CFM, FMP
Events DC
Washington, District of Columbia

Greg Jones, CFM
Finisar Corp.
Sherman, Texas

Nicholas Goddard, CFM
The Provident Group LLC
Kiowa, Colorado

Stephen Phillip Suggs, CFM
Brevard College
Brevard, North Carolina

Geoff Williams, CFM, FMP, SFP
Angus Consulting Management Ltd.
Don Mills, ON, Canada

Jamie Bradley, CFM
Federal Home Loan Bank of Des Moines
Des Moines, Iowa

Aaron Bayham, CFM
Celtic Studios
Baton Rouge, Louisiana

Nicholas Mak, CFM
Fairmont Singapore & Swissotel The Stamford
Singapore, Singapore

The following people were awarded the Sustainability Facility Professional® (SFP®) designation:

Andrew Fogg, FMP, SFP
BGIS
Guelph, ON, Canada

Jeffrey Buck, FMP, SFP
Cisco
Raleigh, North Carolina

Steven Harvey, FMP, SFP
Naval Undersea Museum
Silverdale, Washington

Daniel Dix, FMP, SFP
CU Denver Anschutz Medical Campus
Aurora, Colorado

Michelle Bush Hamilt, FMP, SFP
Fenwick & West
San Francisco, California

Tanzia Sharmin, SFP
Ferris State University
Big Rapids, Michigan

Umarfarouk Lolleh, SFP
Houston, Texas

Steven Cash, SFP
Public Building Authority
Knoxville, Tennessee

Vladimir Zunic, CFM, FMP, SFP
Kingfield
Dubai, United Arab Emirates

The following people were awarded the Facility Management Professional (FMP®) designation:

Abdullah Abdulsamad, FMP
EFS Facilities Service LLC
Madinah, Saudi Arabia

Limi Abdusemed, FMP
Ring LLC
Inglewood, California

Ali Alsamrani, FMP
KSUMC
Riyadh, Saudi Arabia

Mohammed Alshammari, FMP
AWJ Holding Co.
Riyadh, Saudi Arabia

Salman AlThuyayb, FMP
Riyadh, Saudi Arabia

Christopher Banford, FMP
American Preparatory Academy
Las Vegas, Nevada

Andrea Barlow, FMP
Oceanside, California

Charles Bladine, FMP
City of Tempe
Tempe, Arizona

Steven Calloway, FMP
Camp Shelby, Mississippi

Jonathan Cross, FMP
MVL of UCLG
Athens, ON, Canada

Mohamed Lamloum, FMP
Contrack Facilities Management S.A.E.
Cairo, Egypt

Jacob Michel, FMP
H&M Hennes and Mauritz
New York, New York

Sajal Tandon, FMP
Godrej Industries Ltd.
Mumbai, MAH, India

Daniel Munoz, FMP
Madrid, Spain

Steven Bentley, FMP
SPYSCAPE
New York City, New York

Ken Dowdy, FMP
Grainger
Janesville, Wisconsin

Frederik Langlois, FMP
Keywords Studios
Montreal, QC, Canada

Joseph Puchalski, FMP
Los Angeles, California

Ibrahim Saleh, FMP
Koora Arena
Jeddah, Saudi Arabia

Tracy Schiefelbein, FMP
Grainger
Waterloo, Iowa

Mahmoud Shehata, FMP
Contrack Facilities Management S.A.E.
Cairo, Egypt

Meshal Almuzaini, FMP
EMCOR Facilities Services Inc.
Madinah, Saudi Arabia

David Baker, FMP
Equinix
Atlanta, Georgia

Anwar Bashaikh, FMP
National Energy Services Co.
Riyadh, Saudi Arabia

Norberto Figueroa, FMP
Cognizant Technology Solutions Philippines Inc.
Taguig, Philippines

Sanjeev Goutam, FMP
Amdocs
Pune, MAH, India

Vivek Gupta, FMP
Adani Gas Ltd.
Ahmedabad, GUJ, India

Vaibhav Manglu, FMP
Adani Enterprises Ltd.
Ahmedabad, GUJ, India

Gibi Ponnachan, FMP
Central Government
Kochi, KER, India

Jennifer Robinson, FMP
Omniome Inc.
San Diego, California

Chiragkumar Sagar, FMP
Adani Gas Ltd.
Ahmedabad, GUJ, India

Bala Vamsi, FMP
Indiabulls Housing Finance Ltd.
Bangalore, KAR, India

Brian Ross, FMP
Sabra Dipping Co.
Colonial Heights, Virginia

Rodney Fugitt, FMP
The Donohoe Companies
Washington, District of Columbia

Chris Brum, FMP
Department of National Defense
Pembroke, ON, Canada

Jamie Cairns, FMP
City of Kingston
Kingston, ON, Canada

Rebecca Ellison, FMP
Relativity
Chicago, Illinois

Richard Evans, FMP
Complete Building Services
Washington, District of Columbia

Scotty Gray, FMP
United States Air Force
APO AE, United States

Sheldon Holm, FMP
Westlock, AB, Canada

Joms Malapit, FMP
United States Air Force
APO AE, United States

Peter Milligan, FMP
Ornge
Mississauga, ON, Canada

Jim Oconnell, FMP
Forma Therapeutics Inc.
Watertown, Massachusetts

Robert Tella, FMP
Equinix
Winder, Georgia

Jerry Wood, FMP
Continental Tire
Rock Hill, South Carolina

Gerard Angus, FMP
IST Management Services
Atlanta, Georgia

Briggs Ramos, FMP
Equinix
Ashburn, Virginia

Saeed Alzahrani, FMP
Jeddah, Saudi Arabia

Lomesh Bhatt, FMP
Adani Ports & SEZ Ltd.
Mundra, GUJ, India

Rob Bridges, FMP
Equinix
Carteret, New Jersey

David Francis, FMP
Glaxo Smith Kline
Mississauga, ON, Canada

Nicklas Johnson, FMP
Hixson, Tennessee

Joseph Mace, FMP
United States Air Force

Rebecca McCoy, FMP
City of Roseville
Roseville, California

Naif Mesairy, FMP
The Red Sea Development Co.
Riyadh, Saudi Arabia

Mayursindhu Parmar, FMP
Adani ports and Special Economic Zone Ltd.
Ahmedabad, GUJ, India

Jerry Roberts, FMP
San Antonio, Texas

Jeanne Watts, FMP
Arapahoe County Government
Littleton, Colorado

Orwah Adnan Bane-Essa, FMP
Riyadh, Saudi Arabia

Hong Chang, FMP
Suzhou, China

Rahul Joshi, FMP
Mundra Solar Ltd.
Ahmedabad, GUJ, India

Anilkumar Rajyaguru, FMP
Adani Ports and Special Economic Zone Ltd.
Mundra, GUJ, India

Samir Piyush Raval, FMP
Adani Enterprises Ltd.
Ahmedabad, GUJ, India

Morrison Allen, FMP
Shopify
Montreal, QC, Canada

Kaizen Chen, FMP
Monrovia, California

Jerry Cullum, FMP
City of Edmond
Edmond, Oklahoma

Robert Hundley III, FMP
U.S. Postal Service
Merrifield, Virginia

Juanita Kennedy, FMP
Architect of the Capitol
Culpeper, Virginia

Omar Khudhur, FMP
City of Richmond
Richmond, BC, Canada

Amy Quarles, FMP
Federal Home Loan Bank of Dallas
Irving, Texas

Valerie Velez Colon, FMP
Seattle Cancer Care Alliance
Seattle, Washington

Scott Wachel, FMP
Sodexo
Downers Grove, Illinois

April Wang, FMP
BGIS
British Colombia, Canada

Yasser Alammari, FMP
King Saud University - Medical City
Riyadh, Saudi Arabia

Mohammed Alanazi, FMP
Saudi Arabia

Osama AlQarni, FMP
EFS Facility Services
Riyadh, Saudi Arabia

Larissa Bao, FMP
Colt Technology Services Ltd.
Dalian, China

Fernando Cardenas, FMP
Nordstrom Inc.
Riverside, California

XI Cheng, FMP
Chengdu Vanke Property
Chengdu, China

Rrok Dedvukaj, FMP
Equinix
Elmsford, New York

Daniel Demille, FMP
Brown Brothers Harriman
Boston, Massachusetts

Hrishikesh Deo, FMP
JLL
Pune, MAH, India

Nour Jomaa, FMP
Riyadh, Saudi Arabia

Shahzad Mohammadi, FMP
Air Products
Dhahran, Saudi Arabia

Faheem Shah, FMP
Nokia
Riyadh, Saudi Arabia

Chandr Shekhar, FMP
Indian Army
Kasauli, HIM, India

Abdallah Almotiri, FMP
King Abdulaziz University
Jeddah, Saudi Arabia

Khalid Madani, FMP
EFS
Madinah, Saudi Arabia

Akeem Olaosebikan, FMP
Central bank of Nigeria
Abuja, Nigeria

Michael Trad, FMP
Best Western International
Phoenix, Arizona

Stephen King, FMP
Paragon Services
Phoenix, Arizona

Hussam Alrowiatea, FMP
Raza
Riyadh, Saudi Arabia

Sami Alshaalan, FMP
Riyadh, Saudi Arabia

Nader Jomaa, FMP
Riyadh, Saudi Arabia

Muhammad Irfan Khokhar, FMP
Al Futtaim Engineering LLC
Rermraam, Dubai

Want to see your name here? Visit www.fm.training/credentials to find out how.

From a grave digger to a beauty queen, the next FM superstar is just waiting to be discovered.

As part of IFMA's 40th anniversary celebration, the organization sought out the best and brightest young FM professionals for its first-ever ***Forty Under 40*** list. IFMA Fellows had the difficult task of culling the list from more than 100 nominations from all over the world.

This exceptional group of 40 young men and women and their fellow nominees are the future of the profession. FM will be in good hands.

FORTY UNDER 40

IFMA™

Chitwan Saluja ›

NEW YORK, NEW YORK, USA

"(FM) is a profession where you get to work closely with individuals, build collaborative relationships and partner closely with executives to develop a system-based vision and strategy.

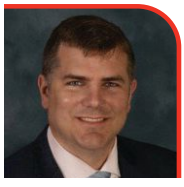
A tireless advocate for women in the STEM field, **CHITWAN SALUJA** is breaking glass ceilings and pulling up as many young women with her as she can. Her combined experiences both as a mentor and mentee have helped her to understand the true value of both seeking out knowledge as well as sharing it along the way.

She mentors middle and high school students who need encouragement to pursue STEM majors and careers and feels it is important to break the negative stereotypes, especially for young girls, associated with the field.

Within FM, Saluja is also a champion of BIM and the digital twin concept, a trending technology that is being adopted by numerous industries such as aviation, automotive and manufacturing. Her talent, experience and leadership qualities enable her to provide thoughtful, innovative and practical solutions.

David Gray ›

INDIANAPOLIS, INDIANA, USA



"By making a small effort to ensure we are good stewards of the facilities we are entrusted we can make a big impact on the world around us."

While looking for the perfect blend of business and construction, former accounting major **DAVID GRAY** found a home in FM. His industry expertise is shared via authored articles and FM speaking engagements.

Gray not only shapes today's FM, he also helps build its future. He strongly believes providing students in FM-related programs exposure to complex facility and project organization. His goal is to provide students opportunities to apply their classroom learning in a professional environment and have an immediate impact on an organization through completing projects.

Outside of FM, Gray is active with the Boy Scouts of America where he teaches the Sustainability Merit Badge and has helped more than 40 young men earn their Eagle Scout. He was also awarded the BSA's Meritorious Action Award from for his actions that saved a life while on vacation in Costa Rica.

Bobby McCrary ›

WICHITA, KANSAS, USA

"There's not a job too small for me. This is part of my DNA and leadership practice."

BOBBY McCRARY is the first to tell you he climbed the greasy ladder to get where he is today … and he does not plan on stopping. While serving in the U.S. Air Force, McCrary has left his fingerprints on thousands of facilities across the world, sometimes working in 120-degree temperatures so tens of thousands of occupants can work comfortably inside.

As a leader in the safety and emergency response team, his occupants have dropped their evacuation time by almost five minutes. During the pandemic, he has worked tirelessly with C-Levels to ensure staff safety.

He also serves on a local charitable board which allocates charitable funds and promotes engagement through volunteer opportunities and civic engagement activities.

"My passion is the career field. I truly understand that the FM industry has on our nation, and our world's infrastructure. If there isn't professionals like us to care for our beautiful facilities, our world will depreciate," he said.

Corey Jackson ›

BROOKHAVEN, PENNSYLVANIA, USA

"Our biggest impact is not only the through the facilities that we maintain but also with the relationships that we form."

COREY JACKSON has always had a passion for working with his hands and FM has allowed him to fulfill that passion and many more rewarding challenges. "You get to work with many different trades and deal with all types of people. There is nothing more rewarding than stepping up in the time of need and help solve a problem," he said.

Jackson's peers call him a highly curious, creative problem solver who works with integrity and pride, building relationships with his local community.

Those relationships include leading volunteer teams to construct a summer camp for troubled youth and wheelchair ramps for cancer patients. He is driven to improve processes that will directly impact the quality of life for those he supports. He is a strong and respected leader among our students, his peers and the community he serves.

Ashley Bradarich ›

CHICAGO, ILLINOIS, USA

"We are all just people showing up to work every day to give our best hours and keep the world turning. We all deserve each other's support and respect."

ASHLEY BRADARICH fell into FM from the most unlikely of places. "My FM career chose me, to be honest. I was participating in the Miss USA Pagenat in Las Vegas in 2010 where I saw a presentation by a professional FM businesswoman. I was so impressed with her and the topics she was discussing, I walked up to her after the presentation and introduced myself and told her I would love to come work for her."

Bradarich landed the job and is focused on the people who work in and are touched by FM. "People are such an important aspect, if not the most important aspect to what we do in FM, and it's important to stay connected," she said.

Through FM, Bradarich also volunteers with charitable causes that build friendship with disabled adults, children of dysfunctional families and the betterment of women in business and arts.

Carolyn McGary ›

DENVER, COLORADO, USA

"People rely on you to help them be their best selves in the workplace."

After going two years without a major, **CAROLYN MCGARY** stumbled into an FM program and hasn't looked back. "I am very grateful I did. I honestly couldn't see myself in any other industry," she said.

Dubbed an overachiever and continuous learner, McGary is carrying her enthusiasm and knowledge back to the classroom as an instructor for a new FM program in Colorado. She hopes to spread her love for the industry to students and peers.

"There are so many others out there just as passionate as you about the same things — we just need to become better at connecting and communicating together to amplify our impact on that passion," she said. "Put yourself out there, share your passions, connect with those kindred souls, and see what impact you can make on the world!"

McGary's is also a tireless advocate for FM education including involvement with SkillUSA, the IFMA Foundation and developing a youth workforce development program in her area.

Anthony Maddox ›

PORT CHARLOTTE, FLORIDA, USA

"When we are current on trends and techniques, we will change the world."

Unhappy with his job at a car dealership, **ANTHONY MADDOX** would ask clients about their jobs. Finally, one client asked if Maddox could change a toliet. "And that was the beginning of my FM career as a maintenance technician," he said.

Since then, Maddox has tackled every test FM has thrown his way. "Whether it is responding to COVID-19, a power outage or building a new headquarters, completing the challenge in front of you and fostering lifelong relationships are the most rewarding aspects of FM," he said.

His peers call him one of the most responsive FMs and exemplifies an attitude of gratitude. When called for volunteer support, he is always right there to help. He cares about IFMA and the IFMA Foundation and is grateful to both organizations for their support. He is always ready to give back to the organization that helped shape his career.

Eric Hansen ›

OTTAWA, ONTARIO, CANADA

"It's a challenging career. Think of any industry and the FM role is part of it."

ERIC HANSEN knows the world needs FM and faces each day knowing his job is shaping organizatonal outcomes.

"If you like pushing the envelope on how an industry or company thinks, then FM is for you," he said.

However, that push comes with accountability. "If we are to be leaders on the impact of our work environment, then we need to include those outside of our facilities as well," he said.

Hansen believes in knowledge sharing, from the FM newcomer to the industry's seasoned veterans.

His peers tout his leadership and selflessness in and out of the workplace. At his core, he devotes his time to his parents and children to make an impact in their lives. Hansen has been instrumental in helping to save the facility and organization money by changing to LED lighting, upgrading old machinery and looking at programs that will donate time or products to help upgrade the facilites.

Giselle Holder ›

PORT OF SPAIN, TRINIDAD AND TOBAGO

"FM is one of the world's best kept secrets."

Just a few years into her career, **GISELLE HOLDER** is already called a powerhouse in the industry. Her enthusiasm for FM is evident through her personality and willingness to volunteeer for outreach programs and job fairs to discuss the essense of FM.

Holder's philosophy is two fold: FM is as much building management as it is people management and no one knows it all. "Building relationships with other consultants, specialists and contractors has been one of the most beneficial byproducts of being in this industry. Through this network of expertise, you are able to draw down on so much knowledge and practical know-how to apply to your own everyday," she said.

She is also a champion of knowledge sharing to grow the industry. "I would love to see very clear pathways to FM as there are for becoming engineers, doctors, lawyers and teachers. This is so critical to both the now and the future," Holder said.

Gene Frazier ›

TALLAHASSEE, FLORIDA, USA

"The sharing of information between other industry practitioners has served to be invaluable."

GENE FRAZIER has left a trail of improvement in his few FM career stops. From preventative maintenance, efficiency programs and his team's upcoming GBAC Star Facility Accredition program, Frazier is constantly seeking ways to help his organization and team to meet the triple bottom line.

The COVID-19 pandemic has provided new opportunties across the industry, and sharing information, lessons learned has made it easier to indentify and implement best practices. Through this process, Frazier believes FM can assure a skeptical public that facilities are safe for occupants and visitors.

"The value we provide is finally being realized. Serving the public during these times and being a focal point to calming their fears has been rewarding. Being able to detail specific steps taken to ensure the public's safety when fears are at an all time high is what I look forward to."

Frazier is also active as a mentor in his city's future leader academy.

Jeff Collett ›

WASHINGTON DC, USA

"Becoming a leader and then mentoring, developing, and understanding your people resources will have a greater impact on your success than any technology or strategy ever will."

After realizing his career choice wasn't for him, **JEFF COLLETT** found his way to FM. He quickly became a subject-matter expert for the industry in his region and developed personnel and sales efficiencies that optimized the returns for his company. Later, he served the U.S. State Department in two of the hardest locations in the world: Ciudad Juarez, Mexico, near the height of the drug cartel violence in and Libreville, Gabon.

Collett said FM can use its leadership ability for the greater good. "As leaders in FM, we can ensure that our maintenance and capital programs are so effective that these situations don't occur and thus have a positive impact on the people in the world around us," he said.

While in Gabon, he received a grant to build a septic tank, toilets, showers, and a rain collection system for an orphanage, as well as awards for his work in Africa and Mexico.

Derek Bacigal › HONOLULU, HAWAII, USA

"We get to influence the lives of so many people who interact within the built environment we manage."

Internationally recognized as an emerging FM leader, **DEREK BACIGAL** readily accepts industry challenges and team leadership. "Place and process can be taught, however you have to pick the right people to create high-performing teams," he said. "I specifically enjoy my current role as our team delivers services and experiences that last a lifetime for our guests."

Part of that leadership includes facing the challenges of evolving trends, needs and balancing people, planet and profit with an organization's stakeholders.

Bacigal touts FM's job security and ability to be employed in virtually any geographic region.

"People who work in FM get the opportunity to gain skills in other industries based on the types of facilities they manage and the scopes of services they manage," he said.

Manuel Rodriguez ›

CHICAGO, ILLINOIS, USA

"You can't let fear of failure get in the way of your professional growth."

MANUEL RODRIGUEZ began his FM journey shortly after high school. He learned early on that FM is service organization where some sales skill is critical. "Whether convincing the C-suite to fund a project, or getting the organization to buy into changes in the services you provide, the ability to persuade can be the key to your success," he said.

He also volunteers with organizations supporting youth with disabilities, and is a recognized leader within his IFMA chapter. His peers describe him as patient, eloquent and he pushes them to be involved in their communities and pay it forward.

Rodriguez is also a big proponent of sustainability. "FM's support of sustainability and work-life balance programs can improve employee satisfaction while contributing to the company's bottom line," he said.

Lisa Miller ›

CALGARY, ALBERTA, CANADA

"Taking risks is not always comfortable and there is always a chance of failing but often times the rewards are worth it."

For **LISA MILLER,** learning never stops and it plays a major role in helping her contribute to her organization's success. Although much of FM is behind-the-scenes, its impact is not, she said.

"To know that my teams' decisions and actions can positively impact the experience is very rewarding," she said.

Her climb in the FM world was met by skeptics doubting her abilities because she didn't possess a trade certificate, an extraordinary amount of experience, and she was a young female in FM.

Not only has she earned FM credentials, she is also sought as a mentor who fosters long-term professional relationships and is strongly committed to employee engagement and staff development.

Miller also advocates for fun. "Teams that also make having fun a part of their every day will not only have a great impact within their organization, but will also have a great impact on their own well-being and the well-being of those around them," she said.

Nick Heibein ›

TORONTO, ONTARIO, CANADA

"FM is pulling itself from its boiler room roots and pushing forward to the boardroom to be part of an organization's critical conversations."

Unlike many in the industry, **NICK HEIBEIN** actually went to school for FM. Originally wanting to be an architect, the FM component quickly got his attention.

In that time, Heibein has seen first-hand the industry's evolution to include amenities. "Occupants and organizations are more educated than ever in areas such as health, wellness, sustainability and environment, and these are subjects of conversation when choosing an employer. Organizations are being pushed to make commitments in many of these areas and are being held accountable to achieve, and FM is often a big part of the deliverables," he said.

He is also focused on growing the industry by bridging the FM talent gap and driving diversity and inclusivity. Facility users are diverse, and have varying needs and motivations, and our facility managers should mirror that in order to provide the best solutions possible, said Heibein.

Mohamed Aashik ›

COLOMBO, SRI LANKA

"The unpredictability of the FM operation and function is quite fun."

MOHAMED AASHIK's passion for FM exists with the industry's core. "If you are really passionate to resolve issues or discover new things and improvements, FM would be an ideal career. This is a highly rewarding industry for performers," he said.

Aashik's rise in the industry is based on constant learning and flexibility.

"Learning allows you to create a competitive advantage while becoming a jack-of-all-trades," he said.

He is a published author with both academic and industrial experience where he conducted research and projects focusing on performance and knowledge management, international health and safety law, and energy and sustainability. Aashik is also a visiting lecturer within FM academia.

Through his knowledge and skills, Aashik plays a vital role in crisis management and helps his organization prepare its people and locations through the pandemic.

Stewart Livsie ›

ALBUQUERQUE, NEW MEXICO, USA

"A leader exists solely to serve others, placing their needs above your own; in this sense, the discipline of FM is the epitome of the philosophy, 'No man is an island.'"

STEWART LIVSIE serendipitously found himself in healthcare FM. While he'd not previously considered an FM career, his background in engineering, construction and project management combined with the broad scope of responsibilities and the mission of the organization resonating with him forged this career path.

Having achieved both his FMP and CFM credentials, Livsie would like to become an instructor to share his passion and knowledge to empower others in the profession. His experience optimizing healthcare FM and the built environment contributes to creating a seamless patient experience, and in many ways, is just as important as what happens on the front line.

"I know that the results of my team's successes or failures can make the experience of a patient going through unimaginable hardship somewhat better, or infinitely worse," said Livsie.

Nishar Fatema ›

NEW YORK, NEW YORK, USA

"FMs are one of the greatest gatekeepers to an organization's budget, workplace and culture."

From the beginning of her career as a design graduate, **NISHAR FATEMA** was highly passionate about how design would impact the experience of the end user. This curiosity drew her into workplace strategy and client understanding where she continues to excel.

"With increasing competition in today's time, organizations are focusing on maximizing their resource utilization and continually redefining their workplaces, to ensure they have an edge over the others in this game," said Fatema.

Today, she has grasped the FM role and leads efforts to create safe working environments and increase sustainability. "With all the other FM responsibilities you will get to lead the effort of a safe working environment and reducing energy output costs as well as participate in reducing the carbon emission if managed correctly," she said.

Fatema is also a driving force for women's initatives in India where she assists with emotional and financial support for young women seeking education.

Riza Kahn ›

SAN FRANCISCO, CALIFORNIA, USA

"In other industries you don't always get to witness the end result of your efforts firsthand. In FM, your successes and failures are very apparent."

From a cemetery groundskeeper to an award-winning FM leader, **RIZA KAHN**'s rise has been exceptional. He has overcome extreme challenges in both his professional and personal life. Riza accepts all challenges with open arms. From excelling at meeting his clients needs by fostering his teams growth and implementing IFMA standards to going above the call of duty by producing high-quality video content, he is doing it all.

In his short time in FM, he has continually improved processes, documented, shared and replicated his success with employees he has mentored.

"I love connecting with others and mentoring talented individuals. FM encompasses such a wide variety of subject matters that you will eventually come across a unique issue that will challenge you to create a new process and to coach others. It's rewarding to tackle those challenges and help others do the same," he said.

Sarah Sims ›

WASHINGTON DC, USA

"Establish a solid network of FM professionals with whom you can knowledge-share and ideate."

Her peers describe **SARAH SIMS** as a dynamic, innovate professional who started in an entry level position and quickly rose due to her work ethic, dedication and focus, not just in the company but also how she can continue to grow, learn and develop to exceed the organization's expectations.

That dedication has earned Sims the respect of her peers. Her drive, passion and commitment to anything she touches, the grace with which she handles any situation and the warm smile she shares with everyone she interacts with is unmatched. She has accomplished and continues to accomplish so much professionally and never ceases to share what she has learned with those in her community.

"Opportunities for acts of service to others in the industry are extremely fulfilling to me. Becoming a member of the Capital Chapter of IFMA has allowed further engagement with the local community and helping support others in the field prepare for their career," she said.

Samuel Kelly ›

FRANKFURT, GERMANY

"People are always more important than the problem."

SAMUEL KELLY sees keeping things in good order as a noble responsibility. "FM is a service profession. We are stewards of the built environment, making it a place where people can work, play or live. I find our profession rewarding when I leave things better than I found them," he said.

Putting people first is part of his mantra, which as catapulted him to a senior member of his organization. "There will always be something to fix and another project to do, but the you won't always get to interact with the same person in the same way twice," he said.

People-first also means growing the FM industry. Kelly helped pilot a virtual student intern program, helping students attain professional experience without leaving their college town.

His peers commend him for his ability to provide both upper-level management and guidance or problem-solving solutions to the technicians and engineers on his team.

Sierra Knepple ›

CHICAGO, ILLINOIS, USA

"I would love to give back to the industry in some way and be able to provide others with a tool to better themselves."

SIERRA KNEPPLE always focuses on the big picture. "It is easy to get wrapped up in the details, but that can lead to failures and missed opportunities. Much of what we do has a real impact on the organizations we work for, so it is important to think like those at the top of the organization," she said.

Discovering FM in college, Knepple realized she could bring diversity to a male-driven industry.

She is also focused on making a difference in the world, creating a safe space in India for women and children, offers improved sanitation and created a secure space for the children to study. Closer to home, she is also partners with at-risk youth to prepare for job interviews, resume writing and college admissions applications.

Tyrel Melville ›

CHAGUANAS, TRINIDAD, W.I.

"FM is the only job that one can perform in any part of the world, if you have the skill and training to execute."

TYREL MELVILLE's path to FM was inspired by his father and a desire to capitalize on the human resource gap for skilled management professionals in the built environment. Earning his degree from the IFMA-accredited University of Southern Colorado (now Colorado State University–Pueblo), his educational experience laid the foundation of his work ethic and resourcefulness that have continued to pay dividends for his career today.

Citing his most revealing lesson, he believes, "Administering your job transitions as a facility management professional within your 'demand organization' is a deliberate system of practice, and should be paid close attention to." Utilizing his FM network and social media to bridge geographic location, he was able to effectively manage and support the immediate response needs of three major hurricanes and a vigorous earthquake. The resiliency of his team's efforts and support of the FM community abroad helped guide him through the devastation.

"Nothing commands industry respect more than an engaged membership council or community," said Melville. "An old proverb states 'It takes a village to raise a child'. If an industry is to mature gracefully, the collective good of the group must be held in esteem."

Yvette Watson ›

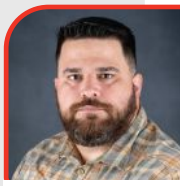
THE HAGUE, NETHERLANDS

"The more and more I immersed myself in sustainable FM and Real Estate, the more I realized that the FM can influence the sustainability performance of an organization like no other."

YVETTE WATSON dared to dream that her unexpected detour to The Hague University faculty of Facility Management would allow her to express her personal ambition through her work. In her first position in FM, she noticed her direct impact on sustainability efforts by asking the supplier to organize a more sustainable solution. Building upon that ambition, she has served as the chair of the circular and inclusive economy expert group of her professional association for more than 10 years.

In 2016, she bundled her strengths and knowledge with her partner to help organizations accelerate toward sustainable and circular business operations. With dreams to expand her business through partnership, she is also working to make sustainable FM measurable and expanding online learning to activate employee contributions to sustainability.

"We have to dare to innovate and experiment," said Watson. "We must realize that all the decisions we make today have an impact on a sustainable world of tomorrow."



Joshua Hobgood ›

WASHINGTON, DC, USA

"(There is) more emphasis on work-and-life balance. As an FM, the question becomes how can we help make that happen in new and innovative ways?"

After leaving the U.S. Marine Corps, **JOSHUA HOBGOOD** felt he had the leadership and creativity to succeed in the construction world. It was when he landed in FM that his career took flight.

"The most surprising aspect of FM that I didn't fully appreciate before was that it touches so many aspects of operations within an organization. From capital construction to grounds, it's impressive," he said.

Lauded for his out-of-the-box strategies, Hobgood's projects have resulted in efficiencies of time and money resulting in organization-wide savings and reliefs of administrative burden. Hobgood believes FM marketing within an organization can build trust with its occupants. "It can help employees feel that their organization is leaning forward and making constant improvements to workplace," he said.

rOutside of FM, Hobgood operates a non-profit organization that connects veterans to the outdoors while providing peer-based mentoring and counseling.

Xuesong (Pine) Liu ›

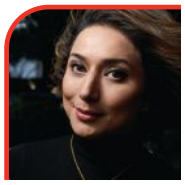
PITTSBURGH, PENNSYLVANIA, USA

"We should embrace new technologies and not go against them."

XUESONG (PINE) LIU comes from a family of construction engineers. Learning computer science as a teenager spurred his interest in utilizing information technology in the building industry. Completing a degree in both software engineering and civil engineering, he investigated the status and pain points of commercial FM. Capitalizing on his studies, he continued his career entrepreneur, researcher and developer to bring IT to FM.

"People spend more than 80 percent of their time inside buildings. Facilities are the world where we live, work and play," said Liu. "Every improvement in the FM industry would directly impact people's life."

Anchored in using IT to its full potential, Lui believes shifting to a model where FMs rely more heavily on data-driven decisions instead of solely on subjective reasoning will continue to bring more benefits and value to the FM industry. "It is critical for the FM industry to implement new information technologies including IoT, BIM, digital twin and data analytics, in order to improve the overall effectiveness and efficiency of O&M," Liu said.



Neelofer Khan ›

ISLAMABAD, PAKISTAN

"FM is expanding its scope into many diverse avenues, creating opportunities for professionals with multifarious backgrounds for employment and entrepreneurship."

NEELOFER KHAN broke barriers in her native Pakistan and has not stopped. In her region, women are not usually allowed to work outside their home. "As a woman, in our society, keeping a home clean for the family is a woman's domain. Where else do you get creative thoughts, of course, at home? With a goal to ensure not only my home, but also my surroundings should be equally clean, I discovered the FM industry."

Khan is making waves in her country as she leads an organization that empowers and networks female entrepreneurs. "The platform offers me an opportunity to promote the value of FM services to create hygienic workplaces to enhance safe workplace experience for corporate employees," she said.

She is also a co-founder of a program that conducts skill-based training for marginalized communities and assists them by placing them in major corporations around the world to ensure employment and supports many female workers and their children with educational scholarships.

Melanie Garcia ›

ALBUQUERQUE, NEW MEXICO, USA

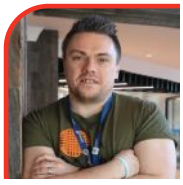
"I would like to encourage other FMs to be brave, not perfect.... Ask questions and make connections."

MELANIE GARCIA was definitely hired directly into the fire. "I was under the impression that I would only be submitting building work orders for our four standing buildings and coordinating graduation ceremonies. I had no idea of the $25 million demolition and new build that I was going to be a part of," she explained.

During the 18-month project, she was lauded for her communication and overall enthusiasm, dedication and sense of community to her coworkers and occupants.

Communication is the cornerstone of her work acumen and can ease generational challenges within the industry. "For the first time in history, there are five generations in the workplace. Reminding each part of the team that maintaining a minimum of respect, not necessarily agreement, would aid in this challenge.

She is also the first in her family to earn her master's degree and plans to continue her education while drawing inspiration and strategy from her mentors.



Stephen Lynch ›

DUBLIN, IRELAND

"FM has given me the confidence to seek my best self and shown me how teamwork is a key part of FM and customer service/satisfaction."

From an entry-level role to managing mutliple sites, **STEPHEN LYNCH** has instilled confidence in his organization for him to lead operational construction projects and change management.

He has developed critical, trusting relationships with business leaders and is able to generate support for initiatives because of the confidence they have in him, said one colleague.

His peers call him a true leader without a big title. "Stephen is truly self-made. He comes from difficult beginnings and has leveraged a thirst for learning and dedication to hard work to grow his career significantly," one collegue said.

Lynch's FM passions are the intersection of hard work and innovation. "A career in FM is both varied and rewarding if you are disciplined and willing to innovate," he said. "Always be willing to adapt to new and innovative ways of working, processes and collaboration but keep a nod to the old-school ways as they can be just as helpful in many situations."

Mohammed Elageed ›

DUBAI, UNITED ARAB EMIRATES

"FM is not a cost center, it's a value adder."

MOHAMMED ELAGEED appreciates the challenges of the FM profession as it gives him an opportunity to make a tangible difference.

"It's a career that is nothing short of demanding with constant training and a chaotic schedule — not to mention a heavy dose of tenacity and patience. But all these are nothing when you recognize the value you are adding to the world as an FM professional," he said.

His peers tout his focus on operational excellence through training and possesses a long record in setting up processes and ensuring adherence to international best practices. He strives to share knowledge, even establishing a program where he shares FM concepts and the industry's latest technology via emails.

His focus is also on his clients as he is known for his dedication to serve customers to achieve their strategic and operational goals, resulting in a high record of customer satisfaction surveys.

Jaclyn Frenzel › STOCKTON, CALIFORNIA, USA

With a distinguished career spanning construction, RE and FM, **JACYLN FRENZEL** is creating opportunities throughout the industry.

She has an innate ability to develop core teams, strategically align the strengths of her employees with the demands of the industry, and create opportunities for working moms, military wives and single parents. Her partnership approach to service means that every team member is well-versed in customer service above all else.

Sarah Clare › TORONTO, ONTARIO, CANADA

A recognized leader in her region's CRE and FM industry, **SARAH CLARE** continues to grow as a young professional. She provides leadership and direction to various private sector service providers to leverage their knowledge and expertise in the delivery of front-line services to clients and tenants.

She continues influencing young professionals, helping provide welcoming opportunities for networking, professional growth, mentoring and career pathways.

Katerina Karasyova ›
TORONTO, ONTARIO, CANADA

"No matter your role within FM, you always have a voice. Your 'small' idea could be the next global initiative."

Just like many FM professionals **KATERINA KARASYOVA** fell into the industry.

"Coming out of school I really did not know what FM was. When a recruiter reached out about a potential FM role I had to do some research about the profession and realized I have been doing it unknowingly for years," she said.

Karasyova said she enjoys tackling challenges and relying on creativity, research and knowledge sharing to solve them.

Her enthusiasm is noticed by her co-workers. They describe her as an inspirational role model in FM with an infectous passion and energy.

That passion extends to growing the industry. She is assisting college students set up their own IFMA chapter amd establish mentorships and networking opportunities.

"With a large portion of the FM industry retiring over the next 5-10 years our challenge will be to ensure a seamless continuity of business with minimal historical data loss," she said.

Elizabeth Davies ›
CALGARY, ALBERTA, CANADA

"Encourage and help enforce a healthy work life balance — so many people are so passionate about their careers and we sometimes have a hard time switching off."

Recognized as a selfless, energetic volunteer and FM, **ELIZABETH DAVIES'** peers laud her for making a difference in the world every single day.

"Elizabeth rises to every challenge with a smile and with an energy that brings people together and gets the job done every time," they said. "As the leader for our company events, she identifies charities in need, heads up fundraising efforts, and rallies our staff to the occasion - whether that be picking up trash for community clean ups, pulling a plane, making sandwiches for the local food bank, or doing a charity walk to recognize work place safety."

Within the industry, she's a problem solver. "My favorite problems are initially described as 'this has been a problem for years.' I am extremely invested in understanding client's expectations and goals, and helping them with creative, innovative solutions," she said.

Terell Weg › BELLINGHAM, WASHINGTON, USA

"I love helping clients care for their facilities and the ability to tackle any project that is thrown our way."

TERELL WEG grew up in the FM industry, with her parents opening a janitorial company when she was ten years old. Providing in-house services for all aspects of a facility's care attracted her to the business upon graduating college.

Over the last decade, she has seen green initiatives and LEED buildings become the standard of care and maintenance in facilities, leading her to conclude that sustainability is our future and it is exciting to see how it's morphing into everyday practice. She believes, "How we utilize the energy we're given and dispose of the waste we create is important to our planet's sustainability and ensuring we leave a livable world for our grandchildren."

Weg said creative thinking is essential to how FMs will reorganize space to keep occupants safe and healthy. "While simultaneously planning in this built environment, FMs must also continue to be on the cutting-edge of sustainability and contribute to lessening our carbon footprint," she said.

Stephen Balanowski › TORONTO, ONTARIO, CANADA

STEPHEN BALANOWSKI's dedication to his craft, fitted with a kind and humble attitude has led to the success of guiding a team within the FM world. In his short career, he has worked on multiple high-profile projects.

The recipient of several IFMA scholarships, he has spent years giving back to the organization by volunteering his time and energy to throughout his college career.

Andy John ›

SEATTLE, WASHINGTON USA

"The diversity of people and enabling global teams to solve complex problems and provide solutions to our clients that enable them to be more productive is one of the most rewarding aspects of FM."

ANDY JOHN ackowledges that FM is both a thankless and rewarding career. His rewards come from the relationships he builds as a problem solver.

"Ensuring that we engage the future leaders of our clients' organizations is just as important as engaging the grassroots of our own industry," he said. "We need to ensure that we lead with action and become role models for our teams and our customers around how a shift in behavior can promote sustainable future workplaces."

John's peers describe him as an ambitious and exceptionally driven individual who is shaping the industry as he continues to progress and influence the industry with creative and thoughtful new ideas. John is always looking to move the needle within property management and real estate, utilizing best practices from other industries and new technologies to move his clients and the industry forward.

Amanda Reed ›

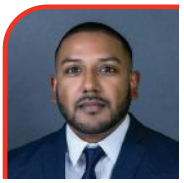
SAN ANTONIO, TEXAS, USA

"Always be considerate of every person when doing your job each day. (Everyone) is important in and should be treated with the same level of respect."

Before **AMANDA REED** found FM, she admits she did not know how much was happening before she went to work each morning. "I never thought about how my office was suddenly cleaned each day, or how I was able to work in a comfortable temperature, or how a well-maintained parking garage protected my car while I was inside each day," she said.

Now she's an intergral part of the industry. "I want people to continue living their working lives without necessarily realizing that an FM is working hard behind the scenes .... taking care of their needs in the working environment. I want people to think it just magically happens every day like I used to think!"

Reed is enthusiastic about her job, her company and the facilities management career. This shines through her daily actions, say her peers.



Timothy Selvadurai ›

TORONTO, ONTARIO, CANADA

"We need to ensure a steady flow of well-trained and passionate FMs. Advocate for sustainability and the industry accredited programs, and mentor every chance you get.

The allure of working on different systems each day attracted **TIMOTHY SELVADURAI** to the FM world. FM is not a fall-back plan for him; it was his career choice from a young age and his determination to move the industry needle forward is evident.

"I didn't know when I began in the industry that it would become a passion for me," he said.

Since then, his employers recognized his love and passion for facilty managment and he recieved promotions over the course of several years to his current position of director of operations. Selvadurai has created and implemented innovative ways to coach and develop building operators, garnering positive feedback from operators to senior executives.

He developed a benchmarking program to identify and resolve potential gaps in service delivery. This program has been used by the most senior team of the organization to validate due diligence to existing and potential clients.

Kathleen Clifford › ARLINGTON, VIRGINIA, USA

KATHLEEN CLIFFORD leads by example, accountability and courage. In her organization, she constantly finds ways to streamline procedures to drive improved results and is personally accountable for her own safety, a champion for safety of others and the work environment.

Clifford tackles each challenge with enthusasism, priortizes customer needs and empowers her team through continuous investment and learning from every win and failure.

Congrats to the IFMA Forty Under 40 finalists!

IFMA

We are proud to honor the *bright future of FM!*

FORTY UNDER 40

IFMA is inspired and awed by the young leaders of the facilities industry. We received over 100 amazing nominations from across the globe for our 40th Anniversary Forty Under 40 Awards.

Join us as we celebrate the promising future of FM!

JOIN FACILITY MANAGEMENT'S INNER CIRCLE.

Strengthen your organization and your professional community through a partnership with IFMA, the world's most recognized association for FMs.

BECOME AN IFMA CORPORATE SUSTAINING PARTNER.

Contribute your expert industry knowledge for the benefit of FMs worldwide through a sustainable partnership with IFMA. As a CSP, you'll gain the trust of potential customers by providing impactful opportunities to make their jobs easier. Along with gaining direct access to FMs who rely on us to help shape their strategies and operations, our CSPs can:

- Visibly partner with the most trusted association of FMs in the world to shape industry standards
- Build trust with and strengthen the global FM community by sharing expertise
- Leverage branding and promotional opportunities customized to their needs by a dedicated CSP concierge

Contact our CSP concierge today to discover the value of connection.

1.281.974.5681 | KIM.COFFEY@IFMA.ORG

IFMA™ CORPORATE SUSTAINING PARTNER

IFMA.ORG

COMPANY NAME Republic Services
EXPERTISE Waste Management/Recycling
CSP LEVEL Silver
CSP SINCE 2020
WEBSITE info.republicservices.com/IFMA

REPUBLIC SERVICES
We'll handle it from here.

FMJ What does Republic Services do?

REPUBLIC SERVICES Republic Services is an industry leader in U.S. recycling and non-hazardous solid waste disposal, serving commercial and residential customers in 41 states. We average 5 million pickups per day. We're committed to keeping communities clean in a safe and environmentally responsible way, with a focus on preserving precious natural resources and extracting as much value as we can from the materials we collect.

We're passionate about being responsible stewards of our nation's waste and have a robust sustainability platform. We work to increase recycling, generate renewable energy and help our customers and communities be more resourceful. As an industry leader, we must also lead by example, continuously improving our own footprint through decreased vehicle emissions, innovative landfill technologies, community engagement, and employee growth and development.

FMJ Sustainability is a hot topic right now. How does Republic Services address sustainability?

RS We have been steadily building on our sustainability performance for several years and in 2019 unveiled a set of ambitious, long-term goals we refer to as Our Blue Planet: 2030 Goals. These goals build on the success of past goals and are designed to significantly benefit the environment and society,

To achieve these goals, we work to increase recycling, generate renewable energy and help our customers and communities be more resourceful. As an industry leader, we must also lead by example, continuously improving our own footprint through decreased vehicle emissions, innovative landfill technologies, community engagement and employee growth and development.

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

RS With a fleet of 16,000 vehicles — we operate one of the largest vocational fleets in the U.S. We're continuously evaluating innovative approaches and technologies to improve the performance, economics and environmental impact of our fleet. We're proud to be leading our industry in building a sustainable, zero-emissions fleet powered by electricity. Our customers are asking for electric vehicles. They want cleaner and quieter trucks in their neighborhoods. We recently introduced our first fully electric truck into residential service and plan to incorporate 2,500 more electric trucks starting in 2023.

COMPANY NAME IAdea
EXPERTISE Space Planning Management
CSP LEVEL Silver
CSP SINCE 2020
WEBSITE www.IAdea.com

IAdea

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

IADEA The COVID-19 pandemic is permanently changing the workplace. FMs are facing the challenge of bringing back workforce safely in a smart and sustainable way.

"Smart" technologies are tasked to ensure the safety of employees and visitors, while raising productivity during the limited hours employees are in the office. Workplace display technology plays a central role between humans and backend intelligence. As a leading display solution provider in workplace management, IAdea sees the following ways in which value is being added to each workplace technology as a solution to address needs in the post-pandemic workplace.

IAdea Enterprise Room management solutions ensure collaboration spaces operate with safety policies such as door access control, ID authentication, access privileges, and reservation timeframe and occupancy restrictions. Touchless and mobile-based ID authentication methods for door access control protects workers against surface-to-surface transferrable diseases. In addition to regulating who has access to specific meeting spaces and at what time with ID authentication, door lock access control fortifies workplace safety policies by limiting entry to only approved meeting attendees and prevent unauthorized access during turnaround times between reservations.

IAdea Desk Booking System leverages mobile-based booking and touchless ID authentication to reinforce social distancing seating in open workspaces where users make future bookings via third-party desk booking software, manually at the reception or directly before the desk. FMs can block out surrounding spaces of reserved seats to prevent overcrowding and collect data to assess and enhance workplace design and flow by analyzing hot and cold desk booking patterns.

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

I As the workplace becomes smarter, organizations need high-level security to protect the company and personnel data with the latest security certificates, patches, and updates and remote device management to track and complete predictive maintenance on all in-field devices.

For protection against unauthorized breaches and access to company data, IAdea features the N-2 operating system, which includes the latest security updates from Google to meet strict corporate IT requirements. Also, IAdea is certified with the ISO 27001 Information Security Management Standard, ensuring every product and service IAdea delivers meets the highest security requirements.

CSP IFMA CORPORATE SUSTAINING PARTNER

IFMA's **Corporate Sustaining Partners (CSPs)** are dedicated facility management industry supporters. These best-in-class organizations make a substantial investment in the facility management community as trusted advisers, topic experts and change leaders. They are committed to the success of the professionals they support.

CSP IFMA CORPORATE SUSTAINING PARTNER PLATINUM | CSP IFMA CORPORATE SUSTAINING PARTNER GOLD | CSP IFMA CORPORATE SUSTAINING PARTNER SILVER

With the generous support of CSPs, IFMA has the means to deliver the quality, cutting-edge information.

PLATINUM

OTIS
Schneider Electric
SoftBank Robotics
C&W SERVICES
Kimberly-Clark PROFESSIONAL

GOLD

ABM Building Value
AL-HAJRY OVERSEAS
amentum Experience | Passion | Purpose
aramark
ARC
Armstrong CEILINGS
biamp.
CORT
DAVIES OFFICE
EDF renewables
EMCOR Facilities Services
EXCEL
FM:Systems
FreeAxez
IBM
Iadea
iffice
KASTLE SYSTEMS
milliCare FLOOR & TEXTILE CARE
Mohawk Group
New Pig
REPUBLIC SERVICES We'll handle it from here.
rzero
SCLogic
sodexo
SpaceIQ
SPACEWELL
Tarkett
UFM
vari.
Wisp by Gensler

Interested in becoming an IFMA partner? Contact us to learn more: **+1-281-974-5681** |

ACOUSTICAL/SOUND MASKING
Biamp Systems | www.biamp.com
Lencore Sound Masking & Acoustics | www. lencore.com
LogiSon Acoustic Network | www.logison.com

BUILDING MAINTENANCE/REPAIR/RESTORATION
Otis Elevator | www.otis.com

CARPET/FLOORING/TEXTILES
MasterCorp | www.mastercorp.com
milliCare Floor & Textile Care | www.millicare.com

CEILINGS/CEILING CARE
Armstrong World Industries | www.armstrong.com

DISASTER RECOVERY/EMERGENCY RESPONSE
BELFOR USA Group Inc. | www.belforusa.com

ELECTRICAL/WIRE MANAGEMENT
FreeAxez LLC | www.freeaxez.com
Schneider Electric | www.schneider-electric.com

ENERGY SOLUTIONS/MANAGEMENT
EDF Renewables NA | www.edf-re.com

FLOORING INSTALLATION/MAINTENANCE
Corporate Care | www.corporatecare.com
Forbo Flooring | www.forbo.com
milliCare Floor & Textile Care | www.millicare.com
Mohawk Group | www.mohawkgroup.com
Tarkett | www.tarkettna.com

FM CONSULTANTS/SERVICES/PROVIDERS
ABM | www.abm.com
Al-Hajry Overseas Co. LTD. | www.alhajry-overseas.com.sa
Al Shirawi Facilities Management | www.alshirawifm.com
Amentum | www.amentum.com
ARAMARK | www.aramarkfacilities.com
Canadian Base Operators | www.canadianbaseoperators.com
C&W Services | www.cwservices.com
EMCO Qatar | www.emcoqatar.com
EMCOR Facilities Services | www.emcorfacilities.com
FEA | FEApc.com
New PIG Corporation | www.newpig.com
Qillaq Innovations | www.qillaq.ca
QNBM | www.qnbm.qa
Renaissance Services SAOG | www.renaissanceservices.com
SRACO Company | www.sraco.com.sa
Sodexo | www.sodexousa.com

FM HARDWARE
IAdea | www.iadea.com

FM SOFTWARE
FM:Systems Inc. | www.fmsystems.com
IBM | www.ibm.com/us-en/
iOFFICE | www.iofficecorp.com
Planon | www.planonsoftware.com
SpaceIQ | www.spaceiq.com
Spacewell | www.spacewell.com
Trimble | www.trimble.com

FURNITURE
CORT | www.cort.com
Davies Office Inc. | www.daviesoffice.com
Kimball Office | www.kimballoffice.com
Sunline Office, LLC | www.arnoldsofficefurniture.com
Vari | www.varidesk.com
Versteel | www.versteel.com

HVAC
Shaqurri International Private Limited | www.shaqurri.com.pk

INTEGRATED FACILITIES MANAGEMENT
Amentum | www.amentum.com
United Facilities Management | www.ufm.com.kw

JANITORIAL SERVICES/CLEANING PRODUCTS
Excel Dryer | www.exceldryer.com
rzero | www.rzero.com

LANDSCAPE/MAINTENANCE/PLANTS/ SERVICES/SUPPLIES
Ambius | www.ifma.ambius.com

RESTROOM PRODUCTS
Kimberly-Clark Professional* | www.IFMAandChess.com

SECURITY
Kastle Systems | www.security.kastle.com
Securitas Security Services USA | www.securitasinc.com

TECHNOLOGY SOFTWARE TOOLS
ARC Technology Solutions | www.e-arc.com
SCLogic | www.SCLogic.com
Spacewell | www.spacewell.com

WATER & FIRE RESTORATION
COIT Cleaning & Restoration Services | www.coit.com

WASTE MANAGEMENT
Republic Services | www.republicservices.com

ACCREDITED DEGREE PROGRAMS

SCHOOL NAME: Georgia Institute of Technology, Atlanta, Georgia, USA

FM-RELATED DEGREES OFFERED:
Master of Science in Building Construction and Facility Management (MSBCFM)

IFMA AFFILIATION: Since 2004

WHY AND WHEN WAS THE PROGRAM INSTITUTED?

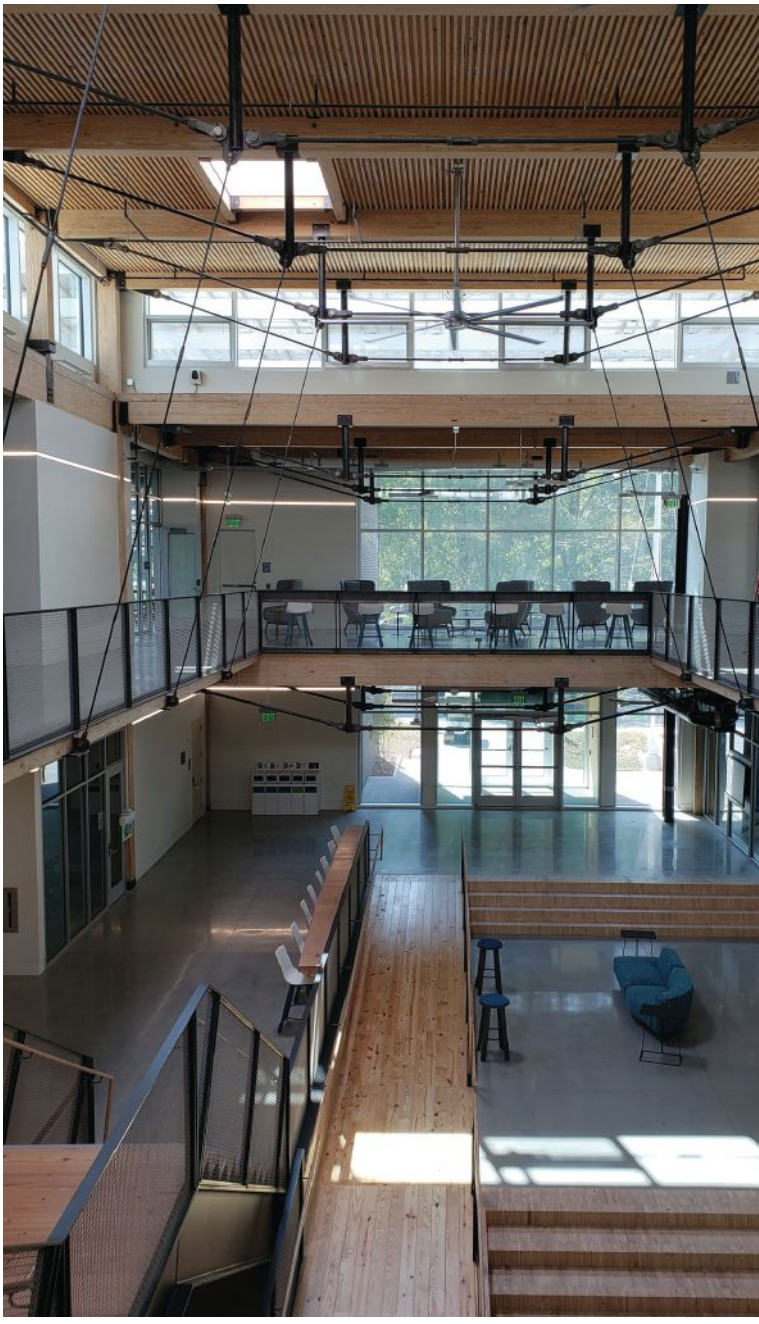
Construction and facility management programs at Georgia Tech have answered the call to the booming industrial rise in Atlanta and the development of sophisticated technology in building systems and materials. The College of Architecture first offered a Bachelor of Science in Building Construction in 1958 and established the Construction Research Center, the first of its kind in the United States, in 1986. The Building Construction program received its Accreditation for Construction Education (ACCE) in 1999, and the University System of Georgia Board of Regents approved the Master of Science degree in Building Construction and Facility Management in 2000.

DOES YOUR DEPARTMENT TEACH ANY OF THE IFMA CREDENTIALS?

The program teaches students to integrate and apply the FM core competencies of the IFMA credentials and develop critical thinking and identify, analyze and solve complex issues throughout a building's lifecycle.

WHAT TYPES OF PRACTICAL APPLICATIONS DO YOUR STUDENTS LEARN?

- Strategic facility planning and overall O&M plan
- Space planning and analysis
- FM-related software tools
- Building Information Modeling
- Facility condition assessment
- Post occupancy evaluation
- Evaluation of O&M procedures
- Facility tours and site visits



Georgia Tech School of Building Construction
COLLEGE OF DESIGN

WHAT COURSES ARE OFFERED?

Students can complete the FM program in as little as one year or at their own pace. The program requires 30 semester credit hours and offers two options: a Thesis Option or Non-Thesis Option. Georgia Tech also offers a Ph.D. program in FM, full- or part-time.

THESIS OPTION

Core Courses (12 Credit Hours)

- Professional Trends in Facility Management
- Maintenance Management-Built Assets
- Safety & Environmental Issues
- Real Estate Assets & Property Management

Approved Electives
(6 Credit Hours): Any course from the College of Design (Architecture, Building Construction, City and Regional Planning, Industrial Design, Music Technology), Civil & Environmental Engineering, or Management at the 6000+ level

Research Methods Course
(3 Credit Hours):

- Quantitative Methods in Construction Research
- Research Methodology

Common Core Electives
(3 Credit Hours):

- Technology Applications in the Construction Industry
- Advanced Cost Management
- Leadership in Design & Construction

Thesis Credit Hours (6 Credit Hours):

- Master's Thesis

NON-THESIS OPTION

Core Courses (12 Credit Hours)

- Professional Trends-Facility Management
- Maintenance Management-Built Assets
- Safety & Environmental Issues
- Real Estate Assets & Property Management

Complementary Concentration Elective
(3 Credit Hours):

- Construction Management
- Value Management-Integrated Design
- Design & Construction Processes
- Advanced Project Management
- Intro to Construction Program Management
- Management of Predesign Phase
- Management of Design Phase

Common Core Electives
(6 Credit Hours):

- Advanced Cost Management
- Leadership in Design & Construction
- Technology Applications in the Construction Industry

Approved Elective (6 Credit Hours):

Any course from the College of Design (Architecture, Building Construction, City and Regional Planning, Industrial Design, Music Technology), Civil & Environmental Engineering, or Management

Capstone Project (3 Credit Hours):

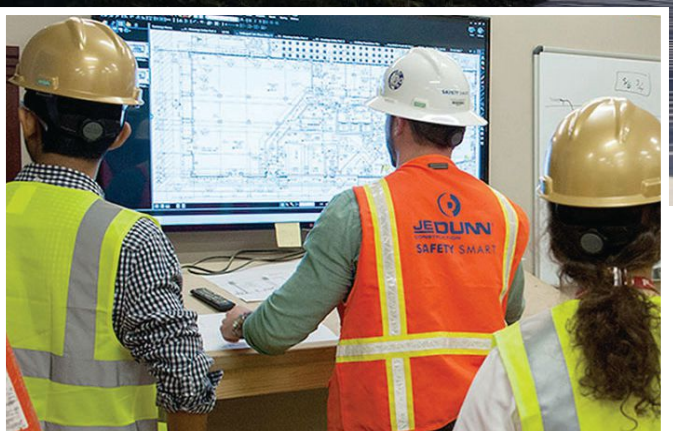
- Building Construction and Facility Management Capstone

TELL US ABOUT YOUR FORMER STUDENTS AND WHAT THEY HAVE GONE ON TO ACCOMPLISH.

Graduates of the MSBCFM program work in diverse environments both in private and public entities worldwide to enhance the quality of built environments and human life. Our students have earned many prestigious scholarships provided by the IFMA Foundation and other major FM service providers. Two students won the Ignite FM Student Challenge at IFMA's World Workplace in 2018 and 2019. Also, students advised by Dr. Eunhwa Yang won the CoreNet Global Academic Challenge in 2018. Graduates of the Ph.D. program are now leaders, scholars, research scientists and engineers in FM programs at other universities.

WHAT KINDS OF RESEARCH IS YOUR DEPARTMENT CONDUCTING AND WHAT ARE YOU MOST EXCITED ABOUT?

- Future of workplace: post-COVID-19
- Workplace ecology influenced by the shifts in work and workers
- Adaptive reuse of facilities (i.e., shopping malls)
- Human-centered space planning and management
- Post occupancy evaluation
- Building Information Modeling for FM
- Internet of Things and smart built environment
- Data analytics and optimization in FM
- Utilization of unmanned aerial vehicles (UAVs) or aerial drones in FM



WHAT ARE THE ISSUES FACING THE NEXT GENERATION OF FMS AND HOW WILL THEY BE ADDRESSED?

The next generation of FMs will face issues of safety and health, security, and sustainability. Potential biological threats, including the current COVID-19 pandemic, the introduction of AI, and robotics, will shift the way we work and the future of the workplace.

WHAT ARE THE ACCOLADES OF YOUR ACADEMIC STAFF?

Faculty members at the Georgia Tech School of Building Construction present a great mix of robust scientific research and professional experience. Tenured and tenure-track faculty bring novel research ideas and methodologies around the topics of a building's lifecycle. Simultaneously, professors of practice offer practical knowledge, industry insight and strong networks in the field.

WHY SHOULD STUDENTS CHOOSE THE MSBCFM AT GEORGIA TECH?

The FM program at the School of Building Construction is uniquely positioned. It not only provides rigorous academic training but also showcases a quality curriculum and resources to the industry. The MSBCFM is ABET-accredited and an approved Science, Technology, Engineering and Math (STEM) degree. It allows international students to extend their Optional Practical Training (OPT) experience for three years. Students point to the degree's integrated approach to program, construction and facility management as the reason they chose the School of Building Construction. Hands-on technology application courses, leadership, communications and capstone classes are signature parts of the curriculum, which enable students to prepare for their next career. We commit to provide interdisciplinary education and create a community built on diversity, collaboration and sustainability. FMJ

IFMA FOUNDATION

MAKING FM A CAREER OF CHOICE

Brings to you...

Meet the 2020 Student Scholarship Recipients

Ignite the way for the future of FM!

Ola Adam
Conestoga College

Matheus Cruz De Oliveira
Temple University

Jeffrey Feghaly
Arizona State University

Gabriel Gamez
Chaffey College

Sungil Hong
Georgia Tech

Dipin Kasana
Univ North Carolina

Yujin Kim
Georgia Tech

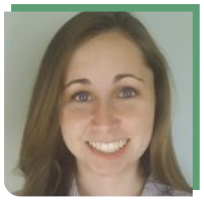
Tyler Kleinsasser
South Dakota School of Mines & Technology

David Lawson
Pratt Institute

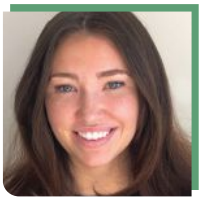
Emma Leary
Ferris State University

Ashley Leung
Hong Kong Polytechnic

DeMarcus Means
Florida A&M University



Kathryn Moore
Texas A&M University



Ana Morris
Princeton University

Xiu Hong Ng
Temple University

Cailyn Poschner
Conestoga College

George Poulos
Univ North Carolina

Doug Postema
Ferris State Univ

Paul Schmitter
Liverpool John Moores Univ

Erika Schroeder
Kirkwood Community College

Andrew Steele
Univ of Washington

Trent Warren
California State Univ- East Bay

IFMA Foundation scholarship sponsors

THANK YOU for igniting the future of FM!

Atlanta Chapter of IFMA
Chesapeake Chapter of IFMA
Dallas/Forth Worth Chapter of IFMA
Delaware Chapter of IFMA
Denver Chapter of IFMA
Eastern Iowa Chapter of IFMA
Greater Philadelphia Chapter of IFMA
Greater Triangle Chapter of IFMA
Hong Kong Chapter of IFMA
Houston Chapter of IFMA
IFMA Airport Facilities Council
IFMA City & Country Clubs Council
IFMA Fellows
Kansas City Chapter of IFMA
New York City Chapter of IFMA
San Diego Chapter of IFMA
Seattle Chapter of IFMA
Southeast Wisconsin Chapter of IFMA
West Michigan Chapter of IFMA

BUILDING FM CAREERS

Help the World Talk FM

Introducing the FM Ambassador Kit and Speaker's Program

The FM Career Ambassador Speaker's Kit makes it easy for facility management professionals to present the value of an FM career to different groups–grade school students, college students, community organizations and the general public. **Visit bit.ly/313FmVX** to learn more.

IFMA'S SUSTAINABILITY AWARDS

IFMA recognizes achievement and rising stars in FM sustainability through two prestigious awards — the **Sheila Sheridan Award for Sustainable Facility Operations and Management** and the **Eric Teicholz Sustainability Facility Professional® (SFP®) Scholarship Program.**

IFMA™ International Facility Management Association AWARDS of Excellence

The **SHEILA SHERIDAN AWARD FOR SUSTAINABLE FACILITY OPERATIONS AND MANAGEMENT** honors the outstanding achievements of individual members, chapters, councils, communities and partners who have made exceptional contributions to the advancement of the FM profession and the association.

This award recognizes an individual or team that demonstrates an outstanding example of strategic sustainable operations and management initiatives that have led to successful tactical and operational adjustments in the management of a facility, including stakeholder engagement, overall performance, energy efficiency, innovation, audits and reporting and long-term solutions for facility management success. This category encourages, rewards and recognizes excellence, leadership and innovation for the operation of environmentally responsible and sustainably managed buildings. The recipients demonstrate how their sustainable FM program or idea has had a substantial positive effect on contributing to the success of their organization.

The award was established in 2006 as a testament to Sheridan's passion for sustainability.

"Sheila was very passionate about facility sustainability issues, long before other FMs were even talking about sustainable facilities," said Rich Famelli, AIA, CFM, FMP, FMP and IFMA Fellow.

"Being a former college graduate with a BS in Environmental Design, I felt that IFMA needed to create a portfolio of case studies devoted to FMs that helped create energy-efficient, sustainable environments for their organizations. I asked Alana Dunoff to team with me to create the Sheila Sheridan Award for Sustainable Facilities as a way of both honoring Sheila's commitment and passion for sustainable facilities as well as a way to help IFMA gather case studies, examples and metrics that other FMs could use as they consider new construction and retrofit projects."

Formerly the Sheila Sheridan Award for Sustainable Design, the award was renamed in 2013.

"The title of the award was changed to the Sheila Sheridan Award for Sustainable Facility Operations and Management and the questions posed in the application were amended to concentrate on how FMs were improving their approaches to benefit the Triple Bottom Line," said Bill Conley CFM, SFP, ProFM, LEED AP and IFMA Fellow

Typical of her generation, IFMA Fellow, RCFM Sheila Sheridan became a teacher with a M.Ed. and left the profession to raise her family. She returned to work in an administrative position. Within a year, she found herself in the facilities field. Sheridan retired as director of facilities and services at the Kennedy School at Harvard University.

She has more than 35 years of experience in the facilities profession. She is past faculty for IFMA and USGBC and been a guest lecturer and visiting faculty at international universities. As IFMA chair, she advocated an awareness of sustainability.

"Sheila is a pioneer in FM. When she became chair of IFMA one of her key platforms was sustainability," said Alana F. Dunoff, ProFM, FMP and IFMA Fellow. "She guided the association and the profession to embrace and become leaders of environmental stewardship. It was only fitting that we acknowledge her vision and leadership with the AOE in sustainability achievement in her honor."

AWARD HISTORY

2006 | Tie
The GSA, Public Buildings Service, Northwest Artice Region and Interface Atlanta Showroom

2007
Franics X. Smith, Century Engineering

2008
Systems Incorporated and Cushman & Wakefield

2009
ProjectsCurtis Slife, CFM, AIA, CARB

2010
Motor Sales USA, Corporate Real Estate and Facilities

2012
Lawrence Berkeley National Lab

2013
Washington County Building Services Division

2014
William D. Broome, SFP, CFM, LEED

2015
Debbie Jaslow Shatz, CFM, LEED AP

2016
Compass Properties Green Team

2017
Global Property Team, ARM

2018
YMUS Cypress Facility Team

2019
Emaar Facilities Management

IFMA FOUNDATION
MAKING FM A CAREER OF CHOICE

The **ERIC TEICHOLZ SFP SCHOLARSHIP PROGRAM** is housed within the IFMA Foundation and was launched in May of 2020. The program provides funds for a number of Sustainable Facility Professional® scholarships over a five-year period.

Teicholz, an IFMA Fellow, established the program with the IFMA Foundation to assist young professionals with a demonstrated financial need who are currently practicing FM or a related field and are interested in earning a specialty credential in sustainability.

"There is a growing sense of urgency about climate change and its impact on all aspects of our lives and the environment," said Teicholz. "Unlike the COVID-19 pandemic, there will be no vaccine to mitigate its impact. With this in mind, the Eric Teicholz Sustainability Scholarship program has been established to provide financial support for a future generation of facility managers in their study of climate science as it relates to the built environment.

"I hope to provide support for facility managers in need of financial assistance so that they can attain the SFP® certification. It is anticipated that scholarship recipients will become more environmentally responsible facility managers and will overall demonstrate enhanced leadership in the field," he said.

IFMA's SFP is an assessment-based certificate program that teaches FMs to take a comprehensive approach to sustainability, focusing on data-driven analytics in managing the built environment. Skill sets taught in the SFP program lead to a better understanding of climate change and how buildings can be managed to reduce negative environmental impact.

"The sustainability skills that the scholarship awardees will learn will remain essential for their careers now and in the foreseeable future," said Joe Archie, IFMA Foundation Chair. "The SFP will increase their knowledge and allow them to demonstrate and apply their expertise in sustainable facility management practices to ultimately impact their organization's economic, environmental and social bottom lines."

MICHAEL MAFA

Facilities Consultant
Dikago Facilities Solutions
Botswana

"Global warming is a huge threat. It is important for FMs to see that they are a great part of the solution not scientists. FMs cover a great spectrum of our lives and to me making a difference means exerting equal pressure to sustainable sources of energy, energy conservation, recycling and sustainable ways of doing things like in landscaping and cleaning amongst other things. FMs have to act and spread the message.

**** Inaugural recipient***

DEMARCUS MEANS, SR.

Facilities Intern
Florida A&M University
USA

"I plan to offer sustainable consulting to construction sites and renovation projects seeking green certifications. These experiences will enable me to achieve my long-term goal of becoming a corporate sustainability officer, making a difference at the C-suite level when it comes to sustainable facilities and corporate social responsibility as a whole."

**** Inaugural recipient***

ISHAH AHUMADA

Senior Facilities Coordinator
KIPP So Cal Public Schools
USA

*"I plan to use my skills to implement a sustainable recycling program, utilize the energy benchmarking to measure our usage, learn innovative solutions for waste reduction and water efficiency to use in our school buildings. I want to learn to report and measure our energy, water and waste management systems to make them as sustainable and efficient as possible. I want to ensure that the practices we're currently implementing and testing will best support student re-entry on school campuses*d.

**** Inaugural recipient***

A Comprehensive Guide to Safe and Responsible Disinfecting

BY DOUG GATLIN AND NINA HWANG

As facilities reopen across the country, people are returning to spaces transformed by COVID-19. To reassure people about the safety of indoor environments during the pandemic, some buildings are turning to excessive disinfection methods that increase exposure to hazardous chemicals without providing added protection from the airborne virus – a practice refer red to as "hygiene theater."

Established preventive behaviors such as wearing face masks, physical distancing and washing hands should not be relaxed because of a false sense of security encouraged by hygiene theater. However, cleaning and disinfecting can still play important roles in keeping building occupants healthy. Building on guidance from United States and international public health agencies, Green Seal developed five best practices to help FM leaders create a responsible and effective disinfecting plan that protects the health of cleaning personnel and building occupants.

These guidelines address gaps in the guidance from U.S. Environmental Protection Agency (EPA) and the Centers for Disease Control (CDC), which does not put enough focus on the health and safety of custodial workers and FM teams who already have a higher risk of exposure to hazardous chemicals. They provide clear direction on the use of new technologies like foggers and electrostatic sprayers and highlight ways that building managers can and should continue to focus on sustainability, so that FMs do not discard decades of green building progress overnight. Following these guidelines also can help buildings meet the requirements for the LEED® Safety First pilot credit and the WELL Health Safety Rating.

CREATE A CLEANING AND DISINFECTING PLAN

Assemble a team with appropriate technical expertise to create a written reentry plan. Cleaning services providers are essential to the planning team because they will be responsible for implementing many of the measures. Prepare for three cleaning and disinfecting scenarios:

A. Workplace/school reopening:
If a building had reduced operations or was temporarily shut down, assess the building for potential hazards beyond the COVID-19 virus.

- Follow recommendations from the CDC for flushing the water system and water fixtures to remove potential pathogens and pollutants that may have built up during the shutdown. Reductions in normal water use can lead to mold and Legionella — which officials have found in the water of several schools in Ohio and Pennsylvania.
- Run any inactive HVAC systems for 48 to 72 hours and determine whether any filters need to be cleaned or replaced.

B. Routine cleaning and disinfecting:
As more people return to the workplace or school, pair routine cleaning with regular disinfection of high touch areas.

- Refer to the CDC's decision tool to create a detailed list of high-touch areas to be disinfected. For example, the building's entry door will be handled more than an office door propped open all day. Consider temporarily removing shared items like remote controls and difficult-to-disinfect items like reception area chairs.
- Determine the frequency of cleaning and disinfection. Schedule around an average number of unique touches rather than time alone. For example, an office entrance and lobby should be cleaned and disinfected more frequently during busy times, such as when occupants enter or exit during the morning, lunchtime and close of business.
- Implement a policy for continuous improvement in cleaning and disinfecting practices, including use of methods to verify efficacy beyond visual inspection. One method to quantify cleanliness is adenosine triphosphate (ATP) monitoring. While ATP monitoring cannot detect viruses, it can detect respiratory droplets that may be infected and in general indicate spots with residual organic material that were missed during cleaning. Another option that uses cleanliness as a proxy for disinfection is the use of fluorescent markers prior to cleaning to identify missed spots.
- Consider how cleaning schedules may be affected by COVID-19 policies. Nighttime cleaning services alone may no longer be enough, given the need for targeted cleaning and disinfecting during business hours.

C. Following a suspected or confirmed COVID-19 case:
Increase cleaning and disinfecting when someone with COVID-19 was in the building. Even if the case is only suspected, do not wait for the infection to be confirmed. Immediately close off areas visited by the suspected case, including offices, restrooms, common areas and shared electronic equipment.

- Open windows and doors where possible and safe, and operate fans (including heating, ventilating and air-conditioning fan systems) to increase the ventilation rate in affected areas.
- Leave the spaces where the suspected case occupied vacant for 24 hours, or as long as feasible, to reduce the viral load before allowing cleaning personnel to enter.
- Clean and disinfect all affected areas. Vacuum the space if needed, using a high-efficiency particulate air (HEPA) filter.

ENSURE THAT CLEANING PERSONNEL ARE PROPERLY TRAINED

Proper training is essential for safe and effective cleaning and disinfecting. Cleaning personnel who know how to correctly use products and equipment are more efficient and effective at cleaning and disinfecting, which reduces product waste and chemical exposure. Confirm that the service provider is implementing in-person training and providing materials in appropriate languages for personnel prior to workplace or school reopening. At minimum, train for:

- Safe handling of all cleaning and disinfecting products, effective cleaning procedures and the use and maintenance of cleaning equipment.
- Standard safety precautions, such as reducing and preventing ergonomic injuries.
- Proper use of personal protective equipment (PPE), including when to wear it, which kind to wear, how to put it on and take it off without cross contamination and how to dispose of it.

MAINTAIN SUSTAINABILITY AND HEALTHY INDOOR AIR

Enhanced disinfection does not have to involve increased exposure to hazardous chemicals for cleaning personnel or building occupants. Custodians already experience twice the rate of occupational asthma as other workers, and the CDC has identified asthmatic individuals as a high-risk group for COVID-19. For the health of the occupants and workers, make it a top priority to choose products that do not contain asthmagens or respiratory irritants.

CHOOSE SAFER DISINFECTANTS

All of the disinfectant products on the EPA's List N are effective at deactivating the virus that causes COVID-19 when used correctly. However, many include active ingredients that cause asthma (such as quaternary ammonium compounds) or are linked to other serious diseases. When considering List N products, choose ones that contain only one of the following safer active ingredients:

- hydrogen peroxide*
- citric acid
- lactic acid
- ethyl alcohol (also called ethanol or just alcohol)
- isopropyl alcohol
- peroxyacetic acid*
- hypochlorous acid

It may be tempting to choose conventional chemical cleaners, but certified green cleaners are more important than ever during this time of increased cleaning frequency. Certified cleaners are proven to be safer than and just as effective as harsher, more caustic cleaning products at removing dirt and grime.

**The combination of hydrogen peroxide and peroxyacetic acid is a designated AOEC asthmagen, so avoid products containing both.*

Choose cleaning products and hand soaps bearing a nationally recognized independent ecolabel such as Green Seal or Safer Choice and promote frequent handwashing. Certified green hand soaps can be less irritating to skin and therefore allow increased handwashing frequency.

USE THE RIGHT DISINFECTION APPLICATION METHOD

Like the disinfectants themselves, some application methods are safer than others. Some technologies marketed for controlling COVID-19 unnecessarily increase hazardous exposures, while others require more proof of efficacy and safety.

A few application methods are listed below. Only use methods that are listed on the disinfectant's label, as those not included on the label have not been reviewed by the EPA for effectiveness.

- Wiping a surface with a cloth, mop or sponge soaked in disinfectant leads to the lowest inhalation exposure.
- Using a trigger sprayer to spray coarse droplets of disinfectant directly on the surface is another option but can lead to increased risk of inhalation.
- Electrostatic sprayer devices produce positively charged droplets that are attracted to surfaces and can wrap around objects, resulting in increased product coverage rates. These can be very efficient tools for applying disinfectant; however, due to the very small droplet size, take care to prevent inhalation. Always follow label instructions and ensure that proper PPE is worn. Also pay careful attention to verify that the disinfectant label specifies use with 'electrostatic sprayers' rather than just 'sprayers.' Currently, only a small subset of EPA List N products is approved for use with electrostatic sprayers. This is important, as effectiveness has only been confirmed for those listed.
- Foggers saturate the air in a room with disinfectant. These suspended droplets linger in the air until eventually settling on to exposure surfaces due. Avoid this

approach, because this method has not been proven more effective than other application methods even though it can increase the risk of exposure to dangerous concentrations of chemicals.

COMMUNICATE CLEARLY AND OFTEN

Transparency is critical for maintaining trust with building occupants. Develop and follow a communications plan to keep stakeholders apprised of the FM team's actions.

The plan should specify an emergency communications procedure if there is a suspected COVID-19 case in the building. When the pandemic began, cleaning personnel were not always advised that a space had been occupied by a suspected confirmed case — critical information that would have allowed them to protect themselves and building occupants.

Confirm when each tenant's space will be unoccupied and available for cleaning staff and have a protocol if the space is found occupied. Clear signage and emails identifying spaces closed for disinfecting and spaces safe to reenter will reduce confusion.

In addition, provide materials that cleaning personnel can share to answer occupants' questions about cleaning procedures. Include actions that occupants should take to help personnel effectively clean and disinfect, such as clearing workstations at the end of each day.

PROVIDE SAFER INDOOR CONDITIONS

Disinfection is only one piece of the puzzle when it comes to helping stop the spread of COVID-19. Building-wide policies for physical distancing and mask wearing are essential, as these are the main tools for preventing transmission of the virus. Cleaning personnel should always wear the most effective PPE items to remain protected from both the virus and chemical products. These additional precautions can contribute to a safer indoor environment:

- Provide adequate ventilation to help reduce transmission of COVID-19 as well as reduce buildup of indoor air pollutants released during cleaning and disinfecting.
- Facilitate effective hand hygiene. Where water and soap are unavailable for handwashing, provide alcohol-based hand sanitizer (containing at least 60 percent ethanol or 70 percent isopropanol).
- Discuss the importance of paid sick leave with service provider partners and building tenants. The CDC has found that paid sick leave reduces viral transmission.
- Provide space for cleaning personnel to store a change of clothes and a place to change out of uniforms at the end of their shift. Facilitating this activity can reduce the risk of spreading the virus outside of the workplace.
- Encourage cleaning service providers to use equipment and procedures to reduce ergonomic injuries during this time of increased cleaning.

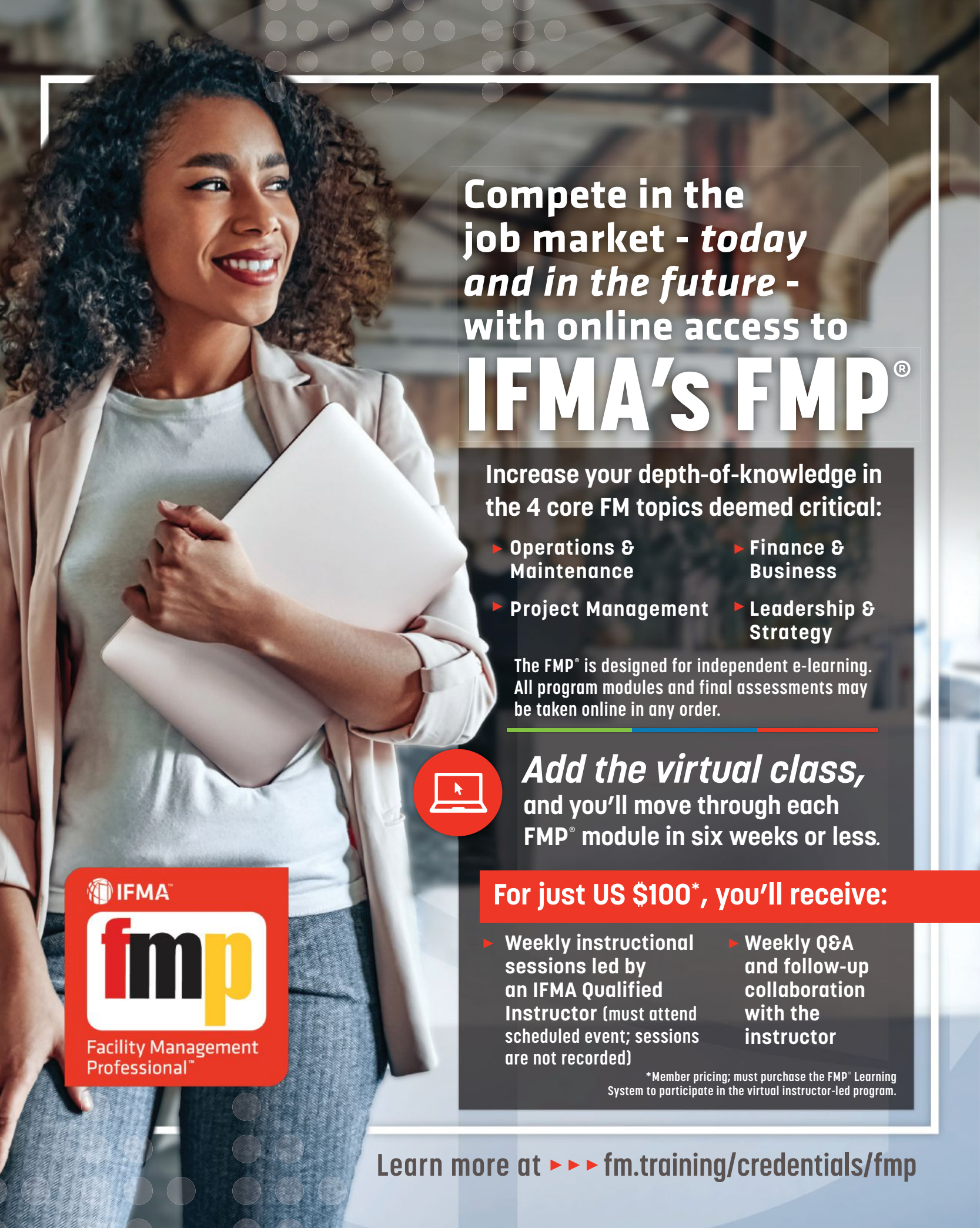
LOOK AT THE BIG PICTURE

Properly implemented, effective and responsible cleaning and disinfecting practices help protect building occupants and cleaning personnel during the COVID-19 pandemic while avoiding the use of hazardous chemicals and technologies that increase health risks yet provide no added protective benefits. Green Seal certified commercial cleaning companies servicing more than 1 billion square feet have committed to following these guidelines for clients.

However, cleaning and disinfecting is only one aspect of maintaining the health and wellness of building occupants. For example, the building environment can be modified to help limit the spread of COVID-19 through appropriate air filtration and humidity levels. Finally, physical distancing, face masks, and hand hygiene are critical and cannot be replaced by cleaning and disinfecting. FMJ

Doug Gatlin *is CEO of Green Seal, a global nonprofit organization and leading ecolabel for cleaning and facilities care products and services. Gatlin has 25 years of experience in the design, deployment and operations of voluntary market transformation programs. He has held leadership positions at the U.S. Green Building Council, where he launched LEED for Building Operations & Maintenance, and was a founding team member of US EPA's ENERGY STAR Buildings program. Gatlin holds a bachelor of science in political science from Duke University and a master of science degree in energy and environmental policy.*

Nina Hwang *is the lead Environmental Scientist at Green Seal, a global nonprofit organization and leading ecolabel for cleaning and facilities care products and services. Hwang previously worked on environmental health issues at the Natural Resources Defense Council and at the U.S. Environmental Protection Agency. She holds a bachelor of science in chemistry and environmental engineering from Rice University and a master of public health in global environmental health from the George Washington University.*



Compete in the job market - *today and in the future* - with online access to IFMA's FMP®

Increase your depth-of-knowledge in the 4 core FM topics deemed critical:

- Operations & Maintenance
- Finance & Business
- Project Management
- Leadership & Strategy

The FMP® is designed for independent e-learning. All program modules and final assessments may be taken online in any order.

Add the virtual class, and you'll move through each FMP® module in six weeks or less.

For just US $100*, you'll receive:

- Weekly instructional sessions led by an IFMA Qualified Instructor (must attend scheduled event; sessions are not recorded)
- Weekly Q&A and follow-up collaboration with the instructor

*Member pricing; must purchase the FMP® Learning System to participate in the virtual instructor-led program.

IFMA fmp Facility Management Professional™

Learn more at ▸▸▸ fm.training/credentials/fmp

Embracing the power of data:

Building a better building

BY DAN O'GORMAN

Advancements in technology make it easy to gather data and use it to improve efficiencies, service and increase revenue for businesses, allowing organizations to effectively identify problems and highlight areas for improvement. According to the University of Salford, "the value of data analytics is understood by the industry [facility management], yet the industry needs guidance and leadership." So why do building managers hesitate when it comes to data management and digitization?

Like any business change, technology can appear intimidating, but it is crucial now more than ever for the property sector to embrace it. Understanding the importance of building data is the first step towards unlocking its benefitss. By investing in new systems and processes in the short-term, the long-term benefits of digitization will provide a powerful return. Future proofing the sector to accommodate the evolving needs of tenants and occupiers, ensuring that the physical space continues to meet expectations and enhances the occupier experience, even with the impact of the current pandemic.

The introduction of technology and the analysis of building data is not intended to eliminate or replace the FM. Quite the opposite, by simplifying and automating previously manual processes it empowers them to make a greater impact. It provides valuable insight that allows for data-driven decision making and supports the transition towards more efficient ways of working.

The Importance of Building Data

The benefits of effective data management and analytics can be seen across all aspects of facility management and can be easily implemented through the introduction of integrated systems that seamlessly digitize processes. Take just one area of FM, such as bookings for example. From loading bays and meeting rooms to cycle bays and tenant events, the traditional practice of accepting bookings via email or paper-based sign-up sheets may work on a small scale, but this method admits room for error and provides limited access to valuable analytics. A digital system not only provides instant and efficient management, it provides the data needed to effectively forward plan. This opens a world of possibilities for FMs to predict busy periods and plan staffing requirements accordingly as well as tailoring services based on previous interest, thereby increasing satisfaction and retention.

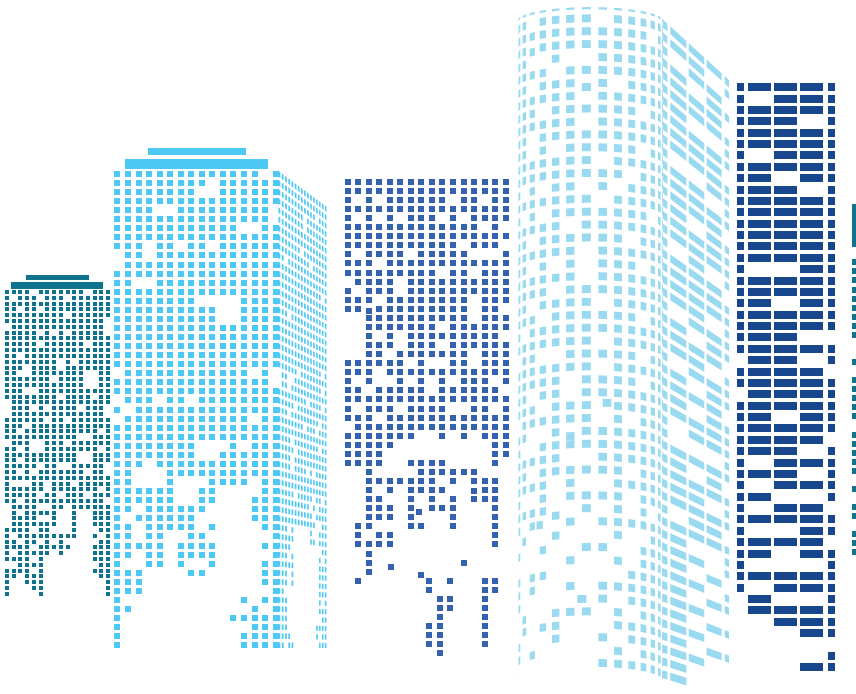
By taking such small steps towards digitizing everyday processes, the value of the asset increases intangibly. Digitization enables FMs to provide a better service and a more seamless experience for tenants. Through analyzing what facilities and amenities are being used, the space becomes more in tune with what the tenants need and want, as well as providing a seamless experience for them to access these.

The COVID-19 pandemic has had a considerable impact on working patterns, with many companies finding that they can operate without a physical office space. Attracting the workforce back into commercial property in the coming months is going to be a key priority. Through data and insight such as analyzing patterns and preferences, FMs and asset owners can create a space that is multifunctional and exceeds occupant expectations. Through taking small steps to improve the customer experience, buildings can see revenues increase as much as 10-15 percent while lowering cost to serve by 15-20 percent (KPMG) and increasing their market competitiveness. This additional revenue can be as simple as generating customer loyalty that reduces turnover or providing such an exemplary experience that word-of-mouth recommendations attract new tenants without the need for marketing expenditure.

The Impact of Building Data on Performance

The evolution of the physical office space was in discussion even prior to the pandemic, only now there are higher expectations from tenants about what a workplace should be and what services it should offer. This impacts the role of the FM, with many expected to wear two hats — one of maintenance, process and general management and another of experience, service and engagement. For many this is a daunting prospect, but there is an easy solution. By investing in the implementation of technology, traditional time-consuming tasks are eliminated — freeing up crucial time to focus on delivering a service that tenants will want to come back to.

A new generation of employees are working more flexibly, a trend accelerated thanks to COVID-19 and advances in technology. Companies are seeing the workplace transition from static office cubicles for silent work, into a place for collaboration, meetings,



and socializing — with homeworking being used for deep work and business-as-usual tasks. By harnessing the power of technology, buildings can capitalize on this trend by providing a differentiated digital experience that adds value to the physical space as well as for remote workers.

Providing a structure and tools for distanced working can be beneficial for FMs as well as tenants and their employees. Technology gives FMs the freedom to work more flexibly themselves, including remotely. Take for example, the often-constant requests for maintenance or to resolve faults within a building. Access to a digital helpdesk allows tenants to raise issues directly in real time as well as monitor progress through to completion, in turn reducing the number of status update requests and complaints. It paves the way for building managers to access helpdesk tickets on-the-go, allowing them to effectively resolve issues at the touch of a button.

The data collected from a digital helpdesk then in turn provides valuable information for asset owners, who can then analyze the results to proactively anticipate problem areas. Reports can be generated to identify bottlenecks, ensure the building is compliant with SLAs and improve performance and agility to deliver a great occupant experience.

The balance between technology and human interaction

Embracing technology and data does not mean the end of the FM. There is a gradual transition into a position that operates at maximum efficiency and can change with the demand for a building to provide a service as well as a space. This can only be achieved through the right ratio of technology and human interaction.

It is said that the younger generation of workers will have adapted to a fully digital consumer experience. Growing up with a multitude of services and communications available instantly, will they still have the same needs for a face-to-face interaction with a brand? Andrew Saul from The Future of Real Estate Initiative at the Saïd Business School cautioned against pigeon-holing people through expectations. It would be too great a risk to provide a customer experience that is either all automated or all traditional service. The age-old argument of man or machine can again be looked at with the power of data. The industry can borrow strategies from media and communications — only by identifying and understanding the target audience, refining what message they want to hear and more crucially how they want to receive it, can FMs provide the most effective method of reaching them.

An FM from Colliers explained, "it is unrealistic to expect technology to eliminate all problems. However, it does provide staff with the tools to deal with them more effectively. As a result, our customers have more confidence to alert staff of issues, allowing management to be more proactive. Thus, increasing customer satisfaction."

It is crucial to firstly understand the tenant's needs to provide a space that is fit for purpose and creates a happy environment to live or work. This also has the added benefit of longevity, by increasing tenant satisfaction and tenant turnover. This can be achieved through the analysis of the data that technology gathers.

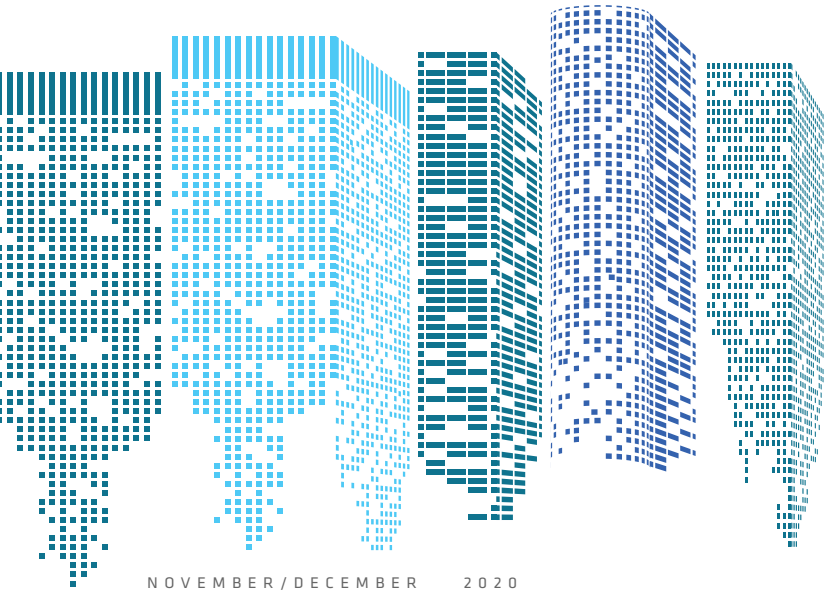
The new generation of FMs

This shift in preferences and technology provides an opportunity for FMs to adapt and evolve using the insight that technology provides to focus their energy on priority tasks that require their in-depth expertise.

Change will afford FMs more time to focus on the users of the building and constantly adapt the residential environment to where they can provide the biggest cost-savings, quality of life improvements or happier places to live. Or, in short, where a FMs can make the biggest impact to the business.

This development is an exciting one, transforming the position of the FMs to one that requires a mix of business, technical and customer experience skills. This new FM must provide elevated levels of service, and recruitment of the correct personnel is vital.

This change can only be facilitated by leaning on technology to manage areas that can be digitized, utilizing data to highlight areas of improvement, and placing the FM at the forefront of implementing this. As the demand for the physical space evolves and adapts, the advantages that technology and data bring cannot be overlooked and those who are not open to change may well soon be overtaken by organizations who are embracing this now. FMJ



Dan O'Gorman *is the chief product officer for Locale. He has been involved in Proptech for more than 10 years, leading the digital transformation of properties and portfolios. At Locale he's focused on using the latest technology to deliver exceptional service to occupiers.*

Reach Your FM Audience

Establish your brand with FMJ, the magazine written by and for FM professionals.

Stand out among industry competitors and reach FM decision makers.

FMJ is the industry resource for facility solutions with authoritative, vetted and up-to-date articles offering practical takeaways and global best practices.

Internationally recognized and industry-trusted for over **30 years**

FMJ Circulation **23,000** new issues are mailed/available online

60,000 average unique online page views per issue

Learn more at www.ifma.org/marketplace/promotional-opportunities/advertise.
IFMA's Expo and Advertising Team | expoadv@ifma.org *or* +1-713-623-4362

Advertiser Index

Companies in **bold** are IFMA Corporate Sustaining Partners

LET'S CONNECT!

MORE THAN 23,000 IFMA MEMBERS AND FACILITY MANAGEMENT PROFESSIONALS READ FMJ MAGAZINE

IFMA MEMBERS: MANAGE 78± BILLION SQUARE FEET | PURCHASE US$526 BILLION IN PRODUCTS/SERVICES

As an advertiser, you provide readers with solutions to the challenges covered by FMJ topic experts. Be a part our readers' full experience with ad placement in both the print and digital versions, plus complimentary listings and live hyperlinks, making it easy for readers to connect.

Contact IFMA Expo and Advertising Team at +1-713- 623-4362 or expoadv@ifma.org for rates and integrated advertising and exhibiting packages.

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

- Network with FM professionals worldwide
- Obtain globally-recognized credentials and continuing education at any career stage
- Gain field-tested strategies for elevating facility performance
- Keep pace with cutting-edge FM best practices

> 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

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

Learn more at

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




SafeT




SAFE-T SCREENS and BARRIERS add extra protection from contagions in workplaces and learning environments. With several materials like Clear Plexiglass, Polycarbonate, Frosted Acrylic, or PET and various mount options, it's easy and economical to retrofit safety screens in any existing furniture. All panel options are available in standard or custom sizes and are easy to disinfect and clean.

SpecialT.net

888-705-0777

THE BEST IN THE GAME SINCE 1962.

IT'S NO COMPETITION. OUR STARTING LINE UP TAKES THE GOLD IN PROVEN PERFORMANCE AND WORLDWIDE COVERAGE.

In 1962, we invented the first thermoplastic membrane, and we've been changing the industry ever since. Our signature advancements have made countless roofs stronger, more durable, and more reliable. Not surprisingly, they've also enabled us to become the global leader in thermoplastic membranes, with more than 15 billion square feet installed worldwide.

Today, Sika Sarnafil remains synonymous with resiliency, sustainability, and innovation as the global leader in PVC roofing. Learn more about building and reputation protection you can trust: **usa.sika.com/why-sika-sarnafil**

SIKA CORPORATION – ROOFING
Phone: 800-576-2358
usa.sika.com/sarnafil

Sarnafil®

BUILDING TRUST

Sika®

Extended

Exclusive online section featuring expanded FM coverage.

The new culture of work & work enablement

COVID-19 caused virtually all businesses to implement their FM and workplace business continuity plans. Most organizations realized that regardless of whether they had a specific planned response to a global pandemic, market supply and demand was impacted. The extent of the impact challenged the fundamental assumptions of access to infrastructure, logistics, telecommunications and broadband networks, mass transport, support staff, medical facilities and much more. A global shutdown ensued.

Remote work became an overnight mandate. Employers realized how adaptive their teams could be when their circumstances were a shared experience helping each other through the pandemic. Remote work has become the global norm over the ensuing months. During the pandemic and ensuing return to the office, there have been benefits realized by companies, employees, and other stakeholders that companies are working to understand. CRE professionals are working closely with business leadership, human resources and their IT departments to discuss and analyze the changes and the potential implications for their organizations.

As companies return to the office, they are taking note of the important shifts that have broadly and almost universally occurred. There is a great reset underway. Though workplace changes such as work from home, hoteling, flexible and shared space, co-working, and other approaches to workplace occupancy strategy gained traction during the 10 years following the global financial crisis (GFC), the broad implementation of workplace change by corporations and institutions was slow.

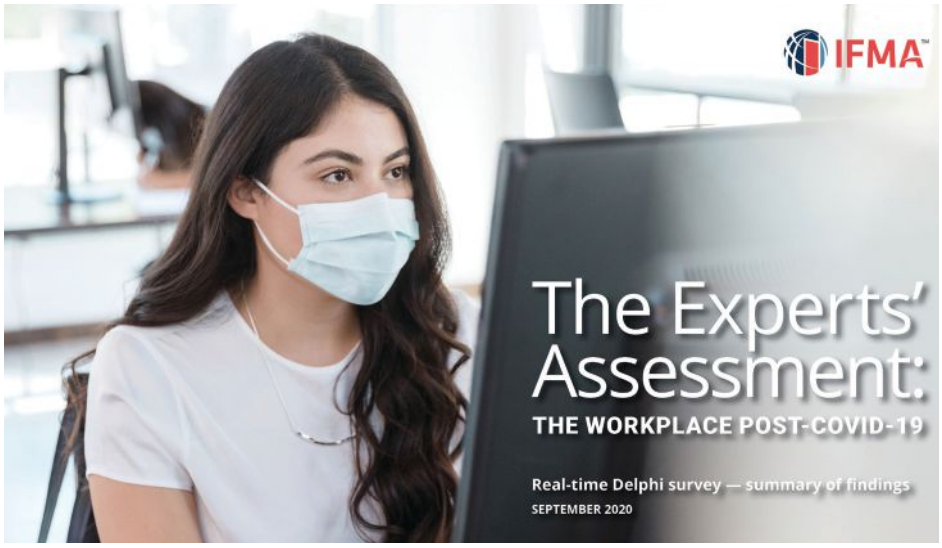
The GFC launched a decade of change and business transformation that resulted in more focus on an organization's purpose, environmental, social and governance (ESG) impact, compliance and reporting, the sustainable development goals (SDG) established by the United Nations, brand, stakeholder experience, business resiliency, digitization initiatives and transparency. As real estate, facility and workplace leaders launched new response strategies, they viewed workspaces and the built environment as an ideal area to align corporate values and reflect them through the way it consumed and curated office spaces. There is a better understanding of the potential provided for new ways of working to accelerate business transformation objectives.

The C-Suite and business leaders have become aware of the challenges and advantages that the extended large-scale shutdown forced on their people and respective businesses. However, the positive overall impact experienced from work from home resulted in a desire to establish a new way of operating and a rethinking of the culture of work. Working from the office was the dominant workplace model before COVID-19. Part of the reason for this is that major workplace change can be difficult to effectively implement without buy-in.

... the positive overall impact experienced from work from home has resulted in a desire to establish a new way of operating and a rethinking of the culture of work.

Various stakeholders struggled with embracing new workplace plans. Managers were concerned they could not effectively manage their teams and outcomes without working together in the office. Employees feared they would miss out on interactions, promotions, team events, professional growth, networking and their daily routines. Business leaders were concerned that workplace change without buy-in could disrupt the business or result in a loss of talent, or productivity or management pushback, and therefore remained with the dominant model. It was more predictable and seen as the safer path.

C-Suite leadership has received feedback from employees that overall, they have a desire for more flexibility. This desire is shared with business leadership, management and shareholders. Employees have enjoyed the savings from reduced commuting, meals and clothing expenses. They have also enjoyed more time at home with family, less time commuting (hence better productivity), more time to relax and workout and potentially, a healthier lifestyle and reduced stress. Workers with young families have endured unique challenges that some employers are helping address by provid-



ing childcare subsidies, flexible working hours, extended work deliverables deadlines and other types of assistance.

Events over the past year have driven CEOs to scrutinize their company's purpose, resiliency, brand, impact on the environment, society and community, corporate governance, compliance and transparency. Working from home and remote work has demonstrated that real estate costs, service support and travel costs can be reduced, environmental impact significantly improved, talent retention strengthened, SDG and ESG goal attainment improved and brand and reputation enhanced. Company leadership realizes that in addition to improved employee experience, there is a directly related reduction in CO_2 emissions, waste and energy consumption. A newly imagined workplace and work-from-anywhere approach can result in an improved impact on the Triple Bottom Line of people, planet and profit.

A newly imagined workplace and work-from-anywhere vision and approach can result in an improved impact on the Triple Bottom Line of people, planet and profit.

This alignment of shared goals and outcomes resulted in a desire for more permanent space, place and work solutions when companies return to the office. Improved organizational resiliency is key to this workplace transformation. This will entail digitization and an improved experience for the effectiveness, uptime, functionality and cost of online work and meetings, choice of where to do the most productive work for different activities and functions. Additionally, a renewed commitment to the environment and reducing carbon footprints creates opportunities for small and diverse suppliers and new employees who previously did not have access to certain jobs/locations and could not relocate or commute.

Companies have made digital transformation and enablement a priority for remote work. This is an important fundamental requirement now and for the future culture of work. In the recently published *The Experts' Assessment: The Workplace Post-COVID-19*, supported by all six IFMA Communities of Practice, the workspace sea-change is supported by results and feedback. Feedback from the survey indicates there are five underlying values and cultural requirements to successfully deliver upon the promise of productive, new models for space-as-a service and work from anywhere solutions for employees. Findings were that trust, talent, teams, technology and transformation are required to implement a new, effective and acceptable solution for those returning to the office.

The office for many organizations will be a place that is a destination for meetings, training, events or team activities that cannot be done effectively online or from remote locations. It will be intended to be accessible or reserved for a specific activity by a team or individual which cannot be done at home or remotely. The office will be a very different accommodation than it was before the pandemic.

FM leaders are conceptualizing remote co-working or flex work options, alternative meeting spaces, and other approaches to support work that cannot be executed effectively from home or headquarters. Hub-and-spoke models are developing which provide office space in a central business district and then other suburban office locations near where employees live. This model reduces the costs of occupancy, parking, meals and travel while improving the experience of the space for the employee.

The findings concluded that to return to the office, trust is imperative. Employees need to believe that measures are taken to access, clean and sanitize the building and space, provide clean, filtered air, and workspaces are safe, resilient and productive. Health, safety and wellbeing must be at the forefront and part of a sustained managed process visible to employees, suppliers and customers. This need for trust extends to third-party managers if the office is in a third-party managed property.

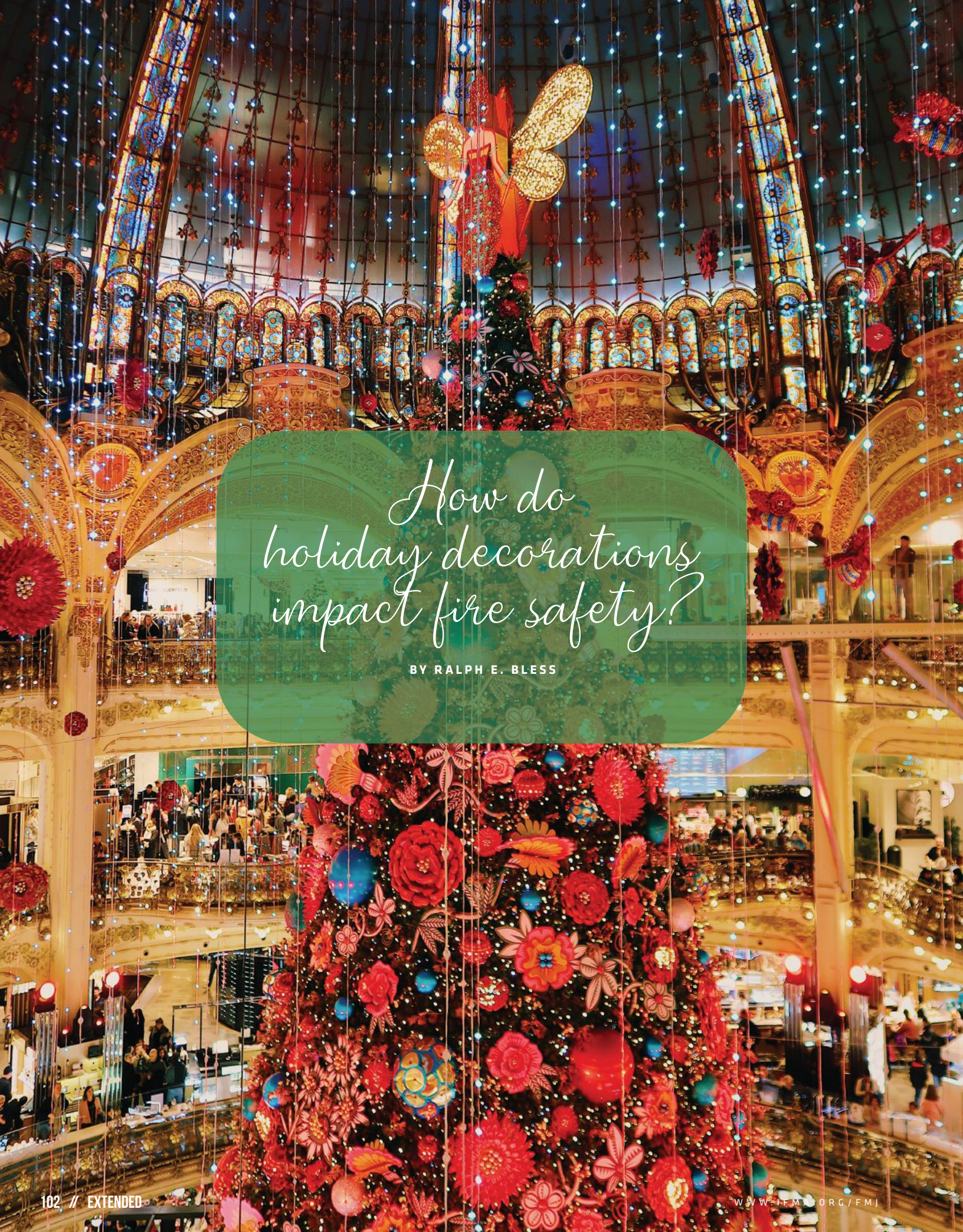
Talent is returning to offices focused on accommodating that talent for their work. Whether in-office or remote work, some extent of agility and flexibility is required. Talent attraction and retention remains integral to the sustainability of the organization and directly relates to the commitments of its SDGs and ESG goals. Also, collaborative space will be a top priority within new office environments as a destination for team members to meet up for face-to-face work and meetings. New spaces will be planned, serviced and provisioned for providing different types of collaboration space as many new offices

will be consumed by talent as "space-as-a-service" in a work-from-anywhere environment.

Effective collaboration in the new culture of work will provide spaces and work solutions for talent to team. This will only be possible and effective if technology at the office and remote locations are reliable, safe, secure and compliant. This provides an organization with important flexibility and resiliency as it has become an area of focus for company investors, shareholders, leadership and talent.

Experience and enablement are all relative. Business transformation is as unique as the companies that are changing for their customers, employees, investors and communities where they operate. Occupancy strategy has been redefined, regardless if companies had adequately prepared for the unprecedented circumstances that have arisen amidst the pandemic. The great reset is underway. It is time for FMs to rethink and leverage this point in time and create the path for their transformed workplace to enable their organization's new culture of work. FMJ

Maureen Ehrenberg, *FRICS, CRE, LAI is CEO of Blue Skyre, Innovating the Built Environment (BSI). An internationally recognized expert on real estate business transformation, strategic redesign for the future of work, and digital facility management, Ehrenberg serves as an advisor and board member to global organizations, investors, and real estate technology providers. A frequent speaker and author, she has been recognized as an industry thought leader with an Innovator of the Year Award from CoreNet Global, the Chair's Citation Award from IFMA, The Julie Devine Digital Impact, and Lifetime Achievement Awards for Vision in technology from RealComm and has received several awards and recognition for leadership and service in the real estate industry.*



How do holiday decorations impact fire safety?

BY RALPH E. BLESS

The holiday season is fast approaching for many cultures. Holidays include faith-based, secular, national and regional celebrations over the next several months and come in all shapes and sizes, from national thanksgiving and independence celebrations, Lunar New Year, summer and winter solstice, to Halloween, Ramadan, Easter, Passover, Christmas and Kwanza and many more.

Many of these celebrations occur in the last quarter of the calendar year or the very beginning of the new year, but they all tend to have some things in common, including holiday decorations. Organizations and facilities decorate during these holidays as a celebration of what the event means to the community at large. This helps community members learn about the history and meaning of the holiday and connects individuals to the overall community. Celebration of holidays enhances and strengthens the values these communities embrace and decorations have a positive impact on society.

While the holiday decorations vary significantly across regions, cultures, and holidays, many of these festive displays can create a significant safety risk. Decorations can impede exiting and egress, present fire, electrical, or trip-and-fall hazards, cause lacerations, and many other challenges. It is critical that the facility management team recognize these issues and properly mitigate them.

In commercial and residential occupancies, these holiday decorations can sometimes go "over the top." So, what are some of the common decorations that can create fire safety challenges? They can include:

- Lanterns, typically of combustible construction with electric or flame illumination
- Decorative lighting (i.e. color light strings)
- Trees, garlands and wreaths for decoration
- Malfunctioning decorations or those beyond their lifecycle
- Candles
- Fireplaces or fire pits
- Decorations that are not flame-resistant and not manufactured to meet stringent listing requirements of major testing laboratories
- Use of indoor or outdoor lighting in the incorrect environment
- Straw bales, hay, fodder or other types of natural vegetation
- Cotton batting, flock, or paper materials used to create the appearance of snow
- Decorations on stair handrails or bannisters
- Power (i.e. extension cords) for decorative lighting and displays

These are just a few of the types of decorations that can create safety issues. But what are some of the common concerns?

Fire

Many of these decorations are of combustible materials and require careful consideration, placement and maintenance to maintain a fire-safe environment. Lanterns using combustible material placed near other combustibles can provide an open flame and a source of ignition for fire to spread. These lanterns have the potential to be knocked over or dislocated, thereby igniting other materials.

Trees, wreaths, garlands and other natural vegetation can dry out due to lack of water or age, resulting in highly combustible fuel loads, just waiting for an ignition source. When located near open flames or heat sources such as heating vents, portable heaters, lighting or other heat-producing equipment, natural vegetation can dry out even more quickly exacerbating the challenges and risks. Providing enough water (at a minimum daily) and regular inspection of these components can reduce the risks.

Electrical power provides a potential source of ignition, typically through frayed wiring, overloaded circuits or wiring and unattended displays. It is important to provide constant supervision of these displays.

Heat sources must be monitored, including open flame (fireplaces, fire pits, etc.), space heaters, heat vents and other sources, which provide ignition sources that can lead to catastrophic outcomes. Space heaters, as an example, have been associated with a significant number of Christmas tree fires. Placement of the decorations and their proximity to heat sources must be considered. Candles, both inside of lanterns and other decorations, as well as use individually, provide an ignition source. These are susceptible to being knocked over and catching adjacent material on fire.

Paper is a common material used for decorations in many countries. Placement on walls or other surfaces can negatively impact the fire resistive nature of the building, as it was originally constructed. Many building and fire codes limit the amount of paper, or other combustible materials that can applied to these surfaces. Lack of familiarity with these restrictions can lead to enforcement

actions from local authorities, and real risks to the occupants. They provide a ready fuel load and are placed in a manner that allow rapid growth of a fire that may otherwise have been limited in size, or controlled, using fire extinguishers or other fire suppression equipment and systems.

Paper is not the only concern. Other common products used to decorate, which provide a significant source of fuel for a potential fire, can come from any lightweight combustible material. Products such as straw bales, hay, fodder or other types of natural vegetation are sometimes placed in the area, or even spread on floors and other surfaces. Straw bales are sometimes stacked near egress points, including creating archways or other features. In this arrangement they provide not only a significant fuel load for the fire, but also an impediment to occupants exiting the building or area. Other products that can add to the potential risk include cotton batting and flock.

Exiting and Egress

Another common area of risk and opportunity includes providing and maintaining adequate exiting and egress from a building or area. When buildings are constructed, they are provided with means of egress, including not only the doors out of the building, but also the path to those doors, adequate lighting and direction (signage), and the ability to discharge or escape from the building in the event of an incident. Occupant notification through alarm or mass notification may also be part of the built-in fire safety systems. In many cases buildings are not constructed specifically with holiday decorations in mind. While there may be provisions to provide power through electrical outlets, and there may be a general knowledge that holiday decorations could be incorporated into the décor of a building, most times the specifics of the decorations are unknown to the architects, engineers and contractors that partner to construct these facilities. Occupants and FM teams commonly decide on what decorations will be used and where they will be displayed. It is crucial that consideration be given on how the decorations will impact the exiting and egress of a facility. Placement should ensure:

- Fire protection equipment is not blocked. This includes fire extinguishers, fire sprinklers and smoke/heat detectors.
- Decorations are not hanging or supported by fire sprinklers and fire alarm devices.
- Doors are not hidden, view obstructed or blocked from use.
- Exit lighting and signage not damaged or visibility impacted by decorations. Do not hang decorations from exit lighting.
- Egress pathways must be maintained. Occupants must be able to reach exit paths unimpeded. Crowd control measures should be carefully planned to allow for proper exiting.

Carbon Monoxide

Carbon Monoxide (CO) is a colorless, odorless, tasteless gas that is a product of incomplete combustion of fuel-fired equipment. Blocked space heaters or poorly vented chimneys, generators, grills and boilers are common sources of CO. Holiday decorations can create or exacerbate issues related to CO build-up and impact occupants. The addition of generators, heaters, and insufficient maintenance of existing and temporary equipment can all lead to issues.

Proper Planning

Before the holidays approach, it is important that the FM team prepare for holiday celebrations and decorations. If these events are not properly planned in advance, it could be too late when the holiday arrives to properly address these issues. Consideration should be given to:

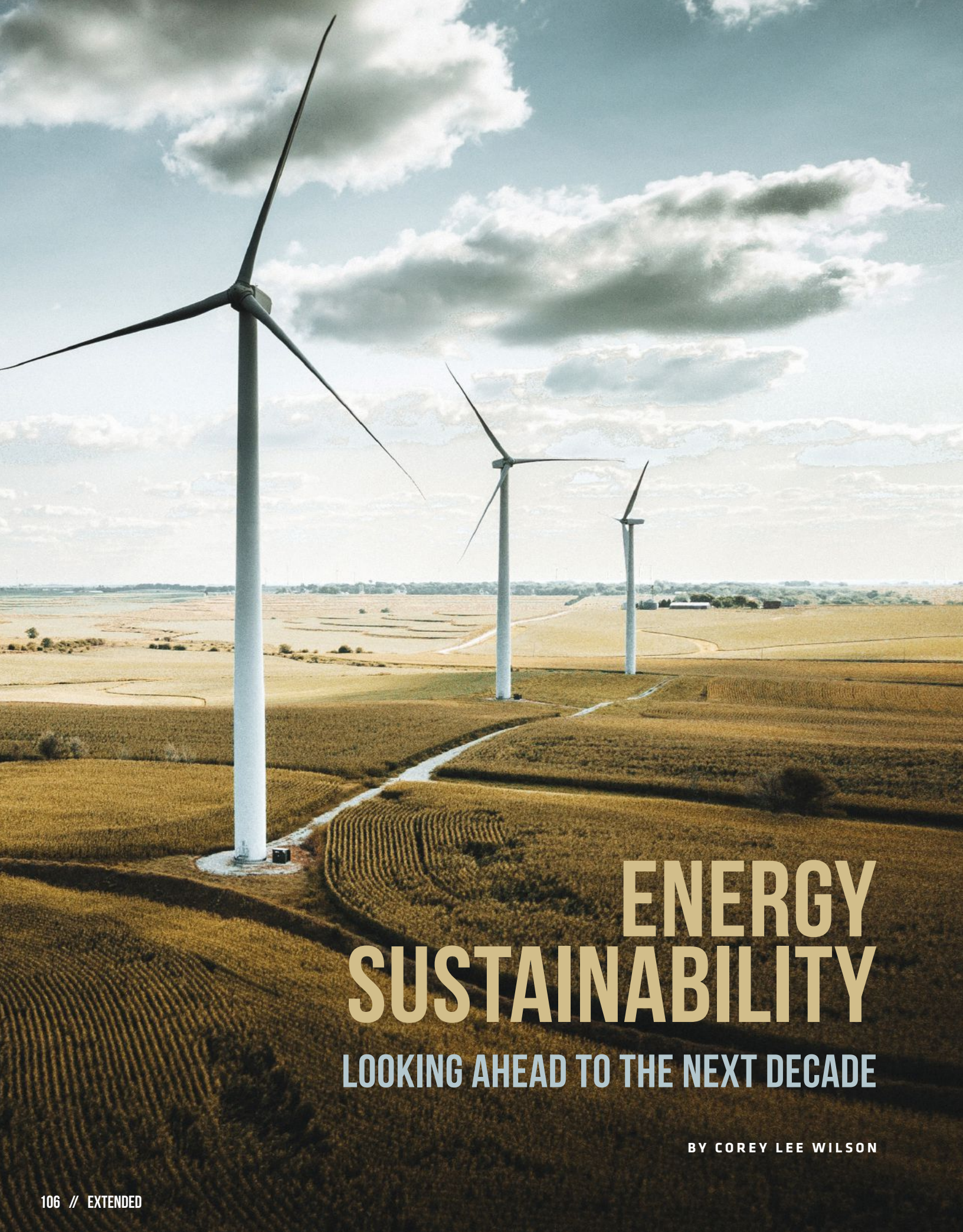
- Completion of any scheduled inspections and preventative maintenance of heating equipment, fireplaces/chimneys, fire sprinkler systems, fire pump systems, fire extinguishers, and fire alarm systems well in advance of the commencement of holiday decorating. Enough time should be allowed in advance of the event to allow for any repairs to be completed which might be discovered during the inspections and preventative maintenance.
- Ensuring sufficient fire protection equipment is provided. The proper amount and distribution of fire extinguishers can help responders extinguish incipient fires.
- Electrical circuit identification and inspection. If the decorations will include lighting or other electrical needs, the FM team should map out the abilities of the various supplies and consider thermal imaging or other means to validate the integrity of the electrical system and its ability to properly supply the needed power.
- Planning for sufficient barriers or other means to prevent open flames from igniting material. Physical separation measures and non-combustible surfaces can reduce the risk of flames from fireplaces, fire pits, candles and lanterns from spreading to combustible material.
- Proper oversight of the decorations. It is important that lighting and flame be monitored constantly. Do not leave lights or flame burning without the presence of team members to monitor. Consider battery operated candles in lieu of burning candles.
- Use of listed decorations and equipment. Equipment and decorations that have been properly tested by testing laboratories present less risk to the facility and occupants.
- Not allowing smoking indoors, or at a minimum, around decorations.
- Ensuring any natural trees, garland, wreaths or vegetation used for decoration are as fresh as possible and are provided with water on a regular schedule. Replace as necessary when they dry out. Artificial substitutes should be considered, but validate they have the proper fire retardancy and listing, if applicable, before installing.

Conclusion

Depending on the community, some may think of these as primarily a winter or summer issue, or cold versus warm environment concern. The reality is they can arise at any time of the year and in any climate. It is all based on the holiday and how the community chooses to celebrate. There are also many other types of celebrations for sports events and other community events. Most of these can result in similar potential issues and care should be taken to mitigate the fire hazard

Careful advanced planning can help ease these risks. FMJ

Ralph Bless *is the vice president of account management at Telgian, a worldwide fire, safety and security firm. He is a licensed professional engineer with more than 39 years of experience in fire protection services and has served Telgian for 22 years. Bless serves on multiple NFPA technical committees, and chairs the NFPA 232 technical committee.*



ENERGY SUSTAINABILITY

LOOKING AHEAD TO THE NEXT DECADE

BY COREY LEE WILSON

Green technology is driving global energy storage installations from a modest 9 GW/17 GWh deployed as of 2018 to 1,095 GW / 2,850 GWh by 2040, according to the latest forecast from research company BloombergNEF. This 122-fold boom of stationary energy storage over the next two decades will require a US$662 billion investment, according to BNEF estimates. It will be made possible by further sharp declines in the cost of lithium-ion batteries, on top of an 85 percent reduction in the 2010-18 period.

As states push clean energy policies, a number are also investigating how they can adapt their utility grids and business models for emerging resources. Nearly every state took some regulatory or legislative action on broad grid modernization or utility business model reform in 2018, with 42 states acting in the second quarter on questions of advanced metering infrastructure, storage deployment, data access and revenue reforms, according to the North Carolina Clean Energy Technology Center.

ENERGY STORAGE SYSTEMS WILL DRIVE FM ENERGY SUSTAINABILITY

As utilities plan to decarbonize their systems, many see the current boom in natural gas generation as a bridge to a low-carbon future providing dispatchable power to balance out intermittent renewables on their systems. Continued advancements in battery technology, however, could make that bridge shorter than anticipated.

In November 2018, California regulators approved four battery projects for utility Pacific Gas & Electric (PG&E) to replace three gas plants that had sought ratepayer financial support. The batteries, including two of the world's largest planned projects, represented the first time that a utility and its regulators sought to directly replace multiple major power plants with battery storage.

California has ambitious environmental and battery storage targets, but large-scale storage is also spreading to states without those policies as battery prices decline. Last summer, generator Vistra announced plans for a 42 MWh storage facility connected to a solar farm in Texas, which would be the state's largest battery.

While smaller in scale, the recent growth in utility-size batteries is outpaced by behind-the-meter installations, which analysis firm Wood Mackenzie says grew more than 300 percent in 2017 alone. Going forward, Bloomberg analysts expect lower prices and increasing market participation options for storage like Federal Energy Regulatory Commission's (FERC) recently approved Order 841 will beget more than 100 GWh of storage capacity in the U.S. by 2040.

LITHIUM-ION BATTERY COSTS CONTINUE TO DROP

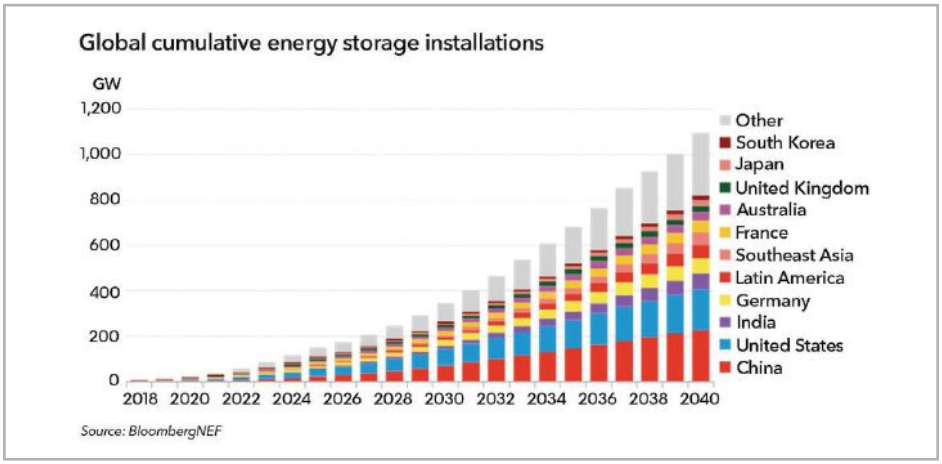
BNEF's Energy Storage Outlook 2019, predicted further halving of lithium-ion battery costs per kilowatt-hour by 2030, as demand takes off in two different markets — stationary storage and electric vehicles. The report models the impact of this on a global electricity system increasingly penetrated by low-cost wind and solar energy.

Just 10 countries are on course to represent almost three quarters of the global market in gigawatt terms, according to BNEF's forecast. South Korea is the lead market in 2019, but will soon cede that position, with China and the U.S. far in front by 2040. The remaining significant markets include India, Germany, Latin America, Southeast Asia, France, Australia and the U.K.

In the U.S., a review of compliance filings submitted by grid operators in response to the FERC Order 841 shows that Independent System Operators (ISOs) and Regional Transmission Organizations (RTOs) are complying with FERC's directive, but work much remains.

DISTRIBUTED ENERGY RESOURCES (DERS)

Utilities, keen to prevent load loss to rooftop solar and the like, initially tried to slow the trend with fees and rate designs that discouraged adoption of such

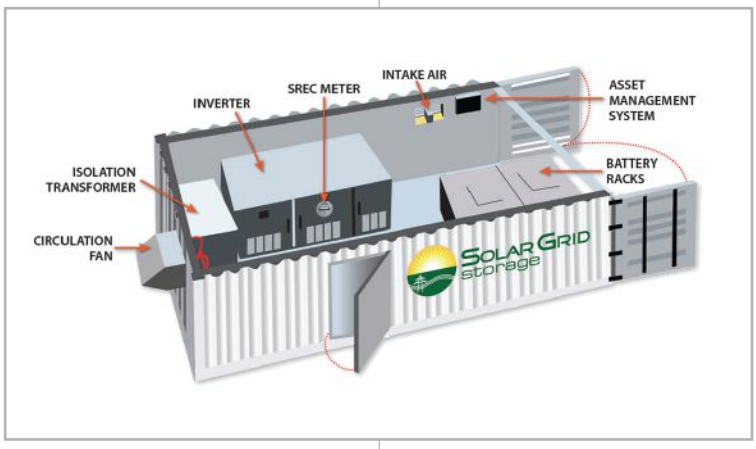


resources. But increasingly — and after a series of lengthy state policy battles — they are beginning to recognize that Distributed Energy Resources (DERs) can also provide benefits to the grid and if managed correctly, will become a reliable Behind the Meter (BTM) power resource.

California Independent System Operators (CAISO) refers to storage as a "vital strategy" to meet the state's goal of 100 percent zero-carbon electricity by 2045. The state's current oversupply of solar power in the middle of the day and subsequent drop-off in the evening has led to a curtailment of solar. With more storage on the grid, the oversupply of solar could be captured and used later in the day, reducing the need for curtailment and increasing the grid operator's ability to balance load, CAISO said.

ELECTRIC VEHICLE (EV) GROWTH WILL BECOME AN ENERGY DEMAND ISSUE

As batteries become cheaper, they hold promise for utilities not just as stationary sources of power, but mobile ones as well. By 2050, the National Renewable Energy Laboratory says electric vehicles could increase U.S. power demand by up to 38 percent, providing an important source of power demand growth for utilities and opportunities to use the vehicles' batteries to meet grid needs.



In 2018, utilities realized this opportunity, ramping up their lobbying and public relations efforts around EVs. In the third quarter alone, 32 states and D.C. took some action on electric vehicles, including the approval of utility EV charging programs in Massachusetts, Rhode Island and, earlier, in Nevada.

In the years to come, utilities across the nation are likely to intensify these efforts, pushing for approval to own EV charging stations, studying new rate designs to incentivize charging and finding new ways to aggregate fleets of vehicles to modulate their charging for grid needs.

EVS COULD OVERWHELM THE GRIDS

The power demand from the 20 million EVs expected to be on U.S. roads by 2030, up from today's 1.1 million, could overwhelm the nation's grids.

However, the coming EV load could deliver great value to utilities and their customers if it is shifted away from high-priced peak demand periods. That would increase utilities' electricity sales without adding stress to their grids, while also lowering drivers' charging costs. Investing in the communications systems and planning needed to properly manage charging can deliver transportation electrification's full value, stakeholders told Utility Dive.

EVs are the biggest electric load opportunity for utilities since the 1950s air conditioning explosion, a May 2019 Smart Electric Power Alliance (SEPA) study reported. But without proper planning to integrate that load, "EVs could lead to grid constraints and increased transmission and distribution peaks" that require new "peaker plants, unplanned grid upgrades, and other costly solutions."

"There is already adequate charging infrastructure technology to incorporate real-time pricing and use price signals to shift charging from peak demand periods to times when utilities have renewables over-generation," the report added.

THE FUTURE OF EV ENERGY STORAGE

The threat to the grid represented by EV growth will not be from a lack of the Electric Vehicle Supply Equipment (EVSE) used for charging. An estimated 9.6 million EV charging ports will be needed by 2030, according to the Edison Electric Institute, but 2018's 1.2 million North American charging ports will grow 10 times to more than 12.6 million by 2027, according to Navigant.

With the electrification of trains, trucks, buses and other vehicles, the coming load could be overwhelming. "But worst-case scenarios assume transportation electrification would happen without optimizing the grid, and there are ways to optimize. Managing the number of cars charging, and when they charge, will determine the real load."

SOLAR PV SYSTEMS

Energy rates and solar policies are in flux, posing a major threat to new solar projects. One major pricing trend — adopted by utilities across the country — is an increasing emphasis on time-variable rates and demand charges. For an average commercial energy user today, 60 percent of energy spent is based not on how much energy is used, but when it is use.

In California, for example, utilities have changed the timing and price of Time of Use (TOU) rates in a way that diminishes solar project economics unless developers pair solar with energy storage.

Utilities have also increased demand charges by more than 100 percent across the last decade. That means businesses are charged more for their peak energy usage each month — and if those peaks occur when time-based rates are highest, it can mean a huge energy bill, and can impact the savings from solar energy.

Solar energy alone does not address the most expensive demand peaks, which now with the new rate structures often occur in the late afternoon when solar production drops. By employing both solar and energy storage, businesses can reduce not only energy charges, but also address demand peaks that may occur when solar output goes down.

During the same period in which energy storage experienced incredible growth, the solar industry witnessed radical threats to existing solar economics due to changing policies and rates. Around the country, Net Energy Metering (NEM) and other market rates and programs have changed substantially over the last few years and will continue to change in the years ahead.

ZERO NET ENERGY (ZNE) STANDARDS AND CHALLENGES

In 2008, the California Public Utility Commission (CPUC) issued its Zero Net Energy (ZNE) goals for all new residential construction by 2020 and for commercial buildings by 2030. California's ZNE Standard is already in place through the state's energy and green building standards codes (Title 24 Parts 6 and 11) to achieve the 2020 and 2030 ZNE construction targets. The 2013 Energy Code will reach 70 percent of the residential ZNE goal, the 2016 Energy Code reaches 85 percent and the 2019 Energy Code will meet the 100 percent goal of ZNE. By 2030, every new school is required to be a ZNE building.

ZNE buildings have zero net energy consumption, meaning the total amount of energy used by the building on an annual basis is roughly equal to the amount of renewable energy created on the site. These buildings still produce greenhouse gases because on cloudy (or non-windy) days, at night when the sun isn't shining, and on short winter days, therefore, conventional grid power is still the main energy source.

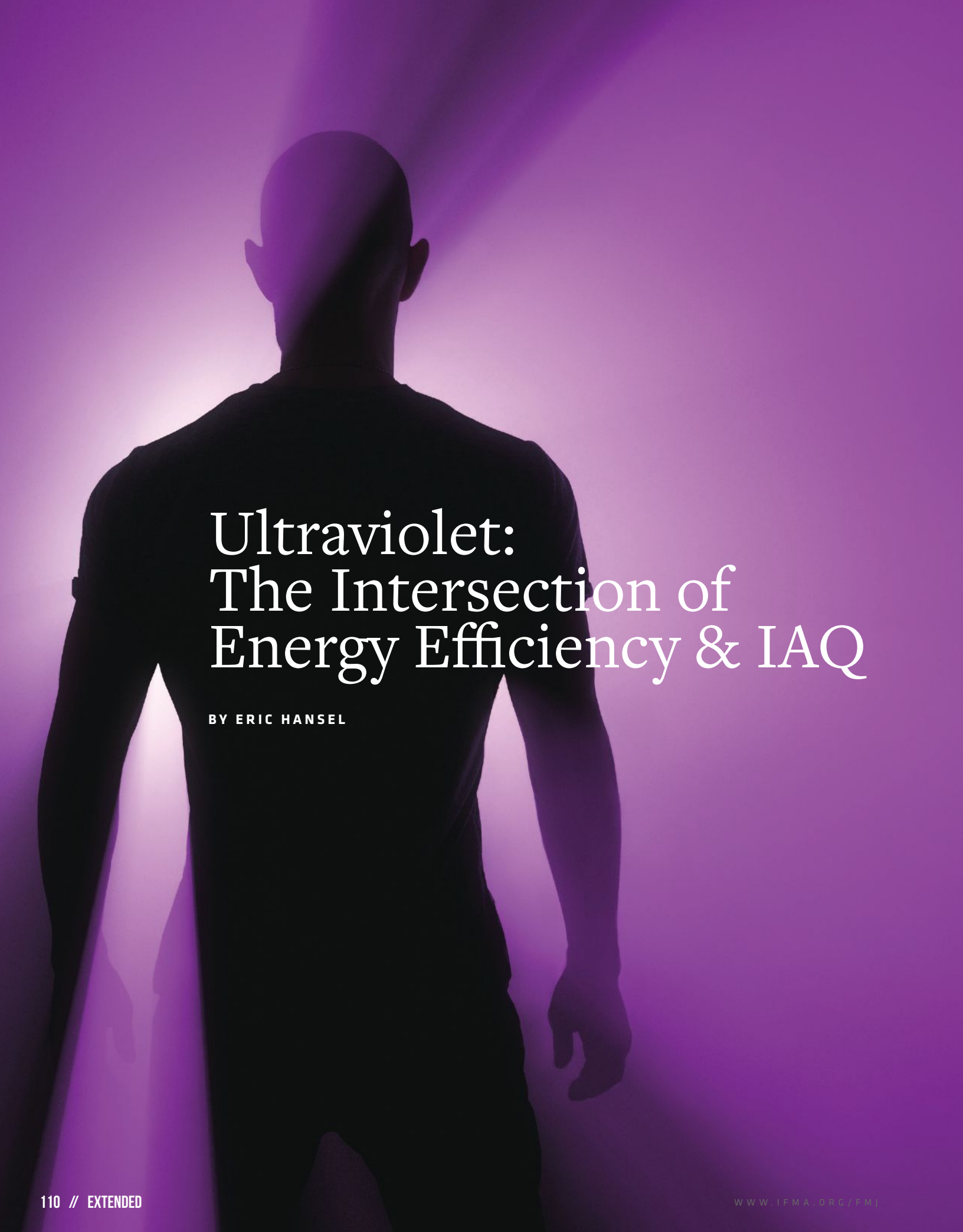
Because of this, most zero net energy buildings still get half or more of their energy from the grid. Buildings that produce a surplus of energy over the year may be called "energy-plus buildings" and buildings that consume slightly more energy than they produce are called "near-zero energy buildings" or "ultra-low energy houses."

To help attain these ZNE measures, California requires their existing buildings to be energy efficient. To ensure attainment of these goals, CALGreen building code requirements were adopted by the California Building Commission (CBC), and included in modified Part 11, of the Title 24 building code.

To summarize the California Energy Efficiency Strategic Plan, the state has ambitious goals for the development of zero net energy buildings. These include:

- All new residential construction will be zero net energy (ZNE) by 2020.
- All new commercial construction will be ZNE by 2030.
- 50 percent of commercial buildings will be retrofit to ZNE by 2030.
- 50 percent of new major renovations of state buildings will be ZNE by 2025.
- AB 758 — Comprehensive Energy Efficiency in Existing Buildings Law.
- AB 802 — Mandatory Energy Benchmarking & Disclosure. FMJ

Corey Lee Wilson *is a California native and founded the IFMA Inland Empire Chapter in 2013 and was its past president from 2013-19. He is the president of CLW Enterprises, and project manager for MicroNOC Inc. He holds a BS in Economics from California State Polytechnic University Pomona, is an IFMA FMP, LEED AP O+M Specialty, CMAA CCM, and a member of the USGBC-LA Chapter. He is an energy savings consultant that facilitates cost-effective and efficient energy reduction and battery back-up systems that reduces energy usage that lowers operational costs.*



Ultraviolet: The Intersection of Energy Efficiency & IAQ

BY ERIC HANSEL

Efforts to mitigate the spread of COVID-19 have brought on a renewed global focus on indoor air quality (IAQ). The conversations, once limited to building engineers and facility managers, are becoming topics in human resource departments as employers and employees seek peace of mind as they return to work.

Ultraviolet germicidal irradiation solutions (UVGI), the most effective which is UV-C energy, are gaining increased prominence both in terms of new construction and retrofitting existing systems. More people are properly equating building health with employee health, and better understanding the role of air purification in that process.

The same air purification technologies that are becoming prominent in COVID-19 safety plans and improving overall building health, also offer energy efficiency advantages that can help FMs meet demands for energy savings.

Beyond COVID-19, UV-C energy solutions are being installed because of its ability to prevent buildup of organic materials and microbes on heating, ventilation and air-conditioning (HVAC) cooling coils, air filters, duct surfaces and in drain pans.

This does more than just improve IAQ, it helps restore cooling capacity, reduces maintenance, and increases energy efficiency to HVAC systems. With those systems accounting for up to half of a building's energy usage, it remains a driving factor for implementing UV-C lighting solutions into HVAC systems. It can provide up to a 35 percent reduction in energy usage, leading to significant cost savings[1].

As FMs navigate a world combatting climate change through energy savings and mitigating the spread of COVID-19, installation of a customized ultraviolet solution is at the intersection of improving energy efficiency and IAQ.

A PATHOGEN KILLER

UV-C has been used for more than 100 years, particularly in health care settings and water treatment plants due to its ability to kill viruses, bacteria, mold and other materials that compromise air quality and can have adverse health effects[2]. It has also been used in high-risk facilities such as prisons and jails, where circulating purified air can be a challenge. That scope, however, is rapidly expanding to include more traditional commercial locations such as large office buildings, megachurches, workout facilities, nursing homes and schools.

The science behind UV-C is pretty straightforward. Ultraviolet energy comes in three forms based on wavelength: UV-A, UV-B and UV-C. While it is produced naturally by the sun, UV-C and most UV-B are absorbed by the Earth's atmosphere [3]. This means people only typically come into contact with UV-A rays, whereas UV-C exposure is generated by germicidal UV-C lamps.

UV-C is used in germicidal lighting products and is commonly used to disinfect air, water and food. This ultraviolet solution is effective against viruses and bacteria because it damages the microbe cell's RNA and prevents them from replicating, rendering them inactive[4]. It has been effectively used against MERS[5], SARS and Ebola in the past[6] and provides an important layer of defense, particularly against pathogens that are resistant to antibiotics. With a lack of a vaccine for COVID-19, it continues to get attention as experts look at the role of aerosol droplets and virus spreading.

MITIGATING AIRBORNE VIRUS TRANSMISSION

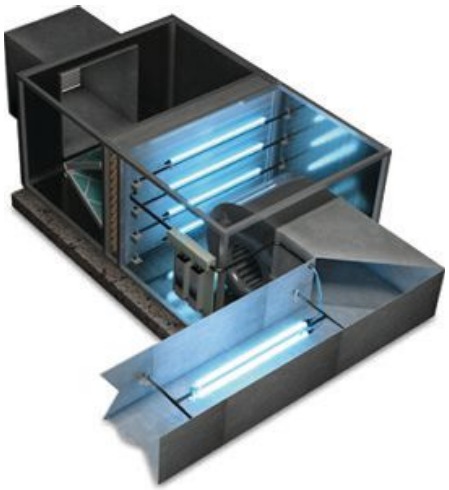
Microparticles can remain airborne for an extremely long period of time, which implies solely wiping down surfaces in rooms and common areas is not enough to properly mitigate the spread of COVID-19 and other illnesses. This evolving understanding is resulting in an airborne battle against COVID-19 that has implications for FMs.

Airborne transmission of infectious agents occurs when bacteria or other viruses on respiratory droplets are expelled by sneezing, coughing, speaking, laughing, exhaling or are otherwise distributed into the air. Although the liquid or vapor around the infectious agent evaporates, the residue (or droplet nuclei) remains suspended in the air for very long periods depending on such factors as particle size, velocity, force of expulsion, particle density, humidity, rate of air flow and the microorganism's ability to cause infection.

This has direct implications for HVAC systems, which are critical to promoting IAQ and need to be well designed, installed and maintained for effectiveness. Transmission of airborne contagious diseases can be mitigated or exacerbated by a facility's HVAC system, according to the American Society of Heating, Refrigerating and Air-Conditioning Engineers. Too many systems are not properly maintained and their effectiveness declines often causing energy costs increase.

INSTALLING UV-C IN HVAC SYSTEMS: A THREE-PRONGED APPROACH

As air circulates through the HVAC system, viruses and other microorganisms are exposed to UV-C, which essentially deactivates and disarms them. Designing a customized ultraviolet solution that attacks such pathogens in multiple areas of an air circulation system is a more effec-



tive and comprehensive approach. Best practices for employing ultraviolet call for one to three components — air handling units, air ducts or upper-room installation — depending on the facility.

Installing UV-C lamps in air handling units needs to be the starting point, and then everything else is customized to the specific building after a thorough study of the facility. Air handling units can harbor many things people do not want to breathe. Treating sources of contamination in the HVAC and in the air while it is moving through the system is critical and typically much more effective than simply using mobile air cleaning units.

Cooling coils and drain pans inside the units are often a cesspool of mold and bacteria growth. Over time, these substances build up and eventually shed particles into the air that subsequently enter the occupied spaces, posing risks, such as non-infectious respiratory health effects. Irradiating the cooling coils and drain pans with ultraviolet can dramatically reduce mold and bacteria growth or destroy the microbial films that previously accumulated on the surfaces, keeping the air coming out of the handling unit clean.

Typically, UV-C lamps are installed within the air-cooling system and above the drain pan to kill contaminants at the source while still disinfecting the airborne microorganisms.

Once UV is installed in the air handling units, additional lamps may be installed in the air ducts to treat air as it streams through. System performance and costs to implement and operate the system depend greatly on the output of the UV lamps and the exposure time, which are affected by the temperature and the velocity of the air passing through the UVGI device.

These efforts can be complemented by installing UV-C fixtures in upper room spaces with high ceilings. UVGI can be installed typically above head level at least seven feet high and point the light at the ceiling. This technology has also been verified to efficiently disinfect airborne microbial organisms by inhibiting their ability to replicate. The UV-C purifies the air in the upper register of the room, which is then circulated improving the air quality. Think of this as a car wash with the air continually passing through it, improving the air quality.

Many FMs are turning to this approach, particularly in more crowded areas such as a large conference room or cafeteria, where large groups of people may congregate very close to one another.

The benefits of purifying the air also include eliminating build-up on the air handling units, which have significant energy implications.

ELIMINATING BUILDUP & SAVING ENERGY

Buildup of organic material on air handling unit coils is a leading cause of increased energy costs and system inefficiency. Often that buildup starts a few years after installation and worsens over time. As buildup continues, the system deviates further from its as-built specifications, which leads to reduced performance.

Once significant buildup occurs, it operates much like a layer of insulation and starts to negatively impact heat transfer and the performance of chillers by serving as a barrier between the air and the coils in the unit. This limits the efficiency in which the coil pulls or transfers heat out of the air.

This often results in a never-ending cycle of band-aid solutions to compensate for reduced operational effectiveness, including increasing fan speed, pumping more chilled water through the system or employing additional standby units, as outlined at the 2019 Virginia Society of Healthcare Engineers fall conference[7]. That leads to decreased energy efficiency, higher operating costs and more stress on the motors driving the air handling units.

UV-C also provides continuous cleaning and maintains air systems performance to ensure operating at as-built rates, which offer the most effectiveness and efficiency and typically extend the lifespan of the system.

In a study that examined a UV-C installation in the HVAC the results showed too much airflow was generated, causing the maintenance staff to reduce the fan RPMs.

In addition, the building's standby chillers stopped running at full capacity, something that had not happened in more than 10 years. After shutting down the standby chiller and with the reduction of the fan RPMs, the utility was saving at least 20 percent in energy use by simply adding the UV-C[8]. Imagine both the energy and maintenance savings extrapolated over that decade.

NAVIGATING THE MARKET

With so many products flooding the market, developing the right ultraviolet solution requires expertise to select the correct strategy that ensures proper and safe installation. Sadly, much like with LED a few years ago, the market is packed with many unvetted companies and products that make it difficult to determine which products are legitimate and will indeed deliver the desired results. There are also too many HVAC professionals inexperienced with UV-C technology and may not provide the experience-based recommendations best suited for each facility.

FMs without knowledge of the market should ensure they have an expert on hand with a proven track record in ultraviolet solutions. It will lead to improved IAQ and building health, while providing significant energy efficiency and cost-savings, when implemented properly. FMJ

1. "UV-C Light Benefits in HVAC Applications," by Forrest Fencl, The Air Conditioning, Heating and Refrigeration NEWS, January 6, 2014.
2. "UV-C-lamps: could something that kills bacteria and viruses also harm you?," European Commission, February 2017.
3. "Ultraviolet (UV) Radiation," U.S. Food & Drug Administration, www.fda.gov, 8/19/2020.
4. "Comparison of UV-Induced Inactivation and RNA Damage in MS2 Phage across the Germicidal UV Spectrum," by Sara E. Beck, Roberto A. Rodriguez, Michael A. Hawkins, Thomas M. Hargy, Thomas C. Larason, Karl G. Linden; American Society of Microbiology, December 28, 2015.
5. "Efficacy of an Automated Multiple Emitter Whole-Room Ultraviolet-C Disinfection System Against Coronaviruses, MHV and MERS-CoV," by Kurt Bedell, Adam H. Buchaklian, Stanley Perlman, Cambridge University Press, May 2016.
6. "Coronavirus: Robots use light beams to zap hospital viruses," by Adrienne Murray, BBC News Services, March 20, 2020.
7. "How UV-C Can Reduce HVAC Energy, Maintenance Costs and Improve IAQ," VSHE 2019 Fall Conference.
8. "The Hidden Value of UV-C," Forrest Fencl, Contracting Business, August 9, 2013.

Eric Hansel *is President of Expert Lighting Group, a Certified Lighting Efficiency Professional and a member of both the International Ultraviolet Association and Illuminating Engineering Society.*

Social and Environmental Performance

Why FMs can't afford to not work with mission-based companies

BY THOMAS HOLLAND

In January, the big news story of 2020 looked like it was going to be the Australian wildfires. The blaze burned for months and ultimately swept through more than 46 million acres, killing or displacing almost 2 million animals. Then, just two months later, the COVID-19 pandemic replaced all thoughts of suffering koalas and kangaroos. Businesses shut down, events were cancelled, and people hunkered down in their homes. This was clearly the story of the year. Nothing could knock it out of the headlines.

Then, on May 25, George Floyd went out for a pack of cigarettes.

The outrage that erupted in response to the deaths of Floyd, Ahmaud Arbery, Breonna Taylor and other Black Americans brought racial injustice and inequity to the forefront around the world. Large corporations swiftly responded, issuing statements and press releases indicating their support of social justice and outlining the actions to combat systemic racism in their cultures and communities. Smaller businesses quietly implemented internal policies that promote diversity and inclusivity. Companies knew they needed to act and act quickly: a 2018 study found that 64 percent of the world's consumers would choose or boycott a company based on its stance on societal issues.

THE B CORP DECLARATION OF INTERDEPENDENCE

We envision a global economy that uses business as a force for good.

This economy is comprised of a new type of corporation —the B Corporation—which is purpose-driven and creates benefit for all stakeholders, not just shareholders.

As B Corporations and leaders of this emerging economy, we believe:

- That we must be the change we seek in the world.
- That all business ought to be conducted as if people and place mattered.
- That, through their products, practices, and profits, businesses should aspire to do no harm and benefit all.
- To do so requires that we act with the understanding that we are each dependent upon another and thus responsible for each other and future generations.

Source: https://bcorporation.net/about-b-corps

It has perhaps never been more important for companies to be aware of their role in creating a just, inclusive and sustainable global economy. But they need to do more than acknowledge it; they need to commit to it and join forces with other companies with a similar commitment. For FM professionals, that means hiring building service contractors that share their organization's corporate values. By working with mission-based Certified B Corporations, FMs can ensure their organization is partnering with companies dedicated to using business as a force for good.

Certified B Corporations, or B Corps, are for-profit businesses that have met stringent standards of social and environmental performance, transparency and accountability. Businesses seeking certification must first complete a credible and comprehensive assessment called the B Impact Assessment (BIA). This assessment includes about 200 questions that measure the company's performance in five key categories: governance, workers, customers, community and the environment. Results of the BIA are verified by the nonprofit organization B Lab, which may request additional documentation or conduct background checks as needed.

Once certified, B Corps are legally required to consider the impact of their business decisions on both shareholders and stakeholders, including employees, the community and the environment. They also must undergo recertification every three years. There are more than 3,500 B Corps representing 150 industries and 74 countries.

FMs can benefit from hiring surface care and maintenance companies that are B Corps in a number of ways. First, they can trust that these companies are managing their supply chains ethically and using products that are environmentally sustainable. Second, they know that these companies value their employees and have a loyal, engaged workforce. Finally, they can rest easy knowing B Corps perform effectively and efficiently and are actively engaged in continuous improvement efforts.

Supply-Chain Sustainability

Social issues may be dominating the news cycle, but environmental sustainability is also critical to global well-being. B Corps are tasked with developing transparent supply-chain strategies that demonstrate how the products and services they use are not harming the environment. To do so, they survey their vendors and suppliers about their practices to ensure they meet certain requirements. They dig deep into not only their vendors' financials, but also their policies, procedures and core values.

Today's consumers want to know where and how a product was made and by whom. They demand accountability and transparency in the supply chain. By adhering to a strong internal commitment to sustainability and communicating this information internally and externally, B Corps assure their stakeholders that they are doing their part to create a healthier environment.

Earth-friendly solutions are vital in the commercial surface care and maintenance industry, which has a significant environmental footprint. These companies have a responsibility to make ethical decisions regarding energy use, water consumption, carbon emissions and other environmental impacts. Cleaning products must

be safe for both people and the planet; water usage must be carefully monitored; and debris and waste must be recycled or otherwise diverted from the landfill as much as possible. If the company subcontracts—and nationwide surface care and maintenance companies almost always subcontract—they must ensure their subcontractors are treating their employees humanely and fairly.

In the end, by choosing to work with contractors who have an established supply-chain strategy that focuses on sustainability and accountability, FMs can ensure they, in turn, are following best practices and adhering to the highest environmental standards. They can readily verify that the products and materials used in their buildings are safe and that the services they need won't have a negative impact on the environment.

People, Not Profit

Simply put, B Corps value their employees. In many industries, that isn't always the case, and turnover rates reflect this lack of appreciation. Employee turnover in the commercial cleaning industry, for example, is extraordinarily high, averaging 200 percent and sometimes reaching 400 percent. It's easy to understand why cleaning professionals don't stick around for long: Wages are low, the work is repetitive and physically demanding, and there aren't many opportunities for advancement.

B Corps address these challenges head-on through their internal HR practices. They pay their employees above-average wages, and they offer benefits and other perks. They incorporate innovative, high-tech solutions such as collaborative robots that can take over more monotonous or strenuous tasks. They offer training and certification opportunities so employees can advance in their careers. Combined, these solutions help keep employees happy and engaged. Happy, engaged employees outperform their peers and are more likely to stay with their company.

B Corps have one other big advantage when it comes to employee retention and recruitment: They attract employees who believe in their mission. The younger generations are especially drawn to companies with a purpose. Recent studies have found that 45 percent of Gen Zers want to work for a company that makes a difference in the world and 75 percent of millennials—who make up the largest proportion of today's workforce—would take a lower salary to work for a socially responsible company. B Corp employees are there for a purpose, not a paycheck.

FMs who hire B Corps directly benefit from their commitment to and loyalty from employees. The teams coming to their facilities are properly trained and certified, and they adhere to best practices. Lower turnover results in a higher consistency of service and a more safe and secure building.

Production and Performance

By embedding better business practices in their governing documents, B Corps are more resilient and operate at higher levels. This long-term legal commitment to the greater good continues throughout leadership changes, organizational growth and external challenges (like a pandemic). It results in consistent performance and clear policies and procedures that positively impact their employees, their community and environment.

Even if a company isn't ready to commit to becoming a B Corp, completing the BIA is an eye-opening experience that can be used to improve performance. The BIA helps companies measure their social and environmental impact by closely examining their current practices. After submitting the BIA, companies receive an impact report that shows where they're performing well and where they can improve. They also receive what is called a B Impact Score. Most companies score between 40 and 100 on a scale of 0 to 200; B Corps are required to achieve a score of at least 80. Companies can then benchmark their score against leading businesses across the globe. The assessment itself is free (there are costs associated with becoming certified) and can be completed on a regular basis to measure performance over time.

Ideally, companies use the BIA to develop a detailed plan to improve their impact. B Lab offers a number of helpful resources to assist with this.

What does this mean for FMs who are partnering with B Corps? It means they are working with companies that not only meet the highest standards of verifiable performance, but also are on a path of continuous improvement. As part of the recertification process, B Corps must set improvement goals that are measured using the BIA. FMs don't have to worry about their contractors' performance declining over time— they can assume it will only go up.

Business for today and tomorrow

B Corps are changing the role of business in the global economy. Companies are no longer simply providing a service or manufacturing a product; they are actively contributing to communities and the environment. They are also being held accountable for these contributions—both positive and negative.

FMs who consider their corporate values and seek out contractors with the same values are leaders in this new way of doing business. By incorporating sustainability, transparency and accountability in their everyday work, FMs raise the bar for everyone and help build a more inclusive, diverse and responsible global economy. FMJ

Thomas Holland *is the CEO of APEX Surface Care, a 23-year-old Certified B Corporation® and CIMS-GB certified national specialty surface care company headquartered in Texas. APEX is part of a family of brands that provides flooring, recycling, specialty maintenance and general building maintenance. APEX has been a supporter of IFMA for more than 20 years and is a founding sponsor of Women in Facility Management (WIFM), a 501(c)(3) professional organization focused on furthering the advancement of women in commercial facilities management careers.*

WHAT IS STRATEGIC ASSET MANAGEMENT?

And why should FMs care?

BY ASHAY PRABHU

Imagine this tale of two cities.

1. Bring to mind for a moment a popular local school. A question is asked about one of the buildings, "How much life is left in this roof?"

The CFO answers: "Around 12 years, based on its age. It was built 18 years ago, it's expected useful life is 30 years, so therefore its remaining life is forecast at 12 years."

The FM counters: "Hang on, our engineers have done a health assessment on the roof. It's an E+ — it's only got five years left, and I need $80,000 in the next five years to fix it."

Concerned citizens are left increasingly anxious whether the school they send their children to is safe and serviceable.

Why are there two answers to one simple question? The CFO is referring to the financial register based on historical data, while the FM refers to the current health assessment. It's very likely work crews have an entirely different view based on day-to-day experience. There should only be one correct answer to this valid and simple question, which would unite the team and alleviate the citizens' concerns.

2. Next, picture the neighboring city, which has already embarked on strategic asset management (SAM). Citizens ask the same question is about the local school.

Everyone says: "That roof has five years remaining, based on the health assessment."

The CFO chimes in: "We've allocated budget for fixing it in this five-year period."

The team is united: "We're taking a holistic view of our portfolio, its condition and required service into the future. We've stopped chasing our tails and we're confidently optimizing our facilities."

The citizens sighs in relief: "My city is in control. My kids are safe at school."

FM professionals should consider:

- Which city is more livable?
- Which city is more accountable?
- And which city is the more attractive workplace as CFO or FM?

ENTER 'STRATEGIC ASSET MANAGEMENT'

FMs are the custodians of countless essential assets — buildings, schools, hospitals, roads, water, power, community centers and more. They all face a similar challenge, not just to one another, but to their counterparts in other asset-intensive industries: roads and streets, rail and transportation.

Regardless of asset type and industry, these professionals are striving to manage budgets, deliver services and works programs, mitigate risk and balance funding allocation. Across all industries, research and experience show that assets are degrading at a staggering rate, often from an already compromised point. In the U.S. alone, the cumulative ranking of the country's infrastructure across all assets was a D+ by the latest American Society of Civil Engineers Report Card. This statistic is alarming for asset managers, who are universally driven to keep their communities safe, moving and productive.

Consider for a moment a facility portfolio valued at $1 billion replacement cost — meaning if that entire portfolio was hypothetically wiped from the face of the earth, it would cost $1 billion to replace. Evidence, experience and international benchmarks show that these assets are being "consumed," or are degrading, at a rate of 2-3 percent a year. That's $20-30 million a year, every year.

WHAT IS SAM AND WHY SHOULD I CARE?

SAM is a future-focused modeling methodology specific to long-life facility and infrastructure assets. It balances budgets, community needs and asset conditions to deliver sustainable and safe services. It does this by providing options or scenarios of what the future may hold if certain levers in decision-making were pushed or pulled differently.

In the U.S., facility and asset management professionals are focusing on fixing the assets at E levels and worse. These are potentially dangerous assets, and the industry is driven by a need to keep communities safe. It's easy to understand this focus, but it's a focus worth questioning.

SAM shifts this focus by empowering objective assessment of which asset requires which treatment at which time to achieve the defined service goals communities need. Sometimes, it's OK to simply make an "E+" asset safe and serviceable without having to improve it. Other times, it makes sense to treat a "C" or "D" asset — it's cost-efficient, faster and more effective to give that asset a metaphorical coat of paint to stop it from entering the dreaded penultimate phase of life, where it costs potentially up to five times more to revive it.

SO WHY SHOULD FMS CARE?

First there is the economic rationale. For a portfolio of 10 buildings, the decision to treat an asset graded ″E″ versus ″C″ is quite simple. But most portfolios have significantly more than 10 buildings and accurate treatment decisions are made at the component-level rather than overall asset condition state. Take a hypothetical portfolio of 100 buildings, and suddenly the potential size exceeds 10,000 unique and competing components. Extrapolate this over 10 years to ensure funding is allocated in the right spaces, on the required components, in the optimal year, and SAM presents a great opportunity to unlock significant, hidden dollars. For an organization with 300 or more buildings, or 1,000 km of roads or pipes, solving this problem becomes increasingly relevant as potential savings are in the millions.

Secondly, consider the service level rationale — assets do not exist for their own sake. Simply put, they exist only to serve community and user needs, which shift and change. SAM is the data-driven approach empowering the professionals responsible for these assets with the systems and framework to manage change transparently, confidently and efficiently — and ensure services are delivered.

And the kicker? It has been shown to reduce asset degradation rates by up to 50 percent. Applied to that $1 billion asset portfolio, this equates to $10-15 million saving every year.

IT'S NOT ROCKET SCIENCE, AND IT'S HAPPENING TODAY

SAM gives the organization one voice and answers to the important questions like:

- How much funding is needed?
- Where will funds be spent?
- Which assets are likely to fail?

With 5,000 competing assets, how is scarce funding allocated to get the best result over 10 years, not just the next one to three years?

For example, in embracing this approach the city of Topeka, Kansas, USA was able to answer questions about removing a tax from a particular roadway and its potential impact. This wasn't based on historical assumptions; it was based on forward prediction. Local officials not only presented evidence that a reduction of funding would have unacceptable impacts on pavement conditions, but also how the city would achieve outlined service goals at that funding allocation. The tax remained in place and everyone understood why.

The Department of Education (DoE) in Tasmania faced a classic challenge — manage cost and mitigate risk to essential school facilities knowing they were reaching critical aging point, but lacking evidence-based data to prove that inherent knowledge. Through a truly strategic approach, the DoE put meaningful, actionable insights into senior decision-makers' hands within a month of very simple data collection and was effectively stimulus-ready with compelling data-driven strategies to present when funding submissions were requested in the early days of COVID-19 recovery packages.

The city of Wichita, Kansas, USA demonstrated prudent fiscal planning by bringing the best engineers and finance managers to a common goal of preserving the city's buildings. Using objective condition data and return on investment metrics, they were presented future scenarios to their leadership team and board, reset proposed strategies and altered funding allocation based on data-driven modeling.

ANSWERING THE IMPORTANT QUESTIONS

Industry bodies such as the Government Finance Officers Association and Governmental Accounting Standards Board in the U.S. are asking these important questions on long-term financial planning. In Australia, planning for infrastructure provision beyond the 10-year horizon is mandated for all local governments. Canada has followed suit. Regardless of legislative and industry pressures, FMs know there is a need to justify why and where money is spent to ensure essential infrastructure assets are optimized and protected.

These are fantastic questions to be asked by citizens and industry alike. Engineers can be proud that these questions are being asked. They were hard questions to answer, but SAM provides the tools to confidently answer these incredibly important questions. Evidence and data are shared with politicians, stakeholders and citizens in real-time to demonstrate control of what is spent, where it's spent and how it's spent to get a significantly better outcome.

CHANGE THE GAME: PROTECT THE FUTURE

If 2020 has brought anything into focus, it is the need to be prepared for change. The year brought unprecedented change — in the fundamental way of life, the nature of work and to already-constrained budgets. Managing the uncertainty of change comes from understanding options and having solid data-driven plans to support them.

Aligning that asset management story — where a CFO and FM are united and confident in a credible, data-driven approach

Managing the uncertainty of change comes from understanding options and having solid data-driven plans to support them.

— brings new efficiencies to the outcomes that can be delivered. Teams can focus on the outcomes that ultimately matter where every dollar and treatment has maximum impact for communities.

It prepares organizations for the unexpected. Whether a global pandemic, a natural disaster or unplanned budget expenditure, FMs are ready and can confidently show proof of wise spending to secure essential stimulus funding.

It means future generations are not left with an infrastructure cost that eats into the ability to innovate and solve even bigger problems — health services, space travel, vaccines, robotics and things not yet even imaginable.

This next generation is coming from an era of media connectedness and objective learning that means they will always question why. In the next five years, guardians of assets will be driven to answer the "why" to important questions about the future like:

- If my grandparents are admitted to this hospital, how can I trust that this facility is the right one?
- When was the virus recovery plan reviewed?
- When was the last audit and inspection?
- Where does this facility operate as compared to the international benchmarks?

Embracing SAM empowers FMs to welcome these important questions, knowing they have the systems and tools to confidently answer them and support those answers with data and evidence. FMJ

Ashay Prabhu *is the vice president of strategic asset management at Dude Solutions and co-founder of Assetic. With more than 20 years' experience in SAM. Prabhu has led the development of condition algorithms, asset valuation methods, lifecycle prediction analytics, and is passionate about applying this science to close the global infrastructure renewal gap. He has a directorship at the Asia Pacific Institute of Asset Management, is an adjunct professor of Strategic Asset Management at Bond University, a Bachelor of Engineering (Hons), and is a chartered professional member of the Institution of Engineers Australia.*

RESOURCES:

Podcast – All About Strategic Asset Management: shows.acast.com/operate-intelligently-podcast/episodes/strategic-asset-management-ep-125

Infographic – strategic asset management framework: dudesolutions.com/resource/strategic-asset-management-framework

Case study – Topeka, KS Closes Pavement Funding Gap with strategic asset management: dudesolutions.com/resource/Topeka-KS-Client-Success-Story

Case study – Rancho California Water District Realizes Massive Savings with Meter Replacement Program: dudesolutions.com/resource/Rancho-California-Water-District-Client-Success-Story

Case study – Department of Education, Tasmania Justifies Future Funding: assetic.com/case-studies/department-of-education-tasmania/?portfolioCats=215%2C213%2C214

SMART BUILDING ENVELOPE

Delivering savings & improving use comfort

BY IVÁN ENRÍQUEZ RUIZ,
GURRAM GOPAL & JAMES COATES

Smart buildings are the results of human and technological evolution. While the first and second industrial revolutions advanced the design and use of machines and enabled mass production, the third was driven by electronics and further advanced automation. Now, the world is in the Fourth Industrial Revolution, the Industry 4.0, driven by connectivity, intelligence, flexibility and efficiency according to Klaus Schwab. The application of new technologies allows the design and construction of efficient buildings that not only reduce energy consumption to be more sustainable, but also improve the comfort of its users.

From intelligence to smartness

The development of construction has been motivated by the need to add value to the building. According to Buckman et al., value can be added to buildings by enhancing durability, sustainability and/or comfort. Although the concept of smart building is relatively new, it has its origin in the concept of the intelligent buildings which emerged in the 1980s to improve comfort through control and automation. One example is the Dayabumi Complex, located in Kuala Lumpur, Malaysia, that has a Building Automation System (BAS), a security automation system and a fire automation system. These systems make the skyscraper an intelligent building, but as these systems operate independently this building is not considered "smart."

While there is great confusion between the concepts of smart buildings and intelligent buildings there are features that set them apart. While intelligent buildings are reactive, smart buildings are predictive and adaptive. Smart buildings can adapt to different scenarios based on not only occupancy, but also on factors based on users' perceptions of comfort at different moments of the day and time of year. Further, while intelligent buildings are designed to reduce energy consumption by being programmed to maintain facility temperature and humidity based on day of the week and time of the day, smart buildings go further as their envelope and operations are designed to both maximize user comfort and minimize energy costs.

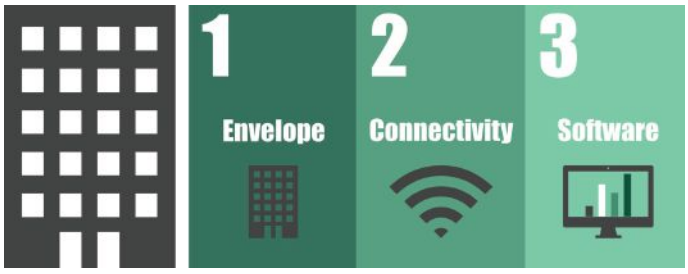
Smart buildings concept

Smart buildings adapt to the environment by optimizing each of the four main elements of the building: physical structure, systems, service and management. According to Buckman, smart buildings have four pillars: intelligence, enterprise, control and materials and design. Intelligence refers to the ability to control the environment while the enterprise pillar allows smart buildings to consider enterprise data, such as worktime and occupancy, to adapt to the environment. Control means the ability to operationally manage the whole building. Smart buildings not only have systems and services, but are designed with smart materials, which help save energy and increase user comfort.

The integration and interaction of systems are also important features of smart buildings. A smart building uses information to manage the coordinated action of subsystems, hence each of the subsystems composing a smart building needs to be horizontally integrated.

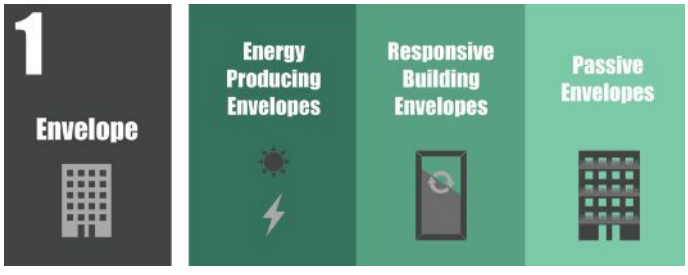
Layers of a smart building

Smart buildings consist of three main layers: the envelope, the connectivity and the software. Each layer has a specific function within the operation of a smart building,



Layers of a Smart Building

A facility's envelope is important as it is the physical component that separates the interior and conditioned part from the external part. The main function of the envelope is resistance to and protection from different external agents, such as light, noise and weather. Within the smart building concept, the envelope no longer isolates from external conditions but adapts to them. It fulfils other new functions, such as energy production, responds to external conditions or acts as a passive element against pollution and other external agents.



Smart Building Envelopes

Energy producing envelopes

Energy production is one of the newest functions of a smart building's envelope. Building-integrated photovoltaic (BIPV) technology integrates photovoltaic materials in modular form into the building envelope. Solar façades, solar roofs and power walls are some of the latest energy-producing envelopes.

Solar façades use vertical photovoltaic panels as part of the building's façade to produce solar energy. The building that houses the School of Industrial Engineering of the University of Málaga in Spain was one of the pioneering buildings of this type of technological solution with photovoltaic panels integrated into both north and south façades. It obtained the highest score in the European Energy Performance Certificate (EPCs).

Building with solar panels integrated into the façade. School of Industrial Engineering of the University of Málaga, Spain. Retrieved from University of Málaga, (UMA, 2017).

Solar roofs made of photovoltaic tiles capture solar energy and produce electricity to supply the building. As solar panels evolve and have greater integration with the envelope, new methods for storing energy have also emerged. These solutions have a payback period of a few years and have become economically viable for most facilities.

Responsive building envelopes

Responsive building envelopes can achieve high-level performance through real-time environmental response based on input parameters such as external and conditions and the number of occupants. These are based on the combination of smart materials and dynamic automation systems. Materials such as smart glass for windows have seen increasingly popularity over the last decades.

According to the National Renewable Energy Laboratory (NREL), almost 30 percent of the electrical load for the heating and cooling is loss through fenestration as windows occupy 15-20 percent of a conventional building envelope. Smart glass involves glazing with light- and heat-sensitive properties, known as photochromic and thermochromic glazing. These types of glazing can alter the transmission of light and heat, either passively or by the external application of a voltage. By controlling its properties, smart glass can reduce building energy consumption by harnessing external energy coming through the windows when there is sunshine and prevent energy loss from the inside to the outside when outdoor conditions are colder.

Three examples of smart glazing are suspended particle devices (SPD), polymeric dispersed liquid crystal (PDLC) and electrochromic glass. Suspended particle devices control the transmission of heat and light by application of voltage. The device consists of two layers of crystals, including two layers of conduit material, millions of suspended particles in between. When an external device actuates a switch, the circuit that will apply a voltage between the layers of conductive material is closed. As a result, an electric field is created in the liquid, which aligns the dissolved particles. When the particles are aligned, light can pass between them, making the window transparent. By the time the voltage is stopped, the magnetic field disappears and the particles become disordered, so the glass becomes opaque again.

Another technology that is very similar to SPD is PDLC. This is a device that works like the SPD but the particles dispersed are liquid crystal and liquid polymer, making the change from opaque to transparent much faster. While the transition in the SPD can take up to three seconds, in PDLC it is a matter of milliseconds. For this reason, PDLC is used in interior applications to divide rooms, as it offers more privacy to users.

Electrochromic glass is made of one layer of electrochromic material and another layer of ion conductor between two layers of transparent conductors. Unlike the two previous types, this glass is transparent when not in use. When a current is applied to the transparent conductor, it releases lithium ions that travel through the ion layer to be placed in the electrochromic layer, changing the glass' color. The glass begins to self-tint, changing its optical properties. Depending on the amount of voltage applied, ions travel, allowing the user to control the tint of the glass. Although the use of electricity could increase electricity consumption, very low voltage is required to operate the device. These devices are almost 10 times more expensive than conventional windows but the extra cost can be recovered in less than five years in most applications.

Passive envelopes

Passive envelopes are made up of elements unable to react to external conditions but contribute to energy saving and improvement of the building's internal conditions. Filter façades and garden walls are the two types of façades included in passive enclosures.

Filter façades are responsible for filtering the air that enters from the outside to the inside of the building. This type of solution is highly effective for large cities where the air is contaminated. An example of this type of façade is the Dr. Manuel Gae Gonzalez Hospital in Mexico City, Mexico, which is ranked among the world's 30 most polluted cities. The façade is a net of plastic shells covered with a layer of titanium dioxide. When the façade receives sunlight,

Façade of Dr. Manuel Gae González Hospital in Ciudad de México, México. Retrieved from Gobierno de México, 2020.

the titanium dioxide activates and the façade oxidizes organic matter, transforming the polluting particles into carbon dioxide and water vapor, thus improving air quality and the health of patients.

Garden walls are external walls are covered by vegetation which can be replaced or substituted by other vegetation at any time. Therefore, the façade of the building is no longer static, as it could change according to the type of vegetation, the season and even the time of day. This feature makes the appearance of the building more dynamic while offering better protection against rain or wind, reducing the amount of UV radiation and trapping airborne particles. In winter months, the vegetation will be less than in the spring or summer months, thus the building can naturally regulate the transfer of heat and light between the outside and the inside. The 17-story Consorcio-Santiago Building in Chile is a good example of how this type of enclosure can contribute to energy savings. The building has a curved façade with three horizontal strips of garden walls.

Consorcio-Santiago Building in Santiago, Chile, retrieved from Plataforma Arquitectura

According to Joaquín Reyes, one of the engineers in charge of designing the building, the double garden façade reduces solar radiation by up to 60 percent. Studies showed that 15 years after its construction, the architectural solution not only worked, but it saved almost 40 percent more in energy costs than they had previously estimated and generated up to 48 percent in energy savings compared to other buildings in the same area.

Embrace the envelope

A smart building is an entire system based on adaptability to the environment and interaction of subsystems to maximize user comfort and reduce energy consumption. Smart buildings use three main layers that work together — the envelope, connectivity and software — to achieve a high degree of performance. Using the smart envelopes either in new construction or in building retrofits can not only deliver energy savings and improve user comfort but when integrated with connectivity and software, it can produce a facility that truly optimizes dynamic performance. FMJ

James Coates *is the training director for the International Union of Operating Engineers Local 399 and adjunct professor at the Illinois Institute of Technology where he teaches maintenance technology and management and sustainable facilities operations. His quarterly educational news articles are published and distributed to approximately 10,000 members of the IUOE Organization since 2001 centering on facilities engineering. Coates also serves as a governor appointed board member to the Illinois Pressure Vessel Rules Board.*

Dr. Gurram Gopal *is an industry professor in industrial technology and management at the Illinois Institute of Technology with a keen interest in sustainability and corporate social responsibility. He is a Fulbright Scholar and has published more than 50 papers and articles. During his career, Gopal has been actively involved in LEED projects working with students to create innovative programs on sustainability using LEED-certified facilities.*

Iván Enríquez Ruiz *is a double master's student in industrial technology and management at the Illinois Institute of Technology and in industrial engineering at the Universidad Politécnica de Madrid with a strong interest in smart technology and sustainable development. He is keenly interested in the design of facilities, project management and sustainability.*

References

Böke, J., Knaack, U., & Hemmerling, M. (2019). State-of-the-art of intelligent building envelopes in the context of intelligent technical systems. Intelligent Buildings International.

Buckman, A. H., Mayfield, M., & B.M. Beck, S. (2014). What is a Smart Building? Smart and Sustainable Built Environment.

Jamieson, M., Brajterman, O., Verstraeten, Y., Arbon, J., Lonsdale, J., Allington, M., European Commission, Directorate-General for Energy, & ICF International. (2015). Energy Performance of Buildings Directive (EPBD): Compliance study : final report.

Larios, V. M., Robledo, J. G., Rincon, R., & Gómez, L. (2014). IEEE-GDL CCD Smart Buildings Introduction. Sinopoli, J. (2016). Advanced Technology for Smart Buildings. Artech House.

Time to Fix It

Changing water usage behaviors

BY **KLAUS REICHARDT**

Several years ago, a water district in the southeastern United States faced some significant water challenges.

Not only was the region's population growing, but due to drought and near-drought conditions, the local water district found it was turning increasingly toward underground water sources to serve its communities.

Greater dependence on underground water, or aquifers, can have several long-term negative consequences. Over time, it can cause wetlands to dry out, reduce lake levels, produce water quality and water pollution problems and cause saltwater intrusion. Further, underground water can dry up. As a result, it is often used as a temporary and not a long-term option.

The district determined that in time, the underground water would only supply about 40 percent of the district's water needs. To meet the growing demand, it would have to implement some very costly measures to find more water and deliver it to their storage tanks.

Because of the worsening situation, the district began a three-year campaign to change water-use behavior. If they could get consumers and businesses to become more conscious of how they used water and the amounts they used, at the very least it could give itself a little breathing room.

This additional time allowed the district to look for long-term solutions to their water problems instead of being forced into an emergency.

Interestingly, many of the steps they took — and did not take — to reduce water consumption can also be used in the FM industry. What changed water-use behaviors in this district is likely to also work in office buildings and other commercial facilities as populations grapple with water restrictions and calls to reduce consumption.

A crucial element of the water district's success was its messaging campaigns. In a commercial building, an example of this would be visual messaging, where banners and posters are put on the walls to remind tenants of an event or encourage them to do or not do something.

In psychology, similar messaging is often called suggestions. The posters and banners create an image about something or some action to take. Studies have shown that they can be immensely powerful in changing group behaviors.

The messaging themes that this water district found to be most effective were fear, facts and fun. These can also be used by FMs to help reduce water consumption in their properties.

One messaging approach the water district did not follow is something called "negative messaging." These campaigns are sometimes referred to as "top-down" campaigns and can come across as heavy-handed.

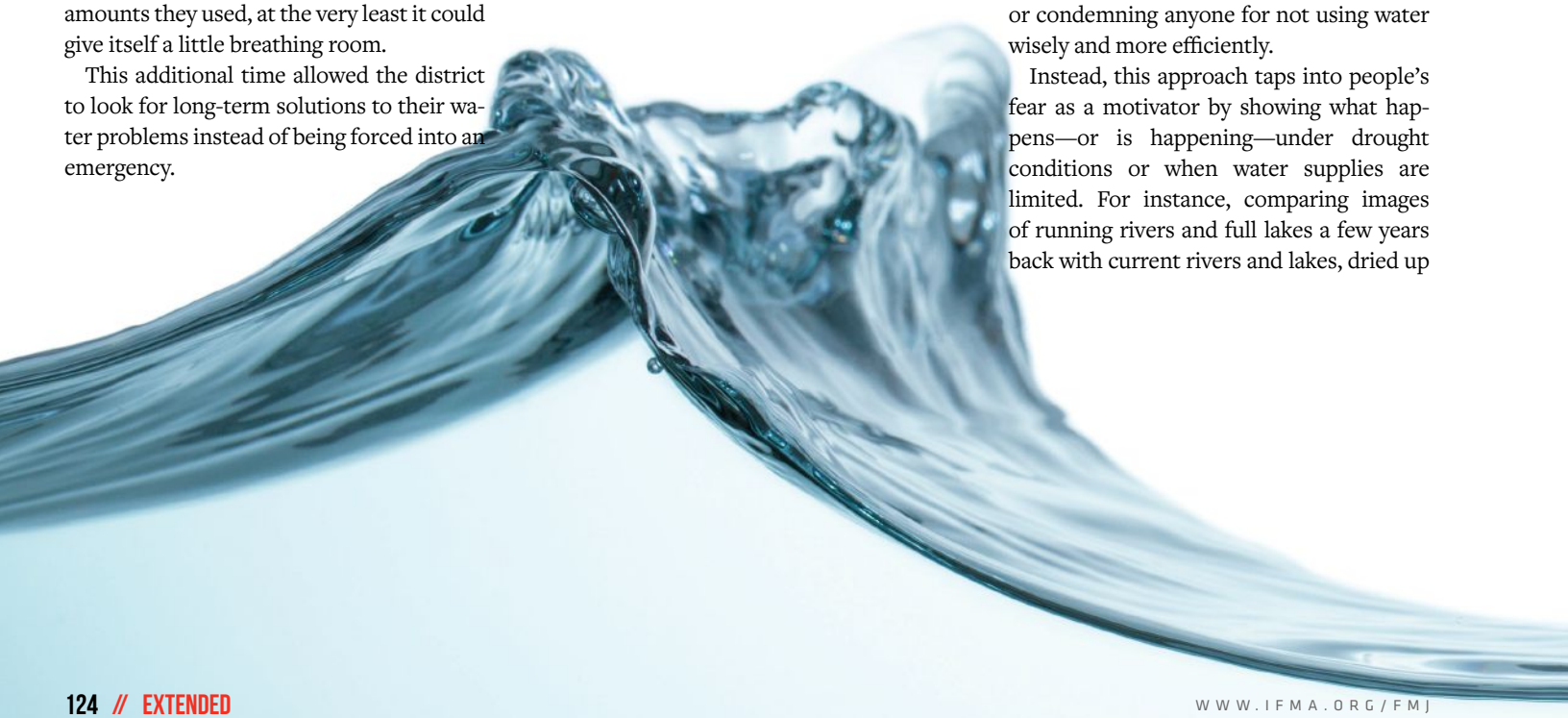
For instance, reminding people that they will be fined, or that punitive action will be taken for doing this or not to do that, is not always a successful, long-term approach to changing group behaviors. People start to resent them, may purposely ignore them or rebel against them. In some cases, they do just the opposite of what the message is asking them to do or not do.

The bigger picture of why most negative messaging does not change group behaviors is that it makes people feel bad. No one wants to feel bad. Instead, they want to feel they are part of the social good, doing good and doing the right thing.

Messaging That Works: Fear

Fear could be considered a form of negative messaging, but that is not always the case. With these campaigns, no one is punishing or condemning anyone for not using water wisely and more efficiently.

Instead, this approach taps into people's fear as a motivator by showing what happens—or is happening—under drought conditions or when water supplies are limited. For instance, comparing images of running rivers and full lakes a few years back with current rivers and lakes, dried up



and empty, can have an immediate reaction and cause behavioral changes.

People see the situation, it becomes implanted in their minds, and they begin to change their behaviors. When Cape Town, South Africa, was on the brink of having no water at all, the images that proved the most powerful were ones of skeletons of fish in lakes that once held millions of gallons of water.

The problem with fear messaging, however, is that it is not effective over the long term. Its impact wears off. It's an excellent start to a program, but it must be supplemented with the next two messaging themes, facts and fun, for long-term behavioral change regarding water consumption.

Facts

A fact messaging campaign may also be called an educational campaign or an evidence campaign because it uses facts and evidence as proof that, first, something is happening, and second, to take action.

The city of Cape Town produced a video titled "How Did Cape Town Get Here?" In the video, a narrator, using video images, discusses how the area had record rainfall in 2013. Dams were overflowing. But each year after that, there was far less rainfall. The amount of water in the dams was cut in half.

The images showed dead animals and trees where rivers once ran. The video then discussed the impact the water shortage was expected to have on people's lives and the economy. It was a powerful video that changed water-use behavior.

For FMs, a fact-based campaign could also involve using videos and visuals about a current water situation and the need to reduce consumption. One caveat: the visuals must be memorable. The more memorable, the more impact they will have on changing behaviors.

Fun

Jeff Hoffman, a marketing and communications professional, referred to the use of fun as a communication professional's secret weapon. "Unfortunately, people accept or reject continuing to read, watch or listen to a message in fewer than three seconds," he said. "[But] humorous, energetic, and upbeat messages engage audiences long enough to get the message across."

In 2015, when California was still in the midst of one of its worst droughts on record, the city of Santa Monica came up with some fun campaigns that hit home and helped change behavior. One was their Doggie Dishwasher Contest, which was more of a gimmick than a contest. It pictured dogs licking dishes clean as one way consumers could save water.

Another campaign pictured a man taking showers in his clothes—hitting two nails with one hammer, so to speak. He got clean, and so did his clothes.

It may take a little ingenuity to come up with a fun campaign, but they do work, as do the other messaging themes discussed.

The water consumption battle is different in the U.S. Most middle-aged or older Americans never gave a second thought to how much water we used. It was always available when from the tap, and it was cheap. Water has almost always been subsidized in the U.S., and it still is.

For a variety of reasons, those days are over. Water is becoming increasingly expensive. Climate change is playing havoc with customary rainfall amounts, causing shortages. The population is growing, increasing the demand for water.

FMs are at the forefront of changing workplace water behavior. The actions they take can do more than just help reduce water consumption in their properties. People take changed behaviors with them. Using less water at home and on the go becomes a way of life. FMJ

"[But] humorous, energetic, and upbeat messages engage audiences long enough to get the message across."

Klaus Reichardt, *is the founder and managing partner of Waterless Co. Inc. Reichardt founded the company in 1991 with the goal to establish a new market segment in the plumbing fixture industry with water efficiency in mind.*

Converting a tech campus to hospital space in India

BY **MAHROOH BASAR & HARIPRASAD HEGDE**

The spread of COVID-19 has been exponential, causing worldwide health and economic crisis. Wipro, a Global IT conglomerate in India, has been deeply committed to supporting India's response to the pandemic. Wipro Limited, Wipro Enterprises and Azim Premji Foundation (Wipro Founder's philanthropic initiative) committed US$154 million in assistance. The efforts have been both humanitarian in helping the most disadvantaged who have lost their livelihood and in healthcare in supporting pandemic response.

Rising numbers in coronavirus infection placed immense pressure on India's healthcare system, especially in urban centers such as Maharashtra. There was a serious need to increase the capacity of the public health care system. Wipro volunteered its existing 25-acre IT campus in Pune, Maharashtra and converted it into a 450-bed intermediary care COVID-19 hospital. Wipro's re-purposed IT campus is India's first public-private partnership hospital for COVID-19, where the physical infrastructure is from Wipro while the medical staff is provided by the government. It was opened in June of 2020 and will be operational for the duration of the pandemic. Thereafter it will be converted back to an office facility.

There were challenges to convert an IT facility into a hospital that met specifications and standards. The project was delivered in 30 days during a complete lockdown in the country.

The hospital is a fully equipped COVID-19 intermediary hospital with 450 isolation beds, an ICU area, reception areas, a testing lab, room accommodation for doctors and medical staff, and a kitchen and restaurant for patient and staff dining. The government's public health care system operates the facility, with a skeletal staff provided by Wipro.

The hospital provides medical care for the economically disadvantaged from neighboring villages and suburbs. Patients are not charged for their treatment, stay, medicine, tests, food or transportation.

SOME INSIGHTS FROM THE PROJECT:

Integrated Design Process

The client was the orchestrator and set goals, quality, budget and timeline. The team of architects, designers, mechanical, engineering and plumbing consultants and on-site team collaborated closely to evaluate possibilities and study feasibility of design proposals. This made it possible to retain parts of the existing fit-out and building systems to re-purpose the workspace into a COVID-19 hospital. It was an integrated process resulting in a holistic design, where more was achieved with less.

Subject expert advisory

Team of doctors and medical experts advised and guided the design from the functional programming, equipment, spatial layouts, user movements, air conditioning, materials and specifications to ensure it met the best practices prescribed by India's government and the World Health Organization for COVID-19 care. The subject experts ensured design was up to date with constantly changing protocols, especially during the early days of pandemic.

Remote collaboration

Before the pandemic it was unthinkable to design without visits to the site. Online collaboration tools allowed designers and the site team to work seamlessly in tandem. Within no time, the team adjusted to the video-call site visits to using quick sketch and mark-up on instant messaging groups to accelerate decision making.

The project required agility to pivot and reimagine solutions while facing challenges from lockdown restrictions and the availability of materials and workers. Regular project review with architects, services and site teams, ensured all design decisions were checked for execution feasibility.

Hospital planning

The planning focused on ensuring segregated movements for patients and healthcare staff. Pressure differentials were checked between the ward and medical staff areas to avoid cross contamination.

Patients enter a designated reception lobby on the lower ground floor and then take elevators designated for patients to reach their respective ward floor. The entire ground floor was planned for a medical staff lounge, locker areas, a nap room, shower and changing rooms, all with no patient access. From the staff area, two elevators were dedicated to medical staff movement. On each floor, the doctors' elevator opened into an air lock where there was a PPE changing area with separate passages to avoid contamination. Each ward consisted of 30 beds with a patient lounge and there was an airlock at the ward entrance to maintain differential pressure between ward and the outside corridors.

The hospital was self-sustaining with all ancillaries including a kitchen for patient food, restaurant for medical staff dining, a mortuary, bio medical waste disposal, laundry and storage for medicines and medical equipment and two ambulances.

Focus on User Experience

The journey of medical staff and patients through the hospital was interspersed with graphics and content to help elevate the mood and user experience. Use of both local (Marathi) and a common language (English) to curate content united and informed patients from different backgrounds. Inside the hospital, designers focused on creating a touchless journey where possible using motion sensor lights and sink taps. To enhance patient comfort, curated music is played in the wards to keep the patients motivated and create a sense of change through the day.

Retrofit process

The retrofit design focused on retaining elements of the existing fit-out to reduce execution time and ensure funds were used for better care equipment. Previously this building had offices. A thorough study of the existing building and layout maximized reuse. The false ceiling, walls, meeting room partitions, and certain flooring areas were retained as-is. Existing elevators were checked against hospital standards and it was decided to order stretchers which would fit through elevator doors. Evaluation of existing services by experts helped design a clear strategy to upgrade systems to meet best practices.

The air conditioning system was modified for COVID-19 wards. All the fresh air intake was treated with UV radiation and pressure differentials were ensured between the ward and medical staff areas to avoid cross contamination. Air changes were ensured in-line with global standards to maintain health and hygiene requirements. Natural and forced exhaust was provided to create a decentralized system.

Ensuring construction site safety

Execution planning was critical because of the limited availability of workers and material, and restrictions on movement. Accommodation for more than 250 workers was created within the campus with all food arrangements while adhering to strict social distancing measures. Construction activities were sequenced and planned to ensure social distancing between workers on-site. All workers and vendors entering the site went through a thermal screening at the security gate and were given masks and gloves to be worn at all times. Contactless hand sanitizers were available at entry and exit points on each floor. No COVID-19 infections were recorded until the project's completion and handed over.

Technology & training as a preventive measure

Frequent contact between the healthcare worker and the patient increases the probability of passing on the infection. Patients wear a small device that transmits vital data to a central location where multiple patients can be simultaneously monitored from afar.

Because this virus is new there is more emphasis on staff training on cleanliness, disinfection protocols and on waste segregation. There is also mandatory training for all staff regarding donning and doffing of PPE without contaminating any surface.

The hospital treats patients with mild to severe symptoms. Critical cases are stabilized in the ICU and then transferred to a tertiary care hospital in the vicinity. The mortality rate in the hospital has been 0.1%, meaning it has a recovery rate of 99.9%.

The mortality rate in the hospital has been 0.1%, meaning it has a recovery rate of 99.9%

Most patients are from economically disadvantaged areas in neighboring villages and suburbs. Apart from medical treatment, all tests, medication and meals are served at no charge to the patient. The hospital infrastructure supports the safety of the healthcare workers who risk their lives to do their duty with empathy, hospitality and utmost professionalism. The project's success are the stories of patient recovery. FMJ

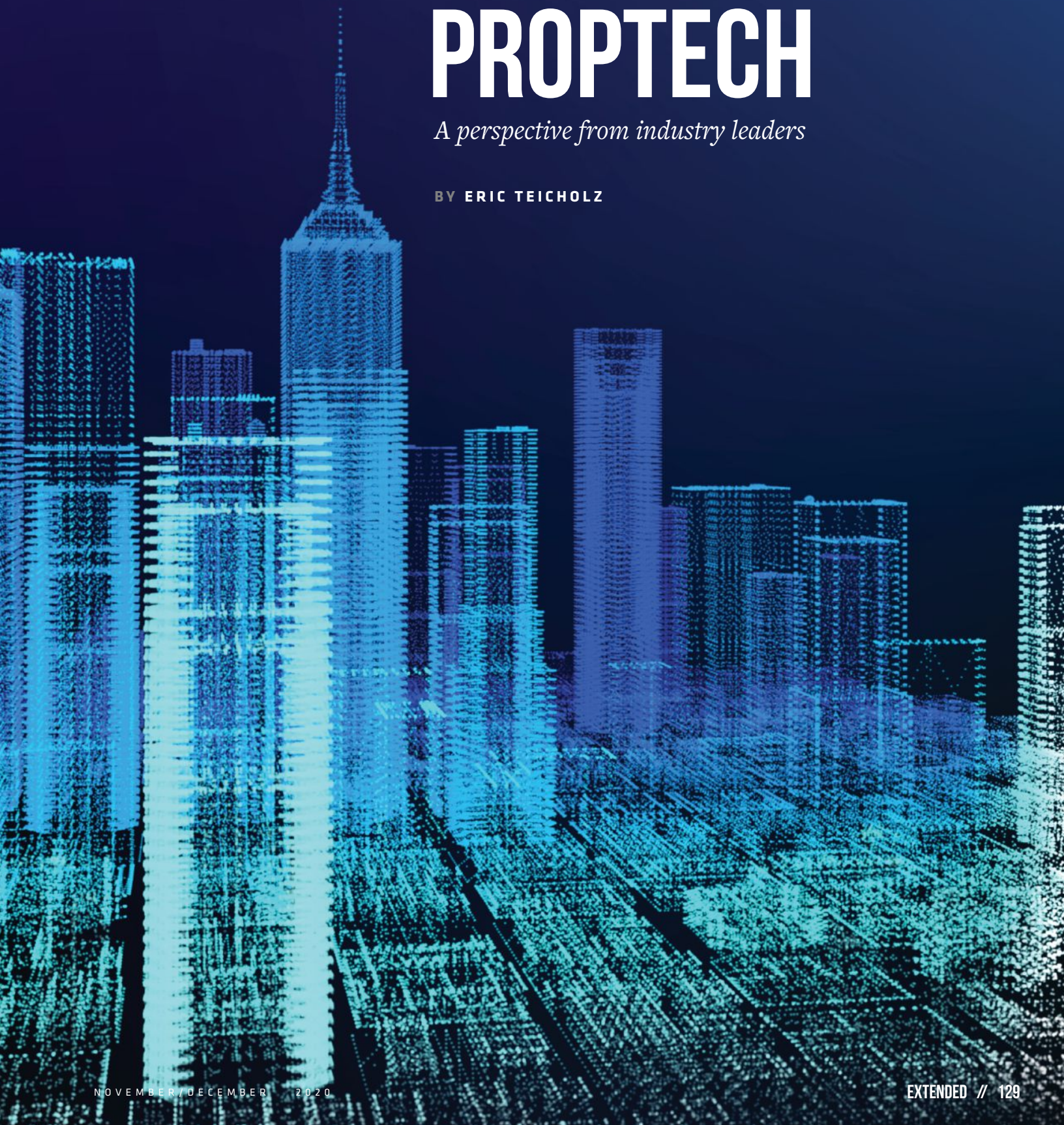
Mahrooh Basar *is an architect who advocates integrative thinking towards a climate-responsive built environment through planning, design and technology. She has nine years of experience working in design and construction in Asia and Europe. Her current role engages multidisciplinary teams for large complex infrastructure projects in a collaborative process, with negotiations and tradeoffs to create human centric workspaces. She has a masters degree in sustainable design from NUS.*

Hari Hegde *is a neo-generalist and has worked in a range of spaces, from deep engineering to executing large complex infrastructure projects to running a business. He is the senior vice president and global head of operations at Wipro Limited, a technology services provider operating in more than 71 countries. He sits on IFMA's Global Board of Directors, the executive board of Indian Green Building Council, and the Asia Pacific World Regional Board of Royal Institution of Chartered Surveyors (RICS). He is a member of the board at the Bangalore International Centre. His broader interests are in ecological and societal well-being.*

PROPTECH

A perspective from industry leaders

BY **ERIC TEICHOLZ**



The term Proptech (short for Property Technology) has been in use for several years. It relates primarily to the deployment of platform economics and innovative technologies (such as artificial intelligence, machine learning, big data analytics, machine vision, or IoT) to real estate. Proptech technologies are rapidly evolving and there is a myriad of new products developed each year.

Although there is some confusion about what technologies and applications Proptech includes and excludes, there is no confusion as to some of its properties. Developers of these products often hope (or intend) to disrupt and transform the markets they address similarly to how Google has transformed peer-to-peer information flow or how Uber has transformed aspects of public transportation. Other examples of high-tech industry transformation can be found in the extent to which Airbnb and WeWork have changed how space is thought of and used.

Two large companies, Ernst & Young and Cushman & Wakefield, are heavily involved in the use of Proptech technologies. Paul Head, construction and real estate technology leader at Ernst & Young and Doug Stewart, head of digital buildings practice at Cushman & Wakefield spoke on four questions :

1. How do these companies define Proptech?
2. What are the major applications of your company's client base and the primary factors influencing these applications?
3. What do you see as the best practices related to implementation of these technologies?
4. How do you see Proptech technology evolving and how would you characterize the impact of the Covid-19 pandemic on its development practices?

TEICHOLZ: Proptech is a relatively new term and there does not seem to be a single definition as to what it is. Let's start with a semantic question. How do you define Proptech; what are the primary technologies it includes or excludes and what are some of the current myths surrounding this rapidly evolving technology?

PAUL HEAD:

1a | Definition

Proptech is the integration of information technology applied to the real estate (property) marketplace. Some examples include supporting real estate transactions (finding your perfect domicile), smart building elements (sensors and dashboards) to collect, synthesize, and automate operations for human convenience and interaction or enhanced building function.

1b | Proptech technologies

Per a recent publication by EY and CRETech[1], the major categories of Proptech markets include real estate and finance, flexible space, management, Internet of things/smart buildings, construction (aka ConTech), data and analytics, visualization, and tenant experience. These technology categories may not be solely Proptech focused, but when combined with other solution categories, they enhance the overall value to the real estate industry.

As with other emerging technologies and technology sectors, there is no silver bullet for the owner-operator. These individual Proptech technologies' ability to plug and play with every existing asset is never as easy as some would allege. When developing a solution to address the client's outcomes, it is necessAry to perform a pilot and evaluate the results before deploying to a production environment.

Real estate and finance — solutions focused on investment, online marketplaces, brokerages, mortgage and title, and blockchain applications.

Flexible space — refers to the shared movement of co-living, co-working, and retail popups.

Management — solutions that support enterprise resource planning, client relationship management, building asset inventory management, and property management.

Internet of things/smart building — solutions focused on building technologies that are 'system to system' interactions, controls, and 'people to system' controls, providing better operation and customer experience.

Construction (**aka ConTech**) — solutions that address the building lifecycle's design/build cycle to include enhanced design performance and modeling, construction processes and resource, scheduling, and financial management.

Data and analytics — solutions developed for the building lifecycle to enhance insights for building portfolio asset acquisition and operation, leveraging artificial intelligence, broadly available market data, and building operating information.

Visualization — artificial reality (AR) and virtual reality (VR) providing users experience in a pre-built environment and operational guidance in a built environment, generally associated with other Proptech applications.

Tenant experience — solutions focused on real estate inhabitants/consumers to enhance their daily experience and interaction with or around these facilities.

1c | Current myths

- **Technologies will take over the world** — While many artificial intelligence advancements have occurred, we have a long way to go before we are serving technology. Practical applications such as scanning, optical character recognition (OCR), and artificial intelligence to interpret and abstract a lease still require intervention and human language interpretation. Localized language intent and meaning are not 100 percent accurate and requires human intervention to complete.
- **Technologies will outsource my vocation** – In some cases, this is true and warranted. Sending an unmanned vehicle (drone) to inspect a bridge, waste line, or roof condition is safer, less intrusive, faster, and provides more accurate and better documentation. Unsafe or repetitive activities, or allow us to process multiple elements in seconds, are great candidates to automate and leverage technology. This automation eliminates undue risk and focuses our efforts on other critical factors.
- **Buying technology X will solve all of my problems** – We aren't there yet, but maybe someday soon. The notable developments in the Proptech community are getting us closer. Still, many of these innovations are focused on single elements of the entire puzzle. It still requires a cast of stakeholders to understand and determine the problem and integrate the unique technologies for a total solution.

DOUG STEWART:

1a | Definition

The definition of Proptech is broad and seemingly varies between interpretation, industry segment, and role. Depending on the point of view, the prop-tech space can be limited to building or 'operational technologies' (compared to IT solutions) such as digital twins, work order systems, or energy management platforms. Or it can include solutions that are more readily consumed by end-users such as tenant applications, reservation systems, etc. In many cases, the term Proptech encompasses both operational and experiential technologies developed for the built environment.

1b | Proptech technologies

Proptech can be broken down into two segments, solutions that drive operational efficiencies and ones that enhance experiences for occupants, tenants, residents, etc. Some solutions may accomplish both to a degree but, in most cases, they serve a primary purpose (operational or experiential) with residual benefits. Some examples of operational technologies may include systems that provide:

- Building automation
- Integrated lighting
- Indoor air quality monitoring
- Access control
- Occupancy and utilization measurement
- Leak detection
- Energy management
- Visualization and reporting
- Building performance operational data and analytics
- Work order management
- Asset management
- Space management
- Digital as-builts or twins
- Capital planning or financial management
- Automated workflow capabilities (scheduling, etc.)
- Examples of experiential technologies may include systems that provide:
- Digital signage and content management
- Space or amenity reservations
- Digital wayfinding
- Visitor management
- Queue management
- Tenant and occupant engagement applications to include communication and engagement functions

Of course, arguments could be made that many of these technology categories can fall into operational or experiential (or both) categories based on various circumstances. The key is to establish the overall value proposition before investing. Another consideration is integrating multiple technologies and solutions to provide enhanced services to staff and occupants/tenants. Ensuring compatibility and security is critical from the onset.

1c | Misconceptions

Many myths or misconceptions around the subject of Proptech typically originate in three ways:

- Limited industry insights or understanding of nascent technologies
- Lack of industry skill sets or focus on technologies as a critical component of real estate/building operations.
- Aggressive vendor marketing during the product evaluation and sales cycles, leading to inflated or misaligned consumer expectations.

Some of the more common myths that seem to be circulating include:

- **Technology as a silver bullet.** Technology, by itself, rarely solves business problems or realizes opportunities. Technology enhances and supports the ability to meet or produce expected

outcomes. Combining the right technology solutions with people and processes will enable the opportunity for significant results.

- **Building technologies as a one size fit all solution.** Buildings vary. The age, condition, and configuration of buildings and underlying systems differ significantly from one building to the next, even within a single portfolio and campus. Finding a solution that fits every situation is complicated. Different solutions within a particular solution category may need to be leveraged to fully provide the desired operational or experiential outcomes in many cases.
- **Self-healing data.** Starting with useful data is critical for any technology implementation. Investing in developing and deploying a structured data management approach is usually well worth the incurred cost. Many companies promote that they have technology that can heal insufficient data. While some solutions can improve data by overlaying analytics and making educated assumptions to fill in the gaps, they are no substitute for starting with a clean, normalized data set. Focusing on cleaning up and putting a structure to existing data is not necessarily the cool or sexy work that we all envision when considering deploying a smart or digital technology platform. But the foundational 'blocking and tackling' associated with the effort will pay long-term dividends as the platform develops and matures.

TEICHOLZ: From your client base, what do you see as the current major Proptech applications being deployed and what are the primary drivers for these applications?

PAUL HEAD:

2a | Significant applications

The following technologies represent a subset of solutions in the Proptech market.

- **Reservation/workplace and utilization systems** – Giving the employees choice of work options and locations and matching them up with other team members and colleagues when they arrive at a building. Pre-registered or just-in-time arrangements to find a space. Helping facility managers drive their building's better performance by understanding effective space use and optimizing areas not performing well.
- **Real estate and asset administration systems** — Providing better operational and financial decision support of their current portfolio. Supporting the financial office with better control and documentation of their owned and leased real /non-real estate assets.
- **Security management** — Enhanced access methods for employees and guests. Providing electronic Bluetooth enabled one-time access through entry points for service people and guests. Self-registration for pre and unscheduled on-site visits. Visual identity and recognition security and enhanced badging solutions.
- **IoT sensors and people traffic** — Supporting other operational and analytical technologies by monitoring and controlling environmental factors and locations. The ability to understand traffic flow and usage within facilities through utilization heat maps and foot traffic counts.
- **Construction IoT, PM, and finance management** — Re-enforce leading practices for construction programs' oversight and operation. Enhanced financial transparency of construction programs to provide decision support. Integration with other IoT devices and things to reduce the risk of injury and theft on project sites. Better as-built documentation with live as-built recordkeeping.
- **Integrated asset management augmented by Proptech** — Real-time asset management using IoT devices and drone technology to inspect as-built conditions.
- **BIM** — Visualization, design, and operation technology to aid in pre- and post-construction. In construction, BIM supports the development of modeling, cost estimating, project scheduling. From an operations perspective, BIM can support the commissioning of a built asset and the ongoing operation.
- **Digital Twin** — This technology enables the convergence between the physical and virtual. The digital twin can support modeling and simulation of entire building systems helping to understand air quality and refresh rates, lighting and other sustainability measures, as well as other potential failure points.

2b | Primary drivers

These different personas' drivers vary slightly but are driven ultimately by operational performance, additional market share, and or tenant experience.

- **Property developers and owners** — The ability to attract and retain tenants. The residential and office space categories are continually competing for market share, and technology offerings are the latest requirement that factor into tenant decision making. Additionally, improved building performance to minimize operating costs is another factor.
- **Residents** — Amenities and convenience, how can I get what I need simply and easily? Whether it's about getting something repaired, adjusting the environment (air and lighting solutions), concierge services, connections to local markets and retailers delivered to your doorstep is about improving the individual's quality of life.
- **Corporate America** (**leased and owned space**) — The ability to find office space with a current technology infrastructure - high-speed throughput and wireless access for employees and guests, lighting and temperature controls, concierge, and social amenities, as well air and natural light, to name a few.

DOUG STEWART:

2a | Major applications

- **Occupancy or utilization measurement.** Measuring occupancy or space utilization, especially in real-time, can give building owners and occupiers a sense of the actual consumption and density of an amenity, area, floor, or building. Further, granular occupancy data can be a decisive element in managing workspaces and return-to-office initiatives, helping organizations enforce spacing and control density. The data can also help organizations monitor other strategies such as planned shifts or occupancy by groups and feed into the broader real estate approach.
- **Indoor environmental quality (IEQ) mostly focused on indoor air quality (IAQ).** Measuring IAQ can indicate how effective ventilation systems are performing. IAQ sensors measure CO2, VOCs, and particulate matter and determine how much fresh air is in a room. This data can show where and how air quality diminishes and provide information to operators to help decide whether to bring in more fresh air or reduce the space's occupancy.
- **Booking and reservation systems.** These systems are usually integrated with tenant or occupant experience applications. They allow organizations to manage defined workspaces and control occupancy. By implementing a reservation-only policy and making specific workspaces available or unavailable to reserve, organizations can more easily deploy alternative workplace strategies (e.g., hoteling, hot-desking) return-to-office schedules.
- **Mobile badging and access control.** These systems use an occupant's mobile phone as the security credential for access to floors or the building itself— touch-free. Organizations that consider deploying these technologies should also evaluate current processes that control access, including traffic flow, lobby queues, and visitor management.
- **Visitor management.** Managing or limiting visitor access to a building is critical to managing overall occupancy levels, especially during high-occupancy periods. Additionally, visitor data availability—tracking who visited and when—can be vital during a pandemic. Consider systems that enable visitors to fill out health questionnaires before arriving.
- **Centralized (remote) operations and building automation capabilities.** The pandemic has bolstered the business case for this ongoing trend. Having the ability to monitor and control building systems, both remotely and securely, is essential. Through data from major mechanical and electrical systems and data from IoT devices, building owners and operators can see a holistic view of operational performance indicators in a single pane of glass and coordinate and direct facility operations for hard services.
- **Fault detection diagnostics (FDD) and Monitoring-based commissioning (MBCx) for HVAC.** These are mostly synonymous terms and increasingly will become a significant part of a building-level response. Ventilation (the V in HVAC) is a critical system in a world that prioritizes reducing transmission risk, but it has been traditionally challenging to maintain and monitor at scale. Automated analytics enables teams to manage and maintain critical building systems proactively. FDD platforms can also feed directly into a centralized Operations Center for proactive response to emergent issues.
- **Integrated destination dispatch for elevators.** Elevators are a significant challenge from both a contact and ventilation perspective. This integration focuses on reducing the number of surfaces occupants need to touch to navigate a building. Integrating destination dispatch systems with access control and visitor management systems can be a way to automatically dispatch an elevator based on the occupant's mobile credentials.
- **Advanced sensors/IoT.** Sensor technology, deployed at discreet points to collect and measure building system performance and status, can provide operational benefits. For example, leak detection sensors help building staff manage the risks of water leaks while the building is unoccupied or under-occupied. Likewise, sensors can indicate pressure drops across ventilation systems, which could indicate dirty filters. This data can indicate issues within the HVAC systems and help them operate as designed, improving indoor air quality by maintaining airflow.

2b | Drivers

Technology can be a great enabler when applied to solving specific challenges or addressing enhancement opportunities. As the focus turns to ensure the health, safety, and well-being of building occupants, technology can play a significant role in how the building contributes to that equation. Traditional approaches to managing and maintaining the core systems in a building have given way to an operating model focused more on the overall health of a building. Building health is defined in terms of the quality of the environment it provides for occupants and staff's ability to respond, or ideally, proactively resolve potential issues. The investments that can positively impact the building's health will be an ongoing discussion for the foreseeable future. One thing is sure, there is no magic solution.

TEICHOLZ: From your experience, what are some of the best practices related to implementation? How do you initiate new Proptech initiatives and what are the differences related to medium vs. large companies or inexperienced vs. mature companies? How do you integrate multiple Proptech components to derive a wholistic integrated solution?

PAUL HEAD:

3a | Leading practices

The first application of leading practice is the technology evaluation and fit for an organization. Consideration for the technology's benefits, applicability to the ecosystem, and application to the scaled operation.

Especially with new and innovative technologies, change management is just as important as the technology itself. Most of us have experienced a failed technology roll out at some point in our careers. In many instances, it is not directly about the technology, due to the due diligence completed in the research and evaluation phase. It is more about the stakeholder engagement, expectation setting, consistent reinforcement of communications/enablement during and after implementation.

In addition to the above, other key factors include support for security protocols and integration methods for a multigenerational infrastructure. Many of these new evolving solutions solve for one aspect of a problem, which they do very well. Still, quite often, the technology will have to support receiving and sending information or commands to many other systems or assets. Another factor to consider is the compatibility of the broader infrastructure/real estate portfolio consisting of many various building types and ages.

Cybersecurity is very critical. All of the innovations we are discussing are technology-based and usually are sitting on someone else's cloud infrastructure. An organization must create access through a security barrier into the company's internal environment to use it. The potential for data loss, corruption, or leakage is a critical risk. For the technologies that support you at an individual level, a focus on personally identifiable information (PII) is a consideration. What does an individual need to divulge to use the application? Does the application continue to track you when you are not using the company's facilities? Personal privacy and, worse yet, data breaches are a significant concern for employees as well as their employers. Where is the line between convenience and security? Mature organizations have a developing or developed cybersecurity program to support the full assessment and deployment of these new applications and devices.

3b | Approach to Proptech for various organizations

Companies with a mature operation and technologies program within their real estate, construction, and facilities operations tend to take a measured approach to new technologies. It is an integrated stakeholder approach to human factors, property requirements, and technology considerations.

Inexperienced companies or smaller companies may see these innovations as a method to leapfrog their organization past the traditional systems into the future. A Software as a Service platform to bypass an IT organization (historically not focused on back-office (RE/FM) operations could offset costs, progress the organization forward, and introduce these new Proptech innovations. Alternatively, outsourcing operations to a third-party vendor and leveraging their technology platform may be another way to leverage these new technologies. Both of these options could be the right choice for the company, as long as the relevant security reviews and planning are in place. Typically, the cloud solutions and outsource vendors have already focused on these concerns and will support the company's review. But it is not a substitute for a thorough corporate IT security review. If the organization does not have the requisite skills to support the review, some third-party vendors can help.

3c | Integrate Protech components holistically

In short, design with the end in mind. Have a multi-year plan focused on key objectives and outcomes that include all relevant stakeholders. This plan needs to be revisited and updated annually to re-evaluate both outcomes and technology advancements and stabilization. What was groundbreaking last year could now be rendered useless by the advance of other technologies.

DOUG STEWART:

3a | Best practices

Selecting the right technology can help organizations communicate more effectively, collect and analyze critical data, enforce the new norms in the workplace, and optimize building operations. As we consider what technology is the "right" technology, the conversation must begin with the intended outcomes and what the technology is trying to achieve. A technology-first approach rarely leads to a long-term viable, and valuable result.

To start, develop or adopt a set of use cases that tie directly to the desired outcomes. Use cases are a valuable tool to help identify the right technology solutions and the underlying required functionality. Keep in mind that use cases are not technical—they are business problems that technology may help solve. With a set of use cases in hand, the conversations with technology suppliers shift from "what do you do" to "how can you help me do this?"

In some cases, the adoption of technology may complicate the use cases/processes. Carefully consider where a solution fits as an enabler and where it is applied solely for the technology itself. While hard to do sometimes, avoiding the bright shiny object represented by technology solutions may be prudent.

From a technology perspective, there are two primary solution types. The first directly facilitates or enables a process. An example would be implementing visitor management and access systems that reduce the need for touchpoints or face to face interactions while controlling who is visiting the building and when.

The second is technical solutions that produce data to inform or direct process changes and enhancements. An example may be a sensor platform that provides the total occupancy and utilization of a defined space or spaces. This data could be used to determine a space's configuration or triggers environmental services, or enables an entirely different process that helps enforce social distancing guidelines post-pandemic.

It is crucial to keep in mind that the first solution type also produces data—a valuable asset. The pandemic reinforces the need

for a broader and more holistic approach to data and data management within real estate. A comprehensive data management strategy enables investors, landlords, occupants, and building operators to glean valuable insights from analytics, business/artificial intelligence, and machine learning.

3b | Proptech initiatives

To steal from Simon Sinek — start with why. The what will follow. As previously mentioned, developing a set of desired outcomes, capabilities, and subsequent use cases will go a long way in establishing requirements, scope, and plot out a path forward. Setting the North Star for the journey toward a digitized operation is a must for any organization — regardless of size or maturity. In a nutshell, success is dependent as much on the preparation and planning as it is on the execution.

3c | Integration issues

Commit the time and resources to identify strategies to recognize and mitigate potential risks arising from future disruptions. In many cases, these strategies will overlap and support opportunities to drive operational efficiency and enhance occupant experiences in normal operating modes.

- Focus on enabling future decision-making based on available data from various sources, including building systems and integrated third-party sources.
- Create a unified operational view of critical data to allow a rapid, effective response to an adverse situation.
- Align opportunities to augment existing data sets using technologies that help inform decision-makers. Examples may include occupancy sensors or air quality monitoring capabilities.
- Focus on automation. Develop automated sequences that can quickly be enacted during an event to manage or change building operations while minimizing the need for human intervention.
- Invest in operational building technologies that enhance the integration, visibility, and control of building and workplace systems.
- Move toward operating buildings in "modes." As situations evolve, predetermined modes can be used to facilitate faster responses. Examples of modes may be occupied, unoccupied, shelter-in-place, critical occupancy, and so forth. The modes should determine how the building operates in various scenarios. Technology should enable the modes through automated sequences of operations, data collection, and analytics where possible.

TEICHOLZ: How do you see Proptech technologies evolving? What will the next generation of these technologies look like? How long is a Proptech generation and is it following Moore's law? Has COVID affected the development or adoption of Proptech and will it do so in the future when there is a vaccine?

PAUL HEAD:

4a | Proptech evolution

The innovation in property and construction technologies has been a growing trend and will accelerate. Since 2015 over 7,000 tech companies focused on "built-world" tech approximately $75 billion in investment [2].

As with any sector receiving this much attention by the venture capital community, Industry-leading manufacturers, software companies, service providers, and real estate companies have taken note. Many are developing strategies to align, compete, or acquire these technologies to include in their ecosystems and offerings.

4b | Next generation

As product categories stabilize and mature, the vendors' offerings that survive and grow will also consolidate. Standards will emerge, and more importantly, the built-environment infrastructure to support these emerging technologies will become more commonplace. This trend will set the stage for the next wave of evolving solutions, similar to the development of computing hardware and software platforms.

IoT devices' infusion to make buildings smarter and more responsive with their owners and inhabitants, including personal device integration such as wearables, mobile devices, is vital in this next phase. As we consider the current and future tech-savvy generations, a personal and social connection is important, so as companies/building owners, we will continue to cater to our audience to attract and retain new clients, tenants, employees to our facilities, residences, and offices.

For construction technology (ConTech), successful technologies will continue to drive performance, increase quality, cost reduction, time to market, reduced risk. We already see unmanned vehicles (drones), robots, and 3D printing technology successfully deployed to innovate the construction process. These innovations will continue to accelerate.

4c | How long is a Proptech generation

The adoption rate for Proptech has dramatically increased and so investment and innovation will continue to gain momentum. To this, we can speculate that the generation cycles will continue to decrease; however, this market is still reliant on other sectors such as computing and battery/energy generation, therefore it may be restricted or unleashed by their progress.

4d | The COVID effect

The pandemic has affected us globally and has helped us become aware of how to use several existing and new innovations together to address an issue that has risen to a new level. It is hard to imagine ten years ago that you could integrate badging systems, thermal scanners, face recognition, and employee contact tracing in a regular office building. These situations were only reserved for spy movies or futuristic dramas. Through the evolution of managing big data, artificial intelligence and other innovations, we can now aggregate and synthesize this information at a level we have never been able to before. Let's not forget that smartphone technology also plays a large role in this evolving scenario. Without the widespread adoption of these mobile devices, we would still be

missing a significant puzzle piece for COVID and Proptech. While all of this helps address the problem, there are still major concerns over personal privacy regarding how much information should be shared with or without our consent.

While COVID is aligning some existing and new technologies to solve for the problem, after COVID, many of these technologies will revert to traditional business models, driving better working environments, effective utilization, and social interaction. Other PropTech solutions, like digital twin, will help monitor and control building air quality, lighting conditions, and performance to promote energy efficiency and employee wellness. Reservation systems will help employees find the right environment to work and collaborate with their peers while maximizing floor utilization.

DOUG STEWART:

4a | Technology evolution

Prop Tech will continue to evolve and mature reasonably rapidly. For the most part, today's market, with few exceptions, are either point solutions narrowly focused on certain functionality or solutions focused on general requirements and not explicitly excelling at one or a subset in particular. The next generation will likely be broader, more integrated solutions that provide more robust functionality and interactivity. Advances in analytics and robotic processes can also assume to be on the horizon as those areas continue to advance.

4b | Proptech generation

It appears Prop Tech is like any other technology segment in terms of development and gestation. In that way, it will likely adhere to Moore's law as it evolves and matures. Over the last few years, there has been an influx of investment in the Proptech space, driving an increase in the number of vendors. The development cycles, especially in those emerging focus areas, seem to be more incremental with the rapid growth of capabilities and functionality.

4c | COVID impact

The pandemic hasn't necessarily shifted our (C&W's Digital Buildings Practice) focus regarding the technology landscape supporting smart and connected building solutions. If anything, it has reinforced the need to invest in technology that enhances the way buildings are operated and occupied. Post-pandemic, the shift in how technology is viewed and valued by the real estate industry should (hopefully) persist. While the focus on energy as the driving factor for investment may be set aside in favor of occupant health, safety, and sense of well-being, the tradeoffs needed to balance the economic and social aspects that technology enables will continue to be a point of discussion. FMJ

1 Venture Capital funding points to the hottest concepts in built-world tech, EY/CRETech publication, 2019

2 Venture Capital funding points to the hottest concepts in built-world tech, EY/CRETech publication, 2019

Vendor Profiles

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

ACOUSTICAL/SOUND MANAGEMENT

LogiSon Acoustic Network

Greater openness and reduced absorption make today's workplaces even more dependent on sound masking for speech privacy and noise control. The LogiSon Acoustic Network is designed and manufactured by a company with over 40 years' experience in the sound masking field. This technology has been installed in many hundreds of millions of square feet worldwide for clients in offices, hospitals, banks and more. It has also earned more than 20 awards for innovation, performance and ease of use.

www.logison.com
twitter.com/LogiSonSoundMsk
www.linkedin.com/showcase/logison-acoustic-network

ASSET MANAGEMENT

EthoSource

At Ethosource, we believe that your vision of an ideal work environment is attainable, no matter your budget. Our approach is to fully understand your space's potential and creatively collaborate with our team to make your vision a reality. Using a blend of our quality product solutions and turnkey services, our experienced staff have the capabilities to handle projects from initial concept to installation... allowing us to create a workplace you can believe in.

fmj.ethosource.com
www.linkedin.com/company/ethosource

Vendor Profiles

BUILDING CONSTRUCTION/DESIGN

Knoll, Inc.

KnollTextiles offers a wide breadth of high performance, forward -thinking wallcovering, wrapped panel, upholstery and drapery products. Driven by design, KnollTextiles creates inventive products that elevate commercial, healthcare, hospitality educational and residential settings, offering some of the industry's most technically advanced materials. Against the backdrop of the rich and storied work of Florence Knoll, KnollTextiles combines beauty and function in the Modernist tradition.

www.knolltextiles.com
twitter.com/knolltextiles
linkedin.com/company/knoll-textiles/

CARPET/FLOORING/TEXTILES

Antron

Carpet contributes to a cleaner, more productive and safer indoor environment in commercial spaces. The cleanability, durability and longevity of Antron® fiber can deliver those human benefits while reducing environmental impact and total cost of ownership. Carpets of Antron® nylon can last up to 75% longer than the majority of competitive nylon carpets. When specifying carpet, there are two choices for Antron® carpet fiber - Lumena™ solution dyed and Legacy™ white dyeable nylon.

antron.net/
linkedin.com/company/antron®-brand

CEILINGS/CEILING CARE

Armstrong Ceilings

Armstrong World Industries provides ceiling & wall solutions to help in the design and construction of commercial buildings and residential spaces.

www.armstrongceilings.com/healthyspaces

ELECTRICAL/WIRE MANAGEMENT

Connectrac

Connectrac® wireways are the best floor-based solution for bringing power, data and communications from the wall to all interior commercial applications without core drilling, trenching or unsightly power poles. Available in In-Carpet or On-Floor options, Connectrac provides its customers with cable management that is easy to install and gives a subtle and elegant look to a workspace. Connectrac is quickly becoming the go-to solution for top corporations, government agencies, and universities.

www.FacilityFreedom.com | +1-877-357-7536
twitter.com/Connectrac
linkedin.com/company/connectrac

FM CONSULTANTS/SERVICES/PROVIDERS

Camcode

Camcode manufactures durable bar code labels used to link information to your facility management software, making data collection efficient and 100% accurate. Based in Cleveland, Ohio, Camcode specializes in bar code labels for tracking equipment history, asset visibility and traceability, and simple identification. Our labels are in service across a wide variety of industries, including facility management, transportation & logistics, utilities, healthcare, education and more.

www.camcode.com | +1-800-627-3917
twitter.com/camcode
www.linkedin.com/company/camcode

FM SOFTWARE

SpaceIQ

SpaceIQ is the workplace operations platform that provides the tools and insights to help execute data-driven real estate decisions, increase operational excellence, and enhance employee experience. SpaceIQ connects data across the enterprise and leverages AI-optimized algorithms and intelligence so you can optimize:

» Space Management
» Real Estate Management, Planning, and Analytics
» Internet of Things (IoT) and Meeting Room Management
» Asset and Ticketing Management

www.spaceiq.com/demo
twitter.com/SpaceIQ1
www.linkedin.com/company/spaceiq/

FIRE PROTECTION SYSTEMS

AGF Manufacturing, Inc.

For over 30 years, AGF Manufacturing has designed and produced innovative fire sprinkler products that provide an unprecedented combination of reliability, versatility and ease of use. AGF's product line include: PURGEnVENT, TESTanDRAIN, RiserPACK, COLLECTanDRAIN, and CORRinSITE.

www.agfmfg.com | +1-610-240-4900
twitter.com/AGFMfg
www.linkedin.com/company/agf-manufacturing-inc-

FURNITURE

Special-T

Special-T is working hard to deliver solutions to help Corporate America secure a safer and healthier workplace. In early 2020 in response to COVID-19, we developed a comprehensive line of screens and shields that can be retrofitted to existing desks and workstations. The company is poised to introduce a revolutionary new approach to air filtration and purification (patent-pending) that will complete an innovative, three-legged stool of protection against the spread of infectious diseases.

https://www.specialt.net/
https://twitter.com/SpecialT_tables
https://www.linkedin.com/company/special-t

Vendor Profiles

HVAC/INDOOR ENVIRONMENTAL QUALITY SOLUTIONS

CETEC

CETEC is an international scientific consultancy focused on optimizing occupant health, wellbeing, and performance and with an unparalleled record across 32+ years and 25 countries. CETEC offers both proactive and reactive risk management dangerous goods design and certification, onsite testing, performance verification against rating schemes like WELL and Fitwel, and more.

cetec-us.com
twitter.com/CETEC_Group
www.linkedin.com/company/cetec-pty-ltd/

ROOFING

Sika Sarnafil, Inc.

Sika Sarnafil is the world-wide leader in thermoplastic PVC roofing technology with over 55 years of proven performance in over 100 countries in every climate imaginable.

usa.sarnafil.sika.com/why-sika-sarnafil | +1-800-576-2358
twitter.com/sika_usa
www.linkedin.com/company/sika-usa

ROOFING, CONT.

The Garland Company

The Garland Company, Inc. manufactures high-performance roofing and building envelope solutions. For over 125 years, Garland has raised the bar of performance while exceeding the needs of customers throughout the world. Our network of over 220 local building envelope professionals located throughout the U.S., Canada and the U.K. provide quality building envelope solutions for single and multi-property facilities. Garland, headquartered in Cleveland, Ohio, is an ISO 9001:2015 certified company.

www.garlandco.com | +1-800-321-9336
https://twitter.com/GarlandWorks
www.linkedin.com/company/the-garland-company-inc-/

WATER MANAGEMENT SERVICES/TECHNOLOGY

Nalco Water

An Ecolab Company

Keep your facilities operating efficiently and safely with Nalco Water, An Ecolab Company. Our solutions for water, air, energy management and facility maintenance deliver maximum ROI by reducing energy costs, protecting building assets, minimizing risk and increasing tenant satisfaction. Trusted at more than one million customer locations, Nalco Water and Ecolab specialize in safe, simple and sustainable programs including our 3D TRASAR Technology solutions, water safety programs, and building recommissioning programs.

www.ecolab.com/nalco-water
https://twitter.com/Nalco_News
https://www.linkedin.com/company/nalco

WATER MANAGEMENT SERVICES/TECHNOLOGY, CONT.

WaterSignal

WaterSignal's intelligent, non-invasive device accurately measures water usage and reports the data in real time to a secure dashboard. While dramatically reducing water costs and footprint, WaterSignal saves valuable time and provides unique insight on our most precious resource, water.

http://watersignal.com | +1-844-232-6100
https://twitter.com/WaterSignal
https://www.linkedin.com/company/watersignal/