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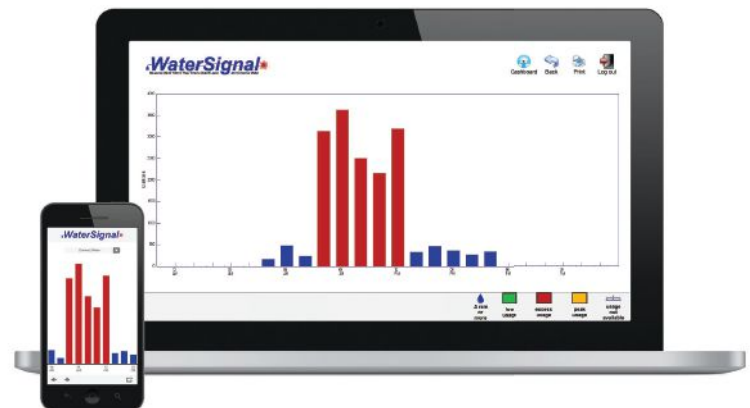
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IFMA is the world's largest, most widely recognized association for facility management professionals, supporting more than 20,000 members in 106 countries. Founded in 1980, IFMA's vision is to lead the future of the built environment to make the world a better place. A key contributor to the development of international FM standards, IFMA provides career resources, continuing education and three industry-respected credentials; maintains the largest repository of FM-related content on the web; and hosts year-round global events. Among the values that guide us, we believe in the benefit of global diversity, inclusion and social equity; and we recognize that sustainability, resilience and responsible environmental stewardship are paramount. For more information, visit ifma.org.

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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.

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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.

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Ask the Experts

Continuous Innovation

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Establishing better workplace experiences
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Case Study

Innovation in the built environment
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A New Light

Using LEDs to protect the workforce
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Vendor Profiles



Editor's Note Bobby Vasquez

Our connected world has provided us new opportunities both at home and in the workplace. Tasks once buried under mounds of paperwork (or laundry), projects delayed by outmoded processes, to-do lists handwritten in a day planner, even keeping up with family and friends are easily accomplished by the push of a button or a swipe across the screen of a phone or tablet. The convenience and control technology has placed in our hands has never been more evident than this past year.

Through the pandemic, we realized that certain team or staff meetings really could be handled in an email. Those who were able to work remotely found they could get more done without walking down the hall to attend a meeting or getting sidetracked by water-cooler chats in the breakroom. Our productivity and focus changed. It was an interesting revelation.

However, as more of our coworkers became just another a face on a screen or a voice from a speaker, the more we craved their company, the more we missed those spontaneous breakroom meet-ups. We recognized that we lost a big piece of who we are in the workspace by not being in the workspace.

Pre-pandemic, those of us who thrive in interpersonal relationships used staff or client meetings not just to plan and track projects and progress — we used them to nurture the sense of belonging to a physical team, to engage with other human beings, to learn, share, create.

And while we have the technology to diagnose system errors from afar, log and track work orders, host meetings and many other day-to-day workplace tasks, those of us who either needed or wanted to fix things with our hands or preferred the direct challenge (and satisfaction) of solving a problem on site did not rely solely on technology.

It will be interesting to see technology's long-term influence on the return-to-work experience. In this issue of IFMA's FMJ, our authors discuss that influence and how FMs can leverage it for their best possible outcomes. As reoccupying space reestablishes itself as everyday life, how will occupants view technology? Will they continue to virtually book space? Will they become accustomed and adhere to capacity limitations? How will they adapt to the touchless and app-based options that have grown in popularity over the last 18 months?

There are many questions for FMs, as well. What's next for space and how it's used? What will be the next technology evolution? Which strategies can be salvaged from the pre-pandemic days, and which must be completely eliminated? The work-from-home experiment is not over. If anything, reentry is adding a new variable from which many valuable lessons can be learned.

Cheers!

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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,
IFMA FELLOW

*Chair,
Board of Directors*

With this issue of FMJ we move into a new fiscal year for IFMA, and I am relieved to say we made it through perhaps the most challenging period in IFMA history.

Nobody could have foreseen the impact COVID-19 had on our society and specifically on IFMA. When I took over as chair last year, I knew this was going to be a tough year for the association as we quickly went into survival mode — reevaluating our budget and postponing our strategic initiatives, major investments and everything that would not have an immediate impact on our financial performance. The association pivoted and our events took a hard hit as we could not sustain the same level of income from our virtual events as we have from World Workplace and Facility Fusion.

I'm very proud of the way IFMA staff reacted to the situation, their level of professionalism and how quickly they were able to adapt their plans and initiatives to a new reality. IFMA staff's voluntary pay reduction and their flexibility will long stand as a testimony to their dedication and passion for IFMA and its members.

Despite the challenges, fears and loss we have experienced, there's a feeling of hope and renewal — an expectancy that we're close to being on the other side of this crisis. While reverberations from the pandemic will undoubtedly linger, organizations and individuals are making progress in the journey toward recovery and normalcy. IFMA, for example, was able to reimburse staff for the pay cut they took last year. Thanks to strong financial discipline, an

approved PPP government loan, increased revenue from our professional development offerings and the continued support of our members, we had the means to make our valued staff whole.

On July 1, Laurie Gilmer, Dean Stanberry and I began our second terms on the executive committee of IFMA's board of directors. We have been given the great opportunity and honor of staying in office for another year to implement the plans we postponed due to the pandemic. (Read more in Industry News.)

This is not something we take for granted, and I would like to thank the nominating committee and the members for their vote of confidence. Also, I would like to thank our outgoing board members Kate North, Michael Redding and Jenny Yeung for the outstanding contribution — and welcome Cheryl Carron, Christa Dodoo and Samson Lee as newly appointed board members. Finally, I would like to thank IFMA staff, leadership, the board, sponsors and the many volunteers for all your support and dedication — this has made a world of difference to the association, especially during such a difficult year.

I do believe IFMA has come out of the pandemic stronger, more focused and more adaptive. These virtues will help us to further grow the association and take IFMA to the next level.



DON GILPIN

*President & CEO
IFMA*

From the **President**

As a young girl, my grandmother traveled by covered wagon as the family moved from Nebraska to Minnesota to take ownership of a new homestead. Over the course of her lifetime, she witnessed the invention of the modern radio, the refrigerator, the television set. She watched Dorothy enter Oz in color on the big screen. She traveled to Hawaii on a 747. She saw a man walk on the moon.

It's hard to imagine experiencing these remarkable breakthroughs for the first time – from prairie schooner to jetliner to spacecraft; however, we're living in our own age of historic technological advancement. The tech evolution is accelerating at unprecedented speeds. While many products and services are becoming obsolete before our eyes, others are taking an innovative stronghold in our everyday use both at home and in the places we manage.

With the increasing adoption of the Internet of Things (IoT), automated control systems, machine learning and artificial intelligence (AI), technology is helping us problem-solve, navigate, communicate, modernize, treat, track, learn and play faster than ever before.

Another business byproduct of the COVID-19 pandemic is the increasing operationalization of AI projects. According to Appen's 2021 State of AI Report, companies focusing on improving productivity, as well as their understanding of corporate data, now view the use of AI to support internal processes as central to their survival.

While sophisticated technologies offer the promise of helping us solve some of our greatest problems, ease some of our greatest burdens and open

the door to some of our greatest dreams, safety, security and ethical issues are still a concern.

Reentry protocols that track people's comings and goings in the name of the greater health and safety are being weighed against the right to privacy. Social media enables connection and engagement with people, brands and projects around the world, but also provides a platform for misinformation, racism, harassment and criminal activity. And quite often, the smarter a building gets, the more vulnerable it is to cyber threats.

Despite ascribing technology with words such as "intelligence," it does not have the capacity for free will. It is simply a tool. Humans are the variable in its use – we can choose to use it for good or for harm. As the technological evolution continues taking our industry to new heights, we must choose to harness its power and usability to improve our facilities and occupant experiences for good.

Earlier this year, IFMA unveiled our new long-term vision for the association: "Lead the future of the built environment to make the world a better place." With our industry's continued push for innovation, growth and knowledge sharing; with well-informed, resourceful and conscientious application of new technologies; and with IFMA's commitment to embrace and act upon our values of social justice, resilience, transparency and excellence in support of the industry, facility management professionals are well positioned to ensure that our environments today and tomorrow are better places for everyone.



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IFMA ANNOUNCES 2021-22 GLOBAL BOARD OF DIRECTORS

Due to the irregular circumstances presented by the COVID-19 pandemic, IFMA's Nominating Committee recommended that the 2020-21 executive committee (EC) of its global board of directors remain in office for an additional year. Members of the EC typically serve for one year; however, the committee's objective in extending the EC's term for the 2021-22 fiscal year (July 1, 2021 – June 30, 2022) was to maintain stability and minimize unnecessary risks.

In accordance with IFMA's bylaws, a ballot was presented to members, who confirmed the nominating committee's recommendation. IFMA is pleased to announce that Peter Ankerstjerne, MBA, COP, IFMA Fellow will continue his term as board chair through June 30, 2022. Laurie A. Gilmer, P.E., CFM, SFP, LEED AP will remain as first vice chair; and Dean Stanberry, CFM, LEED AP O+M will remain as second vice chair. To better reflect the scope of Don Gilpin's responsibilities, his title has changed from president and COO to president and CEO.

"This is the first time in IFMA's history that all three executive committee members will remain in office for another year. I believe it will be of great benefit to the association," said IFMA President and CEO Don Gilpin. "With so many positive changes

happening at IFMA — such as introducing our new mission and vision, unveiling a refreshed logo and brand, and broadening our educational offerings — we need that continuity in leadership. Peter, Laurie and Dean have brought us through one of our most challenging times. Their hands-on experience and deep knowledge of current projects and objectives will help us hit the ground running as we move forward."

Newly appointed board members Cheryl R. Carron, Christa Dodoo, CMQ/OE, CFM, FMP, CIWFM, and Samson Lee will serve on IFMA's global board of directors until 2024. Nominating Committee Chair John Carrillo, CFM, IFMA Fellow, who served as board chair from 2019 to 2020, will remain involved with the association as past chair.

"I greatly appreciate our membership's vote of confidence," said Chair Peter Ankerstjerne. "The past year has been an unsettling time for all of us. Like many organizations worldwide, IFMA had to halt, delay or modify certain goals and projects as a result of the pandemic. I'm grateful that IFMA's executive committee has been given another year in office. We look forward to implementing the strategic initiatives we intended to carry out before COVID-19 hit."

2021-22 IFMA Global Board of Directors



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Chief Strategy Officer,
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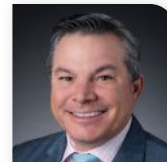
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Chief Strategy and Product
Officer, Blue Skyre, IBE (BSI)
San Francisco, California, USA



Mindy Williams-McElearney
Director, Turner & Townsend
New York, New York, USA

Learn more about IFMA's global board of directors at ifma.org/about/leadership-staff/board-of-directors/global-board-of-directors/.



Kay Sargent testifies before U.S. Congress on behalf of IFMA

As part of IFMA's ongoing efforts to provide FM perspective on public policy, IFMA member and Workplace Evolutionaries co-founder Kay Sargent, ASID, IIDA, CID, LEED AP, MCR.w, WELL AP, Director of Workplace, HOK testified on behalf of the association before the House Transportation and Infrastructure Committee's Subcommittee on Economic Development, Public Buildings and Emergency Management.

In the May 13 "Federal Real Estate Post-COVID, A View from the Private Sector, Part 1" hearing, Sargent opened with an overview of the facility management profession, emphasizing FM's essential role in the continued operation of critical buildings during the COVID-19 pandemic.

"At no time has the essential role of the facility manager been clearer than over the past year. FMs in the public and private sector have met the challenges of the pandemic. They now will have critical roles in safely reopening and maintaining America's building infrastructure," said Sargent.

Sargent also addressed the changing workplace and the importance of "transforming the office from a place where people have to be, to an ecosystem of spaces where people want to be." Outlining three components to a next-generation ecosystem that will support hybrid work, Sargent stressed the need to "leverage technology and continue to invest in the people running our buildings. New requirements for building performance coupled with new expectations in the post-pandemic era require additional investments in facility managers. Smart buildings require smart people."

Sargent closed with recommendations, including:

- the disposition of excess federal property to ensure that federal buildings are assets, not liabilities;
- expanding Federal Buildings Personnel Training Act (FBPTA) requirements to cover leased space and clarify the intent of the FBPTA to focus on utilization of existing industry education programs to ensure compliance; and
- Congress' commitment to supporting enhanced telework, as well as "building, operating and maintaining workplaces of the future, which can be a shining example of American ingenuity and leadership."

"We have a unique opportunity to create government workplace ecosystems where the most exceptional people want to be. But we must take the steps to do so now."

– Kay Sargent

Young IFMA program gains traction globally as regional representatives lead the effort

An initiative launched by the association's Regional Advisory Boards, Young IFMA aims to attract and engage facility management students and young professionals (YP) at or under 35 years of age.

To accomplish its mission to communicate, engage, create value and opportunity for YPs globally inside of IFMA, the program is being led by three enterprising members responsible for these key regions: for Young IFMA EMEA, Maria Hernandez from Italy; for Young IFMA Americas, Derek Bacigal from Hawaii; and for Young IFMA AsiaPac, Joe Chow from Hong Kong.

The representatives are charged with connecting to the global YP network, gaining a better understanding of interregional needs for YP, coordinating local YP activities and forming local working groups to enhance YP involvement. Hernandez, Bacigal and Chow will report to the Regional Advisory Boards and IFMA's global board of directors on their progress and results.

Young IFMA is seeking YPs who are interested in joining this initiative. The overall objectives of the Regional Young Professionals Working Groups are to:

- Attract YP interest in FM as a career of choice from related, underemployed industries;
- Grow membership of YPs 35 and younger currently in the FM industry or through second career opportunities;
- Provide support to successfully grow membership within this demographic;
- Create a platform for YPs to promote global networking and connections, and a venue to share best practices and lessons learned.

"Young IFMA working groups will provide emerging FM professionals with the opportunity to share experiences, build their profiles, and access information and tools that can contribute to the success of their careers, including access to potential employers," said IFMA EMEA Director Lara Paemen. "Working groups are open to any student or young professional member who has an interest in connecting with their peers and contributing the future of the association."

While the Americas group has been active for a number of years with the support of councils, communities and local chapters, the EMEA and AsiaPac groups are still in the development stage. Plans for a Latin America group are being discussed. If you would like to get involved, please contact the regional representatives directly at: maria.hernandez@myefm.it (EMEA); derek.bacigal@gmail.com (Americas); or joe.chow@cityholdings.asia (AsiaPac).

Industry News

IFMA PROVIDES RECOMMENDATIONS TO THE EUROPEAN COMMISSION FOR ACHIEVING SMART, ENERGY-EFFICIENT BUILDINGS

The January/February edition of Industry News reported on the European Commission's Renovation Wave Strategy, which aims to "at least double the annual energy renovation rate of residential and non-residential European buildings by 2030 and foster deep energy renovations." In a written response to the initiative, IFMA welcomed the Renovation Wave strategy as a major step in attaining real energy-efficiency gains through a building's entire life cycle.

While the initiative appears to primarily focus on materials used in the construction and demolition phases, IFMA recommends the Commission take into account FM's existing practices in measuring and benchmarking buildings' life cycle performance as it develops its 2050 whole life cycle performance roadmap for buildings, emphasizing:

- Optimized operational building management carries a significant part of the energy-efficiency savings through a building's life cycle. Facility managers are able to collect data on the building's energy performance throughout the life cycle, indicating where improvement projects need to be prioritized.

- Facility managers are already involved in identifying the recycling potential for building materials and building products, and in particular the provision of Environmental Product Declarations (EPDs) for established products and incentive systems.

Among IFMA's statements of support for various directives and goals, recommendations presented to the Commission centered on:

- involving facility managers as essential stakeholders in the renovation process;
- providing clear guidance to formally consult facility managers on the existing building's energy performance in the preparatory phase of renovation;
- formally consulting facility managers in the conception, integration and management of smart building applications; and
- investing in a formal training programs to upskill and reskill Europe's workforce.

In agreement that integrating automation technologies into the built environment will accelerate the decarbonization process of Europe's new and existing building stock, IFMA stated support of the Commission's ambition to increase the smartness rate of buildings as part of the Renovation Wave Strategy. However, IFMA stressed that achieving smart buildings should not be a goal, but a process in which facility managers are involved.

"It is crucial that facility managers are not only formally consulted about the smart readiness of a given building, indicating which technologies are required and how they should operate, but are also adequately trained to manage the technologies and help the building become smarter." - IFMA

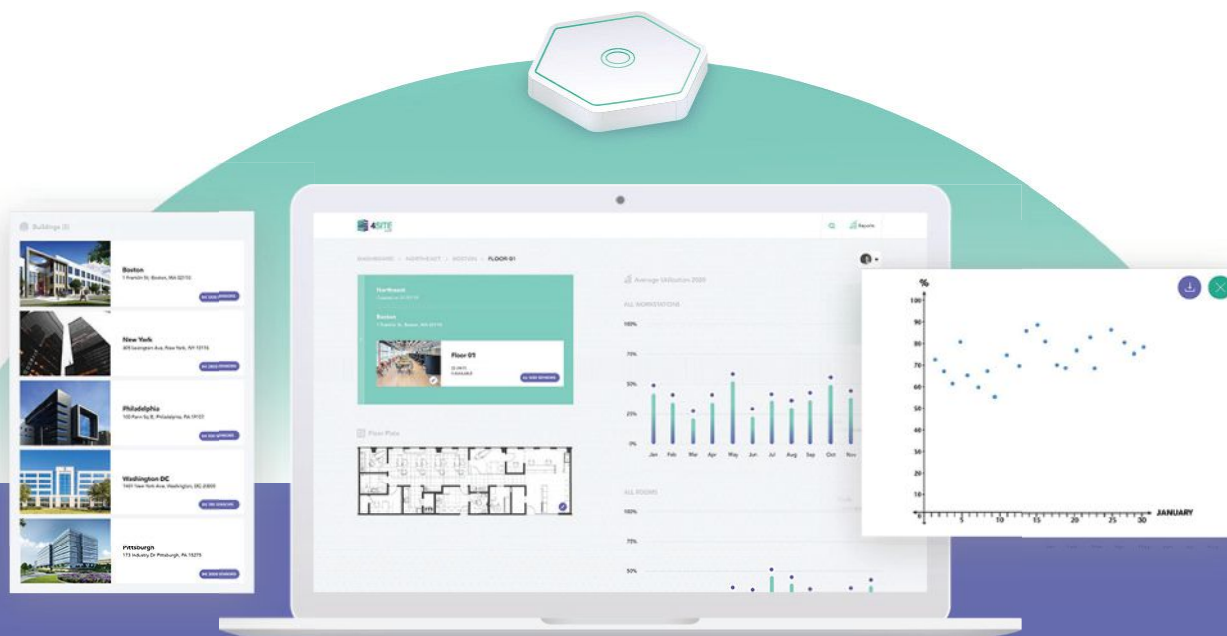
The statement concludes with mention of IFMA's Sustainability Facility Professional (SFP) credential program, which can help FMs and their organizations maximize efficiencies, implement sustainable best practices, and help achieve EU and global regulatory ambition in the area of sustainable buildings.

Have relevant FM industry news to share?

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WORK SMARTER NOT HARDER

Increasing Energy Efficiency &
Employee Well-being with Smart Buildings

BY TC LIN & KEN SEELOW

With so many everyday products and appliances becoming “smart,” it is interesting to look at past depictions of what people thought the future would hold — be it a dystopia or a utopia. Today’s world is not like that of the Jetsons or Blade Runner; however, technology is more advanced than many people realize.

Imagine a building that can learn about the people who pass through it, studying their preferences and responding to them almost like a living entity, even self-regulating to harness efficiencies. These buildings already exist and are called smart buildings; they are facilities not just of the future but the present.

What is a Smart Building?

A smart building is a self-aware facility that takes data from its external and internal environments and monitors occupants to adapt to meet needs and preferences. To varying degrees, all smart buildings are future-proofed, adaptable and responsive.

Smart building users are active participants by providing feedback and being monitored by sensors, tags, geo-location zones and more through the Internet of Things (IoT). People are empowered to utilize integrated technology to make their own comfort decisions, helping the smart building predict future behavior and be truly occupant centric.

Early Adopters

Over the past several years, European countries have been on the forefront of implementing technology and sustainability changes. Two of the most well-known, sophisticated smart buildings in the world are One Albert Quay in Cork, Ireland and Deloitte’s The Edge in Amsterdam. Both facilities are hallmarks for the future of corporate real estate. Monitoring occupants not only allows these buildings to adapt to user preferences, but also reduce energy usage and waste. For example, by tracking who is in the building and applying statistical usage data, on-site chefs know exactly how much food to prepare for that day, and elevators can be timed upon a person’s arrival to reduce wait time, maximizing their day. At One Albert Quay, 200 liters of rainfall are collected and repurposed back into the building central plumbing system.¹ At The Edge, employees utilize a free address system, with live train and bus schedules sent to building users’ cell phones to help plan commutes.² Thousands of light and temperature sensors throughout both buildings are linked to a central data analytics

platform, enabling smart facility management. This helps, for example, guide cleaning staff to heavily used areas for extra sanitizing and restocking and allows facility managers to perform predictive maintenance by monitoring system usage. For these companies, their facilities have become one of, if not their strongest, recruitment advantages.

Advantages of Smart Buildings

Smart buildings offer two main advantages:

1. They provide increased energy efficiency by streamlining usage;
2. They aid in employee well-being by customizing spaces and allowing occupants to feel safe, knowing there is increased security.

Efficiency + Sustainability

Though varying from country to country, utility fees generally are significantly higher in Europe than in the U.S., increasing incentive to streamline and reduce where possible. For example, in September 2020, German households had the highest energy rates in the world, paying about US\$0.36 per kilowatt hour plus value added tax; Polish residents by comparison paid half as much, while U.S. households paid even less.³ Designing a smart building is a significant upfront cost anywhere in the world, but it may only take 10 years to pay off the investment in Europe, whereas it could take 20-30 years in the U.S.

More than just saving money, smart buildings are as much of a long-term investment for a company as for the environment. Smart buildings react through automatic load reduction and shifting, and shedding or peak shaving (reducing demand during peak usage times) as they communicate with the power grid; some can even create their own power through solar, wind and water re-

Smart buildings are future proof and highly customized, helping foster the environment as well as employee well-being. Buildings such as the LEED Gold Certified Green Technology Training Center maximize efficiencies through features such as its HVAC system, hydronic radiant floor heating, LED lighting, automated operable windows and more.



purposing.⁴ In this way, smart buildings are the first step from a centralized power grid toward a localized one, where the building becomes both the consumer and producer of the energy needed to operate.⁵ Additional sustainable steps, such as monitoring CO₂ levels based on occupancy, not only protect the environment but also contribute to employee well-being with healthy, circulated air.

Employee Well-being

Wellness and health are already prominent discussions related to building design and will only increase in relevancy post-pandemic. While energy usage is easy to monitor, it is difficult to put a price tag on intangibles such as employee well-being. Smart buildings can positively affect peoples' physical and mental health in a variety of ways. On a macro level, these facilities provide increased awareness of sanitary needs throughout the building based on traffic levels, operable windows open or close based on exterior conditions and window shades can automatically adjust to maximize daylight or reduce glare; on a micro level, individuals can provide feedback on their specific preferences for temperature and light levels to customize their experience. Smart buildings work smarter, not harder, and ideally enable their occupants to do the same.

Another benefit of smart buildings is the support of recruitment strategies; creating a facility where people want to be can attract top talent and retains enthusiastic employees, resulting in improved company performance. This is even more important following the pandemic, during which people worked from the comfort of their own homes. By offering a space that can be customized through lighting, temperatures and responsiveness to their desires, smart buildings can replicate or even improve upon the comfort and flexibility of home.

Many pilot programs are also using a free address approach in smart buildings to offer flexibility. Employees check in and are assigned or can choose a place to work each day that meets their preference for focused or collaborative work and the space re-

sponsively adjusts to their preferences. Furthermore, employees can tie their schedules to the management system to place them in the most productive, enjoyable environment. For example, when scheduling a meeting, the smart system can select the meeting space in an optimized location, equipped with technology that is powered up and ready upon arrival, and even set to the specific temperature preferences of the users. This saves employees time searching for conference rooms with their technology needs and

By offering a space that can be customized through lighting, temperatures and responsiveness to their desires, smart buildings can replicate or even improve upon the comfort and flexibility of home.

availability and allows companies to be more efficient with how they invest in technology; it may not be necessary for all conference rooms to have the same high-end technology as the system helps people find what they need faster. These streamlining measures not only make users more comfortable, but they can also lead to increased productivity levels as people can tailor an environment that works best for them. The lives of FM staff can be made easier through predictive maintenance indicators smart buildings provide, such as monitoring and indicating replacements of filters in mechanical systems, equipment service life updates or water leaks.

Key Considerations

For some, upon first hearing of smart buildings, their instant reaction is apprehension. However, what many people do not realize is that if they have a device on their person, such as a smartphone or smart watch, they are already being monitored from data collected through IoT — the same platform that smart buildings use. Especially for those who are unsure, there is a degree of transparency and trust that employers must earn by explaining how the system works and the benefits of data collection. Like most policy changes, change management is key in ensuring employees are heard, known and understood. To navigate the transition to a smart building, conversations between leadership, staff and the design team are vital; just because certain smart measures are available, it does not mean they are a good fit for every company or culture. Smart buildings are a significant upfront investment. Like any major fi-

nancial or cultural decision, all factors must be considered with candor and align with a company's long-term goals and mission.

Change can be difficult, especially when it comes to technology. Much like with the emergence of cloud-based systems, there have been many early adopters who are excited about the prospect of smart buildings, but also some who are cautiously waiting to embrace technology until it is essentially mainstream. Initially, when the cloud was introduced, many companies, especially in health care, were resistant, fearing that they could not control data. Now common, cloud storage can provide more security than previous hardware systems. The rise of the smart building appears to parallel this pattern. As with the cloud, the more people who jump on board, the more widely accepted the technology becomes until concerns are eventually addressed or disappear entirely. So far, we are unaware of any major security breaks in smart buildings, but the possibility certainly exists; so, it is paramount for owners and FMs to stay vigilant, taking additional security measures such as hiring security advisors, doing regular assessments, performing penetration tests and having emergency response plans in place. As smart buildings become more common and understood, people's fear of the unknown will eventually diminish, giving way to acceptance.

Smart buildings will eventually yield a positive ROI through energy savings and improved employee performance, but it will take time. Companies considering a smart building must decide if they are in it for the long haul or where the tipping point will be for pay off.

Three key performance indicators are:

- the initial investment payback period,
- the building cost (purchase, own, operate, maintain and decommission) over its lifetime, and
- savings achieved as compared to the initial capital investment.⁶

Still relatively on the frontier of smart buildings, data continues to be gathered. Case studies will be particularly important for seeing theories actualized to aid companies in making the decision to go "smart," and "how smart." Fortunately, smart building software technology is highly customizable and future proof, and hardware can achieve long life spans with slow depreciation. Hardware will inevitably need a refresh at some point, but most things associated with IoT are very simple in nature, such as water sensors that do not have a lot of anticipated room for improvement in the future.

The Possibilities Are Endless

The industry is just scratching the surface of smart building technology possibilities; the more data acquired, the more informed this technology can be and the greater its potential. If an organization is interested in pursuing a smart building, it is best to lay out all the possibilities and allow them to pick and choose what works for their company and culture. Integrating workplace strategy into the earliest stages of smart building design has historically created the highest performing facilities.⁷ When an organization has a clear idea of how they work and how space design and function can help them meet their goals, only then can they put smart building technology to work for them.

The best advice for those considering a smart buildings is to be open to the possibilities. These developments are exciting and help improve the health of business and their employees in so many ways. When possible, begin small, incorporating smart elements to address immediate needs that provide high value, before committing to a full-blown smart building. Start conversations early in the design process anchored by research on culture, business goals and considerations for change management. Smart technology is an investment in a company's greatest asset — employees. **FMJ**



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1. "Smart Building — One Albert Quay, Cork." YouTube, uploaded by Tyco UK & Ireland, 4 May 2017. youtube.com/watch?v=Cgc553YAcKs
2. "World's Greenest Office Building Is Dutch: The Edge." YouTube, uploaded by Bloomberg Quicktake, 24 September 2015, youtube.com/watch?v=JSzkoK7dzo
3. Statista, 12 April, 2021. Household electricity prices worldwide in September 2020, by select country (in U.S. dollars per kilowatt hour). Published by N. Sönnichsen, statista.com/statistics/263492/electricity-prices-in-selected-countries/
4. Manic M, Amarasinghe K, Rodriguez-Andina J J and Rieger C (2016) Buildings of the future: Connected, Cyber Aware, Deep Learning Powered and Human Interacting. IEEE Industrial Electronics Magazine (10,4) pp 32-49.
5. Talon C (2016) 2016 Intelligent Buildings Survey. Navigant Research. pp 1-7
6. Honeywell and IHS, Inc. (2015) Put your buildings to work: A smart approach to better business outcomes. pp 1-2
7. Royal Academy of Engineering (2013) Smart buildings: people and performance. pp 1-12

PropTech Enables the Fusion of Buildings and Workplaces, but Integration is Key

BY MAUREN EHRENBERG & COLETTE TEMMINK



In the pursuit of continuous improvement, relevancy and competitiveness, there has been a drive for everything tech to help address current practices in strategy, scale, execution, priorities, efficiencies, cost, risk, governance and impact (i.e., environmental, social, and corporate governance and experience).

- FinTech – Financial Technology
- EdTech – Education
- RetailTech – Retail
- InsurTech – Insurance
- TravelTech – Travel
- PropTech – Property
- LegalTech – Legal
- HealthTech – Health
- MediaTech – Media
- Telecommunications Technology

Regardless of the technology, the objective is to enable integration, automation and data flow seamlessly across different applications for better business intelligence and an intense focus on stakeholders and net promoters. An example of this would be a mobile banking app customizable to a customer that combines all the user’s accounts (e.g., checking, savings, credit cards, mortgage, bill payment, transfers, etc.).

The foundation and approach to technology are similar if not the same across many technology categories. For example, blockchain, artificial intelligence (AI), data analytics, business intelligence (BI), application programming interface (API) integrations, machine learning, robotic process automation (RPA) and the Internet of Things (IoT) provide a foundation for advancements.

EVOLUTION OF PROPTech

Some sources suggest that PropTech emerged just after the dot-com era. Since then, significant growth and increased demand and investment in commercial PropTech solutions have occurred. However, over the last five to seven years, there has been a proliferation. As of April 2021, approximately 2,171 PropTech companies have collectively raised more than US\$51.6 billion, according to Crunchbase. While both the number of startups and investments have grown exponentially over the past few years, they comparatively remain in the shadow of FinTech. Figure 1 represents data provided by KPMG that illustrates the disparities in funding levels between FinTech and PropTech.

PROPTech IS STILL IN ITS EARLY STAGES.

While the number of investors and investment levels changes significantly across industry sectors, some of the variances can be explained given that a few firms categorize PropTech as a subsection of FinTech (e.g., KPMG), as commercial real estate is considered part of the financial sector, providing financial services to commercial and retail customers. The significant growth of PropTech has remained consistent over the past few years. The report cited that in 2019, 2,693 FinTech and 105 PropTech companies had received funding compared to CBInsights reporting just in the first quarter of 2021 there were 1,735 venture capital (VC) deals in total.

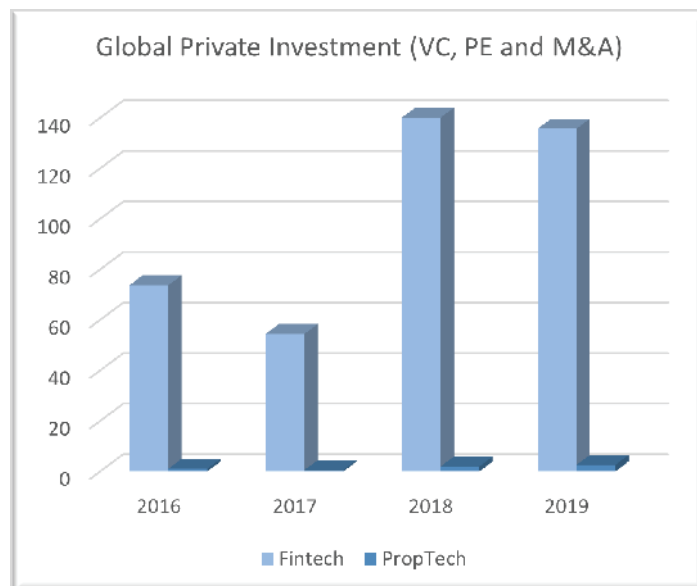


Figure 1. Source: KPMG

According to Freshcode, “FinTech is mostly an alternative to several offline solutions, for example, banking systems and being provided for end-users, whereas PropTech is transforming the whole real estate business ecosystem and creating a lot of new solutions for intermediate users.” This information only provides a sliver of the volume in PropTech.

For example, there are internet directories that list thousands of PropTech startups. Many of these might be self-funded or funded by individual investors. There are also industry combinations like LegalTech and PropTech for lease and contract management. PropTech is a broad category with subcategories such as ConTech (construction), smart real estate, sustainability, real estate FinTech (buy, sell, lease), etc.

There are many dynamics behind real estate and facilities that make it somewhat unique as one of the lagging industries to embrace what technology has to offer. Some dynamics are systemic and stem from dated infrastructure, the tremendous fragmentation from the degree of third-party managers and their propriety tech-

nology solutions and investments, the local nature of the location of real estate, lack of transparency, and occupiers versus owner level of demand and/or control over PropTech implementation decisions.

There are also many owners and occupiers of real estate that can slow the acceleration of technology implementation. The ability to scale tends to reside on engaging the larger owners or occupiers, which may or may not be incentivized to improve transparency, efficiencies or cost structure. For example, increased transparency in real estate data supporting transactions could impact the need for brokers or implementing smart building technology that reduces on-site resources could reduce a service provider's scope or fees.

Prompto cites two ways to adapt a large, traditional, slow-moving institution to an agile and fast-paced world — in-house solutions or cooperating with startups. What remains unclear is the funding from larger service providers or owners in some of the VC funds compared to the level of implementation of the same technologies across their service delivery or client portfolios. How many are implementing the technology that is self-funded or individually funded or have the infrastructure to evaluate the volume of these opportunities?

Based on 2019 studies highlighted by Freshcode, more than 80 percent of CRE investors expected PropTech to have an impact on the industry, but only 58 percent of real estate companies had a digital strategy in place and 25 percent had well-established data strategies to capture the right datasets. Freshcode also noted a 2020 study in which 54 percent of PropTech startup CEOs responded they were targeting office real estate and 31 percent were targeting hospitality real estate.

CHANGES ACCELERATING IMPACTS TO FACILITY AND PROPERTY MANAGEMENT

Change has often accelerated due to disruption caused by others entering an industry. For example, Amazon's impact on retail, Uber's on ridesharing and Airbnb's on hospitality. It is unclear which company will win trying to automate the transaction process of the buying and selling of real estate. FM is more fragmented than one end-to-end business process given the multiple different services and providers. While PropTech solutions can bring new ways of doing things, disruptions bring a new way of doing business.

Clayton M. Christensen defined "disruptive innovation" as innovation that creates a new market and value network and eventually disrupts an existing market and value network, displacing established market-leading firms, products and alliances. PropTech is set to impact FM's future, but a disruptive model for FM may be an all-in-one management system that integrates various solutions into one platform. This integration may include both technologies to enhance the occupant experience as well as technologies to drive operational excellence to provide a healthy and safe environment, e.g., indoor air quality, circadian and other lighting solutions.

2021 AND BEYOND:

While the hybrid office model is still playing out, there are trends that are expected to continue to evolve in PropTech for the second half of 2021 (post-pandemic) and the future:

- ▶ Covid impact and lessons learned for the future

- ▶ Influences of other technologies (e.g., Digital Twins, Blockchain, Big Data, AR/AI, Drones)
- ▶ Open system protocols like BACnet allowing communication between building automation and control systems for HVAC, lighting control, access control, fire protection and their associated equipment
- ▶ Renewable energy, energy management and conservation solutions
- ▶ Predictive maintenance and all-in-one building management solutions
- ▶ Bluetooth mesh, power over ethernet (PoE), and other cost-effective smart building solutions
- ▶ Integration with other industries (i.e., FinTech)
- ▶ Real-time occupancy management and space management planning
- ▶ Occupier apps to improve the customer experience (e.g., concierge services, issuing services and work order requests, accessing indoor air quality readings for room occupants, space access, building security touchless access, room and personal workspace lighting controls, etc.)
- ▶ Circadian and UV lighting, acoustics solutions for sound creation or canceling, smart window shades/blinds, and other building health and wellness solutions
- ▶ Smart buildings, Smart portfolios, monitoring/IoT, cybersecurity for building systems and remote access

WHAT 2021 WILL POTENTIALLY BRING FOR THESE AREAS, ACCORDING TO NEX CUBED:

- FinTech** Personal banking solutions continue to reach a wider audience than traditionally reached.
- EdTech** A combination of in-person and online learning will allow students to conduct their curriculum at their own pace.
- PropTech** Aligning to future trends and societal changes and center on identifying customer preferences as people will be hesitant to gather considering the pandemic.
- Digital Health** Telemedicine continued development and ways to increase access to personal healthcare resources.

PropTech can provide point solutions that are designed to tackle a single, specific problem that subsequently can be integrated to enhance existing platform solutions such as an integrated workplace management system (IWMS) or PropTech point solutions can be integrated with other point solutions to create bespoke workplace management platform system for a company. Time will tell if larger software firms, real estate operators and equipment manufacturers continue to acquire PropTech startup solutions to enhance their proprietary offerings or if a more open protocol approach will drive the trend for integrated technology solutions to provide the ability to connect different solutions under a common database and performance tool.

LEVERAGING THESE CHANGES

Objectives for the use of PropTech range from SaaS applications to building and portfolio features and more holistic ecosystem experience, sustainability operations, performance and compliance solutions.

According to Smart Building Forum, Jan. 20, 2021, Peter Fehl said, “Smart building technologies have come a long way but there has been one group left out of this progress: small and medium-sized buildings... More than 90 percent of the U.S. commercial building stock consists of properties under 50,000 square feet, yet businesses that occupy small- to medium-sized buildings have struggled to effectively optimize occupant comfort, operational performance and asset management. Today there is a need for a more centralized building management system (BMS) that is adaptable to the unique needs of small- to medium-sized buildings.”

For small- to medium-sized buildings, broad capability can be created through standards-based systems. For example, building upon a safe, Class 2 wiring system, power over ethernet (PoE) based building automation can allow buildings 50,000 sq. ft. or less to incorporate advanced automation cost effectively.

Another fast-emerging solution is Bluetooth mesh. According to Bluetooth.com, “Bluetooth mesh networking enables many-to-many (m:m) device communications and is optimized for creating large-scale device networks.”

Bluetooth mesh is a scalable solution for any age of the new small, medium or large asset. It can be used to avoid above-ceiling work in older buildings or existing spaces. It can provide a centralized, web-based dashboard that is dynamic, accommodating space changes, utilization and energy monitoring. It can help to create an enhanced occupant experience in a timely, cost-effective manner with the project being built off site, remote monitoring of commissioning progress and simplified commissioning process for the field technicians and reconfigurations and modifications are easily accomplished.

There are many SaaS solutions available today for small to mid-sized buildings that can integrate with the various smart building BMS protocols and can automate work orders and FM workflows for properties and across portfolios creating a centralized database for CMMS management and reporting.

Smart building strategies can adapt over time if the upfront objectives are clear requiring design flexibility to future proof and create a dynamic automated operating system. The desired results for delivering upon safe, healthy and productive stakeholder experience, efficient operations, energy GHG reduction and savings and equipment optimization. The opportunity exists to accelerate smart building implementations with the system, building and hybrid overlays, which can present the business case through speed and lower cost to implementation to achieve better operational performance, more consistency, compliance, reliability, operational and energy savings and elevated human experience.

Begin by considering the type of operating, social and working environment to be delivered, the visioning of the new digital ecosystem will help to prioritize the approach for that, which is important to have up front and the use cases for those various PropTech platforms and/or point solutions. Input should be sought from IT, human resources, public relations and environmental health and safety and the busi-

ness. Outside advisors that are hardware and software agnostic have a strong facility operations background rather than limited to system controls, and can assist with the oversight of project delivery through commissioning can be an effective outside experience to tap for end-to-end services rather than being product specific.

PropTech integration and the hybrid approaches to enable smart buildings will help the CRE and FM industries to advance and progress as has been seen in other business sectors. The promise of sustainable, operational, physical and digital transformation presents a solid business case and building stakeholders will benefit from the empowered experiences they provide. **FMJ**



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Colette Temmink serves as chief strategy and product officer at Blue Skyre, IBE (BSI) and is an IFMA global board member. Temmink oversees the strategy; product development and quality being delivered to customers to enhance their real estate performance. Temmink's professional affiliations include Counselor of Real Estate (CRE®), Fellow Royal Institute of Chartered Surveyors (FRICS), Certified Property Manager (CPM), Masters of Corporate Real Estate (MCR), Senior Leader of Corporate Real Estate (SLCR) and Certified Facility Manager (CFM).

References:

- Property technology. (2021, April 12). en.wikipedia.org/wiki/Property_technology
- List of top real estate startups - crunchbase hub profile. (n.d.). crunchbase.com/hub/real-estate-startups#section-overview
- Pollari, I. & Ruddenklau, A., (n.d.) KPMG Pulse of FintechH2 2019. assets.kpmg/content/dam/kpmg/xx/pdf/2020/02/pulse-of-fintech-h2-2019.pdf
- CB Insights. (2021, April 20). Venture capital Funding headline Report Q1 2021. cbinsights.com/research/report/venture-capital-q1-2021/
- Kovalenko, I. & Lozovyuk, A. (n.d.) What is PropTech and Why is it Gaining Momentum. freshcodeit.com/freshcode-post/real-estate-technology-trends
- Derynck, A. (2019, October 02). FinTech leads the way For PropTech. prompto.com/fintech-leads-the-way-for-proptech/
- Disruptive innovation. (2021, April 9). en.wikipedia.org/wiki/Disruptive_innovation
- Dinapoli, C. (2021, January 12). Trends from Industry Leaders: A survey of Fintech, Edtech, Digital health, and PropTech. nex3.com/blog-industry-trends-2021/
- Fehl, P. (2021, January 20). A big gap in smart buildings: The needs of small-to-medium buildings. smartindustry.com/blog/smart-industry-connect/a-big-gap-in-smart-buildings-the-needs-of-small-to-medium-buildings/
- Bluetooth mesh networking FAQs. (n.d.). bluetooth.com/learn-about-bluetooth/bluetooth-technology/topology-options/le-mesh/mesh-faq/



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NEW schedule for 2021

All times listed are in EST.

Monday, Oct. 25

8 a.m. – 5 p.m.	CFM® Exam Prep Review
10 a.m. – 5 p.m.	Registration/Badge Pickup
1 p.m. – 4:15 p.m.	Deeper Dive Sessions <i>Sponsored by First OnSite Restoration</i>
2:30 p.m. – 4 p.m.	Annual House of Delegates Meeting
7 p.m. – 10 p.m.	IFMA Foundation's Pirate Regatta

Tuesday, Oct. 26

7 a.m. – 5 p.m.	Registration/Badge Pickup
8 a.m. – 9:30 a.m.	Official Welcome and Opening Keynote, <i>Sponsored by Davies Office</i>
9:45 a.m. – 10:45 a.m.	Concurrent Sessions 1.01 – 1.06
11 a.m. – 12 p.m.	Concurrent Sessions 2.01 – 2.06
12 p.m. – 1:30 p.m.	Coquina Lawn Al Fresco Luncheon
1:30 p.m. – 2:30 p.m.	Concurrent Sessions 3.01 – 3.06
2:45 p.m. – 3:45 p.m.	Concurrent Sessions 4.01 – 4.06
4 p.m. – 5 p.m.	Concurrent Sessions 5.01 – 5.06
7 p.m. – 10 p.m.	Welcome Reception: Spookey Halloween Party

Wednesday, Oct. 27

7 a.m. – 5 p.m.	Registration/Badge Pickup
8 a.m. – 9 a.m.	Concurrent Sessions 6.01 – 6.07
9 a.m. – 3 p.m.	Expo Grand Opening
9 a.m. – 10 a.m.	Continental Breakfast in Expo Hall
9:30 a.m. – 2:30 p.m.	Expo Education Arena Sessions
12 p.m. – 2 p.m.	Lunch in Expo Hall
2:45 p.m. – 3 p.m.	Expo Prize Drawing
3:15 p.m. – 4:15 p.m.	Concurrent Sessions 7.01 – 7.07
4:30 p.m. – 5:30 p.m.	Concurrent Sessions 8.01 – 8.07

Thursday, Oct. 28

7 a.m. – 12 p.m.	Registration/Badge Pickup
8 a.m. – 9:30 a.m.	Plenary Session
9:30 a.m.	Continental Breakfast in Expo Hall
9:30 a.m. – 1 p.m.	Expo Hall Open
10 a.m. – 12:30 p.m.	Expo Education Arena Sessions
11 a.m. – 12:30 p.m.	Lunch in Expo Hall
12:45 p.m. – 1 p.m.	Expo Prize Drawing
1:15 p.m. – 2:15 p.m.	IFMA's Awards of Excellence
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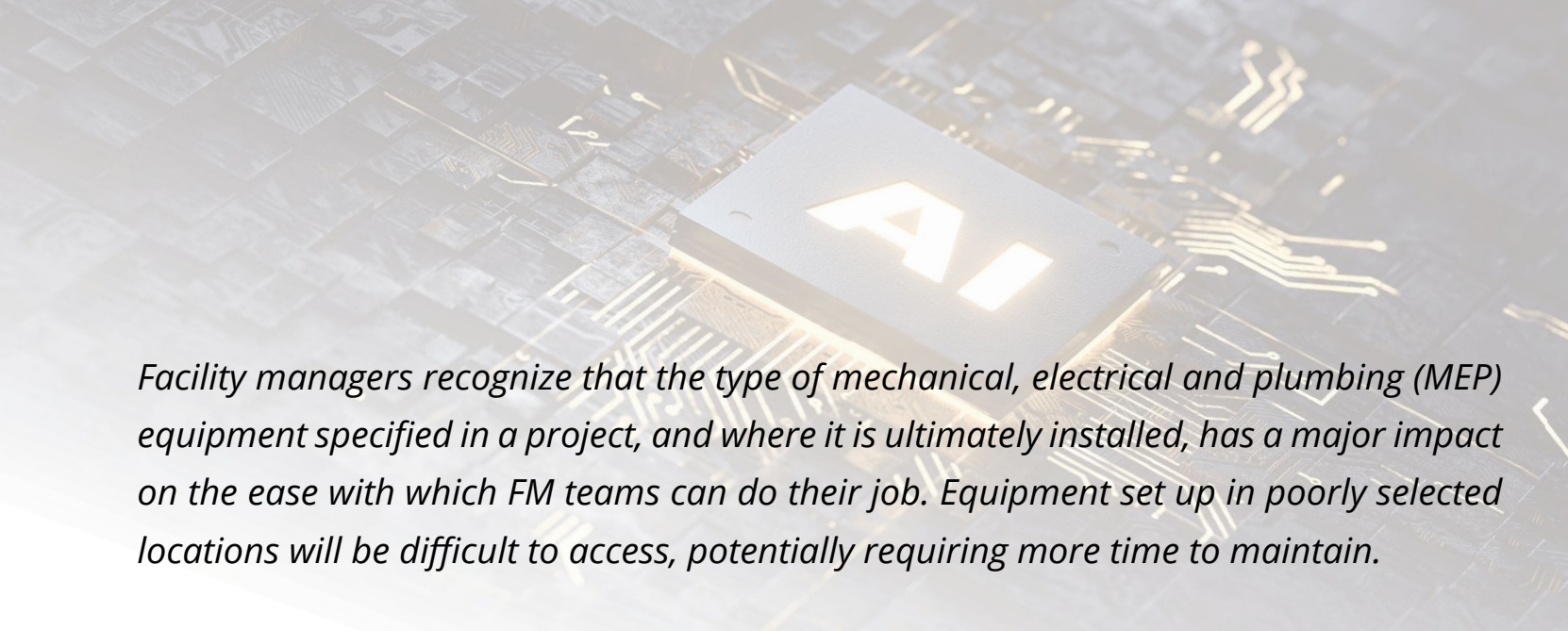




keep it simple

Using AI-Powered MEP Design for FM

BY GREG SCHNACKEL



Facility managers recognize that the type of mechanical, electrical and plumbing (MEP) equipment specified in a project, and where it is ultimately installed, has a major impact on the ease with which FM teams can do their job. Equipment set up in poorly selected locations will be difficult to access, potentially requiring more time to maintain.

However, what few FMs recognize is that the MEP design tools used to specify and lay out these systems could dramatically simplify the time spent maintaining them.

While design work has become increasingly digitized, not all of these advancements have made it down to the subcontractors engineering and installing these systems. However, some MEP engineering firms are applying computational design tools powered by artificial intelligence (AI) to simulate all potential MEP system layouts and identify the optimal solution for a project's specific needs.

This next generation of AI-powered MEP design tools can rapidly run through a near-infinite number of project options to help designers confidently select the option that most efficiently meets all requirements. This might mean, for example, the most affordable option for meeting energy-efficiency specifications and lowering the project's carbon footprint during construction and operation. AI-powered design tools can also ensure MEP systems have the least intrusive footprint possible, a particularly critical factor in space-sensitive projects.

By encouraging design teams to utilize AI to improve MEP system coordination and optimization in a hyper-efficient 3D modeling world, FMs can take an active role in diminishing operational costs and simplifying future maintenance. The cost savings that come from these improvements can be reinvested in the FM department, further driving up the value that this department can provide.

account for cost-effective MEP alternatives

Being among the largest systems making up any building, MEP systems carry a considerable share of the overall project costs. In some cases, these systems may make up more than one third to one half of the total project costs. Any potential effort to reduce the upfront and operational cost of these systems can make a dramatic impact on a building's overall costs and allow for funds to be allocated to more value-added FM items.

This is an area in which AI-powered MEP design tools offer a significant edge over conventional engineering processes. Under more traditional methods, MEP engineers might apply their knowledge, training and experience toward developing a single design solution to the best of their ability. AI-powered design tools, on the other hand, can rapidly work through all potential layouts to determine the single best and most affordable solution to a project's specific design challenges.

For renovation work, this begins with thorough documentation of existing systems. The engineer will identify if there are parts of the existing systems in good condition, as well as the expected useful life remaining for existing components and other critical details. That information is entered into the design software as an existing item that can be reused as part of the renovation at no added cost. However, because the AI-powered design software is able to run virtually limitless design options, there is the option of determining whether it might be ultimately less costly

to meet design goals by removing a certain run of pipe or ductwork and starting with an overall better design.

In other words, AI-driven design tools help remove the uncertainty by evaluating all potential alternatives, with and without reuse of existing materials. This cost optimization capability is unique to AI-powered design tools, but adds tremendous value for facility managers looking for ways to drive down both installation and operational costs.

improve long-term MEP system performance

Selecting higher performing systems may be the best way to lower long-term operational costs. This is challenging, however, as MEP system requirements have become more demanding in recent years. Today, building systems must balance an organization's sustainability goals and climate change commitments, while contributing to lower operational costs and not taking up more space than absolutely necessary. As these requirements stack up and become more complex, MEP engineers may be faced with making compromises on system quality, long-term operational costs or other factors.

By adding AI technology to MEP design processes, engineers can trust that the layout installed is the best option for meeting this tangle of interrelated project requirements. This might include the most cost-effective option for meeting energy-efficiency needs and lowering the project's carbon footprint during operation, all at the most reasonable price point.

A factor often overlooked by conventional engineering processes is that operational efficiencies can be gained simply by reducing the amount of wiring, ductwork and piping laid out in the building. When the MEP materials used are shorter and more directly laid out, systems lose less energy, require less air conditioning to offset heat and result in a lower electrical voltage drop or pressure drop depending on the system. This translates directly into energy savings. Improvements in optimization of the MEP distribution systems can lead to a 10 to 30 percent reduction in energy losses associated with those distribution systems.

simplify maintenance with simple, accessible layouts

More efficient runs can also lower operational costs by simplifying the time spent on maintenance. As engineer Henry Petroski once wrote, successful engineering comes down to an understanding of how things break or fail. Success is more about reducing the amount of time and money spent on repairing those failures. This is another area where AI-powered design can help.

Shorter and more direct runs, fewer fittings, valves and parts to fail can directly contribute to a reduction in future maintenance costs. Because AI-powered designs can lead to much simpler MEP layouts, they reduce the amount of wiring, piping and ductwork that goes into a building. As a result, designers can lower the amount of work needed to maintain that wiring, piping and ductwork over time.

Also, AI-powered MEP design tools can suggest layouts that make it easier to access equipment to perform that future maintenance. Too often FMs find that they must work around pipes and wires to maintain their critical systems. Given the many complexities and demands of today's buildings, few FMs have the time to waste on backbreaking, unnecessarily difficult maintenance tasks.

Because AI-powered MEP design software can factor in site constraints, including the placement of real-world equipment access requirements, it can build those requirements for access into a design upfront. By inputting all access points and the amount of space required to perform maintenance, AI-powered MEP design software can rule out layouts where another system might occupy the necessary service area.

support future troubleshooting

Larger facilities — including universities, medical centers and corporate campuses — are making delivery of building information modeling (BIM) a standard request as these design schematics can support future maintenance efforts. These models are embedded with tremendous amounts of valuable information on equipment models and component sizing that can simplify part replacement and the scheduling of preventive maintenance. A 2019 IMAGINiT Technologies survey on building information modeling and FM practices noted that the percentage of building owners integrating BIM data into their systems to support maintenance rose from 21 percent in 2018 to 24 percent in 2019. While this information is useful, its value still remains fairly limited to FM teams.

Now engineers can increase the value of this design information for the FM team by using AI-driven MEP design tools to embed even more useful design information that will benefit operations over the life of the facility. For example, the software can embed detailed information around flow rates, pressure losses and locations of expected voltage drops at the time of installation. FMs can use this information to rapidly diagnose problems and gauge systems for decreased performance over time.

When FM teams have easy access to this as-designed information they can more readily troubleshoot problems as they arise. The engineer need only dive into the design information to compare current readings with what was expected at the time of design.

For example, an engineer checking the flow rate within a certain piping system may be able to determine, based on checking the corresponding as-designed data, whether a control valve may need to be replaced. Having this data easily accessible helps to narrow down the path for repair and speed the maintenance process.

This depth of information far exceeds what is encapsulated in a typical BIM model or in using conventional engineering methods. Because AI-powered design software calculates all of this information upfront to make the most optimal layout selection, the FM team gains valuable design information at no added effort or cost to their department.

select a partner that shares your priorities

Time is money. Making design choices that can reduce time spent maintaining increasingly complex systems can lead to cost savings that can be reinvested in building improvements. While not all FM are invited to the design table, it is important to recognize that MEP system design has a direct impact on the job to be performed. As a result, FMs may want to consider playing a more active role here, particularly in selecting the engineering partners specifying the systems they will maintain.

Working with an MEP engineer who shares FM priorities around cost, performance and ease of maintenance will lead to installation of the best possible system for your building. Ultimately, with AI-powered software automating the process of MEP layout, this is exactly where MEP engineers can focus: on building relationships by supporting the FM in their job. **FMJ**



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ALL THE RIGHT REASONS

Physical Security Teams Need Digital Transformation

BY DESMOND THORSSON



Planning, protocols, infrastructure and personnel are critical to facility and security management for commercial and institutional buildings, facilities and campuses. FM organizations, whether they oversee one building or an entire campus, must be well prepared to maintain safety in their everyday routines and in the face of unexpected scenarios.

Team communication and collaboration is a core component of having prepared physical security teams ready to address unexpected challenges. Traditionally, security teams relied on legacy technology like radios. However, leading security teams must augment their communications strategies with digital transformation.

Many FMs have experienced the low-quality audio and limited capabilities that radios offer compared to modern, digital solutions. After facing these challenges with radios, frustrated teams often migrate toward multidevice strategies mixing radios, smartphones, desktops and mobile applications to meet their full multimodal needs of voice, text and visual media. This often unsanctioned or unplanned mismatch requires security guards to switch back and forth between devices to communicate by voice or share video or photos, creating a communications method that is overburdensome, creates risk and stalls productivity.

Further, the hybrid mix of technology like radios and mobile phones does not offer the full breadth of intelligence security officers and professionals need to do their jobs. Leading security teams must move away from disorganized multidevice communications strategies that lack security and compliance with today's IT requirements and protocols.

So what is the alternative? Intelligent collaboration solutions unlock the full benefits of digital transformation, ultimately recasting how FM and security teams communicate and operate. By eliminating multiple device usage for people in the field, security teams open the door to a holistic approach to operations and a real-time security operations system of record.

Here are six ways physical security teams benefit from modern and intelligent collaboration technology:

No. 1: Operational control

FM and security leaders need centralized visibility and intelligence to improve management and decision making that enhances productivity and safety. Collaboration technology does this by providing security guard mapping and locations in real time, increasing visibility across operations. Team leads or dispatchers gain insights to improve decision making and accountability during routine operations and safety during emergencies or changing situations.

Managers communicate and coordinate 1:1 or with specific teams or groups, targeting conversations to only relevant personnel. Teams distributed across a campus or a network of campuses coordinate in real time with their security operations center (SOC) and dispatch, as well as local, regional or global teams. Physical security team leaders also communicate cross-departmentally during urgent or dynamic situations, directly updating distributed janitorial, utility, fleet, mechanical and electrical teams with relevant and timely information in an emergency.

Operational control dramatically improves response to dynamic events organization wide and productivity during routine activities.

No. 2: Improved situational intelligence with location-driven insights and analytics:

Security leaders must know where their personnel are at any given time, where they have been, and if they have completed the tasks or routes assigned to them. Intelligent collaboration tools with geolocation and heat mapping enable managers to



track guard locations, analyze low coverage zones and ensure that all teams perform at maximum efficiency.

Even in GPS-denied environments like indoors and subterranean areas, advanced collaboration software can maintain situational awareness and actionable mapping and location data. Managers optimize and gain insights into the day-to-day operations across security teams to maximize overall performance. In urgent or dynamic events, managers and team members are situationally aware of their teammates.

Collaboration platforms also capture 100 percent of the metadata for a message stream providing a complete picture of what happened, what is happening and potentially what will happen. This metadata creates the opportunity for unique analytics that increase situational intelligence for operations, compliance and safety. Recorded and archived information also supports incident reporting needs for compliance. In the event of an incident, teams know they have captured the information needed to complete reporting and assist with any investigations or evaluations. The actual content of messages is only available to users of the collaboration software and cannot be heard or retrieved by the platform provider.

Turning voice into data with collaboration technology creates rich analytics that measure and optimize security operations for continuous improvement. From the start of an urgent or emergency situation, collaboration technology records and archives all relevant information including locations, messages sent and response times. This intelligence informs decision making with pattern analysis and anomaly detection, enabling teams to continually evaluate performance for improvement and effectiveness.

No. 3: Increased productivity with process automation

Voice-automated processes optimize operations and help organizations reduce costs by promoting protocol compliance, documenting and archiving processes, and simplifying routine tasks. Process automation ensures security teams complete everyday tasks like safety checklists, assigned guard routes, and timely check-ins efficiently and effectively. Voice automating these processes promotes heads-up work and frees security personnel to focus on higher-value tasks.

For example, a routine, daily checklist confirming doors and windows are secure at the close of business hours. Instead of documenting task completion on a paper clipboard, voice-activated workflows require verbal verification of each checkpoint while enabling guards to stay heads-up. Location data and voice answers are logged and recorded so no checkpoint is missed and a digital record is stored for future reference.

In another example, a security guard needs to create an incident report for an irregularity like property damage. Instead of taking time to manually enter information about the incident onto a paper form, the guard can take a picture, load it to the collaboration platform and record relevant information. The collaboration platform logs and documents that incident for retrieval or kicks off an automated workflow of next steps when needed.

Intelligent, voice collaboration solutions also manage tasks like building or campus patrol. Process automation tracks guard inactivity or lingering too long in one place. Workflows prompt the worker to respond and remind them to resume their activities without requiring managerial interaction or continuous monitoring.

No. 4: Emergency preparedness

Security teams must be prepared to handle unexpected threats. Intelligent collaboration tools provide the always-on ability to respond to emergencies and threats immediately, and security teams leverage process automation and intelligent collaboration to respond to incidents.

In emergencies, guards have the added support and safety of multifunction workflows like automated safety check-

Security teams that modernize and embrace the benefits of collaboration can truly achieve innovation and have confidence in providing best-in-class security operations.

ins, lone-worker protocols, incapacitation monitoring and location breach alerts. Words like “fire,” “man-down” or “help-help” trigger workflows that deploy backup, alert managers or even escalate serious events to the police or fire departments.

For example, a building occupant is injured in an active shooter scenario. Security guards immediately trigger workflows and protocols by speaking designated words like “active shooter.” Bots without human intervention redirect guards in proximity to provide assistance to the event and emergency alerts deploy remaining resources according to building or campus protocols. Additional workflows inform managers and alert police faster and more efficiently.

In another example, a lone worker lingers too long in one area without responding to bot-driven voice prompts. Workflows redeploy the next nearest guard to investigate and notify management of a possible emergency.

No. 5: Reduced training time for new or contract workers

The physical security industry often undergoes high employee turnover. Every facility has its own unique and specific protocols that each new security personnel must learn. Intelligent collaboration tools immediately connect employees and contractors to the information, SMEs and systems that instantly amplify their ability to perform at maximum efficiency on day one.

Process automation ensures that the new security personnel never miss a protocol step or assigned task. Ultimately, this increases each employee’s effectiveness and reduces training costs for organizations.

No. 6: Data security & encryption

Radio systems and messaging apps do not offer message security or integrity by default, allowing bad actors to listen or even impersonate staff. When bad actors obtain access to a radio frequency, they can track all chatter to learn sensitive information to target people, property or assets. Messaging apps with weak encryption lack the strict IT security standards today’s enterprises require.

Intelligent collaboration software with end-to-end encryption (E2EE) offers unmatched privacy and security. E2EE eliminates security gaps and keeps an organization’s information secure — even from the platform provider.

A physical security operations system of record

Intelligent collaboration platforms create a security operations system of record that integrates operations and provides all the information workers need to perform their duties at their point of work. Security teams that modernize and embrace the benefits of collaboration can truly achieve innovation and have confidence in providing best-in-class security operations.

Constant innovation is necessary to improve productivity and increase the safety of people and assets. With digital transformation, FMs create effective, productive and safer physical security teams. **FMJ**



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with more than 15 years of training and operational experience in incident command, emergency management, homeland security and search-and-rescue roles. Prior to Orion, Thorsson served on the faculty of the School of Communications and Media Technologies at Academy of Art University. He spent over a decade in mass-market broadcasting and was one of the earliest employees at CNET (Now CBS Interactive). Hosting the shows, “Cool Tech,” “The New Edge” and “CNet Central,” he brought the latest exciting developments in technology and the internet to audiences over Sci-Fi and USA Networks.



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"AI is the new electricity" — Andrew Ng¹

APPLYING AI IN FM REQUIRES CAUTION

A two-sided story

BY ERIK JASPERS & GAGANDEEP SINGH SAINI

Few technologies speak to the imagination the way artificial intelligence (AI) does. It holds the promise of fundamental augmentation of human capability. It holds the promise of real, smart automation. As AI technology and its implementations evolve and enter society and the economy, it is inevitable that FM professionals' interest in applying it will grow. Researching the essence of AI also uncovers some of its tricky sides.

FUNDAMENTALS OF AI

Before going into considerations around its application, it is important to know what AI is and its main principles.

The term artificial intelligence was coined at the Dartmouth Summer Research Project on Artificial Intelligence conference in 1956.⁴ It started as an attempt to make machines capable of exhibiting human-like intelligence. AI application operates by a Computational Model (CM). These models are specifically designed to perform the real-world tasks they are to be executing. Designing these models is quite a specialized activity.¹ Machine learning (ML) is the science of training these CMs and it is the mainstream technology driving most of the applied AI.

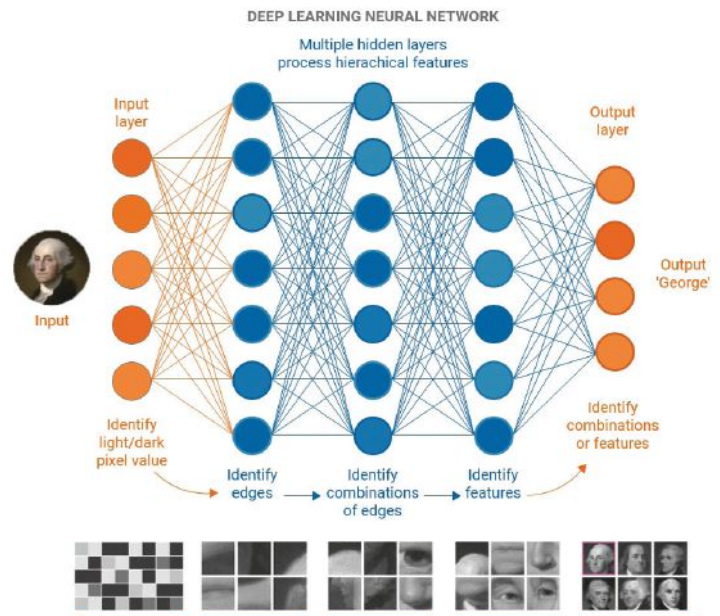


Figure 1: Example of a deep-learning AI model²

“The road to smartness is paved with data.”¹¹

Deep learning (DL) is a subfield of ML and inspired from brain function.³ A DL-based CM comprises either single or multiple layers of artificial neurons networks (ANN). In essence ANNs are big arrays of numbers used for calculation where the calculation procedure is inspired from the working of biological neurons. ANN models with multiple layers as in Figure 1 are identified as deep neural network (DNN). DNNs are perceived to be better at embedding more complex relationships.

HOW AI LEARNS

ML is a data-driven process. In speech-to-text AI applications, such models are trained on mammoth amounts of data containing speech and transcribed text.

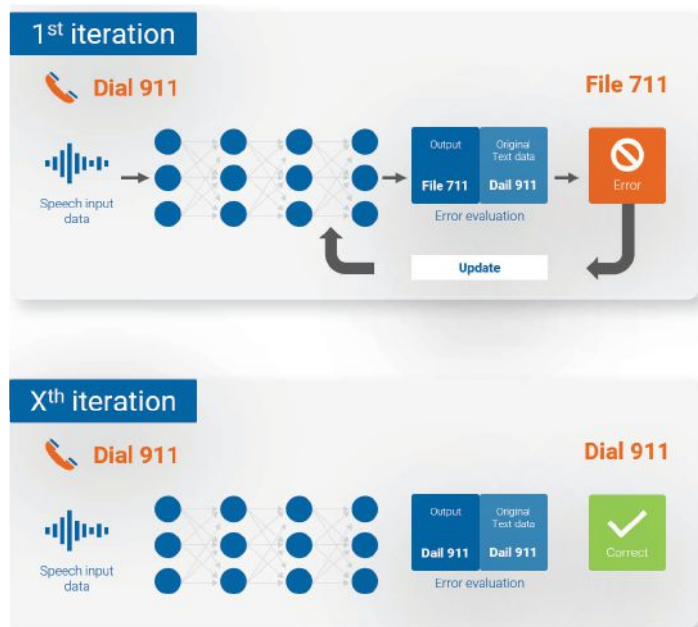


Figure 2: Generalized depiction of deep learning

Initially the speech data is presented to an infant model, making it generate text as output. This generated text is compared with original text to identify errors, which are used to update the model. Several iterations of response generation and updating model results in the computational model effectively performs the translation. Most of the deep-learning models are trained using similar data-driven and pattern-embedding approaches.

This process reveals two key elements that are at the basis of caution.

First, the datasets as offered drive the learning process. Hence, the data must represent the subject of correctly learning and should not contain incorrect or biased data.

Second, the resulting decision algorithm grows during the iterations but cannot be described or explicitly explained: its reasoning cannot be interpreted other than looking at its results.

CAUTIONS AROUND AI TODAY

As the technology is developing at breakneck-speed, applications are released and the lessons from experimenting with them are learned. While much of this is a positive, some of it calls for caution.

On the positive side, AI has fundamentally augmented medicine by allowing doctors to diagnose illnesses better and faster by virtue of AI applications to sift through massive amounts of data (e.g., images), extracting essential conclusions for doctors to use in their diagnoses.

However, there are also fundamental aspects of developing AI applications that give way to caution:

Biased datasets

Overdependency on AI models on training datasets make them susceptible to inherit existing prejudices as in the dataset. An example is found in access management. This task requires assessment of potential threats and opportunities. AI utilized to allow access to the building based on facial recognition could feature bias toward races overrepresented in (criminal) records as offered to the system during its ML process. As a result, the AI used to allow access to the building based on facial recognition can feature bias toward individuals based on external body features alone.⁷

Noninterpretability

Widely used DNN models are essentially black box systems. A DNN provides no explanation on how it arrives at its output. For example, if a speech-to-text model translates “dial 911” as “file 711,” DNN does not provide any reasons for such an error. This aspect of AI makes it unsuitable for several high-stakes business applications. Research in the fields of explainable AI is addressing this noninterpretability. An example of these attempts are deep neural decision trees (DNDT),¹⁰ but this technology is in its infant stage.

AI application in FM

What could be the consequences for the application of AI in FM? This is open to a much-needed conversation and debate within the industry.

The business of FM deals with things as well as people. This implies that both can be subject to AI applications as pictured in Figure 3.

AI ON THINGS

Buildings and the systems that operate in them around workplaces essentially behave in deterministic ways. Their response to environmental conditions and the change in them is repeatedly identical. When all conditions are equal, the thing will respond or run in the same way. This deterministic behavior eases the development of AI applications by defining the model as well as in providing the ML datasets to train the model. It is no coincidence that AI applications such as image recognition and, to some extent, language translations are at the forefront of successful AI-driven solutions in the marketplace.

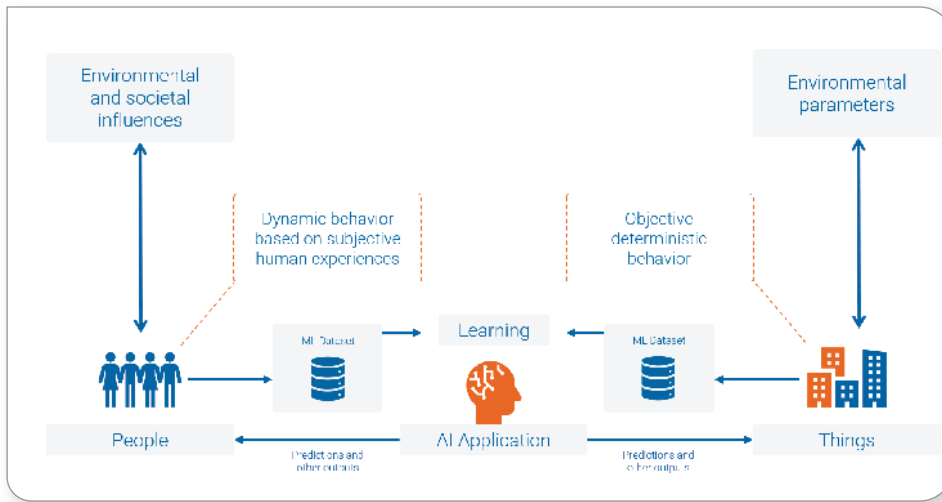


Figure 3: principles of AI applications toward people and things.

Although not many AI applications on asset management (failure prediction) are on the market, they are expected to emerge. However, their complexity is not to be underestimated. For instance, every HVAC installed system is different because of the architecture of the building. Buildings located in different regions might incur different environmental parameters like temperature and humidity profiles. This will result in different responses of the system despite being from the same manufacturer and type. This dynamic clearly attests to the value of deep learning.

AI ON PEOPLE

Using AI applications related to the behavior of people is much different. Apart from the cautions already discussed, there is another fundamental aspect that must be considered.

Where objects show deterministic behavior, people do not. People continuously learn autonomously from personal experiences (inputs of their environment) and as a result, may change in their preferences over time.

This is a fundamental difference with the behavior of objects and may hamper the process of learning of AI applications. The ML datasets of people's preferences and behaviors are datasets that show historic behavior, based on past circumstances.

When AI applications learn from these past behaviors and preferences and adjust their recommendations or other initiatives accordingly, it creates a bubble phenomenon. The system will provide information or advice based on past behavior and

hence put alternatives to the background. Typical examples of this are found with offerings of companies like Netflix and Amazon that provide advice on what movie to view or book to read. When couples open their Netflix main page, the content of both user's profiles will typically differ based on past individual selections. One could state that this is advantageous because the system supports the user in finding interesting content. To the contrary, it could be said the same system deprives the individual from finding great content that is just a little different from what he/she has chosen thus far. It is highly questionable whether this is a desirable situation in business contexts.

There are privacy concerns. To what extent would individuals feel comfortable with the notion of being under incessant supervision and how do these systems comply with privacy regulations like GDPR in Europe?

TAKING AI TO THE WORKPLACE

The workplace community takes high interest in AI technology. However, there is extreme caution to take here.

An example would be an AI application that advises individuals on when to work at what location (desk) at any time. In principle, that provides a powerful application, allowing for individuals to be advised on the use of their preferred workspaces at times that their closest colleagues are near. At the same time, the system would advise when the occupational patterns of the workplace facilities are at their peak.

Many innovations stem from lateral

thinking, which is a manner of solving problems using an indirect and creative approach via reasoning that is not immediately obvious. Lateral thinking is often induced by meeting different people from different backgrounds and discussing a topic between them. By combining different views from different backgrounds, new problem-solving approaches may occur.

Now, the risk in AI application is creating a social-workplace-bubble by putting together a group of people that show similar interests and depriving them from bumping into someone completely different. AI deciding on or recommending suitable workplace for people based on previous preferences can potentially create poor performing workplaces.

How damaging would this potentially be to the innovative power of an organization? If the total cost of housing and FM services address no more than 10 percent of the total cost of the organization, and wages are typically tenfold of that number, suboptimization could prove to be quite damaging. There is no data to prove this case right or wrong. However, this risk is worth noting.

A final consideration is around the ethical question of self-determination. The more advice AI applications provides, the more individuals are implicitly directed in making choices that might lead to diminished autonomy, depriving them from creating individual experiences. As FM, HRM and IT functions deal with the working life of people there is probably more to consider than efficiency. Quality of life is closely related to quality of work. It has not yet been determined how AI can best contribute to that.

VIEWS ON AI IN IT

Gartner states: "AI and the use of ML models to make autonomous decisions raises a new level of concern, with digital ethics driving the need for explainable AI and the assurance that the AI system is operating in an ethical and fair manner. Transparency and traceability are critical elements to support these digital ethics and privacy needs."⁵

In its 2021 report on AI 9 Gartner stated these predictions and recommendations:

- By 2025, pretrained AI models will be largely concentrated among 1 percent of vendors, making responsible use of AI a societal concern
- In 2023, 20 percent of successful account takeover attacks will use deep fakes as part of social engineering attacks
- By 2024, 60 percent of AI providers will include harm/misuse mitigation as a part of their software
- By 2025, 10 percent of governments will avoid privacy and security concerns by using synthetic populations to train AI
- By 2025, 75 percent of workplace conversations will be recorded and analyzed for use in adding organizational value and assessing risk

Most of these probable concerns can be addressed taking suitable technological and managerial measures; however, it is imperative for users of AI technologies to keep an open eye toward the probable pitfalls of emerging AI technology.

As FMs deal with both processes as well as the personal interests and privacy of people, the use of AI applications must be mindful of all aspects, both the good and the bad. **FMJ**



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1. Co-founder of Coursera & Professor at Stanford.
2. Source: Proceedings of the National Academy of Sciences of the United States of America (pnas.org/content/116/4/1074).
3. en.wikipedia.org/wiki/Lateral_thinking
4. gartner.com
5. Gartner is referring to Digital Workplace toolsets here

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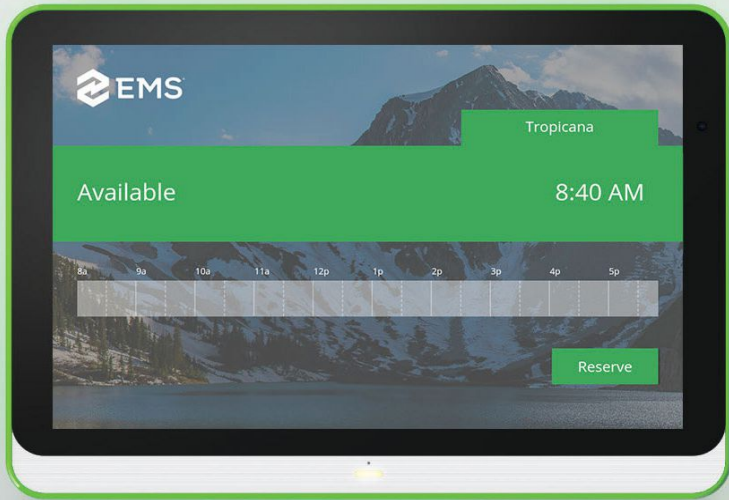
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Using Automation

An Opportunity to Rebuild a Better Workplace

BY JESSICA HORNE & JOHN WANG



As the world emerges from the COVID-19 pandemic, one thing is clear: if companies wish to thrive in today's modern, hybrid work environment, they must be able to adapt and respond to ever-changing circumstances. This calls for an intuitive, scalable, technological ecosystem that allows users to effectively interact with each other and their environment.

In other words, it calls for workplace automation. Effective workplace automation does not simply modernize an organization; it can also facilitate key initiatives, helping organizations support sustainable operations, create adaptive workplace strategies, and improve their cleaning and safety protocols.

Back to basics: Understanding what workplace automation is

Modern, hybrid workplaces are rapidly embracing workplace automation to ensure effective, flexible working environments. But what does this mean? Automation is enabled through both human-aware and passive Internet of Things (IoT). People counting and tracking, human-machine interactions through displays like card readers, cameras and microphones, a centralized booking and entry system — it is all workplace automation, and it can help fast-paced work environments operate flexibly while centrally monitoring and managing spaces according to real-time needs.

Effective workplace automation can also facilitate cleaning and safety, support sustainability efforts and shape the way modern businesses work.

... And what it is not

Despite its benefits, workplace automation is often felt as a threat to many; a monster here to steal jobs and leave employees with nothing left to do. In the recent “Workforce of The Future” report by PwC, 56 percent of respondents stated they believe governments should be introducing measures to halt automation and protect jobs. This reveals a general misunderstanding of automation and its role in the modern workplace.

Yet this concern is largely misplaced: A report by the World Economic Forum forecasted that 75 million jobs will be lost as a result of automation, but 133 million new roles will emerge in major economies. In other words, jobs will not be lost, but rather changed and retasked, thereby enhancing the environment in which people work and streamlining how work is done. This, in turn, will take away monotonous tasks and allow employees to focus on more valuable, meaningful work.

Where Workplace Automation Really Shines

In supporting sustainability

Companies are looking to operate more sustainably and efficiently. For one, lingering effects from the pandemic have left many organizations with unused spaces and wasted resources — and it does not seem like these spaces will be used in the same way moving forward. Additionally, global concerns around sustainability and resource efficiency have shaped space strategies and pushed organizations to adopt greener policies and solutions.

There are many ways that workplace automation can help address both points.

Within spaces, rooms can be automated using IoT to activate heat and light only during occupancy, and hardware sensors can be deployed to help collect microdata about exactly how a space is being utilized and when.

Looking more broadly, effective automations backed by data-driven software can help organizations make informed and effective decisions about their space portfolios and office designs.

After all, it makes no sense to have large spaces go unused or underutilized simply because they do not fit employees' current needs. The right software creates efficiency in everything from resource availability to reservations while providing insights into how space is used for future planning. Making spaces easy to use and flexible to configure is essential to creating the ideal workplace and employee experience and of any space sustainability plan.

Once all the data is gathered from configurable software and hardware, organizations can use analytics to maximize budgets, increase space utilization, and make informed decisions about what room size, accommodations and resources are necessary for individual meetings and for broader operations. This can ultimately help organizations meet a level of efficiency, energy saving and environmental consciousness that was not possible before the realization of intelligent spaces.

In promoting and facilitating adaptive workplace strategies

Long before COVID-19, companies were ditching the traditional, static office space in favor of more dynamic, flexible work envi-

... it makes no sense to have large spaces go unused or underutilized simply because they do not fit employees' current needs.

ronments. The reasoning here is simple: modern employees want their workspaces to meet their habits and their needs. This calls for hoteling, multi-use spaces, lounges and other flexible options in the workplace.

After COVID-19, this will be even more important. After a year of working from home, employees value flexibility and freedom more than ever. At the same time, they crave the social interaction, intellectual stimulation, collaboration and predictability that comes with spending time in an office environment. Organizations can expect their employees to be in and out of the office via flex work, and they are going to need highly relevant, highly useful spaces in which their employees are happy and productive. It will be a tricky balance to strike!

Automation and technology can help ease the pain of this transition and make it easy for employees to have quality experiences that fit a wide range of needs and maximize productivity. It can also pave the way going forward. The smart workplace and the future of work are here, and the necessary solutions and automations are only going to become more advanced.

Think about it: people already expect their smartphones to predict when they want night mode on or for websites to make the correct recommendations when they are running low on a product. They expect a predictive experience in their day-to-day lives — and they will expect this more and more from where they work.

The organizations that keep this in mind and continue to automate, integrate and connect corporate-wide initiatives with day-to-day utilization will not only see business results, but also meet employee and technological expectations moving forward.

In sprucing up cleaning and safety protocols

In the wake of the pandemic, cleaning, hygiene and employee safety are top of mind for all organizations — and they will continue to be for the foreseeable future. But it can be complicated and difficult to track what needs cleaning and how often. Cleaning an entire office block every hour is inefficient and impractical.

The right software and hardware solutions can help organizations track space usage, identify what needs to be sanitized, and avoid wasting resources cleaning unused, already sanitary spaces. It can also facilitate the two other major pieces of the puzzle — contact tracing and social distancing — without compromising

employees' personal information or an organization's cybersecurity and privacy guidelines. This can be accomplished through controls that help users manage which spaces are open and accessible, hardware sensors that track which employee is in which space and more.

The flip side of automation

There are key challenges with automation that will need to be addressed head-on for the technology to work most effectively.

More devices means more time spent on maintenance

No IoT device will ever run perfectly. As more devices arrive in the workplace, the time spent on maintenance and upkeep will inevitably increase in kind. These maintenance efforts should be automated. Consider that by reactively maintaining IoT, devices may go down and remain inoperable and unnoticed for extended periods. This can create long periods of downtime and interruption to operations, which can be crippling when it comes to mission-critical tech like door entry mechanisms.

A predictive approach to maintenance, on the other hand, can mitigate downtime. To make this work, devices will have to be programmed to signal that they require attention before they fail. Similarly, routine tasks like firmware or software updates can be scheduled during off-peak times to minimize disruption to operations.

The continued erosion of security and privacy

Systems are increasingly connected — and increased connectivity inherently leads to increased privacy and security concerns.

In many ways, the pandemic has exacerbated some of these fears. Contact tracing, for example, has been touted as a vital tool in the prevention of outbreaks and infections; but the idea has also awakened a lot of privacy concerns. Privacy and security concerns are expected to grow. More data is being gathered about how individuals move, from exactly where someone is sitting at any moment, to who they have been in contact with throughout the day, all to facilitate effective contact tracing. Reassuring staff their data is secure will be a real challenge.

When implementing these kinds of automations, organizations must address these employee concerns proactively while mitigating security threats by ensuring that their IoT devices are fully secured.





Final Thoughts

Workplace automation is merely one aspect of rebuilding the workplace post-pandemic, but with the right technology in place, it can help organizations successfully navigate key challenges such as keeping employees safe and happy, meeting sustainability goals, and creating an adaptive workplace that will overcome and thrive as the professional landscape continues to change.

At the same time, there is no doubt that the very fabric and culture of the workplace has become stretched and warped in many senses: employees are largely suspicious of their once-familiar work environment, company cultures have shifted and routine tasks like scheduling a meeting will have to be approached with fresh, more risk-averse eyes.

Organizations must respond in kind and meet these new challenges head-on if they hope for a successful return to work, and automation can be a key tool for reestablishing a strong and vibrant company culture and community as organizations move into the uncharted future. **FMJ**



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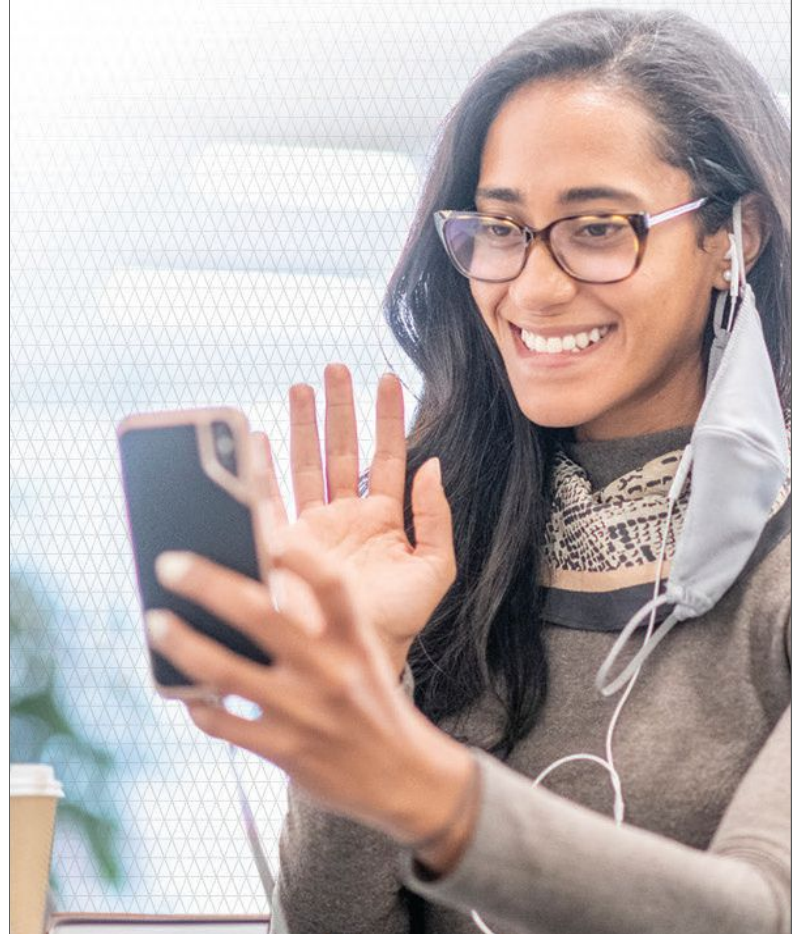


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Paradigm Shift

AUTOMATION:
STILL A
“NICE TO HAVE?”

BY CAROLINA WEIDLER

COVID-19 has dramatically changed the world's reality. In many ways, it also has accelerated the adoption of technology by several years — with many of these changes here to stay for the long haul. More so, it has undoubtedly affected the way businesses operate — as well as how they plan to resume tasks once the economy fully reopens.

The return to normalcy will change how companies — throughout all, if not most industries — conduct business. For the majority of business owners, this change represents an investment in technology, a reconfiguration of work areas, enhanced safety equipment, new protocols and flexibility in the way the work has been performed to date, as well as how it will continue to be executed in the future.

It's go time.

Safety protocols for manufacturing floors will no longer be restricted to Occupational Safety and Health Administration (OSHA) guidelines. As facility managers think about operations, growth and overall good business practices through this pandemic and beyond, automation will be at the forefront when it comes to new technologies to invest in. Not only does it provide the required safety protocols, but it also increases flexibility and efficiencies for companies.

Automation as a way to perform daily tasks in the workplace is not a new concept. Nearly all manufacturing floors have some sort of automation — but how specialized or diverse varies greatly based on several factors: industry, what part of the world the floor is located, and the scale and sophistication of that business.

Up to now, robotics has been a nice to have for some corporations. But restrictive policies, budgets or square footage have hindered the implementation of these work horses.

With innovation transforming the way things work, there is a shift in mindset around automation. That is, if by implementing more automation into a process, a company can get back into full production capabilities, then it is time to pull the trigger!

Previously, incentives in the form of health and safety for the employees pushed the timeframes for implementing automation. Now, budget restrictions are redefined and reevaluated because it offsets the tremendous gains a company will have once it is fully able to resume operations — and faster than they originally thought possible. With COVID-19 causing fear and risk of contagion, companies are more inclined to leverage technologies that will mitigate these concerns and ensure safe working conditions.

Robots are part of the change but not the catch-all.

Fancy equipment — check. Hundreds of bottles of sanitizer — check. Training modules and a rollout of enhanced safety protocols that include hand washing, social distancing and occupancy restrictions — check.

A business is good to go, right? Not quite.

Another change brought on by this pandemic is the need to provide safe, healthy spaces for employees. Although OSHA already issued standards providing recommended protocols for daily operations, internal EH&S departments will come up with more strict protocols to add, especially as guidelines evolve.

Manufacturing facilities especially will need to be resilient to change and be open to adopting new ways of working in ways that reimagine the human element of their business operations. Considerations will need to include natural light; constant, fresh air flow and circulation; safe distancing for workers; break areas with access to exterior spaces and natural air — the list could go on. These are all current requirements to consider, change and implement in order to retain and attract talent, minimize spread of COVID-19 and be in compliance with safety guidelines.

Spaces of the future — it's here now.

Best practices for design, management and operational sustainability are being rewritten. The nice to have's are the non-negotiable, and in most cases the ability of a company to adapt their current space to accommodate these requirements are the testament to true flexibility and innovation. Designers must also consider the unknowns of continuing in a world where health and safety take on new meaning. Robotics adjusts and merges with the changing flows, and humans will have to follow suit.

For the human part of the spaces, the design industry has been talking about sustainability for decades. However, the shift has been to the human element of buildings with the introduction of the WELL accreditation and the Fitwel certification systems. These systems are no

longer the only focus. Human well-being is becoming the goal for these accreditations and a badge of honor for a company. The ability to tell and show employees that their rights to have access to natural light, movement, natural elements, textures and components within the spaces are more important than the carbon footprint of the HVAC systems within the building will be key.

Add automation and the possibilities of control, regulation and monitoring are endless. Building automation systems are nothing new. Most buildings have a version of them to control the systems, temperature, maintenance of units and to make the day-to-day operation of a building easier for the FM team. However, when IA is added — where a computer can predict, can regulate and control all systems within a building in a preventive way, where IA can understand the needs and wishes of the humans occupying the space and adjust as needed — then imagine what these spaces can look like and how adaptable FM leaders can make them.

Key considerations

In the ongoing dialogue about facilities of the future, the future of automation and other technological advances that will transform daily life, a common theme remains: flexibility is king. This will continue to be paramount for facilities of the future — a future that cannot be predicted, but one for which people can be prepared.

This pandemic has proven that the faster the response and implementation of reactive measures, the faster businesses can adapt and move forward. It also has given the industry more tools and protocols that can be placed in a best practices manual. All the while, what has been rapidly executed will still need to be built upon, revisited or analyzed to learn what worked and explore new avenues of flexibility.

But what this past year has really taught the world is that technology, hand-in-hand with human resilience and ingenuity, will continue to evolve and aid in the continuous search for safety, innovation and productivity.

With that in mind, designers, FMs, facilitators of design and planners of facilities of the future will have to keep the following in mind:

- **Optimization of a space dictates how facilities can evolve and accommodate different protocols, processes and tasks.** Now more than ever, facilities must be able to flux, grow, adjust and prepare to receive automation and other technological advances at different levels.

- **FMs must find the right solution for the client.** The right type of automation. The correct type of space allowances. The perfect balance of a comfortable and health-driven environment where humans and robots can continue to interact and thrive. With collaboration looking very different in the years to come, the approach to designing facilities must have these considerations in mind, including how interactions between technological ecosystems and human spaces will intersect — from how it looks, how it could change workers' perspectives on the place of work and more.
- **Think outside the box.** Technology, automation and robotics all offer a great big pool of tools for the toolbox. All parties involved now have many options to choose from and it is only getting more diverse.



As the pandemic continues to push the boundaries and comfort zones of nearly every single industry, tremendous progress in automation will only get more fast tracked, reinforcing the need for FMs to be agile and empowered to pivot in an ever-changing landscape. Thankfully, the tools to help ensure new ways of working and integrations occur seamlessly to meet this growing industry demand are available. FMJ



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USING IAQ TO ACHIEVE A HEALTHIER SCHOOL ENVIRONMENT

BY DANNY WHITE

A young girl with curly hair, wearing a purple shirt, is looking up at a teacher who is leaning over her desk. The teacher is wearing a light blue shirt. In the background, other children are sitting at desks in a classroom setting.

Before 2020, the average person probably did not think much about the air they breathe — at least not while indoors. Like a reliable car or mobile connectivity, high indoor air quality (IAQ) is easy to take for granted until it is no longer a guarantee. Just ask any parent, teacher or school administrator who has questioned whether it is safe to return to in-person learning as the pandemic lingers: a school building's IAQ is now on their radar. The bigger question is why was it not a priority long before COVID-19?

According to the EPA, when IAQ is poor, occupants can experience illnesses such as asthma, fatigue, irritation and headache. Multiple studies have shown IAQ can directly impact students' health and learning abilities. A paper published by a researcher at the Lawrence Berkeley National Laboratory found "compelling evidence... of an association of increased student performance with increased ventilation rates," yet "ventilation rates in classrooms often fall far short of the minimum ventilation rates specified in standards." University College London and the University of Cambridge research found air quality inside classrooms was actually worse than the air quality outside.

According to GAO's national survey of U.S. school districts, more than half of the country's public school districts need to update or replace multiple building systems or features in their schools, and 41 percent of districts need to update or replace HVAC systems in at least half their schools (approximately 36,000 schools nationwide). It is time to prioritize the quality of air children breathe while at school.

After more than a year of being hyper-aware of the risks of poor ventilation and IAQ, parents want reassurance that a school's IAQ is within acceptable levels for their students — as do the educators, administrators and employees who spend as much (or more) time in schools as students. That means school facility managers have an important role to play in improving IAQ within school buildings.

Understanding How to Achieve Ideal IAQ

Considering children in the U.S. spend an average of 1,000 hours each year in school, IAQ is incredibly important in this environment — especially because the concentration of some pollutants can be two- to five-times higher indoors than typical outdoor concentrations.

Many factors go into IAQ, including how a building is designed, outfitted and managed. While FMs must determine their county, region or industry's specific rules and regulations for commercial buildings — which may have changed as a result of the pandemic — some general recommendations around IAQ include:

- Audit a building's air infrastructure to identify its strengths and weaknesses.
- Keep operational parameters, including temperature, humidity, ventilation and particle count, within optimal ranges.
- Make the right data readily available to the right people, at the right time, through advanced operational dashboards.
- Use a combination of on-premise and cloud analytics to monitor real-time results.

Traditionally, building system design emphasized efficiency to minimize construction and operating costs. Now, efficiency is just one factor in building design, and reprioritizing IAQ over efficiency may require updating, retrofitting or replacing outdated HVAC systems. That is where some of the latest technologies can be used — and contrary to what some may think, implementing them does not have to be costly or time consuming. While there will be costs associated with updating HVAC equipment to support better IAQ, ripping and replacing equipment and starting from scratch is not the only solution for buildings. Modifications or retrofits to existing equipment can be a cost-effective way to improve IAQ.

Total costs will vary depending on school age, building square footage and other factors, but the Lawrence Berkeley National Laboratory paper found that the net annual costs of increasing ventilation rates in schools range "from a few dollars to about US\$10 per person... less than 0.1 percent of typical public spending on elementary and secondary education in the United States."

Ventilation

Ventilating small spaces, such as a house or apartment, may require little more than opening windows, but in larger commercial spaces like schools, effective ventilation requires bringing in oxygenated air from outdoors and removing stale indoor air.

Schools should avoid shutting down HVAC systems. Building air should be purged by extending the operating times of HVAC systems to run before the earliest students and staff arrive for the day and after the last occupants have left for the night. When possible, schools should also increase the number of air exchanges per hour to provide fresh air to closed spaces. This can be achieved through natural or mechanical ventilation. Fresh air intake should also be increased to 100 percent or the maximum amount possible.

Air Quality Sensors

Stale indoor air can contain particles, gases and volatile organic compounds (VOCs) — the last of which can come from building materials, cleaning products and certain types of paints. Harvard T.H. Chan School of Public Health research found improving indoor environmental quality by lowering concentration of VOCs improved test subjects' cognitive scores by up to 101 percent, indicating a low- or no-VOC school environment can help students learn better.

Beyond pollutants, the temperature and relative humidity of indoor air also affect students. Researchers found higher air temperatures resulted in lower grades on tests that evaluate students' reading and math skills. High humidity can promote bacteria and mold growth as well as conditions for dust mites, which exacerbate respiratory conditions and allergies, while low humidity can

cause dry, itchy skin and upper respiratory irritations. ASHRAE research shows keeping relative humidity in the 40-60 percent range can decrease occupant exposure to infectious particles and reduce virus transmission.

IAQ sensors that determine a building's environmental state and air-quality status offer an effective, automated solution to monitor the presence of a range of pollutants as well as humidity and temperature. It is possible to add new sensors too, allowing FMs to cost-effectively outfit their school facilities.



Advanced Cleaning Technologies

The Harvard T.H. Chan School of Public Health suggests “filtration of indoor air, supplement[ed] with portable air cleaners” can be used to achieve better IAQ within school environments. Air filtration and cleaning technologies capture contaminants that can linger in the air, and one of the latest innovations in air quality is the use of electronic air cleaners (EACs), which use an electric charge to help remove solid and liquid impurities from the air without impeding air flow. EACs apply energy only to the particulate matter to be collected without significantly impeding the flow of air.

EACs can be paired with a UV system that emits ultraviolet light, which, when used properly, has been shown in laboratory testing to damage the DNA structure of certain microbes at the cellular level and inactivate various viral, bacterial and fungal organisms. Some EACs with UV systems are able to be installed inside a commercial HVAC system as a retrofit due to low pressure drop, so FMs do not need to remove old equipment and install a new system entirely — another way to upgrade at a lower cost while also recouping some of the cost in the form of energy savings.

Additionally, HEPA filters are one of the most effective defenses for airborne pathogens because of their high-capture efficacy. HEPA filters can be at least 99.97 percent efficient at filtering particles in standard test results, according to Radiation Protection Systems.

Real-time Analytics

The World Green Building Council notes IAQ is just one of a range of tools and strategies that should be employed to make buildings safer but adds, “It is clear that an effective approach should... encompass an increased focus on the monitoring and management of air quality.”

A properly configured building management system (BMS) that takes all aspects of a building and occupant needs into consideration — paired with analytics and sensing technology — can give FMs the insight and control they need to create a healthier built environment. Centralized monitoring and control via dashboards make management of a school simpler and more user-friendly while supporting IAQ strategies. Analytics systems can be integrated into a BMS, allowing FMs to monitor humidity, ventilation, temperature, pressure and pollutant levels through real-time data on dashboards. FMs also can run reports to analyze historical data and spot trends.

A BMS can be used to maximize energy efficiency by load-balancing heating or air conditioning based on occupancy levels of certain rooms or spaces (e.g., a sports facility that is only in use certain days of the week or times of day) — which can lower overall energy costs.

Better IAQ, Better Schools

Air may be invisible, but most people will never take IAQ for granted again. As awareness of the importance of IAQ grows, authorities and governments may enact more laws and regulations to keep pace with science.

And, importantly, there is not one single solution to creating better quality IAQ. The “Swiss cheese” model of risk management — first proposed by University of Manchester researcher James Reason in 1990 — serves as a reminder that the best way to prevent issues and eliminate any single points of failure is layering together different layers and types of defenses.

To improve school buildings to support the success of everyone inside them — in the near term as well as in the future — FMs must design a multilayered indoor air quality strategy for school facilities that leverages IAQ best practices and the latest technologies. **FMJ**



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References

1. [epa.gov/indoor-air-quality-iaq/care-your-air-guide-indoor-air-quality](https://www.epa.gov/indoor-air-quality-iaq/care-your-air-guide-indoor-air-quality)
2. onlinelibrary.wiley.com/doi/abs/10.1111/ina.12403
3. london.gov.uk/sites/default/files/gla_iaq_report_with_nts.pdf
4. [gao.gov/products/gao-20-494](https://www.gao.gov/products/gao-20-494)
5. [Ed100.org/lessons/schoolhours](https://ed100.org/lessons/schoolhours)
6. [epa.gov/report-environment/indoor-air-quality](https://www.epa.gov/report-environment/indoor-air-quality)
7. [Ehp.niehs.nih.gov/doi/10.1289/ehp.1510037](https://ehp.niehs.nih.gov/doi/10.1289/ehp.1510037)
8. [Scholar.harvard.edu/files/joshuagoodman/files/w24639.pdf](https://scholar.harvard.edu/files/joshuagoodman/files/w24639.pdf)
9. ashrae.org/file%20library/professional%20development/tech%20hour/tech-hour-ppt_stephanie-taylor_november-2019.pdf
10. schools.forhealth.org/risk-reduction-strategies-for-reopening-schools/
11. radprosys.com/HEPA-Filters/
12. worldgbc.org/news-media/covid-19-brings-indoor-air-quality-monitoring-upfront

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Technology & Workplace Strategy Support the Employee Experience

BY SIMON DAVIS,
MARTIN RUPPE
& DAVID SLIGHT



The pandemic has highlighted the success of a more general approach in which some may never fully return to the office. Many large firms such as Google¹, Salesforce², Facebook³ and HSBC⁴ have announced their adoption of a hybrid 3-2 plan (i.e., two/three days in the office, two/three days working from home), while Amazon recently announced their plan to return to an office-centric culture as its baseline.⁵ Gensler⁶ has also noted a new kind of FOMO (the fear of missing out) on useful updates, critical intel and key connections best shared in person. Facility managers are facing the challenge of a return-to-office plan that incorporates new safety measures, new occupancy/utilization models and investments in enabling technology solutions.

FM should work alongside IT and HR to find holistic solutions, present upgrades and new system requirements (as investment will no doubt be needed) in alignment with overall business goals and the continued pressures of digital transformation.

New challenges include density measurement, variable occupancy planning, reduced lift capacity, asynchronous work schedules, increased employee choice, flexible work hours and scheduling, especially across teams for the days a whole team or department wants to meet face to face in the office.

As employees reoccupy the office space, changes and adjustments to the physical and virtual space will be a factor in demonstrating the organization's post-COVID-19 intent and play a critical role in communicating a company's vision, mission and values along with helping people work at their best.

The process should start with listening for concerns, documenting the challenges, suggesting a strategy that works with HR and IT, auditing the systems and solutions in place, identifying changes required to drive a transformation across culture, work practices and outcomes.

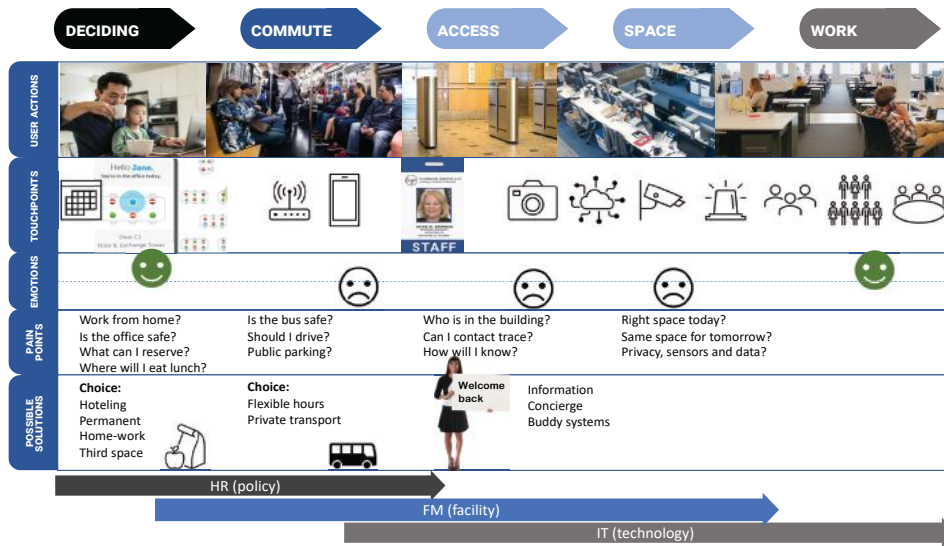
IFMA's Information Technology Community (ITC) and Workplace Evolution-

aries (WE) Community looked at how to develop a best-practice roadmap to help FMs plan for reoccupancy, coordinate and position changes, and steward investment toward the company's overall goals.

The level of choice and empowerment at the individual or team level will require a level of flexibility and responsiveness in planning. Having equipped employees to be productive anywhere, according to the chosen strategy, the employee and team can exercise that choice each morning as they decide on the day ahead. Reservations, capacity and density may fluctuate significantly.

Start with the “customer journey”

A customer journey map can illustrate not only the activities, but the touchpoints, emotions, pain points and possible solutions to understand the decision process and emotions of the employee as they contemplate the return to the office. Journey maps are a common tool to understand the customer experience and clearly show how HR policies, facilities and technology all impact the employee’s decision making. Once obstacles and challenges are identified, appropriate solutions can be investigated.



Developing a technology road map includes identifying and documenting a company’s short- and long-term needs and corresponding potential solutions. This considers the understanding that the technology landscape is getting more complicated every day for several reasons:

- **Tech consolidation** | as companies merge, there is no clear picture of what products will be invested in or moth-balled
- **Changing mindset** | based on how facilities are seen post-pandemic — there will be a need to change existing systems to meet new needs and also potentially new technology to support short- to medium-term needs
- **Proliferation of solutions** | the tech market continues to grow exponentially. For example, reference unissu.com is tracking more than 9,000 solutions in PropTech
- **Growing ecosystem** | hardware/IoT based solutions (such as sensors), enablement technology and compli-

mentary solutions (e.g., tenant experience) increase the complexity of planning a roadmap

- **Tactical solutions** | growth in tactical solutions to meet immediate needs (for example, desk booking and contact tracing). As tactical solutions grow to solve specific pain points (or requirements) there is a growing need to connect multiple solutions under an integrated reporting or BI solution to gain a single source of truth

Built Environment Technology Alliance (BETA) has categorized relevant technology solutions (e.g., CMMS to visitor management solutions) and compiled a list of technology providers within each category on its website. In addition, recent ITC articles have highlighted new apps and return-to-work content. While many new solutions are available, a quick audit may pay dividends in leveraging existing technology during the evaluation phase.

An initial step in developing a technology road map is the evaluation phase, which should include:

CASE STUDY

Potential phased approaches can limit occupancy over the coming months; reservation systems will need to be flexible enough to respect overall occupancy percentages and other business rules. Hoteling is one strategy that allows individual workspaces to be reserved for specific dates and times so that the individual can check in to their reserved workspace when they arrive at the office. They have the assurance of knowing a safe space is waiting for them for a set period.

Free address approaches in which individuals locate and use workspaces on a first-come, first-served basis may be less viable and much harder to manage under restricted occupancy percentages. A blended approach may work at the team level where space is reserved for the team, but the team members manage attendance and occupancy through local team communication tools. However, this may lack the rigor and record keeping required to comply with occupancy limits.

- **Maturity assessment** | How well do current systems meet your business needs today?
- **Opportunity analysis** | Can current systems meet anticipated future strategic objectives? Where are the technology deltas in current and future needs?
- **Gap analysis** | Can the gaps be filled by augmenting the current solutions (e.g., integration of existing solutions and data through APIs).
- **Pain points** | What needs to be addressed to mitigate current pain points with systems in place?
- **Availability** | Costs and rentability of technology and its longevity/duration of use.
- **Vision** | What needs are likely within three to five years?

Corporations do not yet have all the data points needed to determine respective future needs in facilities occupancy management. This year could be characterized by a lot of experimentation around the work-

place, and probably more visibility to FM services than ever before. Encouraging people back into the office will require them to feel safe — air quality and cleaning routines are just two things that can likely allay employees' concerns.

A focus on measurement and data sharing will ensure the workplace is optimized according to needs and that the levels of employee experience are maintained and improved. This is supported by HR policy around key data confidentiality and communication strategy for sharing success.

The suggested approach continues with mapping the solution categories to the customer journey map and selecting those systems that can address identified pain points. Typical capabilities to improve that rely on underlying technologies such as:

Engagement

- Wellness, comfort (STS, AI, sensors)
- Choice, flexibility (self-service, concierge, sensors, beacons, Cameras)
- Access, shared space (scheduling, reservation, badge systems)
- Alerts (communication)

Productivity Effectiveness

- Collaboration, knowledge sharing (connectivity, web + cloud based tools, monitors)
- User availability, focus status (sensors, status indicator/lights)
- Focus, quiet (white sound)
- Wayfinding (digital signage, sensors)
- Change and learning

Use, Access

- Utilization and occupancy (presence, sensors, beacons, cameras)

Smart Buildings

- Building systems (workplace analytics, asset and work order management, AI, cameras)

But what else is still needed? Some concerns are already observed and are driving new capability requirements:

- Self-health declarations, vaccination status, contact tracing, safety and occupancy passports. As with airline travel, some form of digital health passport may soon be associated with building entry.
- Alert systems for office information, closure or evacuation.
- Measure and analytics — privacy and concerns over system-collected data on employee performance and activity at work (using AI or sensors). Employees feel like they are being tracked or followed, especially from their employer, so levels of transparency and opt-in required.

- Equitable presence for those not returning to work or not able to attend an in-person meeting — culture of inclusion required.
- Further integration with existing systems; for example, HR. Try to avoid the rush to point to solutions that increase technical debt (i.e., implied cost of additional rework caused by choosing an easy, limited solution now instead of using a better approach that would take longer to implement) and will need to be retired through integration with APIs. Are there situations of double, triple entry? Consider the employee experience of these additional point solutions.
- Increased levels of automation — look for opportunities for optimization and automation.

Working toward business outcomes

Having identified the challenges and possible technology solutions, a business case will likely be required for investment in new apps or solutions and associated change management. But how can FM present the required investment as part of a roadmap to business transformation? There is an important opportunity to leverage these changes to support new business models and ways of working and not just the return to work.

Numerous stages to reach the transformation goals and map proposed apps or solutions to those goals include:

Ad hoc: Lack of awareness, unprepared for return to occupancy, continue with pre-pandemic or temporary remote-working approaches.

- Consider apps that address the uncertainty and fear of coming back to the office.

Access: Staff able to reengage or confirm desired mix of home remote/drop-in/hoteling/reoccupancy styles; so far, the 3-2 plan seems popular with staff and managers alike. Consider app integration taking advantage of APIs to HR and building systems.

Capability: The business can operate effectively again equaling or exceeding pre-pandemic productivity and cost levels.

- Take advantage of sensor and data collection to tell the success story (with numbers) to build stronger relationships.

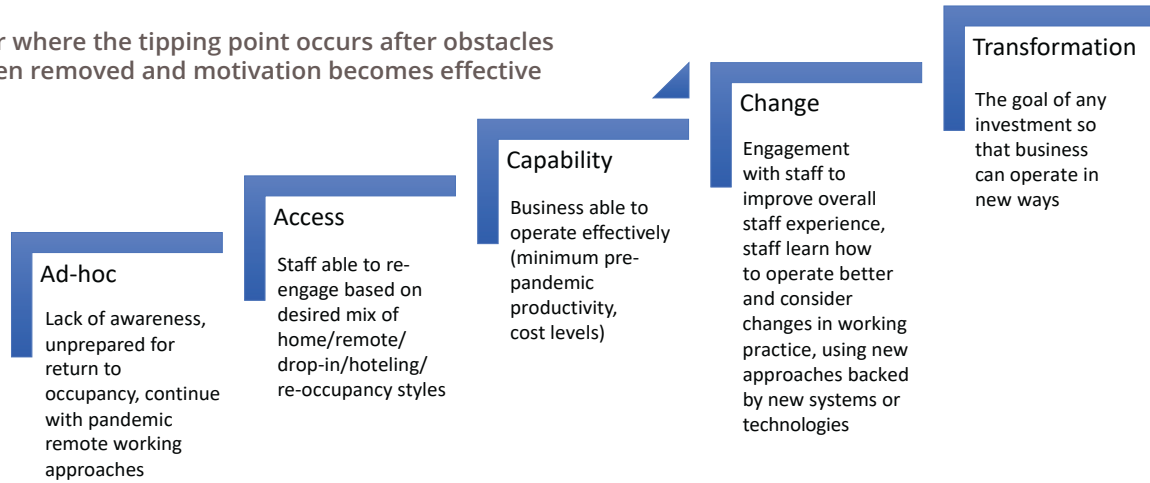
Learning/Change: Engagement with staff to improve overall staff experience, staff learn how to operate better and consider changes in working practice, using new approaches backed by new systems or technologies.

- Building on the success of the return to occupancy, demonstrate change capability highlighting the importance of the physical space.

People Change: Learning about Obstacle Removal and Motivation

FM should consider adopting a human-centered approach to change management and understand the mindset shifts that staff will undergo. To reach a tipping point one will need to address both obstacle removal and motivation:

Consider where the tipping point occurs after obstacles have been removed and motivation becomes effective



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An audit of systems and capabilities can be used to ensure most obstacles (if not all) are addressed:

- Is it safe to return — layout and distancing
- Will colleagues be vaccinated — badges and tracing

As well as motivating factors:

- Easy to book the right space
- Ideation and relationship building from face-to-face collaboration and team working

Most people have heard of Maslow’s Needs Hierarchy, which, as applied to workplace motivation, sought to explain individual employee motivation as a pyramid of needs. But there is more. Frederick Herzberg’s motivation theory and Alderfer’s ERG (existence, relatedness, growth) are adaptations of Maslow. Herzberg classified hygiene factors (supervision, interpersonal relations, poor workplace environment, as well as salary, benefits and rewards), which all de-motivate when not present “as well as motivation-factors (achievement, advancement, recognition, responsibility),” which will **work** when present.⁷

The tipping point occurs with a shift from hygiene (fear) to motivation (desire) when staff can see (again the importance of the physical space) that the hygiene factors have been addressed. Only then are staff open to motivating factors on a topic (a return to occupancy), which can drive the intrinsic value and satisfaction gained.

	Obstacle removal	Motivation
Personal	Over-invest in listening to personal concerns Supervisors as role-models	Promote positive personal stories and inclusive experiences (achievement)
Social	Be transparent with feedback and how you have mitigated concerns (FAQ, top-10 changes)	Harness peer pressure to show how teams are adapting (recognition)
Structural	Changes to the physical environment demonstrate action has been taken	Ensure systems are easy to use Use of gamification/badges

While many change frameworks include a step for motivation this vital smart’s influence model covers all the bases. It is a holistic people-centric approach (with individual, social and systematic elements) that can be used to document both obstacle removal and motivation. FMs can use this to check off how they have addressed the obstacles, as no amount of motivation will succeed if they are not addressed in parallel. **F.M.J.**

Simon Davis is senior vice president of workplace technology at Impec Group, which encompasses agnostic technology consulting, provision of CAD and test fitting services and a technology accelerator to identify PropTech startups and help them grow quickly. As a recognized thought leader in real estate technology, he has almost 20 years of related experience and serves as event chair and strategic advisor to IFMA’s IT community and is part of the Workplace Evolutionaries (WE) Phoenix hub.



Martin Ruppe's background in interior design, architecture, and business informatics led him to the field of facility management and workplace strategy. Since then, he works as a specialist on implementing integrated workplace management systems (IWMS) solutions, as well as CAD and space management tools, business intelligence, system integrations and data quality. Ruppe serves for the IFMA Workplace Evolutionaries as European WE hub leader, is an active member of the Austrian IFMA Chapter, and leads the Austrian Forum for Arbeitswelten.



David Slight focuses on how to accelerate people-centric change across work place, technical and business capabilities in large organizations. He works closely on client engagements with large organizations to ensure they realize value from change. Slight articulates the strategy and the execution of change, drawing on wide experience of business architecture, transformation, change management, business and IT alignment, governance processes, adoption and the early realization of benefit and value outcomes to the business.





References


1. Wakabayashi, Daisuke. “Google Delays Return to Office and Eyes ‘Flexible Work Week.’” The New York Times, The New York Times, 14 Dec. 2020.
2. Kelly, Jack. “Salesforce Says ‘9-To-5 Workday Is Dead’ And Employees Will Only Come Into The Office One To Three Days A Week.” Forbes, Forbes Magazine, 10 Feb. 2021, forbes.com/sites/jackkelly/2021/02/10/salesforce-says-9-to-5-workday-is-dead-and-employees-will-only-come-into-the-office-one-to-three-days-a-week
3. Westfall, Chris. “Facebook CEO Zuckerberg Offers Provocative New Viewpoint On The Future Of Work.” Forbes, Forbes Magazine, 8 Feb. 2021, forbes.com/sites/chriswestfall/2021/02/06/facebook-ceo-zuckerberg-offers-provocative-new-viewpoint-on-the-future-of-work/?sh=1e8f84274c6f
4. Flinders, Karl. “Tech-Enabled Hybrid Working Enables HSBC to Cut 40% of Its Global Office Space.” ComputerWeekly.com, ComputerWeekly.com, 25 Feb. 2021, computerweekly.com/news/252496927/Tech-enabled-hybrid-working-enables-HSBC-to-cut-40-of-its-global-office-space
5. “Amazon Plans Return to ‘Office-Centric Culture’ by Fall.” CBS News, CBS Interactive, 1 Apr. 2021, cbsnews.com/news/amazon-return-to-office-covid-19-pandemic/.
6. April 02, 2021 | By Andy Cohen This article was originally published on LinkedIn. “How FOMO Is Driving People Back to the Office: Dialogue Blog: Research & Insight.” Gensler, 2 Apr. 2021, gensler.com/blog/how-fomo-is-driving-people-back-to-the-office?
7. “Time Is the New Value.” October 16, 2017 BCS, bcs.org/content-hub/time-is-the-new-value/.




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

FRAZIER: I earned my bachelor's degree in political science from Howard University and a master's degree in public administration from the University of New Orleans.

After completing my undergraduate degree, I began working for a university helping students with budgeting and overall college affordability. I was also pursuing my graduate degree in public administration with a concentration in public finance and budgeting. My combination of experience and education afforded me a facility management opportunity within the aviation industry, and I began working for a private facility and assets management company as their facility operations manager.

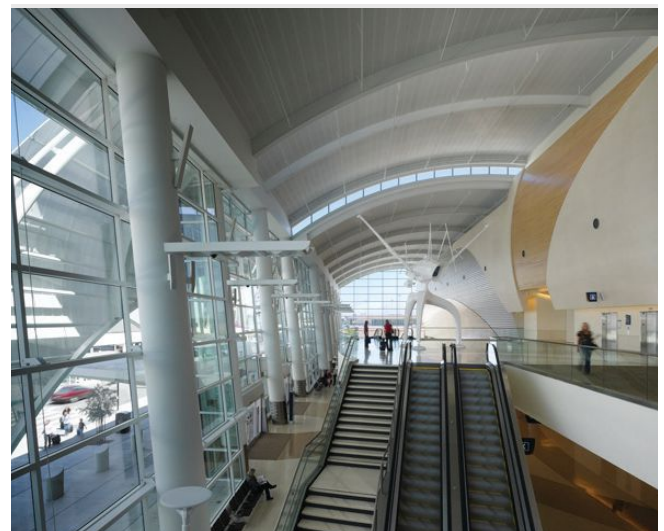
Although my introduction to FM and aviation came from my knowledge and experience with budgeting, the challenge of being responsible for such large and complex assets is what truly intrigued me. After working in the first aviation facility, I had the opportunity to transition to another airport as their superintendent of facilities, facing an even greater challenge of maintaining assets that were beyond their initial life span.

Here in the tech hub of the world, I'm excited to be exploring new technologies to incorporate in our facility operations.

FMJ: What is day-to-day life like at the airport?

FRAZIER: At the apex of our operations, the Norman Y. Mineta San Jose International Airport (SJC) was processing close to 26,000 passengers a day. While the pandemic has impacted our passenger count, we are seeing roughly 9,000 customers traveling through our facility daily.

Our days consist of a mix of corrective and preventive maintenance. Our day-shift and swing-shift personnel focus heavily on responding to issues that arise from our tenants and customers. On a busy day our department could be inundated





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

FRAZIER: Like all facilities throughout the world, the biggest challenge we have faced has been the pandemic. It has caused us to reevaluate our previous operations and implement new procedures geared toward ensuring the health and safety of our occupants. We followed CDC guidance and increased our sanitizing and disinfecting efforts to include electrostatic spraying of all hold rooms, ticket counters and gate equipment. We deployed additional hand sanitizing stations throughout the terminal, installed UV lighting technology to our escalators and are currently looking to incorporate needlepoint bipolar ionization (NPBI) technology to our HVAC system.

Since the onset of the pandemic, we've incorporated other measures such as floor stickers, signage, furniture configuration, digital wayfinding and other tools to help people maintain proper social distancing.

Hand sanitizer stations throughout the airport have been a popular and valuable resource for our customers. We introduced a COVID-19 testing site in partnership with Alaska Airlines, Hawaiian Airlines and Southwest Airlines, which required substantial effort to secure functional space for the new operation.

FMJ: How has COVID-19 changed the way you and your team operate?

FRAZIER: Although many changes are not visible, travelers will experience many of the improvements that were made over the past year in response to COVID-19. For example, we've incorporated new technology such as UV-C lighting on all escalators to sanitize the handrails for each user, as well as new custodial equipment to sanitize the air and increase air flow inside our terminals. Just last month, we introduced new bins with Microban Technology at our TSA checkpoints.

Efforts such as these helped SJC be the first California airport to earn GBAC Star Facility Accreditation for our commitment to cleanliness and safety. Cleanliness will be an increasing challenge as traffic rebounds, but our teams have done a great job during the pandemic, we are prepared and committed to keep up a high standard.

FMJ: How does security shape the way you are able to perform your day-to-day duties?

FRAZIER: Safety and security are the top priorities at any airport. There are rules and requirements set forth by governing bodies such as the TSA, FAA and the county, which influence how our team must upkeep our facilities.

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

FRAZIER: Similar to most in the FM industry, the current climate is causing us to do more with less. Our operations have become leaner with the reduction in both staffing and budget; however, our building and mechanical systems continue to age requiring increased maintenance and repair. The challenge of identifying ways to extend these systems beyond their normal expected lifespan is what I believe is a common reality facing many FMs.

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

FRAZIER: I enjoy looking at ways to incorporate technology into our facility operations and pushing the envelope to optimize efficiencies in our facility offerings to our customers.

RAPID CHANGE

Building Resiliency in FM

BY STUART RICH



Life is uncertain. Change is constant. These statements have always been true, but recently, the depth of uncertainty and the pace of change have been truly crushing — particularly when it comes to the way the world thinks about space management and physical proximity. It is becoming clear that the very nature of how organizations occupy facilities will need to be reimagined, and this envisioning process may take years to come to stasis.

One result of the pandemic experience is that many businesses have learned that people can work from home and still be productive. Some employees enjoy working from home and the subsequent impacts on their lifestyle. Others miss the interaction of the office environment and the structure of the workday. While some jobs have become more digitally sustainable, professions like social services, manufacturing, health care and education are more critically dependent on face-to-face interactions. Even within professions where the work can be done from home, teams may desire to get together regularly to focus on innovation and camaraderie building.

Suddenly, facility and real estate managers are drawn into regular meetings with the leadership team as they wrestle with questions such as:

- Which teams need to come back now, next and later?
- Do the buildings that house high-priority teams have safe, sufficient HVAC?
- How is social distancing impacting seating plans and employee density?
- Which buildings will require renovations to accommodate alternative seating plans?
- Should this organization consider selling buildings to reduce its overall footprint?
- Are there leases coming due in the next year that should be released to reduce overall capacity?

- Should this organization consider leasing rather than owning some facilities due to changing market conditions?
- How can a business adapt to different work schedules to support employee needs?

The answers to these questions are unlikely to be singular or straightforward. Instead, it would appear that FM professionals are embarking on an extended period of iterative scenario planning. The cycles of plan, estimate, approve, execute and evaluate must be repeated in periods of weeks rather than years, as was previously the case. In this environment, facility managers will need to be more adaptable and resilient than ever before.

It's all about the data

The key to building adaptability and resilience into an organization lies in the ability to make data-driven decisions. To answer the questions above, the data in question is about real estate (buildings, parcels, leases, easements) and space management (augmenting the information that may come from floor plans). However, it can be challenging to aggregate this information due to the nature of the data FMs require.

Real estate information about property valuation, condition, operational costs, key lease dates, deferred maintenance issues and energy consumption is likely managed across several systems. All too often, this data is trapped in PDF files and spreadsheets somewhere on the file system — likely with permissions issues.

Space management information is often held in a collection of CAD floor plans and associated spreadsheets. The allocation of people to spaces is often managed at the local department level. It can be challenging to understand the overall space portfolio if an organization has not implemented a modern FM information management system. Many organizations do not have a reliable set of current floor plans in place today, so starting the overall management process will require overcoming a data development bow wave.

Organizations with accessible facility data may not have the business processes in place to ensure that the data is current and accurate. Missing, incomplete, or inaccurate data can be extremely costly. As a Harvard Business Review article pointed out, “It costs 10 times as much to complete a unit of work when the data are flawed in any way as it does when they are perfect.”

The cost of bad facility data may be even more dramatic. If real estate acquisition or disposition decisions are made based on flawed data, the impacts of those decisions may be extremely costly to an organization for years to come.



If an organization does not have reliable or accessible facility information to support these decisions, the FM should champion to change that as quickly as possible. Now is the time to move disparate floor plans into one centralized, location-centric database.

Start at the beginning

Any FM challenge begins with an inventory. In this case, the inventory is not only about the resources that are available to FMs, but more importantly, about how expectations have changed in terms of the way those resources support the organization's mission.

- Are there business functions that can and should be done remotely?
- What types of space are most valuable to remote staff when they do come into the office?
- What spacing is safe for in-office functions or teams that work more productively in person?
- Can an organization justify high-density, open-office seating plans in a post-COVID-19 world?
- If the open-office format is finally dead, what seating formats do teams prefer?
- How can field teams move to mobile workflows that eliminate paper from the process and remove the need to come back to the office for paperwork?

These cross-functional discovery conversations will happen with team leads, the human resources department, and environmental health and safety groups. As this discussion may be the first time FMs have a “seat at the table,” it is a perfect opportunity to showcase the value of smart FM in an organization.

HR policies will likely evolve to address the changing needs of the organization for facility support. Over the coming months, a revised set of requirements will emerge that define the needs that the FM team will be expected to support. These requirements are likely to change iteratively over time as the organization adapts and learns the patterns that work best — and those that do not.



Once an organization conducts an initial study of facility-related needs, the FM should serve as an ongoing resource for the organization, helping the team make efficient adjustments and communicating results.

Prioritize alterations

The changing facilities needs that are discovered in this requirements-gathering process are likely to be significant. Some departments may find they need significantly less space if their workforce shifts to a primarily remote mode of operations. That same department may also find that they need different types of space to support meetings when the remote workforce is in the office.

Other departments may find that they need to continue with a primarily in-office work experience. As a result, the space layouts need to shift from a high-density floor plan to a more distributed seating plan with protective barriers between workstations. The cumulative impact of these changes may be substantial. The FM team will need to employ a prioritization framework to determine which alterations should be made first, next and later. Some of the considerations in the prioritization process will include:

- Which teams have the most critical FM needs to deliver continuity of mission for the organization?
- Which buildings in the portfolio can be quickly and affordably altered to meet the new requirements?

- Suppose an organization should consider reducing its overall space footprint. Are there some buildings that are particularly expensive to operate or have a lot of deferred maintenance that should be prioritized for disposition?
- Are there upcoming lease expirations that could help achieve overall objectives?
- Given the changing commercial real estate market, do businesses have an opportunity to renegotiate leases at more attractive terms?
- For those leases in which the business is the lessor, should the FM anticipate turnover or the need to renegotiate terms?
- Are there geographic risks or priorities that should influence real estate acquisitions and dispositions (e.g., dispose of properties in the flood plain, ensure services to target populations and customers, further the goals of the local government economic development plan)?
- Are there changes in the overall regulatory environment that FMs should consider when reconfiguring portfolios (e.g., Brexit, travel restrictions, changes in the supply chain)?



With an up-to-date facility inventory, organizations are equipped to run detailed scenario exercises to determine the best path forward. Armed with data and details, the team will have confidence, even in the face of uncertainty.

Improve and iterate

Given that expectations are likely to continue shifting and businesses will not make considerable changes to the portfolio all at once, it would be wise to take a page from the agile software development community and establish an iterative cycle of change management.

STEP 1: Define a series of small actionable projects and ensure that each has established measures of success.

STEP 2: Evaluate progress after each project to assess whether the success measures were achieved. If yes, what worked that can be repeated? If not, how can the overall approach be improved?

When evaluating success, it is crucial to understand that the goalposts may have shifted over the past year. How do FMs think about occupancy or utilization rates when the workforce is occasionally in the office? A lease rate that was a bargain a couple of years ago may be overpriced today. Depending on the local real estate market, prices may have changed significantly. What targets should an organization be setting? Are there different targets that are more appropriate to the times? It is essential to assess whether objectives were achieved and if targets should be adjusted at the end of each cycle.

Measuring what matters and ensuring that data is current, complete and accurate has never been more important. Managing a facility portfolio with flawed data is akin to flying a plane with malfunctioning instruments. It is a career-limiting approach. The

more volatile the environment, the more critical it is to trust in the information to make suitable corrections.



Smart FMs will use this opportunity to establish baseline measurements on space utilization, energy costs, facility condition and more. These standards will empower the team to track progress over time and use data to guide future decisions.

It's a big world after all

The world of FM is diverse. The facility needs of a financial services firm in urban London, England, and a meat processor in rural Oakland, Nebraska, USA, could hardly be more different. An approach that may work brilliantly in Sao Paulo, Brazil, may be utterly unworkable in Lyon, France. Still, some fundamental principles can be adapted to most situations:

1. **Keep an eye on the future.** To the extent that they can, FMs must understand the near- and long-term facilities expectations of their organization.
2. **Chart a course to the goal.** Every journey starts with a single step. It will be critical for FMs to identify short, measurable milestones to ensure their efforts remain on track.

3. **Take the time to reflect.** After each milestone or completed project, the FM team should connect with stakeholders to ensure continued alignment. The team can adjust their approach, measures and metrics as necessary.
4. **Rinse and repeat.** In this ever-changing environment, the work of optimizing property portfolios and space utilization is never complete. With the right data and baseline measurements in place, FM will measure progress and make continual improvements over time.

Change is not new. It has been an intrinsic part of the world since the beginning of time. The pace of that change and the consequence of missteps have increased dramatically in the past year. Good data, good systems, good processes and good people are more crucial than ever. Thoughtfully managed, these resources can help FMs navigate this era of uncertainty with confidence. FMJ



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SHOULD WE BE SATISFIED

with Zero Energy Buildings?

BY LAURENT BATAILLE

CLIMATE CHANGE IS REAL.

GLOBAL TEMPERATURES AND SEA LEVELS ARE RISING, ICE SHEETS ARE MELTING AND THE FREQUENCY OF EXTREME WEATHER EVENTS IS INCREASING. WHILE THESE CHANGES ARE OCCURRING DUE TO A PERFECT STORM OF HUMAN ACTIVITY, CITIES HAVE REALIZED THE ROLE THEY ARE PLAYING — CITIES COVER AROUND 3 PERCENT OF THE EARTH'S LAND AND PRODUCE A STAGGERING 72 PERCENT OF ITS TOTAL GREENHOUSE GAS EMISSIONS.



Masdar City, Abu Dhabi

The problem is clear. So, what can be done?

Technology is playing an increasingly important role in the fight against greenhouse gas emissions. The concept of a smart city — a city that embraces Internet of Things (IoT) and other technologies to make lives better — is nothing new, but it is a notion that has historically worked best when ecosystems are built from scratch.

Masdar City, for example, is a pre-planned city that has created a “green print” for sustainable urban development. Located in Abu Dhabi, clean energy, sustainable real estate and clean technology have been a top priority for the city since its inception in 2008.

The results seen from pre-planned smart cities are impressive and provide inspiration, but urban centers that have

been around for hundreds of years do not have the luxury of starting from scratch. These cities require a different approach: creating change one building at a time.

Taking a collective approach to achieve carbon neutrality

There is power in numbers — this is especially true when tackling a global problem such as climate change. The EU Commission has established a mission that will support and promote 100 European cities in their systemic transformation toward climate neutrality by 2030, and Carbon Neutral Cities Alliance (CNCA) members aim to achieve carbon neutrality within the next 10-20 years.

New York City, New York, USA, is part of the CNCA and has committed to reducing its greenhouse gas emissions 80 percent

reuse, refurbish,

by 2050; and Vancouver, British Columbia, Canada, plans to shift building and transportation energy use in the entire city to 100 percent renewables before 2050. Although these may seem like lofty goals at first glance, making drastic changes is the only way cities will be able to meet the limit temperature goals set forward in The Paris Agreement — a legally binding international treaty on climate change.

The numbers don't lie — the important role buildings play

Buildings consume about 30 percent of the world's energy via their construction and operations, and account for almost 40 percent of annual global greenhouse gas emissions according to the IEA. Unfortunately, despite current efforts, energy use in the buildings sector has continued to increase steadily since 2000.

While disappointing to see that not more progress has been made, the good news is that a scenario highlighted in a 2019 IEA report found, "Efficient and clean energy technology solutions, coupled with low-carbon power generation, cut buildings-related CO₂ emissions by 87 percent by 2050, while global floor area nearly doubles." This shows that if sustainability is really made a priority — both for new and retrofit buildings — the industry can make a real impact.

Take the T-Mobile Arena in Las Vegas, Nevada, USA, as an example. It is a state-of-the-art entertainment building that made sustainability a priority from the start. The arena has full connectivity and 24/7 control, from air conditioning and lighting to access control, energy management and building operation. In its first 12 months in operation alone, T-Mobile Arena saved about 18 percent on its energy.



Fort-Garry Hotel, Spa and Conference Center in Winnipeg, Manitoba, Canada

Working with what you've got — retrofitting for net neutrality

Integrating technology from the start can produce impressive results, but there are millions of buildings around the world that must be retrofitted — in New York City alone there are an estimated 1 million buildings. For those looking to make changes in established cities, the good news is that software and digital technologies create a second mover advantage. Any building can be digitally retrofitted to become both smart and sustainable.

The historic, century-old Fort-Garry Hotel, Spa and Conference Center in Winnipeg, Manitoba, Canada, is one building

that made what was once old, new. Prior to its upgrade, the hotel was facing pressure from rising energy costs, increased regulation and the need to improve operational efficiency as the hotel used a lot of energy and was not insulated to modern standards.

The hotel was built with steam heat and no air conditioning, and all adjustments to temperature, airflow and steam in ballrooms, common areas and the spa were done manually as a reaction to complaints. By utilizing advanced guest room and building management software, systems

recycle, renew...

and connected devices to add a layer of intelligence to existing systems, enabling automation, visibility and control of environmental conditions, the hotel experienced an impressive 20 percent reduction in energy consumer and 25 percent reduction in maintenance staff hours. They now have a modern hotel in a historic building; and old system with new brains.

So, what does zero energy buildings really mean?

The goal for many buildings is to achieve carbon neutrality. According to the U.S. Office of Energy Efficiency & Renewable Energy, zero energy buildings combine energy efficiency and renewable energy generation to consume only as much energy as can be produced on site through renewable resources over a specified time period.

While there is no one-size-fits-all or one-size-solves-all approach, here are a few aspects to creating smarter and more sustainable buildings:

- Become ultra-efficient. Develop a smart, connected infrastructure that produces, stores, distributes and shares power.
- Become fully electric. Heating electrification has proven to be many times more efficient than traditional fossil-fuel based systems, and ultimately economically competitive in most regions of the world, particularly when associated with air conditioning.
- Use retrofits solutions. Circular economy is today's alternative to the "take, make and dispose" industrial model. It redefines products and services, minimizes waste and saves money.

Thanks to retrofit solutions, this "re" concept (reuse, refurbish, recycle, renew, etc.) is applicable to electrical distribution equipment. Obsolete components can be refurbished, repaired or recycled to minimize waste, leading to a prolonged operational life cycle and less cost — according to estimates, savings can range from 43 to 65 percent.

The future is self-healing buildings

It takes a commitment to create zero energy buildings, but the technology is available to make it a reality. The next question is — why stop there?

This leads to a fourth consideration when creating sustainable buildings. Systems should be ready to rely on local (renewable) generation and work with flexible residential-owned energy sourc-

es, connected to modern and digitalized grids, to increase overall system resiliency. This will lead to buildings having the ability generate their own energy and become energy positive — or what some call self-healing buildings.

Self-healing buildings will crop up especially fast in areas where the energy generation aspect is more easily imagined. In turn, buildings will be part of the solution (rather than the problem) as they become value-adding energy generation assets that strengthen grid resilience and help mitigate grid disturbances through microgrids, which operate autonomously and utilize renewable energy such as solar. Not only will this help save the earth, but it will also help with energy continuity during natural disasters.

A look ahead — what's needed to achieve net neutrality and self-healing buildings

The transition to sustainable practices is going to take coordination between governments, industry and builders. Regulations must be enforced by government mandates, industry must freely share best practices and innovate to create technology that is accessible and affordable for all, and builders must prioritize technology from the start.

The time to act is now. Together, cities, building developers, FMs and solution providers can rise up to the challenge and embrace sustainable practices to ensure generations have a safe and healthy place to live. **FMJ**



Laurent Bataille is executive vice president of Schneider Electric's Digital Energy Division and is an experienced global business leader, with a demonstrated track record in general management positions that require expertise in transformational leadership. Bataille works with his team reinventing the world's vision of buildings for the future and accelerating the digitalization of power distribution through the implementation of new technologies solutions such as IoT, software and cloud solutions for building management. He holds an MBA from INSEAD and a Master of Sciences in Applied Mathematics from Ecole Polytechnique.



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WHAT EMPLOYEES SHOULD KNOW

IN CASE OF A NATURAL DISASTER

BY BILL CONLEY



A secret held benefits no one, but a secret shared serves everyone. Not that facility managers keep secrets, but sometimes communication is neglected as a consequence of too much to do, so little time to do it. Other times, an FM's failure to share information stems from their perspective. Actions to be taken when disaster strikes seem obvious to the FM, but not to the entire staff.

Most employees are only concerned with going to work and going home. The damaging impact of external forces such as extreme wind, heavy rain or falling trees on the business may not register until their daily routine is interrupted. Diligent FMs will have a written disaster response in place, but making sure a solid emergency strategy has been communicated to all employees is imperative.

A natural disaster is a major adverse event resulting from natural processes of the Earth. Natural disasters, such as floods, hurricanes, tornadoes, volcanic eruptions, earthquakes, tsunamis, storms and other geologic processes can cause loss of life or damage property, and typically leaves some economic damage in its wake, the severity of which depends on preparations taken.



HURRICANES

Hurricanes do not just suddenly appear. Fortunately, there is technology and information available that can provide alerts or warnings. The four key elements of a hurricane are high-speed winds, storm surges, torrential rains and tornadoes, all of which can result in devastating damages to a facility.

With the ability to know the exact time and day a hurricane is expected to hit, there are no excuses for not properly securing a building or preparing employees. Once a hurricane alert is broadcast, it is crucial that cautionary measures are taken immediately and relayed to everyone.

Back up all electronics and disconnect all wires. Employees should clear their desks, bring work home or store it in a safe place. Furniture and equipment should be moved away from windows into the innermost rooms of the commercial building. All valuables and displays located outside the building should be moved inside to secure locations. Utilities should be turned off prior to the hurricane making landfall if possible and employees should be notified.

It is also important to protect important documents and information. Hard-copy insurance documents, legal contracts, tax returns and accounting statements must be safeguarded to avoid water damage. Files should be backed up on the cloud or on a company server. A list of important contacts that are critical to business operations, such as employees, banks, lawyers, accountants and suppliers, should be saved in an alternate, accessible off-site location and/or digitally.



FLOODS

Flooding causes power outages, disrupts transportation, damages buildings, creates landslides, causes overflow of dams or other water systems, and could lead to serious injury or death. Flooding results from rain, snow melt, coastal storms, storm surges and can develop slowly or quickly. Flash floods can come with little or no warning.

Most facilities are connected to their community's warning system. Employees should know and practice evacuation routes, shelter plans and flash flood response. They should be familiar with designated safe locations to gather and be ready to evacuate on a moment's notice. If employees are trapped in a building, they should know to go to its highest level, but only go to the roof if absolutely necessary. They must also know the risk of electrocution. Electricity and water do not mix. Be aware that snakes and other animals may end up inside the facility.

If employees are away from the facility, they should understand the dangers outside and avoid driving except for emergencies. If they do drive, they should never go around barricades: they are there for a reason. Nor should they walk, swim or drive through flood waters. Water flowing at 25 mph has the pressure equivalent of wind blowing at 790 mph, faster than the speed of sound. People should also stay off of bridges over fast-moving water.



TORNADO

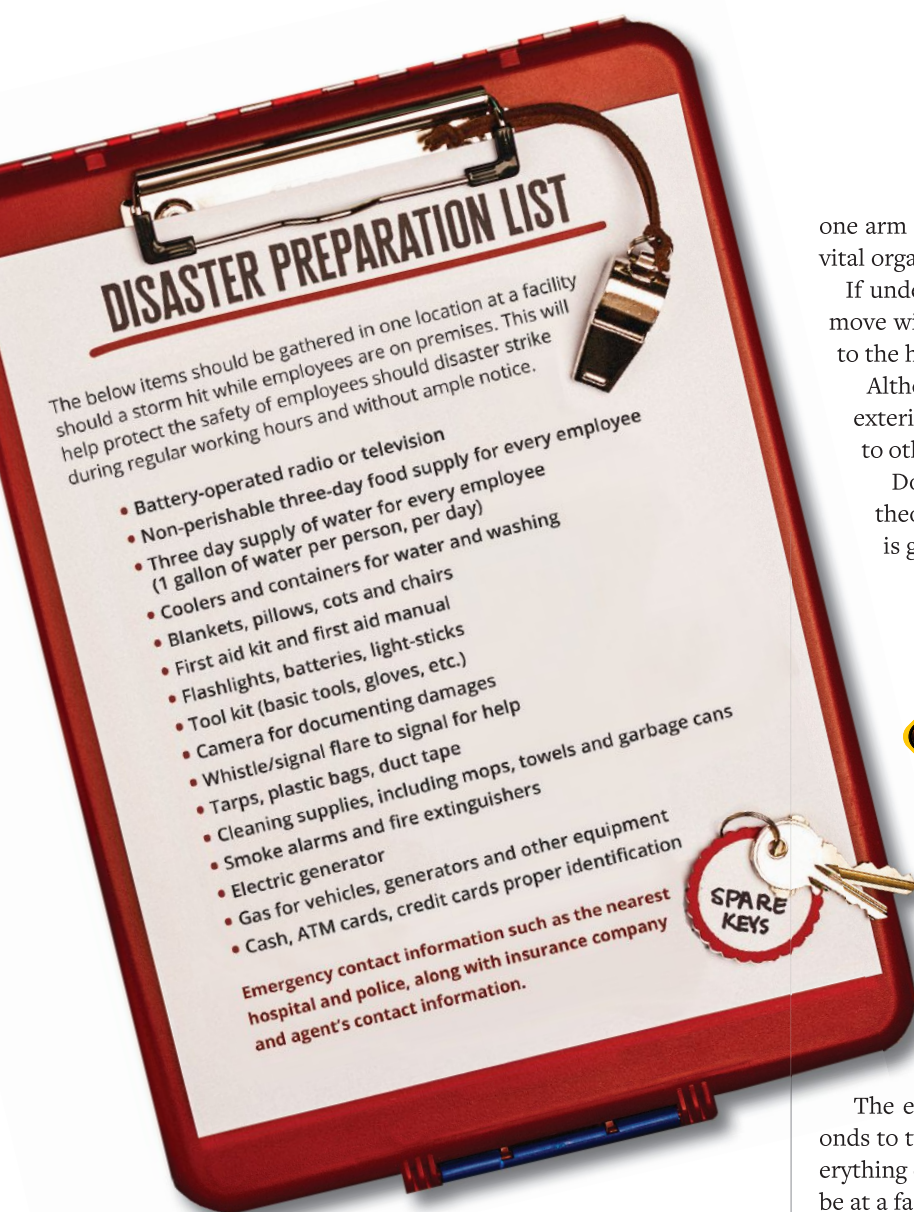
A tornado is a violently rotating column of air extending from the base of a thunderstorm down to the ground. Tornado intensities are classified on the Fujita scale with F0 being the weakest and F5 being the strongest. Tornadoes have been reported in every geographic location.

In the case of an imminent tornado threat, whether it has been visually sighted, indicated on radar or a warning issued, shelter must be sought immediately. Tornadoes are capable of destroying any man-made structure, uprooting trees and hurling debris with lethal force. All employees must be prepared for this eventuality. They should be able to recognize any alarm or warning systems.

Preparation for tornadoes requires identifying places to take shelter, familiarizing employees with community or facility warning systems, and establishing procedures to account for individuals in the building. An underground area, such as a basement or storm cellar, provides the best protection from a tornado. If an underground shelter is unavailable, employees should seek a small interior room or hallway on the lowest floor possible. Rooms constructed with reinforced concrete, brick or block with no windows and a heavy concrete floor or roof system are ideal.

Employees should be warned to stay in the center of any room, keeping away from doors, windows and exterior walls. They should also stay away from the corners of the room. It might seem to be one of the safer places, but flying debris likes corners, and that is where most trash accumulates.

If anyone is caught outdoors during a tornado, they should seek shelter in a basement or a sturdy building. If nothing is available within safe walking distance, they should try to drive to the nearest shelter. If flying debris is encountered while in their vehicle, stay inside with the seat belt on, keeping their head below the windows and covering up as best they can. If there is an area that is noticeably lower than the road, they can lie down there, again covering up.

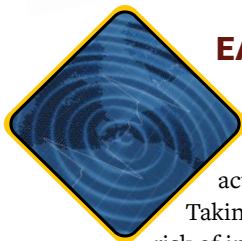


DISASTER PREPARATION LIST

The below items should be gathered in one location at a facility should a storm hit while employees are on premises. This will help protect the safety of employees should disaster strike during regular working hours and without ample notice.

- Battery-operated radio or television
- Non-perishable three-day food supply for every employee
- Three day supply of water for every employee (1 gallon of water per person, per day)
- Coolers and containers for water and washing
- Blankets, pillows, cots and chairs
- First aid kit and first aid manual
- Flashlights, batteries, light-sticks
- Tool kit (basic tools, gloves, etc.)
- Camera for documenting damages
- Whistle/signal flare to signal for help
- Tarps, plastic bags, duct tape
- Cleaning supplies, including mops, towels and garbage cans
- Smoke alarms and fire extinguishers
- Electric generator
- Gas for vehicles, generators and other equipment
- Cash, ATM cards, credit cards proper identification

Emergency contact information such as the nearest hospital and police, along with insurance company and agent's contact information.



EARTHQUAKE

Earthquakes occur without any warning and may be so violent that it could knock a person off their feet. In case of an earthquake, the best action one can take is to drop, cover and hold on. Taking these actions can save lives and reduce the risk of injury.

Do not underestimate the importance of dropping immediately to hands and knees. This may not seem dignified, but dignity takes a back seat to safety. It is better to drop as soon as possible rather than falling and risk injury. Being on all fours protects a person from being knocked down and allows them to stay low and crawl to shelter. If a sturdy table or desk is nearby, crawl underneath it for shelter. If all is available is a chair, crawl under it to protect the head and neck. The greatest danger is from falling and flying objects, such as ceiling tiles, light fixtures or loose items on desktops or shelves.

If no shelter is nearby, crawl next to an interior wall, away from the windows. To protect vital organs, cover the head and neck with

one arm and hand, or stay on the knees and bend over to protect vital organs. Hold on until the shaking stops.

If under a shelter, hold on to it with one hand and be ready to move with the shelter if it shifts. When out in the open, hold on to the head and neck with both arms and hands.

Although building collapse is not a great danger, windows and exterior walls are unsafe. Do not try to walk or run outside or to other rooms during the earthquake. This creates more risks.

Do not stand in a doorway, nor trust the Triangle of Life theory. Get to a safe place and stay there until the all-clear is given.



FIRE

When it comes to fire emergencies, everyone should know the drill.

However, repetition and practice are extremely important when it comes to evacuation procedures. All staff should be aware of the dangers and precautions that are endemic to a fire in the workplace. Through safety meetings and departmental representation, the process of what to do in case of a fire should be periodically outlined. Maps identifying safe routes out of the building should be posted in visible areas, and they need to be aware of the assembly areas.

The estimated time of evacuation should be between 90 seconds to two minutes. There is no time to grab personal items. Everything can be replaced except for human life. Evacuation should be at a fast pace, with no running.

Ideally there will be safety representatives to take control and manage the evacuation.

They need to know who in their department may have special needs and will require assistance exiting the building and be willing to help or ensure help is available in these instances.


ALL IN ALL

Note the differences in reactions to fires versus other natural disasters. In case of a fire, the first action is to evacuate the building. Every other occurrence dictates staying in place until it is safe to leave. Also, first responders will be dispatched fairly quickly in case of a fire. Other disasters will have a much broader impact and assistance may not be immediate.

As in any emergency situation, specific duties should have been assigned in advance and checklists created for each specific role or responsibility. Alternate personnel should be designated and trained in case the assigned person is absent or incapacitated. Those employees who have been trained in first aid and/or CPR/AED, should be willing and available to assist personnel in need until emergency responders arrive.

Part of the communication plan for employees is defining disaster survival common denominators. No matter what happens

to a facility, there are a few practices that must be implemented. Facility maps, exit routes and assembly points need to be posted and available to all employees. There should be an established procedure to perform an accurate headcount. Employees must understand the need for people to know where they are. Whether they are out to lunch or in another department, their location, given any emergency, should be known by someone. In the same vein, visitors and customers must be accounted for in case of an emergency. Every employee should understand that they are responsible for their guests and need to assist them if a situation arises. There must be strong leaders identified and ready to take control and guide employees calmly and efficiently to safety.

Preparedness involves a continuous process of planning, equipping and exercising. Many things that seem logical to FMs may not resonate with employees. Sometimes, they need to be told. Ignorance of proper safety procedures and not responding correctly could be a disaster in itself. 



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

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Building Envelope Performance Takes Center Stage

BY DR. SIMON PALLIN

IFMA is an organizer of the Better Buildings Building Envelope Campaign, alongside the American Institute of Architects (AIA) and the International Institute of Building Enclosure Consultants (IIBEC). The U.S. Department of Energy's Building Envelope Campaign is one of the latest in the series of Better Buildings Alliance technology campaigns and is designed to help building owners and facility managers create more energy-efficient buildings. This will be achieved by targeting the building envelope thermal performance, determining available energy savings, and providing technical support to building owners and FMs.

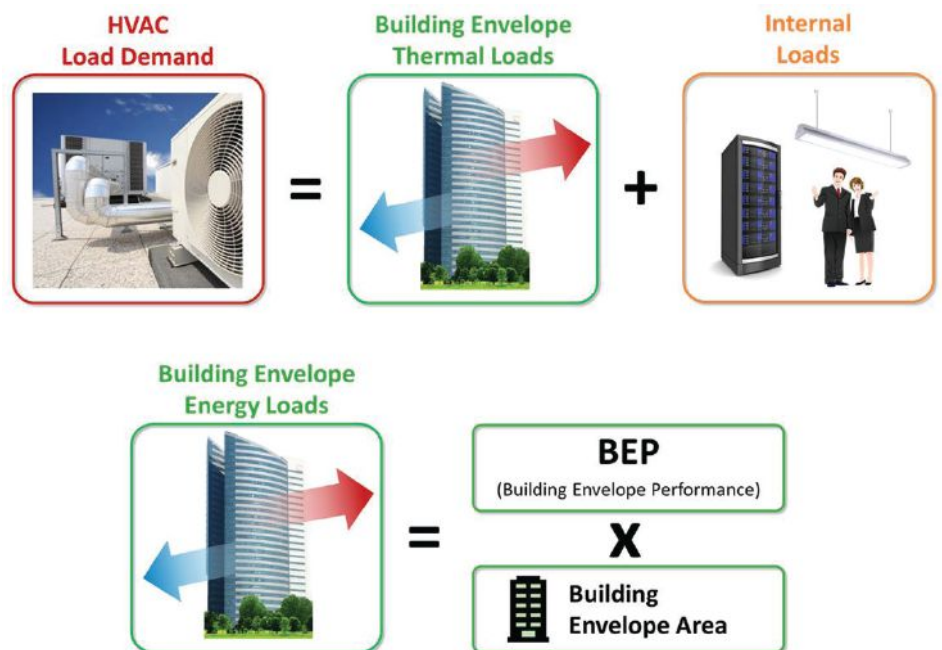
The building envelope consists of walls, windows, roof and foundation, and is one of the most overlooked areas of available energy savings in commercial buildings. Envelope technologies account for approximately 30 percent of the primary energy consumed in residential and commercial buildings, and therefore, play a key role in determining levels of comfort, natural lighting, ventilation, and how much energy is required to heat and cool a building. The Building Envelope Campaign provides momentum for FMs to invest in high-performance building envelope technologies for both new and existing commercial buildings.

THE BUILDING ENVELOPE CAMPAIGN WEBSITE AND TOOL

The Building Envelope Campaign evaluates the thermal performance of the building envelope for existing and new buildings, using a new metric called the BEP-value. Any commercial building owner in the U.S. is eligible to join the campaign as a participant, and buildings built or retrofitted since January 2019 are eligible to be submitted for recognition. The Building Envelope Campaign website (ec.ornl.gov) allows participants to enter information about their buildings, such as

type of building, location, building geometries, thermal characteristics and building airtightness. For retrofit projects, the participant must enter information about the building both pre- and post-retrofit.

For new construction, the performance will be evaluated against present code requirements. For both cases, the BEP-value will serve as an indicator of performance and is calculated in real time. In addition to calculating the BEP-value, the tool performs a sensitivity analysis to determine, based on the user entries, which components of the building envelope can most significantly improve performance. For example, the tool may determine that increasing the R-value of the roof insulation is the most strategic measure to improve the overall building envelope's thermal performance. In addition, the website provides resources, case studies and information about building envelope systems to improve the building energy efficiency.



The energy balance of a building comes down to whatever heat load (or sink) that is generated inside the building, such as building envelope related loads and internal loads from lighting, people, plug-loads, etc., including the HVAC System, which needs to compensate for these loads to maintain a comfortable indoor climate.

Building Type

Is this a new construction or a retrofit?

New Construction

Retrofit

Approximate year of building construction:

1990

Climate

Select the climate zone where building is located

4A - Mixed-Humid

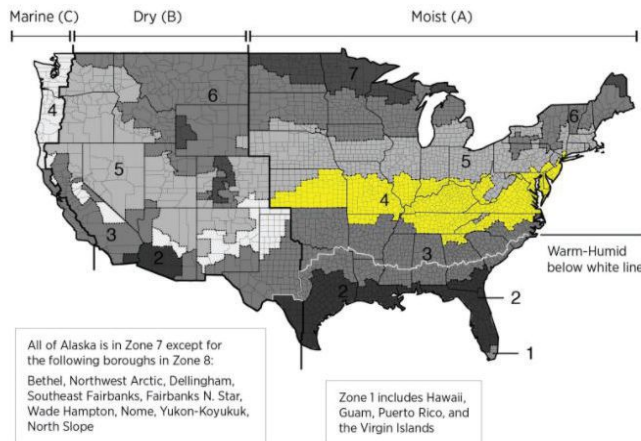
Select the state where building is located

Tennessee

On average, Tennessee has a 7 year delay adopting new construction code.

Select the built environment

Rural



The Building Envelope Campaign provides an embedded performance assessment tool for the campaign participants.

Participants can be recognized in various ways. For retrofit projects, the building owner can be recognized if the building envelope performance, thus BEP-value, is improved by either 30 percent or 50 percent compared to pre-retrofit. For new construction, 20 percent and 40 percent improvement compared to code applies. These awards are Retro 30, Retro 50, Novel 20 and Novel 40, respectively. Projects may also be designated as Role Models for going above and beyond these awards or Honorable Mentions if those lower tiers are barely out of reach.

THE THERMAL PERFORMANCE OF THE BUILDING ENVELOPE

In many cases, engineers, architects, consultants and building owners use prescriptive measures to quantify the thermal performance of the building enclosure. For example, steady state measurements such as material R-values or U-values are used to calculate the composite thermal resistance or transmittance of the building envelope. These values are then used to determine the overall thermal performance of the building envelope in the absence of dynamic effects. Unfortunately, R-value alone does not account for the building envelope's response to energy transfer. Other factors, such as thermal mass, the thermal properties of fenestrations, air infiltration, occupant behavior and climate, especially solar loads, all play a role in determining the overall performance of the building envelope. It is these properties and the relation-

ships between them that make quantifying or developing a metric (or a more representative metric) of the building envelope's thermal performance complicated. For example, whole building energy simulations account for these properties separately rather than using a single metric to account for the thermal performance of the building envelope. The result of the energy simulation is often used to compute metrics that describe the performance of the entire building, including heating, ventilating and air conditioning (HVAC) system, plug loads and lighting. One such metric is the energy use intensity (EUI), which is the energy use of the building per conditioned floor unit area. The properties and performance of the building envelope, good or bad, are just one part of these results.

As part of the Building Envelope Campaign, a simplified methodology and performance metric was developed accounting for mechanisms relevant to the heat loss and gains through the building envelope and its impact on interior loads. Using a single metric, the methodology attempts to characterize the building envelope thermal performance as a system that includes the geometry of the building, thermal resistance and inertia of the opaque portion of the wall, fenestrations and even air infiltration. More importantly, the metric tries to capture all the complexity associated with the thermal performance of the building envelope into a single value. The introduced metric is referred to as the building envelope performance (BEP)-value.

THE BEP-VALUE

As complex as the energy performance of a building may seem, it typically comes down to a simple relationship (see Fig. 1). Whatever acts as a load on the HVAC system is basically a result of two variables: the heat loss or gains through the building envelope components including any solar induced load and the heat loads generated inside the building. For the Building Envelope Campaign, the focus lies on the building envelope thermal performance, and how it can be improved to reduce the HVAC peak and overall energy demand.

To evaluate the thermal performance of the building envelope, the BEP-value was defined. Instead of using a wide range of metrics, such as R-value, air exchange rate per hour (ACH), solar heat gain coefficient (SHGC) of windows and U-factor, the thermal performance of the building envelope can be described through the BEP-value. As seen in Fig. 1, the BEP-value represents the annual energy load associated with all heat transfer mechanisms through the opaque building envelope and windows. This load is then divided over the total building envelope area and thus expressed in annual energy gain/loss per square foot of building envelope area (kBtu/sq. ft. per year). The unit is comparable to the EUI with two exceptions, the BEP-value is given over the total building envelope area instead of conditioned floor area and only includes loads related to the building envelope.



Station 51 in Athens County, Ohio, USA, will be awarded the Novel 40 recognition.



Interior view of Station 51.

PARTICIPANTS

The Building Envelope Campaign was launched in the summer of 2020 by the Better Building Alliance. During the first year of the campaign, 75 building owners signed up as participants and just as many signed up as supporters. Of the 75 participants, about 20 percent will be awarded in the year 2021. Altogether, these buildings have a conditioned floor area of about 1.5 million square feet and an expected annual energy savings of 9 million kBtu compared to pre-retrofit or if the buildings were built according to present code requirements.

The first building is the Station 51 Solar EMS in Athens County, Ohio, USA. The 8,726 square-foot building is designed to be virtually a net zero energy building. The building envelope has an astonishing 50+ R-value for the roof and R-38 for the exterior walls. The airtightness of the building has an impressive value of 0.13 cfm/sq. Ft. at 0.3 in water gauge (75 Pa), which is three times better than the present code requirement. According to the campaign tool and building envelope performance assessment tool, the BEP-value of this building is 5.0 kBtu/sq.ft. per year. With an expected 52 percent reduction in energy consumption from building envelope loads, Station 51 of Athens County is awarded Novel 40.

The second building is the retrofitted American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) headquarters in Atlanta, Georgia, USA. This three-story building has 53,600 square feet of conditioned floor area and more than 90,000 square feet of building envelope surface area. Originally built in 1978, the new R-value of the cool roof and exterior walls are 35 and 17, respectively. The BEP-value of the retrofitted building is 7.4, which is a 51 percent improvement compared to pre-retrofit. Because of a remarkably improved overall building envelope energy performance, the ASHRAE Headquarters is awarded Retro 50.

The Building Envelope Campaign is anticipated to continue for another year and will recognize buildings in 2022 for their envelope performance beyond common practice. For more information about the Building Envelope Campaign, upcoming events and resources, visit ec.ornl.gov. FMJ



ASHRAE New Global Headquarters
180 Technology Parkway, Peachtree Corners, GA 30092
ASHRAE Headquarters in Atlanta, Georgia, USA, will be awarded the Retro 50 recognition.



Dr. Simon Pallin serves as Building Envelope Technical Lead. He is an R&D staff member in the Building Envelope Materials Research Group at ORNL. Dr. Pallin has worked in the building industry since 2005 and is responsible for the Building Science Advisor, an online tool that helps the building industry design durable and energy-efficient wall assemblies. He holds a Ph.D. in building technology from Chalmers University in Sweden. Dr. Pallin is a member of the ASHRAE Pandemic Task Force-Residences; a voting member of ANSI/ASHRAE/IES Standard 90.2-2018, *Energy-Efficient Design of Low-Rise Residential Buildings*; handbook chair and voting Member of ASHRAE Technical Committee (TC) 1.12 on *Moisture Management in Buildings*; a voting member of ASHRAE SSPC 160, *Criteria for Moisture-Control Design Analysis in Buildings*; a corresponding member of ASHRAE TC 4.4, *Building Materials and Building Envelope Performance*; and a Certified Energy Manager with the Association of Energy Engineers.

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

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EMCOR Facilities Services | www.emcorfacilities.com
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Linc Facility Services. Doha. Qatar | www.abm.com
New PIG Corporation | www.newpig.com
Office Depot | www.business.officedepot.com
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QNBM | www.qnbnm.qa
Renaissance Services SAOG | www.renaissanceservices.com
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FM:Systems Inc. | www.fmsystems.com
IBM | www.ibm.com/us-en
iOFFICE | www.iofficecorp.com 
Planon | www.planonsoftware.com
SpaceIQ | www.spaceiq.com
Trimble | www.trimble.com

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Kimball International | www.kimballoffice.com
Vari | www.varidesk.com
Versteel | www.versteel.com

INTEGRATED FACILITIES MANAGEMENT

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United Facilities Management | www.ufm.com.kw

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Excel Dryer | www.exceldryer.com
rzero | www.rzero.com
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Securitas Security Services USA | www.securitasinc.com

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WASTE MANAGEMENT

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Waste Harmonics | www.wasteharmonics.com



Behind the Brand

COMPANY NAME: Pivot Energy
EXPERTISE: Commercial Solar Ecosystems
CSP LEVEL: Silver
CSP SINCE: 2021
WEBSITE: pivotenergy.net



Pivot Energy wishes to gift qualifying organizations of IFMA with up to US\$25,000 to apply towards reopening facilities after the global pandemic, once they purchase solar energy. The offer is only active until the end of the 2021 calendar year.

The global pandemic was a challenging year for many facilities required to close their doors and shut down operations. In response to these challenges, Pivot Energy would like to give up to US\$25,000 to IFMA members who decide to purchase solar energy. Pivot recognizes the hardships associated with reopening facilities, and would like to offer this incentive when choosing to go solar. The gift is contingent on the following terms and conditions.

TERMS AND CONDITIONS:

- Minimum system size of at least 500 kW across 3 buildings or less
- Roof age is less than 15 years old*
- Metal standing-seam roofs age less than 30 years
- Roof is under direct sunlight
- Current IFMA membership
- Must be the property owner
- Must purchase solar through Pivot Energy in 2021

**If older than 15 years, you have the option to replace, though it would be deducted from the US\$25,000 gift amount*

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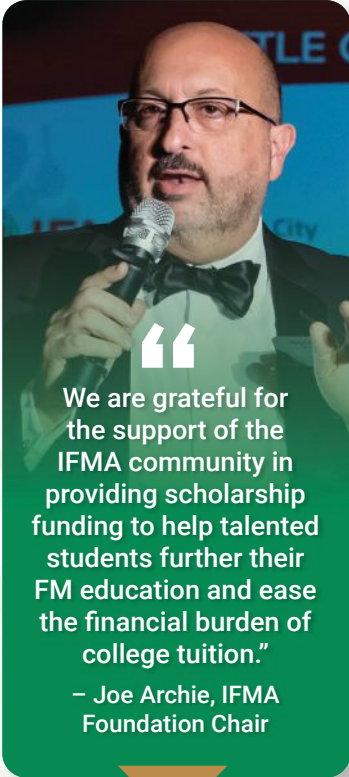
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We are grateful for the support of the IFMA community in providing scholarship funding to help talented students further their FM education and ease the financial burden of college tuition.”

– Joe Archie, IFMA Foundation Chair

IFMA Foundation's Pirate Regatta

October 25, 2021
7:00 pm – 10:00 pm EST
Kissimmee, Florida

Ahoy Ye Buccaneers!

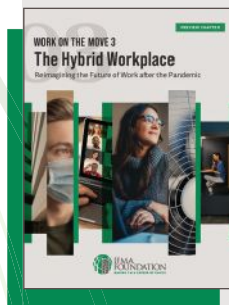
Dress the part of yer favorite swashbuckler for the IFMA Foundation's Pirate Regatta. Blow me down, it will be an evening of games, pirate competitions and fun. Purchase your tickets for two complimentary drinks and light vittles. Landlubber or seadog, it's a pirate's life for everyone! Yo ho ho and a bottle of rum!

Learn more at:

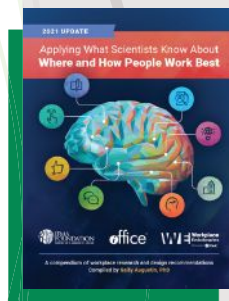
foundation.ifma.org/event/ifma-foundation-pirate-regatta

IFMA Foundation appreciates the support of the IFMA chapters, councils & communities for their sponsorship toward scholarships.

If interested in impacting the life of a future FM leader, Contact Program Support Specialist Christina Gonzales at christina.gonzales@ifma.org to learn how to become a sponsor.



Work on the Move 3, the third book of the series, will be published in the summer of 2021. This important publication will be released as the world recovers from the COVID-19 pandemic. The foundation published “Work on the Move” in 2011 and “Work on the Move 2” in 2016. Both books are widely appreciated for helping facility managers around the globe prepare for the future of work. Preview chapter available online: app.etapestry.com/onlineforms/IfmaFoundation/WOTM3PRE.html



Applying What Scientists Know, Update In 2020, in the midst of the pandemic, there was a need to update the scientific research of the previous publication as meaningful data for new forms of building renovations which would be designed to reflect enriched ways of working, and should be based on the largest scientific data. foundation.ifma.org/news/publications



ACCREDITED DEGREE PROGRAMS

SCHOOL NAME: Kennesaw State University, Kennesaw, Georgia, USA
Department of Construction Management

FM-RELATED DEGREES OFFERED: Bachelor of Science in Construction Management with Facilities Management Concentration
Facilities Management Certificate (non-degree option)

IFMA AFFILIATION: Since 2012

HOW LONG HAS YOUR PROGRAM BEEN AFFILIATED WITH IFMA?

KSU has been affiliated with IFMA since 2012. The Facilities Management (FM) concentration offered within the Bachelor of Science in Construction Management degree was first accredited by the Facility Management Accreditation Commission (FMAC) in 2012.

WHY WAS THE PROGRAM INSTITUTED?

The program was instituted to address the needs of the industry brought forth by the industry and lack of such a program in the surrounding institutions.

WHAT TYPES OF PRACTICAL APPLICATIONS DO YOUR STUDENTS LEARN?

- Life cycle costing analysis using economic analysis
- Real Estate Analysis (especially lease vs. buy decisions)
- FM estimating and budgeting
- Quality assurance with tools such as Failure Mode and Effects Analysis, DMAIC and DMADV Six Sigma, FCAP and Benchmarking
- Human factors analysis
- FM technology implementation process and tools
- Strategic and tactical planning using balanced scorecard and SWOT analysis





KENNESAW STATE
UNIVERSITY

- Project management — planning, scheduling and implementation
- Project/Construction finance — cash flow, labor burden, general overhead budgets, and company cash flow and financial health analysis

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

The KSU CM graduates are second to none and highly sought after by industry employers. Our students are recruited by top industry leaders large and small in the various disciplines of the construction industry securing roles as project managers, superintendents, estimators, facility managers, VDC designers to name a few. One of our notable alumni is Brent Scarbrough who received the Atlanta Business Chronicle's 2020 Most Admired CEO Award.

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

The KSU CMD has dynamic talented research faculty committed to the advancement of knowledge in the built environment. Some of our most exciting work includes advancement in the use of construction technology and materials, sustainability and diversity in construction academia and industry.

- **Dr. Pammy Juneja:** Her research objective is to facilitate strategic alignment between work environment and goals of high performance and overall well-being for occupants, thereby, optimizing the whole life cycle costing of respective environment. Her research work includes Soundscapes in classrooms, Life Cycle Costing Index: A transformative approach to managing the performance of facilities or assets, and FM in the developing countries.
- **Prof. Jackie Stephens:** Researching how the built environment affects a person's mental health. This study examines if the changes for sustainable construction improve the anxiety and depression among the residents. It looks at 12 stressors and the anxiety and depression levels of the occupants of university housing. This research is exciting because it could improve the quality of life of our students.
- **Dr. Pavan Meadati:** The goal of the research is to develop a framework which facilitates automated information flow be-

WHAT COURSES ARE OFFERED?

The following are the major courses offered within the CMD BS degree including the FM concentration electives.

- CM 2000** Construction Graphics
- CM 2210** Intro to Structures
- CM 3000** Computer Applications in Construction
- CM 3040** Building Information Modeling 1
- CM 3110** Resi. and Light Construction Methods
- CM 3180** Mech. and Electrical Building Syst.
- CM 3400** Risk & Quality Management
- CM 3410** Construction Quantity Surveying
- CM 3800** Construction Finance
- CM 4510** Construction Scheduling
- CM 4560** Construction Project Management
- CM 4660** Advanced Scheduling & Project Mgmt
- CM 4710** Construction Safety
- CM 4760** Construction & Real Property Law
- CM 4900** Capstone Project

IFMA Concentration Courses

- CM 3270** Facility Management Strategies
- CM 3290** Facility Management Practices
- CM 4190** Sustainable Operation & Maintenance



tween BIM and project management system and helps usage of BIM for monitoring, analysis and decision-making stages of project control. This framework reduces collection and formatting time at monitoring stage and enables to visualize the analysis results linked to the building components in BIM.

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

The key challenge of the FM industry is to understand the role of life cycle costing and BIM in the entire process of facility and asset decision making. Our students are aware of these challenges and how to address them as they progress towards a FM role in their career. They are also made aware that time and availability of resources will be the foremost challenge they will face, as FM is the cost department in any organization. They are taught how problem-solving skills, analytical skills and economic tools (they are learning while they are in school) can turn the FM department

into a revenue component of an organization.

WHAT ARE THE ACCOLADES OF YOUR ACADEMIC STAFF AND FM PROGRAM?

There are 12 full-time faculty members in the KSU Department of Construction Management. All faculty members teaching in the program satisfy the credential requirements for university faculty as prescribed by SACS. This is significant for the maintenance of a high-quality educational experience and ensures the quality of our programs. Additionally, our program is nationally ranked and offers nearly US\$100,000 in scholarships annually to CM students. The following are a few faculty and student highlights:

Faculty Highlights

- **Dr. Pammy Juneja** has served on the IFMA Atlanta Executive board as vice president of professional development from 2018-2020. The key responsibilities of this position were to work with IFMA and the Atlanta Chapter board and members to cre-





ate opportunities and strengthen the link between academia and industry; connect student chapters with each other to foster growth and development. For the past three years, she has been the recipient of the World Workplace Sponsorship from IFMA Atlanta Chapter.

- **Dr. Faruque Hossain** has completed numerous publications on sustainability. He recently completed his third book “Global Sustainability in Energy, Building, Infrastructure, Transportation and Water Technology.”
- **Prof. Irish Horsey** is committed to diversity in the built environment. She serves as chair of the National Association of Women in Construction Atlanta Chapter Professional Development Committee where she champions the mentorship program for women in industry and in construction academic programs. She is the founder and advisor for the KSU Women in Construction (KWIC), which prepares KSU students for careers in construction and has helped secure thousands of dollars in scholarships and funding to support women in construction. She is also a 2021 Provost Faculty Fellow.

Student Highlights

Our students are among the best and brightest. They strive for excellence in their academics and among peers. For example, our students annually compete in student competitions where they continue to shine amongst other students in similar programs. Students have earned top prizes for community service and student chapter awards at the National Association of Home Builders Student Competition, Association of Energy Engineers and others. Students are national scholarship recipients including the IFMA Foundation Scholarships and Associated General Contractors of America Scholarship. Additionally, FM students annually participate and volunteer at IFMA Atlanta Workplace, IgniteFM! compe-

tion and have earned a IFMA Atlanta Scholarship. Our students have also been featured in the IFMA Atlanta Newsletter Spotlight.

HOW DOES KSU GUIDE STUDENTS TO SELECT FM AS THE BEST CAREER?

Selecting the right job is a multi-attribute decision problem that requires a tradeoff between various contributing and conflicting mutually exclusive attributes. We train our FM students in multi-attribute decision making process that requires thorough systematic thinking and results in consistent and rational results. We also connect our students with FM professionals for mentoring so they can ask questions, relieve their fears, and enter the workforce with confidence and pride.

The College of Architecture and Construction Management (CACM) where the concentration is housed, provides career and internship advisement through the Student Success Headquarters which aids our FM students in the preparation of cover letters, resumes, CVs, and answers questions related to internships, co-op positions, interview skills, career fairs, the use of Handshake (a career placement tool), and other support to prepare FM students for work or graduate school. The CMD also hosts networking events with industry partners to aid students in the career decision making process. Other means of career and networking opportunities for students are offered through industry sponsored cookouts, industry guest lectures and annual industry townhall meetings.



Digital Twinning: The Future of Building Engineering and Design

BY JASON PELSKI



Data is the currency of efficiency and productivity, revealing both risks and opportunities across the built environment. Healthy buildings require both responsive facility management and data insights that can be interpreted into action. Building data can come from anywhere and everywhere. Converging on-premise system data with off-premise data at a rapid volume and speed often renders it too unwieldy to manage. Dynamically changing factors are driving the need to make buildings smarter, more sustainable, adaptive to occupant needs and self-aware. The digital twin vision provides reliable, enriched datasets that feed machine learning, driving smarter artificial intelligence, which is the engine that automates the responsive building.

The Digital Twin Solution

A digital twin is a virtual, real-time replica of a physical product, asset or system. It is the digital replica of every system, asset, event, space and occupant within the as-built environment. The digital twin takes datasets across a facility and creates more enriched information, helping simulate use cases and scenarios before they affect the physical built environment, with datasets and APIs that can factor in several data points across systems to generate an entirely unique, customized set of data.

In the past, a digital twin was limited to focusing solely on a single aspect of a building — like an HVAC system or lighting. Now, however, digital twins have expanded to include every aspect of a campus, building, space or asset, allowing near-absolute insight into the operation of a facility. This complete digital representation provides an easy-to-access, cloud-based overview of data across the built environment. Data gathering and synthesis become even more challenging during building engineering and design, where effective data utilization can make or break the optimization of a building or campus.

A digital twin also allows for cloud-based testing and predicting future processes. This can save thousands of dollars via the avoidance of ineffective changes within a

facility, such as the addition of a new asset or system in the physical world. Being able to answer “what if” questions makes a digital twin critical as more and more highly technological systems are introduced into facilities around the world.

Digital Twins and Democratizing Data

Systems like energy, security, HVAC and IT/OT (among others) all create metadata that is typically siloed. The data from these systems and subsystems oftentimes lives only within the system itself, without being unified or analyzed in a holistic way across the facility.

The future of the healthy building converges all available datasets that drive building efficiency and performance optimization, which, in turn, drive the ROI required for business outcomes. But the collection of data, even if accounted for during the engineering and design phase, is not enough. Without unification and enrichment of data from across systems, very little context across the as-built environment can be achieved. A digital twin, alongside supporting systems, can gather, enrich and bring holistic context of location, events, assets and occupants across the built environment. This leads to better operational performance and ex-

tensibility of new applications using the latest in machine learning and artificial intelligence. The digital twin and corresponding building graph provide reliable and cleansed datasets, which machine learning models need for making better predictions, used for artificial intelligence and automation.

By unlocking data from their respective silos, unifying multiple datasets to provide clearer context, a more complete understanding of each facility system's performance can be achieved in a repeatable and reliable fashion — both in how a system functions within itself and in how a system is affected by surrounding systems. Enriched information is gathered by the digital twin and used to feed machine learning engines, which creates predictive algorithms and artificial intelligence for building-health automation, capable of reacting and responding. This provides FMs a powerful, data-driven automation tool that helps simulate, predict and preempt issues from disrupting business operations.

Combining FM and IT/OT

A digital twin does more than unify and enrich data. It connects the visual elements of the digital twin's attributes of location, events, assets and people as part of the building information model (BIM).

The BIM, or architectural drawings of the building, is becoming the de facto master repository for storing digital twin attributes and provides the visual aspect of relationships across the as-built environment. The visual representation of the digital twin occurs in 3D modeling and provides context to provide up to eight-dimensional (8D) representations. It is the digital twin that provides the construct to achieve this level of dimensional fidelity. These visualized interfaces help translate the building system context into communication among FM, operational technology and information technology. With easier visibility into the goals of FM, unprecedented value is created across buildings, campuses, and overall real-estate portfolios.

Digital twins grant higher visibility into dynamically changing building system data, including lights, security, parking and HVAC, for example, so each of these systems can be optimized and streamlined. A digital twin helps gather all of the location, event, assets and people data, integrate relevant external data and present that data as a complete set of information to act on. This data democratization is part of a successful digital twin strategy. It is through data democratization that FMs can create scenarios in the virtual space to analyze impact and outcome and determine the impact of a new asset or system — not just within a single area but across the entire facility.

Implementing Digital Twins in Greenfield or Brownfield Projects

Most new greenfield (new construction) customers are starting with a 3D, 4D, 5D or 8D BIM and need a digital twin to provide the level of data fidelity that meets their desired outcomes of sustainability, energy simulation modeling, occupant wellness and automation. It will become nearly impossible to expand dimensions and manage change management without a well-managed digital twin. The earlier



in the process a digital twin can be introduced, the faster it can be integrated into the project. From an FM perspective, the earlier in the process that digital twins are involved — even as early as working with the architects of the project — the cheaper it is to organize and cleanse the data required to implement digital twins.

With a brownfield (existing buildings) project, older BIMs typically need to be updated and enhanced to extract the full value of the digital twin visualization. Because the digital twin was not part of the original project, it is treated much more like an overlay and requires more involvement in ingesting the location, assets, events and people so data can be collected by the digital twin for use.

In both cases, the flexible nature of a digital twin helps during implementation. Digital twins are designed to evolve as more data is measured and acquired, so whether starting new construction or overlaying a digital twin on an existing building, this technology is able to adjust and grow as needed throughout its use.

Digital Twins in the Real World

This example shows a digital twin in use at a facility in Mumbai. Integrated into the facility's building management systems (BMS), the digital twin allows for remote control, monitoring and automation management — all while real-time data is being gathered and synthesized into actionable information. With complete control of the building using existing protocols such as BACnet, Modbus, and MQTT, the digital twin allows an FM to see fault de-

tection and diagnostics, even allowing for work order generation if service or routine maintenance is necessary. In this example, the digital twin also creates the opportunity for scenario optimizations and risk simulations, so changes to the facility can be done virtually — and intelligently — before any changes in the physical world are made.

The FM can select and focus on an air handling unit within the building, as the entire BIM and digital twin are geo-referenced with real-time telemetry data (including real-time asset data), a user manual and the current temperature.

The use of a digital twin can also extend to simple, more direct optimization. For instance, when service is required on an asset within a facility, the digital twin can provide the service technician with the specific location of that asset, a step-by-step guide to reach it and any pertinent information regarding what security protocols may be in place or with whom they may need to speak. This helps speed up the maintenance process and reduces the impact of maintenance on the FM staff.

Digital transformation is having a big impact on an FM's day-to-day operations. Today, FMs must interpret huge datasets and attempt to make decisions based on the context of what is happening in the as-built space. And that data load is only increasing — making it even harder to synthesize information and act appropriately. Digital twins will help create models to interpret and streamline the data points, helping FMs be more proactive in facility operation and optimization.



The Future of Digital Twins

While the current state of digital twins is already revolutionizing and optimizing the effectiveness of smart building interaction, future digital twin states will include more expansive machine-learning models. It is likely that, within five to 10 years, this technology will create more complete building automation, where models are making operational decisions in the digital world based on real events in the physical world. Simply put: a building will be able to determine with confidence when a part needs to be replaced, create a work order for itself and submit it — all without the need for an FM to intercede on the thousands of events that occur in a day.

FMs will not have to wait long for some of these benefits — this technology is already being implemented. For instance, there is a facility in Europe that has automated the opening of windows to increase indoor air quality (IAQ) in the building based on the relationship of CO₂ levels inside and outside, the position of the sun and the temperature outside, effectively reducing energy loads while increasing IAQ.

Getting Started With a Digital Twin

The first step in utilizing a digital twin is having a robust edge IoT platform that provides a reliable asset and event management process. Asset management and associated event mapping, alongside integration, is key. This information can then be supplied to the

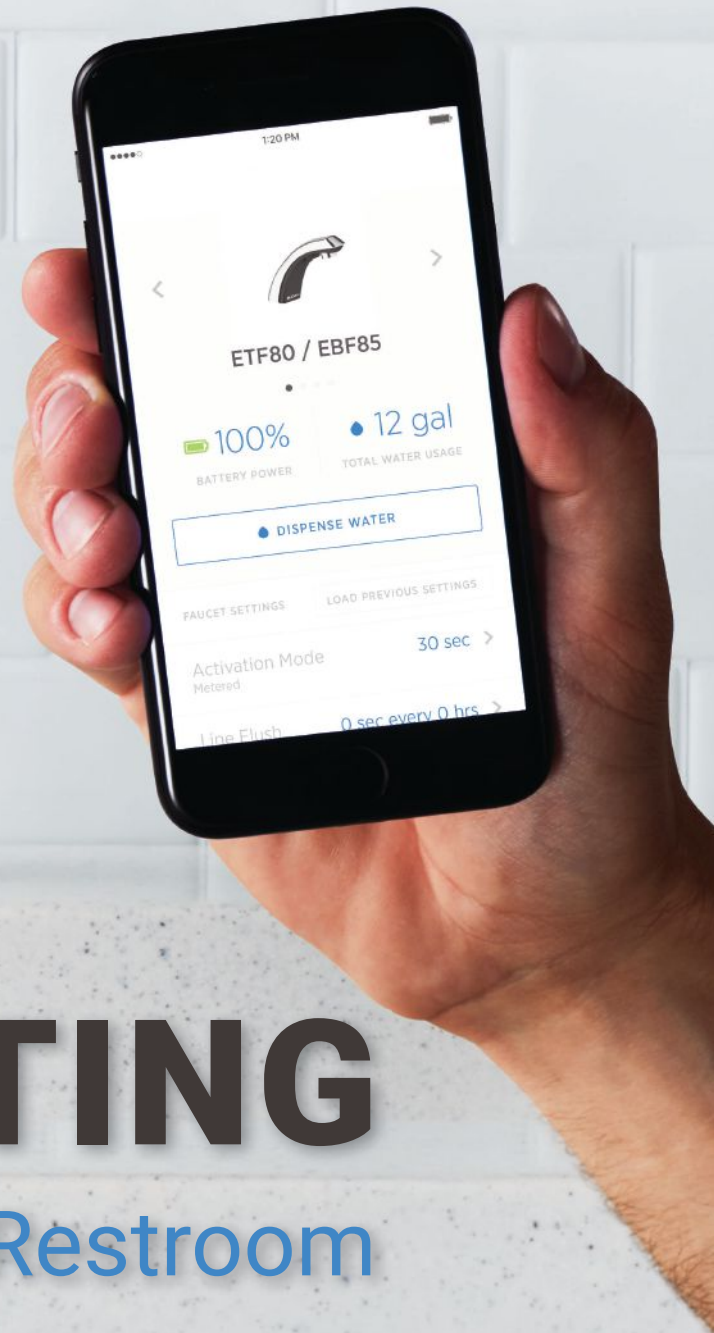
digital twin to create the building graph, where enriched datasets are stored.

Digital twins are not quite plug-and-play-ready yet, particularly because as-built environments differ greatly. Starting with a knowledgeable digital twin partner, highly experienced in the building controls space, is a good place to start. The best digital twin partner is one that bridges the edge IoT with the digital twin and cloud to unify the asset, space, event and people data relationships. The more thorough and involved stakeholders are across a facility, the faster the digital twin implementation happens.

Digital twins are the future of FM. As this technology becomes more prevalent and is integrated at the start of a building project, more FMs will be able to proactively interact with building data. Through this synthesized data, FMs will find their roles shifting from one that is largely reactive to one that orchestrates optimization and utilization efforts more often. The buildings they oversee will, in turn, become more healthy, more secure and more intelligent. **FMJ**



Jason Pelski is cloud Platform product lead for Johnson Controls, where he provides product-driven leadership for the OpenBlue digital cloud platform. He is focused on digital transformation of buildings, occupants, and operations, as well as democratizing data across the digital ecosystem using cloud-native architectures, digital twins, AI, and best-in-class security to create and accelerate value driven customer solutions across the entire business portfolio.



CONNECTING

to the Commercial Restroom

BY FAYE BADGER



Maintaining a commercial restroom can be a labor-intensive task.

Crawling under the sink to manually fix faucets, squeezing between water closets and urinals to access flushometers, and making constant visits to inspect products showing signs of breaking down have become the norm.

But thanks to innovations like the Internet of Things (IoT) and wireless and Bluetooth technology, facility management teams can manage restrooms with much less of the physical labor of yesteryear.

This type of connected restroom technology is redefining how FMs communicate with their plumbing systems to proactively manage their restrooms and address problems before they happen. They are now able to remotely control faucet settings right from a smartphone and analyze how much water is being used down to the specific fixture.

With the digital era now making its way into the restroom, it is important for FMs to understand these new benefits at their disposal and how to best implement them to work smarter not harder.

Understanding IoT

IoT. These three letters are becoming part of today's vocabulary. But what exactly do they mean?

One of the fastest growing trends in the evolving technology landscape, IoT is the concept of machine-to-machine communication to collect data at a centralized location for analysis. IoT is a modern network management system for various sensors, products and machines to connect through the internet — via either wired or wireless connectivity. It has become a staple in day-to-day lives in cars, phones, wearable devices, and much more as it virtually transmits and stores data.

With the increasing popularity of touch-free, or sensor-activated, restroom prod-

ucts, this type of technology can be utilized in the commercial restroom. With this innovation, users are gaining a wide range of information about their flushometers or faucets without ever having to touch them, and it is all done from a mobile device.

The Three I's

IoT is providing FMs with three primary benefits known as the three I's — intelligence, insight and interaction.

Beginning with intelligence, FM teams can now remotely monitor systems such as faucets, flushometers, soap dispensers and hand dryers to collect data on hours of operation, the number of activations, accumulated activation time and water usage, as well as battery level. This new level of increased visibility into product usage, particularly for faucets and flushometers, helps to drill down to the exact amount of water each fixture is using. On the contrary, users can also tell if a product has not used any water in the last several hours, a telltale sign that it is likely out of order.

When it comes to insight, IoT is also helping to unlock predictive maintenance for FMs to identify and revolve issues before they occur. While restrooms typically only comprise a small percentage of a commercial building's budget, as a commercial building's second most-visited space, they go a long way toward impacting how a guest perceives the entire facility. Seventy-three percent of tenants say a bad restroom experience reflects poor management, and 60 percent say an unhygienic restroom lowers their opinion of a building.

This is where IoT and Bluetooth technology can help improve perception. Instead of typically changing a product's batteries on a yearly basis, FMs can look at specific

faucets to determine their exact battery strength prior to replacement. Regularly scheduled diagnostic reports sent to a mobile device provide a holistic approach to a sustainable facility. On-demand timeout settings allow for precise, managed water-flow down to the second, an essential benefit for increasing water efficiency that has a direct correlation on LEED ratings and other certifications. Additionally, IoT sensors track not only how many people wash their hands, but also for how long. This has been an especially important feature for health care and institutional facilities during the pandemic to monitor if medical professionals and patients alike are practicing proper handwashing for 20 seconds as recommended by the Centers for Disease Control and Prevention (CDC).

From an interaction standpoint, IoT technology facilitates data collection and delivering information to FMs to keep them aware of issues so that they can respond in real time to improve customer satisfaction, save time and lower costs. Having to change the settings on the flushometers across the eighth floor used to require going fixture to fixture and adjusting each one. Now, FMs can fix all the products on the entire floor with just the touch of button, while running and sharing diagnostic reports within seconds. During the pandemic, it was common for an entire restroom to be idle for an extended length of time. With innovation, automatic programmed line flushes help to keep lines clear and users safe by eliminating stagnant water that can breed bacteria and odor.

Putting Restroom Technology into Practice

When the Vanderbilt University Medical Center (VUMC) FM team sought new faucets to cater to more than 2 million pa-

tient visits each year, it wanted touch-free fixtures that promote a hygiene-friendly handwashing experience and products that also help its maintenance team become smarter water managers.

Utilizing sensor-operated fixtures combined with IoT technology has enabled them to enjoy the three I's firsthand. The touch-free faucets came equipped with an underdeck control box that reduced the service time needed by VUMC and helped the FM staff remotely monitor each individual faucet through their mobile app. The team now conducts weekly check-ins on specific fixtures throughout the facility while gathering information to measure and report water usage as needed.

Where Do We Go from Here?

While IoT and Bluetooth technology have certainly made great strides toward easing the burden on facility managers while helping them to do their jobs more effectively, there is still more progress that can be made.

The next evolution and progression from a commercial plumbing perspective is implementation into a building management

system with dashboards where maintenance staffs can monitor building systems status. Thus, the next step is to enable these big buildings to have a single source to monitor the entire facility all from one management system.

One day connected restrooms will be able to communicate even more information to FMs than they are right now. This information could include leak detection, determining if the floor is wet, automatically reordering parts, directing visitors to open stalls elsewhere in the facility and more. **FMJ**



Faye Badger is Sloan's product line manager for IoT where she leads the company's efforts in connected restroom technology. Badger has a wide range of experience in wireless technology and software from her time at Motorola and as a consultant where she helped to lead the company down the path toward IoT innovation.

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IN ACTION:

Addressing Asset Management with VBIS

BY TK WANG

Developed to meet the increasing challenge faced by building owners and facility managers to readily access digital asset information, Virtual Buildings Information System (VBIS) is supporting new construction handover to operations processes, as well as digital transformation within existing property portfolios enabling the better utilization of new digital technologies for operational efficiencies and improvement.

Asset management challenges

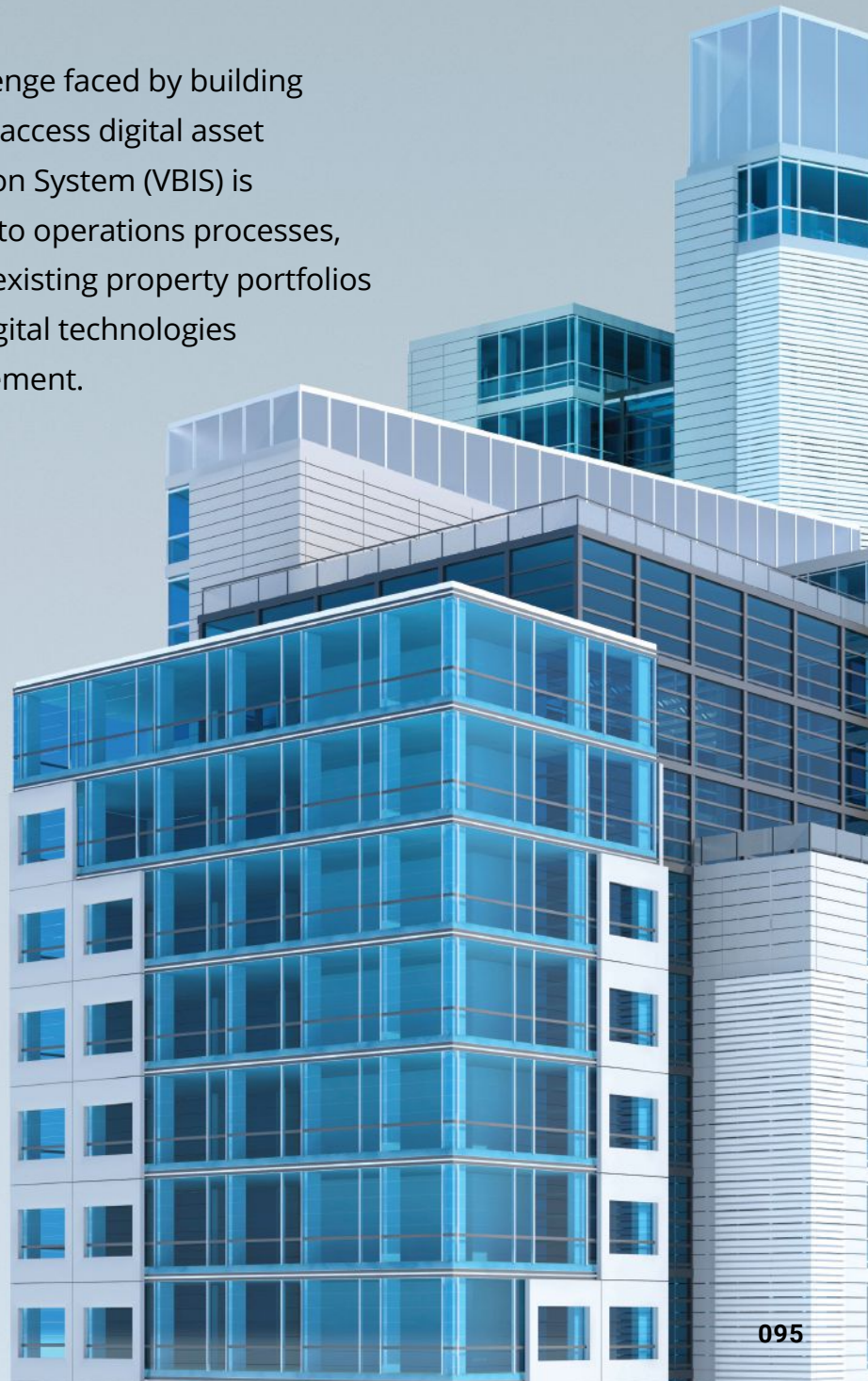
VBIS helps FMs readily access asset information to make informed decisions to efficiently operate their facilities.

These challenges include:

- Inconsistent asset classification
- Project information handover
- Accessing up-to-date information from multiple information sources (interoperability)
- Data structuring to support technology adoption such as analytics and asset management systems/platforms
- Communicating requirements to stakeholders and suppliers

Challenges can be further exacerbated by facilities often employing several information applications or platforms, each catering to specific functions. Each application can contain components of information related to specific assets. This makes it difficult to quickly locate accurate information when it is needed leading to impacts on productivity, cost and risk.

VBIS was designed to be implemented at any stage of the asset life cycle.



THE VBIS STANDARD

VBIS is a freely available standard for classifying and connecting asset data sources and systems. The standard was developed in Australia with significant support from the Victorian State Government and is featured in the 2020 Victoria State Government's Digital Asset Strategy and in the Queensland State Government's Data and Information Guideline.

Using an ecosystem approach, the VBIS standard facilitates the standardization of asset categorization particularly suited to unified searching of FM databases and linking a range of asset-centric FM applications such as asset registers, service systems, life cycle analysis systems, O&M manuals, virtual reality systems and emerging cloud-based facilities.

It allows means of communication between 3D models, 2D drawings, FM systems and other asset management systems acting as repositories of project data in a standardized and consistent way. Key aspects of VBIS are:

- A standard four-level asset object classification coding (tagging) convention to standardize in the way data is labeled or tagged and the introduction of logical parent/child relationship for data, independent of its use.

Level 1 Disciplines	Disciplines are used to group design, construction and maintenance activities and are based on the traditional building services engineering & associated disciplines. A total of 70 discipline categories have been identified to date.
Level 2 Products	Products are created to serve a specific function. e.g. for pumps the product specific function is to generally move a fluid or in some cases compress a gas.
Level 3 Sub-Type	Provides the first level of categorisation of the product.
Level 4 Sub-Sub-Type	Provides the second level of categorisation of the product.

The four-level VBIS classification structure.

- A VBIS syntax that permits a call to a website and pass search parameters for the site to initiate a search and display results. The syntax works with VBIS tags as well as any other asset data parameters such as barcodes, equipment designations or other classification standards.

ASSET CLASSIFICATION IN NEW CONSTRUCTION

As infrastructure projects move through the design stages, from concept design to preliminary design, detailed design to construction, asset information is progressively gathered and enriched. While designers and construction contractors can build up knowledge of the facility during construction, it is often expected that building owners and facility operations service providers can understand all the details of the building within few training sessions and with minimal mobilization time on site.

With projects becoming increasingly complex, use of building information modeling (BIM) within the design and construction process has similarly increased.

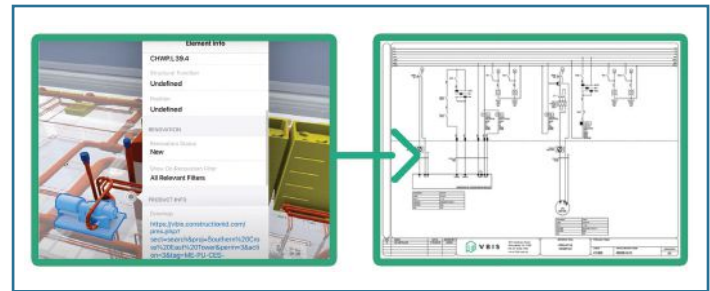
Using the VBIS asset classification tags, asset types can be incorporated into the BIM model ready for export at the completion of the project. With the four-level asset classification tagging structure, FMs can quickly extract a digital asset list that can be used to procure ongoing maintenance contracts by utilizing the first level of the VBIS tags which identify the asset discipline.

This information can also then be used to help establish an asset management system (AMS) or computerized maintenance management system (CMMS), with the level of asset identification granularity required to accurately schedule maintenance task requirements.

The asset lists available through VBIS will also ensure accurate asset registers are provided for maintenance planning and procurement.

IMPROVING THE HANDOVER TRANSITION

Using the VBIS linking syntax to connect to asset information within the BIM model allows facility stakeholders to start the learning process within the BIM environment during design and construction. This supports effective planning and efficient transition from construction to operation.



Example of using the VBIS linking syntax within a BIM model to access asset information.

ASSET CLASSIFICATION IN EXISTING PROPERTY PORTFOLIOS

The drivers of success in FM for the operation of a building differ from those for construction stakeholders. The primary drivers for construction relate to achieving satisfying time, cost and quality goals. In construction all assets are new, and the key consideration is tracking design, supply, installation, commissioning and handover of the asset.

Success drivers for FM relate to establishing value from assets to maintain the quality of the user's environment. In existing facilities, assets are often installed at different times, aging at different rates, and many cases, will require multiple replacement during the facility's life. The availability of consistent, complete and accurate asset information can make a significant difference in addressing these challenges. A fit-for-purpose asset classification system is fundamental in effectively providing this information and should enable:

- Assigning assets into groups based on common characteristics.
- Maintenance planning.
- Life cycle analysis.
- Information and knowledge transfer.

Adoption of the VBIS classification standard can assist to provide the tools to address these requirements.

CLASSIFYING EXISTING ASSETS

The first step to ensuring accurate and efficient operational and capital planning is to ensure assets are captured and recorded in a consistent way to facilitate structured planning and analysis.

It is important that the optimum level of detail is captured, to make certain critical assets are captured without burdening the process with detail that is not useful.

The use of VBIS asset classification tags supports this by introducing multiple levels of granularity to assist with ease of adoption. This can also reduce the costs to capture assets as detail can be built over time.

For example:

- **ME-Chr** is a Mechanical Chiller (Level 2)
- **ME-Chr-AC** is Mechanical Chiller that is Air Cooled (Level 3)
- **ME-Chr-AC-Ce** is a Mechanical Chiller that is Air Cooled and Centrifugal (Level 4)

The example considers the level of information that may be available at the time within the organization, in which the tags can then be initially adopted as two or three levels while creating the necessary structure and process to work toward full level adoption of the VBIS tags.

Ultimately, having the full level adoption of the tags will provide the right level of detail required for accurate whole-of-life analysis of asset performance, helping with capital and operational analytics and decision making.

As assets are captured and classified, maintenance tasks can then be reviewed and aligned to specific equipment types. This information can be used by procurement to ensure contractors tendering for works understand the specific types of assets being maintained.

For example, belt-driven fans will have different maintenance tasks to variable speed drive fans.

This level of identification granularity allows for the ready comparison of scheduled tasks and activities across the portfolio.

The consistency provided by VBIS tagging also better supports performance benchmarking of similar assets across portfolios of similar asset types.

INFORMATION SHARING

As FMs reduced site interaction time as part of risk mitigation strategies during the pandemic, there has been a new and increasing demand for easy communication and sharing of asset-related information with stakeholders.

The VBIS syntax provides for the robust and resilient interoperability of systems within a common data environment (CDE) by facilitating embedded search and display instructions in CDE applications. As computer systems and applications evolve and new functionality and systems are made available, the VBIS syntax ensures easy transition and adoption of new systems using a common search and display instruction that is not tied to any specific application.

A good example of where this syntax has been deployed to facilitate better collaboration and information sharing, is via 360-degree models and providing quick linking to relevant information. This approach model allows for measurements to be done remotely, provides context to assist with work planning, and facilitates easy access to up-to-date information using the VBIS linking syntax standard.

The advantage of the VBIS syntax is that it provides a search and display call to an application that will only require modification to the domain name at most in the future but will always call and display the current version of the document named, displaying it according to the functionality of the application being called.



Linking asset information to contextual 360-degree models

VBIS REALIZED OUTCOMES

The VBIS standard provides a cornerstone for enterprise-level asset management systems, providing targeted outcomes that reduce risk and improve operations by enabling:

- Consistent baseline information (asset register) to ensure accuracy in maintenance and life cycle planning.
- Enhanced asset analysis and performance tracking.
- Ability to share relevant details with contractors visiting the site, such as exact location of assets, wayfinding and all asset information is available prior to arriving at site.
- Risk mitigation by making risk assessment, permit and compliance requirements available for contractors and mapped to the areas and assets as applicable in the facility.
- Reduce time taken to conduct jobs and reduce time on site. The contractor is aware of the exact requirement through the visualization and site information. They know exactly what to expect and complete reviews and relevant paperwork before attending site.
- Streamline new staff and contractor induction requirements and site familiarization.

FMs rely on accurate information for planning and to keep assets running effectively. VBIS supports these objectives by providing an open classification and connection standard that is system agnostic and can be adopted to work with all commercial software applications.

For more information on the VBIS standard, live demonstrations of the application of the VBIS linking syntax and list of vendors who have adopted the VBIS standard to become VBIS enabled, please visit vbis.com.au. **FMJ**



T.K. Wang has more than 15 years of industry experience with a focus on building automation and technologies. During this time, he has taken on roles in engineering, project management, operations management and account management, predominantly in the health care and commercial buildings sectors. He has implemented new technology solutions with a focus on stakeholder outcomes. Most recently he is involved in asset management in consulting delivering services for VBIS.

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Member Spotlight

EDDIE LUCHS



Serra Mesa, California, USA
Director, Facilities
Years in FM: 12

What kind of facility do you manage?

I manage a 72,000 sq. ft. start-up biotech facility split between office and lab space.

How did you get into FM?

I spent 24 years in the U.S. Navy focusing on ship, submarine and diving system maintenance management, and quality assurance. The rigorous maintenance and documentation requirements, and strict standards and regulatory compliance gave me the tools to easily transition into the biotech and life sciences field. It's been a fantastic journey.

What has been your biggest FM challenge and what have you learned?

When I joined my organization in April 2019, they were 17 days away from relocating more than 80 employees and about 40 truckloads of "stuff" from a 15,000 sq. ft. suite to an 80,000 sq. ft. temporary site. We then partnered with our senior vice president of finance to oversee the design, build, start-up and commissioning of our new headquarters, located in Sorrento Valley with a March 2020 move-in date. Over the next nine months the company doubled in employees and tripled in "stuff," especially lab equipment. With everything going as scheduled, we began planning the company relocation 8-10 weeks in advance of the scheduled move date. With three weeks to go, COVID-19 came to the U.S.

As rumors of a stay-at-home orders circulated, senior management asked if we could reschedule the move a couple of days earlier, just in case. Everyone pulled together; the company started packing, the movers and move planners shifted their schedules, and our general contractors did the impossible – they got the city inspectors to expedite our final inspections and got

our certificate of occupancy issued two days early, as loaded trucks were leaving the move site.

After four very long days and nights, all our trucks were safely secure at the new site. But we were not done; we still had to clean up, decontaminate and close out the old site by the end of the month, or receive a US\$10,000 per day fine. We did it.

Over those 11 months I learned a tremendous amount about planning, communication and how to manage people's expectations. You must have a good plan and good people that can adapt to a dynamic environment when things go sideways. In the midst of chaos, the company will look to the facility manager for guidance about everything. Stay calm — the sun will come up tomorrow. And your desk chair will find its way back to you, very soon.

What advice would you give to someone starting in FM and what is the best advice you have received?

Best advice I can give: gain as much knowledge as you can, every day! Take IFMA courses, earn your FMP Certification, get a minimum of an associate's degree in a technology field, read everything you can to stay current on building trends and technology and network. Your network is your lifeline.

The best advice I received is that you must love what you do. This is a tough field. You get beat up a lot, but don't take it personally. Smile and serve others — that's the job.

Where do you want to take your FM career in the next few years?

In the short term I plan to complete my CFM and focus my energy on developing my project management skills. If the stars align well for my company, I would like to help them grow and support global facilities operations.

What do you hope to gain from your IFMA membership?

There are so many perks to be an IFMA member: networking, access to the highest quality vendors and contractors, camaraderie, sharing of ideas/teamwork, top-notch training classes and certifications.

EDWARD RE



New York, New York, USA
Adjunct professor
Years in FM: 49

How did you get into FM?

As a young boy I was enrolled in a mechanics training program and learned under what was called the craft method. I was trained in repairing everything from roofs to boilers. In the early 1980s, I started my own contracting company and quickly recognized the need for formal education. I took the GED, went to college and graduate school at night, and later became a state-registered architect. Despite building many buildings, houses and offices buildings, I recognized the need for talent in managing and maintaining buildings. Over time, my original company progressed into a facility management company specializing in evaluating and correcting improperly repaired and/or designed buildings.

What has been your biggest FM challenge?

The biggest challenge in FM today is finding talent. I've learned if you want the talent you have to train them yourself.

What advice would you give to someone starting in FM and what is the best advice you have received?

The best piece of advice I can give came from my grandfather in broken English, "No work, no eat."

Where do you want to take your FM career in the next few years?

I love doing what I'm doing. I love my job. I would like to do it forever.

ERIN RELOVA



Chicago, Illinois, USA
Senior Facilities Manager
Years in FM: 8

What kind of facility do you manage?

I manage my client's owned building, which is their office and banking headquarters, as well as 19 floors in an adjacent multi-tenant building.

How did you get into FM?

To be fair, I fell into FM. Out of college I was hired as a customer service representative with JLL, which ended up being more of a facility coordinator role. I had no idea this field existed until then, but I was good at it and really enjoyed the work. Here I am, seven years later and still loving it! I thrive knowing that each day will be different from the last. I've had great mentors and managers who've helped guide me.

What has been your biggest FM challenge and what have you learned?

When I joined my current organization in August of 2019, I was thrown into the middle of a large roofing project and all the capital projects that had been delayed due to a finance issue. I was trying to get to know my team, my new building, the ins and outs of my client and everything else. If that wasn't enough, a small piece of mortar fell onto a pedestrian on my property during an extremely windy day. It was a crazy time in my career. However, I quickly learned to trust my team and we all made it through the last months of 2019 together. We became stronger and more agile, which prepared us for the hardships of 2020.

What advice would you give to someone starting in FM and what is the best advice you have received?

My best advice is, "Don't waste slow days because you never know what will happen tomorrow." There is no room for procrastination in FM. The best piece of knowledge I've received is, "Project management might seem more fun, but FM is more stable and we get to do projects anyway!"

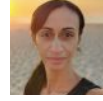
Where do you want to take your FM career in the next few years?

In the next few years I hope to become a regional FM with my organization and obtain all of the IFMA credentials.

What do you hope to gain from your IFMA membership?

I moved to Chicago from Los Angeles a couple of years ago and I haven't been able to meet as many FMs as I'd like, especially in 2020. Chicago is such a beautiful city with a rich history and amazing architecture. I would love to meet the FMs who manage the most iconic buildings.

YVONNE VARGAS



Las Vegas, Nevada, USA
Senior Director of Workplace Operations
Years in FM: 5

What is your role in FM?

I manage facilities managers for seven offices around the world.

How did you get into FM?

I am passionate about operations, building management and finding best solutions for creating innovative spaces.

What has been your biggest FM challenge and what have you learned?

The biggest challenge is dealing with unknown circumstances like COVID-19 and its effect on the future of building operations. I learned that it is important to think ahead of each challenge and find a way to use it as an opportunity for growth.

What advice would you give to someone starting in FM and what is the best advice you have received?

Everyday try to learn something new, or continue to find ways to perfect what is still working. The best advice I received is, the biggest room in a house is the room for development.

Where do you want to take your FM career in the next few years?

I would like to find more ways to collaborate and think about what is best in this current environment to support other women breaking into FM.

Ask the Experts

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

CONTRIBUTED



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

Our organization is looking to upgrade our visitor/access management systems, security and other technologies across our portfolio. How do we go about choosing what is right for our facilities that have different needs, capacities and not get trapped in a one-size-fits-all solution? How do we convince our executive-level decision makers to sign off on what is actually needed rather than the next shiny object?

A

When choosing a system for FM, the first thing you need to do is assess your needs. The main areas are:

1. What do you need it to do?
2. What differences do you need to accommodate? (different security systems, different access technologies, etc.)
3. What organizational and portfolio considerations do you need to address? (different building types, user structure, etc.),
4. What may change over time? (portfolio size, users, etc.).
5. What information, analysis, reporting do you need?
6. What integration with other systems or data is required and does it really need to be live or will a periodic synchronization/upload work just fine? Get stakeholders involved and ask the right questions internally.

To better address the above areas, you need to know more about what software is available and what it can and can't do, some of which you may not even be thinking about. This may also help you understand what is a need versus a want.

To learn more and better understand the software capabilities, search for software vendors, ask for suggestions in the IFMA Engage platform and check with colleagues. Just remember, what works for someone else may not be the best fit for you.

Get product brochures and feature lists from vendors. Have them give you a demo of the software. You can even use a request for information (RFI) process to get the insight you need, including information for your RFP if you need to procure competitively.

You should be able to find an off-the-shelf product that is configurable to your needs. Avoid customization, which is not the same as configurable. If you think you can't find anything that fits your needs and you think you need customized software, reassess your needs before customizing and ask vendors about work arounds and options. There may be something that does what you want, but in a different way. Be prepared to change your needs and processes to match the available industry standard software solutions – the ones that many other FMs use off-the-shelf.

To get approval for what you need instead of what looks bright and shiny, bring everything down to functionality and useability. Do side-by-side comparisons of products, features, workflows, etc. Document benefits or drawbacks in practical use within your organization. Get the right stakeholders/users involved to help you with the requirements and your business case, which creates built-in support for your preferred solution.

Michel Theriault has more than 30 years of FM experience, delivering services in-house and with an FM outsourcing provider as well as providing consulting and training service. He contributes FM articles to leading magazines around the world, delivers seminars at national and international FM conferences and delivers FM training, including IFMA's FMP designation program, worldwide.

A

Step 1 – Reality Check

Max Dupree, in his book, “Leadership as an Art,” stated,

“The first responsibility of a leader is to define reality.”

Digitization is very real and no longer a sci-fi movie. It is here now.

What is your present digital reality? Keep in mind the IFMA FM definition: the integration of people, property, process and technology. Determine which of those four elements are already digitized and what are the gaps towards effective digitization.

It should be noted that if an element is already digitized, it may not have been rendered correctly or entirely. For example, you may have CAD drawings but are they an as-built version of the drawings? Are they current as-built drawings? There is a technology like Lidar that can convert physical assets into digital twin.

Are you up to speed on building information modeling (BIM)? If not, it would be prudent to become familiar.

Step 2 – Senior Leadership Buy-in

With the reality defined, discuss with senior leadership to obtain their support for your digitization efforts. This step will be required as some digitization efforts may cross into other departments or user groups outside your influence or responsibility. You will want to have leadership’s support.

This principle of obtaining senior leadership’s buy-in would apply to any company-wide initiative. This step is often called FM’s marketing side.

Step 3 – Develop a roadmap

Most journeys require a roadmap to get to the destination. This document would be a high level, one- to three-page document outlining key initiatives, timelines and champions to drive your digitization effort.

Be sure also to obtain stakeholder engagement. This action will increase the likelihood of getting a more comprehensive program in the future. Another suggestion is to connect with IFMA colleagues or FM consultants who specialize in digitization strategies.

Keep in mind that if you manage a portfolio of facilities, a greenfield roadmap will look different than the roadmap for existing facilities.

Step 4 – Initiate the plan

You have probably seen the stats where the number of CMMS software fail on implementation can run between 40-60 percent. Don’t be too quick to initiate the plan. Spend an adequate amount of time in the planning phase to increase the likelihood of success in this digitization effort phase.

As your digitization plan is being executed, it is very motivating to celebrate predetermined milestones along the way. Everyone loves a party.

Step 5 – Stay on top of it

The life cycle of a facility will change over time. Moreover, defining reality is ever evolving. Like other FM best practices, you will need to establish a digitization audit to ensure you see and understand the present digitized reality.

Finally, start considering data as your new asset. It may well help start to reframe strategies and objectives towards a more sustainable and efficient facility operation.

John Ringness, SFP, MRIGS, has enjoyed his career as a facility manager for more than 30 years. During that time, he served as the chair of IFMA’s Business Community, IFMA’s FM Consultants Council and IFMA’s Mumbai Chapter. He also provides coaching/advisory and training services and PropTech solutions.



IFMA helped me stay engaged and continually learn when I was

OTHERWISE TOTALLY DISCONNECTED

- KIM SMITH, MBA



Continuous Innovation

The Keys to Successful Climate Management

BY MARINA BADOIAN-KRITICOS, JOHN MCGEE & ERIC TEICHOLZ



In April 2021, the Paris-based International Energy Agency (IEA) issued its 2021 Global Energy Review with a focus on assessing the effects of economic recoveries on global energy demand and CO₂ in 2021. The Review also included negative predictions related to the current state of climate management. In summary:

- Global energy demand is set to increase by 4.6 percent in 2021, more than offsetting the 4 percent contraction in 2020 and pushing demand 0.5 percent above 2019 levels;
- Electricity demand is heading for its fastest growth in more than 10 years with a projected increase of 4.5 percent in 2021 (equivalent to more than 1,000 terrawatt hours). This is almost five times greater than the decline experienced in 2020;
- Global energy-related CO₂ emissions are heading toward their second-largest annual increase ever;
- Energy-related emissions are expected to finish the year just below where they stood in 2019, reversing 80 percent of the decline seen during the pandemic year of 2020;
- At the same time, the IEA is predicting some good news. Renewables are set to provide more than half the increase in global electricity supply for 2021. However, it is also predicted that the demand for coal is expected to rise by 4.8 percent in 2021 to meet the same projected growth in the use of electricity.

The COVID-19 pandemic has upended lives and economies. While greenhouse gas emissions have decreased and air quality has improved during this time, more sustainable production and consumption changes are needed. To maintain these climate-related improvements as businesses rebound, every aspect of the world economy will have to get involved, making a coordinated, multifaceted effort toward reducing global carbon emissions by combining common sense with state-of-the-art technologies. A number of strategies are required for these efforts to be successful:

- Leadership skills
- Corporate commitment
- Sustainable green financing
- Focus on high-impact sectors
- Partnership between cities and buildings owners
- Improvement of the energy grid
- Research and technology optimization

1. Leadership Skills

Visible and committed leadership is critical. Examples include:

- The U.S. rejoining the Paris Agreement on Climate Change and the presidential administration's commitment to supporting climate change management;
- Business leaders' advocacy, such as can be found in Bill Gates recent book "How to Avoid a Climate Disaster: The Solutions We Have and the Breakthroughs We Need;"
- Environmental activist initiatives such as those by Greta Thunberg in Sweden. Her book "No One is Too Small to Make a Difference" is well worth reading;
- Philanthropic initiatives such as Elon Musk's recent declaration that he will commit US\$100 million as a prize for a demonstrable, scalable best carbon capture technology.

2. Corporate Commitment

The Science Based Targets initiative (SBTi), a partnership between the Carbon Disclosure Project, the United Nations Global Compact, the World Resources Institute (WRI) and the World Wide Fund for Nature (WWF), released their 2021 report in January. They reported that 338 large companies from whom they received emissions data collectively reduced their emissions by 25 percent for the period 2015 through 2019.

The University of North Carolina-based Data-Driven EnviroLab reported there has been a three-fold increase in the number of companies committed to net zero, from 500 recorded in 2019 to 1,541 in 2020. But to fulfill these commitments, companies will require deep decarbonization efforts, with residual emissions balanced by investment in carbon removal activities. Commitments will require ongoing financial investment in technology and operations.

3. Sustainable Green Financing

Climate change is a financial disruptor yet private Green Financing initiatives continue to emerge and grow. For example, Cambridge, Massachusetts, USA-based Prime Coalition, a public charity that

partners with mission-aligned investors to support extraordinary companies that combat climate change, have a high likelihood of achieving commercial success and would otherwise have a difficult time raising adequate financial support to scale. Another example is Fifth Wall, a VC company that specializes in real estate and climate tech and is raising US\$200 million for a new Climate Impact fund.

Existing major financial institutions are funding carbon-cutting startups as well as ridding their investment portfolios of carbon intensive companies. JPMorgan Chase, for example, announced financial commitments aligned to the objectives of the Paris Agreement. They also set a goal to finance US\$2.5 trillion in sustainable investment funding by 2030. Citigroup likewise committed US\$1 trillion to climate change/sustainability investments. BlackRock and Temasek set up a new company, Decarbonization Partners, to finance companies that reduce reliance on fossil fuels and reach zero-carbon emissions by 2050. Finally, the Bank of America and HSBC both indicated that they plan to phase out all greenhouse gas emissions from their operations and supply chains by 2050. Major banks will play a major role in combating climate change if they can overcome the barriers raised by U.S. legislatures and the courts.

Green financing from the U.S. Government takes many shapes and forms, including the president's infrastructure plan and green stimulus goals. His stimulus proposal calls for spending trillions of dollars and has clean energy at the core of the program. The money proposed includes grants, loans and tax incentives to support clean energy, energy efficiency and electric vehicle programs.

The proposed stimulus plan has two primary goals: fighting climate change and re energizing the economy. This dual approach assumes that the economy and sustainability initiatives are inextricably intertwined. To realize these goals, the administration's plan focuses on building a renewable-energy infrastructure greatly expanding the technologies to support a more powerful and resilient power grid, retrofitting buildings to be more energy efficient and resilient, and eliminating carbon from major greenhouse gas-emitting industries. Additionally, there are several initiatives to support the production of electric cars, such as the provision of permanent tax credits for electric utilities that generate zero-carbon electricity. Another such initiative will subsidize the current cost of electric car and truck batteries to make such vehicles competitive with fossil fuel vehicles. The stimulus plan also calls for the construction of more than 500,000 electric charging stations in the U.S.

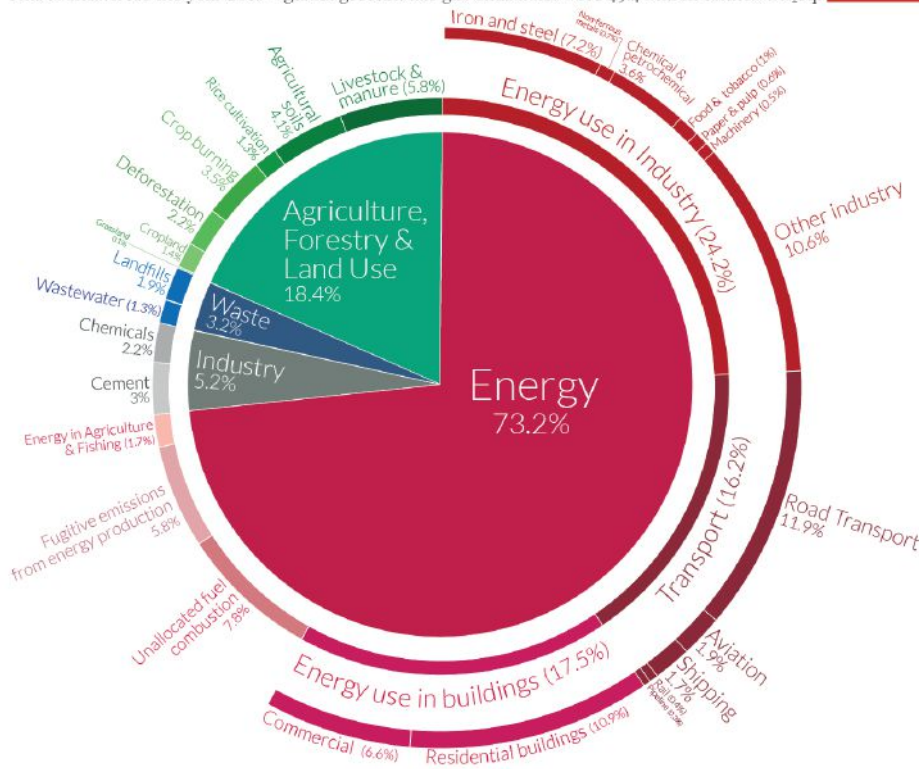
Existing programs provide a variety of loans or grants that are provided and administered by government organizations such as the Small Business Administration and the EPA.

4. Focus on High-impact Sectors

OurWorldData.org maintains that energy use accounts for more than 73 percent of global gas emissions. This number includes 17.5 percent that comes from energy use in buildings and an additional 16.2 percent that comes from transportation.

Global greenhouse gas emissions by sector

This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO₂eq.



OurWorldinData.org – Research and data to make progress against the world’s largest problems. Source: Climate Watch, the World Resources Institute (2020). Licensed under CC-BY by the author Hannah Ritchie. (2020).

5. Partnerships Between Cities and Building Owners

The C40 Cities Climate Leadership Group is a network of 97 of the world’s megacities that are committed to addressing climate change. According to Forbes magazine, “C40 supports cities to collaborate effectively, share knowledge and drive meaningful, measurable and sustainable action on climate change. According to C40, buildings account for roughly 50 percent of a city’s total carbon emissions and 70 percent in major cities like London and Los Angeles.”

The UN Environmental Program reports that the buildings sector has one of the highest carbon footprints, currently contributing 30 percent of annual global greenhouse gas (GHG) emissions and consuming around 40 percent of the world’s energy. Commitments made within the Paris Agreement call for cutting 77 percent of CO₂ emissions currently produced in the buildings sector by the year 2050.

There is also a great deal of work going on in the U.S. with local governments adopting climate action and resilience plans to focus on adaptation and mitigation strategies that focus on public/private partnerships.

6. Improvement of the U.S. Energy Grid

As reported by Michael Jung, Policy Director for Silver Spring Networks for EnergyCentral.com, the U.S. Energy Grid can support climate change improvements through investments in:

- Improving energy conservation by providing real-time feedback on energy usage and communicating time-sensitive price information to customers;
- Increasing grid efficiency through grid optimization;
- Achieving renewable energy integration and intelligent alignment of the grid’s energy demand with supply from renewables.

- Transporting electrification including electric vehicles powered by renewables. Utilities also have a role to play through providing incentives to charge electric vehicles during off-peak periods.

7. Research and Technology Optimization

This can take place at several levels including:

Infrastructure

Perhaps the most promising technology related to environmentally and financially sustainable carbon storage today relates to carbon capture – taking back CO₂ from the air and storing the carbon so that it cannot reenter the atmosphere. Climate capture and storage (CCS) is the essential technology required if we are to meet climate change goals and targets. The extracted carbon is stored primarily in underground geological formations. To date, there are more than 200 CCS facilities globally under development or operational, and it has been estimated by the U.S. National Energy Technology Laboratory that North America can store more than 900 years’ worth of CO₂ at 2019 production rates.

What is new about carbon capture and storage technology is the ability to prove that storage of carbon in many types of geological formations is effective (i.e., will not leak) well beyond the time that carbon can impact climate change; and the probability that it will soon be possible to capture post-combustion CO₂ cost effectively, which means that fossil fuel power plants and other large CO₂ emitting companies could be retrofitted with CCS technology.

Renewables

There will be two break-out technologies that should make green financing investments successful: wind power and battery storage capacity.

Wind Technology

The U.S. Government loan guarantee program has set aside US\$2 billion with a plan eventually to install 30,000 offshore turbines by 2030. The first scheduled offshore wind farm, to be located over 10 miles off the coast of Massachusetts, will install 84 wind turbines by 2023. Carbon emissions will be reduced by over 1.6 million tons per

year. This renewable source of energy represents approximately 20 percent of the electricity consumed by the state.

Energy from wind turbines is vastly expanding globally. Europe has used this technology for years and already has more than 75 wind farms in 11 countries with 2,500 turbines and a combined capacity of more than 8,000 megawatts installed and connected to electric grids.

Battery Storage Capacity and the Electric Grid

Batteries and electricity storage are receiving a great deal of attention as most automakers have made major commitments to electrifying their car production lines. Batteries are responsible for one-third the cost of electric cars. The transition will be accelerated by an infrastructure bill that proposes US\$174 billion to encourage Americans to drive electric cars and trucks. This in turn has generated hundreds of battery start-ups to examine and improve the primary characteristics of current-generation lithium-ion technology: cost, speed of charging, number of charge-discharge cycles, the amount of energy that is contained and safety to operate. Although the lithium battery has undergone improvements, much attention has been given to solid state batteries, which can improve the energy capacity by 50 percent as well as charging speed and safety.

As the demand for energy increases, more fossil fuel utilities will turn to high-capacity batteries to meet the demand. Researchers are already experimenting with grid-scale batteries using renewable power sources including solar and wind farms. It will be possible to generate and store electricity during the day and then make it available at lower cost during off-peak periods.

Summary & Recommendations

As countries and economies recover from COVID-19, there is a unique opportunity to focus recovery measures that are compatible with climate goals. This includes a coordinated approach by governments and businesses to leverage evidence-based research and scientific fact to establish incentives, policies and investments that fo-

cus on commonly agreed-upon goals. Opportunities to lead by example are readily available for both the public and private sectors. Many governments have taken this step with a financial and sustainable climate change commitment at the federal government level – such as the U.S. infrastructure/climate plan and the country re-joining the Paris Agreement.

The government must expand its vision to provide support for companies that declare not only that they are going to reduce their carbon emissions, but that they will put the necessary actions in place to achieve realistic goals and report regularly on their progress toward those goals. It will also require that the government monitor industries to reduce greenwash. Because buildings account for such a large part of total energy consumption, building owners and operators have a major opportunity to make a positive impact on the climate.

There are a few examples of countries that have successfully planned and implemented climate change activities. Germany has had to balance a number of competing economic and political factors to get to its current level of successful clean energy. As stated by ForeignPolicy.com, Germany's level of energy maturity is the result of several factors:

- Adding clean energy capacity over the last two decades;
- Encouraging investment through price supports;
- Accepting financial responsibility for its energy policies; and
- Exporting surplus power to other countries.

Germany has an excess of energy generated from wind, which can overwhelm its power grid. The stability of the electric grid will be further challenged as the population switches to electric vehicles. The government is aware of this issue and will make capital investments to add capabilities to the grid infrastructure. Germany has a social market economy, which combines a capitalist economic system with social policies more in keeping with a welfare state that nevertheless enables com-

petition in the global marketplace. This is a unique set of strengths, with government, businesses and unions cooperating for the common good. When it comes to climate management and carbon emission reductions, all countries must also work for the common good. **FMJ**



Marina Badoian-Kriticos is a research scientist at HARC where she also serves as assistant director of the U.S. Department of Energy's Upper-West Combined Heat and Power Technical Assistant Partnership (CHP TAP). Her research focuses on the intersection of energy, climate, resilience and natural resource policy and program adoption and implementation, and strategies that advance environmental, social and corporate governance (ESG) integration and sustainability performance.



John McGee is an IFMA Fellow and a past chairman of IFMA's global board of directors. He has held executive roles in the facility management, building controls and sustainability sectors, at Fortune 500 companies ABB, EMCOR Facilities Services and Johnson Controls. He has worked in Ireland, Italy, Germany, the U.K. and the U.S.



Eric Teicholz, IFMA Fellow, is president of Graphic Systems, a past member of IFMA's global board of trustees and a trustee of the IFMA Foundation. He is the author/editor of 17 books on facility management and technology and a past associate professor at Harvard University's Graduate School of Design.

CASE STUDY



A Critical Laboratory Exhaust Fan Battle

BY RYAN KEESBURY

Wiss, Janney, Elstner Associates recently experienced a year-long battle with a laboratory building's highly critical, but malfunctioning, exhaust recovery unit (ERU). The ERU removes more than 25,000 cubic feet of air per minute from more than 20 individual lab spaces. This exhaust rate equates to a full exchange of the air, in the areas served, every 15-20 minutes. The battle began only a few months after the new, state-of-the-art laboratory facility was opened. Eight critical fume hoods located around the laboratory are all directly connected to the ERU and operate at a constant face velocity (measured air speed) of 100 feet per minute. The rumble of 100 FPM is equivalent to normal HVAC operation heard in a commercial building or a large residential floor fan set to high speed.

The ERU operated as advertised a few months before the problem began. The ERU drew vast amounts of air for a few seconds, like the initial start of a jet engine, then shut down — then complete building silence. It was quickly determined that the shutdown was caused by an in-duct high-limit pressure switch. This pressure switch acts like a circuit breaker stopping the ductwork from crushing in on itself. The pressure switch is tripped when the negative duct static pressure exceeds more than negative four inches of water column, which is twice its normal operating setpoint. The high limit pressure switch cannot be removed or bypassed because it would cause significant damage if removed. The ERU will not restart until the switch is manually reset. The pressure switch was an easy, but annoying task. However, it was unknown what caused the extremely high negative pressure, consistently causing the shutdown.

A MAJOR ISSUE

The chemists and scientists working in these labs rely on the fume hoods to exhaust all volatile and toxic chemicals and compounds within their spaces. The malfunctioning ERU was a major issue for the safety of employees and the operation of the facility. Not knowing when the ERU would shut itself down created a critical safety challenge. The problem arose at any time without warning. So, the lab staff needed to constantly monitor their work environment. At times, the ERU would fail multiple times per day.

Multiple causes were initially examined, and most were ruled out. Four suggestions that started the conversation included a faulty outside air bypass damper, lab staff misusing the fume hood equipment, a malfunctioning (fail secure) main branch fire damper, or all duct branches being closed off simultaneously. Initially,

the bypass damper was ruled out because it would have registered as a fault in the building automation system (BAS). Likewise, misuse of the equipment could be ruled out because some shutdowns would occur at night when lab staff were not present. The failed secure fire damper was permanently removed, per the engineer of record, as soon as it became a possible cause, but the shutdowns kept happening. Now the only reasonable, albeit highly unlikely, cause was that all the ERU branches closed simultaneously. If this was the case, the closures had the possibility of being recorded on the BAS.

Facility management staff, along with the original installing automation contractor, took an in-depth look into the BAS data. Unfortunately, the data was archived at five-minute intervals, which made it impossible to review what happened in the few seconds it took for the ERU to shut down. Data collection was increased to every second on each branch going into the ERU to ensure



there would be enough information the next time it shut down. As further background, each branch is controlled by an in-line duct variable air volume box (VAV box). There are VAV boxes for the supply and exhaust (return) of each room as well as each critical fume hood, there are 140 boxes throughout

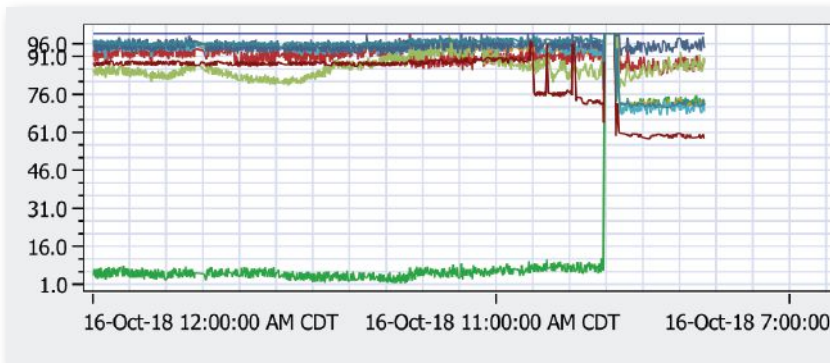
the building. After the proper data collection parameters were set on more than 60 of the VAV boxes, the ERU ran as designed, with no malfunctions, for almost four months.

As soon as the lab staff began to feel comfortable operating at full capacity, the ERU problems struck again. This time, the FM staff was able to review the BAS data collected from more than 300 data points logging at one second intervals. Over the next two weeks, more than 150 separate files, spreadsheets and graphs were downloaded, deciphered, and analyzed, but there was no indication that all the ERU branches closed simultaneously. There was no obvious answer and all the possible identified causes had been investigated or systematically ruled out.

WHAT WAS MISSED?

Something must have been missed. After exhausting all options, WJE reviewed the information with another HVAC and automation contractor. Initially, the third-party contractor proposed inspecting the physical mechanical connection between the outdoor air bypass damper and the electronic actuator motor to ensure it was clamped tightly. If the mechanical connection between the shaft and BAS controlled motor was slipping, the physical damper would close but the BAS would not record it as a problem as initially thought. If this individual outdoor air bypass damper closed abruptly it would result in the described ERU shutdown.

This bypass damper allows for proper duct static pressure in the ductwork while still permitting the exhaust fans to operate at full speed. The exhaust fans are required to operate at full speed to ensure the exhaust chemicals are properly dispersed into the atmosphere. The bypass damper is like a breather hole in a can; if the breather hole is plugged while the can has active suction, the can will crush. To test the mechanical clamp connection WJE personnel placed a pair of vice grips on the shaft of the damper and moved it gently back and forth to verify the clamp was tight. The shaft was securely fastened to the motor, but after the vice



grips were released, the actuator motor started closing the damper on its own, creating the exact fan shutdown as previously witnessed. WJE then notified the installing mechanical contractor of their findings to escalate a potential repair. The mechanical contractor ran the actuator through its

cycles, and they stated there was no problem with it. They also mentioned that the damper shaft had teeth marks on it from the vice grips, which was against, standard procedure and it could cause permanent damage, but desperate times called for desperate measures.

With no solution found, WJE staff discussed their findings with the damper actuator manufacturer and other experts. Upon consultation with the manufacturer, it was evident that the actuator should not change position with any shaft movement. The manufacturer's technical support suggested tapping on the case of the damper actuator to determine if there was a loose connection inside their equipment. When the case of the damper actuator was lightly tapped on, the same results were achieved—an ERU shutdown. Finally, there was a solid lead after 25 shutdowns and eight months of investigation.

The manufacturer explained that the specific spring-return actuator installed would close (cause an ERU shutdown) if there was a loose internal connection. Luckily, there was a five-year warranty on the actuator, so a warranty claim was arranged. The new actuator was installed by the original mechanical contractor six weeks after a possible cause of the shutdown was identified. During replacement of the actuator, the mechanical contractor discovered water inside the exterior junction box and flexible conduit of the actuator. The water issue was resolved, and new wiring was installed by the original automation contractor in all locations exposed to standing water.

PROBLEM SOLVED, OR NOT?

Three months after the new actuator was installed, the ERU struck back with multiple devastating shutdowns over several days. After the final shutdown, the replacement warranty actuator was unresponsive, causing all lab exhaust hoods and HVAC to be out of commission until another actuator could be sourced and installed. The mechanical contractor stated the new actuator would take two weeks to arrive and there was no way to get it sooner, but WJE

produced a solution to use another non-critical actuator from the ERU in the meantime to get the highly critical system back in operation.

It seemed unlikely that replacing the actuator every three months at a yearly cost of US\$12,000, would be acceptable. WJE decided to contact the manufacturer again for other solutions. They suggested that there could be a missing ground wire between the power source and the controller, in the original wiring, which they commonly referred to as a “four-wire configuration.” This resolution was relayed to the installing automation contractor, but their response, without field investigation, was that the actuator would not operate unless it was installed per the stated “four-wire configuration.” Instead of inspection, the automation contractor suggested there was too much torque being applied to the actuator causing failure. WJE tested the torque applied to the actuator and it was significantly below the damper actuator’s maximum allowable threshold. All signs pointed to a potential wiring problem.



THE ONE-WIRE FIX

The fourth wire is a potentially unnecessary ground that tech support stated caused an undefined range of problems if not installed. To ensure the fourth wire had been installed, a physical examination of the automation wiring needed to be performed. WJE FM staff found that the fourth wire was placed into the terminal block but not clamped and secured properly. So, the wire was properly reconnected and the ERU has run problem-free for the past two years.

So why did the original actuator fail intermittently, and its warranty replacement fail completely? The answer remains a mystery, but FM staff concluded that the missed connection — an earth ground — resulted in the actuators internal circuit board having possible ground fault issues. The actuator was more reliable during the warm, humid months. WJE concluded that during the region’s summer months, the fourth wire did not have issues simply because

of high humidity. It facilitated what can be considered a “mist effect” assisting the improperly clamped wire. **FMJ**



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Refocused

Putting People at the Center of Work

BY SANJAY RISHI & MARK ZETTL



Ongoing, widespread remote work illuminated the positives and negatives of working from home. While some people established a more equitable work-life balance, others found themselves overloaded with the demands of full-time work and family obligations happening simultaneously, with no separation between the two. Still others grew isolated as video calls became one of the few ways for them to engage with their coworkers, friends and family.

Across the board, people missed the camaraderie of the office and its physical attributes, from an ergonomic workstation to the buzz of a busy lunchroom.

The workforce of the future is eager to realize the best of all possible work environments: an office that meets their needs for face-to-face interaction and complex problem solving; home for providing flexibility around when work is done; and other remote locations, from coworking sites to coffee shops, to offer a differentiated experience that fulfills the needs of employees in some new and fresh way.

Despite having more competition than ever, the office is still a draw for employees, with 75 percent reporting they want the ability to be in the office, according to JLL research. The office emerged from the pandemic not as a holdover from another era but as a valuable asset that enables a wide array of personal interactions, career development, social and professional networking and collaboration, along with the necessary space for heads-down concentration.

The challenge before today's real estate and organizational leaders is to connect all of the elements of this complex world of work. Many of the technology solutions that helped companies manage through the pandemic will continue to facilitate a seamless experience in the hybrid world, from the basics of strong Wi-Fi and upgraded AV systems to cloud storage and collaboration technologies that bring far-flung teammates together with only a few keystrokes. But on their own, these technologies cannot provide the detailed data to help business leaders make informed decisions about what their teams need to thrive.

A new generation of technologies is emerging that will power the expansion of hybrid work — and make office buildings more efficient and valuable in the process. Much like the pandemic accelerated the adoption of new business strategies, the incoming era of distributed work will demand greater adoption of emerging tech, from single sign-on apps to sensors embedded within the workplace itself and many points in between.

It is time for technology to facilitate and measure the office's return as a high-performing asset, from the basics of utilization to assessing the very health and wellbeing of the building environment and its impact on employees. To create an agile, adaptive and cost-effective workplace that meets employees' needs, real estate and facility management leaders need always-on, real-time data and insights to make sure their real estate strategy is meeting the emerging future.

As the world begins to imagine life on the other side of the pandemic, the entire real estate ecosystem is faced with new questions about creating value and becoming more resilient. All parties, from investors and brokers to occupier C-suites and individual employees, will be best served when the workplace is equally cost-effective and future-fit, outfitted with the technology to power an expansive network of workspaces — with employee productivity, health and well-being at the forefront.

A golden age for workers

Despite the attention paid to rapid adoption of hybrid work strategies throughout COVID-19, employees have been leading the charge for more flexible work environ-

ments for years. Demand is so strong that four out of every five employees said that, given two similar job offers, they would turn down the one that did not offer flexible working, according to the 2019 IWG Global Workspace Survey.

For decades, companies have looked at flexible workplace arrangements as a way to broaden their talent pool and attract the best and brightest to their teams. But some of the earliest remote work programs fell flat when company culture wasn't well defined and workers who were primarily on site took priority over those in remote locations.

In the new world of hybrid work, all available workplaces must exist on equal footing, meeting the same employee expectations across every location where work happens. This frictionless experience begins with FMs who can operationalize hybrid workplace strategies, spelling out clear expectations and policies. But it also includes a marketplace approach to resources, from procuring home office furniture to setting a reminder for a daily wellness break.

Increasingly, leading companies are adopting apps and centralized platforms to maintain a bird's eye view of how employees are working — and shaping the workplace around emerging trends.

Like logging on to a world-class retail website, the workplace app serves as a one-stop shop for accessing vendors, tools and products that power worker experience and productivity. Connecting the digital and physical workplace in one system can help employees navigate their new hybrid reality, from finding the shortest path to an open meeting room to ordering supplies for their home office. Increasingly, employees will get the best of their workplace right on their phone, including employee engagement offerings that were previously enjoyed only within the confines of the office.

Livestreaming services and interactive platforms can work through the app to recreate the workplace atmosphere, which is especially important for those employees who live too far away to consider dropping in for a Friday happy hour or Monday morning all-hands meeting. In conjunc-

tion with FMs, occupiers can deliver live-streamed social gatherings, trivia, training, webinars and more in a fully digital format that brings the office into the digital realm.

These technologies will continue to evolve as virtual programming becomes increasingly sophisticated and content is tailored to meet specific locations, building communities, companies and even individual preferences. Already, greater adoption of augmented reality (AR), which can put remote workers on equal footing with in-person cohorts via right-sized screens, is starting to emerge as the divide between physical and digital realms is eroded.

AR can be utilized as a key marketing and brand value tactic, leveraging space that is unseen by the naked eye, as a digital billboard or communication. Think: the IKEA app that allows customers to view furniture in their homes digitally prior to making a purchase, but with any sort of marketing piece that tenants may want to convey to their workers. That said, exploring AR and other technologies are coming full-circle for the landlord, tenant and worker.

This one-stop system provides a host of information to real estate leaders, as well, from FMs to building investors, which can power a new era of decision making to reduce costs and optimize assets.

Balancing optimization and experience

The office's draw continues to be its ability to bring people together, to connect and collaborate and experience a differentiated corporate culture. Viewed in that light, the widespread use of assigned seating and department zones does not make a lot of sense. In the new hybrid world of work, this tried-and-true approach can impede broader business goals.

In pre-pandemic times, the average office was only 60 percent utilized, according to JLL research. With the number of remote workdays increasing going forward, relying on assigned seats and fixed zones will create extreme inefficiencies. While in the past employees have been wary of giving up their personal space, they are now more inclined to adopt hot desking or share individual space — provided the proper cleaning protocols are in place.

New technologies are emerging to make physical space more dynamic, supporting next-level utilization, maximizing space and social connections to fuel work across functions, teams and departments. With a combination of data collection, artificial intelligence (AI) and real-time workplace modeling, the built environment can enable new methods to bring people together.

This next generation of occupancy planning begins with the workplace app, which is also used as a workspace booking system where employees can reserve a desk, a conference room or whatever space suits their needs. Forward-looking companies are combining efficient space utilization with activity-based design, providing different kinds of workspaces for different kinds of work to drive productivity, engagement and efficient use of space. Rather than a single desk, workers can experience a variety of stations throughout the day, with a simple tap on their phone to reserve their spot.

The individual data these employees generate as they move from location to location is collected and uploaded to an AI-augmented engine that will predict occupancy demands in the short term — a competency that was not previously available to real estate and corporate leaders. Combined with dynamic zones or areas that can be turned on and off as needed based on utilization, buildings can evolve to support the broader organization, with the real estate footprint expanding and contracting as the need arises, without interrupting workflow and employee productivity.

With less time and money spent on raw space and static workstations, organizations can turn their attention to creating a workplace experience that is safe, productive and seamless, that satisfies people's personal and professional needs. With smart sensors embedded within the workplace and the entirety of the building, workplace technologies can let buildings "know" when someone is present and will even evolve to know exactly who that person is, what lighting conditions they prefer, what temperature keeps them engaged — even how they take their coffee.

To reach that level of personalization will require greater collaboration among building owners, investors, FMs, developers and the people who ultimately occupy the space — a conversation that is already starting in many buildings around the world as all parties try to figure out who owns the blurring line between physical and digital spaces.

Technology for health and well-being

Technology tools to address COVID-19 safety and general wellness are readily available today, from pre-entry symptom screening to on-site temperature checks and socially distanced seating arrangements. But the technology for health goes much deeper, considering air quality, water quality and even mental health assessments.



In this new complicated world where health, safety, engagement and productivity are spread among countless workstations and brought together in complex ways, companies need to take a closer look at the workforce's needs and where there are gaps in their current offering. An expert assessment, considering all of these variables and many more, may be necessary to identify the solutions to support the workforce, wherever they work.

At a minimum, the flow of people in and out of buildings must be managed, with buildings and occupiers alike embracing data-enabled information gathered through workplace apps. Touchless technology coupled with a growing database of user information can call for an elevator while the employee is still entering the lobby and shepherd them to their floor without ever having to come into contact with a shared surface.

Health and wellness efforts are also extended beyond the office. Whether workers have a code for a free, healthy meal delivered to their door or they can dial up an exercise class on their work app, they want their wellbeing to be at the forefront of their work experience, a desire that does not diminish with adoption of hybrid strategies. Providing technology-powered solutions can deepen employee engagement and showcase the organization's commitment to wellbeing. These efforts also drive value to the building owner's bottom line.

Already, properties that boast upgraded HVAC and digital systems, WELL and LEED certifications and outdoor space are drawing more tenants than less health-conscious buildings. There is a growing understanding that the value of buildings can only be truly unlocked when the health and well-being of the people inside it are considered in every facet of building design and operation.



Unleashing the power of data

While the focus now is on incorporating new technology into the workplace, wherever it extends, the best businesses are people centric. Collaboration, innovation and engagement need to join any conversation around space optimization and employee productivity, especially as we move out of the crisis phase of the pandemic and into the new hybrid reality of work.

While powering next-generation technology platforms that encompass all cycles of FM and real estate ownership, it is important to aggregate data to support people, rather than merely capturing moment-in-time progress reports. Leading edge companies will use AI to generate real insights and actions to drive not just their workplace, but their workforce, and the very nature of work itself. **FMJ**



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After COVID-19

COVID-19 has been the most powerful game changer across industries the world has ever seen, and it epitomizes the meaning of the term itself. It comes as no surprise that conventional facility management best practices simply will not work in the post-COVID environment.

The call is for a new workplace paradigm and supporting workplace services, all driven by seismic shifts created by the pandemic. As workplace design and capacity changes, CRE/FM is rising to the occasion to offer technology-based solutions and strategies for corporate boards and the C-suite.

In addition to COVID-19 challenges, FM leaders must also overlay these integrated components with a reinvigorated commitment to sustainability. Available technology addresses energy conservation, waste management and carbon reduction. The investment community and a younger global cohort of employees are interested — and involved. For the enterprise, business goals and corporate finance will be connected to sustainability goals issued by critical third parties including the government, potential investors and even talented job seekers. Smart, efficient buildings will not only enhance the employee experience, but will also help to meet sustainability goals.

What is needed is an integrated approach to technology across all domains of facilities — from smart buildings to user experience

related apps, to work order systems. Companies may be at different points along the technology maturity curve, but the one thing they do not have is the luxury of time. The call for action is now, and the vision is clear.

Whether the scale of the enterprise is a startup with few employees or a Fortune 500 firm with millions of square feet of assets throughout the world, it is only through workplace technology that enterprises can evolve quickly to meet the new realities of the post-COVID-19 workplace. Central to the new workplace challenge is the need to address new and nuanced notions of real estate capacity, workplace design, services, supply and demand, and the requirement to assess portfolio performance. None of this will be possible without technology and a clear technology implementation strategy that optimizes both in-house and externalized supplier market technological capabilities.

It is imperative that owners and operators of corporate real estate leverage technology to make decisions and enable asset management, workplace experience

and portfolio strategy in the post-COVID workplace. But this is easier said than done. Companies must assess their technology stack, streamline and optimize it, then supplement it with the capabilities of their delivery partners.

This is no different than designing a product and bringing it to market. Design, sales, supply chain issues, engineering, procurement and manufacturing technology must all be integrated and on the same page for it to work.

Therefore, the first task for an FM will be to achieve expertise in the full range of workplace-specific applications, such as building access control, air quality, energy efficiency and waste management. Larger client companies may have their own proprietary software running these applications, but in many instances, it will be up to the FM team to offer integrated application software as a service. Then, data provided by the application must be translated into business digestible insights and action items.

This is a formidable task because, for one reason, most FM suppliers traditionally assess their goals and productivity on a monthly reporting schedule. But technology provides data on a real-time basis. In hyperactive markets, such as India, where it is commonplace for businesses to grow by 50 percent yearly, workplace space planning can happen on the fly.

Fortunately, the effort dedicated to achieving expertise in the technology of

Reassessing best practices

BY RAKESH KISHAN & STUART LANGDON

workplace apps will pay dividends for both the user and the provider. In addition to offering real-time space planning, technology will enable planned maintenance to evolve into risk-based maintenance — at tremendous cost savings. Smart buildings and the Internet of Things (IoT) already empower machinery to talk about their vital signs, such as refrigerant leaks and pump vibration.

In the post-COVID-19 workplace, the user experience will be paramount. Technology will have a significant impact on visitor management, meeting room booking, way-finding on large campuses and food service. Insights that are driving innovation on this front include interpreting workplace access and IT log-on data to make the best use of so-called dead space within buildings.

In addition, simple, yet costly everyday functions such as hospital-grade restroom cleaning are using IoT to send data on real-time consumption of paper products. In the post-COVID-19 workplace, custodians whose jobs traditionally consisted of scheduled bathroom inspections and paper replenishment are now being tasked with meeting a constant hour-by-hour demand for paper products. Custodians are being told to reduce large amounts of wasted and “disappearing” supplies — especially since paperless hand drying blowers are known to spread airborne germs.

To be sure, all of FM is measured by ROI. Retrofitting is expensive, but in today’s world modernization makes a lot of sense

for new construction. What is mandatory? What is nice to have? An in-depth understanding of the best available technology empowers in-house FM professionals and their retained advisors to synchronize business and sustainability goals with their CRE space.

First, structure a post-COVID-19 framework. Start with an assessment of who needs to return to the workplace, balancing work-from-home with mission-critical on-site attendance. Leverage technology to solve problems and have that technology in-place and ready, primarily, to ensure workers’ safety and protection.

Know which services must be retained for the enterprise, and which can be terminated. Does the building need to keep its cafeteria? On the other hand, what mission-critical resources does the workplace offer to employees? Do these resources need to extend into the work-from-home office?

Then, measure the effectiveness of an all on the same page FM deployment. Finally, write an outsourcing contract based on expertise and performance, ideally a five-year plan. Just as the internet revolutionized commerce on a global level, COVID-19’s influence will have lasting, irreversible effects on the way the world conducts business. All things considered, the pandemic has generated a flight to technology and a consensus that facilities are not just suitable places to work, but desirable, safe spaces to do business in a meaningful way. **FMJ**



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Collaboration + Communication

Tools for Facilities of the Future

BY DAVE GEORGE



No matter the industry, scale or type of facility, facility managers face the same basic challenge of communicating efficiently and effectively with busy teams who are on the move or off site. This was already a challenge for FMs with teams spread throughout facilities in siloed departments or in multiple locations. COVID-19 has all but eradicated traditional in-person meetings and forced many team members to work remotely, making the FM's job of keeping everyone synced all the more difficult. The entire face of team communications has changed, escalating the need for alternate ways to communicate. Internal and external communications are merging as facilities strive to reconnect with disconnected teams in virtual environments.

Email is not enough and video conferencing is creating Zoom fatigue. Remote work requires mobile communication delivery at an unprecedented level. To meet these challenges, FMs are leveraging emerging communications technologies that provide faster, more effective ways to communicate meaningfully with simple, plug-and-play digital solutions.

Future-proofed facilities: app-connected FMs

Mobile team communication applications are becoming the go-to solution in facilities, from smaller commercial properties to large logistics warehouses. App features are more comprehensive than ever with integrated augmented reality (AR), artificial intelligence (AI) and mixed reality programs, as well as text chats, audio calls, video conferencing, file and screen sharing, discussion threads, forums and more, all combined into one communications hub.

Today's apps allow FMs to communicate, collaborate and manage more efficiently. They can help achieve a number of tasks, such as tracking assets and employees, supervising work process flows and managing facilities.

Apps also do a great job of connecting personnel who would otherwise be disconnected via real-time data sharing. As an example, a very common scenario is maintenance inspections. An FM can create a work order digitally in an app (on a smartphone, desktop or tablet), which would then be shared online with a maintenance technician. If any issues were to arise during the inspection, the technician could use the app to take a photo and upload the image with comments to the digital work order. The FM would then receive a real-time notification, allowing them to resolve any issues or request further repairs instantly from there.¹ This gives the FM unparalleled visibility into what is happening in their facility right now — even if they are remote or working from home — and the ability to deliver a rapid response.

Furthermore, digital management apps allow FMs to store information like work orders and other important documents digitally, with robust time stamping and audit trails of who did what when, thus eliminating the need for rows of file cabinets filled with endless amounts of paperwork.¹ Centralizing all the data digitally also means that any user with the right level of permissions can access these documents online via secure login from any location or device globally.² Gone are the days when FMs would be asked for documents or information. With digital data, all stakeholders can access it themselves.

Centralized data storage paired with AI also equips FMs with powerful forecasting capabilities. Apps can analyze data generated from historical records and patterns, which can be used to create predictive analytics and intelligent recommendations when planning preventative maintenance schedules, facility management

budgets and so forth.^{3,4} Information is power, and the possibilities do not end there. With the multitude of app options available, the key is determining which apps provide the functions that will best address specific organizational needs.

Aside from the immediate benefits apps present to daily operations, switching over to these types of digital solutions also provides long-term advantages that help future-proof facilities. Innovation is happening at a rapid pace never experienced before in human history, and what is significant today may be obsolete tomorrow. Facilities must be adaptable and ready to adjust to the constantly changing environment. With digital management systems and applications, infrastructure can easily be updated to support new advancements and solutions as they become available in a post-COVID-19 world.²

Same day delivery: no/low-code customized solutions

The FM industry has highly specific processes that sometimes require more customized communications interfaces. The emergence of no-code/low-code development platforms (LCDP) have made it possible for developers and customers to accelerate the delivery of these types of custom applications.

FMs use LCDPs to create applications that replace emailing documents, spreadsheets and other files back and forth.⁵ They've even been used to build platforms that streamline trash collection for university campuses.⁶ Though they can be deployed on virtually any platform, mobile accessibility is a driving factor behind the use of LCDP apps, which allow workers to tap into on-premise or cloud data from a mobile device.

Where security and compliance risks are a concern and privacy is essential to protecting sensitive information, there are communication apps that can be self-hosted on a company's own servers and integrated directly to the user interface rather than through a third-party server.

Digital collaboration: push-to-talk systems

Though team text chats and video conferences are productive, nothing compares to live voice messaging in real time, either one-to-one with individuals, or one-to-many with groups. Team apps that offer a walkie-talkie feature enable push-to-talk (PTT) to transmit instant voice messages to colleagues without risk of cross-talk or eavesdropping, while also reducing the number of devices workers carry and thus cutting IT costs.

PTT makes communication instant, minimizing the time to report safety, security and maintenance issues. Feature-rich apps also allow FMs to track locations, trigger alerts in critical situations, coordinate logistics and quickly resolve issues.

Traditional private radio and land mobile radio (LMR) networks often require significant up-front capital expenditures (CAPEX). The spike in mobile workforces is driving explosive growth in push-to-talk over cellular (PoC) for wide-area communications due to the low operational expenditure (OPEX) for startup and subscription-based services. With the press of a PTT button, PoC provides the same capabilities as traditional two-way radio systems and enables instant group calls to multiple users. Because PoC leverages existing LTE cellular and ubiquitous Wi-Fi networks, systems can be deployed more quickly with no infrastructure required.

PoC network services can also be located on privately hosted servers using gateway routers to provide connectivity between the LTE network and the PoC server. Another approach is unified communications (UC) platforms, which integrate diverse radio systems with PoC and PTT over Wi-Fi into one centralized ecosystem.

Moreover, with social distancing and "lone worker" measures in place, communication has quite literally been pushed beyond its limits. Thankfully, because PoC is not limited to a specific site, communication is possible anywhere there is 3G, 4G or 5G network coverage.⁷ To top it off, PTT functions can be performed on a multitude of different devices.⁸

PoC devices such as radios and smartphones are purpose built for professional communications as compact, rugged, easy-to-operate handheld devices. Digital mobile radios (DMR) with advanced features can support PoC functions, including instant group calling, GPS location tracking and status update notifications. FMs can spend far less time scoping where issues are, and more time resolving them.

Enterprise models of ruggedized smartphones now have programmable buttons that support PTT communication and integrate with walkie talkie apps, which offers FMs and teams a similar experience to using the two-way radios they might already be familiar with. Warehouse and logistics facilities can even use programmable buttons to enable scanning and tracking capabilities.⁸

For harsher work environments like industrial settings, there are PoC devices tested for durability in extreme temperatures, low pressure and high vibration, along with IP ratings for water and dust resistance. Some devices even offer enhanced touch or enlarged buttons for warehouse employees who are required to wear gloves while working.⁸

Specialized accessories for the FM workforce

Many team communication apps are compatible with hands-free PTT accessories, including headsets and Bluetooth adaptors, which allows freedom of movement when operating machinery, maintain-

Facilities must be
adaptable and ready to
adjust to the constantly
changing environment.



ing facilities and a host of other physical tasks. A single button push connects FMs with staff or workers with other team members.

A vast array of accessories are available that augment audio and voice quality, including throat mics and earmuffs for high noise environments like manufacturing plants and entertainment venues. However, few manufacturers specialize in making affordable professional-grade products that far surpass most low-cost alternatives. Practicing due diligence is important when making any purchase, but especially so when it comes to communication devices. Hygiene is also a primary concern, which is why experienced makers offer swappable accessories specifically designed for individual or one-time use.

FMs are striving to raise team communications and productivity to a higher level, while reducing expenses. They are demanding simpler, more cost-effective solutions that are also dependable and backed by strong support to ensure smooth operations and optimal teamwork. Software applications, digital management programs LCDPs, PoC networks, devices and accessories are solutions that answer the call, providing FM teams with communication and collaboration that will stand the test of time. **FMJ**

References

1. Maintain X. (2020, July 14). 3 New Technologies for Facilities Management Teams. getmaintainx.com/newtechnologies-facility-management
2. FacilityManagement.com. How Mobile Technology Benefits Facility Managers to Be More Efficient. facilitymanagement.com/mobile-technology-facility-managers/
3. Retail Info Systems (RIS). (2021, February 23). Look for Tech's Starring Role in 2021 Facility Management. risnews.com/look-techs-starring-role-2021-facility-management
4. CrowdComfort. A World-Class Workplace Starts with Employee Empowerment. crowdcomfort.com/
5. Forbes. (2016, May 16). Citizen Developers: Low Code is Now Enterprise-Class. forbes.com/sites/jasonbloomberg/2016/05/16/citizen-developers-low-code-is-now-enterprise-class
6. AppSheet. (2019, February 12). What is a No-Code Development Platform. blog.appsheet.com/what-is-no-code-development-platform
7. ANT Telecom. Push to Talk Over Cellular (PoC). anttelecom.co.uk/poc
8. Insights. (2021, February 17). What is the Best Rugged Mobile Device for Warehouse and Logistics? insights.samsung.com/2021/02/17/what-is-the-best-rugged-mobile-device-for-warehouse-and-logistics/



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LITHIUM-ION FIRE PROTECTION

What FMs Need to Know

BY GERARD G. BACK & DR. JASON A. SUTULA



Lithium-ion (Li-ion) battery technology has become the industry standard for powering the spectrum of consumer electronics, tools, electric vehicles and backup power systems. With a high energy density, slow self-discharge and small memory effect, Li-ion batteries have been readily incorporated into warehouse storage, military, automotive, aerospace and power storage applications, among others. Additionally, grid-scale energy storage has reached a new dimension as megawatts of electrical power are being stored both to support the electrical grid and to provide on-demand power for residential, commercial and industrial facilities.

LI-ION BATTERY HAZARDS

Li-ion batteries have a much higher energy density than legacy battery technologies, such as nickel metal hydride, nickel cadmium and lead acid, providing both space and weight savings while significantly increasing the run time of the end device. However, these benefits come at a cost of an increased risk of fire potential. Li-ion is one of the only battery technologies that incorporate a flammable organic electrolyte. Research and industry experience has demonstrated that physical damage, electrical abuse (i.e., short circuits and over charging), and

exposures to elevated temperature can cause a runaway reaction within a Li-ion battery or cell that can lead to an explosion or fire. This is referred to throughout the industry as thermal runaway. Manufacturer's defects such as imperfections or contaminants in the manufacturing process can also lead to thermal runaway under certain conditions.

Li-ion batteries tend to fail in one of two ways: at a high state of charge (i.e., fully charged batteries) via flaming, overpressure and flaring, or at a low state of charge via non-flaming venting of the flammable

aerosols and gases. At a low state of charge, the vented products are flammable and can be ignited when exposed to an ignition source like an open flame or spark. At a high state of charge, the venting is extremely forceful and involves a much larger volume of flammable gas or aerosol. The electrolyte will ignite upon cell rupture forming small, torch-like fires. In some instances, there can be a stronger, substantial overpressure created with the electrolyte release. In these failure scenarios, flaming debris can be violently expelled from the battery.

During a battery failure reaction with no ignition, the gases consist primarily of electrolyte constituents. This fragmented electrolyte typically contains about 30 percent hydrogen, 30 percent carbon monoxide, 30 percent carbon dioxide and 10 percent smaller chain hydrocarbons. Based on this composition, Li-ion electrolyte gas mixtures have a lower explosive limit (LEL) on the order of 6-10 percent by volume. As a result, the venting of cells and battery packs have the potential to produce explosive concentrations and significant fireballs and overpressures if the gases are confined before ignition, thus, identifying the need for explosion prevention measures.

When a Li-ion battery has sustained a flaming failure, the electrolyte is the main fuel producing primarily nitrogen, carbon dioxide and water as the byproducts. The energy from the fire can also liberate hydrogen fluoride gas, which will form an acid when in contact with water or humidity. Other gases that can pose a danger can be produced by this reaction and include chemical species that can create phosphoric acid. The toxicity of these gases must be considered when addressing the potential risk to personnel at facilities that contain Li-ion batteries.

ENERGY STORAGE SYSTEMS

A primary facility safety concern in the Li-ion battery market involves energy storage systems (ESS). There are facilities implementing ESS in both indoor and outdoor settings without fully assessing the fire and explosion risks or conducting analyses to determine the appropriate fire protection. Data centers are a primary example of this challenge: older data centers' equipment upgrades increasingly include battery backup systems that contain Li-ion technology, while newer data centers are frequently being retrofitted into existing buildings in smaller spaces. The inclusion of Li-ion battery technology in these smaller spaces creates both fire, explosion and toxic hazards that are typically overlooked.

An example: an aging data center was upgrading equipment and wanted to remove older lead-acid battery backup machines and replace them with smaller Li-ion battery power storage units. Because the energy storage in the new battery was relatively small, the facility did not consider them to be a hazard. With analysis, it was determined that there was a risk associated with both fire and explosion hazards that needed to be addressed. This problem is not just in data centers, but across the board in many facilities that are using or storing Li-ion battery technology without fully understanding the hazards.

WAREHOUSE STORAGE OF LI-ION CELLS

In addition to the concern of the installation and protection of ESS, Li-ion cells, modules and batteries are being transported, shipped and warehoused in larger and larger quantities throughout the world. Few companies that are engaged in these activities understand the hazard this creates and the best way to mitigate it through appropriate fire protection.

An example: a portion of a typical, aging office park/light industrial facility was planned to be repurposed to house electric products containing Li-ion battery packs. The sprinkler system was only designed for a light hazard occupancy and no fire alarm system was required or installed within the building. An analysis of the hazard associated with the large number of Li-ion battery packs determined that sprinkler system was inadequate to be able to control a potential fire starting in the Li-ion battery packs. Additionally, the facility was not staffed over a 24-hour period, thus, the lack of a monitored fire alarm system was identified as a substantial risk that could result in a catastrophic loss if a fire were to occur when the facility was not staffed.

REGULATORY STANDING

The fire, explosion and toxic hazards within Li-ion energy storage systems and storage applications can be challenging to mitigate. Additionally, the heat release rates and rapid burning create Li-ion battery failure fire scenarios that are not readily apparent. Compounding this problem is the lack of guidance in the regulatory codes and standards that existing and new construction building projects are subject to. In particular, NFPA 13: Standard for the Installation of Sprinkler Systems contains no design specifications on how to protect spaces that contain Li-ion cells and batteries.

Regulatory agencies are aware of this challenge and are working to mitigate this issue. In 2019, the National Fire Protection Association released the first version of NFPA 855, Standard for the Installation of Stationary Energy Storage Systems, 2020 Edition, which provides useful guidelines to suppliers, system integrators and operators/owners. NFPA 855 is on the standard three-year revision cycle and has already begun work to continue to provide fire protection guidance to minimize the hazards of Li-ion ESS, with a new revision expected in early 2023. Even with this positive moment in the regulatory environment, it may be several years before prescriptive solutions are available for facility managers.

GAP ANALYSIS AND FIRE PROTECTION BEST PRACTICES

Many companies are looking to get ahead of any forthcoming regulations and assess the safety and fire protection of their energy storage systems and Li-ion storage applications. Even with the gap of knowledge in the regulatory environment, research has been conducted into the best practices to protect Li-ion energy storage systems and Li-ion storage applications. In general, water-based fire sprinkler systems in combination with a monitored fire alarm system have been found to be the most effective.

To better determine the most effective fire protection strategies, each facility can start by developing a hazard analysis at the design stage to safely mitigate any known hazards. Additionally, an existing facility can request a walkdown and hazard analysis of their current processes. From there, fire, explosion and toxic gas hazards from a Li-ion battery failure can be characterized and recommendations can be developed to address these failure points.

1. As a result of previous hazard analyses, seven consistent best practice recommendations have been developed and can be applied by FMs to mitigate the hazards associated with Li-ion energy storage systems and Li-ion storage applications. Conduct a hazard analysis
2. Provide a monitored fire detection and notification system
3. Install a robust water-based sprinkler system
4. Separate Li-ion applications from other areas with fire-rated construction
5. Maintain clearances to combustibles from Li-ion applications
6. Provide separate HVAC systems for Li-ion application areas and ventilation to mitigate explosion hazards
7. Develop an emergency management plan for a facility to respond to a Li-ion emergency

CONCLUSION

The demand for Li-ion powered devices continues to accelerate. More companies than ever are building their own Li-ion cell manufacturing facilities, utilizing energy storage systems and expanding the storage of Li-ion batteries into less protected building facilities. The types of hazards and facilities associated with Li-ion applications

can provide challenges to a range of battery and device manufacturers and storage facilities teams. Some examples of these include:

- Cell and battery pack manufacturing facilities
- Li-ion battery pack integration into power tools
- Electric vehicle manufacturing facilities
- Automatic storage and retrieval system (ASRS) facilities that plan to store a large amount of Li-ion cells
- Large-scale charging station development for Li-ion powered public transportation buses
- Warehouse storage of Li-ion cells, packs, modules and full batteries


The important lesson: FM teams must be proactive in adopting fire protection methods and strategies for their Li-ion battery manufacturing facilities, energy storage systems and the storage of Li-ion technologies. Doing so positions them to focus on the benefits of Li-ion technologies while having the peace of mind knowing that their systems are protected with state-of-the-art solutions against failures that could be catastrophic. **FMJ**



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Dr. Jason A. Sutula is a fire protection engineer with Jensen Hughes, with more than 20 years of experience. He has specialized in fire protection and special hazard analyses involving the manufacturing, testing, storage and usage of industrial products and consumer electronics containing Li-ion batteries. Over the last eight years, Sutula has conducted research on the flammability characteristics of Li-ion batteries and conducted fire hazard analyses of Li-ion batteries in commercial and industrial facilities.

A modern office interior featuring glass-walled rooms, wood-paneled walls, and exposed ceiling pipes. The scene is brightly lit, with a conference room on the left and a desk area on the right.

IT'S NOT THE END

Establishing Better Workplace Experiences

BY MARK SCULLION



Technology shapes everyday life. A single swipe or the click of a button has transformed everything from shopping and entertainment to banking and education. It is no surprise that consumers are driving new expectations in the workplace, creating a need for more connected offices that offer intuitive, easy-to-use technology to help employees meet their potential.

Many companies are behind the curve when it comes to integrating useful technology into the workplace. The COVID-19 pandemic further brought to light this gap when employees were suddenly sent to work remotely, solely relying on technology to communicate and collaborate. While most organizations found a way to cope with the circumstances, a new hybrid model of work, in which employees expect more freedom and flexibility, was born.

The business landscape has forever changed, as evidenced by a Gartner survey released in 2020, which revealed 82 percent of company leaders plan to allow remote work some of the time. It is also clear business leaders are seeing negative aspects of the work-from-home lifestyle.

In 2021, Forbes reported that the downsides of remote work are weighing on employers, and many conclude that at least a partial return to the office after the pandemic is a near certainty.

It is clear the workplace is not dead — but, it has competition, and it must perform like never before. Offices must be more connected, more multidimensional and more productive to show their value.

“Today’s conversation around technology must go broader than ever before,” said Jay Morris, the president and founder a commercial technology consulting and project management company.

“Businesses have to think about any tech-enabled elements that directly impact engagement and productivity, like audio visual, lighting control, sound mask-

ing, room reservation, access control and security. All these elements combine to strengthen the employee experience, and today’s employee wants these solutions to be easy to pick up, touch and start, or so integrated into their everyday activities they don’t even have think about them.”

A HOLISTIC APPROACH

Today’s office sits at the intersection of technology, facility and people. Gone are the days of technology as an add-on or enhancement. Now, it is as critical as a physical building or the employee workforce is to achieve success.

As companies plan for renovation and construction, they may not realize that these processes are often behind the in-

novative curve and have not evolved to address critical technology issues early enough in project planning. This oversight often creates expensive mistakes, a need to redo work or can even lead to businesses compromising on their needs.

Where many businesses run into trouble is only working with firms that specialize in a certain type of work. For instance:

1. ARCHITECTS ARE EXPERTS IN CREATING FUNCTIONAL, SAFE, SUSTAINABLE AND COMPLIANT FACILITIES
2. INTERIOR DESIGNERS DO STRATEGIC WORK REFINING FLOW WHILE APPLYING FINISHES, ACCESSORIES AND FURNITURE TO SPACES

However, architects and designers are not experts in technology planning, as it is not central to either provider. The issue is technology is not an add on. It is an essential, mainstream project element that must be strategically addressed at the beginning of a project, before putting a plan into action.

Businesses need technology experts who understand the importance of pre-planning for their needs and can represent their technology priorities to ensure better communication and coordination across the various trades and stakeholders involved in a project.

This need for more interconnected, versatile spaces has increased complexity in furniture and wall products as well. Yesterday's monolithic panels, static worksurfaces and simple projection setups have been replaced by integrated workplace designs marrying building materials with technology and furniture.

What businesses need today to stay competitive includes switches, controls, motors, architectural walls and complex materials like double paned glass and integrated power, data, lighting and technology components. The more complex nature of these products requires a much higher level of installation expertise. Years ago, providers needed basic training and tools. Today, a provider must have a firm understanding of construction practices, build-



ing codes, electrical requirements, data infrastructure, and much more diverse and complicated furniture systems.

UNBIASED VERSUS BIASED PROVIDERS

Another compromise many companies fall into is working with traditional build-and-design integrators who are focused on selling particular brands and incentivized to push certain products. This often leads to companies getting a lot of technology, but not necessarily the right technology for their needs. Inevitably, this leads to overspending and underdelivering in shared spaces such as conference rooms, meeting rooms or in the ability to connect in-office and remote workers. A better option is to work with a technology solutions company that is brand agnostic, which gives customers a wider variety of technology, enabling companies to get the right solution to meet their needs.

LOOKING AHEAD

Ultimately, the workplace of the future must include integrated technology to be successful. Companies that can capitalize on solutions that push their collaboration and communication forward will be the winners who see more success with the hybrid workplace approach. By implementing easy-to-use technology into

the workplace, employees can streamline communication whether they are sitting in a physical office or working hundreds of miles apart. Bridging this gap will enable the flexibility employees are looking for, leading to better experiences, and ultimately making organizations more competitive when it comes to recruitment and talent acquisition. **FMJ**



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CASE STUDY

AT THE CREST

Innovation in the Built Environment

BY CHRIS BOWYER & JASON PAGE

Envision the surf of the ocean with waves coming to land, some small, some big, some fizzle out, others make it to the shore. The Alliance Center has a proven track record of riding and leading the most impactful waves to pilot innovation in the built environment for the 113-year-old building it owns and operates in landlocked Denver, Colorado, USA. It has continuously been at the crest with building performance, transformative technology, and human health and wellness.

The Alliance Center is a 40,000-square-foot coworking space in the heart of Lower Downtown Denver that has served as the hub of Colorado's sustainability movement since its founding in 2004. The organization's broader mission is to bring people together from all sectors to create solutions for pressing social, environmental and economic challenges, most notably the climate crisis. The Alliance Center also utilizes its building as a living laboratory, demonstrating sustainability in action and testing innovative green building practices to improve performance in the building sector and the wellness of building occupants. With the living laboratory program as the basis for piloting innovation and sharing successes and challenges, The Alliance Center shows continuous commitment to finding and leading cutting-edge sustainability efforts for the commercial building sector.

Proven building performance

Building operations account for 28 percent of global CO₂ emissions, and building materials and construction comprise another 11 percent. Committed to the efficient operations of existing buildings, The Alliance Center received the first of many green building certifications to communicate their commitment to the market and its customers soon after its founding. This focus on performance was this first wave that set the organization on the path for success in the built environment and has been a constant effort for nearly two decades.

In 2006, The Alliance Center earned its first two Leadership in Energy and Environmental Design (LEED) certifications from the U.S. Green Building Council (USGBC), receiving Existing Buildings Gold and Commercial Interiors Silver. It was the first historic building in the world to earn two LEED certifications. LEED has grown in popularity throughout the U.S. and continues to expand its building certification efforts to a global level. As this growth continued, The Alliance Center proceeded as an educator and early

adopter of LEED certifications, while also pushing for more rigorous performance standards themselves. In 2011 the center earned LEED Existing Buildings v2009 Gold recertification.

The LEED existing building certifications required a substantial time commitment and included a heavy focus on policies over actual, real-time performance. This meant very few buildings continued to certify their environmental performance, and a LEED certified building did not necessarily mean it was efficiently operated. The Alliance Center recognized this problem and joined as an early adopter of USGBC's Dynamic Plaque, now Arc platform, that focused on streamlining existing building performance reporting and certification across energy, waste, water, transportation, air quality and human performance. The Alliance Center was the fifth building in the world to participate in this program and continues to emphasize the importance of efficient building operations above prescriptive guidance.

A better commercial office model

The Alliance Center is a space for mission-driven people to come together to collaborate and was one of the first to develop a coworking space in Denver. This model focuses on making it easy for individuals and organizations to work together in shared spaces and uses economies of scale to provide the communal resources occupants need. More than just a building, The Alliance Center is viewed as a destination for collaboration and the hub of sustainability in Colorado.

The Alliance Center undertook a full building renovation in 2014 to transform its 1980s office space into one that provides a variety of workspaces and amenities. Sparked by an end-of-life mechanical system, this renovation also enhanced the building performance. The result of the renovation was that the space's occupancy and revenue doubled, while its energy usage decreased nearly 20 percent. The

building also earned Energy Star with a score of 94 in 2016, and achieved LEED Arc Gold and finally LEED Existing Buildings Operations + Maintenance v4 Platinum recertification in 2017.

In 2020, The Alliance Center was recognized as the most energy-efficient building in its area and was listed among the top 10 in Denver. Built in 1908, it took a fully holistic approach to sustainability and a dedicated project team to perform at standards even modern-day buildings often do not accomplish.

As building performance takes on an increasingly more important meaning with efforts worldwide to meet rigorous climate goals and a focus on human health and wellness, The Alliance Center sought ways to expand its impact by using the building as a demonstration site for climate mitigation solutions. New waves in the building sector were forming in 2016, including smart grids



and transformative technologies, and The Alliance Center took this as an opportunity to expand beyond status quo.

Microgrids and building electrification

The first of these waves relates to how the energy grid functions today, an approach that originated just a few decades before The Alliance Center building was built and has changed very little since. Until recently, power plants generated and distributed almost exclusively alternating current (AC) electricity. However, with the advancements of photovoltaics (PV) batteries and other renewables, new opportunities are arising to save energy by changing the path from the generation to end use phases.

In 2017 The Alliance Center jumped on this new wave and completed one of the country's first fully direct current (DC) microgrids, which includes a PV array and battery storage. The significance of this system is that it is exclusively DC based. DC power is inherently more efficient than AC power, and recent forecasts indicate that 80 percent of electricity will flow through native DC devices. With renewables that natively generate DC, such as PV, and battery storage, which natively stores DC, considerable savings could be seen in utilizing DC power and removing inefficient conversions and long-term transmission. There are also operational gains given the resilience provided by on-site generation and storage. By piloting this technology, The Alliance Center hopes to be an early adopter to show efficiency gains in power usage and emissions reductions.

The DC project has had many successes as well as challenges in its short history. One year after completion, an equipment outage and bankruptcy of a key member of the project team resulted in equipment protected by intellectual property being inoperable and a down system. The Center continued sharing lessons learned with others in the building sector and sees



potential for DC-based microgrids in the right settings.

Housed in an all-electric building since its founding, The Alliance Center has also observed the converging trends of building, transit and utility electrification and is focusing its efforts on supporting this important transition. Enter in the wave of electric vehicle charging. The Center is a strong proponent of electric vehicles (EV) and electric vehicle charging (EVSE) as is evident by multiple pieces of state legislation signed in their parking lot by the last two Colorado governors. In 2017, one of the first fast-charging EVSE in the state was installed to advance adoption of the technology.

This year, The Alliance Center installed one of the world's first bidirectional electric vehicle chargers that also incorporates a publicly available carsharing vehicle. This project reduces their electricity costs by using the EV's onboard battery to reduce the building's utility demand charges. While this is valuable in its own right, providing

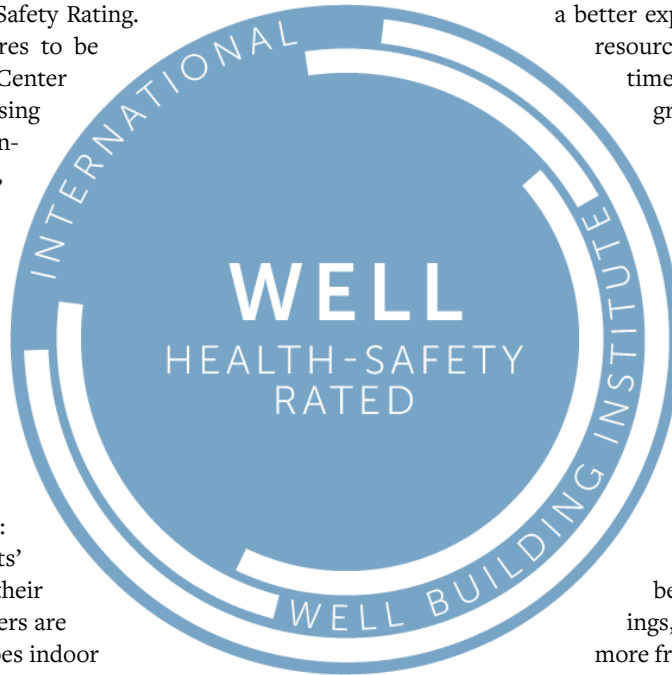
carsharing to reduce the number of vehicles on the road from a partner who provides subsidies to low-to-mixed income communities allows for even more benefits and a win-win proposition. On-site research is beginning to evaluate how this model could scale for building or community resiliency, utility savings and adoption into other markets. This includes building automation on how the building can best leverage this distributed energy resource to respond to utility pricing signals.

Occupant health and wellness

As an organization focused on holistic sustainability, catching the right wave for The Alliance Center does not always take on the form of energy efficiency improvements. Waste reduction, transportation mitigation and water reduction are all focus areas; however, buildings are for people and the COVID-19 pandemic has only increased the significance of the Center's work on workplace wellness and air quality.

During the COVID-19 pandemic, The Alliance Center adapted its operations to make their space a safe environment where its community could return. To provide verifiable evidence the building was following best practices and providing a safe workspace, The Alliance Center pursued the International WELL Building Institute's WELL Health-Safety Rating. Requiring a minimum of 15 features to be awarded the rating, The Alliance Center earned 21 of 22 features. Addressing topics such as reducing surface contact, planning for healthy reentry, supporting mental health recovery and monitoring air quality, it became one of the first in Colorado to earn this rating.

The pandemic necessitated exploration of increasing outdoor air and heightened focus on filtration media and evaluating air cleaning or disinfecting technologies. However, one important piece of information was missing: does this matter to the occupants' feeling of well-being and change their behavior? The Center and its partners are hoping to answer the question, "Does indoor air quality (IAQ) transparency increase occupant satisfaction with IAQ and perceived infection risk?" The team is in the midst of a one-year research effort that will share those results to a peer reviewed journal. However, this will not be enough as many building owners and operators want infor-



mation today related to balancing IAQ against energy use, thermal comfort and when someone will return to work. The Center is also studying this to share important information to consider.

All of this work points toward a future in which buildings are connected and responsive to their occupants to create a better experience and more efficiently utilize resources. People spend 87 percent of their time indoors. How does that building greet them? Does it know what temperature that person likes their office, whether their EV (or maybe electric bike) will be parked for multiple hours for the building to discharge and charge the onboard battery? Will a sensor in their office give them confidence that the air is clean, or maybe something else entirely? The Alliance Center began its work with a focus on why a building is used and how it is performing. What is most important are the waves of the future. As grids become more interactive with buildings, occupants appropriately demand more from their workspaces and the climate crisis becomes more urgent, building operators have a critical role to play and will need to focus on what they can do today to choose the right wave. The Alliance Center continues to ponder these questions and is doing their best to be at the crest. FMJ



Chris Bowyer is The Alliance Center's director of building operations and responsible for the strategic development and day-to-day operations of the building's systems. He serves as lead on the Living Laboratory program and has overseen the building's LEED certifications, WELL Health-Safety Rating and many other significant projects. Bowyer is an active member of the IFMA Denver Chapter and a LEED AP O+M and was selected as an Energize Denver Individual Leadership Award winner in 2020.



Jason Page is The Alliance Center's chief operating officer and responsible for maximizing the impact of the Center's collaborative coworking and high-performance building efforts. He oversaw The Alliance Center's award-winning building renovation which later received LEED Platinum certification. He is a Project Management Professional and LEED AP O+M.



A New Light

USING LEDS TO PROTECT THE WORKFORCE

BY BILL PLAGEMAN

What is the best way for companies to reopen their offices and protect staff?

Corporate leadership and boardrooms are in dire search of the answers to that very question, as both their employees' comfort level and their company's productivity hang in the balance.

One such poll by Eagle Hill Consulting in April 2020, just a few weeks into the world's largest telecommuting experiment, revealed that a majority of employees were extremely apprehensive about their exposure to pathogens, including coronaviruses, in the workplace. A year later, when Eagle Hill conducted a similar poll, a new set of survey participants expressed greater confidence, but some concerns remained. Close to half wanted employers to postpone any office reopening. Most hoped their employ-

ers would adhere to the strictest of health recommendations — continuously cleaning and disinfecting, included.

For facility managers, these findings suggest it is more important than ever to provide an extra layer of protection to reduce their staff's exposure to bacteria, viruses and other infectious diseases as more workers return in the coming months.

Such an approach will require a new, adaptive way of deep cleaning and disinfecting that goes beyond extra scrubbing from the nightly janitorial crew.

Lighting plays new role inside offices

Thanks to recent advancements in LEDs, there is an innovative approach to mitigating contamination: antimicrobial LED

lighting technology, which attains the maximum dosage levels of disinfectant action by tuning the power of its lights to specific lux levels, angles and distances from targets.

This new lighting technology, which is internationally approved for uninterrupted use around people, pets and plants, illuminates where and when light is needed, simultaneously creating an inhospitable environment for pathogens, microbes and multiples classes of viruses — including coronaviruses.

Antimicrobial lighting uses a wavelength of light that commonly attacks and kills bacteria, fungi, yeast, mold, coronaviruses and pathogens on any surface that light touches, with effectiveness often exceeding 90 percent.



This next generation of germicide illumination operates 24/7 to reduce the bioburden — the number of microorganisms living on a surface yet to be sanitized — and supplements general cleaning efforts. This is completed in two ways: by incessantly disinfecting already cleaned-off surfaces and by checking off frequently overlooked items such as doorknobs or items on workers' desks that janitors are told to steer clear from, such as phones, keyboards and computer mice.

Antimicrobial lighting technology utilizes LED diodes to emit a specialized luminosity that provides continuous, uninterrupted protection inside small or hard-to-reach spaces while illuminating high-traffic areas of the office where workers gather, including lobbies, restrooms, kitchenettes, breakrooms and conference rooms — all of which, according to studies, were breeding grounds for microbes long before the COVID-19 pandemic upended the hustle and bustle of commercial office spaces.

How infectious diseases spread easily inside offices

According to WebMD, employees who report to work at the office collect more than a paycheck. Unwittingly, they also collect bacteria and other causes of pathogens — lots of them, with the average office desk yielding some 400 times more bacteria than on a typical toilet seat.

Researchers at the University of Arizona found equally disturbing conclusions. The average desk has more than 10 million bacteria organisms, and men reportedly have three to four times more bacteria breeding on their desks than their female colleagues. According to the report, men tend to have lower levels of desk hygiene as well as larger-sized desks, translating to more surface area for bacteria and viruses to accumulate.

Perhaps more alarming: germ-infested doorknobs and tabletops can spread pathogens to 60 percent of an office's staff within two to four hours. No wonder employees take an average of 4.9 sick days each year, according to a PwC analysis. For a company with 100 workers, that equates to 490 days lost due to sickness linked to the office. Sick days add up fast, representing a total productivity zapper.

Professor Kelly Reynolds, an environmental microbiologist at the University of Arizona, explained this damaging domino effect in the clearest of terms just after the release of the 2019 report: "We touch a lot of different surfaces that hundreds of others might be touching. Germs spread quickly."

Even the greatest scrubbing efforts by professional cleaners can do only so much for so long.

Research shows bacteria counts are the lowest just after cleaning has been completed. That was traditionally at the start of a workday because offices were cleaned the night before. Today, with re-occurring cleaning efforts increased, that could be at multiple times throughout the workday. Still, it does not take long for bacteria to return. All it takes is the arrival of a single person to make the last deep cleaning effort all for naught. "As the day ramps up and more people touch more surfaces, the risk of encountering bacteria goes up," Reynolds said.

Soap and water, Reynolds said, are traditionally not strong enough to kill all bacteria, coronaviruses and other infectious diseases on surfaces. "You need to use a product with a disinfectant," she said. This is where the right touch of light can shine a purifying glow. But if managers and FMs want to keep their operations humming along, the first disinfectant light that comes to mind is not the way to go.



Why UV lighting can cause business disruptions

Offices have already shifted their focus to researching and investing in state-of-the-art, hospital-grade technologies to better protect their workforce from the fast growth of viruses and microorganisms and the infection threats they impose.

A common, go-to solution has been investing in and installing ultraviolet (UV) lighting, which closely mirrors the technological composition and disinfecting benefits of antimicrobial lighting. Both have powerful, well-documented disinfectant capabilities.

But the two are not the same. They differ in many ways — the technologies they use, the microorganisms they are effective against, the way they kill microbes and even the applications they used in. Perhaps the most significant difference for office environments: one will minimize business disruptions while the other will escalate them.

Here's why: UV lighting is intrinsically dangerous. It essentially works as a harsh disinfectant, piercing a microbe's nucleus and obliterating nucleic acids while disrupting DNA structures. The damaged DNA accumulates and leaves the cells unable to perform vital essential functions.

Prolonged exposure at high intensities harms the cellular structure in living things — humans included. Potential eye problems include cataracts, issues with the cornea and temporary or permanent loss of vision. UV lighting can also make it harder for the skin to heal, experts say. It may even cause cancer.

In other words, UV lighting is not suitable for use when humans are present in a space. This explains why, for all the raving headlines touting UV lighting, just as many warn about its limitations and safety issues. Reports last year alerted workplaces about the potential

eye damage UV lighting can cause, and a report about a Boston food bank robot that shined UV disinfectant lighting came with one big caveat: the light cannot be shined when people are nearby. A built-in protection feature shuts off the robot's cleaning function when movement is detected.

Both cautionary tales emphasize how it is exceedingly challenging to promise endless disinfecting without any business disruptions when it comes to UV lighting.

Antimicrobial lighting
continuously disinfects
without business disruptions.

Antimicrobial lighting, on the
other hand, can make — and
not break — such a promise.

The illumination meets the international standards for continuous and unrestricted use with people present by using wavelengths cluster around the 405-nanometer mark, which is just north of the UV frequency range of 100 to 380 nanometers. More nanometers traditionally equal more wavelengths on the visible light spectrum, and the shorter the wavelengths below 380 nanometers, the greater the danger to living things.

Antimicrobial lighting's extermination power comes from within the visible light spectrum, from 380 nanometers to approximately 750 nanometers. It activates certain types of porphyrin molecules

in infectious microbial cells but not in human, plant or animal cells. When activated, the porphyrins produce excessive reactive oxygen species (ROS), such as singlet oxygen, hydrogen peroxide and hydroxyl groups, destroying multiple structures within the infectious cell.

Unlike microbial cells, the types of porphyrin molecules found in humans and other animals are not photoactivated by illumination in the 400-to-420 nanometer range, which is why antimicrobial lighting technology is approved for continuous usage with worker bees crisscrossing underneath.

Similarly, antimicrobial lighting does not trigger the degradation of materials as UV does. UV rays can break down the chemical bonds found in plastics and cause fabric and some other objects to fade in color and structure. Nor does antimicrobial lighting require the high upkeep that UV lighting requires, such as regular bulb replacement and constant oversight.

With antimicrobial lighting, its varying cleaning modes require just two simple steps: first, set the system up using a preset, timer or sensor. Then, forget about it — it is good to go.

Antimicrobial lighting shares the disinfecting benefits of UV lighting, but without the long-lasting harmful impacts or productivity-sucking side effects. Call it a specialized, round-the-clock sanitation service office workers see, but never feel.

How antimicrobial lighting beats the contamination challenge across the office

Antimicrobial lighting has already been tested in commercial applications worldwide, passing each time with flying colors.

For instance, a large corporate office witnessed a 92.4 percent bioburden reduction on five of the most commonly used surfaces in the company's breakroom — the toaster, refrigerator, sink, water cooler and trash can — after installing an antimicrobial clean lighting system. A public bathroom, according to reports, also experienced significant bacterial declines. Newly released research also underscores antimicrobial light's knockout punch on viruses, with the system's efficacy reaching 91 percent or higher when a greater lighting intensity was enacted.

These case studies share two additional characteristics: no business disruptions and no need to vacate the well-lit space.

Lighting has always been among the most prominent features in a dynamic work environment. Studies show that certain types of lighting can fundamentally impact employees' mental and physical health. The National Lighting Bureau, for instance, underscores research that shows how lighting can influence mood, behavior and creativity. Certain types of lighting, the organization said, directly correlate with workers' ability and desire to get projects and work completed. The productivity factor of cooler-temperature lighting — illumination between 4,000 kelvin (K) and 7,000K — paired with higher intensities compared to the effects of warmer-temperature lighting with lower intensities is well-known and documented.

Now, thwarting surface bacteria, viruses and infectious pathogens is a new leading role for commercial lighting technology.

Workers have long expected quality lighting to think and see well. Same with leadership. Both should consider their office lighting — with the integration of an LED antimicrobial system — as the gateway to something perhaps even more critical: a soothing illumination that helps reduce unproductive sick days, minimizes remote workdays and welcomes back staff with the company's commitment to a healthier, cleaner work environment under the right light. FMJ



Bill Plageman is the vice president of marketing and product development at Amerlux, a part of Delta Electronics.

With more than 25 years of lighting industry experience, Plageman has worked as a salesman, specifier and product manager, prior to marketing. Plageman also educates about the industry's fast-emerging LED technologies and strategies.

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Vendor Profiles

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