Technology's Role in Healthy and Safe Indoor Environments

(Building Energy Innovators Council Newsletter)

"A 1984 World Health Organization Committee report suggested that up to 30 percent of new and remodeled buildings worldwide may be the subject of excessive complaints related to indoor air quality"

The Challenges

Humans spend approximately 90% of their time inside. With COVID-19 fears ever present, building owners need to develop strategies to ensure their tenants feel safe as part of their back to office strategies. Although it seems that "help is on the way" with new vaccines getting into the arms of people around the globe, mutations have now been found and new invisible invaders will appear throughout the world. With so much still unknown, people in the business, heath, educational fields, and so many others, are taking steps to find creative methods to safely return to work.

The greater question then becomes: How do we get people back to their workspaces after COVID-19 lockdown and utilize technology to provide confidence in our safety concerns? The answer: we must construct a new paradigm seeking out the support of what new technologies have to offer.

The solution must be to analyze the air we breathe and how we interact indoors, as well as how to ensure we are protected against the way this COVID-19 virus, its mutations and other diseases enter our lungs through certain indoor air quality ("IAQ") conditions. The economic impacts also weigh heavily as we make decisions that will affect us for years to come.

Prop Tech companies are doing their part by developing solutions that use smart sensors to monitor indoor air quality while also helping building owners reduce operational costs through energy efficiency recommendations.

The Advantages – An Analysis

The existing problems that affect IAQ and health/wellness are CO2 and humidity levels as well as densely populated areas. Pathogens are transmitted through the air. The CDC states that viruses are more easily transmitted when people are less than 6 feet apart. Even under certain conditions, "particularly indoors and in areas with poor airflow around unmasked people infected with COVID-19, the virus can be transmitted via an airborne route via so-called aerosols (very fine particles suspended in air),'' according to pulmonologist Dr. Benjamin Singer.

Carbon Dioxide ("CO2") also plays a role in the transmission of viruses. It is proven that as CO2 levels increase, the probability of infectious disease increases. According to ASHRAE and OSHA, normal outdoor CO2 levels are 400 ppm and indoor levels should hover around 1,000 ppm to prevent Sick Building Syndrome and virus transmission. However, at CO2 levels of 800 ppm, the probability that a person becomes infected with a virus is five times higher than outdoor levels.

Elevated CO2 levels are also proven to have negative impacts on the brain which can cause headaches and reduce a person's ability to process information.

Humidity is a contributing factor in the transfer of viruses as well as other health concerns. While "Cold, dry air facilitates the spread of the coronavirus", elevated humidity levels can cause mold and respiratory problems. Scientific studies have proven that when relative humidity decreases to 20%, viruses thrive. COVID-19 specifically can stabilize for longer periods of time when there are lower levels of relative humidity, which enables viruses to attack the receptors in our airways.

The Solution: Smart Technology

Smart IoT sensors combat pathogens and ensure safety by collecting and analyzing data while providing immediate feedback to building owners, engineers, asset managers and all who have a stake in ensuring that the inside of a facility is safe for its occupants.

IoT-based advanced energy dashboards are the answer. At first glance, you are probably asking yourself, "what does an energy dashboard have to do with ensuring healthy and safe indoor environments?". The answer is clear: Prop tech companies deploy sensors throughout facilities as they track building data. The intent is to collect a multitude of information from a facility so the technology's artificial intelligence ("AI") and algorithms can "learn" a building (predictive analytics) and "tell" the facility when and how to curtail energy consumption, with a focus on occupant comfort. Imagine a world where real-time facts are at our fingertips as we make informed decisions to protect the safety of occupants in buildings and support sustainability worldwide.

Monitoring how many people are in a facility, on a floor, or even in a specific portion of a space with the challenges we face today, becomes essential as the dangers of viral pathogens lay before us. Smart building technology provides information on a mobile app or desktop in real-time. Obtaining this data will help decrease the spread of COVID-19 and other pathogens that scientists tell us we will inevitably face in the future.

The technology's algorithms notify you immediately though text/email if the levels exceed what is acceptable in your facility. Rest assured that you can go about your day and know that the AI is working for you so you do not need to constantly monitor the data. For example, knowing that normal indoor CO2 levels should be no more than 800 ppm, you are immediately alerted when the ppms hit a certain customized threshold. Having confidence that you have advanced warning of unsafe CO2 and humidity levels in your facilities is invaluable. What are safe occupancy rates in one facility may be different than another facility. The change in occupancy reported to you in real-time allows you to make better informed decisions.

As with anything else, this peace of mind comes with a cost. It may be priceless to keep the facility occupants safe and healthy, but the truth is that we almost instinctively compare prices when purchasing something, even if it could potentially save lives. What is remarkable about the economic aspect of this technology is that it can pay for itself, sometimes in less than six months. While the health, wellness and safety of facility occupants may be the primary concern, the technology also monitors energy usage (in the background: using AI, predictive analytics, and algorithms). The system sends actionable alerts in real-time to the facility to reduce energy consumption while never sacrificing occupant comfort. Some companies collect and analyze the facility data while tying in mitigating energy

consumption to make the cost more palatable. They also offer opportunities to charge no upfront cost as they partner with the facility owner.

The future safety and comfort of the occupants in hotels, colleges, office buildings, transport systems and the like, has arrived now, as we look to prop tech companies to ensure “we will get by”. In this fast-moving society, building owners and managers depend on support to reduce operating costs and their environmental footprint while decreasing strain on the grid. Optimized energy reduction, increased health and wellness, and transparent on-site visibility is here, right at your fingertips.

RESOURCES

1. Why Is IAQ Important for a Healthy Workforce? (pressac.com)
2. BOMA Toronto Webinar - Latest Pandemic IAQ Standards Operational Best Practices (003).pdf
3. Does coronavirus spread more easily in cold temperatures? Here's what we know (theconversation.com)
4. Making buildings healthier in a Covid-19 world (smartbuildingsmagazine.com)
5. CaGBC WELL Building Workshop - 1.20.2021.pdf
6. 72-74_ieq_schoen.pdf (ashrae.org)
7. ID Number: (ashrae.org)
8. Covid-19’s wintry mix: Dry indoor air helps the virus spread - STAT (statnews.com)
9. https://www.usatoday.com/story/news/nation/2020/10/09/covid-19-six-feet-really-safe-distance-experts-answer-questions/5930932002/
10. Carbon Dioxide Concentration - Comfort Levels (engineeringtoolbox.com)
11. base_3c2o2.pdf (epa.gov)

Peak Power and Jeremy Bressler

Jeremy Bressler is on the business development team at Peak Power. Jeremy has 15 years of experience in the commercial real estate industry. Peak Power develops AI-powered software to help building owners ensure the health/wellness and safety of facility occupants as well as to operate energy resources more efficiently. Peak’s Insight™ is an IoT-based advanced energy dashboard which will give your team all the benefits of computer-generated insights without sacrificing control of the building. Insight will improve your visibility and reporting on key building metrics and can integrate energy resources like electric vehicle (EV) charging stations or battery energy storage at a later date. It is quick to install and compatible with all buildings regardless of any existing building management systems. **Contact Jeremy Bressler at jeremybressler@peakpowerenergy.com or 914-469-2839 for more information on Peak Power’s Insight™.**