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Predicting What's to Come for HVAC in 2022

BY MARY KATE MCGOWAN, MANAGING EDITOR

ATLANTA—What the HVAC&R industry could experience in 2022 could be similar to what it has been facing throughout the COVID-19 pandemic, including indoor environmental quality (IEQ) concerns. Other consistent challenges will continue, such as the shift to lowering carbon use.

But there are always surprises.

Several industry leaders discussed what they predict to be significant trends, topics and technologies that could captivate the HVAC&R industry in the new year.

The Persistence of IAQ

Indoor air quality (IAQ) has been top of mind since the onset of the COVID-19 pandemic, and Madison Schultz, P.E., Member ASHRAE predicts that will continue into the new year.

In her 15-year career, not many building owners have asked Schultz about IAQ—until the start of the COVID-19 pandemic. Before, Schultz said, building owners did not want to spend money on IAQ technologies, and sometimes they had never heard of it.

"This year, about half of my clients have asked something about indoor air quality, about air cleaning, about virus transmission, about [having] better healthy air inside. I think that trend is going to continue," she said, adding that she predicts the industry will see owners requesting air quality, air cleaning or other related technologies.

Building owners are vital in another trend predicted by 2021–22 ASHRAE President Mick Schwedler, P.E., Fellow ASHRAE—resiliency. "I think engineers are trying to work with the building owners to look forward and say, 'What can be done moving forward to make the buildings more occupiable quickly to allow them to respond more quickly to reopen when we need to and when we want to?'"

Erin McConahey, P.E. HBDP, Fellow ASHRAE, said she thinks the public will probably talk about COVID-mitigation measures a bit less now that vaccines are in place, but ASHRAE should continue with research to establish modifications to ANSI/ASHRAE Standard 62.1, *Ventilation for Acceptable Indoor Air Quality*, that acknowledges infection control as an aspect of IAQ for non-health care buildings more explicitly.

Madison Schultz, P.E., Member ASHRAE

Mick Schwedler, P.E., Fellow ASHRAE

Schwedler also discussed the importance of ASHRAE research, in particular the need for independent research on air cleaning technologies.

"For almost 105 years, we've been funding our own research. That allows us to be both practical and also independent in the results of our research," he said.

Moving On From MERV 13?

Resiliency expands beyond COVID-19 mitigation and virus concerns to other challenges, such as wildfires and air filtration technologies. "COVID and wildfire events have led to a big focus on better air filtration," said Mike Gallagher, P.E., Fellow ASHRAE. "For a variety of reasons, MERV 13 has become the 'go-to' efficiency level for many purposes. The filter industry was caught flat-footed when the COVID era began; they could not meet demand."

Manufacturing capacity has still not increased commensurate with the increase in demand, said Gallagher, adding that part of the reason for this is a concern that as COVID-19 fades from being the highest priority social concern, the market will return to using cheap filters, such as MERV 8.

"The manufacturers are worried that the massive amounts of money that would have to be committed to

new manufacturing facilities will prove to not get an adequate return on investment if demand for MERV 13 drops. I expect that question to be answered by the end of 2022, and based upon what I am seeing in the market now, I don't expect a huge drop off in MERV 13 demand," he said. "I expect the trend in 2022 will be for MERV 13 to become institutionalized as the standard filter for many of the clients that began using them due to COVID."

MERV 13 will continue to be a featured technology in 2022, according to Joe Lstiburek, Ph.D., P.Eng., Fellow ASHRAE, adding that several COVID-19 mitigation efforts include increasing interior relative humidity (RH), ventilation rates and room filtration air change.

"Increasing RH is going to be a disaster in existing homes and buildings during the winter in cold climates. Increasing ventilation rates is going to be a huge issue with part-load humidity in hot-humid and mixed-humid climates requiring supplemental dehumidification and is going to be a huge issue with excessive dryness in cold climates during the heating season requiring humidification," said Lstiburek.

He said humidification can be dangerous to occupants when poor humidifiers are used, and increasing ventilation rates everywhere are going to be a huge energy penalty unless energy recovery ventilation (ERV) systems are used. "Increasing room filtration air change is a much better approach to dealing with COVID than increasing ventilation rates," he said.

Eyes on the Environmental Side

Another long-standing industry trend is predicted to continue into the new year: building decarbonization and reducing carbon emissions. McConahey said net zero carbon buildings, decarbonizing existing buildings through electrification and deep energy-efficiency technologies and low global warming potential (GWP) refrigerants becoming available for heat pumps and chillers are essential to supporting global climate action.

"In addition, I would predict that increased attention to the use of water for evaporative cooling will need attention in some parts of the world where potable water creation has a high carbon intensity—like the Southwest U.S.," she said. "I would estimate that increased use of demand shifting through smart building controls and a combination of electrical and thermal energy storage will become more prevalent to help owners avoid high-carbon electricity if they are not already buying green power."

Erin McConahey. P.E., HBDP Fellow ASHRAE

Mike Gallagher, P.E., Fellow ASHRAE

Joe Lstiburek, Ph.D., P.Eng., Fellow ASHRAE

As far as a technology to help decarbonization efforts, heat pumps come to mind. "Heat pumps for water heating domestic and smaller heat pump replacements for gas-fired furnaces are the most essential elements to support decarbonization of buildings," McConahey said, adding that the rise of hydrogen alternative for combustion-based heating is another replacement technology to track.

On the other hand, McConahey said she thinks the traditional means of life-cycle cost analysis that looks only at operational energy will wane and be replaced with whole life carbon assessments that include both operational and embodied carbon. "Similarly, total cost of ownership will need to expand to include the cost of carbon offsets for those owners who have committed to net zero carbon performance."

ASHRAE established its Task Force for Building Decarbonization this past spring, bringing together a group of experts to strategize how building owners and operators can work to reduce carbon emissions, said Schwedler.

"We are going to require global collaboration and outreach. We have realized during the pandemic that we are in the same world with everybody else. That is true, whether it's in respect to environment, emissions, whether it has to do with health issues [or] whether it has to do with getting the materials people need in order to build and update their buildings," said Schwedler.

As industry groups are deciding how to decrease building carbon emissions, the cost of heating fuel, including natural gas, has increased.

"I think people should really start focusing on more efficient heating systems. We've really focused on the efficiency of cooling systems and getting those seasonal energy efficiency ratio (SEER) numbers up nice and high or higher than they have been. I think there's going to be

a shift to heating systems in the next year," said Schultz.

She also predicted a shift to installing air-conditioning systems in places that traditionally never used the technology, such as places in northern climates like Seattle and Europe.

"With climate shift, they are starting to see the need for that, so I think we're going to see air conditioning emerging in those markets as well," said Schultz, adding that with the increase in demand in newer markets, there could be a shortage of design engineers with experience designing those systems.

Seeing Trouble in the Supply Chain

The supply chain is no stranger to challenges lately, and the HVAC&R industry could be affected—in several ways.

First, from the carbon side of things, the HVAC industry needs to do "a deep dive into supply chain and manufacturing to understand the embodied carbon and healthy material status of its equipment and start to publish Environmental Product Declarations (EPDs) and Health Product Declarations (HPDs), as these are essential elements of transparency that are necessary to support a sustainable and low carbon future that understands a broader value chain understanding of community and public health," said McConahey.

Second, just as IAQ concerns are tied closely to the COVID-19 pandemic, so are supply chain issues. Because of anticipated delays, Schultz said she is curious to see if the industry will experience a shift in just-in-time manufacturing practices, which are common with lean management practices.

"I think we might see a trend towards manufacturers scaling down their products that they offer, simplifying their lines. I think we may see some manufacturers start to have more supply just waiting to ship out," she said, adding this could mean less customizable options.

This change could mean design engineers working more closely with local manufacturers that offer semi-custom options, said Schultz. "I wonder if we'll see a lot more of local manufacturers maybe being able to spread their wings a little bit more and fill those gaps."

More Diversity, More Communication

Other trends ASHRAE members are hoping for are less technical. Schultz—the Central Oklahoma Chapter's Diversity in ASHRAE chair—said she would like to see the HVAC&R industry strive for diversity of thought.

"Diversity doesn't just mean gender. It also means background, ethnicity, someone from a different country of origin. It also means sector-of-the-industry diversity," she said, adding age diversity is another area for improvement."

"Diversity, equity and inclusion (DEI) is not about making yourself feel better or being nice to other people. It's the right thing to do. And studies show that more diverse groups come up with more creative ideas and are more profitable," she said.

The desire for more connection also includes in-person communication and meetings, said Schwedler, adding that he believes people have learned to be more understanding and flexible during the pandemic "allowing us to collaborate more fully, more openly and more honestly." ■

AHR Expo Innovation Awards Winners Announced

WESTPORT, CONN.— The battle to be the best is on.

The AHR Expo has announced the winners of the 2022 AHR Expo Innovation Awards in 10 industry categories: building automation, cooling, heating, indoor air quality, plumbing, refrigeration, software, sustainable solutions, tools and instruments and ventilation.

These 10 products will compete head-to-head to be awarded the coveted AHR Expo Product of the Year award at the 2022 Show, scheduled for January 31–February 2, at the Las Vegas Convention Center.

"This past year was a challenge for everyone, and in unique ways, the HVAC&R industry," said Show Manager Mark Stevens. "Our industry was called to the front lines to put our very best products and technologies to the test. The Innovation Awards purpose is to honor those that are pushing the bar to create innovative solutions to difficult problems. We are thrilled to celebrate this year's winners and what they bring to the industry, as well as to continue to champion innovation among our professionals."

Find out who the Innovation Awards winners are at https://tinyurl.com/2js77t7z

For more information about the AHR Expo and the Innovation Awards, visit https://www.ahrexpo.com/awards ■

ASHRAE Global HQ Reaches Net Zero Energy Milestone

ATLANTA–Almost two years after ASHRAE began renovating a 1970s-era building, the Society's new global headquarters will operate at net zero energy (NZE) performance following the recent installation of a large photovoltaic (PV) system.

The office is 66,770 ft^2 (6,203 m^2) and located on 11 acres (4.5 ha) of land at 180 Technology Parkway in Peachtree Corners, Ga. The $20 million renovation project was intended to prove the economic viability of an NZE operation. Buildings classified as NZE consume less energy over the course of a year than is generated on-site through renewable energy resources.

The project is a testament to ASHRAE's leadership and commitment to sustainability and showcases innovative built environment technology, said 2021–22 ASHRAE President Mick Schwedler, P.E., Fellow ASHRAE.

"Completing the installation of our PV system marks a tangible milestone for ASHRAE that will demonstrate to others how to successfully move on the path to NZE status," he said.

The PV project was a combination of three sub-arrays:

- 187 kW ballasted rooftop;
- 65 kW ground mount on a south-facing hill adjacent to the building, allowing narrower spacing between rows and thus higher energy density; and
- 81 kW ground mount situated in an unused section of a parking lot.

ASHRAE

ASHRAE renovated an office built in 1978 to prove the economic viability of a NZE operation.

The installation of the PV panel system shows how to reduce grid-energy consumption and greenhouse emissions in an older, existing building to create a sustainable environment, said ASHRAE Treasurer Ginger Scoggins, P.E., Fellow ASHRAE, former chair of the ASHRAE Headquarters Building Ad Hoc Committee.

"An important part of getting to NZE is the low energy consumption of the building (low EUI of 21 kBtu/ft^2·yr)—while maintaining excellent ventilation and IAQ," she said.

The building's NZE accomplishment was announced just weeks before ASHRAE hosted a grand opening and ribbon cutting ceremony in mid-November. ■

ASHRAE HQ: Driving HVAC Design, Technology Forward

ASHRAE's new global headquarters proves it is possible to transform a 1970s-era building into a net zero energy, low carbon operating office—on a budget.

On the latest episode of *ASHRAE Journal* Podcast, the architect, mechanical engineer of record and project manager of ASHRAE's new HQ discuss what went into deciding which systems to use and how the building would operate.

ASHRAE Treasurer Ginger Scoggins, P.E., Fellow ASHRAE, former chair of ASHRAE's Building Ad Hoc Committee, Gregory Walker of Houser Walker Architecture and Stanton Stafford of Integral Group also share lessons learned from this high-profile project.

ASHRAE JOURNAL Podcast

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