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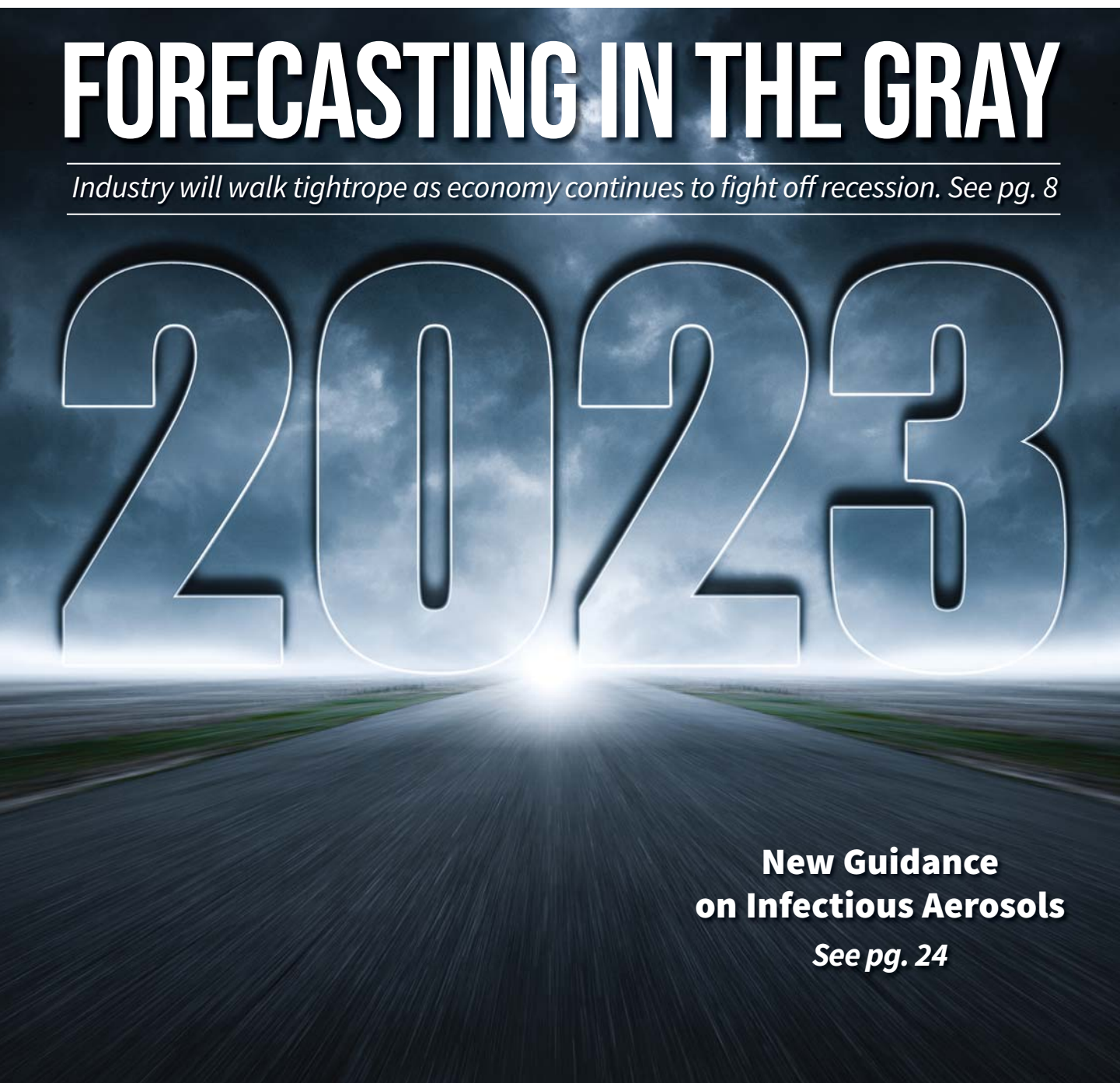
HEATING / PIPING / AIR CONDITIONING

FORECASTING IN THE GRAY

Industry will walk tightrope as economy continues to fight off recession. *See pg. 8*



New Guidance on Infectious Aerosols

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By Rob McManamy

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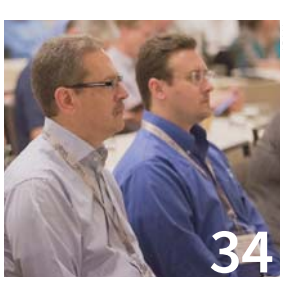

ABMA

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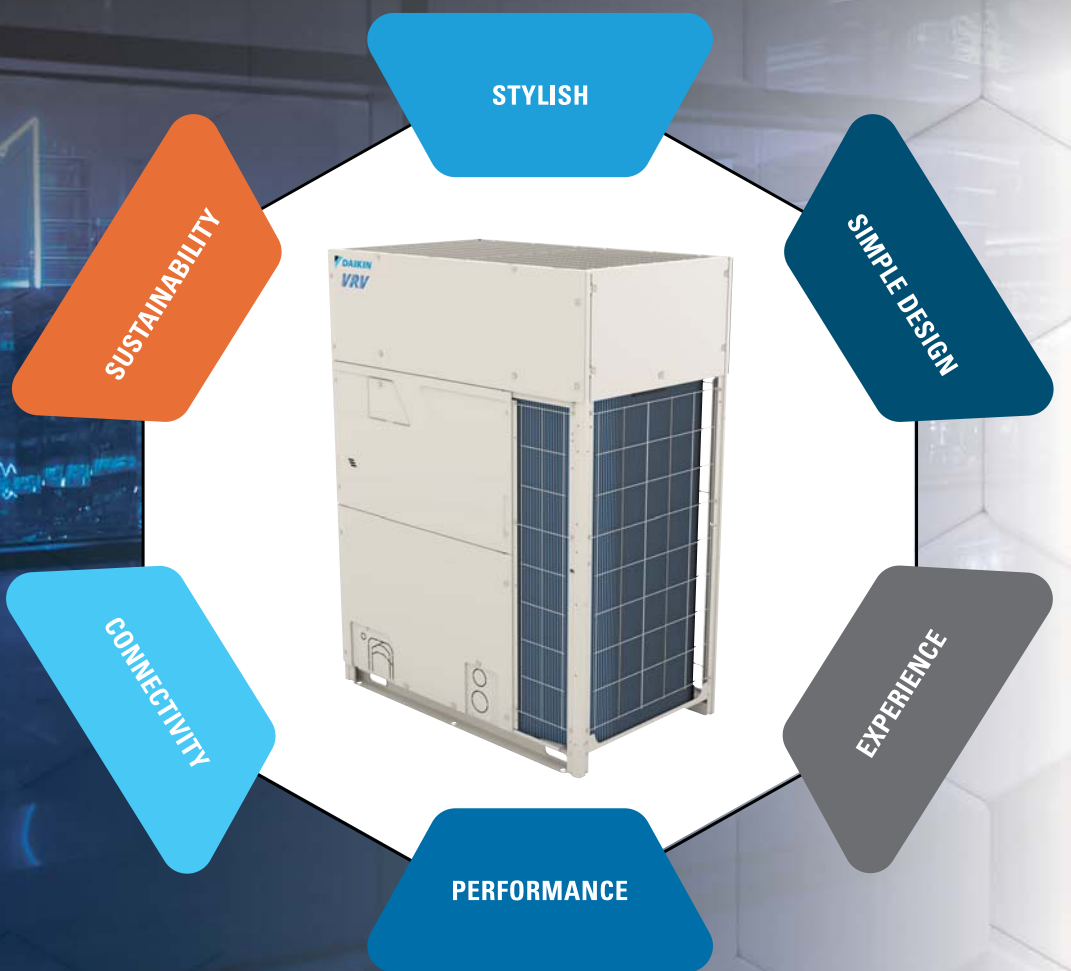

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Breathing Real Change Into History

As we now ready ourselves for a new year closer to normal, the "before times" seem finally to be returning, albeit in a forever altered form.

Of course, we don't know what all the long-term effects will be of the last few years. We are told that students of just about every age are showing the ill effects of isolation and distancing in ways that suggest setbacks in socializing and emotional development. Depression is on the rise. And in many places, for people of all ages and occupations, there remains the inescapable sense that things are still, well, different.

Rob McManamy
Editor-in-Chief

Granted, as the uber-vaccinated spouse of an elementary school teacher, I firmly believe that social distancing, remote learning, and vaccinations and boosters during this persistent global pandemic have all been necessary and have saved hundreds of thousands, if not tens of millions, of lives, worldwide.

But after-effects do remain, of course, and several are much broader than we can even imagine.

Indeed, the influence on history of The Great Influenza of 1918 has been vastly underappreciated. Just as World War I was ending, that pandemic emerged to infect more than half a billion humans, and kill roughly 50 million. (To date, COVID-19 has claimed some 6.6 million lives globally.)

Yet, even with those jaw-dropping numbers, its most consequential victim may have been President **Woodrow Wilson**, who in 1919 was incapacitated during peace treaty talks in France, rendered ineffective as a participant, and then unable to rally support at home for his League of Nations. The result was a disastrous and punitive Treaty of Versailles that historians now agree planted the seeds of the even more devastating WWII.

Unintended consequences.

It begs the question of what will come out of this pandemic that we cannot quite foresee at the moment?

Toward that end, our industry now still has before it the massive opportunity to forge a true global renaissance of indoor air quality (IAQ) management. This would be a hugely consequential "paradigm shift" that would both improve public health and also bolster the uncertain future of commercial construction and renovation.

> "Progress is still possible, if we can just stay focused."

With that in mind, even as it currently seems focused more on decarbonization (Earth's *other* front-burner issue), ASHRAE this fall just released new guidance on Infectious Aerosols. It is an important effort that seeks to keep owners and developers focused on public safety moving forward. *(See p. 24)*

But that is a task easier said than done. In this golden era of shorter and shorter attention spans, we now have to try even harder to remain focused on goals that require us to actually do things differently.

"As the saying goes, 'You can lead a horse to water, but you can't make him drink,'" laments Dr. **Bill Bahnfleth**, P.E., former ASHRAE President, and former chair of the society's emergency Epidemic Task Force (ETF), which ended its work last June. He is still Vice Chair of ASHRAE's Environmental Health Committee, which he says will now carry the work forward of the ETF.

Even after all he has seen in the last two-and-a-half years, however, which included his own breakthrough bout of COVID earlier this year, Bahnfleth remains hopeful that real progress is being made toward healthier buildings. *(For much more, listen to our new podcast with Bahnfleth at www.hpac.com.)*

"The field **is** shifting, but sometimes it's hard to see that happening early on," he says.

Indeed, it's nice to be reminded that some hidden consequences can also be positive.

Let us hope that the new year may be filled with only such pleasant surprises.

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Dodge Forecast: Industry Will Walk Tightrope in 2023

Even as the Fed continues to target inflation, the U.S. construction industry still has not reversed course. And the possibility remains that any true economic recession may yet be averted.

It was not at all lost on the online audience Nov. 15 that Dodge Construction Network Chief Economist **Richard Branch** was wearing a bow tie covered in flying pigs as he delivered his 2023 industry forecast, entitled, *"On the Razor's Edge."*

Branch laughed when one virtual attendee asked him about the tie, a gift from his wife, but its relevancy was clear. "Flying pigs" have long symbolized the impossible and the economist was suggesting that the U.S. economy may well pull off the impossible next year. All it has to do is thread the needle between persistent inflation, rising interest rates and wages, resilient job growth and anxious building owners and developers, wondering if they should move forward on their sizeable project backlogs.

Already, he noted, the U.S. economy had bounced back with growth in the third quarter of 2022 after two consecutive quarters of GDP decline, which used to define a "recession." Still, the Federal Reserve Bank has been extraordinarily aggressive in trying to tame inflation, raising interest rates by 75-basis points on four different occasions this year, the latest announced on Nov. 2. So far, that has brought the short-term borrowing rate into a target range of 3.75% to 4%, the highest level since January 2008.

To avoid recession, Branch said the AEC industry will need to thread the needle.

On Nov. 15, though, Branch said he believes the Fed's aggressiveness has peaked. He predicted Fed Chair **Jerome Powell** will likely raise rates 50-basis points in December, and perhaps another 25 points apiece in both January and March of 2023. "But that should be it," said Branch. Even so, he also cautioned, "If we don't see core

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inflation improve, the Fed is going to keep fighting this battle. And I think they will win it eventually, but the Federal Reserve is not afraid to break the back of the economy to get us there."

But Branch does not think that will be necessary.

Overall, speaking as keynote for the 84th Annual Dodge Construction Outlook Conference, he predicted that total U.S. construction starts will be unchanged in 2023, at $1.08 trillion. When adjusted for inflation, total construction starts will dip 3%, he added.

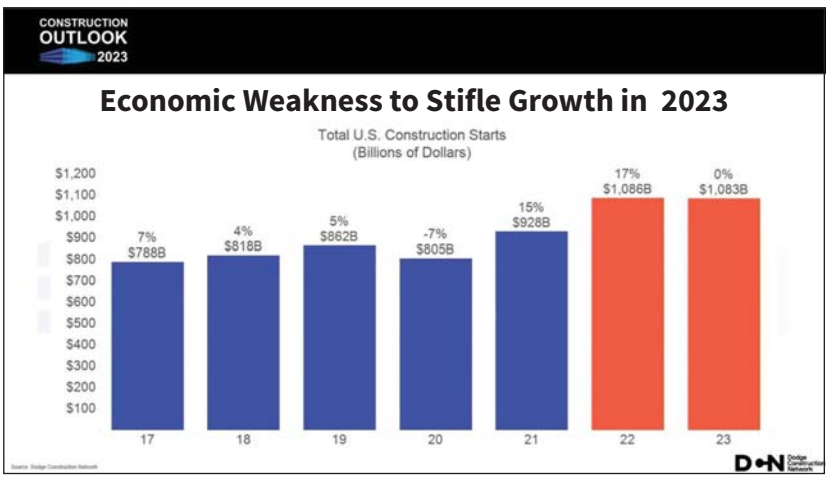
"As the clouds of uncertainty mount on the fate of the economy in 2023, the construction sector has already started to feel the impact of rising interest rates," said Branch. "(And this) has raised concerns that a recession is imminent in the new year. Regardless of the label, the economy is slated to significantly slow, unemployment will edge higher, and for parts of the construction sector, it will feel like a recession."

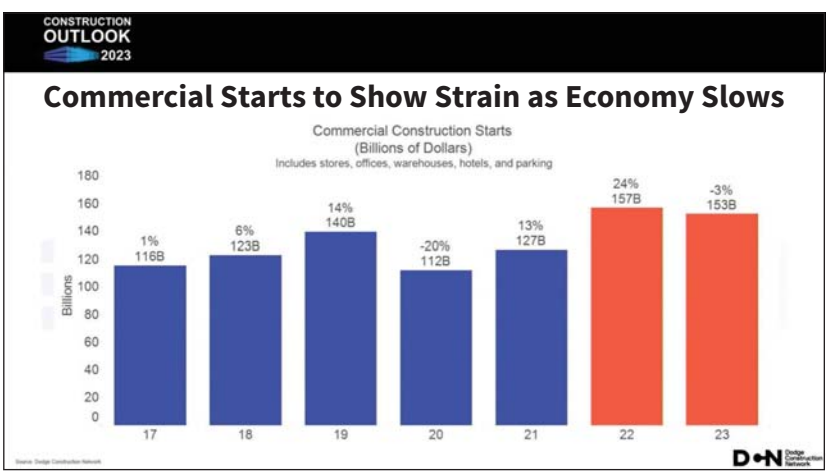
But Branch was also quick to add that whatever slowdown comes next year will be very different from the one that hit so hard in 2008-2009.

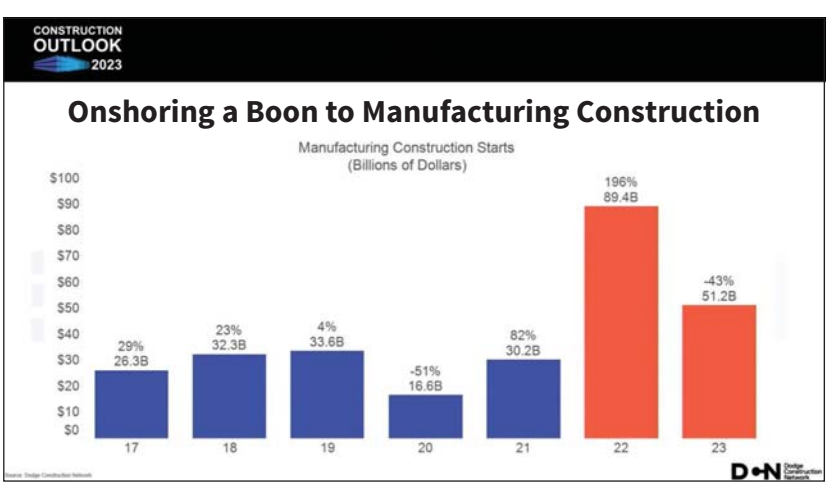
"Next year, however, will *not* be a repeat of what the construction sector endured during the Great Recession when the financial system collapsed," he explained. "Residential construction, already reeling from rising mortgage rates, will continue to contract and will be joined by nonresidential construction as the commercial sector retrenches. (But) the funds provided to the construction industry through the Infrastructure Investment and Jobs Act (IIJA), the CHIPS and Science Act, and the Inflation Reduction Act (IRA) will counter the downturn, allowing the construction sector to tread water."

Branch added, "During the Great Recession, there was no place to find solace in construction activity. (Next year) will be quite different."

Looking at specific markets, the 2023 Forecast also made these notes:







- The dollar value of **single-family starts** will be flat (-5% when adjusted for inflation), however, units will be down a further 6% to 891,000 units (Dodge basis) as higher mortgage rates and worsening affordability eat away at demand;
- The **multifamily housing sector** has so far been reaping the benefits

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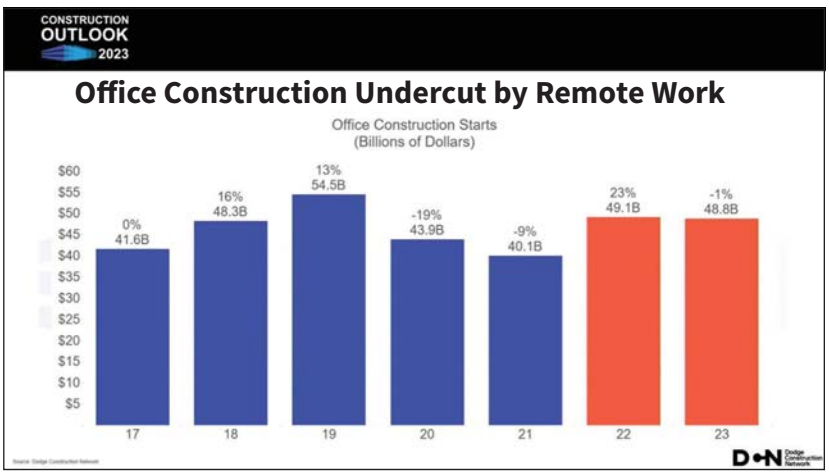
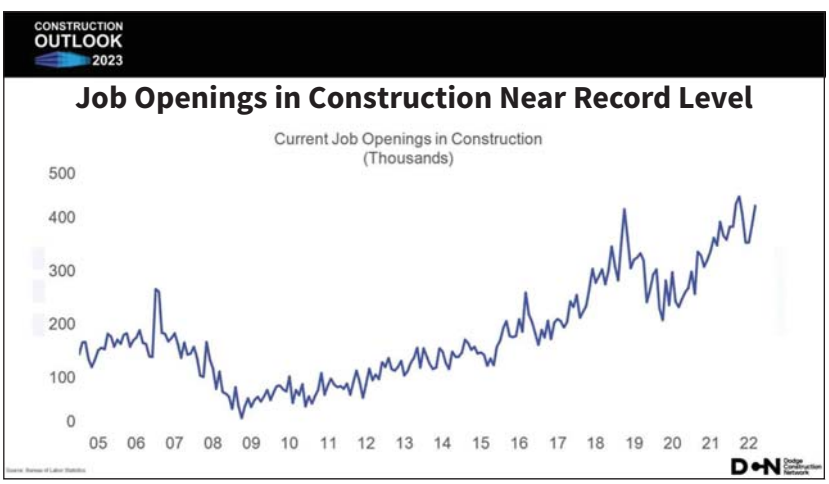
of the affordability issues plaguing the single-family market, pushing demand for space up and vacancy rates down to record lows. The softening labor market and investment outlook will eat away at these gains in 2023. While the dollar value of multifamily starts will rise a scant 1% (-7% when adjusted for inflation), units will fall 9% to 723,000;

- **Commercial starts** will fall 3% in 2023 (-13% when adjusted for inflation) led by pullbacks in warehouse and office sectors. Hotel and retail starts will post tepid growth in nominal dollars, but when adjusted for inflation, will also slip. But the declines will not be as dramatic as in the office and warehouse markets. There is some positivity in the commercial space in 2023, though, as **data center** construction is expected to remain brisk;
- **Institutional starts**, meanwhile, will hold steady in 2023 (-1% inflation-adjusted) as gains in healthcare should offset losses elsewhere. Traditional education starts (classrooms) have languished as slow demographic growth eats away at overall demand. However, life science buildings have flourished and will continue to do so in the new year. Healthcare starts will be the engine of growth in the institutional sector as greater demand for both outpatient clinics and hospitals is on the rise, post-pandemic;
- **Manufacturing starts** have been robust since the pandemic, as industry re-shoring has led to numerous chip fabrication plants, EV battery plants, and other large facilities breaking ground. **Manufacturing starts are expected to nearly triple in 2022**, and while they will decline in 2023 the level of 2023 starts at $51 billion has not been seen since the beginning of Dodge's historical starts time series in 1967. The CHIPS and IRA acts will support abnormally high levels of activity for years to come;
- **Nonbuilding/infrastructure** grouping of projects will be supported by an infusion of public dollars through IIJA. Public works starts will gain 18% in 2023 (+12% adjusted for inflation) led by gains in streets and bridge work, while the utility/gas category will gain 8% (+2% inflation-adjusted). Also, the extension of the investment and production tax credits in IRA will lead to gains in utility-scale wind and solar projects across the U.S.





The day after the forecast conference, on Nov. 16, Dodge separately released its latest monthly construction starts data for October 2022. That measure rose 8% during the month, to a seasonally adjusted annual rate of $1.12 trillion. Overall, nonresidential building starts gained 9% in October, and nonbuilding starts rose 26%. Meanwhile, however, as residential starts slipped 3%.

Year-to-date, total construction was 16% higher in the first ten months of 2022 compared to the same period of 2021. Nonresidential building starts rose 37% over the year, residential starts remained flat, and nonbuilding starts were up 17%.

"October's gain in construction starts is a further sign that the construction sector continues to weather the storm of higher interest rates," said Branch. "While the residential sector is feeling the pain, the nonresidential building and infrastructure sectors are hitting their stride."

Of course, it remains to be seen how long those strides will last into 2023. But for now, Branch is relatively bullish about what's ahead — provided the industry can successfully navigate its ongoing high-wire act. HPAC

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The M2000 meter is now available with BACnet/IP, Modbus TCP/IP and EtherNet/IP communication protocols. It has completed rigorous testing for the BACnet Testing Laboratories (BTL) Certification Program, assuring seamless integration with building management systems (BMS). This meter is the first full-bore inline electromagnetic meter to achieve BTL Certification.

With these communication protocols, the M2000 meter seamlessly integrates into existing operations to provide enhanced data points, including bi-directional flow rate, totalizers in multiple directions, empty pipe statuses, leak alarms, no flow statuses and more.

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The M2000 meter has no moving parts or strainer requirements and is suitable for potable water, well water, reclaimed water, wastewater and water-based solutions. Additional benefits include:

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When selecting a metering technology, there are many considerations to make, including flow rates, line sizes, meter location, materials of construction, connectivity and certifications.

When there is a need for the highest measurement accuracy and versatility, the M2000 meter is an ideal choice. It offers high-performance features—including the option for BACnet MS/TP, BACnet/IP, Modbus TCP/IP and EtherNet/IP communication protocols and zero straight run performance—at a very competitive price. Learn more about the M2000 meter at **badgermeter.com/precision**.

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ASHRAE, Building Industry Groups Pledge to Lead on Global Decarbonization

At COP27 this November, 25 of the world's building organizations issued a joint statement, pledging to push decarbonization efforts in the built environment.

ASHRAE, along with 24 of the world's leading building industry organizations issued a statement to government representatives attending the United Nations Climate Change Conference of the Parties (COP 27) pledging to assume a leadership role in decarbonization efforts in the built environment.

The organizations are signatories of the *Building Industry Steps Up to Address Climate Change* – a statement to government representatives that are parties of the United Nations Framework Convention on Climate Changes (UNFCCC), expressing a collective commitment to meeting 1.5°C Paris Agreement targets.

In a video presentation, 2022-23 ASHRAE President **Farooq Mehboob**, Fellow Life Member ASHRAE, presented a roadmap for addressing climate change, reading directly from the joint statement.

"The buildings that we live and work in are responsible for approximately 40% of total global direct and indirect greenhouse gas emissions," said Mehboob. "The built environment is therefore one of the leading drivers of climate change. Simultaneously, making changes to how and what we build is one of our most effective tools for mitigating and adapting to climate change and places a great responsibility on the built environment industry. This is a responsibility we earnestly accept."

Signatories voiced their support.

Peter Templeton, new President & CEO of the U.S. Green Building Council, said, "Collaboration across the buildings industry is critical to enable and accelerate progress on climate goals. This shared statement communicates to engineers around the globe that their work matters; and our collective commitment to leadership in decarbonizing the built environment engages them in the global effort to address the devasting impacts of climate change. USGBC is pleased to work with ASHRAE and other partner organizations to support the many engineers and building professionals on the front lines, making the case to their clients to push their designs to go further to decarbonize."

Government leaders, industry stakeholders and environmental activists from around the world all convened for climate negotiations at COP27, Nov. 6-18 in Sharm el-Sheikh, Egypt. ASHRAE leadership also participated in a COP27 Official Side Event on Nov. 16, entitled *"Planning, Design and Development in the Global South: The 'How To' for People + Planet."* The event organizers were Architecture 2030, ASHRAE and the International Network of Women Engineers and Scientists (INWES).

To view President Mehboob's video presentation of the statement, to read the statement in its entirety, and to see a complete list of signatories, visit ashrae.org. *(Also, see p. 16.)*

About OzonAction of the UN Environment Programme

The UN Environment Programme (UNEP) is the leading global authority that sets the international agenda, promotes the coherent implementation of the environmental dimension of sustainable development within the UN system, and serves as an authoritative advocate for the environment. As an Implementing Agency of the Multilateral Fund for the Implementation of the Montreal Protocol, UNEP through OzonAction assists 147 developing countries to meet and sustain their compliance obligations under that treaty. Visit UNEP OzonAction page https://www.unenvironment.org/ozonaction.

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BUILDING INDUSTRY JOINT STATEMENT

It is anticipated that our planet will reach 1.5° C of global warming by 2040, which will amplify climate hazards and present numerous risks to all ecosystems, including to humans and our built environment. These hazards include increased frequency and severity of disasters around the globe. In the mid-term and long term, the likelihood and severity of these hazards and risks increases dramatically. Mitigating both short- and long-term negative outcomes, and adapting to our changing planet, depends primarily on actions we must take in the short term.

The urgency of the situation cannot be overstated.

The buildings that we live and work in are responsible for approximately 40% of total global direct and indirect greenhouse gas emissions. The built environment is therefore one of the leading drivers of climate change. Simultaneously, making changes to how and what we build is one of our most effective tools for mitigating and adapting to climate change and places a great responsibility on (our) industry.**This is a responsibility we earnestly accept**.

MITIGATION

Mitigating climate change requires the reduction of greenhouse gas emissions. This entails reducing and ultimately eliminating emissions from existing buildings, new construction and the larger built environment; a concept known as **building decarbonization**.

There are many technical tools and related strategies to decarbonize our built environment. At their core, they all involve increasing energy efficiency, use of renewable energy, and applying a circular economy that uses materials that are reusable, recyclable, and repairable. Energy use varies significantly between Global North and South regions, requiring different strategies and tools for different regions.

These technical tools and strategies should be intensely analyzed to determine which have the highest ROI and simultaneously minimize holistic environmental impacts, and then pursued relentlessly to mitigate the increasing scope and scale of climate disasters.

ADAPTATION

Fundamentally, adaptation to climate change means ensuring that existing buildings and new construction can weather disasters of increasing severity and frequency with minimal damage, loss of functionality, and recovery time. This leads to lower lifetime carbon and monetary costs for our built environment, and safer, healthier occupants.

Through these two strategies, achieving net zero whole life carbon to mitigate the effects of climate change, and ensuring structures are resilient enough to survive and thrive despite the effects of climate change, we can ensure the ongoing health and safety of all those in the built environment while also protecting and preserving our global environment.

(Signatories) are writing to demonstrate our willingness to assume a leadership role in decarbonizing the built environment and to publicly support the efforts of the government representatives that are Parties of the UNFCCC and planning to meet at (COP27) in Sharm El-Sheikh. HPAC

Honoring the Profession, with ASPE's Jim Zebrowski

The new president of the American Society of Plumbing Engineers spoke with us about the goals for his two-year term, as well as the role of character on the job.

Our guest this month is **Jim Zebrowski**, PE, CPD, FASPE, new president of the American Society of Plumbing Engineers (ASPE), and a plumbing /fire protection engineer with DLR Group in Atlanta.

Zebrowski has been an active member of ASPE for 36 years now and was elected to the society's top spot for a two-year term this September in Indianapolis. He spoke with us about the goals of his presidency and his views on the indispensable role of character in all that we do.

Below is an edited transcript of this podcast. Listen in at hpac.com.

HPAC: Jim, thanks so much for joining us here, not long after being elected president at the ASPE Convention and Expo in Indianapolis in September. Before we get into any plans for your presidency, though, please give us a brief history of your experience in this industry and how you came to your current position at DLR.

Jim Zebrowski: Well, thanks for the invitation, Rob. Glad to be here. Back when I was in school in Columbus, Ohio, at THE Ohio State University, I happened to walk into the Engineering office, at my wife's urging, and told them that I could do drafting. I was so excited when I walked out of there and they had offered me the job, and I was going to get $3 an hour to draft!

I just thought that was the greatest thing in the world.

So that's how it all started and I did drafting for electrical, HVAC and plumbing. And then about three months after that, our plumbing designer left. So they came to me and said, "Do you want to be our plumbing designer?" I said, "Sure!"

Now, back in those days (40+ years ago), we didn't have the internet. So you had to go to the bookshelf and grab the code books and read through those. That's how I started learning the profession. We did a lot of engineering for schools back then. And I think we literally did the design for every middle school and high school in the State of West Virginia. And we did everything, start to finish, on those.

I was still going to night school at Ohio State at the time, but since these schools were fairly remote, we had to do independent systems and all the site work, including sewer treatment plants, water supply systems, etc. So it was a pretty good learning experience, and I worked there for about four years before I was offered another job with a slightly larger mechanical engineering firm.

There, I did both HVAC and plumbing design and got more experience before an A/E company in Albany NY called and offered me a job. So, I moved there and that's when I first started attending ASPE meetings.

HPAC: Please tell us about that. How did you end up on the leadership path at ASPE?

JZ: Well, that was about 36 years ago now. When I first started attending, we had to go to meetings in Central NY because there was no chapter in

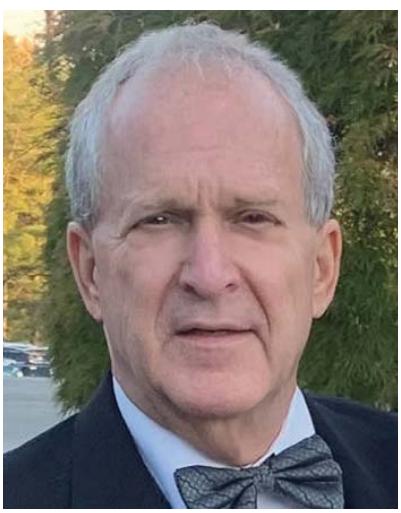
the Albany area. So, I got involved there and we decided to form a satellite chapter for the Capital Region in NY. And when we did that, I became a board member for the chapter. So that's when the leadership roles started. Probably around 1986-87.

HPAC: So you have certainly seen the industry grow and evolve since then. Today, of course, is truly an extraordinary moment for the U.S. and the world, emerging from a global pandemic while also committing to improve water and air infrastructure to enhance public health. How do you see ASPE contributing to this broader effort over the next two years of your presidency?

JZ: Well, we have all faced that crisis and seen how it's affected health. Coupled with that, we've got a lot of failed infrastructure in various places. We've seen issues with well water, failed backflow systems, failed piping. So we need to be the ones who offer those solutions. So, yes, it's been a tough two years. But at ASPE, we had a number of initiatives in place already. We have a number of subcomittees now, including a Legionella working group. And we've been working with several other groups and associations on these matters.

HPAC: With that Legionella working group, I often feel like that issue has fallen off the radar a bit. Could you please update us a bit on that? Would you say that such work is as important and as relevant as ever?

JZ: I would say it is. Clean water is just essential. You can't deliver water and not have the quality at least at a minimum standard. And Legionella is a problem everywhere. So our working group has been very active and they have a lot of accomplishments that they have made already. They have put together a design handbook for ASPE members that is in a draft state right now, so it is being reviewed. But we hope to have it published shortly, likely next year. It's really guidelines that go beyond codes, and will help alleviate Legionella and other bacteria issues that affect water quality.



> "It's important to get young people thinking that the plumbing industry is vital to the health of, well, the world."
>
> —Jim Zebrowski

HPAC: Will new federal infrastructure funding help to propel some of these efforts?

JZ: ASPE is not directly involved with that. But all of these failing systems need a complete overhaul. So we will be monitoring this because that's where all of that spending is going to start.

HPAC: Looking ahead, what is ASPE doing to help member firms to recruit next generation engineers? Has focus on that next-gen issue increased over the last two years?

JZ: Yes, it has increased, and that's one of the things I want to focus on probably the most in my term. We've got a lot of things in place. We just need to make sure that our information gets out. For instance, for our chapters, we have an ASPE Resource Center on our homepage. It's got things on there like templates for recuitment letters that chapters can send to prospective members.

There are separate letters that we can send to employers in different cities to make them aware of ASPE and to make sure their designers are in touch with our members. They will want to make sure that their designers are on the cutting edge of what's new. So we will help them to learn what they need to know and what they need to get done.

We also have outreach programs at colleges and even in grades eight through 12. It's important to get young people thinking that the plumbing industry is vital to the health of, well, the world. We've had several people at the chapter level, and the society level, going to those schools to get the word out, too.

HPAC: How would you say today's engineering graduates are different from you and your classmates when you entered the field way back when?

JZ: Certainly, the internet is a real advantage now. It's a great resource. Granted, you still have to be careful sorting through all that stuff to see what's valid and what's not. But I think back to early in my career when I had to design a water storage tank or a fire protection system for an entire school. I'd have to take those big black binders of NFPA code books off the shelf and sit and go through them. But now you can just do 'keyword' searches online and find your answers a lot quicker. So that's a big advantage for designers these days.

What I would like to see more of is — and I hate to distinguish people by age groups — but many younger designers

now tend to value their time such that they just leave work at the end of the day. And I agree that it is important to separate your work life and your home life. But it's also important that if they want to advance and contribute more, they may want to attend an ASPE or ASHRAE meeting to learn more.

I've come to realize over the years that education is really what's going to help you to move on. It helps you in your job and helps you in your career. So you should really take advantage of the opportunities out there. The more you know, the more valuable you are. Sure, you can get CEU's online. But you should also get out to meetings, too. Network with people. That's really important, and I think many are missing out on that.

HPAC: At this stage of the pandemic, mask restrictions have been dropped and so many have been vaccinated and boosted. It seems like there is a hunger among many in the industry to get back out there. Indeed, there seemed to be a real energy at the ASPE Convention in Indianapolis in September. Do you think that enthusiasm will continue to grow?

JZ: I do. I think our recent convention and even our symposium last year in San Diego have shown that our people are feeling like they are done with the pandemic time and are ready to get back out and see things.

We do our convention and expo every two years, and in the intermediate year, we do our technical symposium. We've got our next one of those coming up in Bellevue, WA, September 28 to October 1, 2023. That's more focused on the educational seminars, but does include a smaller products show for the local vendors there.

As you noted earlier, "next generation" is definitely an issue, and that's something that all engineering groups and societies like ASPE and ASHRAE need to address. We've got to get young designers up to speed and interested, and into leadership positions. After all, they are the future leaders of our group.

> **"I really think character is all you have to go by. That is what you will be remembered for, your character."**
>
> —Jim Zebrowski

HPAC: Lastly, I read in an earlier interview that you had done with ASPE Pipeline a few years ago that you counted being a student of military history among your hobbies and you noted separately that the great World War II film 'Casablanca' was your favorite movie. Coincidentally, it is also one of my favorites. So it occurred to me that issues of character, courage, and even sacrifice are common to both those areas of interest? How would you say those traits have influenced your career and how might they help to guide young engineers joining the profession today?

JZ: That's a very interesting question. Yes, 'Casablanca' is my favorite movie, and if it's one of yours, then you understand, too. That does represent self-sacrifice, and at least as important, character, too. In my opinion, I really think character is all you have to go by. That is what you will be remembered for, your character. And that's something you've got to live up to every day.

As an example, about three years ago, even before the pandemic, I started this online fitness program, and I've been able to stick to it. They do a good job with the trainers they get to motivate you, and one of the things they say has really stuck with me. When you're near the end of your daily workout and you really want to just quit, they say, "You can't quit now. You have to honor this workout. Honor your body."

I think that parallels how I feel about work. Each day you go into work, no matter how long you have been there, I think you need to honor your job. Honor your profession.

Focus, follow through, and deliver... That's the way I live, and that really has helped me in my approach.

HPAC: Well, that seems like a great place to end here. Thanks so much for your time, Jim. Maybe we can check back in with you next fall for a halftime report on your two-year term.

JZ: A "focus and deliver" pulse check. I'd like that. Thanks so much for having me here today.

To read more at Zebrowski's ASPE President's blog, go to www.ASPE.org.To listen to previous 'HPAC On The Air' podcasts, please visit our Members Only page. To suggest new guests or topics, please contact Rob McManamy at rmcmanamy@endeavorb2b.com. HPAC

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Now a Necessity: How the Pandemic Elevated Our Focus on IAQ

An expert on indoor air quality assesses where the industry is now on mitigating health risks for students and staff in K-12 schools.

By JAKE FELDMAN, VP & General Manager, Modine Manufacturing

Four years ago, the term "indoor air quality" (IAQ) was rarely mentioned. When it was, it was typically to discuss allergens or volatile organic compounds (VOCs). There weren't many headlines that pushed educational facilities to maintain their HVAC systems, and IAQ topics were not the main conversation on national news programs.

Fast-forward to the present, however, and IAQ is now a major news generator.

When the COVID-19 pandemic struck in the early portions of 2020, concerns were high. Many didn't know what the virus was or how to combat it within school facilities or other commercial buildings. As stay-at-home orders became the norm across the U.S., the pandemic brought much-needed attention to the importance of IAQ and mechanical HVAC units. With buildings not prepped for the outbreak, many restaurants, movie theaters, and K-12

Based in Denver, the author is vice president and general manager for Indoor Air Quality at Modine Manufacturing Co. Modine specializes in thermal management systems and components, bringing highly engineered heating and cooling components, original equipment products, and systems to diversified global markets through its four complimentary segments: CIS; BHVAC; HDE; and Automotive. For more information, visit www.modinehvac.com.

schools temporarily closed or shut down completely.

Today, with the pandemic still top-of-mind for the foreseeable future, the importance of good IAQ remains front and center for K-12 facilities that want to ensure an in-person, collaborative, and safe environment for both students and staff.

Ventilation and Filtration Needs

In early 2020, when schools began addressing the necessary tools to create a safe learning environment in K-12 facilities, there were two main areas that saw increased focus: ventilation and filtration. For in-person learning to remain an option, schools relied on mechanical HVAC to supply fresh, clean air while improving filtration within classrooms.

IAQ is enhanced through ventilation by bringing fresh outside air into interior spaces. In the process, contaminated air is pushed outside the facility to ensure students and faculty have fresh air to breathe. Thanks to the modern capabilities of HVAC units, facility managers can control how much fresh air is brought into the space to ensure classrooms aren't overventilated, which could lead to efficiency and humidity control problems.

Also, filtration solutions within HVAC units are typically utilized to minimize the number of particulates in the air. Amid the pandemic, the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Epidemic Task Force recommended that facility managers upgrade to MERV 13 filters if the unit was compatible. Limiting these particulates helped to create cleaner air for students and helped schools inch closer to being better equipped for the ongoing pandemic.

Common Allergies and Viruses

While the pandemic brought to light the need for better IAQ from a COVID point of view, enhanced IAQ also helps to improve everyday air quality issues. Even as daily conversations surrounding COVID have now lessened, seasonal allergens and viruses, such as the flu, are still very prominent. These issues can be problematic, too, when it comes to students staying in school. This fall in Kentucky, for instance, 14 separate school districts announced that they would be closing or switching back to non-traditional classroom instruction in November due to a high number of influenza cases, according to the Kentucky School Boards Association (KSBA).

With all this mind, filtration and ventilation solutions offer greater potential for HVAC units to successfully minimize the amount of flu and allergen particulates in the air. For improved filtration, K-12 facilities can also incorporate UV lights. According to ASHRAE, "Ultraviolet germicidal energy (UV-C) has been shown to inactivate viruses, bacteria, and fungi." Combined with filtration solutions within HVAC units, UV-C can play a role in helping to prevent flu viruses from being introduced into a school environment.

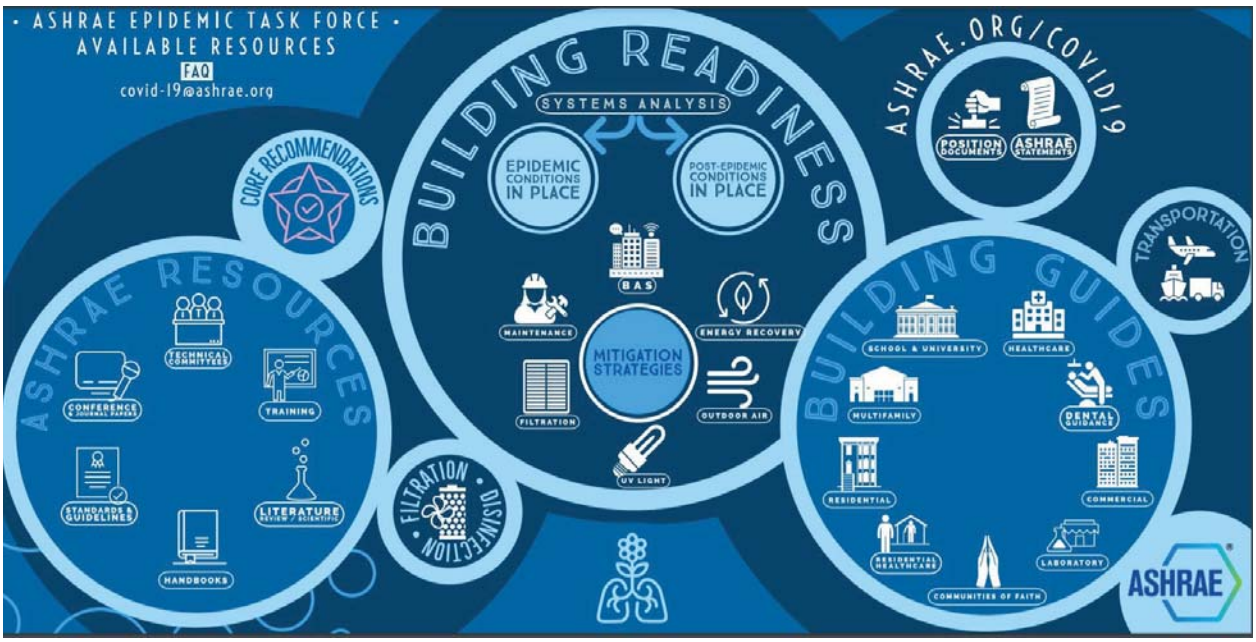
Staying In School

Keeping schools open throughout the year should be a main priority for those who want to see students learn and succeed. Nothing can compare to the one-on-one interaction that a student has with their teachers in a collaborative atmosphere.

To ensure students remain in the classroom, it is essential for K-12 school leaders to place a primary focus on creating a safe environment with enhanced IAQ. In addition to reducing the number of allergens, VOCs and viruses, keeping the COVID-19 virus at bay continues to be a primary focus.

Mechanical HVAC units possess the capability to create clean, fresh air through ventilation and filtration solutions. By either upgrading your existing unit or replacing it with a newer model, school leaders can develop an effective plan that focuses on enhanced IAQ. And with cleaner air in the classrooms, HVAC solutions can permit schools to keep classes in session and to avoid cancellations for *any* type of airborne illness. HPAC


ASHRAE, USGBC



ASHRAE Takes New Positions on Infectious Aerosols

On October 13, ASHRAE published a new 27-page Position Document (PD) on Infectious Aerosols. It is informed by the work of the pandemic-driven Epidemic Task Force (ETF), which formally disbanded in June, as well as the Environmental Health Committee (EHC), which remains in operation. problems. Former ASHRAE President **William Bahnfleth**, PE, PhD, served as ETF chair and is now vice chair of EHC. He pointed us to this new PD as our guest on the November episode of our monthly podcast, *HPAC On The Air*.

From the Introduction

The magnitude of risk from aerosolized pathogens has become increasingly obvious, especially during the COVID crisis. These risks are particularly elevated in enclosed buildings. Public-health officials, policymakers, building owners, designers, and members of the public all need accurate, reliable guidance for appropriate ways to mitigate the risk from these pathogens. Available risk mitigation strategies include pharmaceutical interventions, non-engineering controls, and engineering controls. Given the concurrent climate crisis, the optimal mitigation bundle of interventions must achieve the highest possible risk reduction with the lowest possible resultant emissions.

ASHRAE Takes the Positions that:

- Exposure to infectious aerosols is an important factor in the transmission of infections in indoor environments between a source and a susceptible individual;
- Engineering controls demonstrated to reduce the risk of exposure to infectious aerosols include dilution with outdoor air provided by mechanical or natural ventilation, filtration of indoor air, indoor airflow patterns, and disinfection by germicidal ultraviolet light and other technologies proven to be effective and safe;
- Strategies using engineering controls for managing the risk from infectious aerosols should focus on reducing exposure to infectious aerosols in the breathing zone;
- Effective design, installation, maintenance, and operation of ventilation is critical to needed risk mitigation;
- Existing evidence for the effects of temperature and humidity on infection risk does not justify changes to ventilation and IAQ standards, regulations, and guidelines;
- The effectiveness of any one risk mitigation strategy depends on many factors. Using multiple strategies will usually be more effective than reliance on any single strategy;
- Risk mitigation measures should be adaptable to levels of risk in a particular space;
- Combinations of engineering controls and non-engineering controls can be optimized for effectiveness, cost, and energy use.

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ASHRAE Recommends that:

A multidisciplinary research & development (R&D) working group be established, aiming to improve coordination between engineers, scientists, and health professionals and prioritize and accelerate the research agenda, development process, and dissemination. As a minimum, this research should include the following topics:

- Controlled intervention studies to quantify the impact on infection transmission resulting from various engineering controls considered singly and in combination with other nonengineering controls with respect to infectious aerosols of varying characteristics;
- Real-time detection methodologies for the purpose of improved variable control of HVAC controls responsive to different levels of risk;
- Methods to reduce the life-cycle cost and carbon emissions of engineering controls in all conditions;
- Studies to characterize the size-resolved emission rate of infectious aerosols for different pathogens, respiratory activities and metabolic intensities, determine the relationship between size and risk of transmission, and predict the fate and transport of aerosols in indoor environments;
- Quantitative infection risk evaluation tools for infectious aerosols (as those widely used for water and food);
- Impact of indoor airflow patterns on the transmission of infectious aerosols and the resulting risk of infection.

ASHRAE Commits to:

- Support model codes and standards that address exposure to infectious aerosols, balancing quality of evidence, risk mitigation, cost of installation and operation, and energy use and carbon emissions;
- Support model codes and standards using variable amounts of outdoor/clean air delivery in response to the measurement of air quality to optimize IAQ efficiently;
- Promote research to enhance HVAC tech and knowledge to mitigate infection risk from airborne transmission.

From Appendix B

The position document attempts to bridge the world of evidence-based medicine (EBM) and the imperative to use available evidence to make needed recommendations in the practical world... Historically, the world of the application of ventilation systems has not had the kinds of investments in the research necessary to reach the levels demanded by the rigors of EBM. However, decisions must be made based on the best available evidence. Bringing these worlds together brings a level of transparency and rigor to the practical need for guidance... with a call further research (and) better data.

The chart below offers just some of the guidance contained in the PD. For the rest, download it at: *https://www.ashrae.org/File%20Library/About/Position%20Documents/PD_-Infectious-Aerosols-2022.pdf.* HPAC

ASHRAE Positions on INFECTIOUS AEROSOLS
Approved by the ASHRAE Board of Directors • October 13, 2022

Strategy	Quality of Evidence (from EBM perspective)	Indirect Evidence	Magnitude of Benefit	Life-Cycle Cost	Energy and Carbon	Strength of Recommendation
Physical distancing	Moderate	High*	Moderate	Low	Low	Strong recommendation
Barriers between occupants	Low	Low*	Low	Moderate	Low	Conditional recommendation
Surface and object cleaning	Low	Moderate*	Low	Low	Low	Conditional recommendation
Face mask	Moderate	High*	High	Low	Low	Strong recommendation
Right-sized ventilation — natural	Low	High**	Moderate	Low	Low	Strong recommendation
Right-sized ventilation — mechanical	Low	High**	High	High	High	Strong recommendation
Filtration (requires mechanical ventilation)	Moderate	High**	Moderate	Moderate	High	Recommendation
Air cleaning (UVGI)	Moderate	High**	Moderate	High	Moderate	Conditional recommendation
Air cleaning (other)	None	Low**	Low	High	Moderate	Weak recommendation
Indoor airflow patterns	Moderate	High**	High	Moderate	Low	Recommendation
Humidity control (requires mechanical ventilation)	None	Low**	Low	High	High	Weak recommendation

* Capron et al. 2022 ** de Mesquite et al. (2022)

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REFRIGERANT TRANSITION: WHAT STAKEHOLDERS NEED TO KNOW

Adapted from our fall webinar, the authors explain how the AIM Act is upending the commercial refrigeration market and what end users should already be doing to adapt.

By GLENN BARRETT
DC Engineering,
with LEIJA WALN
Refrigerant Management Solutions

Engineers dealing with commercial refrigeration or HVAC design will all tell you that, like it or not, the U.S. has started down the path towards reducing the global warming impact caused by refrigerants.

This is due in large part to the new American Innovation and Manufacturing Act (AIM Act), passed by Congress in December of 2020 with bipartisan support, which essentially required the EPA on January 1, 2022, to initiate a high-GWP refrigerant phasedown schedule.

The purpose of the phasedown schedule is to reduce the availability of high Global Warming Potential (GWP) refrigerants and is designed to accelerate the reductions of carbon dioxide equivalent (CO2e) emissions at a national level.

Although states like California have already begun to aggressively reduce their refrigerant based global warming impact, the AIM Act will accelerate the refrigerant transition from the federal level.

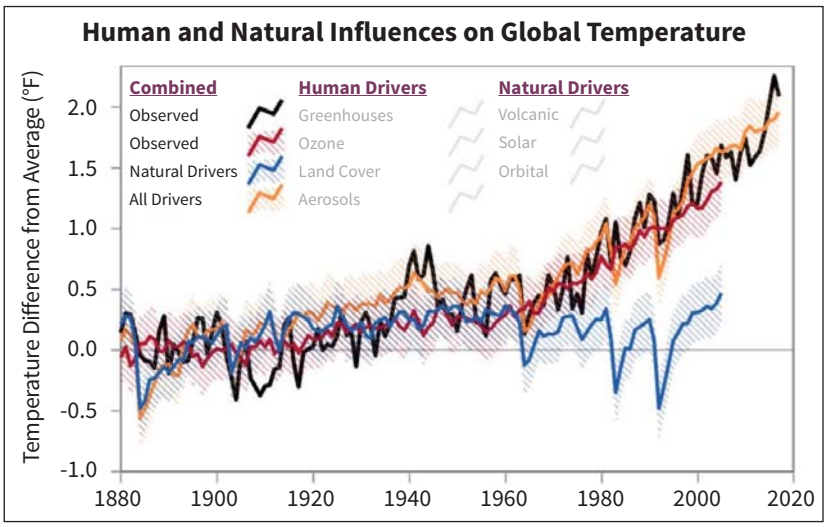
Adapted from our October webinar for *HPAC Engineering,* this article will help the reader to understand what the AIM Act is and how it will affect commercial refrigeration and HVAC designs, along with what end users of refrigerants should be doing now to avoid increases in first costs and operational expenses.

Why now? Why focus on refrigerants?

In order to predict how something will affect the bigger picture outlook for your operation, one must first

Glenn Barrett serves multiple roles as Technical Engineering Lead/Director of Refrigerant Management Solutions and as a Sr. Associate Partner at DC Engineering. He is a veteran in commercial refrigeration design, construction, commissioning, and compliance related issues and is involved in energy modeling, measurement and verification, and is a consultant and speaker on natural refrigerant system design, deployment and best practices. Contact him at gbarrett@dcengineering.net.

Leia Waln is the Refrigerant Compliance Program Manager at Refrigerant Management Solutions, a subsidiary of DC Engineering. Leia has over 10 years of experience working with retail end-users to manage their refrigerant usage and refrigerant compliance tracking and reporting. Leia is considered a Retail Industry Refrigerant Compliance and Reporting subject matter expert, is a leading consultant to the North American Sustainable Refrigeration Council (NASRC), and provides consulting to some of the largest supermarket chains operating in the U.S.



understand why circumstances are changing. Fundamentally, the EPA has determined that higher GWP synthetic refrigerants, like those commonly used in HVAC and commercial refrigeration applications today, are – pound for pound – one of the most significant causes of global warming on the planet.

To put it in perspective, avoiding releases of high-GWP hydrofluorocarbons (HFCs) by using low-GWP refrigerants may avoid as much as 0.5°C warming by the end of the century.

GWP impacts on global warming are typically calculated over a 100-year time period. Additionally, HFC refrigerants are considered to be short-lived climate pollutants (SLCP) that are powerful climate forcers with relatively short atmospheric lifetimes. Therefore, reducing the emissions of these short-lived refrigerants will have an

immediate impact on reducing the potential for climate change worldwide.

The AIM Act – 3 Parts to Implementation and Refrigerant Phasedown

The AIM Act, or American Innovation and Manufacturing Act, was enacted by Congress in December 2020. The AIM Act provides authority in the form of a Federal Law to be enforced and provided for through the Environmental Protection Agency (EPA) to address HFC emissions. The AIM Act has three main parts to the rule:

1. Phasing down production and consumption – "Final Rule";

HFC Phase-Down

- 85% reduction HFCs production & consumption by 2036
- First phase-down rulemaking finalized (Sep 2021)

2. Facilitating the transition to next-generation technologies through sector-based restrictions;

Transition to Next-Gen Tech.

- Restrictions on specific HFC uses and approval of substitutes for regulated HFCs (SNAP)
- Rulemaking in progress (Oct 2023)

3. Maximizing reclamation and minimizing releases of HFCs from equipment.

HFC Refrigerant Management

- Establish regulatory requirement for the management of refrigerants
  - Refrigerant reclamation
  - Equipment servicing, repair, disposal, or installation

AIM 1: Phasedown of HFC Use According to GWP

The phasedown of higher GWP HFC refrigerants is the major focus of the first part of the AIM Act. The phasedown is designed to purposely increase the cost for higher GWP refrigerants by lowering their availability in the U.S. market.

To lower the availability, the EPA set a phase down schedule for all refrigerant based emissions and individual "allocations of GWP or CO2 equivalent emissions" that refrigerant manufacturers must stay under. In other words, refrigerant OEMs will be limited in how much virgin refrigerant they can provide into the marketplace based on the GWP equivalent of their portfolio of refrigerants that they sell.

GWP: Global Warming Potential, analagous to AIM Act "Exchange Value"

Allowance (unit of measure): 1 metric ton CO2 of exchane value equivalent (relates to Global Warming Potential)

Starting January 1, 2022, allowances are needed to produce or import bulk HFCs.

HFCs with higher GWPs require more allowances to produce/import than lower GWP HFCs.

Entities need to expend allowances in order to produce or import bulk HFCs.

Allowances are valid for a calendar year; cannot be banked or rolled over to the next year.

HFC phasedown is designed to leverage the "natural order of supply and demand" economics, which in a classic sense, if the demand stays the same, limiting the supply of a commodity will naturally cause the price to increase. Refrigerant OEMs will be limited in how much refrigerant they can supply into the market by their individual CO2e allocations, based on historical production or import. This will, in fact, reduce the amount of refrigerant that OEMs can provide into the U.S. market, according to the refrigerant GWP value.

Lowering the availability of higher GWP refrigerants based on "allocations" simply increases pricing pressures.

Supply will be constrained vs. the demand, and therefore, the prices must increase, unless demand for those higher GWP refrigerants reduces accordingly with the amounts allocated to each OEM, according to the phasedown schedule, or the difference in supply is made up from reclaimed refrigerant.

The bottom line is this: higher GWP refrigerants will be more expensive and may have limited availability in certain locations.

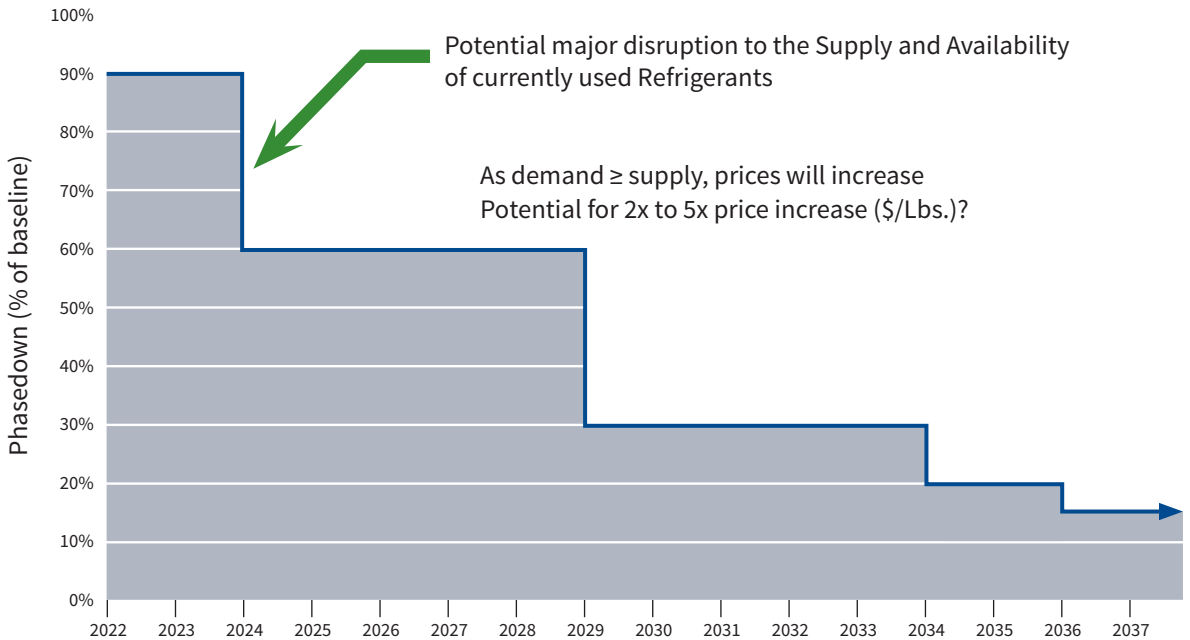
HFC production and consumption allowances decreased by 10% in 2022 and by 2036 allowances will be decreased by 85% from historical baselines. It is worth noting that the phasedown allowances are issued by the EPA on October 1st each year, for the following year for planning purposes.

AIM 2 & 3: Facilitating Transition to Next-Gen Tech via Sector-Based Restrictions, Maximizing Reclamation, Minimizing HFC Release

As mentioned earlier, the initial phasedown schedule is the first salvo from the AIM Act. There are two additional portions of the rulemaking that are still in progress; "Facilitating the transition to next-generation technologies through sector-based restrictions" and "Maximizing reclamation and minimizing releases of HFCs".

Congress set aggressive timelines in the language of the law to implement the refrigerant phased down and allocations. The final two phases have yet to be fully defined, but we can expect them to contain more restrictions on use of refrigerants in different applications and "sectors", and establish more requirements on reclamation, and equipment servicing, repair, disposal, and installation.

The following illustrates the HFC production and consumption phasedown schedule as outlined in the AIM Act.



The law gives EPA authority to regulate HFC refrigerants through sector-based rulemaking and several "technology transitions" have been submitted for review related to stationary air conditioning, chillers, commercial refrigeration, and other end uses. Law further directs EPA to establish regulations for purposes of maximizing reclamation of refrigerant and minimizing the release of refrigerant from equipment.

One should also expect additional EPA requirements to include HFC record-keeping and reporting, along with the enforcement actions to be potentially taken for any violations. The EPA also seems to be gearing up toward increasing the use of reclaimed refrigerants in certain applications.

What You Should Be Doing Now

I have been in the commercial refrigeration industry for over 25 years and this refrigerant transition is by far the largest market sector disrupter that we will experience.

With uncertainty comes challenge and potentially opportunity, so my advice is to be prepared and act now. Do not wait until you can't find or afford the refrigerant you use or hear from the EPA that an Enforcement Action is being filed against you.

Below is a short of list of what I would consider the most important steps to be taking now:

1. Know your refrigerant asset inventory.

What do you have (in lbs.) and where do you have it (by equipment type, application, location)? Bring in-house or hire an experienced consultant if you are relying on a 3rd party service partner to be responsible for maintaining your asset and servicing documentation. Remember, the owner has ultimate responsibility for compliance and would most likely be the sole defendant on any enforcement actions taken;

2. Set up a method to maintain the refrigerant compliance records.

I would suggest using a Software built and designed for that purpose (single source for all records – consider options other than servicing contractor). I should note that "record keeping" has historically been an easy area to fine companies for non-compliance;

3. Develop a refrigerant management compliance plan.

4. Ensure your technicians and 3rd party servicers are up to speed. They all need to be aware of the Section 608 requirements, and any additional state and local jurisdictional requirements;

5. Determine what you want to do with recovered refrigerants. This includes refrigerants removed during remodel, end of life, or refrigerant change out/retrofit;

6. For new equipment, ask questions of your design engineer and equipment OEM. Make sure you are getting the best long-term solution for your operation;

7. Know where and when natural refrigerants make sense in their applications. HPAC

Reduce Leak Rates

e.g., Supermarkets leak ≈ 25% of their total charge annually. HVAC has been in the 10% to 15% range.

Perform preventative maintenance and periodic leak inspections.

Refrigerant is not a consumable. If the vendor is adding refrigerant, they should also be identifying and repairing any leak.

Availability and price of higher GWP refrigerants is going to get worse.

Understand which refrigerant compliance requirements pertain to you.

Knowing your asset inventory and maintaining required records is critical. Ensure leak repairs are performed and documented immediately

Additional refrigerant-based regulations are coming down the pike and will transform the market — be prepared!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ABMA: Annual Meeting to Position Members for 2023 and Beyond

Boiler manufacturers are gearing up for their next big event, a kickoff conference in California to be packed with key industry intelligence and fun networking opportunities.


ABMA


ABMA

By SHAUNICA JAYSON
American Boiler Manufacturers Association

Twice a year, boiler industry leaders from across the country and beyond come together for ABMA's bi-annual meetings to learn about current and emerging industry trends and obtain valuable networking opportunities to enhance and grow their business relationships.

This January 13-16, the boiler industry converges at the Park Hyatt Aviara in Carlsbad, CA for the 2023 ABMA Annual Meeting.

ABMA has focused this meeting on preparing our members for the top challenges they are facing and new issues on the horizon to position them



From left, Sher, Jones, and Lokar all will deliver keynotes at our conference in January.

for future success. We have a top-notch lineup of speakers and content for the new year and beyond, designed to deliver excellent return on investment.

Our Product & Market Group leaders are working diligently on timely topics that focus on trending issues in the boiler industry, guaranteed to deliver thought leadership and takeaways for all attendees, addressing pertinent issues such as evolution of ESG (environmental, social, and governance), boiler trends in healthcare sector, decarbonization, and nuclear energy opportunities.

Our Featured Speakers

ROBERT SHER
Founder & CEO, Mastering Midsized
"How the Best Companies Develop and Retain Top Talent"

Mr. Sher will be kicking off our Friday Opening Session talking about how the best companies develop and retain their top talent.

Sher founded *Mastering Midsized* to provide business leaders with advice on how to maximize growth – and do it in a way that is sustainable and predictable. The insights into what it takes firms to create real mastery – how to lead, how to plan, and how to implement – now infuses everything *Mastering Midsized* does as a firm.

During his presentation, Sher will explore the tactics companies employ to develop high-potential employees.

Attendees will learn:

- How to know where to concentrate professional development;
- How to create a career path that benefits both individuals and the business as a whole;
- The role of strategic delegation in developing high-potentials;
- When to use internal training vs. external training.

RACHEL JONES
VP of Energy & Resources Policy,
The National Association of Manufactures (NAM)
"Impact of Energy Policy on Manufacturing & the Boiler Industry"

Ms. Jones will address our participants and share her insights on how energy policies and trends are affecting the manufacturing sector and boiler industry and how to prepare your products for the changes ahead.

She oversees NAM's energy and environmental policy work and has expertise on issues ranging from energy production and use to air and water quality, climate change, energy efficiency and environmental regulation.

Before joining the NAM, Jones was the environment and energy counsel for the U.S. House of Representatives Committee on Science, Space, and Technology, where she advised the Committee on EPA, U.S. Dept. of Energy, U.S. Dept. of the Interior, FERC, NASA, NOAA and the White House Office of Science and Technology activities. She served as a legal fellow for the U.S. Senate Committee on Environment and Public Works and as executive student notes and comments editor for the *Energy Law Journal*.

CONNOR LOKAR
Economist, ITR Economics
"Economic Outlook for 2023 and Beyond."

Mr. Lokar will be presenting a 2023 economic forecast to prepare our members for the year ahead.

There have been a lot of changes in the U.S., and the rest of the world. What is happening in the markets served by ABMA members? How will they impact us? How long could a recession last? Attendees will know what to expect in 2023 and into 2024, and what tactical decisions need to be made now in anticipation of the upcoming changes to the U.S. and global economy.

Boiler-Focused Content Highlights

We are excited to announce the initial list of confirmed presenters below and expect these topics will be pertinent to boiler industry. More topics to be announced in December.

- **Alternative Energy Group:** Youssef Ballout, Idaho National Laboratory - Topic: Steam and its Role in Nuclear Energy;
- **Commercial Systems Group:** Greening Healthcare Coalition - Topic: Tracking the Evolution of Boilers in Healthcare;
- **Industrial Systems Group:** Jason Garner, Clear Process Engineering -Topic: Realities of ESG Boiler Market Trends;
- **Hydronics Group:** Paul Glanville, Gas Technology Institute - Topic: Energy Technology Investments and Evolutions to Meet a Decarbonization Agenda.

But it wouldn't be an ABMA Meeting without networking and a little bit of fun, too. ABMA welcomes our attendees on Friday, January 13th with an evening reception sponsored by NBBI, featuring a casino royale theme complete with blackjack, craps, war, and roulette tables with dealers. On Saturday evening, attendees will have an opportunity to connect during our networking reception, sponsored by Frederick Cowan Products by ICI.

Monday features ABMA's Golf Tournament at the Aviara Golf Club sponsored in part by Miura America Company with proceeds benefiting the Randy Rawson scholarship and closes out the meeting on Monday night with an "Evening to Die For", a Clue inspired murder mystery closing dinner sponsored by Atlas Copco Rental and Powerhouse Equipment & Engineering Co., Inc.

The 2023 Annual Meeting is packed with fantastic speakers, excellent networking opportunities, and enjoyable social activities. We look forward to seeing our members in California this January.

If you are not a member and interested in attending, please contact me at **shaunica@abma.com**.

A complete listing of sessions and program highlights can be found on our Annual Meeting web page, **ABMA.com/annual-meeting.**

To obtain more information on **ABMA** and stay up to date on everything happening in the boiler industry, please sign up to receive ABMA's *Boiler Weekly* E-Newsletter by visiting **ABMA.com/news**. HPAC

Unit Heat Pro+ Series

Marley Engineered Products offers its QMark MUH unit heater (pictured) and Berko HUHAA unit heater in ready-to-install PRO Series bundles, which include the SmartSeries Plus thermostat and B10 mounting bracket. The thermostat connects to BACnet MS/TP building management systems for easy control and monitoring. The bundles also include a 24VAC transformer for immediate connection to a low voltage thermostat or for future integration flexibility. The heaters feature an advanced pull-through air flow design that draws air across the heating element for even air distribution and cooler element operation.

Marley Engineered Products

RM-2 Riser Manifold Line

The RM-2 riser manifold line from Tyco adds two RM-2 Base models: the commercial RM-2 Base with TD-2 test and drain valve, and the residential RM-2 Base with either TD-2 or ball drain valve. The riser manifolds support fire safety by supplying, monitoring and regulating water flow to a building's fire suppression piping system. The Base models, which help better control valves and piping in a range of commercial buildings and high-rises, feature a built-in waterflow alarm switch, pressure gauge, drain valve and a compact design for horizontal or vertical installation. The TD-2 test and drain valve achieves a tight seal using a plunger-type valve, significantly reducing product wear and deterioration.

Tyco/Johnson Controls

FMS-2000C Critical Environment Controller

Johnson Controls releases the FMS-2000C Critical Environment Controller. It helps ensure laboratory and healthcare settings are safe for occupants by continuously verifying room pressure, airflow and other important room parameters. One controller can control and monitor up to six parameters across four spaces: differential pressure, temperature, humidity, carbon dioxide, airflow and air changes per hour. If designated parameters fall outside of the set range, the unit generates an audible signal as well as a yellow or red visual alert. It uses BACnet MS/TP for easy installation, commissioning, control, monitoring and data analytics. The controller integrates into Metasys and third-party building automation systems.

Johnson Controls

Performance Monitors for Water Quality Systems

Watts releases new monitors designed to ensure optimal performance of key water quality systems. The monitors will be standard on the Big Bubba BB-S101 whole home filtration system and the OneFlow OFRES-K & OFCOM-EK Series anti-scale systems. The BB-M101 Smart Volumetric Flow Monitor for BB-S101 (pictured) displays % Filter Life Consumed, % Filter Life Remaining, and Volume of Water Remaining until filter replacement is due. OneFlow's U-M311 Time Elapsed Monitor displays % Media Life Consumed, % Media Life Remaining, # of Days until Media Replacement is Due, and water volume conditioned since last media reset.

Watts

Laboratory AirFlow Monitor Alarm

Hemco's AirFlow Monitor Alarm continuously checks the fume hood face velocity air flow to help ensure a safe operating environment for laboratory personnel. For fume hood applications, a small probe is provided, which is installed on the interior sidewall of the hood. This probe is connected to the monitor using 1/4-in. tubing. Select and calibrate at desired FPM velocity set point. If the hood face velocity falls below set point, an audible alarm sounds and a visual red indicator light appears. Air flow alarm is factory installed or can be field installed, 115/60Hz AC.
Hemco Corp.

Cocoon Thermal Mass Furnace

Unico releases the Cocoon, an electric furnace that uses a solid ceramic thermal mass to produce heat in the infrared spectrum. It uses up to 41% less electricity to produce heat than standard electric furnaces, features a compact modular footprint and high-quality construction, and uses a multistage, variable-speed electronically commutated blower motor. It includes smart control that optimizes the heating and blower operations. It is modular and easy to install, and comes in two model sizes: THRMS1800 for spaces up to 1,800 sq. ft., and THRMS3200 (pictured) for areas up to 3,200 sq. ft.
Unico

EVERLOC+ R-20 Fitting System

The EVERLOC+ R-20 fitting system from REHAU is designed for use with RAUPEX cross-linked polyethylene (PEXa) pipes and PRO-BALANCE manifolds. Machined from solid brass with a nickel-plated swivel nut, the manifold outlets are available in 3/8 in., 1/2 in., 5/8 in. and 3/4 in. sizes. The compression-sleeve fitting is a single piece that pairs with existing EVERLOC+ compression sleeves used in the company's PEXa plumbing systems. Includes an insert with a pre-installed O-ring and swivel nut in a one-piece assembly to support connection security. The fitting uses the swivel nut to connect to the manifold, then joins to the hydronic circuits using the EVERLOC+ connection technology.
REHAU

CAF Series Flow-Through Expansion Tank

The CAF Series flow-through expansion tank from Taco helps reduce environmental conditions necessary for Legionella and other bacteria to flourish in domestic hot water systems. With standard tank volumes ranging from 23 to 528 gal., the expansion tank provides precise flow channeling through a patent-pending head design, minimizing erosion potential and promoting turbulence. The full-acceptance Captive Air design provides separation of air and water for optimal efficiency. Constructed, tested and certified to ASME Section VIII Div. 1, this tank minimizes pressure loss, discourages short-cycling and is retrofittable to meet ASHRAE Standard 188 on existing designs.
Taco Comfort Solutions

128 Series Union Y-Strainers

128 Series Union Y-Strainers from Caleffi are ideally suited for use in hot water recirculation or hydronic systems. Constructed of DZR low-lead brass bodies, they feature dual-union connections for 1/2-in., 3/4-in. and 1-in. pipe sizes and tailpiece connections in sweat, NPT, press, F1960 PEX expansion and F1807 PEX crimp. They come with factory-installed integral PT ports that allow quick verification of pressure drop across the strainer. The easy to remove strainer cap includes a plug for installation of a field-provided blowdown valve.

Caleffi

Water Flow Monitoring and Leak Detection

Reliance Detection Technologies introduces the RSC-900-F wireless, commercial-grade solution for detecting plumbing leaks and monitoring a building's water usage trends to identify excessive water usage in real time. If an abnormal flow is detected, the water supply is automatically shut off to prevent water damage, and an alert is sent to the property owner or manager's smartphone so that they can address the issue. The modular system features a brass, lead-free flow sensor and self-cleaning shut-off valve with corrosion-resistant internal sensor components, including a rust-proof, hard ferrite magnet.

Reliance Detection Technologies

NEUTRON Digital Emergency Mixing Valve

Leonard Valve unveils its NEUTRON digital emergency mixing valve includes a programmable temperature setpoint (accurate within 2 degrees), self-balancing/self-diagnosing/self-cleaning features, and alerts users when maintenance is required. It has a minimum flow rate as low as 3 gallons per minute and a maximum flow rate of 80 gpm. Other features include an internal cold-water bypass of more than 40 gpm, automatic hot water shut-off upon cold water inlet supply failure, and optional backup power supply that offers two hours of run time in case of primary power loss. Meets low-lead requirements of wetted surface areas, containing less than 0.25% lead by weight.

Leonard Valve Co.

Matched Motor/Drive Combination Package

Siemens offers combination motor/drive packages, allowing an OEM or end-user the option to select the optimum solution for a variety of heavy-duty industrial motion control applications. The combinations are power-matched for 480V high-overload operation through a 20 hp range. I2T protection from thermal damage provided is a standard in both the motor and the drive components. The Intelligent Operator Panel is included with these packages. Choosing from a pre-determined list of motor/drive combinations, the customer simply makes the selection best suited to the application. The motor and drive are packaged on a single pallet, shipped and invoiced together.

Siemens Industry

Glycol Makeup Unit GF60

The Glycol Makeup Unit GF60 from Bell & Gossett is an automated 110V diaphragm pump with digital control. The automated system operates as needed to add water or water-glycol solution to a closed loop heating, chilled water, process, snowmelt or radiant heat system. In the event of a leak, the system immediately notifies the operator that the fluid level is dropping. Each engineered package maintains critical minimum pressure levels to make up for losses that may occur due to leakage. It can handle output pressures from 7.5 to 70 psi and has a self-priming pump. Cut-in and cut-out pressure adjustments can be made easily using a digital display.

Bell & Gossett/Xylem

HydroFlame Pro Cast-In-Place Firestop Sleeves

HoldRite's HydroFlame Pro cast-in-place firestop sleeves transform firestop solutions with a design that's easy to specify, stock and install. UL-listed and lab-tested, it offers a variety of telescoping sleeves with a built-in W rating and water dam accessory to protect against fire, gas, smoke and water. An interlocking telescoping sleeve design eliminates the need to cut sleeves on the jobsite, and locator whiskers make the sleeve easy to locate after concrete pour. Patented firestopping sleeves compatible with flat-form or corrugated metal decks. Designed for pipes ranging from 8 in. to 12 in.

HoldRite/RWC

5.8K Concealed Pendent Sprinkler

Tyco's LFII residential 5.8K concealed pendent sprinkler is for the protection of homes, apartments, dormitories, hotels and other residential buildings. The sprinkler's increased 5.8 K-factor features improved hydraulic performance compared to other residential models to help more efficiently protect 18-ft.-by-18-ft. and 20-ft.-by-20-ft. rooms. Available in both ordinary 155° F and intermediate 200° F temperature configurations. It is intended for use in wet pipe sprinkler systems for one- and two-family dwellings, residential buildings up to four stories in height and residential portions of any occupancy per NFPA 13, 13D and 13R. It features a maximum working pressure of 175 psi.

Tyco/Johnson Controls

Copper Street Fittings

Copper street fittings from Quick Fitting come in both 45-degree and 90-degree angles. They can connect directly to other fittings without requiring an additional short connecting piece. The patented dual seal design creates redundant sealing surfaces that reduce the chance of leaks. They can be installed in tight corners where press tight fittings are not applicable. The grip ring is also self-centering, requiring less force to insert a tube or pipe. They are fully NSF 61- and NSF 372-compliant and certified as complying with the Safe Drinking Water Act's lead-free requirements.

Quick Fitting

Outset Seal Lineset Protection

RectorSeal introduces the Outset Seal, an adjustable lineset protection system for ducted and ductless HVAC installations, based on its hinge design. It is designed to protect indoor areas by blocking air leakage, moisture penetration, and rodent intrusion, as well as hiding unsightly wall penetrations where HVAC linesets enter or exit structures. Suitable for both new and retrofit HVAC installations, the kit includes a 12-in. by 12-in. panel that will accommodate HVAC linesets up to measurements of 7/8-in. outside diameter with 3/4 in. of insulation.

RectorSeal

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HPAC Engineering

HPAC ENGINEERING'S MONTHLY PODCASTS

HPAC ON THE AIR

Our monthly Podcast series offers unique and compelling industry insights for engineers in the HVACR market. Each month, we talk with engaging thought leaders and practitioners like ASHRAE President Mick Schwedler and USGBC co-founder Rick Fedrizzi. Produced by *HPAC Engineering* magazine and hosted by Editor-in-Chief Rob McManamy, this series is just one of several exciting **Members Only** features, designed to enhance your HPAC multimedia experience.

Check out all the new media offerings at hpac.com/members.

ENDEAVOR BUSINESS MEDIA

Multi V Water 5 VRF System

The Multi V Water 5 product line is LG's advanced water-cooled VRF system. The systems are designed to provide the benefits of VRF: lower operational costs per year, minimal or no duct work to purchase or install, tenant comfort with zoning while maintaining architectural integrity. No need to place any units outdoors. Available in 208V to 230V with sizes ranging from 6 tons to 36 tons, and in 460V with sizes ranging from 6 tons to 48 tons. Unified heat pump or heat recovery units. Stainless-steel plate heat exchanger for condenser water, with built-in temperature sensors. Compact size to fit in small mechanical rooms.

LG HVAC

Force5 HVAC Spray

Force5 Products introduces Force5 HVAC spray, an industrial-grade corrosion inhibitor, lubricant and cleaner that prevents and removes rust. It helps contractors to be significantly more productive while improving equipment reliability and extending its lifespan. The corrosion inhibitor penetrates into metal parts to prevent rust and corrosion while forming a bond that repels water and other contaminants. A shield-like film coating protects equipment against the effects of moisture and corrosion, including coastal salt air. As a lubricant, it cuts through corrosion, rust and dirt, quickly getting into metal parts that have become frozen or encrusted to get them working again. It contains synthetic-based additives that act like microscopic ball-bearings to reduce friction.

Force5 Products

Vertex Evaporative Condenser

Baltimore Aircoil Co. introduces the Vertex evaporative condenser, which offers year-round operation and performs through the harshest conditions with a durable and robust industrial design. Increase reliability, corrosion resistance, and longevity with material options that save time and money. Alleviate confined space concerns with the largest access door; it easily accommodates a 6 1/2-foot-tall person. A sturdy step and safety handle provides safe entry and exit. Ground level access to the drive system, pump(s) and terminal box eliminates the need for platforms or ladders to access them. Save energy with improved head pressure control in winter months due to the EC fan system's lower minimum speeds.

Baltimore Aircoil Co.

NEW PRODUCTS

Aquaport System

The Aquaport System from Uponor is a self-contained unit that converts a building's hydronic heating supply to on-demand domestic hot water. It eliminates centralized domestic hot water and recirculation piping in a structure. Incorporating the system can reduce hot-water energy use by up to 35%, eliminate up to 40% of unnecessary piping, and remove more than 50% of the total DHW volume in a building. The compact, in-wall design is 25.6-in.-tall by 14.5-in.-wide and 5.4-in.-deep to maximize overall square footage. It is lightweight at 47 lb. for the 100,000 Btu/hr. version and 57 lb. for the 180,000 Btu/hr. version.
Uponor

Intellistation Jr. with IoT

The Intellistation Jr. with IoT from Watts is a digital mixing valve that allows users to remotely control and monitor tempered water distribution. Configurable on-site and easy to install, the valve controls the outlet temperature to +/- 2° F of set point in compliance with ASSE 1017. Connectivity to the building automation system is standard in both BACnet and Modbus protocols. Temperature setback feature contributes to energy efficiency and savings. The valve also features a high-temperature sanitization mode to help mitigate the risk of waterborne bacteria as part of a user-directed and controlled thermal eradication protocol. Connects to the Watts OnSite app for remote hot water visibility and control.
Watts

AD INDEX

Science, Not Politics, Must Lead on Climate Change

Election season reminds us that absurd arguments on both sides of the climate debate are not helping. But there is hope in recent legislation.

Larry Clark

A regular contributor to HPAC Engineering and a member of its editorial advisory board since 2012, the author is a principal at Sustainable Performance Solutions LLC, a south Florida-based engineering firm focusing on energy and sustainability. Email him at larry@sustainflorida.com.

Over the past nine years, I have frequently addressed climate change in this column. And there have always been readers who disagreed with my premises or conclusions, although I have always tried to base them on the best available current science.

On at least one occasion, I was prompted to call out those who completely denied any human contribution to climate change. I even went so far as – in some cases – comparing climate change deniers to flat earthers.

Now, after weeks of being deluged with political nonsense in every media (phone, text, print, TV), I've concluded that it's not just the climate change deniers who are ignoring the science. The accepted conservative position on climate change has, for the most part, been to minimize or dismiss the issue. Even some conservative Christian politicians have, surprisingly, ridiculed climate change science. I say surprisingly because there is a Biblical calling for us to be good stewards of the earth.

Remarkably, I have received comments from professional engineers (in one case, a PhD) who actually believed (or claimed to believe) that climate change was entirely a left-wing hoax. When shown the satellite photos of the melting glaciers, they espouse conspiracy theories about NASA and NOAA colluding to "photo shop" the evidence. Kind of reminds me of the story of the Moon landings being staged in the Astrodome. However, it's still much easier to dismiss these clueless folks than it is to dismiss some elitist liberals who totally miss the mark.

Those liberal politicians who have also ignored the science when they thought it would further their agendas have, I believe, damaged the cause even more than the deniers.

Probably the most egregious of those was the so-called Green New Deal, first proposed by a certain NY congresswoman who is commonly referred to only by her initials. Since then, we've heard from a number of uber-liberal politicians about the need to stop eating red meat (actually, there are many cardiologists who agree with that, but not because cow farts will irreparably damage the atmosphere), stop traveling (unless they're flying to their own campaign stop or a boondoggle), and stop using energy that isn't provided from renewable sources.

On that last note, one of the most contentious climate change issues facing politicians today is the issue of electrification.

Many politicians have committed to eliminating fossil fuels in order to decarbonize. Unfortunately, they don't understand that (according to the U.S. Energy Information Administration) only 20% of U.S. electricity came from renewable sources last year. They also don't understand site-to-source ratio, the amount of energy used onsite compared to the amount of energy consumed at the source, which according to *Energy Star* is presently 2.8:1. In other words, for every kWh used, there are 2.8 kWh produced at the source. That's 2.4 lbs of CO2 emissions!

Believe me, I am all for reducing our dependence on fossil fuels, but not at the expense of increasing our carbon emissions. And even if all of our grid power was produced by renewable sources, the infrastructure today couldn't handle total electrification, and would crash.

All that being said, there actually was one potential bright spot nationally this year: inclusion of climate change elements in the new **Inflation Reduction Act** (IRA), signed into law in August. It provides for an estimated $369 billion to be spent on "Energy Security and Climate Change," with the goal of reducing carbon emissions by about 40% by 2030. The IRA is expected to drive R&D for low-carbon materials and clean tech, and to increase the growth of renewable energy through direct funding and tax credits.

All of those developments will help.

But they won't do enough.

Climate change is probably the most serious issue facing the country (and the planet) on which all politicians could and should be on the same side. All they have to do is stop politicking and really follow the science. HPAC

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