



2
0
2
2

TREND REPORT

CO-SPONSORED BY  



JAN 31 - FEB 2
LAS VEGAS



2022 Trend Report

The HVACR industry is unique in that it is made up of professionals from many different sectors. And while we all ultimately address the same goals, the everyday disciplines and practices often look very different. It is with this in mind that we created the Industry Trend Report in 2020 to provide a thoughtful connection point for our audiences. Our industry association's feedback allows us to formulate discussion points that we can share with our peers when we finally gather 1:1. We believe this will lead to a better understanding of the challenges and opportunities within the industry from every viewpoint.

To compile this report, our respondents were asked to write in potential opportunities, threats and challenges to be considered for the near future as well as feedback regarding discussions happening in their specific areas of expertise.

We encourage you to review the input from our industry associations and carry this knowledge with you onto the Show floor at the 2022 AHR Expo, to be held in Las Vegas, NV January 31 - February 2nd.

We would like to express our appreciation to everyone who contributed to this report. There has been no shortage of challenges since the last time we gathered, however, the strength of this industry is more evident than ever. We look forward to the opportunity to meet in Vegas and get to work on the future of HVACR. We hope to see you there.

For more information, please visit ahrexpo.com.



Table of Contents

Summary Takeaways & Common Industry Themes →

Industry Associations

ASHRAE →

AHRI →

Women in HVACR →

CABA →

HARDI →

Green Mechanical Council →

NCI →

HIA-C →

SMACNA →

PHCC →

BCxA →

From the Floor →

From the Field →



Legas®



Summary Takeaways & Common Industry Themes

The Future is Clean

- Decarbonization
- Electrification
- Low-GWP refrigerants
- Regulation updates

We Need to Grow Our Professional Workforce

- Attract talent from diverse backgrounds
- Provide attractive opportunity for career growth
- Rethink the value of the employee
- Think long-term and invest in your workforce

The Pandemic Has Changed the World...and the Industry

- Customers are more aware of their indoor environments
- The desire for IAQ is here to stay
- Upgraded HVAC systems keep buildings healthy

The Supply Chain

- The industry is stretched for supply
- The supply chain interconnectedness is clear - the shipping and freight industry has resulted in unpredictable delays
- Manufacturers, distributors, suppliers, contractors, techs - the industry as a whole has been forced to get creative in solving problems
- Costs are unpredictable

The Industry Is Stronger When We Work Together

- Open lines of experience and communication across the supply chain
- Strengthen understanding of goals and methods to maximize efficiency and equipment performance
- Learn from all areas of expertise



ASHRAE

ASHRAE is a diverse organization dedicated to advancing the arts and sciences of heating, ventilation, air conditioning and refrigeration to serve humanity and promote a sustainable world.

ashrae.org

Booth #C2906

50,000+ members

Located in over 132 nations

A 2022 View of ASHRAE



MICK SCHWEDLER
President, P.E. Fellow
ASHRAE, LEED AP

The Impact of COVID-19

“ASHRAE’s most recent global impact is our Epidemic Task Force. Through volunteer efforts of more than 130 experts, **ASHRAE is a beacon, providing needed information to mitigate the spread of disease, reopen buildings, and deliver education for building owners and operators.** All to improve Indoor Environmental Quality and keep people safe. The impact has been global and touched each of us locally.”

WHAT’S CHANGED



A greater importance has been placed on **indoor air quality and the ongoing need to create more healthy indoor environments** that extend beyond the current COVID-19 pandemic. This means that **our members have an even greater role to play in terms of guiding all industry sectors** in creating and maintaining healthy indoor environmental quality.

GOING VIRTUAL



In some ways the **pandemic has brought us closer together by promoting digital collaboration and extending our reach globally.** While there is no substitute for in-person interaction, being able to connect virtually has enabled us to continue our vital missions despite the challenges of the pandemic.

- By adapting and adopting new ways of communication, we have been able to:
 - conduct annual meetings
 - chapter regional conferences
 - task force meetings
 - share research
 - update standards
 - provide continuing education

Upcoming Opportunities



ASHRAE’S NEW GLOBAL HEADQUARTERS BUILDING

The renovation **has been one of the industry’s most closely-watched and highly publicized projects** and showcases what can be done with existing building stock. We chose to renovate due to reuse of existing structures being a basic tenet of sustainability.



66,700 sq. ft. on **11 acres** in the Technology Park area of **Peachtree Corners, GA**

Prior to the COVID-19 pandemic, **ASHRAE had already planned to provide 30% more outside air to the building than the required minimum ventilation rates** from ASHRAE Standard 62.1 - Ventilation for Acceptable Indoor Air Quality and will implement other applicable guidance that has been developed by the ASHRAE Epidemic Task Force (ETF) for commercial office buildings.

A 2022 View of ASHRAE continued...



Challenges Ahead

Our technical focus is on **IEQ, resilience, and decarbonization** - which is a newer direction for us, but of great importance.

We are **working on our internal organization** with one result being the flexibility to adapt to regional differences.

Additionally, we are highly focused on **Diversity, Equity and Inclusion in our society and in the HVACR industry**. ASHRAE reaffirmed its commitment to providing a welcoming and inclusive environment for the communities that we serve by assembling members to serve on our Diversity, Equity and Inclusion subcommittee, making this one of the first Board subcommittee formed in some time.



Upcoming Opportunities



ASHRAE'S NEW GLOBAL HEADQUARTERS BUILDING

Technical Features include:

- **Radiant ceiling panel system:** This is used for heating and cooling & dedicated outdoor air system for outdoor air ventilation with enthalpy heat recovery.
- **Overhead fresh air distribution system** augmented with reversible ceiling fans in the open office areas and displacement distribution in the learning center.
- **Six water source-heat pumps (WSHPs):** There are four on basement level and two on upper level atrium that will be used to condition these spaces.
- **Demand Control Ventilation (DCV):** This will be used for high occupancy spaces in the meeting and learning center. Air distribution is constant volume in office areas and provided by fabric duct, reducing diffuser count and duct branches.
- Modeling Energy Use Intensity of **17 kBtu/sf/yr**.
- On-site **electric vehicle charging stations** available for guests and staff.
- Roof-top and ground mounted **photovoltaic solar energy system** planned for installation March 2021.
- 18 new **skylights**
- Useful daylight illuminance (>300 lux) at the work plane Window Wall Ratio (WWR):

Existing WWR **79.9%** → **33.5%** & **41.9%**
East/West North/South

HVACR's Pressing Issues



Jurisdictions globally are **confronting climate change and recognizing that building decarbonization** is an important component in their efforts.



The worldwide building sector accounts for about **40%** of energy-related carbon emissions

& buildings remain a major sector that lack sufficient mitigation policies

As the standards authority for energy usage in buildings, ASHRAE recently formed a task force to address climate change through responsible decarbonization strategies for the built environment. **The ASHRAE Task Force for Building Decarbonization (TFBD) mission is to develop technical resources and provide leadership and guidance in mitigating the negative carbon impact of buildings on the environment and the inhabitants of our planet.**



The data-driven buildings industry, through innovation and ingenuity, will drive our buildings to increasingly higher performance. **ASHRAE's Vision 2030 is committed to leading, serving, and providing all professionals in the buildings industry with the resources and knowledge** to continually support intelligent design, construction, and operation for a more adaptable and resilient built environment.

A 2022 View of ASHRAE continued...

Highlight the Positive



The most important role we can play is to patiently educate consumer-focused media to bring about a greater understanding of the role HVAC plays in almost every aspect of our lives.

• ASHRAE TASK FORCE FOR BUILDING DECARBONIZATION

Our Epidemic Task Force is a great example of how **our industry can play a proactive role in educating reporters**. Members of the Epidemic Task Force have tirelessly conducted extensive media interviews to date, with more than 450 articles published in consumer and industry media regarding HVAC applications in mitigating the spread of COVID-19.



ASHRAE Member Discussions

“ One of the most important conversations we can have is how we continue to **support personal growth, global impact and feed the roots of our members and our industry**. As president of ASHRAE, I am committed to using our knowledge and connections to cultivate our deep, widespread, and strong roots to collectively provide global benefits today as well as for future generations.”



Air-Conditioning, Heating, and Refrigeration Institute (AHRI)

Our industry comprises residential and commercial air conditioning and space heating, water heating, and commercial refrigeration equipment. It doesn't include so-called "white goods" - room air conditioners or residential refrigerators - those are in the purview of the Association of Home Appliance Manufacturers.

ahrinet.org

Booth #C3006

320 member companies

Sectors: Applied; Heating; Refrigeration; Unitary

A 2022 View of AHRI



STEPHEN YUREK
President & CEO

The Impact of COVID-19

“The state of our industry is strong, despite the challenges brought on by the pandemic. On the one hand, supply chain and workforce issues continue, while on the other hand, demand for our products and equipment has arguably never been higher.”

WHAT'S CHANGED



The pandemic has raised the profile of the issue of indoor air quality and our industry is responding by showcasing innovative products and equipment that improves ventilation, cleans the air, and improves ideal humidity levels. Many of these products can be seen on the floor of the 2022 AHR Expo.

SHIPPING & SHORTAGES



The ongoing tariffs on steel and aluminum have affected our members, as have shipping delays and increased shipping costs and the continued shortage of microchips and skilled labor.

BEYOND THE PANDEMIC



Our industry, like many industries, is increasing its emphasis on improving energy efficiency and reducing emissions. The products and equipment AHR Expo visitors will find on the show floor showcase that increased emphasis and offer the most innovating equipment ever available.

HVACR's Pressing Issues



ONE

Successfully completing the transition to lower-GWP refrigerants is high on the list, as is the industry's response to decarbonization efforts across the U.S. and around the world.



TWO

In addition, the coming transition to new performance metrics for heating and air conditioning equipment (the M1 transition) is a major communications effort for the entire industry, manufacturers, distributors, and contractors alike.



THREE

Finally, increasing awareness and use of AHRI standards and our globally recognized, industry respected certification program around the world will continue to be a major emphasis.

A 2022 View of AHRI continued...



AHRI Member Discussions

Increasing concerns about **efficiency and emissions** will showcase our members' innovation on the show floor, as will the increased focus on indoor air quality.

Upcoming Opportunities



I think **working with schools to ensure proper equipment to increase health, safety, and productivity** is an excellent opportunity given the amount of federal funding available.

- We also have the opportunity to have the U.S. **join many other nations, both developed and developing, in ratifying the Kigali Amendment to the Montreal Protocol**, which establishes a structure to phase down the use of HFC refrigerants.

Highlight the Positive

There is not a person in the United States today that does not use one of more of the products and equipment our members manufacture, whether it is heating, cooling, refrigeration, or water heating. The positive contributions of our industry are too numerous to mention and we highlight those contributions at every opportunity. We sometimes see negative media stories regarding the effects of our products on energy use and the environment, but we respond by noting the absolute necessity of those products in protecting American life, health, and safety as well as the strides we've made in decreasing their effect on the overall environment.





Networking. Education. Mentoring.

Women in HVACR

womeninhvacr.org

With over 600 members, Women in HVACR exists to improve the lives of their members by providing professional avenues to connect with other women growing their careers in the HVACR industry. They empower women to succeed through networking opportunities, mentoring and education.

Booth #N10410

A 2022 View of Women in HVACR



MARCIA CHRISTIANSEN
Secretary WHVACR & Business Unit Manager, PECO Control Systems

The Impact of COVID-19

“ Amid the challenges presented by COVID, we see new opportunity and change as positive outcomes. System design improvements will drive new development and improved environmental control.”

LABOR SHORTAGE



HVACR and other trades continued to be in high demand during the pandemic so the labor shortage has grown. Women are a significant resource and can have a positive impact, given the chance.

GOING VIRTUAL



The shutdown opened the virtual meeting space as an accepted business method. While it is faster and carries significantly less cost than in person meetings, there is a challenge to create a personal experience with these platforms. **Focusing on improved communication has become imperative to providing a superior customer experience.**

BEYOND THE PANDEMIC



We see a significant effort to improve air quality systems. **Right sizing systems to provide adequate ventilation will ultimately create a cleaner and more comfortable environment for people.** This is happening through agency regulation and innovation in equipment designs. This will ultimately drive opportunities throughout the HVAC industry.

HVACR's Pressing Issues

SUPPLY CHAIN



Delays from transit, port congestion, container shortages, trucking, tariffs, component shortages and so on have created significant challenges to creating a great customer experience.

EQUAL OPPORTUNITY



The biggest challenge we face is in the tech side of our business. **Women can graduate in the top of their class and be passed over based on gender.** We have some really talented members. We need to raise the bar for these women!

Upcoming Opportunities



Systems design requirements will provide new design challenges and opportunities for all sectors of the HVACR industry, while **outside air management and online experience** have the potential to make the biggest impact.

Highlight the Positive



We have extreme labor shortages in the Trades. Talk about the success of non-traditional schooling, like the Trades, and how it provides both high paying jobs and satisfying careers. **These jobs contribute to our environment and fill a critical need for everyone. HVACR ensures comfort, is increasing the efficient use of energy and providing environmental sustainability.**



Continental Automated Buildings Association (CABA)

caba.org

The Continental Automated Buildings Association (CABA) is a leading international, not-for-profit, industry organization that promotes advanced technologies in homes and buildings. Its 380 strong corporate members and 27,000+ individual industry contacts are leaders in advancing integrated home systems and building automation worldwide.

Booth #C1053

A 2022 View of CABA



GREG WALKER
President & CEO

The Impact of COVID-19

“ COVID brought home that buildings that aren’t optimized for health and safety or that lack smart systems can be potentially costly in both human and economic terms. But as tragic as this pandemic has been, **it has been a once-in-a-generation opportunity for the industry to step back and ask: How can we contribute to making buildings healthy and safe while reducing their carbon footprint? How can we be part of the change we want to see?**”

GETTING THINGS RIGHT



Heading into 2021 last year, there was a huge focus on offices expecting to reopen, and the (quick) building improvements needed to support them. **The guiding question was “Is your building ready?”** Putting off that overdue HVAC upgrade was no longer acceptable.

• **Well, months later that question is more like, “Are you getting your building right?”** There’s still urgency to the moment, but returning to the office will develop in phases, and hybrid work will be in the mix. So, it’s better to be right than fast.

MAKING IT WORK

In the association world everyone has found **creative ways to stretch finite resources**. As well, like just about every organization these days, we’re **looking to virtual tools to accomplish more** and have woven Zoom and Teams into our daily activities.



In terms of members, we have 385 organization members, and the past year we saw a number of members in the HVACR industry join. Collectively, these **members reveal the industry’s growing interest in innovations** like remote control of HVAC technologies, artificial intelligence, and occupancy sensing and its implications for IAQ management.

BEYOND THE PANDEMIC

While a trifecta of concerns has traditionally guided HVAC planning decisions – energy efficiency; maintenance and upkeep; occupant comfort – a fourth issue jumped to the front of the queue...



Optimizing IAQ Management

Though the term overlaps with the others, it **highlights the interest stakeholders have in directing HVAC efforts more broadly** at what can be done proactively to achieve a safe and healthy building.

A 2022 View of CABA continued...



Highlight the Positive

Better IAQ management is of acute importance and what HVAC industry professionals do, matters. The past 19 months have really driven that home. **Intelligent buildings help bring together numerous subsystems, from lighting, energy optimization, and communications to elevators, wayfinding, and access controls.** But it's HVAC subsystems that have really been seen as on the vanguard of supporting resiliency.

HVACR's Pressing Issues

Building stakeholders don't know what the workplace will look like in the future. They just aren't able to say for sure. This calls for **conversations about how their current data shapes their understanding of the workplace or the office of tomorrow. It means that facility managers should be equipped with technologies that can gather – and provide visibility into – better data.** That continues to be a key requirement.



Upcoming Opportunities



INTELLIGENT BUILDINGS

As highlighted in our research report on the impact of the pandemic on the industry released in February 2021 (“Intelligent Buildings and COVID-19”), **remote service-based solutions are a key trend increasing in the past decade. Post-COVID, building stakeholders are more inclined to view these solutions as innovations supporting resiliency and future readiness in their buildings.** So these technologies are expected to be in high demand as well as to continue to mature.

INNOVATIONS WITH BIG IMPACT

Maintenance and upkeep have always been central concerns with HVAC systems. There are many types of approaches and philosophies that have traditionally informed maintenance programs. But now along comes **predictive analytics and artificial intelligence that could change the game and create new opportunities for business.** It's understanding how those opportunities intersect with the growth of intelligent buildings and how the industry can leverage those technologies that prompted the CABA Board of Directors to launch **“AI and Predictive Maintenance in Intelligent Buildings” as our 2021 research project for the large buildings segment.**



Hot/cold complaints from building occupants
↓ 40-60%
with AI-based HVAC controls

Challenges Ahead

Finding ways for control solutions and integrated systems to reduce the carbon footprint of HVAC is a key challenge. On this front, HVAC energy management evolution requires two major innovations, CABA's research on “Intelligent Building Energy Management Systems” highlighted:



ONE

The first is **more advanced sensing and automation.** By integrating HVAC controls with occupancy sensors and access control systems, rooms can automatically reduce loads in response to vacancy.



TWO

The second need is for **DER (Distributed Energy Resources) integration:** Leveraging DER generation and storage capabilities, buildings can enable energy-efficient applications such as solar cooling, geothermal heating, and energy-efficient recirculation and reheating, by shifting DER loads to HVAC systems.



CABA is really looking forward to the return of in-person AHR Expo because **achieving better IAQ management is a topmost concern for stakeholders in the post-pandemic environment.** We're eager to track advances in software and standards development, and in particular integrated systems that are providing a degree of enhanced control to facility managers and building occupants that they have not enjoyed previously.”



Heating Air-conditioning & Refrigeration Distributors International (HARDI)

hardinet.org

Our distributor members collectively employ 60,000 Americans and account for nearly 70% of the US Wholesale distribution market of residential and commercial HVACR equipment supplies and controls. HARDI currently has over 900 members. 440 wholesalers and over 460 total vendor, supplier, manufacturer reps and other associate members.

A 2022 View of HARDI



TALBOT GEE
CEO

The Impact of COVID-19

“ The industry finds itself at a strange inflection point - fallout from the pandemic and massive federal stimulus have led to a demand surge, all while labor and raw material shortages are disrupting the channel’s ability to satisfy that demand. Where things go from here is up for debate, but the industry is likely to be stuck between these opposing forces for the foreseeable future.”

SUPPLY AND DEMAND



In the short term we anticipate a continuation of what we’ve seen since May 2020; that is, **an industry moving at a frantic pace to satisfy demand.**

In the long term you’ll start to see **manufacturers and distributors price risk into their evaluation of supply chains**, which likely means fewer global suppliers, slightly larger inventories, and greater sales and inventory transparency between the two groups.

DISTRIBUTION ISSUES



The experiences of wholesale distribution throughout the pandemic have been fairly similar to what the industry at large has seen. Wholesalers have been forced to carry larger inventories to account for unpredictable (and ever increasing) lead times. Also, distributors have seen their costs climb dramatically as the price of raw materials, shipping, and labor have all spiked during the pandemic. **While the entire industry grew, we all missed millions of dollars in opportunities due to product and labor shortages.**

GROWTH THROUGH INNOVATION



Although the pandemic has definitely been a driver of this, **we’ve seen an uptick in the number of innovative and value-additive services distributors have been offering contractors.** Survey work done as part of our State of the Channel project showed that contractors highly value **delivery services, smart lockers (for contactless pickup), and mobile apps for placing orders and checking product availability.** We’ve seen several distributors doubling-down on these innovations throughout 2021, and we expect these trends to stick even after the pandemic.

A 2022 View of HARDI continued...



Highlight the Positive

Just imagine where we would have been the last 18 months without effective HVACR, and **we all need to help end customers recognize all those technicians in the field just as they do first-responders and healthcare workers.** They never stopped solving problems and keeping clean, cool or warm air flowing despite the pandemic and every other challenge thrown at us since early 2020.

HVACR's Pressing Issues

Workforce challenges are either at the top or near the top of the pressing issues list, and that means **both current labor shortages (a consequence of COVID) and the growing gap in workforce talent.** The industry has to keep improving communication and cooperation throughout the channel to mitigate continued supply chain challenges.

- **Additionally, the efforts made by the federal government to mitigate the effects of climate change will continue to have a profound effect on the industry.** Whether it's recent EPA rulings on the banning of single-use disposable refrigerant cylinders, or the looming 2023 standards change for ACs and ASHPs, an evolving regulatory landscape is likely going to be the norm for years to come.

Upcoming Opportunities

UPGRADE AND ENHANCE



Perhaps never before has HVACR been more noticed by the general public than now so opportunities will continue to abound for **system upgrades, improved indoor air quality and comfort, and further expansion of the HVACR installed base.**



New methods and services for final mile delivery, increased use of analytics to improve forecasting, and digital tools to **enhance inventory visibility and customer service.**

Challenges Ahead



Distributors will need the help of their suppliers and contractor customers to continue to **maintain significantly higher inventory levels to enable the channel to endure an erratic and overtaxed supply chain** which will mean closer, more strategic partnerships, more open communication between channel partners, and paying bills on time to keep cash available for more inventory.

HARDI by the Numbers

State of the Channel report

\$68.8B

Total addressable HVAC/R market (U.S.)

\$42.8B

Sales through HVAC/R wholesale distribution

\$4.1B

Sales through HVAC/R distributor ecommerce



Green Mechanical Council

escogroup.org/greenmech

The Green Mechanical Council, an affiliate of the ESCO Group is an association of more than 360,000 individuals. Representing those who manufacture, design, build, install, maintain, and service the energy efficient and environmentally responsible mechanical systems built or retrofitted into today's commercial, industrial, and residential structures.

A 2022 View of Green Mechanical Council



HOWARD WEISS
COO

The Impact of COVID-19

“ When COVID-19 was declared a pandemic, **the HVACR workforce was declared essential, putting us in the center of nearly every topic making news headlines.** This includes IAQ, vaccine distribution & storage, virus containment, and negative pressure technologies.”

A NEW PERCEPTION



The pandemic provides an opportunity for us to reshape the perception of the HVACR industry. Containment of COVID-19 in hospitals, for example, is made possible by airborne infection isolation rooms, which are serviced by highly specialized HVACR service personnel. **The pandemic should be a great opportunity to let the public know that HVACR is much larger and important sector than they perceive.**

MAJOR SHIFTS



The pandemic required those who train our workforce to **embrace new hybrid learning models.**



The **transition to Low GWP refrigerants** will be amongst the greatest changes our industry has seen in a generation.

HVACR's Pressing Issues & Challenges Ahead



TRAINING & LABOR

Quite often, the **training offered is not keeping up with the technological changes** the industry is experiencing.

While everyone discusses the skills-gap and technician shortage, the **aging of the industry is expected to cause additional workforce shortages** for several years to come.

Big Impact Innovations



It is often not an innovation that has the greatest impact, **but regulatory changes and industry incentives that drive change.** As an example, it took the heat pump, invented in 1948, forty-years to obtain industry acceptance. It was not a technological change that drove this acceptance, it was incentives from utilities that understood the benefits of these systems.

A 2022 View of Green Mechanical Council continued...



Fast Facts

Data from multiple equipment manufacturers indicates that:

>82% and **10%**

of residential parts replaced in the field

of factory-tested chiller components

were found to have no fault

The key difference is the level of training required to work on these systems. **This shows that, through training, we can dramatically reduce warranty claims, call backs, and improve the energy efficiency of equipment.**

Important Discussions



The AHR Expo will provide an **opportunity to educate the industry about air filtration, air cleaning, and virus arrestation.** Unfortunately, there are many misconceptions regarding the abilities and capabilities of HVACR equipment to capture particulate matter and viral infections.

This is an opportunity to re-shape the perception of our industry, by **making others aware of the key role we play in keeping them safe.**

Did You Know?



Our group has **statistical data to show a direct correlation between the knowledge of an instructor and those they teach.** Although the level of expected retained knowledge varies from learning to teacher, the competencies being evaluated are the same. As such, it is often the case that the results are similar, where the strengths of an instructor translate to their students, as do their weaknesses.



National Comfort Institute (NCI)

nationalcomfortinstitute.com

National Comfort Institute, Inc. (NCI) is an organization of 1,800 members that provides heating, air conditioning, plumbing and electrical contractors with a focused offering of services and tools to help them improve their businesses, differentiate themselves, grow, and become more profitable. NCI accomplishes this through membership groups and by providing unique business management, sales, marketing and technical tools, training, support and coaching - all designed with the goal of helping HVAC professionals to differentiate their companies through measured performance, quality and value.

Booth #N10806

A 2022 View of NCI



ROB FALKE
President

The Impact of COVID-19

“ COVID-19 has focused the world on the V (ventilation) letter in HVAC. **COVID brings an increased opportunity to companies able to deliver effective and verifiable ventilation solutions.** We can restore a degree of peace of mind to those we serve.”

THE PANDEMIC’S NEXT BEST SOLUTION



COVID has forced change on the world. Fortunately change brings opportunity for those that seek it. Our industry is able to control ventilation. **We don’t make vaccines, but ventilation is the pandemic’s next best solution through healthy buildings.** We have the ability to test, diagnose, improve and verify ventilation system performance that makes building safe.

A SHIFT IN TRAINING



Initially the training segment of our industry suffered. For decades we’ve gathered large groups of people together and taught them. This activity became illegal, almost overnight.

The training organizations that survived, adapted immediately. **We adjusted what, when, where and how we train and certified industry professionals. We became stronger and more relevant to our industry.**

• Herbert Spencer (1820-1903) said:
“The great aim of education is not knowledge, but action.”
Surviving training organizations shifted from conveying knowledge to enabling immediate responsive action in the field.

INCREASED RECOGNITION



Our members speak of a shortage of a willing workforce. They find solutions by attracting and training people from outside the industry, providing generous pay and benefits, advancing careers and flexibility to provide a work life balance. **Strangely, our members are benefiting from these shortages. Increasing wages and prices are elevating our industry to a higher status and increased recognition for what we contribute to our customers.** Although threatening to some, current conditions are granting us long past due recognition and advancement in society.

A 2022 View of NCI continued...

NCI By the Numbers

Our members gather live field test data revealing the percent of heating or cooling being delivered from installed HVAC systems into the building. For more than a decade this number averages below 60%. Then they typically improve the performance of the system to near 90%.

That's a measured & verified
↑ 50% in system performance

The opportunity to be paid well to improve system efficiency is a driving force for HVAC industry training.

HVACR's Pressing Issues



WORKFORCE SHORTAGE

Our members have known about the looming workforce shortages for more than a decade. COVID magnified the problem, pumped life into it and brought it home to each of them. **They're searching for answers - how to keep, attract, hire new, train new team members.**



PRICING ISSUES

Pricing jobs to **keep up with increasing labor costs and vendor prices** is another hot topic.

This morning I heard "Never before has our industry been in the state it's in today. Opportunities and obstacles are everywhere. We're constantly deciding which opportunities to embrace and obstacles we can avoid."

Opportunities for HVACR

INCREASED VALUE

I see now being the time for our industry to regain opportunities we let slip through our fingers decades ago. **The labor and material shortages are pulling towards being paid what we're worth.** Our challenge will be increasing the value we deliver to justify the increase costs and keep our customers.

CUSTOM PRODUCT

Current conditions are ripe for our industry to **identify and deliver a custom product**; Top performing installed HVAC systems far superior to the current level the industry offers.

TRAINING

The training sector's most pressing issue is keeping up with the new and increasing demand for training. Progressive employers are attracting the best of the workforce by offering career paths, and advancement through individual merit gained through training and certification. Employers who continue to consider their workforce as captives are unable to understand their workforce exodus. **In the training segment of our industry, our unspoken mission is to help elevate the industry from HVAC laborers to professionals.**

Challenges Ahead



ELECTRIFICATION

Electrification is a current challenge. We see a **huge gap between what regulators are decreeing and what a large majority of home and building owners think of the idea.** Looks like the two sides of electrification are headed for a collision.



ENVIRONMENTALISM

While environmentalism creates opportunity for the HVAC industry, **not all consumers are willing to spend large sums of money to bring it home.**



EMERGING TECHNOLOGY

Our members are on the front line being surrounded by HVAC emerging technology. While this is good, higher technology equipment, accessories and software do not install and operate themselves. To them, vendors see their products as plug and play. **With low and unexperienced support staff, much new technology is being abandoned.**

A 2022 View of NCI continued...

Important Discussions



FIND AND RETAIN PERSONNEL

Our certified contractors are currently discussing how to retain and find qualified personnel. They know the solution is far beyond paying higher wages. They are learning how to discover people who are hungry for a long-term career, work-family balance, the opportunity to learn and grow. They want people they can invest in and grow with confidence.



ESTABLISH PRICE

Another subject is how to respond to the current trend of **rapidly increasing costs and how to set their pricing to recapture past and future cost increases**. This is a trick task in our current business climate. This topic spans all segments of our industry.



AFTER INSTALL REPAIRS

Many of our members are seeing a significant increase in requests from new customers to repair their competitors newly installed systems. **Calling competitors to make after install repairs is prime evidence consumers are desperate to pay handsomely for top quality installations and results that are hard to find.** Only highly skilled technician are capable enough to provide these solutions. Eventually the installing contractor will pay the cost of poor workmanship.



Highlight the Positive

The solution that will spotlight our industry's contributions to society is to **deliver pristine and delightful consumer experiences and comfort systems that do what we promise**. Our product is highly complex and technical, and few understand what we do and how we do it. In reality they pay for an enjoyable, honest, pleasant experience before and after the job is complete.

Mainstream media is always searching for a good story to tell, so give them one. Most in our industry has a unique project, job or customer experience that is of interest to the public. **Become proactive towards the media and send them an achievement of yours of interest to the general public. Allow a third party to publish your positive story.** It's the best marketing you can receive.

In a recent discussion among several industry leaders, we paraphrased consumer sentiment about lost trust in our industry. Speaking for consumer we coined, "If I'm going to get rotten results from an HVAC contractor, I might as well get rotten results at the lowest price." **The best way to highlight our positive contributions is to stop contributing negatively.**

Our distributor members collectively employ 60,000 Americans and account for nearly 70% of the US Wholesale distribution market of residential and commercial HVACR equipment supplies and controls. HARDI currently has over 900 members. 440 wholesalers and over 460 total vendor, supplier, manufacturer reps and other associate members.

A 2022 View of HIA-C



RICK BOSTIAN
Chairman

The Impact of COVID-19

“ COVID-19’s obvious effects slowed business but, in a way, increased communication as online communication exploded. **Many in the HVAC industry found themselves in high-level staff meetings bringing the issues of IAQ and IEQ front and center.** Combine that with the electrification and decarbonization, highly variable occupancy, and the cost of both increased filtration and ventilation presented challenges to reduce energy use against mandates that increase energy use.”

HVACR’s Pressing Issues



At the Hydronic Industry Alliance - Commercial committee we have recognized that our early modeling software, BEST, compares annual HVAC System initial and operating cost. Our focus needs to be on demand energy use. **Electrification is all about demand day or weather created demand day energy use and points out that all our resources need to be deployed intelligently.**

Important Discussions



NEW SOFTWARE & VIDEO SERIES

At the show we will introduce our Demand use, HVAC and Water Heating additions to the basic BEST software.

- Plus, we will present the “Let’s talk” video series that is aimed at building owners faced with the crossroads of cost, safety, and efficiency.

Opportunities for HVACR



HIA-C will be actively supporting the recently announced **joint ASHRAE/NYSERDA webinar series supporting the growth of District and Community Heat Pump loops.** The opportunity to give the building owner the ability to “Net Energy” within a building and then among buildings for “Energy Sharing”. IAPMO is leading the charge to add District ATL to the code so when the questions are asked about jurisdiction and best practices there will be direction. Today’s hydronic central systems have the natural ability to control demand, net, and share energy for the life of the building.



Sheet Metal & Air Conditioning Contractors' National Association (SMACNA)

smacna.org

SMACNA members perform work in industrial, commercial, institutional, and residential markets. The voluntary technical standards and manuals developed by SMACNA Contractors are accepted worldwide by the construction community, as well as foreign government agencies. ANSI, the American National Standards Institute, has accredited SMACNA as a standards-setting organization. SMACNA represents 3,500 signatory contractors with more than 100 local chapters.

Booth #C5306

A 2022 View of SMACNA



MARK TERZIGNI
Executive Director
of Market Sectors
and Construction
Technology

The Impact of COVID-19

“The world is focused on HVAC, specifically a significant increased focus on Indoor Air Quality. **The industry should take advantage of this attention and make sure the focus or at least the practices resulting in good IAQ become standard practice for the foreseeable future.**”

FOCUS ON IAQ



There has been an **increased focus on IAQ which has benefits well beyond COVID**. As COVID winds down we hope the focus on IAQ remains.

• Even though the focus is on IAQ we have an **opportunity to deliver better IAQ and increased energy efficiency.**

EXPLOSION OF OPPORTUNITY



We have seen **substantial increases** in testing and balancing work as well as increases in residential work. Commercial projects have been steady with increases in pharmaceutical, higher education and research facility projects.

ARTIFICIAL INTELLIGENCE



An increase in application of **Artificial Intelligence (AI)** has begun to show up in the **design process as well as reviewing documents** such as specifications and contracts.

Big Impact Innovations



Technology will continue to impact the industry from **improving efficiencies for equipment to improved fabrication practices to BIM** and the changing dynamics between owners, designers, and contractors.

Important Discussions



Aside from workforce development **anything that can improve the process of building buildings**. Some of that will come from improved fabrication, installation, and coordination tools. Some products combine processes such as coordination and installation.

A 2022 View of SMACNA continued...



Fast Facts

HVACR Pressing Issue
Trained Workforce

Upcoming Opportunities
Focusing on IAQ

Deferred maintenance
on public buildings
and schools

Biggest Challenges Ahead
Material pricing
and availability

Highlight the Positive



Research exists pre-COVID that already shows how good IAQ has a positive effect on occupants. **Educating the public to what good IAQ is and supporting the standards and installation practices that result in good IAQ** should be a priority for everyone in this industry.



Plumbing-Heating-Cooling Contractors Association (PHCC)

phccweb.org

Formed in 1883, PHCC provides legislative advocacy, education and training to more than 3,500 plumbing and HVACR businesses and 65,000 technicians. Members of PHCC have access to a wide variety of services designed to increase their professionalism, grow their business and improve profitability.

A 2022 View of PHCC



MICHAEL COPP
CEO

Bi-Annual 2021 PHCC Contractor Sentiment Survey

92% of respondents were plumbing contractors and 55% were HVACR contractors who responded to this survey, albeit some plumbing contractors also provide HVACR services. With the economy growing by 6.4% in the first quarter, according to CNN on April 30, 2021, **there is greater optimism and increased consumer confidence in this economic recovery.**



The Conference Board forecasts that:

U.S. Real GDP growth will rise to 5.0% annualized rate in the first quarter & 6.0% YoY

Source

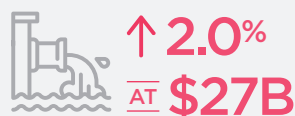
Trends

FMI Advisors projects steady growth in construction spending in 2022 after a slight dip this year in most industry sectors except for construction of data centers, educational, healthcare and public safety facilities.

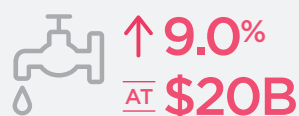
FMI Advisors projects segment performance for:

Source

Sewage & Waste Disposal



Water Supply Spending



Power



Overview

COVID IMPACT

Respondents rated the continuing **impact of COVID on their business as being a low or medium impact.**

Over half of respondents indicate they are **not planning to apply for a second draw PPP financial assist.**

Most respondents indicated that COVID has impacted their workforce most because of employee absenteeism, increased anxiety, difficulty finding technicians, and reluctance for workers to take mandates seriously when they are working in spaces together.

Top challenges include:

- Not operating with full staff
- Increased operating costs due to increased needs for PPE and jobsite sanitation
- Addressing employee and customer health and safety concerns
- Customers holding off on projects
- Replacements due to economic concerns
- Difficulties with shortages and huge price increases, getting HVAC equipment, and slow supply chain

A 2022 View of PHCC continued...

SUPPLY CHAIN ISSUES

Just under half of respondents indicate that **manufacturers and suppliers have been highly responsive to their needs.**

- **Concerns include:**
 - Supply chain shortfalls
 - Commodities volatility
 - Significant supply disruption and parts are not available when promised
 - Hard to get items: some heaters, AC, garb. disposal and water heaters, touchless faucets and flush valves to complete owner desired renovations.



The majority of respondents indicate that supply chain disruptions are due to **delays in shipping materials, cost increases, shortage of construction materials, equipment, or parts, and manufacturer training disruptions and lack of experienced new employees.**

NEW BUSINESS PRACTICES

Respondents are **mitigating safety risks for employees and clients** by:

- Screening employees as they report to office or job site
- Social distancing on construction jobs
- Mandatory requirements to use adequate PPE
- Increased disinfection of high touch areas
- Complying with all CDC guidelines
- Increased communication with customers about the importance of safety protocols
- Following the General Contractor's requirements on the job
- Encouraging employee vaccinations

Respondents ranked **concerns they have for their business and working environments** over the next six months:

- The increased cost of doing business (safety equipment, materials, insurance)
- Continued challenges finding qualified employees
- Potential recession
- Increased risk (safety, health, lawsuits)
- Commodity price increases in copper and steel affecting our PVF costs as well as our coil and sheet steel
- Procuring materials and shipping delays.

PHCC RESOURCES

Respondents indicated that **additional resources that PHCC might provide include:**

- Supporting the easing of restrictions and opening up the country to in person meetings and training
- Advocating for vaccine eligibility for workers and promoting the adoption of all public health guidelines
- Educating the public about respecting our safety
- Providing easy-to-use recruitment tools
- Advocating for preferred interest rates for loans
- Continuing to market to the general public about the [value of the] trades.

Industry Concerns

With the unemployment rate at 5.3%, a continuing concern for contractors is the challenge of finding qualified workers-- and certainly the recent pandemic did not help this pervasive problem. Patrick Jones in his March 2021 article, *What Workforce Challenges Are Ahead for Key Construction Industry Segments?*, reports that **"pandemic-related disruptions experienced last year [and] the lingering effects of these setbacks will continue to unsettle the industry's workforce for much of 2021."** Fortunately, it is expected that construction projects delayed in 2020 will slowly restart to include water infrastructure and industrial projects with the push for a large-scale multi-trillion dollar Infrastructure spending package over eight years. But all of these efforts presume an adequate recruitment of skilled workers given that as Jones (2021) points out, "the industry has seen even more experienced workers retire from the workforce during the pandemic." (ibid)

Some recruiting tactics offered by Jones (2021) include:

Look for talent over experience: "Employers may be better off hiring more candidates with the right aptitude, motivation and drive who can be trained in construction.. [and] retention rates typically improve when hiring and developing new talent." (ibid)

Promote career growth potential: "Prepare a company overview document that gives ... candidates detailed insight into the company... as well as forward-looking insight into company plans and how their career progression fits in." (ibid)

"The builders and contractors that will secure and retain workers are those that look at the labor pool in new ways, and are strategic about their talent acquisition strategies." (ibid)



Building Commissioning Association (BCxA)

bcxa.org

The Building Commissioning Association (BCxA) is an international nonprofit organization with more than 1,200 members from the commercial building industry who are committed to the highest standards and practices for the commissioning process. We're here to raise awareness of building commissioning and to empower commissioning providers, building owners, and others to optimize the built environment so families and communities can live, work, and play in buildings that are safe, efficient, and resilient.

Booth #C2850

A 2022 View of BCxA



RYAN LEAN
Associate Partner

The Impact of COVID-19

“ The pandemic has put a renewed focus on indoor air quality (IAQ) in buildings, especially how it relates to existing HVAC infrastructure. With an ever-increasing workload for facility managers and operating engineers, IAQ fell behind energy reductions, no downtime and user complaints – among others - prior to the pandemic. **Today, discussion around IAQ is back near the top with everything from upkeep of outdoor air dampers and increased filtration monitoring to major infrastructure upgrade projects like UV lights and Bi-Polar Ionization installs.**”

HEALTH & SAFETY



In addition to the focus on HVAC, there has been a **renewed focus on wellness, and keeping people working inside buildings safe.** With the advent of smart technologies in almost every facet of our industry, many Owner/Developers are focusing on a way to keep their occupants healthy on a large scale with technology such as people counters, smart elevators, temperature screening through thermal lobby cameras, etc. It is an exciting time and how these systems interact with the HVAC infrastructure over the near term will be fun to watch.

CxPs STEP UP



Commissioning Providers (CxPs) have put themselves on the front lines to support facility managers and operating engineers to realign their facilities to the Current Facility Requirements (CFR). Over time, buildings experience space and use-type changes in isolation without recognition of how these changes impact the integrated operation of major systems – like Outside Air (OA) systems.

CxPs have spent the last 18 months checking sequences, unlocking jammed outdoor air dampers, cleaning up old operating schedules to start early and end late, upgrading filtration, adding new technologies like UV to spaces, and re-testing equipment serving occupied spaces, or in some cases testing them for the first time. **Continual maintenance is how we get through this. Automation does not work without human support.**

HVACR's Pressing Issues



Staffing and finding the right talent has always been a priority, but it has renewed focus in today's environment. HVAC, engineering, commissioning, can be taught, just like other job functions and sectors, but it takes time for someone to be trained and ready to support major functions on their own.

A 2022 View of BCxA continued...



Big Impact Innovations

Monitoring Based Commissioning (MBCx) is poised to make an incredible impact. Based on the focus around data, and the staffing issues we've seen in many facilities, software tools now exist to provide belts and suspenders to your traditional BMS. Dashboards and rules with alerts that tell you where the problems are, before they are problems, should be widely adopted and implemented everywhere. In addition to monitoring the IAQ in a space, and being more transparent with your occupants, this software has the ability to save organizations a lot of money by advising operations teams of invisible cost savings. Simple, yet extremely effective.



Highlight the Positive

People in the HVAC industry are the unsung heroes of this pandemic. Without taking away from all the amazing work healthcare professionals on the front lines are dealing with every day, **the people in HVAC have the best chances of making our buildings safer than ever.** We absolutely have the ability to improve air quality in schools. And considering COVID-19 is an airborne disease, that's really important. Upgrading filters and/or increasing outside air is not a substitute for masks or vaccinations, but it's a variable we can control to protect indoors from breathing in the virus. While simple upgrades have been around the mainstream media for over a year, within the inner circles of the HVAC community, this is nothing new. **There is renewed focus on it now, and the overwhelming story here, it works to keep people safer, but only if designed and installed correctly, hence the need for professionals to support.**

From the Floor



The Impact of COVID-19

“The impact on the air conditioning industry is similar to other industries with a major shift toward more reliable domestic component supply sources.”



SUPPLY ISSUES

Virtually, every air conditioning company will **continue to be impacted by supply problems**, due to COVID-19, thru most of 2022.



DEMAND INCREASE

We have experienced a **major demand increase from resellers**, who are switching from Asian suppliers to US based suppliers.



TURNING POINT

Long term demand has increased a cross the board for air conditioning products. **In the last year, the supply and manufacturing limitations for the air conditioning industry have become glaring**, leading to major fallout for companies that cannot make the transition to greater efficiency and performance reliability.

HVACR's Pressing Issues



The air conditioning industry is facing **major regulatory challenges related to climate change**, that require advanced flexibility and development capabilities.

The portable air conditioning industry is facing **more technical innovations that continue to meet a dynamic construction and design environment**.



Important Discussions

Moving away from single source components to developing multiple vendor choices. **We always explore the show for new technology manufacturing solutions and supply sources.**

Upcoming Opportunities



There is substantial opportunity for US based companies to **increase market share, but only for those with the ability to expand production.**



Highlight the Positive

Our industry should be focused on **reasonable solutions to make an environment more livable.**

Challenges Ahead



Domestic companies will continue to **be challenged to fill the supply gap**, left by customer transition away from Asian suppliers.



The Impact of COVID-19

“ The pandemic has shined a spotlight on the importance of HVACR systems, especially when it comes to indoor air quality (IAQ). Clean, fresh and safe air is critical for everyone, whether you are working at home, in a commercial building or shopping at the grocery store. As a result, the pandemic is creating a lot of opportunities for innovation. At Johnson Controls, we pride ourselves on innovation tapping into our entrepreneurial spirit across the organization.”

MAJOR INDUSTRY SHIFTS

The two biggest shifts are digital solutions and connectivity. **Building owners and managers are constantly looking for ways to do things digitally and ensure their equipment is connected to achieve occupant wellness, track energy usage and system efficiency, and reach sustainability goals.** That’s why Johnson Controls launched OpenBlue. It’s a complete suite of connected solutions that serves industries from workplaces and schools to hospitals, campuses and homes.

In addition, more than ever before, the industry is taking **aggressive steps toward environmental sustainability and tackling global carbon emissions with innovative new technology**, such as cold-climate heat pumps, the transition to low-GWP refrigerants and the Department of Energy’s 2023 energy efficiency regulations currently in process. These are all major initiatives for Johnson Controls, and when conducted as part of a collective global effort could put us solidly on the pathway to net zero by 2050.

IAQ & EFFICIENCY

Because of the need for clean, fresh and safe air indoors, we’re taking innovation to the next level. That includes better systems to manage air distribution and better ways to filter the air and remove potentially harmful contaminants. **Providing clean, fresh and safe air is very important to our industry, customers and end users – both now, as we continue to battle COVID, and going forward, as we work with our customers to leverage the health, wellness and productivity benefits of well-managed IAQ.**

However, with the introduction of fresh air, improved filtration, humidity control, and other air treatment methods, comes a **growing concern about the potential for higher system loads – and the increased energy use that can result.** Fortunately, the proper application of modern HVAC technologies, like variable air volume systems and energy recovery wheels, can help maximize IAQ while minimizing losses in operational efficiency. This focus on greater efficiency and even further, on electrification and decarbonization, will continue to be a major focus.

HVACR’s Pressing Issues

PROGRESS THROUGH RECRUITMENT



Aside from what is already been discussed regarding indoor air quality, innovative new technology and environmental sustainability, recruiting and training the next generation of HVACR professionals continues to be a pressing opportunity. The industry is making progress – for example, more female technicians are entering the field – but we still have a long way to go. **We need to collectively spread the word that our industry is a dynamic one in which to work and build a career.**

DUCTED SYSTEMS ACADEMY



Johnson Controls has made major investments in our workforce with the **Ducted Systems Academy**, located in Oklahoma City. **The academy offers a wide variety of business, management, and technical training for our contractors and distributor partners.** With a first-of-its-kind, world-class training laboratory featuring residential, light commercial, and applied commercial HVAC products and controls, contractors can attend hands-on classroom and lab training as well as live training sessions online.

Those investments are helping foster the next generation of HVAC professionals. They’re quickly learning that HVAC is indeed a rewarding career. They have opportunities to contribute to healthy buildings solutions and support our mission of providing healthy people, healthy planet and healthy places.



Big Impact Innovations

We believe our **OpenBlue suite of connected solutions is a game-changer**. For example, OpenBlue Enterprise Manager allows our customers to proactively manage their buildings as well as their entire portfolio of spaces and assets, including HVAC, security, fire and lighting systems.

Another innovation is the **digital twin - a connected, virtual replica of a physical product, asset or system**. Through data and visualization, the digital twin connects and integrates all building systems into one unified application. With the digital twin, buildings will ultimately become so smart that they will be able to solve issues on their own.

Upcoming Opportunities



We believe addressing climate change – specifically carbon emissions – is a huge opportunity for our industry. Buildings account for nearly 40% of CO2 emissions – and HVAC is typically the largest energy-consuming technology within a building. **While further improving energy efficiency and deploying more zero-carbon-generating products remain critical, another important opportunity to drive further emissions is by electrifying building end-uses like heating.** One way we can help achieve this is through increasing adoption of cold-climate heat pumps that can displace, and ultimately replace, fuel-burning and electric resistance heat sources.

Challenges Ahead



The **labor shortage and training the next generation of HVACR technicians** will be a challenge in the near and long term.



Also, we need to help building owners make sense of the huge amount of data they are receiving from their systems. That includes **interpreting the data and using it wisely to make sustainable business decisions**. Implementing technologies like digital twins will allow building systems to leverage that data, acting autonomously to solve issues without human intervention.



Moreover, **identifying ways to become more energy efficient** will always be a critical opportunity for our industry.

Important Discussions



At the Expo, we will feature several themes – from **digitalization and sustainability to healthy buildings, vertical markets and security**. We'll showcase a variety of products and solutions to support those themes. They include energy-efficient products such as the Choice rooftop unit, new heat pump models, the YVAA Style-B air-cooled chiller and a new air-handling unit for data centers. Digital Solutions will address OpenBlue Enterprise Manager, Connected Chillers and Central Plant Optimization. On the controls side, we'll have Metasys, Facility Explorer, EasyIO and Critical Environments. And we will feature the IsoClean 800 clean air recirculating system.



Highlight the Positive

The pandemic has certainly put the spotlight on HVAC systems, especially on the home front. Homeowners are very much interested in how their systems perform, save energy and provide clean, fresh and safe air. **As industry professionals, we have an obligation to educate people about the benefits of proper heating, cooling and air distribution. Technicians play an important role.** They can help homeowners make the most of their HVAC systems.



“ Technology has never been more critical in the way we run our businesses, our cities and our communities. To tackle the twin crises of the pandemic and climate change, we need to re-think how buildings operate.”

“For example, our ability to accelerate innovation, solve unique customer outcomes and deliver on the key secular trends of sustainability and energy efficiency, healthy and safe buildings and connected/smart buildings, is critical to our strategy.

We continue to build on the increased confidence and momentum from our transformation from a multi-business industrial portfolio to an integrated digital and technology leader.

Johnson Controls has a rich history of delivering world-class products, solutions, and services globally. In serving our broad portfolio, **becoming connected and providing intelligence to deliver world-class outcomes and value for our customers is core to our mission.** It’s the cornerstone to our brand, OpenBlue, and integral in delivering sustainable, secure, healthy environments served by connected environments in the building.

Our OpenBlue platform is a suite of digital solutions that connects information technology and operational technology. I like to think of it as the brain and nervous system of a building’s operations.

Many large buildings have extensive HVAC systems, lighting systems, door and entryway systems, security systems, etc. But often those systems are siloed and don’t communicate with one another. **With OpenBlue, sensors across all building management systems collect data and feed that into a central repository. Then, on the back end, our software, powered by artificial intelligence, makes sense of it all.**

This helps facilities managers automate systems and maximize efficiency, which leads to healthier spaces, more comfortable environments, more environmentally sustainable energy and water use, and ultimately helps save operators money as well.”

“ OpenBlue enables us to help optimize buildings for health, safety and sustainability, and is central to fulfilling these goals and creating an environment for healthy people, healthy places and a healthy planet.”





The Impact of COVID-19

“ The HVACR market, especially residential, is strong as manufacturing and contracting organizations alike have adjusted to selling and training in the new normal environment. The industry’s supply chain and logistics, however, are still challenged, pushing lead times out and costs up.”

WHAT’S CHANGED

People’s behaviors have shifted, affecting market segments differently. Hospitality and Office segments in the commercial market have not come back to their pre-COVID levels yet, while the residential market has grown tremendously. **The pandemic has also put a larger focus on indoor air quality via outside air requirements, filtration, and/or purification.**



VRF GROWTH

Duct-free and variable refrigerant flow (VRF) growth is still outpacing traditional solutions in the HVAC industry, though growth in each market segment is very different.



REDUCING FOSSIL FUEL

Electrification and decarbonization are becoming increasingly important as more states consider measures aimed at fossil fuel reducing guidelines. This will continue to push heat pump technology as a preferred solution going forward.



Highlight the Positive

Right now, **HVAC is helping people improve their environment**, whether that is through improved indoor air quality, increased comfort or providing heating and cooling options that encourage the reduction of fossil fuel consumption. HVAC professionals can begin to and continuing highlighting these positive contributions. **Not many industries can improve product experiences while making it better for the Earth.**

Upcoming Opportunities



The electrification movement, coupled with the increasing use of incentives by utilities to encourage the reduction of fossil fuel consumption, is **one of the biggest drivers in indirectly promoting heat pump technology in the industry.**

Challenges Ahead



Imminent changes to refrigerant requirements in the U.S. will, in the next few years, challenge the industry as the **market looks to improve the environmental impact of refrigerants** without sacrificing fire safety, system efficiency, or user comfort.

Big Impact Innovations



The continued **convergence of traditional HVACR systems with variable speed or inverter technology** will have a large impact on the industry. Innovations in this technology will continue to gain acceptance in the market while also meeting the increasing demand for higher efficiencies and reduced reliance on fossil fuels.



Important Discussions

HVAC is a relationship driven business, so the most important discussions continue to revolve around growing our relationships with customers. **At the show, this means creating an environment that promotes customer engagement and aligns with industry trends.** Our booth will have product displays related to electrification (DOAS, ESS, Heat Pump Chillers) and residential growth (inverter heat pumps), as well as discussion areas for our Pro Dealers, channel partners, and customers.



The Impact of COVID-19

“ On the upside, indoor Environmental Quality is in the news! At least people are asking more questions about the ventilation systems in their buildings, they usually ignore it until it breaks.”



MAJOR EFFECTS

The COVID-era has been a great reassessment period for trainers and trainees. **Everyone is evaluating what mix of virtual and in-person training works best, long-term.**

Uncertainty is the common thread. Specifically, is there a “normal again” date to plan around?



SOFTER SIDE

Workplaces in the industry have changed drastically. **The quick shift to work-from-home let us see a softer side of the people** we work with every day, which may not have happened without the pandemic.



Important Discussions

Do they have products to ship? **The day-to-day discussions relate to getting the job done with the products available**, which may be a more complex puzzle than it was in 2019.

Highlight the Positive

For the first time in recent history, the general public is interested in what is behind the wall. **We can't let them forget the incredible things we are able to do with mechanical systems and disappear into the background again.** Otherwise, people will go back to caring more about their countertops than their indoor environmental quality.

HVACR's Pressing Issues



What does the electrification trend mean to my business?

The answers are all over the board, but it is a topic that can't be ignored.

Upcoming Opportunities



Optimization of the supply chain to keep construction projects moving is an enormous opportunity.

The heroes of 2022 will have time-saving products to keep contractors working.

Challenges Ahead



Who will convince politicians that they are the most worthy of **infrastructure investments to address climate and resiliency concerns?**

Big Impact Innovations




All technologies that can help **renovate existing hydronic systems to work with sub-140 degree F supply temperatures** will open up more energy source flexibility.

“ 2022 will be the year we decide which COVID-era workplace adjustments we want to make permanent. For training, the key is concise, engaging virtual training for a webinar-weary audience.”




The Impact of COVID-19

“ All market sectors have gone through a re-evaluation of their HVAC systems. On earth, HVAC systems are mechanical units we hide in closets, attics, roofs, or mechanical rooms and forget about them. When the space shuttle is between the earth and the sun, it requires cooling. When the space shuttle is behind the earth, it requires heating. In the space, we call these life support systems. We need to start thinking of our HVAC systems like life support systems!



RETHINKING STANDARDS


The pandemic has caused all industries, particularly the HVAC industry, to re-design supply chain, factory labor, and field labor. But most importantly, **we need to rethink the standards we use to design these systems and, more importantly, develop the load impacts** we can expect with higher ventilation, higher static pressure capability for higher filtration, and operational resiliency.



VENTILATION SYSTEM GROWTH

Just like everyone, we have experienced significant effects in supply chain, and labor.


But demand for ventilation systems has exponentially grown. The USA is among the lowest ventilation rates for the built environment compared to other first nations. So **building owners, operators, and users in concert with homeowners are now looking at exceeding the minimum code requirement and looking for higher-performing structures.**



GO-TO-MARKET STRATEGIES


The most dramatic shift in the HVAC industry, I feel, belongs in the go-to-market strategies that companies are adopting. Basically, how do we get the product to market? How do we engage with engineers and influencers? How do we manage orders and stocking levels? **Companies are now rethinking their go-to-market channels and looking at streamlining the initiative to improve the speed of business, cost, and penetration to increase market share.**

HVACR's Pressing Issues



I believe the most pressing issues remain **delivery time, cost control due to inflation, and, as mentioned above, codes and standards.** We shouldn't be running away from buildings during pandemics or any adverse situations but running into them for protection. How we design buildings and setting codes and standards will require ASHRAE to set up and re-evaluate what market demand will be post-pandemic.


Challenges Ahead



Standards that will become code.

New and more direct **go-to-market initiatives** to improve the speed of business and improve the user (customer and end-user) experience.

Upcoming Opportunities



Demand Demand Demand. Besides new standards for new buildings, the existing building market with these outdated and matured HVAC systems will require updates. **This demand will remain in effect for the next ten years.** Besides the higher efficiency needs for operational efficiency and cost savings, updated ventilation rates and higher filtration efficiencies will be the new baseline.

Many existing systems operate at **50-70%** of the original design - especially outdoor airflow rates



NICK AGOPIAN

Vice President Sales and
Marketing; RenewAire LLC



Important Discussions



Safety and building resiliency. We live in a Whole Foods society. Younger generations are now taking note of what they eat. **Health is paramount. So more emphasis will be placed on what people breathe within the built environment.** Consumers will look for health and safety.



In addition, the **show floor will be looking for equipment and design practices to be adopted into the design for a higher-performing building** as market demand will dictate the need.



Big Impact Innovations

Organic integration into the built environment. Research ongoing in Europe offers plants to help purify the air naturally, without adding harmful chemicals or electronic devices.

HVAC systems will start using more outdoor air as energy recovery devices become more and more efficient. So **WHY REUSE AIR WHEN YOU CAN REUSE ENERGY!**

Highlight the Positive



ASHRAE has some of the greatest minds. These people meeting in rooms while the show is ongoing deliberating on standards that will be adopted into code will be a topic of discussion. **Meaning, engineers, contractors, and consumers will be looking for insight on designing higher-performing buildings that are safe.** How do we upgrade for more outdoor air at a lower operational cost? How do we increase filtration at lower static pressure implications?



Also, I feel the **WELL building institute's healthy building standards** will be a topic of discussion. So previously used to take about the metal used, the fans used, the insulation used, the controls, etc. In Vegas, we will be talking about how these systems will be integrated and how we communicate the benefits to people inside these buildings.



From the Field



 **@hoosier_hvacr**

Dave Elliott, HVACR/Electrician

“ COVID fortunately hasn’t had a day to day affect on my work load. Actually just as busy or busier than pre-pandemic. The early days were confusing and a little scary. From masks to gloves and an overload of information that at times seemed useless.”



What innovations have the potential to make the biggest impact?

Refrigeration piping press tools and fittings are making a huge impact. Before the cost of tool/fittings weren’t as cost effective. Especially with a propane based refrigerant R-290, a non flame press system is huge reduction in safety concerns. Refrigerant changes always have a yearly impact as well.

In a Nutshell

- Business has been very well, fortunately the skilled trades were considered essential.
- Air quality control has taken a more prominent role in industry over efficiency, it seems.
- Replacement for air quality will become more prevalent than just normal changeout considerations.
- Equipment and parts availability is a huge conversation. Refrigerants and newer tools are always a big topic as well.
- Manufacturers should provide better online training for techs.
- Equipment and parts availability is a huge conversation. Refrigerants and newer tools are always a big topic as well.



How has your day to day been affected by supply?

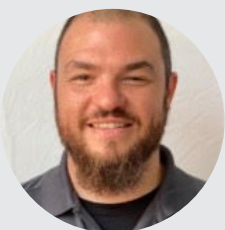
I have a larger amount of stock parts now than ever before. The parts ordering to delivery time frame has become quite the daily guess. Everyone is suffering, so the customer is frustrated but still more understanding than ever before.

In a Nutshell

- **A Major Shift:** The amount of equipment available. Some have delays which can be bothersome but we get through with different equipment to be installed
- **Big Impact Innovation:** Wifi capable everything. Everyone wants to be connected and most equipment now can connect and keep you dialed in.
- **Important Discussion:** Press technology specifically RLS. The superior brand of refrigerant press fittings. Getting people on board. I know they are going to be there and I am a huge advocate for it.



Everyone is looking to hire right now. If you want to get into the trade the time is now.



 **@flynnstone1**

Michael Flynn, HVAC & Plumbing

“ Early on it was a bit slower. But picked right back up when people needed service. We are super busy now. Working every single day with new installs to be done. The company I work for is striving. We are on the move and looking to hire new personnel.”

 @flynnstone1

How can professionals in the field highlight the positive contributions of the industry?

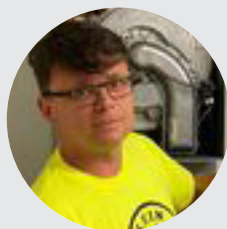
Keep putting out clean and proper work. The jobs that we do and service we provide can be held to the highest caliber to have the trade rise up. It is our job to showcase this cleanliness and pride for our work in our day to day. *No matter the situation, do it right, do it once.*



What would you like to see from manufacturers?

Press technology!!! Most of what we do is moving toward easier ways to connect tubing and piping. Having equipment that can support that would be incredible. HVAC equipment that comes with a press connection or stub to press right on to would make our day to day much easier and provide a flameless install.

I think proper in the field training should happen. **School is great for learning theory and practice but it all happens at work.** You have to be prepared for every situation to adapt and overcome. No home or building is exactly the same so you have to be able to figure out what's going on and complete the task correctly.



 @nample

Bruno Frie

“ As an essential worker, COVID-19 changed the way we work and protect ourselves – life has slowed down and brought families closer. In the beginning, everything was new and nobody was prepared for the situation, and a kind of fear of the virus was everywhere.

During the lockdown, most of the private customers have been very careful to protect themselves from infection. Homeschooling and working from home was a much bigger challenge as hot water and heating boilers have been in use longer than normal, and they also failed more often. Also empty office buildings are facing problems with draining, clean water and air conditioning.”



As I'm now over 30 years in the HVAC trade it was never possible for me to contact a manufacturer directly like it is now. All the time I had to go over the Plumbing/Heating merchant and over that way to the manufacturer. That changed completely with social media and also the connections between the installer's community is great.

In a Nutshell

- **Business Status:** As more people are vaccinated, a little normality is back in our life, and customers invest much more money now in their bathrooms and homes.
- **Big Impact Innovation:** I think Press Jaws for the refrigeration have the potential to make a big impact. Refrigeration systems and heat pumps can be installed quickly and safely instead of connecting the copper pipes by brazing.
- **Manufacturer Wish List:** Using battery powered tools is absolutely common. It would be much easier if manufacturers would use a compatible standard for battery pack technology.



What are the most pressing issues facing HVACR right now as an industry?

Manufacturers are apparently continuously faced with major challenges due to the severe shortage of important raw materials and continuing price increases. It started early this year with wood and now almost every raw material is effected. This evidently caused construction activity to slow down. It feels like capacity had been scaled back because of Coronavirus and then runs up faster than expected. Delivery times of a few months are more common now.



@hvacjess

Jessica Bannister,
Level 3 HVAC Apprentice

“ In the beginning it slowed things down significantly, although we still continued to do at least one service call a day. Access to roofs or mechanical rooms was made available before we arrived on site and we had very little human interaction. Suppliers would bring our stuff right to our vans. There was absolutely no traffic. The first few weeks of the pandemic were kind of great to work during.

Things started to pick up in June 2020 and by July, we were rocking and rolling. We started to see a shortage of general supplies like capacitors and contactors, etc. but if we planned accordingly, it didn't affect us too much.

We've been working steadily through the rest of 2020 and into 2021. We were slammed by Summer 2021 with a few heatwaves in a row, causing us to have extremely limited stock of condensing units locally.”



How has your day to day been affected by supply?

We have had some challenges with general supply of items. If we plan ahead (i.e. stock up on a couple extra), we seem to be able to get by. It's hard sometimes to explain to the customer that we don't have a basic part and that it's going to be a 2 week wait. During the heat of summer, we had a shortage of condensing units - both AC units and low temp commercial units.

Business in general is good. The pipeline looks promising and I am hopeful for the future.

With climate change impending, there is only going to be more work for us in the future. We are already seeing it with summers starting sooner, staying hotter, and lasting longer. Equipment that was specked and engineered 10 years ago, can no longer keep up with the demands imposed on it. We are either repairing it year over year or replacing it with more efficient equipment.

In a Nutshell

- **A Major Shift:** Being a woman in the trade, this year we've seen a few more women emerge, maybe only because I'm paying more attention? We definitely need more ladies!
- **Staying Connected:** Social media is gaining traction and we have a building community. Technicians are getting more excited and showing more pride for their trade. We have social media contests for Best HVAC tech, best copper pipe work, etc. It's very cool to see and be part of. I'd like manufacturers to keep interacting with technicians on social media, etc.
- **HVACR's Pressing Issue:** The skills gap. We need more fully, properly qualified people doing a proper job. We need more women in the HVACR industry.
- **Big Impact Innovation:** I think compression fittings are going to make a huge impact to the HVACR industry in the future.



womeninhvac.ca

I am currently the President of Canadian Women in HVAC/R and wish to create more awareness and inclusion of women in the industry. I'm hoping to find a few more strategic sponsorship partners to help us gain awareness and traction.



How can professionals in the field highlight the positive contributions of the industry?

With transparency - by sharing and showcasing their best work on social media. By showing what an interesting, challenging, rewarding industry it is.



 **@northwest_hvac**

Jamie Christensen

“ In the beginning it was very scary for us because our son had just got out of the hospital from having a very severe case of RSV, so I took myself out of work, thinking it would only be a short period of time before this thing passed, it turned out to be 4 or 5 months before things opened up enough for me to go back to work. When I would come home from work I would strip down to my underwear and shower before touching or kissing my family.

Now it's more “normal” but the biggest effect is always having to wear a mask and making sure I'm washing and sanitizing my hands as often as I can think, and just overall being as cautious as possible for my family's safety and others.

Business is great, the biggest shift I've seen is customers are more concerned with IAQ now over these last two years.”



I wanted to give huge shoutout to the whole IG HVAC family! HVAC is truly KING OF THE TRADES, and I cannot wait for the show next year, I was truly bummed when Chicago was cancelled due to the pandemic.

In a Nutshell

- **Upcoming Opportunities:** I think more companies and manufactures are focusing on IAQ and obviously efficiency with equipment.
- **Staying Connected:** I think you are starting to see more “influencers” in our field, more and more companies are seeing the benefits of having us promote tools and equipment.
- **Big Impact Innovation:** Anything that has to do with IAQ and new refrigerants to replace R22 and when 410a eventually gets phased out I'm curious what the next big thing will be. Also, I think anything VRF is going to make a huge impact, seems like more and more people are leaning towards that level of energy efficient equipment and its pretty complex stuff so I'd recommend any technician out there to learn it.



How can professionals in the field highlight the positive contributions of the industry?

I believe all anyone has to do is check out the HVAC IG community and see what we do on a daily basis to keep people comfortable and as safe as possible with COVID. I mean we are handling equipment that circulates and filters all the air in peoples home and in commercial buildings. Other than first responders and people in the medical field I think we are right up at the top of being put at risk through this pandemic.

What are the most pressing issues facing HVAC right now as an industry?

I think the most pressing issues are getting equipment and supplies, especially in the beginning when MERV 13 filters were 4+ weeks out and everyone wanted them. Now it seems it's more of an equipment shortage, I've seen supply houses start carrying different brands than before because they couldn't get what they normally sell. Then you have major price increases across the entire nation for material and equipment.