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HPAC ON THE AIR

In early 2021, *HPAC Engineering* launched its first monthly podcast series, *HPAC On The Air*, featuring audio interviews with industry thought leaders and newsmakers. Each 15- to 30-minute episode speaks to relevant and compelling issues of the day, which have not been in short supply during a global pandemic. Conducted by HPAC Editor-in-Chief Rob McManamy, all of these interviews are archived and available for listening under the Podcasts tab of our *Members Only* section at HPAC.com.

This e-Book offers a select sample of that first year of podcasts, featuring representative transcripts from interviews with leadership at ASHRAE, the American Boiler Manufacturers Association, the U.S. Green Building Council, and the International WELL Building Institute. Topics include the latest on industry efforts to address public health and indoor air quality, decarbonization, energy efficiency, and next-generation recruiting.

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ROB MCMANAMY
HPAC Engineering

ASHRAE'S NEW FOCUS ON DECARBONIZATION

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Former ASHRAE presidents Don Colliver and Tom Phoenix explain why their new Task Force for Building Decarbonization is such an urgent priority for the organization.

BY ROB MCMANAMY
FEBRUARY 2022

This month's guests are two accomplished engineers and past presidents of ASHRAE, Dr. **Donald Colliver** from the University of Kentucky and **Thomas Phoenix**, of Mechanical Contractors Inc. in Charlotte NC. The highly experienced pair have been linked since last spring as co-chairs of ASHRAE's new Task Force for Building Decarbonization (TFBD).

This is an ambitious and important new effort that our listeners have heard referenced in prior podcast episodes with current ASHRAE President **Mick Schwedler**, as well as his predecessor, **Chuck Gulledge**. It was Gulledge who launched the TFBD in 2021 and intentionally patterned it after the successful ASHRAE Epidemic Task Force that was urgently birthed by the pandemic.

Here, Colliver and Phoenix explain how their task force came together, what they hope to achieve, and why they think it is worth everyone's attention. *Please listen and share...*

ASHRAE'S NEW FOCUS ON DECARBONIZATION

Above, Don Colliver (top left); Tom Phoenix (bottom); Rob McManamy (top right).

EDITED TRANSCRIPT:

HPAC: Gentlemen, welcome. Let's first dive into your backgrounds a bit. Please tell us how your careers and involvement with ASHRAE and sustainability efforts over the years have led you to lead this key task force.

Don Colliver: Thank you, Rob. And thanks for this opportunity to talk about the new task force. There are a lot of exciting things going on with it. In response to your question, I have been doing research and teaching in the HVAC area and the design of efficient buildings for 40-plus years or so. I got involved in ASHRAE first as a student and then later as a faculty member involved in its research program and standards development. Eventually, I became Society president in 2002. During that time, I had come to realize that many design professionals were looking for guidance on buildings and designs that were better than just the code minimums. I envisioned that if we broke down the silos in the built environment and brought professionals together that we might be able to provide this guidance. Working with AIA, and U.S. Green Building Council, and IES, and U.S. DOE, we pulled together a team to start development of the Advanced Energy Design Guide (AEDG). I subsequently served as chair of that group for over 10 years, and by 2013, we had over 50,000 copies of AEDGs in distribution. I believe this is what led to me being requested to work on this particular project.

Tom Phoenix: First, let me echo Don's thanks for allowing us to talk about the task force. As for me, I'm a consulting engineer and I have worked in this business for a long time... When I first started, I was invited to join the local ASHRAE chapter, and the rest is history, as they say. I was ASHRAE president in 2014-15, and I am still very involved. The AEDG committee that Don just described, I am the current chair of that committee, and have been for the last six years. I also serve on the board of the National Institute of Building Sciences in Washington., where I am the current Vice Chair. Like Don, I got a call from Chuck Gulledge and Mick Schwedler last spring that said, "Hey, we need to get into this decarbonization world. Would you be willing to co-chair this with Don?" And I enthusiastically agreed. The

world of energy efficiency and now carbon reduction has been our focus, speaking for Don and myself, for a long, long time. And I think that's why we are here today.

HPAC: Please give us some more details about the work and goals of the task force.

Phoenix: Sure. We were appointed initially by President Gulledge and then re-appointed this year by President Schwedler. We have 15 members, including some from Europe and the Far East. So there is global representation on the task force. Early on, we identified key areas of concern that we needed to focus on to address the decarbonization problem in buildings. We came up with nine areas of concern and assigned members to chair individual working groups for those areas. Those chairs were then asked to populate their working groups with experts in those areas from all over the world, whether they were inside ASHRAE or outside. So now we have over 120 volunteers participating in those very active working groups. One is now working on a position document on decarbonization for ASHRAE to approve. Others are working on things like Embodied Carbon, Grid Interaction, Overall Building Performance, Operational Carbon Issues, etc. So, that's what we've been doing for just about a year now, since the working groups got started last April.

HPAC: Since the TFBD was patterned after the Epidemic Task Force, which arose from a global emergency, it would seem that urgency is built into its DNA. What is driving that sense of urgency and how is the task force structured to deliver on its work sooner than later?

Colliver: Why are we looking at decarbonization as being so urgent now? Well, let's consider that a number of things are driving this. First of all, population growth. Earth's population over the next 30 years is anticipated to grow by 2.4 billion people. That's a 25% increase. To meet the needs that this population growth will create, we will need to have building growth, which itself is now anticipated to increase by 2.5 trillion sq ft globally by 2060. To put that in perspective, it means that we will need to construct an entire New York City... every month! Or an entire city of Paris... every week! And consider also that at least half of all the buildings that will be standing in 2060 have yet to be built!

We have to understand that the built environment really has a great impact on greenhouse gas emissions, or carbon emissions. About 11% of all greenhouse gas emissions can be attributed to building materials in construction, and 28% is from building operations. So we're talking about all of the built environment contributing about 39%. By comparison, transportation is only 22%, and industry is at 30%. Therefore, the built environment, by far, has the largest impact.

Now, scientists also tell us that we need to limit the global temperature rise to 2 degrees Celsius, and strongly recommend that we retain it to 1.5 degrees Celsius. In order to meet these goals, emissions from buildings will need to be significantly reduced. In fact, models project that these emissions from buildings will need to be reduced about 65% in the next eight years. And that's just decarbonization. So, it's not total net zero, which is where we need to get to by 2050.

Phoenix: We are working to a deadline. So the urgency just described is very real. Each one of our working groups is working to develop deliverables, which is a pretty broad definition. It can include things like just gathering information. One of our groups, basically, is what we call "The Library," our Research & Knowledge Working Group, which is gathering up all the information it can find about this. So, our deliverables can include new documentation, new research, and certainly new tools that practitioners in our business can use. And we are working to get all of these deliverables out into the hands of people as quickly as possible. We just did eight seminars at our ASHRAE winter meeting in Las Vegas. And now we have the International Conference on Decarbonization scheduled for October in Athens, Greece. So, there is a lot going on, and this really has turned into almost a full-time job on its own. That's not a complaint. It's just a reflection of the urgency involved here.

> "Building owners have begun to become very aware of the severity of the issue and... are now much more willing to talk about how to get to zero carbon."
>
> —Tom Phoenix, TFBD co-chair

HPAC: From your long experience in the field, in research, in business and in academia, do you both believe that building owners, both public and private, will now be ready and willing to act on the recommendations of your task force?

Colliver: Well, first, this really is more than just about our recommendations. The Society is adding carbon reduction to its portfolio now, but it has been working in energy efficiency for many, many years... In response to your question, we already have many owners, designers and agencies in both state and local governments that are already asking for this information. Many states and provinces have already set goals for decarbonization, but it hasn't really been determined yet how those goals are going to be reached. So, our purpose is to help the built environment reach those goals. Now, as with anything new, there is going to be some hesitancy in acting. But what ASHRAE is trying to do is to provide some good, solid guidance for those who are wanting to reduce the impact of buildings on CO2-equivalent emissions.

Phoenix: I would say that I have actually seen the answer to this question change in just the last 12 months, since we were appointed

to the task force. As a consulting engineer, I work with clients both public and private who want us to design their buildings. Even just a year ago, there was hesitancy if you would say to them, "Can we start talking about zero carbon?" Their perception was, and this was the same with energy efficiency goals, was that this was going to cost a lot more money. What has happened, though, and again, this was just in the last several months, is that building owners have begun to become very aware of the severity of the issue and the urgency to try to address it. So they are now much more willing to talk about how to get to zero carbon. More and more of our clients are aware of that now and the need to address this quickly.

Colliver: I agree with that, and I've worked a lot on industrial energy assessments, as well. I was working with a company recently and they put in a $15-million solar system. I asked them what their economics were on that decision. They response was, "Well, we wanted to be perceived as a green company. So therefore, it came out of our advertising budget!" So, other factors are contributing to this effort now that are making me think it's going to get done.

HPAC: Finally, you are both very accomplished engineers with more than 40 years of experience. Many contemporaries have likely retired at this point. So, what is driving you both to give back to the profession at this level and to remain this active?

Phoenix: Well, I had the opportunity to retire only last year, but I decided against it. Only because I'm still very passionate about this. And as long as your health allows you to continue to participate, and to help, and to add something to the conversation, then that's what drives me. I've always enjoyed being in the industry and I'm really not ready to give that up after all these years.

Colliver: I agree with Tom, and I think you have heard the passion that we both have for this. Yes, it is tempting to look at slowing down, however I feel that all of my experiences have put me in a unique position to address something that is important to my grandchildren and those that are coming after them. My faith calls for us to be good stewards of our resources. Through this effort, I can now see the rewards of putting into practice these many years of hard work. But I think there are a lot of other people who have these experiences who are willing to contribute, as well.

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BOILER 2022 Advisory Committee has been preparing the April show for roughly two years.

ALL EYES ON BOILER 2022

ABMA's new show for the boiler supply chain is finally at hand. Advisory committee chair Eric Graham and event organizer Shaunica Jayson explain why that's such a big deal.

BY ROB MCMANAMY
JANUARY 2022

It's been more than two years since the American Boiler Manufacturers Association (ABMA) first contemplated putting together a targeted conference and trade show exclusively for the boiler supply chain. At that time, an advisory committee was formed and a date was set for BOILER 2021, to be held in Dallas last fall.

"But then COVID happened," recalls **Shaunica Jayson**, ABMA's director of marketing and the day-to-day point person responsible for making the new event a reality. Like so many best laid plans at so many organizations all over the world last year, ABMA's schedule was completely upended by the Coronavirus pandemic which still persists today, albeit in a weakened form. As a result, the new conference was pushed into the new year and renamed BOILER 2022, still set for Dallas, now in less than 90 days.

For more, *HPAC Engineering* spoke with both Shaunica and ABMA Advisory Committee Chairman **Eric Graham**, of Webster Combustion Technology, about the extraordinary effort that has gone into keeping BOILER 2022 on track. Suffice to say, the fits-and-starts journey has been a memorable lesson in resilience for all involved. *Please listen and share...*

HPAC: Thank you both for joining us at this exciting time for ABMA. First off, Shaunica, let's start with you. Please tell us a bit more about BOILER 2022, its genesis and how it is different from other ABMA events, including the annual meeting this January.

Shaunica: Hi Rob, thanks for having us... Traditionally, all of our annual events, and we have two per year, have been members-only meetings. But BOILER 2022 is different because it will be our first inaugural event that is focused exclusively on the boiler supply chain. Over the past few years, ABMA has shifted its emphasis from being strictly an association of manufacturers of boilers and boiler-related products to an association focused on the entire boiler supply chain.

Part of our shift had already included more engagement with end-users of our products, with things like the launch of our podcast series, *Inside the Boiler Room*, plus special editions of our newsfeeds and *Boiler Weekly* newsletters. We've also repositioned our magazine, and some of the releases of our new publications and whitepapers. So, it was really time for us to take that next step forward to facillitate direct engagement with our end-users, and offer education on products and services, like installation, operations and maintenance.

Overall, we are super-excited about BOILER 2022, and right now we're looking at over 70 exhibitors, and we hope, 750 attendees, who will all be joining us for two action-packed days and 10 dedicated expo hours.

HPAC: Eric, as chair of the event's Advisory Committee, please explain how the show has come together and how your committee has helped to shape the user experience?

Eric: Thanks for having me on, also, Rob. Well, we've been talking about this show for quite a while, so we are really anxious to get it going. You know, we came up with the advisory committee almost two years ago now, and we've got 15 to 20 industry people who are on the committee, working with us. It's a great mix of some very experienced people, like myself, and some people who are newer to our industry. They are giving us some great perspectives on what we want the show to be, and what kind of value we can bring to our exhibitors and our attendees from the industry.

We wanted something that would be totally focused on the boiler room. So we broke up our advisory committee into subcommittees, and one was focused on the "member experience". We want our exhibitors to have a great experience, to make it easy for them to be there and show all their products. We wanted educational content, so we needed keynote speakers, and workshops, forums. And then we have end-user engagement, which is extremely important. We need to get end-users there, whom our members and exhibitors can engage with at their booths and during the show, so that's really our main focus.

Our last subcommittee is focused on arranging tours and student engagement there in Dallas. So we'll be leading tours to some local facilities and having students come in to learn more about our industry and visit with people at the show. We really want to showcase our industry and let them see all the opportunities it has to have a great career.

Shaunica: That should be exciting. We are always about the next generation, and getting them to be more aware of the boiler industry and learning more about our association and what our industry has to offer.

Eric: Yes, there are a lot of opportunities... for engineers, sales, trades people, welders, designers, drafting, etc. Just a lot of possibilities that we want them to be aware of.

HPAC: Now, due to the pandemic, this special event had to be postponed and rescheduled. Could you please tell us a bit about the challenges that presented to ABMA and how you have managed to overcome them?

Shaunica: Yes, ABMA originally announced "BOILER 2021" as a new event in January of 2020. So it was originally scheduled to take place in October 2021. But then Covid hit. And we all know how that goes... So, by November 2020, we had decided to reschedule the event to April 2022. We had surveyed our members and the message we got was really clear, to move our inaugural conference and expo. And I think was the really best decision for our members, our exhibitors and those in the boiler supply chain.

HPAC: Eric, as I understand it, ABMA does not want BOILER 2022 to be a one-off. How does the advisory committee envision it taking shape in the years to come?

Eric: We really want to make this show something that we can consistently build on and that will bring a lot of value to our members, especially our exhibiting members. But we only have one shot at making a good first impression, so we definitely want to do that in Dallas. And we are already planning for our next show in May of 2024 in Colorado. That should be exciting. As I've said, we want to engage the end-users and bring in engineers, facility managers, boiler operators, what have you.

We go to a lot of shows, and it's easy to get lost in some of the bigger shows, where you might have 2,000 exhibitors, but only 70 or so in our industry. So, our idea is to give these people a much more focused experience where it ends up being worth it for them perhaps to skip one of their other shows, and to replace it with ours.

HPAC: Eric and Shaunica, thank you for your time. We look forward to seeing you both in Dallas for BOILER 2022.

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Report from COP26, *with* USGBC's Liz Beardsley

United Nations

UN Climate Change Conference (COP26) took place in Glasgow, Scotland, last fall, from Oct. 31 to Nov. 12.

November's UN Climate Conference met with high hopes and great urgency, but left many disappointed. Our guest explains why she is now more hopeful than ever.

BY ROB MCMANAMY
DECEMBER 2021

"The younger generation is not going to let us off the hook!"

Just back from Scotland, our guest this month is **Elizabeth Beardsley**, senior policy counsel for the U.S. Green Building Council, which she represented last month at the 26th United Nations Climate Change Conference in Glasgow, or 'COP26', for short. A longtime environmental advocate, Liz holds a civil engineering degree from Stanford University and a law degree from the University of Virginia. She describes herself online as "a mom, daughter, friend, and lifelong earth lover."

Here, Liz expounds on several key COP26 takeaways and also highlights some important climate components contained in the new federal infrastructure funding. Please listen and share... *(Below, a partial transcript, edited.)*

HPAC On The Air: Liz, thanks so much for joining us. We feel privileged to be able to share your very fresh insights from COP26 with our audience, and last week we even posted your first wrap-up blog from the conference on our website, hpac.com. Could you please sum up some of those initial impressions for our readers? Had you been to any of the previous COP conferences?

Liz Beardsley: Thank you, Rob. It's a pleasure to be here. And yes, that's a great place to start. I had actually been to COP21 in Paris. That was my first one and that's, of course, where the Paris Agreement was formed. So, it was really an exciting time. And COP21 was the very first time there was a "Buildings Day"... To describe the conference, I'll do my best here.

Elizabeth Beardsley

Part of it is the actual negotiations, where the countries, or "parties" to the framework agreement, meet every year to try to make progress with additional details, changing the terms, if needed, and having detailed negotiations, by article. Then there's also additional, behind-the-scenes negotiations that might go on between two countries, or groups of countries. And that's where there are different coalitions that form... Also, if you're not part of a country delegation, you might be observing, and there are some NGOs that really do get in the weeds re specific things that they want to see in the agreement. So they will work with the parties to try to accomplish those goals and influence those outcomes... And just observe and report out to interested stakeholders.

Part of the COP is also just like a conference, so it was interesting to see how that has evolved over the last five years. There are pavilions that countries have, and depending on the country, they might showcase their technologies and solutions, or the science, or the impact that climate change is having on that country.

So, you can imagine roaming the pavilions and seeing that diversity and all the focus around the globe, all on climate, from different angles. Whether it's on rising sea levels, or droughts causing agricultural problems, it really put things in perspective how real this situation is. And then there were side events where there were presentations, and panel discussions, and so on, on a full range of climate topics. And that's one of the things that we do at the COP: make presentations and participate.

This year, there were probably more local governments and state governments than there were before. So that was really a positive. And overall, I would say that the trend was more toward solutions. There are some countries that are really quite vulnerable, so they were showing what is happening there now.

Overall impression for me was just the very sobering reality of where we are. Just a couple weeks before the COP, the International Energy Agency released its assessment of where things stood, based on all the climate commitments that had already been made by nations. It found that they would still bring global temperatures up by more than 2.5 degrees! But since COP happens every year, it is also *forcing* event that brings with it a lot of new commitments, especially in that first week of the conference. And there was an assessment there that all those new commitments might bring us closer to about 1.7 degrees of warming.

But that still depends on everything in a commitment getting done. And that's one of our concerns. We see commitments being made, and that is progress, in and of itself. But now we really have to see the action and accountability across the board, from the country level to businesses that are making commitments. We have to be able to see that change happen through data, over time, and we need to accelerate our actions, as well.

HPAC: As for takeaways, much has been made about the inability of the largest nations to agree on truly urgent action to mitigate global climate change. Some have even called COP26 a "cop-out". Beforehand, many had referred to this event as the "last best hope" to change the planet's trajectory. How do you assess the success and impact of the summit?

Beardsley: Well, I'm more of an optimist, "glass half-full" person, by nature, I guess. And I think that would dictate someone's response to that question because there *was* a mix. The positives were that we did see that flurry of enhanced commitments come out. Also, the youth voice was really strong, mostly outside the fence line. I think it was palpable. I know that's hard to define, but I think it was there. And some of the negotiators were bringing photos of their grandchildren and bringing up future generations. That was more and more common. As I said, those commitments need to be followed up on now. But once they are, in a given strategy or sector, then I think that *can* create momentum.

I mean, I remember as a kid, hearing my dad talk about solar energy, and it seemed so crazy. And it seemed crazy for the longest time, until all of a sudden, it seemed like the coolest thing, and 'Why can't I have it on my house?' So, flip to where solar and wind (energy) are now lower cost for new production than fossil fuels are in the U.S. now. It just took a while to get there.

Another big takeaway was a focus on the next 10 years as being critical, so that we don't lock in more carbon and we preserve the chance to keep global warming to less than 1.5 degrees. That's a really important recognition for us. And getting started is better than not getting started. So I think that was an overall positive. The presence of business there was also important. The business community was

pushing. They want more certainty, and more ambition. And I think that was another positive.

There were also some other specific breakthroughs that helped to make this summit have a positive impact. There was the Methane Pledge on the countries side. And on the business side, there was the *Race to Zero* (emissions) pledge, so there were a number of commitment platforms, and all of them seem to have 'zero' in the air somewhere... So more and more businesses now seem to want to make this part of their brand, and they seem really motivated to make changes.

The other big thing for the building sector and engineering was seeing the focus on embodied carbon and supply chains. That's been a really hard issue for companies, too. How do you get the data? You might care about how much energy is used to produce your concrete, or how much the carbon emissions are. But as one entity, you might not feel you can change that. But we saw that the U.S. was a leader, along with the E.U., in forming the first mover's coalition which brings together corporate buyers of materials, like steel and concrete, and manufacturers of those materials. That purchasing power sends a signal to the manufacturers that they can still invest in these processes without losing their competitve advantage. They will still have buyers for their products even though they may cost a little bit more.

HPAC: Looking ahead in the U.S., please talk a bit about what this month's passage of our nation's long-overdue infrastructure investment package will mean to the future of green building.

Beardsley: We'd been working on these bills for some time now, since back in 2020 when it was clear that there was goung to be some reinvestment in the economy as a result of the pandemic. We started talking then about building efficiency as an important area for jobs, and for helping to meet some of our climate goals, and all the other co-benefits of saving consumers money and improving businesses' competitiveness, and so on. And now the infrastructure bill is law, which is great. Some of the things in there include our program with the Dept. of Energy to help fund lower-wealth, higher-need school districts with energy-efficiency and renewable energy projects. There are also some funds in there for weatherization and for state energy programs. And then there's monies for more tradional infrastructure like airports, but include a priority for projects that improve energy efficiency and sustainability. So some of that language is really positive and will help get this money not just out there for traditional replacement and expansion projects, but also to make it more climate-friendly as an outcome.

HPAC: The U.S. House of Representatives also just passed the new Build Back Better bill, which still must go through the Senate. But there are more climate mitigation measures in there. Can you speak to that a bit?

Beardsley: The reconciliation bill we know will see some size haircut in the Senate. We don't know yet what that trim will look like. And that one is most definitely not bipartisan. It's a Democratic endeavor using the specific budget process of reconcilitaion. It includes much more, such as legislation for federal buildings, to do renovations that make them high-performing green buildings; money to help build resilience and to use procurement to invest in cleaner materials and

> **"It is incumbent on our industry and our government to hold ourselves accountable, and to do what we said we were going to do."**

products, which could include electrification, as well. There's also some tax incentives for clean energy, including some updates to something your audience is very familiar with, the 179-D Commercial Buildings Energy-Efficient Property Deduction, as well as 45-L for New Residential Construction, and 25-C, for retrofit components, and retrofits of housing. So, there's a lot there, and we hope monies ultimately will be used to help optimize outcomes and build momentum for more and more changes in the building sector, and getting deeper efficiencies much more commonplace.

HPAC: Finally, we also spoke to USGBC co-founder Rick Fedrizzi earlier this year, and I will ask you the same question that I asked him... Today, taking real action on the climate ironically faces obstacles from two diametrically opposed factions: those who somehow still deny that climate change is real; and those who acknowledge that it is, but say it is already too late to make a difference, the Eeyores of the movement. As a "mom, daughter, friend, and lifelong earth lover", what do you say to friends, colleagues, legislators and business leaders who express either of those views?

Beardsley: That's an interesting question. There are people like that out there. But I feel like when you talk to someone one-on-one, or in smaller groups, there is a lot less of that. So I feel like, in the U.S. especially, it really comes down to change. People are just really afraid of change. So I don't really even know if that is so much idealogically-based as much as it is just a fear of the unknown. People think of it in a very personal way, i.e., 'If we transition to clean energy, does that mean that we can't go on vacation because we're not supposed to fly? Or does it mean we have to have a smaller house? Or how will it affect my job?'

To answer that question more directly, I recently attended a dinner sponsored by the Conservative Climate Caucus. So there were some conservative lawmakers there and I spoke with Congressman **John Curtis** from Carbon County, Utah. We spoke about conversations he has had with coal-miners in his district, essentially saying that, 'You know, these jobs are going to be gone and that mining is very good for you.' And he said that the miners understand that. In his words, he says that just want to have determination of what's next. They don't want

to have Washington decide what they are going to be re-trained as... So, in the U.S., I think it's really more about options and freedoms of personal choice, and how do we go about recognizing those traditions while recognizing that we have one Earth. We have one planet. So we really have to work together.

HPAC: You have referred to yourself previously as always being an optimistic person. Before Glasgow, after Glasgow... how would you rate your level of optimism now?

Beardsley: I think it's higher, actually. The youth pressure there was just really strong and effective. It was all very peaceful, but there were posters from children in the halls of the COP and all the negotiators were very aware of them. I just think the younger generation is not going to let us off the hook. They will keep that [pressure up, and that will keep ambition up. But I think it is incumbent on our industry and our government to hold ourselves accountable, and do what we said we were going to do. And that's where I think 'Build Back Better' and infrastructure funding can be really helpful in building that momentum. And that's where things will take off, and then it will go faster than anyone predicted. As engineers know, I'm hoping it will be like technology adoption, where that curve just goes slow, slow, slow, and then everything just takes off.

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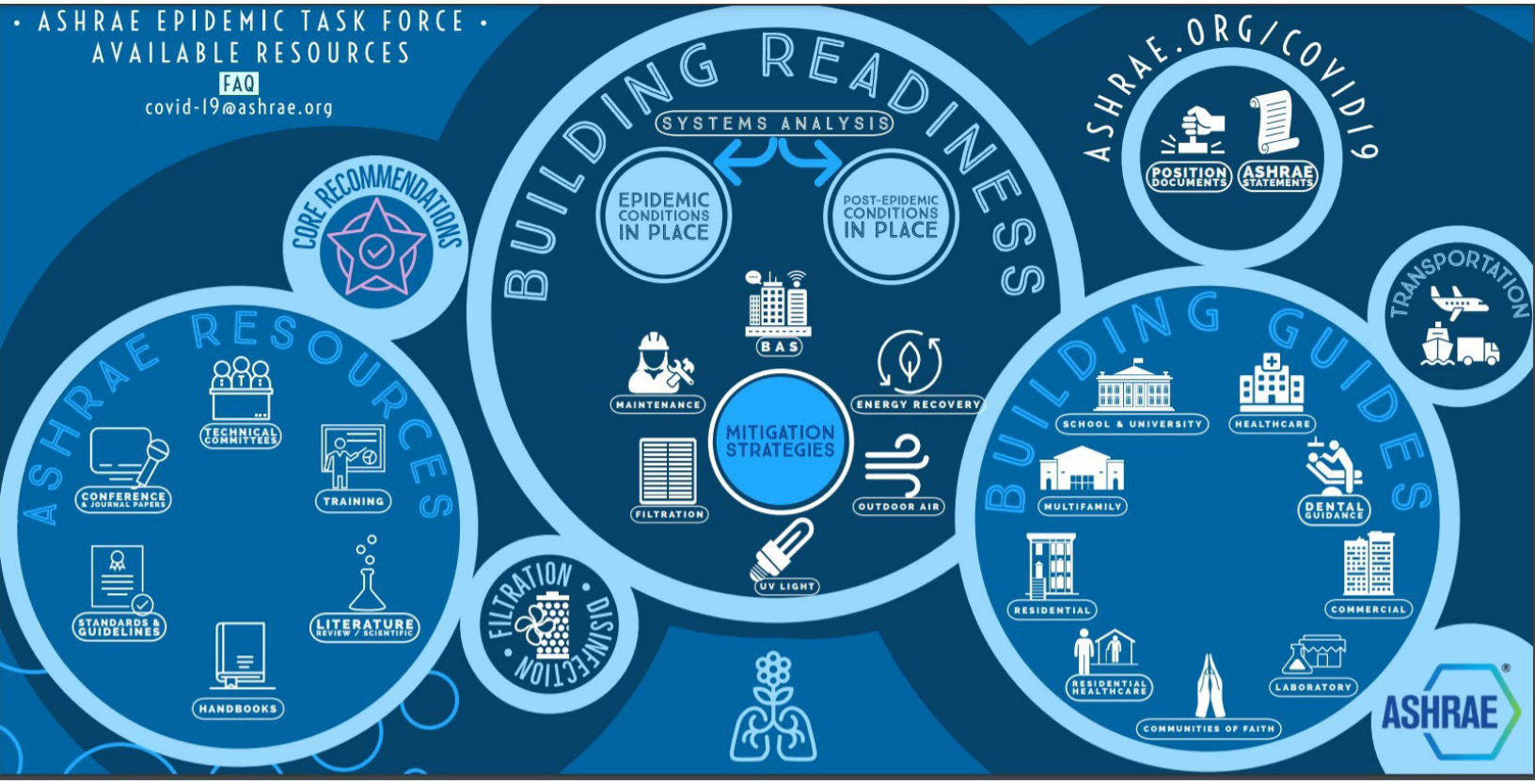

Inside the Epidemic Task Force, *with* Dr. Bill Bahnfleth

ASHRAE's pandemic point man takes us behind the scenes for a fascinating look at the last 18 months of urgent collaboration, research, recommendations, updates and now hope.

BY ROB MCMANAMY
SEPTEMBER 2021

This month, *HPAC 'On The Air'* welcomes Dr. **William P. Bahnfleth**, P.E., an ASHRAE past president (2013-14), chair of the group's ongoing Epidemic Task Force, a professor of architectural engineering at Penn State University, and a longtime member of *HPAC Engineering*'s Editorial Advisory Board.

Bill's father, **Donald R. Bahnfleth**, P.E. (1927-2016), also served as ASHRAE president in 1985-86, making them the only father and son duo to *both* hold that office in the 126-year history of the organization. In 2019, Bill even received the *Donald Bahnfleth Environmental Health Award*, which only that year had been renamed to honor his father's pioneering focus on indoor environmental quality (IEQ). Of note, from 1960 to 1971, the elder Bahnfleth also served as editorial director for *HPAC Engineering*, then known as *Heating/Piping/Air Conditioning* magazine.

For his part, Bill holds B.S., M.S. and Ph.D. degrees in mechanical engineering from the University of Illinois, and is a fellow at ASHRAE, the American Society of Mechanical Engineers (ASME), and the International Society for Indoor Air Quality and Climate (ISIAQC).

Early last year, however, Bahnfleth embarked on what he says may be "the most meaningful chapter" of his distinguished professional life when he was asked to assemble and lead an ASHRAE Epidemic Task Force to address the fast-growing public health emergency posed by the new Coronavirus global pandemic. Here, he offers a behind-the-scenes look at the last 18 months of urgent collaboration, research, recommendations, revisions, and now hope for a post-pandemic "paradigm shift" in managing and improving indoor air quality. To listen to our full show, click below...

For more from Dr. Bahnfleth, follow his lively Twitter feed at @WBahnfleth.

For the latest from ASHRAE's Epidemic Task Force, visit its interactive dashboard at www.ashrae.org/file%20library/technical%20resources/covid-19/ashrae-covid19-infographic-.pdf.

What follows is a partial, edited transcript of this show:

HPAC: Bill, thanks so much for joining us. Let's dive right into the ASHRAE Epidemic Task Force (ETF) and go back to early 2020, when the depths of the looming pandemic was just becoming a reality. Please tell us how the ETF came into being, how you became its chair, and how its structure evolved...

Dr. Bahnfleth: Good to be with you, Rob. Looking back, our awareness of the pandemic developed very rapidly. The index case in China was in December of 2019, and we were only aware of it to a small extent at the ASHRAE Winter Meeting in Orlando at the end of January. Some exhibitors didn't show and there was concern that this was going to grow. But between then and late February, early March, it got into the U.S., and really took off. So, by then, it was clear that this was going to be a big issue here and for the rest of the world.

At that point, ASHRAE leadership approached the Environmental Health Committee and asked if there should be an ASHRAE group working specifically on pandemic response and what that should look like. Ultimately, I was invited to chair this group and even to name it. And they asked me to propose what we would do, and how we would do it. So it was really an unparalleled opportunity in my career as a volunteer or even a professional, to just start with a clean sheet of paper to try to solve a problem.

The one thing that was clear was that we needed to respond quickly. And most people know that speed is not really what ASHRAE is known for. It does high quality work, but that takes time. So, we were really being asked to cut against the grain of that typical ASHRAE process. I decided that what we would do was make a small group, but with a lot of leverage. So, instead of getting 15 or 20 people together and saying that we are going to write all of this guidance, I put together a group of subject matter experts in areas that I thought were going to be important, like air filtration, disinfection, and commissioning. And I said to those people to go out and find whoever you need to make a team that you will lead, and then produce guidance in that area. So we would function, more or less, as a steering committee. So that initial group of 15 to 20 people actually wound up working with over 130 subject matter experts.

One of the other things that I think was important was that while we were free to operate as an ad hoc group put together with the authority of the ASHRAE board, they insisted that we reach out to the rest of the Society and work with technical committees, and standing committees, and whoever else was necessary. So that was how it was structured and operated from the very beginning, and we would meet for about two hours every two weeks. So we have had more than 25 meetings now.

Our scope, first of all, was to develop guidance quickly, then to refine the guidance, and third, to make recommendations for the future about what ASHRAE needed to do after the Epidemic Task Force went away. So that we would be better prepared to respond the next time something like this happened.

HPAC: Nearly a year and a half later, after so much research, discussion, debate, consensus, recommendations, revisions and now several hundreds of pages of guidance, can you please sum up the ETF's latest core recommendations for our HVAC audience?

Dr. Bahnfleth: Over the course of 2020, from the time that we initially started issuing guidance, we started rethinking our approach to make it more flexible, and to dial back some earlier recommendations that clearly didn't seem to be necessary anymore. So that we had a package that could be used to suit the needs of a particular building. They are not perfect, but I still think it is a pretty good guide, given what we know and the time we had to produce it.

What do they say? Well, the first thing is to follow public health guidance. This goes along with the Swiss cheese approach to risk management. We can't rely on any one type of control, like HVAC, to remove risk to the maximum amount. So there is a layering of things like masking and social distancing, and now vaccinations. Regarding things like ventilation, there has been a lot of discussion about how much uncontaminated air is needed to reduce risk to an acceptable level. We have not published a hard recommendation on that, but we do say that buildings should at least have their code minimum of outdoor

air as a starting point. That doesn't necessarily mean that's enough protection, but you shouldn't go under what the code requires. And that's important because a lot buildings are not actually up to code.

We also recommend not enabling demand-controlled ventilation during the pandemic because that reduces the amount of outdoor air in proportion to population, and that clearly is something that could increase risk. So for the time being, we recommend not doing that. Operating the system when people are present is important. Initially we had said 24/7, but the risk analysis has shown that that's not really necessary. Also, add filtration up to MERV 13, if you can do it. If not, then some other combination of controls that will get you there.

We encourage the use of air cleaners, but only air cleaners that are well-characterized in terms of their effectiveness and safety. Of course, that could be a long discussion, in itself. But basically at this point, the one that ASHRAE is very comfortable with is germicidal ultraviolet air disinfection. But other technologies may be used. There is still a lot of work going on right now looking at efficacy and safety. Also, for the present, portable or stand-alone air cleaners do seem to be a good approach when it's hard tp modify central systems.

The final recommendation is to commission buildings because we know that so many are not functioning up to their design intent. So that makes them unreliable and means they're probably wasting energy in addition to not providing good indoor air quality.

HPAC: In May, you co-authored an article in Science magazine with 39 other scientists, IAQ experts and engineers, titled "A Paradigm Shift to Combat Indoor Respiratory Infections." You were hopeful that it could spur designers to become more proactive in creating healthier building environments, moving forward. But there has been pushback from some practicing engineers (see p. 20) who argue that taking on such roles will expose them to new liability and future lawsuits. Can you please explain this hopeful 'paradigm shift' a bit and why you believe those concerns are misplaced?

Dr. Bahnfleth: I actually have felt this way about indoor air quality for years. But two things have happened during the pandemic. One is that a lot of effort has gone into understanding how respiratory diseases are transmitted -- coronaviruses like SARS and MERS, COVID-19, and seasonal influenza. And I think there is a pretty strong case now that inhalation of aerosols is a big part of that. So that makes disease transmission partly a matter of exposure to air contaminants that we know how to control.

Buildings have an important role to play in mitigating diseases, and not just the kind that come around every 100 years or so, like the 1918 epidemic, and the current one. Seasonal influenza comes around every year and costs billions of dollars in healthcare costs and contributes to excess mortality. So the article views this as a tractable problem, one that we can do something about to reduce risk. The fact is that if you pick up a ventilation or indoor air quality standard like ASHRAE 62.1 or 62.2, you find that the definition of what's acceptable does not address communicable diseases or airborne infections. It deals with

"Buildings have an important role to play in mitigating diseases, and not just the kind that come around every 100 years or so."

the kinds of contaminants that are associated with building emissions and outdoor air, and with bio-effluent from people. But it is silent on the issue of infection risk reduction. And we know that comparing those standards for non-healthcare buildings with the ones we use for healthcare buildings that the levels of ventilation and filtration that we have in most buildings are just not adequate for significant risk mitigation.

The "paradigm shift" is to bring some of that thinking into the development of new minimum standards for non-healthcare facilities. And I think that is a fairly straight-forward task.

So I think this argument about exposing professionals to additional liability is a bit of a red herring. I had been hearing that argument long before COVID-19, that any attempts to address health concerns will open professionals up to greater liability. But I think that is misstating what we are trying to do. We now have a large and growing body of work to help us improve indoor air quality. We are not saying that indoor air can make you healthy. But we know that if we don't treat it right, it can make you sick. So it's really just trying to raise the bar on what our expectations should be.

For much more, please listen to the full podcast.

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Buildings WELLNESS Check, *with* Rick Fedrizzi

We reconnect with the Carrier alum and USGBC co-founder whose International WELL Building Institute now aims to lead a post-pandemic revolution in healthy buildings.

BY ROB MCMANAMY
JULY 2021

For our latest podcast, *HPAC Engineering*'s **Rob McManamy** talks with UTC Carrier Corp. alum **Rick Fedrizzi**, co-founder of the U.S. Green Building Council (USGBC) and now executive chairman at the International WELL Building Institute (IWBI), which he helped to launch in 2016. Not surprisingly, there was much to discuss...

We last spoke with Rick for a Q&A in January of 2018, but suffice to say, our world has turned upside down since then. So today, in the summer of 2021, as the globe tries to emerge from a paradigm-shifting pandemic, the role of buildings in promoting the health and safety of their occupants has never been more vital or consequential, even to the future success of downtowns, themselves...

"And engineers will be at the center of the storm," says Fedrizzi, who worked 25 years at Carrier before joining USGBC full-time.

For much, much more, please listen in to our latest episode...

What follows is a partial transcript of our June conversation...

HPAC: Rick, welcome to 'HPAC on the Air'. Thanks for joining us. Let's just open by giving our listeners a bit of a history lesson about how your time at Carrier led to the creation of the USGBC.

RICK FEDRIZZI: Thanks for having me. It's good to be back. Well, in 1988, I had been at Carrier Corporation about 12 years in when I woke up one day and they said, "You are going to be our new head of environmental marketing." And I said, "Okay, could you tell me what that is?" They said, "Well, we're not really sure."

Carrier's CEO at the time had been at GE Lighting, where they had put an incandescent light bulb in a recycled content wrapper and called it the Eco-Bulb. It sold really well. So, now our CEO wanted to do the same thing at Carrier with air conditioners. But when I went to research it then, I didn't have many resources. There were no chief sustainability officers. So, I went to the bookstore, but could only find books strictly on the environment like **Rachel Carson**'s *Silent Spring*, and **Aldo Leopold**'s *Sand County Almanac*.

Then, as if it was a gift from God, I stumbled on this new shelf of books, including one by **Paul Hawken** (future author of *The Ecology of Commerce* in 1993). His new book then (*Growing a Business*, 1987) was beautiful in that it stated very clearly that it was absolutely appropriate to be both a capitalist and an environmentalist. That business was the single largest cause of some of the worst environmental degradation, so business had to be the solution, too. You just had to incentivize business to become better partners.

So this book really gave me my marching orders. I went back to Carrier and I said I've got a plan. I remember the CEO then said, "Well, I don't care what you do, just as long as we're the green leader by January." That's when the next ASHRAE show was being held in Chicago.

HPAC: So this was July 1988? That meant you had just five months to make something happen.

FEDRIZZI: Yes, that's right. Now at the time, the idea of climate change wasn't an issue. It was ozone depletion then, which was a refrigerant issue. Looking

Looking ahead to the show, I started doing research internally and and asked our product managers how our products performed for things like energy efficiency? Does it have better acoustics? Does it add certain value to air quality and thermal comfort or ventilation? Is there any recycled materials involved? In the end, probably about 75% of them slammed the door in my face. They were too busy to be bothered by all my questions. Then in Chicago I got an idea. I am a marketer by training, so it occurred to me, let me take those areas that I am looking at — energy efficiency, acoustics, refrigerants, recyclable content, etc. — and I will create these really cool stickers or decals

that I will take with me to McCormick Place. They were beautiful, green and white stickers, and I brought them to the show floor to the booths of products that I had done my own research on. I walked from product to product and awarded my own swag to those products that I thought were performing the best.

The minute I did that, product managers were chasing me down all over McCormick Place. What are those stickers?" they'd ask. The real exciting moment was when they'd see a competitor with more, and say, "Why did their product get three stickers, and ours only got one?"

It was like a light went on. I realized if there was a way of certifying or creating a credential around this, that someone would see real value in it.

HPAC: So how did this evolve into the U.S. Green Building Council?

FEDRIZZI: Well, while still at Carrier, I met a guy named **David Gottfried**. He had this great idea of creating an industry group that brought everyone to the table: architects, engineers, developers, building owners, product manufacturers, state, local and federal government officials, universities, retail establishments. All to help them understand this great environmental opportunity in real estate.

Real estate is the largest single asset class we have. So if we could make a meaningful environmental impact there, we could do something huge. And that was how USGBC was born, co-founded with David.

HPAC: Fast-forward to today and your work now at IWBI. How do you see the issue of building wellness playing out now as we hopefully near the end of the pandemic?

FEDRIZZI: If we had had this conversation a year ago March, we would have been talking about WELL certification very differently. But it now has quickly gone from a 'nice-to-do' opportunity to an absolute 'must-do' opportunity. The demands on us have grown and we have seen real growth in the number of certifications, and number of people becoming WELL-accredited professionals.

A tool that we introduced to the market about a year ago is the Health/Safety Rating. It's not the full-blown WELL system, but it's a way of looking at this in a post-COVID world and seeing how we get people back into buildings safely. For instance, Yankee Stadium is one of our first certified organizations.

And that tells the public the recipient has done everything it can, with the information available that it has collected from 600 medical and scientific bodies, to provide a place that is safe to return to. It rates their plan for cleaning and sanitization and air quality, etc., and puts it through the funnel of that lens. But it is only good for one year, because the science is changing and everything we are learning about this virus is changing on a daily basis.

HPAC: USGBC focuses on the buildings. IWBI focuses on the health and wellness of the occupants. But the green movement ultimately is about the planet. What do you say to people who lament that it is already too late to make a real difference?

FEDRIZZI: I say that they need to go get religion somewhere. I don't care how bleak things may look, come the day that we give up, we should all be ashamed of ourselves.

There truly is opportunity everywhere. And the more people become involved and educate themselves, the more they will see that. Or they can just study their children or grandchildren, and ask themselves, "What will their world look like in 20 years?"

> **"I don't care how bleak things may look, come the day that we give up, we should all be ashamed of ourselves."**

Look at the record temperatures we are seeing across the U.S. this summer. What is that going to be like in 25 or 30 years if we don't start doing something now? Can we fix everything by then? Absolutely not, but we could have three strategies by then that may yield one really great strategy for the future. We just have to keep trying.

Years ago, I remember being at the *Greening of the White House* ceremony and **Amory Lovins** from the Rocky Mountain Institute was there. I asked him, "What are we going to do with all the refrigerants being phased out in the U.S.? And the chillers? And all the toxicity associated with them?"

He just looked at me and smiled.

"Don't worry about it," Amory said. "The engineers will figure it out."

So, I say, "God bless the engineers."

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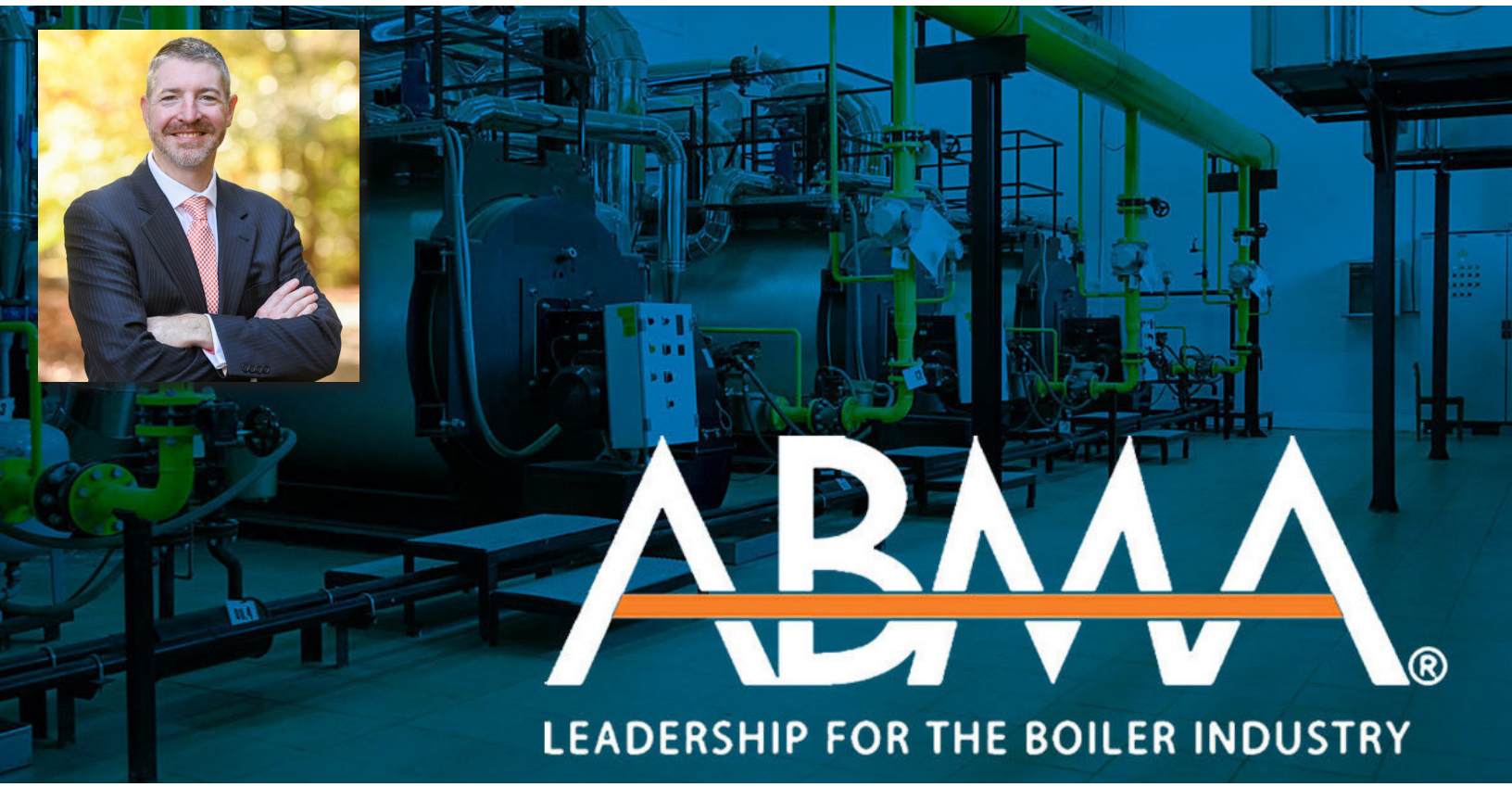
How Boiler Firms Have Survived and Thrived *with* Scott Lynch



ABMA's President & CEO talks about the myriad challenges his group has faced in the last crazy year and the shifting strategies that so far have managed to succeed.

BY ROB MCMANAMY
APRIL 2021

For our third podcast, *HPAC Engineering*'s **Rob McManamy** chats with **Scott Lynch**, President and CEO of the American Boiler Manufacturers Association (ABMA). Incredibly, the 133-year-old organization has now weathered *two* global pandemics, tested mightily by the persistent crisis that continues to challenge us all in myriad ways.

Incredibly, Lynch reports that ABMA has actually seen a *net increase* in total membership over the past year, testament to the heightened value of staying connected to industry colleagues and advisors while navigating the ultimate shared crisis.

Here, ABMA's chief also discusses how the association, itself, has had to become as nimble as possible, shifting annual meetings online,

increasing webinars, and rescheduling its planned launch of *Boiler 2021* in Dallas this fall to become *Boiler 2022* there next April. "I definitely learned to never include the actual year in the title of an event again," says Lynch with a laugh.

Of note, this special joint episode will also appear in ABMA's own podcast series, *Inside the Boiler Room*...

What follow is a partial transcipt of our April conversation...

HPAC: Scott, welcome to 'HPAC on the Air'. Thanks for joining us. Let's just open up, if you would, by giving our listeners a bit of an overview of ABMA's programs and services.

SCOTT LYNCH: Well, thanks for having me. Yes, you may not know this, but ABMA was actually founded in 1888. So we are the longest continuous trade association in the country… We were brought together as an industry due to the safety of boilers during the industrial revolution. And safety is still at the core of what we do. It might sound like it's energy efficiency or technology changes, but all of our focus in the end is on trying to build the most safe and efficient boilers in our industry. And our organization is focused on facilitating that, and bringing our industry together to tackle issues like codes and standards. Other issues involve things like workforce development and finding the right people, building the leadership within our organization, and developing the programs and services for our members that are most relevant to their needs. This industry is very different than it was 20 years ago, and very different from what it will be 20 years from now.

HPAC: How many member companies do you have now at ABMA?

CEO SCOTT: We have 110 members now, and they include our main manufacturing members, those who make the large components, like the burners and boilers, themselves, as well as the suppliers… Look around any boiler project and you'll see 10 to 15, even 20 components in that room, and all those companies are members of our organization.

HPAC: This last year has been extraordinary by any measure. Could you please speak for a moment about how the pandemic has affected your organization and the work of some of your members?

CEO SCOTT: Yes, the impact has been significant. Our fiscal year begins May 1, so when this all broke in March a year ago, you can imagine what that did to our budgeting process in the last few months of that year, as we were all still trying to figure out what this was… Initially, the most important thing was making sure that our members stayed in business. So, we worked with the National Association of Manufacturers to create letters for our members that said the boiler industry is a critical part of the manufacturing sector and has to continue, even during times of a global pandemic. And a number of our members have told us that our letters got to their governors and members of Congress, and kept them in business, where otherwise, they would have had to shut down.

The other challenge for them was to remain safe during the pandemic, and they had to evolve on that like any other company would

have to evolve. What happens if one of their employees gets COVID? How would they handle it? Based on the feedback that we received from them, I would say that our members took it as a challenge to both be safe and to still manufacture product and serve the end-user community. It was really a challenge for them in the beginning, so we facilitated that by creating a Coronavirus Resource Center on our website. That would update them on news coming out of NAM or the federal government on things like how to access PPE dollars, what programs are available, what's not, etc. There were a lot of challenges for us, even just trying to figure out how to host a meeting!

HPAC: No doubt. And those meetings included ABMA's big plans for BOILER 2021, now BOILER 2022, which was originally planned for this fall. Tell us how that evolved.

CEO SCOTT: Well, one thing I learned is that in the future I will not name an event based on the year that I propose it… There was a lot of material created for that event with the '2021' branding, so we have had to cross that out and put in '22'… But we had announced this in January 2020, and had huge momentum coming out of our annual

meeting… There was a lot of excitement, but then March hit… Still, we shifted really quickly, and soon realized that if we were going to do this as an inaugural event, it cannot be during a pandemic, or even coming out of a pandemic. So, we worked with our partners, the Hyatt Regency Dallas and pushed it from October 2021 to April 2022.

And that's where it is now. And we think we're well-positioned, actually, to address a huge need out there, because what we are hearing from end-users is that they have held back on a lot of projects during the pandemic. So we really think things are going to open up in '22… and our members will have the opportunity to engage end-users. We'll be able to say, "Look, we're going to have an event where you can meet all the leading manufacturers in one place." In addition, we'll also be giving tours of boiler manufacturer facilities and end-user facilities that are 'best in class'. So, they will come and see a 'best in class' boiler room, maybe one on the industrial side, and another on the institutional side, like a hospital or a college campus... There will also be educational sessions focused on things like the trends in decarbonization and energy efficiency, and trends in technology.

> "The boiler industry is a critical part of the manufacturing sector and has to continue, even during times of a global pandemic."

HPAC: So will this be a hybrid event? Will there be virtual presentations and tours, too?

CEO SCOTT: Well, we're still trying to figure that out… Our annual meeting last year converted to a virtual event, in keeping with the times. And we shifted on the fly a number of times for that, and had great success. So we'll have to see. Right now, we're still planning for a face-to-face, pretty much 'normal' event for BOILER 2022. But if we get to the end of 2021 and see the need to adapt, we feel that we can do that and still meet the needs of the boiler supply chain.

Keep in mind, this event was created because there is no event solely for the boiler supply chain. A lot of events include boilers, where we are a small component of the activity, but the educational sessions and the tours are not related to our industry. So, we felt that if somebody at an end-user, or a consultant, or an EPC firm really wants to understand what's going on, then they can come for two days and really get a lot out of this.

HPAC: And your annual meeting is still happening this June, correct? Will that be a hybrid event?

CEO SCOTT: Yes, it is. And yes, that is our plan, but it is a much different conversation when you're talking about bringing together 75 to 100 people and spacing them out and doing a lot of outdoor activities, versus having a thousand people together for BOILER 2022, a much larger event.

HPAC: Things in general do seem to be improving and the pace of vaccinations so far this year has been incredible. Has that changed things for your members?

CEO SCOTT: Yes, it has. Healthwise, and in terms of financial and business outlook, it is changing and people are seeing a change here. Our members are telling us that they are starting to see some stuff pick up; projects that were delayed earlier in the year, but now are getting green-lit and moving forward.

HPAC: I understand you have been engaging more with the hydronics sector of the industry. Can you tell us more about those efforts?

CEO SCOTT: That's one of those things where an industry evolves and you have to keep up with it… Our members who are making larger boilers are adapting and making smaller boilers now to meet the needs of end-users who are interested in a smaller footprint, maybe duplicative boilers instead of having one giant one… On the other end, we also have the smaller members who were making boilers for the residential market now moving into commercial, so they are growing their footprint. So whereas they were only into light commercial before, now they are heavily into commercial now and maybe even the light industrial sector. So they have evolved and it was really our components members who said we should reach out to them.

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