



Shaping Tomorrow's Global
Built Environment Today

MINUTES

PLANNING COMMITTEE MEETING

Friday, February 7, 2025

1:00PM – 4:00PM

ORLANDO, FL

Note: These minutes are not the official record of minutes until voted on and approved by the Planning Committee.

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February 7, 2025

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PRINCIPAL APPROVED MOTIONS
 Planning Committee Meeting
February 7, 2025

No. – Pg.	Motion
1-2	The minutes for the October 3, 2024 meeting of the Planning Committee be approved as presented.
2-4	Motion 2 be postponed until the 2025 Annual Conference Meeting of the Planning Committee on June 20, 2025. <i>(2) The Planning Committee MOP as presented be approved.</i>

ACTION ITEMS
 Planning Committee Meeting
February 7, 2025

No. – Pg.	Responsibility	Summary
1-1	Schultz	Create a short list of strategic recommendations from YEA and SA and provide an update at a future PLC meeting.
2-6	Smith (Chad)	Connect with current Membership Promotion Chair, Jason Urso, to brainstorm ideas in how to grow the response rate for the Membership Survey and possible liaison from Planning to Membership Promotion.

MINUTES
Planning Committee Meeting
February 7, 2025
1:00PM – 4:00PM EDT

MEMBERS PRESENT:

Trent Hunt, Chair
Andres Sepulveda, Vice Chair
Billy Austin
Kellie Huff
Rupesh Iyengar
Dunstan Macauley
Farhan Mehboob
Michael Patton
Madison Schultz
Chad Smith
Samir Traboulsi
Buzz Wright

Sherry Abbott-Adkins
Bassel Anbari
Carrie Brown
Sheila Hayter
Mick Schwedler
Chandra Sekhar
David Yashar
Jonathan Smith
Devin Abellon, CO

GUESTS:

Dennis Knight
Bill McQuade
Stephanie Kunkel
Darryl Boyce
Genevieve Lussier
Stephen Duda
Erica Powell
Charles Bertuch
Juliana Velez
Matthew Rowe
Joseph Sanders
Ken Fulk
Doug Cochrane
Jonathan Alo
Money Khanna
Kellie Huff
Scott Peach
Matthew Martinez
Rob Craddock
Pat Marks
Aakash Patel
Mohammad Tassi
Wade Conlan
Christine Miner

STAFF PRESENT:

Jeff Littleton, Executive Vice President
Lizzy Seymour, Staff Director, Membership
Kirstin Pilot, Staff Director, Development
Vanita Gupta, Staff Director, Marketing
Mark Owen, Staff Director, Publications
Stephanie Reiniche, Staff Director, Technology
Candace Denton, Sr. Manager - Board Services
Savanna Smith, Executive Assistant/Scholarship Coordinator
Chandrias Jolly, Manager - Board Services

CALL TO ORDER

Mr. Hunt called the meeting to order at 1:04pm.

ASHRAE VALUE STATEMENT

Mr. Hunt read the value statement and referenced links included.

ROLL CALL

Roll call was done. Members and staff in attendance as listed above. A quorum was present.

REVIEW OF AGENDA

The following new business items were added:

- *Strategic Plan Development and Implementation and Innovation Subcommittee Structure*
- *Strategic Plan Initiative Rollout – Budget Anticipation (Next 3-Years)*

APPROVAL OF MINUTES

Mr. Traboulsi moved and Mr. Macauley seconded that,

(1) The minutes from the October 3, 2024 meeting of the Planning Committee be approved as presented.

Mr. Traboulsi referenced the *Approval of Minutes* section. He shared that the document as presented needed an update as it should list that the June 21st minutes were approved. The committee agreed and the update would be considered editorial.

MOTION 1 PASSED (Unanimous Voice Vote, CNV)

ACTION ITEM REVIEW

Action items 1, 2, and 4 were reported as complete. Action item 3 was reported as ongoing.

ASHRAE LEADERSHIP PRESENTATION

Mr. Abellon gave the 2025 Winter Conference leadership presentation as displayed on screen. Below is a high-level summary of items presented:

The update of ASHRAE's tagline/positioning theme to include the word "global" was shared.

Notification of the strategic plan and its availability was mentioned.

Current ASHRAE BODs members were reviewed.

An update was provided regarding current Government Affairs activities and the status of campaigns to support ASHRAE's mission through Research Promotion and the Foundation.

The Center of Excellence in Building Decarbonization has been doing extensive work and two new guides will be released in association with this work.

Several Refrigeration Standards have been updated and new e-learning opportunities by way of courses and certifications were noted.

Scheduled Conferences for 2025 and upcoming nomination deadlines for Society participation and awards were shared with the committee to close out the presentation.

SUBCOMMITTEE UPDATES**Strategic Plan Development Subcommittee**

Mr. Macauley reported on behalf of the subcommittee. Discussions among the subcommittee have taken place regarding the efficacy of an 18-month development cycle for a 3-year strategic plan. Should we change the 3-year length of the strategic plan as approved by the BOD 2 years ago?

He shared that if the committee chooses to propose a new timeframe, considerations for the following should be given:

- Timing of BOD strategic planning sessions
- What is the value of having in-person strategic planning sessions?
- Should other timeframes be considered due to the cost of including a consultant in strategic planning efforts?
- Should we look at more of an operational plan so that progress with strategic initiatives may be made first?

Mr. Macauley noted that as a part of the subcommittee's work, the subcommittee would be discussing possible scenarios but wanted to gauge the committee for comments before discussions began.

Below is a summary of comments received:

There are some pros and cons to a 3-year or 5-year plan. A 3-year plan could be considered more adjustable in terms of initiatives noted.

If we are trying to use recommendations from the Vision 2030 Ad Hoc to shape today's strategic plan, wouldn't this be in conflict as we can't tell what will happen with the industry in the future?

The current plan and recommendations from the Vision 2030 Ad Hoc work together. Long-term vision tells where we want to go. The strategic plan will help us get to that point by focusing on goals and objectives. Without the long-term vision, we are only dealing with the focus of today. If we focus on right now, it's hard to tell where we should be going. The strategic plan should be considered a living document. As technology changes, the vision should change as well.

Is monitoring the effectiveness of the strategic plan through KPIs efficient enough for a 3-year plan?

If we want to continue to do an in-person session, this would be affected. For the next plan, the next strategic plan's development cycle must start on October 2026. The new plan would only be active for over a year. This doesn't allow enough monitoring of the current plan. The structure of the organization is not nimble enough to allow for feedback quickly. A 4-year plan would give us another year to get data related to the current plan, but 5-years is too long as commented by the Planning Committee and BOD members alike.

Narrowing the years the strategic plan covers means the plan has to be more prescriptive so that actions can be given to the councils. The further out the plan is in length, the more it will be perceived as a concept or a high-level ask.

In the past the Planning Committee had two roles; to create and monitor the plan. Over time, we brought up streamlining and there is currently not a function in ASHRAE to look back and make sure we are operating effectively. It should rest with this committee to continuously review our structure. This might require changing the committee in some way. We need this functioning to continue to streamline what we do and how we do it.

The initial cost to develop the plan is the same whether it's 3-years or 5-years. Biggest considerations are cost and membership composition of the committee during strategic plan development cycles. If we keep a 3-year plan, we will need to keep three subcommittees. General feeling is to make the best use of volunteer time, we should strongly reconsider any items that involve an increase in volunteer time.

Will there be a presentation or some other material that can be shared at the chapter level about the new strategic plan? 3-4 Regions have already done President–Elect Training. If there are materials to be shared, how quickly will the materials be ready?

The new strategic plan will be referenced in the CRC leadership presentation. It will also be mentioned at the DRC leadership forum.

Initially, the strategic plan moved to a 3-year cycle to buy the committee time to promote a more continuous focus for the Society. A shorter cycle allows us to be more streamlined and make small adjustments when needed.

Sharing the operation of the plan at the chapter level is good; plan must go through all the chapters to materialize.

Could we include a future industry outlook in our strategic plans moving forward?

If we include some sort of outlook into the future of the industry with the strategic plans moving forward, the document in which this information resides should be considered as nimble. The plan as of now is not considered a static plan but one where actions can be derived for the organization. We could even include a 10-year outlook if the committee chooses, which increases in detail, that can then be turned into an actionable plan.

The work of Vision Ad Hocs in the past should be pulled into PLC for this effort.

Agree. We would be discussing the Society' long-term vision and will need to also work with ExCom on how this is developed.

The new strategic plan is set to roll out officially at the 2025 Annual Conference. Wouldn't it be better to roll it out earlier?

There is a soft roll out of the plan now to councils and committees. Official rollout will be during the Annual Conference extending to July with press releases and other items sent by Marketing. Standing Committees, as they have been notified prior, will have time to formulate MBOs based on the new strategic plan.

If asked, should we be directing members to the old plan or the new one as the new one hasn't officially begun yet?

We should be directing members to the new strategic plan.

Validation and Documentation Subcommittee

Mr. Patton reported on behalf of the subcommittee.

Mr. Patton moved that

(2) The Planning Committee MOP as presented be approved.

Ms. Schultz shared that there are some discussions that should be held regarding the permanence of the Implementation and Innovation Subcommittee.

Mr. Patton moved and Ms. Schultz seconded that

(2A) Motion 2 be postponed until the 2025 Annual Conference Meeting of the Planning Committee on June 20, 2025.

MOTION 2A PASSED (Unanimous Voice Vote, CNV)

As approval of the MOP was postponed, Mr. Patton determined that a motion relating to approval of the Reference Manual was not needed at this time. He continued the subcommittee's report.

The subcommittee has been doing extensive work to develop an online form for the retrieval of council and committee MBOs. A brief demonstration was given to the committee regarding the form progress thus far.

It was noted that there be a feature for comparing MBO Submissions and a location on the form for MBO progress to be noted. Completion date of the form is intended to be May 1st.

Mr. Sepulveda inquired about the subcommittee's involvement with the Membership Survey that has since been transferred to the Membership Promotion Committee.

Mr. Patton shared that the transfer of duties relating to the Membership Survey has been challenging. Membership Promotion has a lot on their plate. They received the data, but no action resulted from it.

Offered to be involved in the process but was not invited into sessions involving the development of the survey. It was a rocky transition within this first full year. Maybe by the end of the year we will come up with additional recommendations on how we can improve communication. Most of the questions noted on the survey remained the same from when it was owned by the Planning Committee.

A summary of the remaining discussion is noted below:

Are the number of respondents changing?

It was confirmed that the rate of respondents to the membership survey is decreasing. There were various promotions, however, this did not increase the response rate.

Could we consider adding the Membership Survey to the communication sent regarding membership renewal?

Ms. Seymour shared that in the last 2 years when the survey had been distributed, there had been a 6% response rate. As the Membership Promotion Committee administers multiple surveys and provides regional support in the way of training chapters, the task of administering the survey may be seen as just another project. We see a lot of the same type of audience complete the survey. We won't see a lot of data unless we change it dramatically. If there were some way that the survey could be delivered differently than what it is now, we may be able to get better data.

The purpose of the communication sent during the renewal period is for members to renew membership. This may become misconstrued if too many requests are made during that time as renewals should be effortless for members.

Are members renewing online or via email more? We don't want to lose certain segments of the membership by not having the right channel. There are a few questions that need to be addressed to increase the survey response rate.

Without feedback from the members in a good sample size, it's hard to tell which direction we should be going as an organization and if we are on the right track.

Mr. Hunt suggested that contact be made with the current Membership Promotion Chair to possibly have a liaison from Planning to Membership Promotion.

ACTION ITEM – Mr. Smith (Chad) will connect with current Membership Promotion Chair, Jason Urso, to brainstorm ideas in how to grow the response rate for the Membership Survey and possible liaison from Planning to Membership Promotion.

AI-2

There were mixed feelings around adding the survey to the membership renewal correspondence.

Do we know what percentage failed regarding the renewals? It would be great to have these details.

Mr. Littleton emphasized that we must be careful with renewals. Anything that lengthens the process could result in fewer renewals. We track those who begin a renewal but don't complete it. Would be cautious about tying anything to the renewal that lengthens the process.

Mr. Knight's presence at the meeting was acknowledged by the Chair.

He thanked the group and shared that he served on several Planning Committees in the past. Noted that the workforce is viable to the sustainability of the industry. He expressed great appreciation for the work of the committee and shared that the group's work is important to the Society.

Implementation and Innovation Subcommittee

Ms. Schultz reported on the activities of the subcommittee.

During the report, Ms. Seymour notified the committee that from a Members' Council perspective, some committees have gotten confused regarding strategic plan communication. Within the past week, several committees have shared that they have been asked/notified several different times that a member of Planning will be attending their committee meeting. Members Council, parallel to this, has its own subcommittee that is addressing communication of the strategic plan to its reporting committees.

Mr. Austin clarified that the intent of visits as organized by the subcommittee were done in good faith to introduce the work of the Planning Committee and to offer help if needed. Comments regarding confusion were shared ahead of the Winter Conference which resulted in some additional coordination before visits began.

Ms. Schultz shared that the aim of the activity would be to reach out every year. This year there just happened to be an overlap with communication of the strategic plan and the ongoing work of the subcommittee.

Global Trends Subcommittee

Mr. Hunt reported on behalf of Ms. Hayter. Shared that the subcommittee has been assigned and will be working with Mr. Rakheja, current chair of the Global Technical Interaction Committee to complete its charge. Members of the subcommittee were assigned as noted below:

- Sheila Hayter, Chair
- Jonathan Smith, Member
- Dunstan Macauley, Member
- Andres Sepulveda, Member
- Chandra Sekhar, Member

2024 ROUNDTABLE SUMMARY REPORT

A presentation regarding the outcomes of the CRC Roundtables was given by Mr. Abellon. The presentation and full report are noted in **ATTACHMENT A**.

A summary of the discussion after the presentation is noted below:

Roundtables have been held over the past several years. The challenge has been how to disseminate information after for council and committee use.

This feedback is the best we can get anywhere. Nice that it is an internal document. This could be useful to our members and their individual firms as well. Noted that there is a skills gap amongst firms.

It's important to ask the customer what they want, they tell us, and then we take that information to the councils so they can act upon that. This is fundamental to the success of our organization. When does the report go to each council and how often? Would be great if this could be anticipated.

The idea is that the report will be distributed once generated. Want it treated as a living document. Feedback so far has been that most of the items of concern noted in the presentation are common knowledge. We are working to have additional discussions with the councils as well. Talked about when it would be appropriate to share. Questions at roundtables tend to reflect the presidential theme. Does it make sense to have the report at the Annual Conference instead of the Winter Conference? This is to be determined but as of now it will be at the Winter Conference.

2024-25 MBO UPDATE

Mr. Hunt notified the committee that progress for MBOs 1-4 was discussed organically via updates from the subcommittees and should be considered ongoing.

MBO 5 was reported as ongoing with an intended completion date confirmed with Mr. Macauley for the 2025 Annual Conference meeting of the committee.

Mr. Sepulveda, in response to MBO 6, reported on the activities during the Workforce Development Summit as displayed in the meeting and presented in **ATTACHMENT B**.

Mr. Knight noted that the Workforce Development Summit was well attended and a roadmap was created that firms can use to better attract top talent in their companies. Mr. Hunt was in favor of this, and shared that an ongoing discussion among membership is how to attract, maintain, and retain talent.

Mr. Schwedler expressed the opinion that to retain talent, we should discuss our impact instead of the tools we use. We keep people safe and healthy in buildings. When rebranding this way, people will want to be a part of the industry.

Mr. Hunt shared that he and Mr. Sepulveda are working to formulate a Planning Committee Advisory group. The groups would be made up of the current Chair, and past two Chairs of the committee to create strategies to attract new talent for Planning. A path forward is set to be presented to the committee at the 2025 Annual Conference.

NEW BUSINESS

Strategic Plan Development and Implementation and Innovation Subcommittee Structure

Mr. Macauley notified the committee that subcommittee leadership from the Implementation and Innovation and Strategic Plan Development Subcommittees are looking to prevent an overlap in work for the two groups moving forward.

Would like to have a discussion to work out how we will eliminate the overlaps and where there are opportunities to increase communication. Discussions have not started yet. This is an initiative of both subcommittees and not just one. Comments received are noted as below:

What are the overlaps currently?

Implementation and Innovation is responsible for implementation of the strategic plan. They were not involved in any development of the plan. How can they effectively present the new plan if they were not involved in its development other than at the committee level? This is one area we need to resolve.

Implementation and Innovation is also responsible for strategic initiatives and ideas for the plan; however, this is part of development of the plan as well.

The Strategic Plan Development Subcommittee worked with the consultant to develop strategic initiatives and draft KPIs. This was done as a natural progression of the work assigned.

When does the work of the Implementation and Innovation Subcommittee feed into the plan?

Ms. Schultz noted that this would be added to the next Implementation and Innovation Subcommittee agenda for discussion.

Strategic Plan Initiative Rollout – Budget Anticipation (Next 3-Years)

Mr. Austin, as a member of the Planning and Finance Committees, brought forward the discussion of a strategic plan initiative budget. The Finance Committee is seeking to receive all requests associated with the strategic plan for implementation into the 2025-26 Society Year budget.

Mr. Hunt shared that as far as marketing the strategic plan, no additional costs are associated with the plan from a Planning Committee perspective as confirmed by Ms. Gupta. Additional comments have been provided below:

Funds could be used for growing online training.

PubEd Council has addressed a lot of online training concerns already.

Items that are associated with the plan that don't belong to a council or committee but may need funding will be reviewed.

Mr. Littleton shared that we have a draft budget for the society year. We have a deep dive of the budget for the BOD in May and then the budget is approved in June. If any of the councils and committees want strategic plan funding to be added to the budget for next year, it has to fall in line with that cycle. They will need to get the requests to the Finance Committee soon. This is the reason for the soft launch here.

Councils and committees might have items, but we aren't recommending budgets for that.

Mr. Austin shared that he would take back the request that proposed budgets for councils and committees regarding the support of strategic plan initiatives, if needed, will be sent to the Finance Committee soon based on council discussions.

We want to identify as much as possible so that the likelihood of cost implications that relate to the strategic plan being approved are high.

Mr. Sekhar shared that from PubEd Council's perspective, the idea is to have conversations about the strategic plan with the subcommittees of the council and then the main council body. They won't have budget information yet, but discussions have begun to ensure that if needed, items are built into budgets to support the strategic plan.

Budget requests are anticipated to come from the councils within the next several weeks.

FUTURE MEETINGS

Mr. Hunt notified the committee that the next meeting will be during the 2025 Annual Conference in Phoenix, AZ.

ADJOURN

The meeting was adjourned at 4:00pm.

Respectfully Submitted,

Trent Hunt

Trent Hunt

Attachments: A. 2024 CRC Roundtable Presentation and Full Report
 B. PLC Orlando 2025- 2024 NYC WFD Summit Report



Shaping Tomorrow's Global
Built Environment Today

Industry Roundtables

2024 Critical Issues Summary
and recommendations for Councils

[ashrae.org](https://www.ashrae.org)



2024 Industry Roundtable Critical Issues



- **Role of the Industry**
The role that the industry is taking on reducing **carbon emissions** and **adopting sustainable practices**, through **decarbonization** and **electrification**
- **Refrigeration Regulations**
The industry faces an overwhelming amount of regulatory information, creating confusion about which guidelines to follow for refrigerant regulations and safety. The challenges of flammable refrigerants, their impact on different sectors, and ongoing phaseouts further add to the complexity.
- **Workforce**
The growing generational gap in the workforce.
- **HVAC in Higher Education**
The lack of HVAC education presence in undergraduate curriculum.
- **Industry Collaboration**
The need for more collaboration between technicians, building owners, engineers, and architects on projects.
- **New Educational Tools**
New, more interactive and engaging tools to train and educate new and young professionals

Recommendations to Publishing & Education Council

Training and education, particularly for young professionals entering the industry is critically needed. Publishing and Education Council may consider:

- Leveraging emerging technologies and alternative formats to create training materials that may be more accessible for young professionals
- Developing additional training programs focused on HVAC fundamentals
- Adapting ALI courses to be region/country specific
- Developing resources to better educate the general public



Recommendations to Members Council

Acknowledging President Knight's theme of workforce development, many of the discussions centered around the need to engage with students and young professionals, supporting and encouraging them in their career journey in the built environment. Members Council may consider:

- Developing programs that focus on showing students (K-12, post-High including trade/technical schools) the impact they can have by choosing careers in the built environment
- Encouraging chapters to include technical training on HVAC fundamentals
- Encouraging collaboration with other industry organizations
- Exploring alternative training options, such as podcasts, videos, hands-on technical tours
- Developing a program to help facilitate internships for engineering students



Recommendations to Technology Council

Decarbonization, IEQ and refrigerant regulations are issues that members at all levels need guidance on. Technology Council may consider:

- Continuing to develop resources and practical guides on decarbonization, IEQ and refrigerants for manufacturers, design professionals, contractors, building owners/facility managers and building scientists
- Providing guidance on how emerging technologies like AI can be used to improve productivity and optimize system performance
- Providing more opportunities for technicians/operators to get involved in ASHRAE





ASHRAE Roundtables Review and Findings

January 2025

Notes have been collected for some 12 roundtable discussions held between January and October 2024. The roundtable reports are available on the BOD Basecamp [here](#). Appendix A provides a simple executive summary of each roundtable. (Note: Other roundtable discussions may have occurred, but notes were not available.)

Fully 4 of the 12 roundtable discussions (33%) were held **outside of the U.S.** The locations are listed below in the order in which they were held.

1. Central Florida Chapter (Region XII), Orlando, FL, January 2024
2. Region VIII CRC Dallas, TX, April 2024
3. Region XI CRC Spokane, WA, May 2024
4. Region V CRC Cincinnati, OH, July 2024
5. Region IX CRC Boise, ID, August 2024
6. Region III CRC Bethlehem, PA, August 2024
7. Region I CRC Albany, NY, August 2024
8. Region X CRC Phoenix, AZ, August 2024
9. **Region II CRC Toronto, ON, Canada, August 2024**
10. **Region XIV CRC London, UK, September 2024**
11. **Region XV CRC Udaipur, India, September 2024**
12. **Region-at-Large CRC Karachi, Pakistan, October 2024**

Executive Summary

The notes from the 2024 Industry Roundtables all reflect an important need for better education, training and industry collaboration to address both short-term and long-term challenges in the HVACR industry. Most roundtables discussed focusing on preparing the next generation to meet the demands of a rapidly changing industry. A stronger connection between industry and academia is needed.

It is worth noting that the three earlier roundtables were conducted during President Scoggin's term in which the Society Theme was "Challenge Accepted: Tackling the Climate Crisis." The ten later roundtables were conducted during President Knight's term in which the Society Theme is "Empowering Our Workforce: Building a Sustainable Future." Topics covered in roundtables may have been dependent on the participants and the current Society theme.

Six common themes emerged from the feedback received during the Roundtables, providing opportunities for each of the councils to explore to better serve the needs of our members.

- **Publishing and Education Council** – Training and education, particularly for young professionals entering the industry is critically needed. Publishing and Education Council may consider:

- Leveraging emerging technologies and alternative formats to create training materials that may be more accessible for young professionals
 - Developing additional training programs focused on HVAC fundamentals
 - Adapting ALL courses to be region/country specific
 - Developing resources to better educate the general public
- **Members Council** - Acknowledging President Knight's theme of workforce development, many of the discussions centered around the need to engage with students and young professionals, supporting and encouraging them in their career journey in the built environment. Members Council may consider:
 - Developing programs that focus on showing students (K-12, post-High including trade/technical schools) the impact they can have by choosing careers in the built environment
 - Encouraging chapters to include technical training on HVAC fundamentals
 - Encouraging collaboration with other industry organizations
 - Exploring alternative training options, such as podcasts, videos, hands-on technical tours
 - Developing a program to help facilitate internships for engineering students
- **Technology Council** – Decarbonization, IEQ and refrigerant regulations are issues that members at all levels need guidance on. Technology Council may consider:
 - Continuing to develop resources and practical guides on decarbonization, IEQ and refrigerants for manufacturers, design professionals, contractors, building owners/facility managers and building scientists
 - Providing guidance on how emerging technologies like AI can be used to improve productivity and optimize system performance
 - Providing more opportunities for technicians/operators to get involved in ASHRAE

These are just a few recommendations gleaned from the feedback received during the Roundtables. A summary of each of the discussions can be found below. We invite all councils, along with Planning Committee, PEAC and TRAC to review these notes to see what other opportunities there may be to better serve our members as MBOs are developed moving forward.

Critical Issues in the Industry

The 2024 roundtables highlighted several critical issues within the HVACR industry:

- The role that the industry is taking on reducing carbon emissions and adopting sustainable practices, through decarbonization and electrification
- Refrigerant regulations
- The growing generational gap in the workforce
- The lack of HVAC education presence in undergraduate curriculum
- The need for more collaboration between technicians, building owners, engineers, and architects on projects
- New, more interactive and engaging tools to train and educate new and young professionals

Some of the critical issues addressed at roundtables in 2024 were also addressed in roundtables in previous years. See Appendix B for the 2022-2023 roundtables summary with updates/additions from 2024 roundtables highlighted.

Decarbonization, Sustainability and Resiliency

ASHRAE can empower organizations, students, individuals and the general public to make carbon emission reduction goals. Educating all stakeholders (design engineers, architects, commissioners, technicians, building owners/operators, facility managers, etc.) on the importance of their work and the role it plays in reducing carbon is critical. The work the team does together makes a difference on every project.

Some regions in the US and globally are using the term “Resiliency” to encompass decarbonization, IEQ and sustainability practices. One roundtable suggested incorporating carbon calculations into all ASHRAE standards.

Refrigerant Regulations

The industry faces an overwhelming amount of regulatory information, creating confusion about which guidelines to follow for refrigerant regulations and safety. The challenges of flammable refrigerants, their impact on different sectors, and ongoing phaseouts further add to the complexity.

Education and Training

Several roundtables discussed the lack of specific HVAC training at colleges and universities around the world and the need for dedicated curricula. Workforce development initiatives such as vocational training, internships and professional mentorship programs can help bridge the gap between formal education and real-world skills. One roundtable suggested creating a university course that utilizes hands-on training of the universities HVAC system since all colleges and universities have large HVAC systems located on campus. On-the-job training and real-world experience were expressed as critical in learning this industry and currently there is a lack of this type of education in the HVACR space. On-the-job training also involves relationship skills that are needed for all the roles to work together on a project (i.e. technician/contractor, building owner/operator, facility manager, design engineer and architect). One roundtable suggested developing a “year in the field” approach to teaching engineering students about the practical side of the industry.

Training and education delivery was also discussed at most roundtables. There is consensus on evolving delivery methods to better engage the younger generation such as short YouTube training videos, podcasts, utilizing LinkedIn Learning platforms, interactive training tools such as VR and gamification. One roundtable even suggested creating a buildings/HVAC version or modification to Minecraft to support interest and understanding starting with an even younger audience.

Education and training must also be tailored geographically based on the needs of the audience. For example, Canada Net Zero goals are hard to achieve due to cost and implementation strategies while in the Middle East and Africa, there are challenges on how the HVACR industry is adapting to the rapidly changing climate conditions.

Industry Collaboration

The industry is currently working in silos based on their role and job title. Collaboration is key in moving the industry forward as well as motivating and educating the next generation to choose a profession within the HVACR industry. Industry collaboration with academia is needed to integrate HVAC curriculum and education into MEP programs. Collaboration and better communication between the different roles within the industry (engineers, technicians, building owners, etc.) is critical to understanding new technology and proper design and maintenance of building systems.

ASHRAE Standards are excellent and very valuable but mostly address design issues. Industry collaboration is needed to expand content in ASHRAE Standards to include commissioning and installation direction.

Development of New Tools

ASHRAE has incredible resources such as the ASHRAE Handbook, Standards and Guidelines. Many roundtables indicated that while the more seasoned professionals rely on these tools, the younger generation is looking for more efficient, quicker ways to access information, guidance, and data. One roundtable suggested having the TCs create short videos about their Handbook chapters for quicker content consumption. Another roundtable suggested a small language model AI tool for ASHRAE publications. Creating an ASHRAE Reddit Forum was another idea from a roundtable.

Additionally, there are opportunities to leverage emerging technologies such as AI not only improve access to technical resources, but to improve processes and optimize system performance. ASHRAE can take on a leadership position in how AI can be used in our industry.

Engaging and Retaining the Younger Generations

Several roundtables discussed inspiring the next generation, starting as early as with K-12 students, by messaging the “why” HVACR matters and how it can impact the world. If ASHRAE can message and show the real-world impact of HVAC systems, particularly in terms of sustainability and climate change, more young people will want to explore careers in the HVACR industry. K-12 STEM activities, career fairs, and design competitions were cited as successful outreach programs and events throughout the regions.

Roundtable Process

Market intelligence gained from roundtables is very valuable. Conducting roundtables should be adopted as the best practice for all CRCs. The Roundtable Reports Review Committee (R3C) should provide to the Executive Committee and Planning Committee summaries from roundtables held immediately preceding the Spring and Fall CRCs at the Winter Conference. The Executive Committee will allocate items to the appropriate Councils for consideration. Councils will use the roundtable reports to inform their MBOs and action items. Society Planning Committee will use the roundtable reports to inform Strategic Plans and support development of Council MBOs. Roundtable notes should be archived on the BOD basecamp.

Guidelines for conducting ASHRAE Industry Roundtables were updated in July 2024 and can be found on the BOD basecamp [here](#). The guidelines include an overview, goals, attendance, invitees, coordination and discussion questions. R3C should review and update this guidance and distribute to DRCs and RMCR by the Annual Conference.

Appendix A. Abbreviated Roundtable Highlights

- **Central Florida Chapter (Region XII) Orlando, FL, January 2024**
 - Critical needs impacting our industry include technical and cost illiteracy associated with high performance building construction and renovations and reliability including IEQ.
 - ASHRAE can support the industry by providing resources to better educate the public with general education of the importance of reducing carbon emissions and understanding the climate impacts.
 - Empowering organizations and even individuals (starting with students) to make carbon emission reduction goals. This includes educating facility technicians, maintenance personnel and commissioning agents who normally do not connect their work to carbon. Supervisors need to be better educated on that connection.
 - ASHRAE can support workforce development by reaching out to technical schools and supporting technicians to development.
 - Connect the dots to technicians that their work matters in addressing climate change – not just installing and servicing HVAC systems.

- **Region VIII CRC Dallas, TX, April 2024**
 - Critical issues impacting our industry include refrigerant regulations.
 - Another critical issue is there is too much information available without a clear and consistent message on which guidance to follow (i.e. ICC, ASHRAE, state-wide/county-wide minimal energy code, Building Codes, UL, etc).
 - Standards are being written by academics and then “tossed to engineers/operators to implement.
 - Additional education to the younger generation of students and professionals with more direct HVAC education.
 - Suggestions include an undergraduate curriculum on HVAC, Reddit Forum on ASHRAE, More Fundamentals Training resources that could be pushed down to the Chapter and use Chapter Leaders to train.
 - ASHRAE materials are great for the trainer but not for the student/trainee.
 - Chapter leaders could be certified to train chapter members on fundamentals and systems training so that chapter members get industry training baked into their chapter meetings.
 - Interactive pieces of the ASHRAE Handbook are needed.

- **Region XI CRC Spokane, WA, May 2024**
 - Most critical condition in our industry is the lack of well-trained engineers in the 35-45 age range.
 - Inexperienced new hires are the norm.
 - Colleges are more focused on non-building related mechanical engineering.
 - Better candidates are usually people who have experience on job sites (not just a degree).
 - ASHRAE can help by providing background on how codes are developed so that people think more critically when applying standards.
 - Not enough people are trained to service VRF systems therefore people are backing away from these systems.
 - ASHRAE could develop a “year in the field” approach to teaching engineering students about the practical side of their work.
 - It is important for owners and contractors to work together and stay engaged with one

another to support long-term success.

- A joint ASHRAE/AIA effort to coordinate work between disciplines.
- ASHRAE should create a standard for the various options/templates for the sequence of operations to support technicians.
- One idea might be for ASHRAE to create a curriculum for a local ASHRAE member/professional to teach 30-minute sessions in advance of Chapter Meetings. Perhaps utilize TCs that develop applications and fundamentals handbook.
- A suggestion for ASHRAE to provide educational content in short YouTube- type videos for easy consumption (ASHE does something like this).

- **Region V CRC Cincinnati, OH, July 2024**

- Focus on decarbonization/resiliency changes how projects are approached.
- Sustainability practices of the past are now mainstream and part of the project implementation.
- “Resiliency” is a term that is more used in this region of the country and is also catching on in Asia as well. It encompasses decarbonization, IEQ, and energy sustainability.
- Building owners are only concerned with budget and meeting minimum code requirements.
- Incorporate carbon calculations into all ASHRAE standards.
- AI, machine learning/automation, digital visualization need investment from our industry.
- Using AI to train new workers faster but also keep “old-school” understanding of plans and projects must be maintained in training.
- ASHRAE can increase passion in the industry by more K12 STEM activities, show real-life impact, focus on cutting edge technologies and teach kids/youth how to change the world through HVAC.
- Required HVAC courses in university curriculum is a must. Right now HVAC is just a footnote in Mechanical Engineering classes. There is a disconnect between the need in society versus emphasis in college.
- Disconnect between design engineers and building owners. What is designed is ignored because the owners can’t operate the systems.
- Messaging should be to younger generations that the industry can help save the world. Buildings have a long-lasting impact due to their long lifetimes.

- **Region IX CRC Boise, ID, August 2024**

- A critical issue in the industry includes the increasing costs associated with labor and projects which stalls or limits projects.
- There is a growing gap between industry professionals with 5-20 years of experience that is causing labor shortages which increases project time and expense. A&E firms are beginning to bring in vocational training, even at the high school level, to offset some of the labor shortages.
- There is a missing opportunity in industry training related to the “why.”
- Too few schools offer HVAC/Buildings specific programs. Most universities only offer one semester of HVAC course work.
- There needs to be better messaging from ASHRAE on why HVAC is important to the world.
- Encourage more ASHRAE-specific career fairs at Student Branch schools.
- ASHRAE Design Challenges have been successful at local colleges/universities to get students engaged in the work of the industry.

- Make more co-op internships available within the industry.
 - There isn't enough time to train and mentor younger professionals. There is too much to do and all projects seem to be urgent recently, which doesn't allow time to train.
 - More "real world" experience is needed for example, taking students and young professionals into the mechanical room and on job sites.
 - More interactive training available (i.e. VR).
 - AI needs to be integrated. The Handbook is great, but searching through a 1,000-page handbook for an answer is the research of the past.
 - Programs for technical people are needed. ASHRAE scholarships don't allow for support of people in technical schools.
 - ASHRAE does networking and mentoring well.
 - If people in the industry aren't engineers, they feel like they don't have a place at ASHRAE and therefore don't become members.
 - There is a need for more programming for owners and facility managers.
- **Region III CRC Bethlehem, PA, August 2024**
 - Critical issues in the industry include lack of personnel and basic understanding of fundamentals, technology and equipment.
 - Another issue is the building owners awareness of products and applications. Regulations and equipment are changing rapidly which is creating compatibility issues.
 - Idea to create applications that field personnel can use to help make job site decisions.
 - ASHRAE Standards are great, but they only address design issues, more support is needed with commissioning and installation direction.
 - Training is needed for those installing the systems that engineers are designing. There is a big disconnect between the two.
 - Learning materials are changing for the younger generation. They aren't using handbooks and books anymore. They learn in shorter segments with 15 minute videos on specific topics.
 - Ideas include:
 - Subscription based podcasts, YouTube channels of training content
 - Consider providing a free number of PDHs each year to members
 - Get the Lucy books adopted into K-5 curriculum
 - A "Minecraft" game of sorts that's dedicated to buildings and is used as a training tool for the younger generations.
 - TCs provide content for short educational videos to cover Handbook chapters
 - Another issue the industry is facing is flammable refrigerants and how they impact various aspects of the industry.
- **Region I CRC Albany, NY, August 2024**
 - Critical issues in the industry include attracting and retaining new people, electrification and finding new ways to decarbonize while making smart decisions, and trying to get building owners back-to-basics training and IAQ knowledge.
 - Contractors have picked up more design work recently at the expense of design firms.
 - More focus should be on existing buildings to save energy within existing structure.
 - More student knowledge and engagement with ASHRAE. Professors are not pushing ASHRAE so students don't really know what it is or why ASHRAE is important. There are limited HVAC specific college courses available.

- Companies are having to do the bulk of the fundamentals training with employees who are right out of college since college courses don't dive deep enough into HVAC.
 - Creating shorter, detailed videos to capture the educational content (not long manuals or handbooks).
 - Training needs to showcase how this industry aligns with their ideals of environment and health
 - AI tools are needed for ASHRAE members specific to ASHRAE.
 - New technology is needed, other than heat pumps, to meet decarbonization goals.
 - Hands-on training strategies are also needed.
 - LinkedIn learning has proven to be successful in some areas of this region.
 - Encourage facility internships at colleges and universities. Every university has a large HVAC system.
- **Region X CRC Phoenix, August 2024**
 - Refrigerant phase outs is the most critical issue.
 - Another issue is electrification and high ambient temperatures.
 - Rely on ASHRAE Fundamentals Training to train employees right out of college who did not get much HVAC/Buildings training with college courses.
 - Lack of college courses available for HVAC at local universities.
 - Education takes a lot of time. Are there ways we can deliver education in different methods for easier consumption?
 - Internships are critical for graduates. How can ASHRAE be involved?
- **Region II CRC Toronto, August 2024**
 - Critical issues are climate change, the many solutions for decarbonization yet issues implementing, and the industry is working in silos.
 - Building owners and operators need more training to understand the impact on building performance related to actions on the equipment. There needs to be more connection between the design engineers and this group.
 - ALI courses and instructors should be tailored to the region/country. Some courses and instructors are very US-based and aren't tailoring presentations to support international audiences.
 - There is a trend of drifting operating performance once consulting firms leave the projects.
 - Universities do not have courses that cover equipment.
 - Need to bridge the gap between building operations and design. How can ASHRAE help building owners plan and educate them about energy efficiency.
 - Net Zero targets in Canada are a big challenge when balanced with realistic plans and costs.
 - ASHRAE needs education on publishing data benchmark on buildings. ASHRAE should be guiding the industry on benchmarking data.
 - Small language model for Handbooks.
- **Region XIV CRC London, September 2024**
 - Critical issue in Europe is lack of government leadership.
 - There are gaps between "official paths" and actual policy implementation.
 - Training gaps in the workforce are fundamentals and bridge the gap between technicians and engineers.

- ASHRAE can incorporate new ideas into existing standards to help the industry.
- **Region XV CRC Udaipur, India September 2024**
 - Critical need for ASHRAE is MEP curriculum in last semester of engineering programs.
 - ASHRAE needs to connect with students in their last year of university.
 - Training for technicians is needed for installation and commissioning of the MEP system.
 - The salary gap between IT and engineers in India is great and most young professionals gravitate toward the IT industry because of the salary.
 - ASHRAE certification for installation or another area more geared toward technicians could be beneficial.
 - Government policy amendments to encourage decarbonization are needed.
- **Region-at-Large CRC, Pakistan, October 2024**
 - ASHRAE should invest more in AI:
 - AI usage in the HVACR industry is limited and not effectively advancing technology.
 - Education on how to use AI related to air conditioning is lagging.
 - Rapidly changing climate conditions leading to severe weather are impacting the economy and HVACR needs to adapt more quickly.
 - Focus education to mirror current workforce and focus on technical and vocational training for technicians.
 - Training programs are needed for mid-level engineers and technicians that offer certification.
 - Enrollment in mechanical engineering programs is declining as students are invested in more money-making fields.

Appendix B. 2022-2023 Roundtable Summary

Updates from 2024 Roundtables are highlighted.

Broaden ASHRAE's Target Audience

The need to broaden ASHRAE's community to include both owner/operators and technicians/contractors was cited at several roundtables again in 2024.

- According to the December 2024 membership dashboard, ASHRAE has 4,652 contractor members and 2,918 design/build members for a total of 7,570 or 14% of 54,486 members. Despite being the 3rd largest segment of ASHRAE's membership behind design engineers and manufacturers/ reps, ASHRAE offers few programs designed specifically for contractors.
- Lack of qualified technicians is seen as a universal problem at roundtables. Advance MEP systems cannot be deployed without skilled technicians for both installation and service. Refrigeration technicians in particular are cited as being in low supply as demand for cooling grows globally.
 - The transition to mildly flammable, low GWP refrigerants underscores the need to provide training to both current and new technicians.
 - More complex mechanical and control systems will require technicians with higher skill sets.
- Improved communication between the owner/operator and the design communities is critical to accelerate the transition to healthier and more sustainable buildings. Increase owner/operator participation in ASHRAE is cited as benefiting the mechanical design community and ASHRAE's mission. One roundtable suggested bringing contractors, technicians, and building owners into project committees to bring their perspectives during the standard writing process.

Practical Guidance/Tools Needed

ASHRAE is the undisputed top global technical resource for HVAC systems. However, the Society lacks guidance on practical implementation of complex design best practices. Standards and handbooks are best-in-class, but simplified guidance is needed to bridge the gap between theory and implementation. Participants of the 2024 roundtables offered solutions such as creating short YouTube videos to cover content for each chapter in the ASHRAE Handbook, podcasts, VR and gamification (such a Minecraft modification focused on buildings and HVAC systems), and LinkedIn Learning.

This issue is linked to workforce development. The 'gray tsunami' of retirements drives the next generation's need for practice implementation guidance. Traditional delivery of technical information such as printed/electronic handbooks is not appealing to younger generations. Videos, apps, online tools, and interactive training is considered more valuable than complex printed guidance.

Similarly, guidance is needed on how to navigate through ASHRAE's volumes of technical guidance, training programs, publications and standards. Roundtable participants often cited difficulty in finding relevant information.

Young current and prospective members learn differently (interactively) and respond to being challenged. Practical solutions must be delivered in new ways to have broad appeal. A few roundtables suggested training local chapter members or leaders to be "certified" to teach industry basics to ASHRAE young and members for 30 minutes before Chapter Meetings begin so that local industry professionals can attend Chapter Meetings but also receive some industry training with peers in addition to networking

Labor Shortages are a Universal Issue

Workforce development was cited as a key issue at virtually every roundtable. Note that the workforce development conversation was prompted by questions in some roundtables rather than being volunteered independently by roundtable participants.

There was a universal call to improve the understanding of and the appeal of careers in HVAC&R (“convince me to be an HVAC&R engineer”).

- Short videos
- Training needed to accelerate the learning curve of those new to HVAC&R.
- Tie HVAC&R buildings engineering to solving the climate crisis.
- Message to younger audience (K-12 even) and general public about the impact HVAC&R jobs have on the environment and the future of the world.

Chapters/Regions Need Flexibility, Resources for Localized Solutions

Challenge and opportunities differ widely in regions around the world, underscoring the importance of empowering and resourcing Chapters/Regions to provide localized benefits and services.

The degree to which language is a barrier for standards, training, etc. varies widely. For example, English is not a barrier in India but is considered an issued in Brazil and Turkey. Grid limitation is a significant issue driving energy efficiency in Monterrey. Declining population in Japan exacerbates HVAC&R workforce shortages.

Canadian roundtables noted the importance of ASHRAE courses being tailored to the region (i.e. climate, regulations, carbon emission and net zero goals, policies, etc.). The roundtable in India discussed their struggle with government advocacy and adoption of ASHRAE Standards and guidance.

The cost of ASHRAE products and services is a well-documented and growing issue for many countries, often driven by inflation, political turmoil and current valuations.

Practical Refrigerant Transition Strategies and Training is Needed

The transition to low-GWP refrigerants is paced differently around the globe. Standards and regulatory timelines are not aligned. Several roundtables underscore the importance of aligning refrigerant strategies.

A strong need for comprehensive training on the design and maintenance of systems using mildly-flammable refrigerants. The need for that training varies widely by region based on the regulatory timing. It is needed for design, but more significantly needed for technician/contractor/owner operation and maintenance.

Networking is Universally Valued

Multiple roundtables underscored the value of connecting with ASHRAE’s global network of building professionals as a primary benefit of ASHRAE. The Society would be well-served to identify and increase opportunities for networking throughout the Society. Creating opportunities for cross-discipline networking between designers, contractors, researchers, building owners, and manufacturers was recommended as being particularly valuable.



Shaping Tomorrow's Global
Built Environment Today

Industry Roundtables

2024 Critical Issues Summary
and recommendations for Councils

[ashrae.org](https://www.ashrae.org)



2024 Industry Roundtable Critical Issues

Florida, Texas,
Washington, Ohio,
Idaho, Pennsylvania,
New York, Arizona

8
Held in US

12
Round-
tables

January –
October 2024

4
Outside
the US

Toronto,
London,
Udaipur, and
Karachi

- **Role of the Industry**
The role that the industry is taking on reducing **carbon emissions** and **adopting sustainable practices**, through **decarbonization** and **electrification**
- **Refrigeration Regulations**
The industry faces an overwhelming amount of regulatory information, creating confusion about which guidelines to follow for refrigerant regulations and safety. The challenges of flammable refrigerants, their impact on different sectors, and ongoing phaseouts further add to the complexity.
- **Workforce**
The growing generational gap in the workforce.
- **HVAC in Higher Education**
The lack of HVAC education presence in undergraduate curriculum.
- **Industry Collaboration**
The need for more collaboration between technicians, building owners, engineers, and architects on projects.
- **New Educational Tools**
New, more interactive and engaging tools to train and educate new and young professionals

Recommendations to Publishing & Education Council

Training and education, particularly for young professionals entering the industry is critically needed. Publishing and Education Council may consider:

- Leveraging emerging technologies and alternative formats to create training materials that may be more accessible for young professionals
- Developing additional training programs focused on HVAC fundamentals
- Adapting ALI courses to be region/country specific
- Developing resources to better educate the general public



Recommendations to Members Council

Acknowledging President Knight's theme of workforce development, many of the discussions centered around the need to engage with students and young professionals, supporting and encouraging them in their career journey in the built environment. Members Council may consider:

- Developing programs that focus on showing students (K-12, post-High including trade/technical schools) the impact they can have by choosing careers in the built environment
- Encouraging chapters to include technical training on HVAC fundamentals
- Encouraging collaboration with other industry organizations
- Exploring alternative training options, such as podcasts, videos, hands-on technical tours
- Developing a program to help facilitate internships for engineering students



Recommendations to Technology Council

Decarbonization, IEQ and refrigerant regulations are issues that members at all levels need guidance on. Technology Council may consider:

- Continuing to develop resources and practical guides on decarbonization, IEQ and refrigerants for manufacturers, design professionals, contractors, building owners/facility managers and building scientists
- Providing guidance on how emerging technologies like AI can be used to improve productivity and optimize system performance
- Providing more opportunities for technicians/operators to get involved in ASHRAE



Summary of the ASHRAE 2024 Workforce Development Summit

The ASHRAE 2024 Workforce Development Summit, held on October 20, 2024, in New York City, brought together 38 industry leaders to address the critical challenges of attracting, engaging, and retaining talent in the HVAC&R industry. With rapid upcoming emerging technologies and increasing demand, the industry faces a workforce gap that must be strategically addressed. The summit resulted in key recommendations to reshape workforce strategies and ensure sustainable growth.

Key Findings and Recommendations

Attracting Talent

Challenges:

- Lack of awareness and visibility of the HVAC&R industry among potential candidates
- Unclear career pathways from high school to professional roles
- Strong competition from tech-driven industries

Recommendations:

- **Rebranding and Awareness:** Promote HVAC&R careers as innovative, sustainable, and impactful, emphasizing climate solutions and technological advancements
- **Skill-Based Recruitment:** Shift focus from traditional degree requirements to essential skill sets, enabling diverse career entry pathways
- **Enhanced Recruitment Strategies:** Implement mentorship programs, targeted outreach to underrepresented groups, and support small employers with hiring resources
- **Education and Partnerships:** Strengthen collaborations with high schools, universities, and vocational training programs to improve industry alignment

Engaging Talent

Challenges:

- Mismatch between academic preparation and industry needs
- Limited onboarding processes and professional development opportunities
- Employees feeling disconnected from company missions and values

Recommendations:

- **Mission-Driven Culture:** Align job roles with a broader industry mission to enhance job satisfaction and long-term commitment
- **Comprehensive Onboarding:** Develop structured onboarding programs with clear career growth pathways, leadership training, and mentorship
- **Diversification of Roles:** Encourage cross-functional experiences to prevent employees from feeling pigeonholed and increase engagement

- **Work-Life Balance:** Utilize technology to support remote work options, mental health programs, and flexible schedules

Retaining Talent

Challenges:

- Competitive salaries offered by larger industries drawing talent away
- Limited career growth opportunities and lack of transparency in progression paths
- High burnout rates and poor work-life balance

Recommendations:

- **Supportive Work Environment:** Foster a culture centered on employee well-being, transparency, and organizational mission
- **Career Development Programs:** Implement structured career progression plans with continuous learning opportunities and leadership training
- **Employee Feedback Mechanisms:** Encourage open communication through regular check-ins and strategic planning participation
- **Leadership Development:** Equip managers with the tools to effectively mentor and guide employees, ensuring they see the impact of their work

Conclusion and Next Steps

The HVAC&R industry must proactively address workforce challenges to secure its future. By implementing these recommendations, companies can position themselves as attractive employers, enhance engagement, and retain top talent. ASHRAE commits to supporting these efforts by developing industry resources, expanding educational initiatives, and fostering collaboration among industry stakeholders. Through a collective effort, the HVAC&R sector can cultivate a skilled and motivated workforce, ready to meet the demands of a rapidly evolving industry.