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AHR EXPO 2024

*Thousands head to Chicago for **ASHRAE Conference** and industry's largest annual trade show. For **Technical Preview**, see **p. 8**.*



**Some Good
Climate News**

See Page 40

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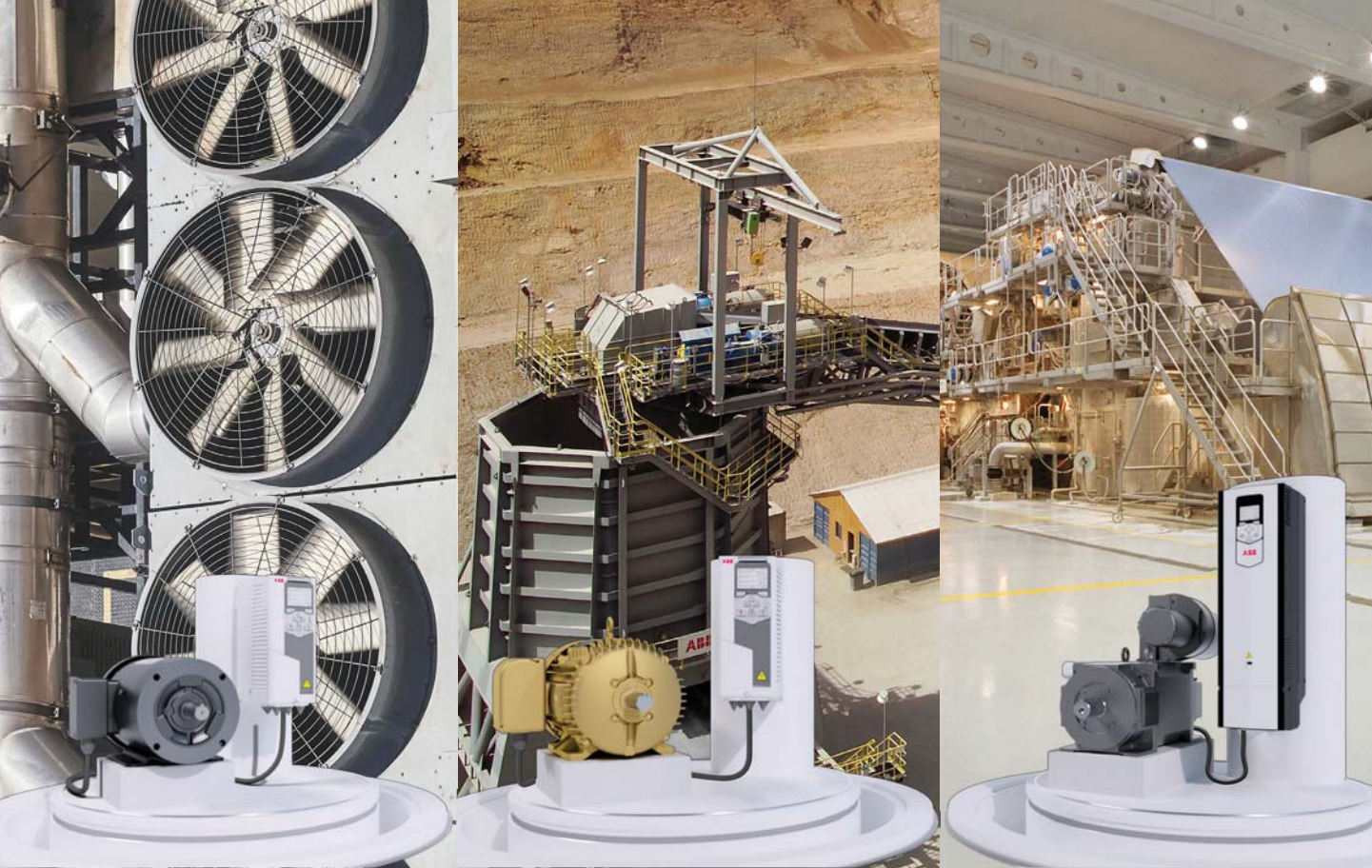
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As the World Churns, Optimism

Even as we approach a winter decidedly more upbeat economically than just a year ago, world events once again have intervened to restrain our optimism.

Undoubtedly history will remember the fourth quarter of 2023 more for a ghastly new war in the Middle East than it will for declining inflation, improved supply chains and a quietly miraculous escape from an all-but-certain recession. Similarly, persistent war in Ukraine and bombastic dysfunction in Congress have overshadowed

our resilient return to a post-pandemic “normal.”

But good news is still out there.

On Nov. 17, the Dodge Construction Network released its forecast for 2024, and chief economist **Richard Branch** is now predicting a 7% increase in construction starts next year. Bolstered by federal stimulus funds for

domestic manufacturing projects and continued infrastructure investment, Dodge expects total starts will surpass \$1.2 trillion in 2024.

In particular, manufacturing starts will lead the way with a 16% surge, said Branch. “Not a surprise, considering the impact of the CHIP and Inflation Reduction Acts.”

Also on the good news front, our own **Larry Clark** in this issue (p. 40) notes some silver linings in the climate clouds. Citing a new update to the International Energy Agency (IEA) report, *Net Zero by 2050, A Roadmap for the Global Energy Sector*, he writes, “The IEA has given us a glimmer of hope.” The update states:

Positive developments over the past two years include solar PV installations and electric car sales tracking in line with the milestones set out for them in our 2021 Net Zero by 2050 report. In response to the pandemic and the global energy crisis triggered by Russia's invasion of Ukraine, governments

around the world announced a raft of measures designed to promote the uptake of a range of clean energy technologies. Industry is ramping up quickly to supply many of them. If fully implemented, currently announced manufacturing capacity expansions for solar PV and batteries would be sufficient to meet demand by 2030.

Such surprisingly good news was also cited at ASHRAE's *Decarbonization Conference for the Built Environment*, held in Washington in late October. There, keynote speaker and veteran journalist **Chris Turner**, author of the book, *How To Be a Climate Optimist*, told assembled stakeholders, “This global energy transition, now emergent, now genuinely global in scale and scope, is also increasingly inevitable, with a momentum that continues to build with staggering speed by the day... It really is an extraordinarily powerful and inspirational moment.”

Turner will be bringing that inspiration to Chicago in January for the ASHRAE 2024 Winter Conference, which will be emphasizing the Society's recently accelerated and global decarbonization efforts. Young engineers, in particular, are being encouraged to make their voice heard.

In Case You Missed It

On Oct. 29, CBS News '60 Minutes' ran a 14-minute segment, “*The Air We Breathe*.” Available on YouTube, it is worth seeing.

The show spoke with two experts familiar to HPAC readers, Dr. **Linsey Marr, P.E.**, of Virginia Tech, and Dr. **Joseph Allen**, of Harvard University's T.H. Chan School of Public Health. They discussed how IAQ was left out of discussions at the outset of the Coronavirus pandemic and how that compounded the tragedy that followed.

“Think about the early days of the pandemic, with ‘flatten the curve’—‘stay home,’” recalled Allen. “Why wasn't ‘Improve indoor air quality’ part of ‘flatten the curve’? We had tools to protect ourselves... But we ignored the building side of this.”

Now, there is hope and real evidence that building owners and designers have learned those lessons, and are adjusting accordingly. Yes, more actual hope for the holidays!



Rob McManamy
 Editor-in-Chief

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ASHRAE Ratchets Up Building Decarbonization Push with Summits, New Guide to Electric Grid

Answering Climate Challenge, Society gears up for even broader efforts in 2024.



Epstein Global

Building on the momentum and overall success of its unprecedented emergency Epidemic Task Force, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) will enter its 129th year focused on an even greater existential threat: climate change.

“Who could have imagined that the two things ASHRAE is most known for, indoor air quality and energy conservation, would both come to a head, with the pandemic and the climate crisis, at almost the exact same time?” said ASHRAE President **Ginger Scoggins, P.E.**, speaking on the October episode of the *HPAC On The Air* podcast. “Everything feels much more urgent now. So, we are trying to operate at the speed of business and not the speed of ASHRAE,” she added.

With that in mind, on Oct. 26, ASHRAE unveiled the preliminary

technical program for its 2024 Winter Conference, set for Jan. 20-24, 2024, at Chicago’s McCormick Place Convention Center (above), coinciding as always with AHR Expo, our industry’s largest annual trade show.

“The conference gives attendees an unparalleled opportunity to discover solutions to some of the greatest challenges facing the built environment,” said **Suzanne LeViseur**, 2024 ASHRAE Winter Conference chair. This year’s “decarbonization focus is included within all of the technical tracks, so that we can provide effective strategies on a variety of topics.”

The technical program can be found online and in the ASHRAE 365 app. It features 11 technical tracks and more than 100 sessions, offering attendees a wide selection of topics and the opportunity to earn Professional Development Hours (PDHs) while exploring tracks such as Decarbonization and

Climate Change, Clean Spaces and Mission Critical Facilities, Tall Buildings Design, Artificial Intelligence, Refrigeration and Refrigerants, and more. Some examples of decarbonization-focused sessions include:

- *Decarbonization in Cold Chain Process* (Refrigeration Track);
- *The Logical Way to Tap Into Decarbonization: Hydronic District Energy Systems* (Hydronic Systems Track);
- *Beneficial Electrification* (HVACR Systems and Equipment Track);
- *Grid-Interactive Buildings for a Decarbonized World* (Decarbonization and Climate Change Track).

Grid-Interactivity Guide

Regarding “*Grid-Interactive Buildings*,” ASHRAE on Nov. 2 released a new guide focusing on the critical role that grid interactivity is now poised to play. The *Grid-Interactive Buildings*

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for Decarbonization: Design and Operation Resource Guide is the second in a series of guides developed by the ASHRAE Task Force For Building Decarbonization (TFBD) and provides information on maximizing carbon reduction through buildings' interaction with the electric power grid.

“Grid-interactive buildings actively engage with the energy grid,” explained TFBD Chair **Kent Peterson, P.E.** “They utilize smart technologies, renewable energy sources, and energy storage systems to optimize energy consumption and generation. This allows them to respond in real-time to grid signals, thereby reducing overall demand and greenhouse gas (GHG) emissions.”

Integrating buildings with the electrical grid is a critical component in the decarbonization process, he added. “It’s an emerging focus for building professionals, and ASHRAE is thrilled to provide new guidance as we collectively work towards a more sustainable, resilient, and energy-efficient built environment,” said Peterson, who also appeared as a guest on *HPAC On The Air* last February.

According to ASHRAE, decarbonizing the electric grid necessitates a fundamental shift towards a dynamic, two-way relationship between buildings and the grid. This approach enables buildings to respond flexibly to grid

conditions, including time-varying carbon emissions rates. The significance of this two-way communication has grown in recent years, driven by the integration of renewable energy sources, grid reliability concerns and the impact of extreme weather conditions.

“We’re all on a journey. We have to find reliable and affordable methods to decarbonize.”

— Kent Peterson, P.E.

These factors have prompted utilities, grid operators and the building community to reassess the role buildings can play in supporting grid reliability and decarbonization by reshaping their energy consumption patterns. ASHRAE’s new guide offers best practices, design considerations and operational guidelines to target the three primary value streams of grid integration:

1. **Reduced Carbon Emissions:** Learn how to make significant contributions to reducing carbon emissions through smart building-grid interaction;
2. **Cost Savings:** Discover strategies to optimize energy usage and save on operational costs;
3. **Resiliency:** Enhance your building’s ability to withstand and adapt to changing grid conditions, ensuring uninterrupted operations.

While the resource guide primarily focuses on commercial and multifamily buildings, it also includes relevant aspects for the residential and industrial sectors. In addition to design guidance, the new document provides operational recommendations for both new and existing buildings, empowering building owners and operators to optimize their available demand flexibility.

“We’re all on a journey,” Peterson said on our podcast last winter. “We have to find reliable and affordable methods to decarbonize. The building industry and the electric generation industry are going to have to work together to optimize what that solution is going to be.”

The Grid-Interactive Buildings for Decarbonization: Design and Operation Resource Guide can be purchased from the ASHRAE Bookstore or by contacting ASHRAE Customer Service by phone at 1-800-527-4723 (United States and Canada), 404-636-8400 (worldwide), or fax 678-539-2129.

For its part, the TFBD web page offers technical resources, historical information, videos and publications to expedite the adoption of climate change mitigation policies. It also reaffirms the Society’s goals stated in the ASHRAE

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Vision 2020 report, approved by ASHRAE's board of directors, as well as the ASHRAE Position Document on Building Decarbonization, to achieve net zero emissions in operation for all new buildings by 2030.

At the 2024 ASHRAE Winter Conference in Chicago this January, the *Grid-Interactive Buildings* seminar will present the new guide, as well as several of the project case studies used in its development.

Challenging, Engaging

Also in Chicago, ASHRAE will name the winners of its first *Decarbonization Challenge*, launched in August by Society President Scoggins and implemented by the Young Engineers in ASHRAE (YEA) Committee. Overall, \$50,000 in grants will be awarded, ranging in size from \$1,000 to \$10,000. The money will fund competitive, year-long decarbonization projects within local chapters.

"Young folks are so passionate," Scoggins told us 'on air' this fall. "If you talk to them about saving the planet, and climate change, and all of the difference they can make in the building services, building sciences area, that makes a big difference in getting them involved."

Similarly, ASHRAE has been focused on engaging other stakeholders on this issue throughout the industry. In late October, the Society hosted the first-ever **Decarbonization Conference for the Built Environment**, held at the Renaissance Arlington Capital View Hotel in the Washington DC Metro Area.

“ We must take the lead in ensuring that what we design, construct, operate and manage is achieved thoughtfully, strategically, collaboratively. ”

—Laurie Gilmer, IFMA

Significantly, the event was organized alongside the American Institute of Architects (AIA); the International Facility Management Association

(IFMA); the Association of Physical Plant Administrators (APPA); and the Building Owners and Managers Association International (BOMA).

"The built environment generates nearly 40% of CO2 emissions annually with approximately 27% attributed to building operations," noted **Laurie A. Gilmer, P.E.**, Chair of IFMA's Global Board of Directors. "That places significant responsibility for reducing operational and embodied carbon emissions on the built environment industry. We must take the lead in ensuring that what we design, construct, operate and manage is achieved thoughtfully, strategically, collaboratively. Working together to reduce or reverse the harmful impacts of our buildings is empowering, but we need direction on how to go about it."

In addition to Scoggins and Gilmer, others seeking partners at the conference included **Henry Chamberlain**, BOMA President and COO; and **Lakisha Ann Woods**, AIA's Executive Vice President and CEO. Together, they talked about their organizations' respective toolkits for addressing climate change and sustainability issues and explored how best to integrate and coordinate their overlapping strategies in a panel discussion.

The conference keynote was Canadian climate solutions expert and author **Chris Turner**. He spoke on the global shift towards clean energy, in his presentation, “How to be a Climate Optimist: Blueprints for a Better World.”

Based on his hopeful 2022 book of the same title, the veteran international reporter made a powerful case for optimism in the face of relentlessly grim climate news. Turner painted a vivid portrait of a global energy transition that is already tackling the climate crisis and pointing the way to a much brighter future. And that future will be enabled by decarbonization, he said.

Those who missed Turner’s talk in Washington will get a second chance to see his presentation at the upcoming Winter Conference in Chicago, where he will be the featured speaker at the

Opening Plenary session. Additional featured topics include:

- *Laboratory Superhero: The Critical Plan to Save;*
- *Pulling Back the Curtain on DEI (Diversity, Equity & Inclusion);*
- *Standard 241: You Have Questions; We Have Answers;*
- *Artificial Intelligence for Buildings Performance Simulation;*
- *Harmony in Action: ASHRAE Standards Paving the Way for Building Decarbonization;*
- *What’s the Fuss About Zero Trust? Cyber Security for BAS Control Systems;*
- *Who’s Afraid of the Net Zero Wolf?*

In Chicago, the Opening Plenary session will also include a report from ASHRAE Executive Vice President and Secretary **Jeff Littleton**, who will

provide Society updates and detail the accomplishments of ASHRAE members to be recognized during the Honors and Awards ceremony.

At the President’s Luncheon, Scoggins will deliver her State of the Society address, marking progress so far on all the many initiatives she launched last June in setting the current Society theme, “Challenge Accepted: Tackling the Climate Crisis.”

Meanwhile, the ASHRAE Learning Institute will offer 18 courses during the conference. All are approved for continuing education credits toward maintaining P.E. licensure.

Four new courses are being offered:

- *Starting the Path to Net-Zero Buildings Using ASHRAE 90.1-2022;*
- *Understanding ASHRAE Standard 241: Background, Overview, and Key Requirements;*

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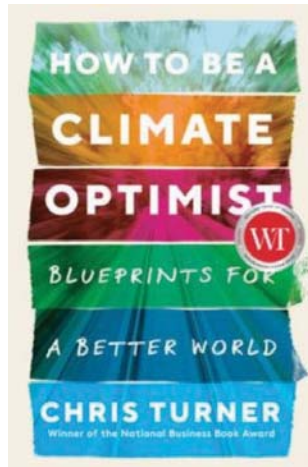
- *V in HVAC – Health and Energy Improvements Using the Indoor Air Quality Procedures;*

- *Is Your Building Ready? Applying ASHRAE Standard 241 Control of Infectious Aerosols – Facility Assessment, Planning, and Implementation.*

ASHRAE certification exams will also be administered during the week and business, committee and technical meetings will be conducted in the weeks prior and during the event. The cost to attend in-person is \$755 for ASHRAE members (\$1,010 for non-members, which includes an ASHRAE membership for one year).

Decarbonizing into 2024

After the Winter Conference, two more decarbonization events loom on the horizon. The first will be the *ASHRAE International Conference on Building Decarbonization*, set for



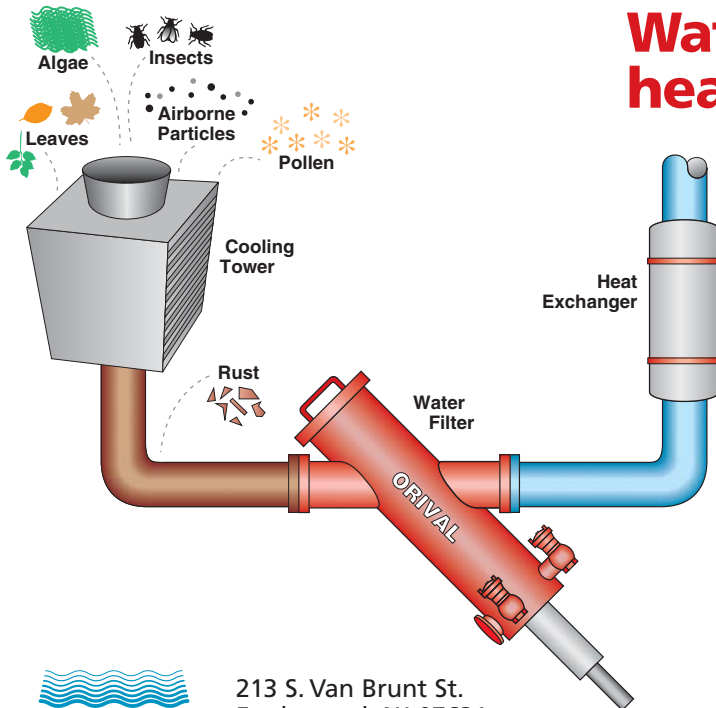
April 17-19, in Madrid. It will be co-hosted by ASHRAE’s Spain Chapter, and focus on Europe’s ongoing efforts to rise to the climate challenge.

Next fall, New York City will host the *2024 ASHRAE Decarbonization Conference: Decarbonizing Existing*

Tall Buildings. Scheduled for Oct. 21-23, the event will be co-sponsored by the New York State Energy Research and Development Authority (NYSERDA). [HPAC](#)

For more on these events and other related activities, visit www.ashrae.org.

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Refrigerants Deadline Reminder, with ICC's Jim Cika

Much-discussed, EPA-mandated code changes for A2L refrigerants will take effect in January. Here, our returning guest details what our industry is doing to prepare.



In this episode, *HPAC On The Air* welcomes back **Jim Cika**, director of PMG technical resources for the International Code Council (ICC).

An HVAC design engineer with a mechanical engineering degree from Georgia Tech and more than 20 years of experience at ICC, Mr. Cika first joined us here in June 2022 to discuss the major code changes for A2L refrigerants that were then 18 months away. Now, set to take effect in January, those changes are upon us, but many in the market are still scrambling to get ready.

With that in mind, he updates us here on the flurry of related activities still taking place to help our industry prepare.

What follows is an edited transcript of our conversation ...

HPAC: *Our returning guest this month is Jim Cika, director of PMG technical resources for the International Code*

Council. *Now, as deadlines rapidly approach for a major market transition, he updates us on those code changes for A2L refrigerants. So Jim, thanks so much for returning to HPAC On The Air.*

Jim Cika: Thank you. It's great to be back with you today to provide listeners with the update on the EPA phasedown and the transition from the HFC A2L refrigerants.

HPAC: *Now we last spoke in the middle of 2022 about the upcoming deadlines for the EPA phasedown of HFC refrigerants over the next 15 years. The first major target dates were the end of this year. So please give us an update on what movement and progress you've seen in the market on this?*

Cika: Sure. So when we first spoke, that was June of last year. Our focus then was on the details and the history behind the HFC phasedown,

particularly how it applies to residential and light commercial air conditioners and heat pumps. And then I went into how it impacted building codes and in particular, the International Building, Fire and Mechanical codes. You may recall that with regards to the EPA's phasedown schedule, that the HFC production and consumption were limited to 90% of their historic baseline levels beginning in January of 2023.

As expected, those limitations have already impacted the availability and the cost of the HFC refrigerants in the marketplace.

So, beginning in January 2024, the total quantity of the allowed HFC production and consumption will drop another 30%, taking them to the 60% level of the historic baseline. And this will be followed again in 2029 with another 30% baseline reduction.

And that EPA phasedown schedule is fixed. So, these reduction levels will **not** be changing. That means we can expect that further market disruptions will occur this coming year, as well as in the years that follow.

Regarding the impacts of the phasedown on the building codes, at the time of our last podcast, ICC had just completed the final stages of its 2024 code development process. So that allowed me then to review all of the approved changes that are forthcoming in the 2024 IBC, IFB, and IMC codes that are related to the A2L refrigerants.

It also gave us the opportunity to discuss the industry efforts needed to prepare for the next stages of the EPA phasedown. Since our last meeting, the 2024 IBC and IMC codes have been published and released for distribution in the market. So, things have been moving forward.



Starting in January, HFC refrigerants are going to be limited another 30%, on top of the 10% reduction that hit in 2023.

HPAC: And what about the International Fire Code?

Cika: The 2024 IFC is in its final publication stages, as we speak, and is scheduled to be released in November. The 2024 I-Code changes are aligned with the EPA requirements and support the appliance manufacturers that are already transitioning their equipment to A2L refrigerants.

So, as we discussed, the timing of the EPA regulations and the availability of the 2024 codes posed a bit of a dilemma for the industry. Primarily, how could contractors and local building officials plan for the changes if the codes weren't even published or adopted yet?

Over the last year, the Code Council has been working in collaboration with the Air Conditioning Heating and Refrigeration Institute (AHRI) and some other industry partners to prepare the construction industry for these changes and to help them navigate the changes. The Code Council has developed what we're calling a *Hot Topics* page on our website that covers the upcoming code changes related to A2L refrigerants and provides other important resources on the topic.

This web page provides access to documents that contain the code language necessary to amend the IMC, IFC and IBC, with A2L provisions that are found in the 2024 I-Codes. To simplify matters for regulators, documents have also been provided for each version of the code going as far back as 2012.

So, whether a local jurisdiction currently adopts the 2012, 2015, 2018 or 2021 versions of the codes, they'll have access to *all* of the relevant code provisions they'll need to address the use of the A2L refrigerants.

AHRI has also developed web resources to help with this refrigerant transition and they've created a *Safe Refrigerant Transition* website that includes many resources, fact sheets, presentations and webinars that provide information about the industry transition to the A2L refrigerants. So, where the ICC *Hot Topics* page is geared more towards the legislators, building officials, architects and engineers, the AHRI website is geared more towards the HVAC, and our industry, in general. But both sites are valuable resources for anyone researching the A2L refrigerant topic. Now, we're looking at other ways to get the word out on this, too.

HPAC: To that point, with the deadline pretty much here, tell us a bit about those other efforts that ICC and other groups are undertaking in these last few months to 'get the word out', as you say.

Cika: Well, as part of our collaboration with AHRI, we've been working with them and other industry partners, which include ACCA, PHCC, and HARDI, to raise awareness about the industry resources that are available on this topic. Right now, we're working on creating a short video series that addresses building officials and HVAC and our contractor concerns and provides answers to questions about the transition to a A2Ls in the coming months.

We'll also be using these videos to get the word out through social media campaigns. Some of the topics that we're going to be covering in these videos are things like how to prepare for the refrigerant transition; what changes were made to the codes and standards, etc. We'll be covering restrictions on refrigerant use, some of the basics of handling A2L refrigerants, and we'll get more into the 2024 and 2025 deadlines for the phasedown.

We'll also get into the availability of the training resources and where to find them.

After we shoot these videos, the Code Council and each of our partners will begin sending out social media posts, be it on LinkedIn, Twitter (X), Facebook, and any other platforms. And by each of the organizations focusing and targeting their individual audiences, when you add them all up, that creates a pretty big network. And when you add in all the other partners going out to their already established networks, you get a much broader audience.

HPAC: *So, how can HPAC readers and listeners get involved?*

Cika: If you're not currently following the Code Council (iccsafe.org) or our partners on social media, I would encourage you to do that today. If you are following us on social media, you'll begin seeing our posts on this subject in the coming weeks.

So, you'll have the videos to look at, which provide information and offer directions to the websites and other resources for further reference and action. We'll be doing that periodically in the coming months, and even the coming years, if necessary, depending on how much information is needed as we go through 2024.

Once your listeners begin receiving our posts, they can then comment and repost on their own social media networks. Again, that will expand the outreach of our campaign even further.

HPAC: *Well, we'll certainly do our part on HPAC's social media sites. So, in the near term, what is the firmest deadline approaching that our audience members should have on the front burners for this transition? Is New Year's Day really the day this all kicks in?*

Cika: Yes, January 1st is when the 30% additional limitation on HFC



Cika spoke on new code changes in late September at the ASPE Tech Symposium in Bellevue WA.

refrigerants takes place. So January 1, 2024, will see a further restriction of the amount of HFC refrigerants in the marketplace. Remember, we already had a 10% reduction hit us in January of this year. And that already impacted pricing and availability. Now, it's going to be restricted another 30%, in addition to that 10%. So, it's definitely going to have some impacts.

HPAC: *No doubt. Looking ahead, where do you think we will be a year from now in this whole transition? What would you say is the level of awareness in the market right now?*

Cika: Well, let me just take a step back first. Looking at the HFC phasedown and the related code changes for A2Ls, there really hasn't been any revisions or changes in the deadlines that we haven't already discussed. However, EPA just published in October a new

final rule on HFC Technology Transition. This is a program for the HVACR industry that again, is going to have an impact in the marketplace and is tied to the whole HFC phasedown. This new rule does multiple things.

The first is it prohibits the manufacture and import of some self-contained, packaged HVAC products. That would include window units and portable air conditioners. These are units right out of the factory. They're like plug-ins, and they're ready to operate. So, what they're restricting is the manufacture of any of these products that use a refrigerant with a higher global warming potential (GWP).

That will take effect on January 1, 2025, and it prohibits the sale, distribution and export of these types of products *three years after* that date. Again, these are little packaged units, window units, etc. So, they will not be able to make those after next year.

The new rule also prohibits the installation of new residential and light commercial air conditioning systems and heat pumps that use higher-GWP HFCs, beginning January 1, 2025.

So there's actually two differences there: one for the manufacturer, and one regarding installation.

With the systems, these include air conditioning, heat pump split systems and mini-split systems, things that are assembled and charged in the field. So that's probably what most of your listeners are going to be interested in.

Essentially what the rule is doing is setting the limit for the HFC refrigerants that are used in equipment for any new HVAC system to a global warming potential value of 700. That's the maximum GWP value that you'll be able to see for the refrigerants used after January 1, 2025.

This is important because the global warming potential values for many of the HFCs covered by the phasedown have GWPs that are greater than 700.

Basically, those new installs of split systems and heat pumps won't be able to use refrigerants with GWPs above 700. So, even though the phasedown goes for 15 years on new systems, you're going to be limited even further, and sooner, to a very small number of usable refrigerants.

HPAC: How does the phasedown deal with existing equipment? Can they be upgraded to meet code, or is replacement the only option?

Cika: Well, what EPA is doing is still allowing the manufacture of the equipment and installation, but it is purely for repairing existing systems.

So, if an existing system utilizes a refrigerant with HFCs in the range of say 1,500 to 2,000 GWPs, they cannot be used for a new system. But if someone had a condensing unit that went out, the manufacturers can still produce them as replacement units for repair only.

So the system already has to be in existence and running, and then they'll be able to use that new equipment. They're not making manufacturers stop manufacturing, but they are stopping installers and service contractors from installing them in certain cases. Again, though, the final rule just came out (in October). It was posted on the federal website. So, it's very new and it can be very impactful. (www.epa.gov/newsreleases/biden-harris-administration-advances-latest-actions-address-climate-damaging-hfc.)

Where do I see us a year from now?

I see this HFC equipment transition program forcing a much faster transition to equipment that uses A2L refrigerants. And I also see this having a significant impact on the service contractors and the service sector. So, for those listeners that are in the HVAC service industry, you may now have to carry parts and components for use in *both* HFC systems and A2L systems much earlier than you may have otherwise been planning for.

Outside of that, I think we're just going to have to take a 'wait and see' attitude, because again, this new rule just went into effect and, from past experience, I also know there may be some attempt to stop it (in the courts). But even if there are lawsuits, I just don't see this stopping. It's very tough to stop things like these once they are already in motion.

And, don't forget, this one was kind of driven by the manufacturers, anyway. So, I think EPA is really set on proceeding with it.

HPAC: Of course, the Code Council deals with much more than refrigerants. So, other than these pressing issues with the A2L transition, what should our readers also be aware of at the moment?

Cika: For me, looking back over the past several years, and now, with all the changes in the plumbing and the

mechanical codes in place, I must say that the COVID pandemic has had an incredible impact on our lives. One thing I've learned working for the Code Council is how much the design and layout of a building can impact the health and safety of the occupants. I've been privileged to serve as a staff liaison to the Code Council's *Pandemic Task Force*, and this group has been researching the effects of the COVID 19 pandemic on the built environment. It has developed some guidelines and recommended practices, and other publications related to pandemics, and is currently in the process of recommending changes to the I-Codes that are necessary to overcome the numerous challenges we face during pandemics.

These recommended changes will impact several areas of the codes, including building occupant loads, ventilation and filtration systems, water distribution systems for the plumbing code and system control schemes and other areas of the code. The ICC task force is set to submit its recommendations for code changes in the 2024 code development process, which just opened up this past week. This is for the 2027 additions of the codes.

So, much like the code changes that were developed for the handling of A2L refrigerants, I really foresee similar support activities and awareness campaigns will be needed for the changes that are coming in 2027, and beyond that.

Our code development is a three-year process, but the mechanical code, building code, fire code, etc., are all in the first year of the cycle. So, really, by the end of 2024, we'll have a good idea of what the new changes are going to be and what impacts they will have for the mechanical contractors and the HVAC industry. [HPAC](#)

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District Energy Networks Gaining Popularity

Not just for campuses anymore, the concept of sector coupling is energizing efficiency-minded cities and communities.

By NEIL PARRY
Global Head of District Energy
Armstrong Fluid Technology

For decades now, district energy networks have been successfully deployed around the world and shown to be a proven method of providing heat to multiple properties, even while reducing carbon emissions.

Globally, there are many examples of municipalities and business districts reporting substantial energy savings and dramatic reductions in their carbon footprint. The district heating and cooling networks in North America

are on a more modest scale and tend to be located in university and hospital campuses. However, that could soon be changing, as an even greater variety of renewable energy sources come available and the concept of sector coupling further increases available energy.

Hierarchy of Importance

One helpful approach to building an understanding of efficiency in district systems is to construct a hierarchy of importance and use comparative returns in energy reduction as a decision tool. The first stage, and the easiest way to reduce our carbon emissions, of course, is to simply use less energy.

This means making buildings more air-tight, using more insulation and reducing water use. When the opportunities at that stage have been exhausted, and a stage of diminishing returns is reached, we can move on to the next step in the progression—reducing energy waste by making systems more efficient.

But waste that can't yet be reduced, such as from industrial processes, for example, needs to be utilized. So, we also need to examine opportunities for using waste heat sources. With that in mind, as much as possible, sources of energy should be both renewable and as diverse as possible. The

Based in the United Kingdom, the author has more than 30 years of experience in engineering, manufacturing and HVAC system design, with diverse roles covering product management, technical training, lecturing and sales. Since 2006, his focus has been within the district energy market, specializing in network and energy center design and renewable energy source integration.

diversification of energy sources gives rise to greater security and increased flexibility in our energy supply. Finally, any carbon that is emitted, should be offset.

What is a District Energy System?

A fact sheet published by the U.S. Dept. of Energy provides a helpful answer: “District energy systems are characterized by one or more central plants producing hot water, steam, and/or chilled water, which then flows through a network of insulated pipes to provide hot water, space heating, and/or air conditioning for nearby buildings. District energy systems serve a variety of end-use markets, including

““ The diversification of energy sources gives rise to greater security and increased flexibility in our energy supply. ””

downtowns (central business districts), college and university campuses, hospitals and healthcare facilities, airports, military bases, and industrial complexes. By combining loads for multiple buildings, district energy systems create economies of scale that help reduce energy costs and enable the use of high-efficiency technologies such as combined heat and power (CHP).”

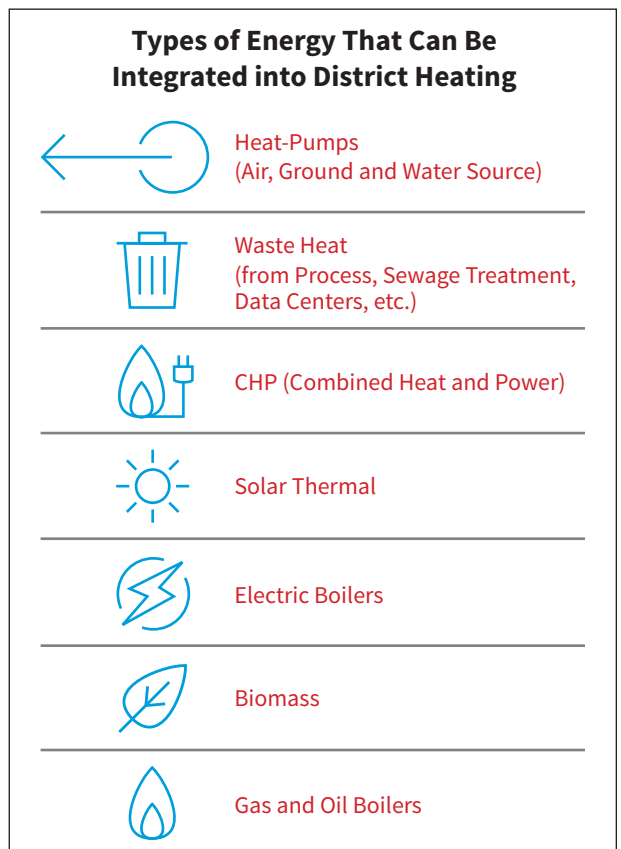
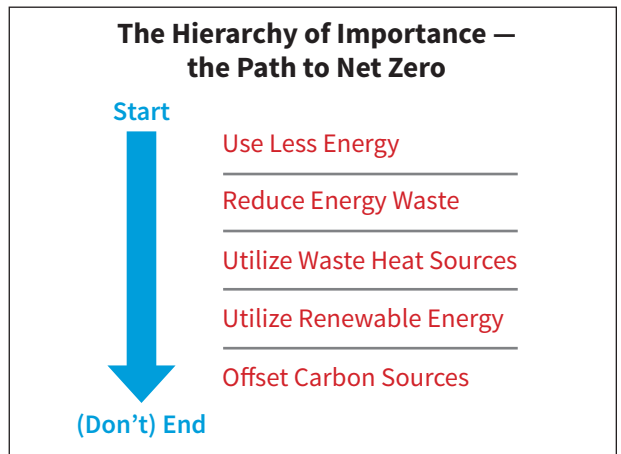
What is a Central Plant System?

A central plant system is simply a building with heating, domestic hot water (DHW), possibly a cooling load and an energy center located within the building. But to think of a building in this way can limit its future potential.

The network of low temperature hot water (LTHW) and/or chilled water pipework should be optimized to maximize delta T and efficiency. Control and heat emitters should be sized such that the flow and return temperatures future-proof the building and allow it to be connected to district networks at some point in the future. In this way, it can be helpful to think of a central plant building as district heating (or cooling), vertically.

Central plant buildings are the precursor to more ‘traditional’, horizontal district heating or cooling systems. They allow for easier connection to the district networks as soon as the pipework comes close to the building. In this way, they facilitate the organic growth of heating and cooling networks, speeding up their expansion and the benefits of the amalgamation of demand and the increased utilization of renewable and waste heat sources.

Traditional heat networks will normally consist of various building types —residential, commercial, industrial—connected by a large network of pipes. Systems can include a number of energy centers, storage facilities and waste heat



capture stations connected to a single network. Notably, the variety of building types served by a network has the effect of smoothing the peaks and troughs of demand. This creates a more stable and higher base load that allows for the improved utilization of renewable sources.

Together, the waste heat and renewable energy sources take a greater share of the load.

If higher carbon-emitting sources are required, their use is minimized and is restricted to times when the combination of the energy from waste, renewable sources and the stored energy cannot meet the short-term peak demands.

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District Heating Systems

District heating systems are energy source-agnostic and allow for multiple energy sources, sometimes even on the same network. This means district heating both increases the resilience of heat supply and creates opportunities for building owners, councils, towns and cities to reduce carbon emissions.

Ways in which district energy systems offer out-sized value include:

- Variety of energy sources allow for the productive use of waste heat;
- They significantly reduce carbon emissions, while increasing resilience and reliability;
- They future-proof the supply of heating and DHW and support reduction of carbon emissions to multiple end-users;
- They remove reliance on traditional fossil fuels and increase available practical energy sources;
- They reduce the pronounced peaks and troughs of individual demand, thereby allowing greater renewable utilization within the energy supply;
- They serve as a gateway technology for sector coupling. Waste heat from various sources can be utilized in the heat network.

District heating and thermal storage also go hand in hand. Thermal storage allows even greater utilization of waste heat and renewable sources despite changes in the demand profile.

District Cooling Systems

District cooling systems use similar designs, but supply chilled water instead of heating or DHW. The chilled water is typically generated via chillers or cooling towers. It is then typically sent through fan coil units within the building to cool the air during periods of high ambient temperatures.

The equipment required in cooling networks along with the benefits of the district approach are the same for cooling as they are for heating. Amalgamating the cooling loads reduces demand peaks and allows for greater utilization of renewable cooling sources, such as



An intelligent packaged pumping system provided in support of a district heating installation in Amiens, France. This network serves more than 19,000 apartments and more than 90% of the city's commercial buildings.

the free cooling that may be available from a nearby lake or river.

District cooling also reduces the 'heat island' effect of multiple individual air conditioning units. Waste heat from these individual AC units contributes to the higher ambient temperatures seen in most cities with high individual AC unit use. District cooling plants can be located remotely from residential dwellings, so the heat island effect is effectively removed.

Generally, for cooling, the capacities in terms of both power and flow tend to be greater on cooling applications than heating applications.

Flow levels are generally higher, due to the much smaller delta T associated with cooling circuits. In heating applications, delta T values of 20 to 40 deg. C are common. In chilled-water applications, delta T values of 8 to 10 deg. C are typical. This much lower delta T dictates higher volume flow rates for a given power output.

The result is larger plate heat exchangers (PHEs), pipes and pumps. Component types and hydraulic layout remain the same, but the sizes are

generally larger. Due to the likelihood of condensation, pipework, valves, PHEs and all associated equipment installed on the chilled network needs to be vapor-sealed. So it is common to see drip trays and condensation drains on the fan coil units.

Sector Coupling v. Hard Electrification

As we start to think about sector coupling, these large networks can be thought of as large energy stores that can facilitate the energy flow into and out of buildings. They also allow for energy to be transferred to and from the district heating and cooling networks via bridging facilities such as data centers, and large-scale heat pumps and absorption heat pumps (heat to cool, cool to heat).

A 2018 report from the European Parliament Committee on Industry, Research and Energy noted that the 'hard electrification' of our energy supply is problematic and may actually be restrictive in achieving carbon reduction goals. The report also indicated that district energy systems

and sector coupling would help with the decarbonization process, increase flexibility of energy supply and improve reliability. It recommended focusing on sector coupling rather than hard electrification.

Sector coupling allows energy to be utilized in various forms, regardless of changing demands and changing outputs during a typical 24-hour period. *Key advantages include:*

- Leveraging combinations of commercial, industrial and domestic sectors;
- Leveraging aspects of a network to optimize energy sources, storage, conversion and utilization;
- Energy distribution across a network;
- Use and prioritization of waste heat sources;
- The potential for storage of energy in a formats such as LTHW, electric batteries, hydrogen;
- Use of low or zero carbon sources, such as wind, solar;
- Allowing end users to feed energy back into the network.

With these advantages to bolster the effectiveness and efficiency of a network, opportunities for sector coupling must be seriously considered, wherever available.

Comparing Benefits, Stakeholders

The Combined Heat and Power Technology Fact Sheet, published by the U.S. Dept. of Energy, provides an excellent summary of the benefits, broken out by stakeholder:

Benefits to Customers

- Higher energy efficiency;
- Lower building costs (no separate boilers, chillers, or other related hardware);
- Easier building operation and maintenance;
- Enhanced building aesthetics and comfort (reduced noise and vibration);
- Improved reliability (industrial-grade district energy equipment is more robust than commercial equipment installed at building level).

Benefits to Cities and Communities

- Reduced first cost for new development;
- Flexibility in use of fuel sources, including local or regional fuel sources (wood waste, biomass, waste heat, etc.) that keep energy dollars recirculating in local economy;
- Architectural and aesthetic advantages, with roofs free of mechanical equipment;
- Grey water/treated sewage effluent usable for condenser water (owing to central plant scale), conserving potable water for consumption;
- Capacity to provide baseload power and heat for microgrids, enhancing resilience and reducing regional greenhouse gas emissions.

Benefits to Grid Infrastructure

- Reduced peak demand (enabled by aggregating loads and shifting peak demand with thermal energy storage);

- Fewer natural gas peaking stations;
- Lower transmission and distribution costs.

Benefits to the Environment

- Reduced air emissions, including greenhouse gases, as a result of greater fuel efficiency of district energy systems that include CHP;
- Increased adoption of renewable energy sources at scale, replacing higher-emitting central station generation with low- and zero-emitting technologies;
- Improved stormwater management owing to free roof space, which can be used for low-impact storm water management strategies and mitigation of excessive runoff.

How to Get Started

Despite the clear benefits of district energy systems, the scale of construction and the number of stakeholders involved make these projects seem too difficult to complete or even to start. Resources are available to help planners better understand the technology and the possibilities for energy savings and sustainability gains. A few of the most prominent are listed here:

“ Despite the clear benefits of district energy systems, the scale of construction and number of stakeholders involved can seem intimidating. ”

Local Governments for Sustainability is a global network of more than 2,500 local and regional governments committed to sustainable urban development. The organization holds online ‘energy exchange’ events, meant to provide light-touch technical assistance to dedicated cities and regions undertaking their sustainable energy transition. The events are recorded and archived at: renewablesroadmap.iclei.org/energy-exchanges;

The District Energy In Cities Initiative is a multi-stakeholder partnership coordinated by the United Nations Environment Program. The effort supports local and national governments by facilitating learning and advocating for policies that will accelerate investment in low-carbon and climate-resilient district energy systems. Through a network of contributing partners, including municipal, national and state governments, utilities, industry associations, and research institutions and universities, the initiative provides neutral and comprehensive advice based on global best practices;

The International District Energy Association hosts webinars and conferences, prepares whitepapers and case studies and publishes a quarterly magazine. The association also maintains an active web site of resources including a Product and Services Directory designed to help identify industry partners for district energy projects. [HPAC](#)

Membership Climbing, ABMA Releases More Details on BOILER 2024

Panels on Women in the Boiler Industry and State of the Industry highlight newly released schedule of events.



By SCOTT LYNCH,
ABMA President & CEO,
and SHAUNICA JAYSON,
ABMA Marketing Director

The American Boiler Manufacturers Association (ABMA) is excited to announce our inaugural Women in the Boiler Industry Panel and Networking Luncheon at BOILER 2024, set for next spring at the Gaylord Rockies outside Denver, CO.

Celebrating the growing participation and contributions of women in our industry, this event will provide a platform for several accomplished women to detail their journeys for attendees. Their stories of challenges and successes are already inspiring future generations in their respective professional worlds, so this panel will undoubtedly engage with our audience, as well.

Scheduled for May 1-3, 2024, ABMA's Boiler Technology Conference & Expo will also include key insights

and technical innovations, shared in the following sessions:

- *Enhanced SCR Systems to Address Today's Operational Challenges;*
- *Firetube vs. Watertube – The Right Boiler Type for Your Application;*
- *Practical Applications for Hydrogen Firing in Industrial & Utility Size Boilers;*
- *Installing & Maximizing Ultra Low NOx Boiler Burners – Project Case Studies;*
- *Rental Boiler Market – The Need, The Process, & The Equipment;*

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- *A Day in the Life of a Boiler Technician – Immersive Role Play;*
- *Secondary Heat Recovery – Increasing Efficiency & Reducing Emissions;*
- *Boiler Sales Process – Partnering with a Representative.*

On the exhibit floor, ABMA is once again setting the stage for the largest gathering of the boiler supply chain, with a focus on educating and connecting with those in the purchasing, operation, and maintenance of boilers. BOILER 2024 promises more exhibitors, more attendees, more networking opportunities, more enlightening sessions and tours—bigger, yes, but more importantly, better.

In response to soaring demand, ABMA has expanded the exhibit area by almost 50% and already secured over 85 exhibitors, surpassing BOILER 2022. We now expect roughly 100 industry leaders will showcase their innovative products that continue to advance technology in the boiler room. We also expect attendance now of well over 1,000 attendees.

At BOILER 2024, if a product is in the boiler room, you'll find it here. General registration is now open, so mark your calendars and secure your spot for this unparalleled event. Together, we all advance and elevate the boiler industry to create safer, more efficient boiler rooms. *(Special early-bird pricing for attendees is available until January 31, 2024.)*

Earlier this fall, ABMA announced that U.S. Army Staff Sgt. **Travis Mills**



(Ret.) of the 82nd Airborne will kick-off BOILER 2024 as the opening keynote speaker. A “recalibrated veteran”, motivational speaker, actor, author, and advocate for veterans and amputees, Mills is also the Founder and CEO of the Travis Mills Foundation, formed to benefit and assist post-9/11 veterans who have been injured in service to our nation.

Also new to the BOILER 2024 program will be ABMA's first State of the Boiler Industry Leadership Panel, which will be featured during our general session on May 3rd. ABMA President & CEO **Scott Lynch** will moderate the group discussion on current opportunities and challenges impacting the boiler industry, including the increasing rate of boiler innovation, investments in renewable technology, product

education and workforce challenges, among other topics.

Of particular note, ABMA also announced in November that its membership has now reached a record 142 members, up from 99 members in 2020. This growth is due to recent expansion efforts to include hydronics and more recently to engage manufacturer representatives, as well.

ABMA has transformed over the last five years to focus beyond the manufacturers and engage more and more of the supply chain. Those initial efforts culminated with our inaugural BOILER 2022 offering, and can now be seen gaining greater momentum with BOILER 2024. **HPAC**

For more information on BOILER 2024 or the upcoming ABMA Annual Meeting in February, visit ABMA.com.

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AHR Expo Announces 2024 Innovation Awards Winners

Ahead of industry's biggest annual event, organizers tap 10 top HVACR products to look for on the show floor this winter in Chicago.

The AHR Expo (International Air-Conditioning, Heating, Refrigerating Exposition) in October announced the winners of the 2024 AHR Expo Innovation Awards. Winners are chosen annually in 10 industry categories, representing the most innovative products and technologies in the market.

“There’s no shortage of innovation in HVACR right now,” said Show Manager, **Mark Stevens**. “To be recognized as an award winner is a true honor and an indication that we as an industry are responding to real problems with creative solutions. The Innovation Awards aim to highlight this innovation trajectory and celebrate those that are pushing the bar.”

The program draws hundreds of manufacturers to enter breakthrough designs for new and never before seen solutions or improvements upon existing products and technologies. All entries are reviewed and selected by a panel of third-party judges made up of distinguished ASHRAE members. Evaluations are based on overall innovative design, creativity of the product or service offered, product or technology real-world application, as well as overall potential market impact.

“It’s encouraging to see so many entries and the growth the awards program brings year to year,” continued Stevens. “Manufacturers across the industry are responding with solutions for cost savings, energy savings, production efficiency and are filling performance gaps in product and technology. Congratulations to our 2024 winners, we look forward to supporting your journey of innovation in Chicago and beyond!”



In addition to celebrating innovation in HVACR, the Innovation Awards provide a means to strengthen the industry by allowing for the AHR Expo Workforce Development program, which aims to grow the industry through programming geared to inspire future members of the HVACR community.

Funds collected from the entry fees are donated to programming at the student level, including show field trips, curated introductions to professionals and manufacturers, laboratory equipment and monetary donation to student programs in the hosting city. Learn more about workforce development on ahrexpo.com.

BUILDING AUTOMATION

Winner: 75F

Innovation: 75F HyperStat Split

AHR Booth: #S6374; S6277



The 75F HyperStat Split enables contractors to upgrade RTUs with advanced rooftop control with unprecedented ease. Using only two existing wires from the RTU to the thermostat, HyperStat Split provides dual enthalpy economizer, demand-control ventilation, and VFD control. What's more, an onboard PIR occupancy sensor enhances energy savings with auto away. Devices like the HyperStat Split encourage the building controls industry to make two design considerations the norm.

First, HyperStat Split's ability to work with the existing two wires provided for a standard temperature sensor while still delivering advanced control sequences demonstrates that hardware can work with existing infrastructure without excessive complexity.

Second, the device's eight onboard sensors and native cloud connectivity for real-time analytics prove that rising demand for excellent indoor air quality management can be met in a straightforward, modern, and user-centric manner.

Finalists: Carrier, i-Vu Express Connected Building Automation Appliance (Booth #S7510); Copeland, Copeland CC200 case controller (Booth #S7110).

COOLING

Winner: Danfoss

Innovation: DSG Compressor

AHR Booth: #N2510

The DSG compressor has been specifically designed for low pressure refrigerants such as R1234ze with low global warming potential. Applications include chiller systems, with a wide range of compressor capacities available to support unit design requirements. The DSG has been specifically designed for low pressure low global warming potential refrigerants such as R1234ze. These refrigerants would usually require a much larger compressor size to have the same capacity as high pressure (R410A, etc.) refrigerants.

As chiller manufacturers will need to transition to lower global warming potential refrigerants <700 GWP they will need to move to medium and low-density refrigerants. The DSG with its same size will enable a smooth transition without a significant increase in physical compressor size. It is qualified for R1234ze which is an excellent replacement for the market that has been dominated by R134a for many years, but will be phased down due to its impact on the environment.



The DSG can also be used with other refrigerants with similar properties, so it offers a great deal of flexibility for manufacturers to choose without requiring a new compressor design. This will also support future refrigerant changes and regulations without requiring significant modifications.

Finalists: Daikin Applied Americas Inc., WMT (Booth #S7549); Innovair, DuoTec (Booth #N3060).

HEATING

Winner: Ephoca

Innovation: Nextac - The next generation of PTAC AHR

AHR Booth: #S9914



Nextac transforms the PTAC into a tour-de-force of total comfort control. R32, twin rotary inverter compressor, heat pump performance to -10°F, integrated ERV, MERV13, zero air leakage, self-cleaning coils, 27 dB(A) operations, STC of 40, sleek, all-metal, paintable cabinet. No drain is required for cooling or heating. For many years, PTACs have seen minimal advancement.

Often considered a "cheap, low-end" product, installers have favored them for their affordability and ease of installation. However, those living with PTACs in their homes have endured poor performance with no better options to fit existing sleeves.

Nextac aims to disrupt this status quo with this new high-efficiency and quality PTAC by compelling manufacturers to enhance their PTAC lineup, making them more efficient, aesthetically pleasing and adding more insulation for quieter operation and a better seal.

Finalists: Caleffi Hydronic Solutions, Caleffi XF (Booth #S7981); Intellihot Inc., Electron iE1 (Booth #S10323).

PLUMBING

Winner: Rheem Water Heating

Innovation: Triton® Light Duty (50- and 75-gallon)

AHR Booth: #S7569

A smart, robust solution for small businesses, Triton Light Duty is the most intelligent high efficiency commercial gas water heater on the market. Boasting built-in smart monitoring and precise leak detection, the unit prevents downtime, manages water heater issues, and keeps businesses running smoothly. Perfect for retrofit or new construction.

With changing regulations, Rheem designs with sustainability in mind. Triton Light Duty (LD) is designed to promote energy efficiency and environmental responsibility and holds the potential to drive transformative changes in the way water heaters are conceptualized and manufactured.

With a capacity ranging from 50 to 75 gallons, Triton Light Duty's patented combustion system and helical coil heat exchanger provide maximum thermal efficiency and durability. The latest Triton offers up to 97% thermal efficiency and eliminates downtime with the ability to detect and prevent water heater problems before they occur thanks to LeakGuard™ — an all-inclusive leak detection and prevention system capable of limiting water leakage outside the tank. The helical coil heat exchanger offers maximum thermal efficiency and energy savings. With porcelain/ glass-coated steel, corrosion is minimized, extending the life of the tank while the unique minimum weld joint construction increases durability.

Most importantly, the unit features a built-in condensate neutralizer, which eliminates the need for a separate device to raise the pH of the condensate for safe draining.

Triton LD is part of a decarbonization portfolio to transition away from less efficient water heaters, thereby reducing carbon emissions and environmental impacts.

Finalists: Bonomi North America, Inc., LOCPOWER Energy Harvesting Control Valves (Booth #N2560); ECM



PCB Stator Technology, Ultra-light, Premium Efficiency 3HP PCB Stator Pump Solutions (Booth #S10334).

INDOOR AIR QUALITY

Winner: WellStat

Innovation: WellStat

AHR Booth: #N3417



WellStat® is an indoor Air Quality + Energy Management Software platform used by property and facility management teams to responsibly assure healthy air quality conditions, lower operating costs, and increase operating revenue. It is our goal to optimize an asset's performance while promoting a safer and healthier work environment. WellStat is FCC tested and UL listed. It provides data beneficial for achieving various sustainability certifications (LEED, WELL, RESET certified, US Energy Policy Acts).

WellStat is completely integrated, customizable and provides a single, unified enterprise hardware, software, and mobile platform experience. With WellStat, customers can optimize their asset's performance while promoting a safer and healthier work environment. Additionally, WellStat uses the highest caliber sensors available and maintains systemic accuracy through persistent, over-the-air calibration that never requires maintenance.

Monitoring systems are tested, calibrated and always accurate, all the time including 14+ IAQ sensors monitoring: temperature, relative humidity, particulate matter, carbon dioxide, ozone, total volatile organic compounds, formaldehyde, reset TVOC, dew point, wet bulb, light level, carbon monoxide, occupancy, pressure, sound DB, duct flow.

Finalists: ECM PCB Stator Technology, Ultra-light, Premium Efficiency 6hp PCB Stator Air Blower Motor (Booth #S10334); Sensirion, Inc., SEN6x (Booth #S6156)

REFRIGERATION

Winner: AirGreen

Innovation: AirGreen-BMIL Brine-based DX Cold Room Heat Pump

AHR Booth: #S9377

The innovative AirGreen-BMIL brine-based DX refrigerant system essentially creates a low dewpoint "heat pump" for

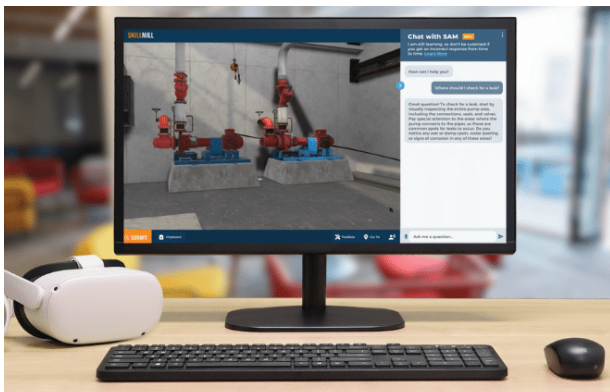


cold room applications – providing 26°F dewpoint supply air in a single process step. Because of its simplicity and efficiency, this packaged unit design provides up to 50% energy savings while also significantly reducing capital costs.

Solid desiccant products can only achieve supply air at 55F with a 40-45F dew point, and to lower the dry bulb temperature to as low as 33F it requires three or more pieces of equipment at considerable capital and energy penalty. The unique low temperature brine solution achieves this performance because it simultaneously cools and dehumidifies.

For customers, it also eliminates the downtime related to multiple defrost cycles, or worse, downtime for cleaning if condensation forms. Further, the AirGreen product only needs low regeneration temperatures (~110F), compared to solid desiccants requiring 180F or more. This low temperature hybrid brine system is uniquely suited for cold storage applications and addresses a \$5.1B market.

Finalists: Honeywell, Honeywell Solstice N71 (R-471A) (Booth #N2137); Mitsubishi Electric Trane HVAC US, Mitsubishi Electric Variable-Speed Scroll Compressors (Booth #S7177).



SOFTWARE

Winner: Interplay Learning

Innovation: SAM (Skill Advisor and Mentor)

AHR Booth: #S10537

SAM (Skill Advisor and Mentor) is the first AI-powered advisor for the skilled trades. SAM gives teams instant and personalized guidance so they can gain skills faster and more efficiently. Technicians can ask SAM questions and get immediate assistance while learning, to enhance comprehension and sharpen critical thinking. SAM is the first of its kind. Interplay's unique approach to on-demand mentorship and training provides considerable value, such as:

- **Fast Tracks Learning:** SAM meets technicians where they are, providing assistance to suit their specific needs;
- **Sharpens Critical Thinking:** SAM doesn't shortchange learning with easy answers. It guides them towards "aha" moments and helps to develop problem-solving skills;
- **Saves Time and Boosts Productivity:** When newer techs ask SAM for help first, it can free senior techs and managers from answering basic questions;
- **Taps Into Expert Knowledge:** SAM uses data from SkillMill, carefully crafted by top subject matter experts, to ensure techs learn skills right the first time.

Finalists: Conduit Tech, Conduit Tech Software (Booth #S10064); IES Ltd., IESVE Software (Booth #N3452).



SUSTAINABLE SOLUTIONS

Winner: Midea Residential Air Conditioning

Innovation: Midea PWHP

AHR Booth: #S10371

Midea's Packaged Window Heat Pump is a window-mounted cold climate air source heat pump, designed for DIY installation and high-performing, energy-efficient heating and cooling. Developed to support multi-family buildings' transition towards electrification, the Midea PWHP provides a cost-effective solution for buildings looking to quickly meet future sustainability requirements.

This model stands out as a window-mounted unit. Unit performance is 9,000 BTU/hr heating and cooling, with the category's highest CEER of 16.0, as of the application date, a 2.35 COP @ 17F, up to SEER2 21.8 and HSPF2 11.6. This is done without the use of auxiliary heat.

While high-efficiency heat-pumps typically require professional installation including new electrical circuits, the Midea PWHP operates on a 120V/15A circuit mounting to hung-type windows, allowing for DIY installation. The innovative saddle design allows window view and functionality while simultaneously reducing indoor noise levels.

A distinguishing feature of the Midea PWHP is a telescoping center section that adjusts to various wall depths and a hinged outdoor section allowing for rotation during installation. This along with ~50% footprint reduction from the industry first integrated inverter compressor offers the ability to quickly install into windows while maintaining optimal performance.

Finalists: Blue Frontier, Blue Frontier, Liquid Desiccant DOAS (Booth #N1440); Mitsubishi Electric Trane HVAC US, Mitsubishi Electric, Hybrid VRF® (Booth #S7177).

TOOLS & INSTRUMENTS

Winner: INFICON

Innovation: FLUE-Mate™ Combustion Analyzer
AHR Booth: #N2934

FLUE-Mate Combustion Analyzer is designed to improve combustion efficiency and safety. This tool is equipped with an integrated manometer, thermometer, CO test, cracked heat exchanger test and draft analysis. FLUE-Mate can even generate a QR code to be scanned for a quick analysis report.

The Combustion Analyzer provides a host of useful features for user convenience and safety, like the easily visible water trap and filter, easy operation, cracked heat exchanger test, automatic pump shut-off, and ambient CO monitoring. The free mobile app also allows the user to do even more with this tool.

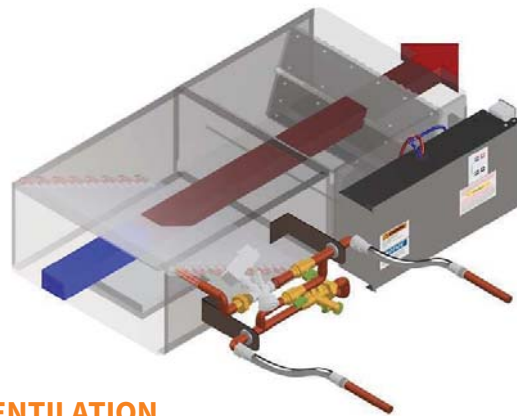
FLUE-Mate generates a QR code that can be scanned using the app for quick analysis without the need for a Bluetooth® connection. All key readings and information are on your smart device with just a scan of the code. The app also allows the user to save and share reports.

Unlike many other combustion analyzers, FLUE-Mate displays efficiency, O₂, CO₂, CO and flue gas temperature readings all on one screen. This makes FLUE-Mate more user-friendly and helps techs get the job done quicker. FLUE-Mate's



water trap and filter assembly is designed to always be upright and easy to see, so you always know when to change the filter or empty the trap and keep your FLUE-Mate protected. The automatic pump shut-off feature stops flow when a high level of CO is detected, saving the CO sensor from being poisoned and saving customers an expensive repair bill.

Finalists: MSA Safety, Legend Series HFC (Booth #S6536); Snap Drill AS, Snapdrill (N3165).



VENTILATION

Winner: HVAC Manufacturing and Technology Inc.

Innovation: SAV® - Smart Air Valve
AHR Booth: #S9220

The SAV-Smart Air Valve is an economical self-commissioning air control solution. Featuring a 100-1 turndown and precision airflow accuracy to within a few CFM operating as low .03" W.G. It matches the ventilation rate to the risk of hazard, featuring advanced Demand Control Ventilation & low EUI with a single unit size.

The SAV® adds value and mitigates risk by creating a new simplified and economical value chain leading to a paradigm shift by obsoleting fixed orifice plate technology. The Variable Orifice Plate Technology solves a complex fluid dynamic problem of measuring a fluid accurately over a wide dynamic range, obsoleting current fixed orifice single venae contracta fluid measurement/fluid control air terminals. Offers a variable dimensional aspect ratio footprint. It solves current issues for end users, A/Es, contractors, and TAB entities.

This innovation allows the controls/system integrators to supply and warranty zone level devices, to optimize their software/network architecture with self-balancing flexibility, Eliminate GI/GO data and mitigate risk for the building life cycle. SAV transforms infrastructure into a user-centric healthy flexible space without mechanical upgrades.

Finalists: ECM PCB Stator Technology, High-Performance, Lightweight 12hp PCB Stator Blower Motor (Booth #S10334); LG Electronics U.S.A. Inc., LG Split Compact M3 DOAS with Multi V S® (Booth #S8345).



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AMS Device Manager Data Server

Emerson's AMS Device Manager Data Server securely extends intelligent field device data to outside systems to make it easier for reliability and maintenance teams to further capitalize on modern advanced analytics software. Asset management software to carefully deploy and monitor plant production assets – like measurement and analytical instrumentation, digital valve controllers, wireless gateways, and others. The data server makes intelligent field device information such as configuration parameters, alerts, calibration data and others available in near real-time.

Emerson



Toshiba Carrier u-Series Variable-Refrigerant Flow Line

Carrier introduces the Toshiba Carrier u-Series: the next generation, three-phase, full-line VRF equipment for commercial and large residential needs (pictured is the VRF heat pump). The series manages the heating, cooling and fresh air input into offices, K-12 schools, hotels, restaurants and large single and multifamily housing, with connection flexibility. The product line offers a higher capacity and extended operating range, along with an updated communication protocol and service tool.

Carrier

Marley WaterGard System

SPX Cooling Tech introduces the Marley WaterGard, a water usage optimizer and filtration system that helps reduce wastewater and overall water usage on packaged evaporative cooling products. It uses membrane technology to pre-condition cooling tower water and limits salt introduction into the tower, reducing necessary blowdown water. Also limits corrosion and scale tendencies of the cooling water. Offered in a variety of sizes based on the capacity of the cooling towers. Features include an integral pump, bypass function and an optional carbon system for chlorine filtration. Plus, WaterGard is designed for easy maintenance and filter replacement at regular service intervals.

SPX Cooling Tech



Electric HVRF System

The Trane/Mitsubishi Electric HVRF is an all-electric, two-pipe hydronic variable refrigerant flow system. By combining the benefits of VRF and hydronic chillers, the unit reduces refrigerant in the overall system to achieve more ambitious sustainability goals. Employs a 100% electric heat pump with simultaneous heating and cooling. Ideal for multizone commercial spaces. In the proprietary Hybrid Branch Controller, heat is exchanged between refrigerant and water, resulting in up to a 20% reduction in overall refrigerant charge. The system's interior line sets are also replaced with water, making it easier to meet regulations around refrigerant concentration levels and leak detection and allowing for easier refrigerant transitions

Trane/Mitsubishi



Pulse-Pure Water Treatment Systems

Pulse-Pure water treatment systems from Evapco provides a chemical-free water treatment system for evaporative cooling equipment. The physical water treatment technology uses pulsed electric fields to control microbiological growth, scale and corrosion. Recirculating water from evaporative cooling systems passes through the Pulse-chamber, where it's exposed to alternating high-frequency electric fields. These pulsed electric fields impact both the surface charge of small suspended particles and free-floating microbial organisms found in cooling water. Factory- and field-mounted systems are available. The technology significantly reduces the environmental impacts associated with the use, production, shipping, handling and storage of chemicals.

Evapco

Series 19 MAV MultiPack

Asahi/America expands its Series 19 electric actuation line with the MAV MultiPack, capable of operating on Type-14 diaphragm and gate valves up to 4 in. Features accelerated cycle times ranging from 13 to 100 seconds, and a smart feature that tracks the number of completed cycles. Available in two packages as on/off or modulating unit. It includes a heater, one set of dry contacts for PLC confirmation and one for alarm reporting, OLED screen with push buttons, local controls and a QR code for easy and instant access to user manuals.

Asahi/America



VertiCool Premium

United CoolAir launches VertiCool Premium, an efficient vertical, packaged, air-cooled unit designed for commercial retrofit

and replacement applications. The compact cabinet makes it easy to fit on an elevators and maneuver down narrow hallways and through doorways. This is essential when retrofitting old buildings with tight spaces. Features a high-efficiency, variable-speed compressor along



with VFD blowers and microprocessor controls, enabling the unit to be used for comfort cooling, DOAS, CAV and VAV. Also features capacities of up to 10 nominal tons and can enhance productivity even further up to 20 nominal tons with an optional twinning kit. Designed to excel even in the most extreme conditions, with low ambient operation capabilities down to -20° F.

United CoolAir

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Hercules Cryo-Tek GL48 Fire System Antifreeze

Hercules Cryo-Tek GL48 fire system antifreeze from Oatey is designed to be used in wet fire sprinkler systems. It is formulated to be used in place of water and other sprinkler system fluids where freezing can occur. The antifreeze is approved for use with CPVC and metal sprinkler systems, and complies with NFPA Requirements for Wet Fire Suppression. Made of a pre-mixed blend of glycerin and water, the fluid also has burst protection to -50° F (-46° C). Available in two variations of weights: 5 gallon and 55 gallon.

Oatey Co.

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PS Form 3526-R, July 2014

High-Efficiency Gasketed Plate-and-Frame Heat Exchangers

As part of Bell & Gossett's Building Better platform and commitment to sustainability, the addition of high-efficiency "X" plates enhance the new gasketed plate-and-frame heat exchanger GPX P45, P55, P86 and P110. "X" plate technology increases heat transfer thermal performance up to 20%, reduces surface area up to 20% and reduces materials up to 15%. Standard options include a variety of high-efficiency plate corrugations, material options of 304SS, 316SS or titanium plates, and nitrile or EPDM gaskets.

Bell & Gossett/Xylem



NPF Hydro-furnace

Navien enters the HVAC market with its NPF hydro-furnace. Available in upflow and horizontal configurations, the NPF comes in two sizes: 60,000 Btu/hr. and 100,000 Btu/hr. They meet 97% AFUE and the stringent requirements of SCAQMD rule 1111 for ultra-low NOx performance. Dual stainless-steel heat exchangers heat water in an isolated compartment out of the airstream, which provides sound reduction and energy efficiency. The heated water is circulated through a hydronic coil that transfers the heat into the airstream for quiet forced-air heating comfort.

Navien





Multi-Position Pro Ladder

The Multi-Position Pro Ladder from Werner is a 5-in-1 ladder works for a variety of uses—as a step ladder, as an extension ladder or on a stairway. Each side of the ladder adjusts up to 7 inches to provide solid footing on uneven ground. To re-adjust or retract, simply click the pinch-proof yellow lever near the base of the ladder, and safely retract level with one touch. An extended tab on the outside of the foot makes it easy to extend with your foot—even in work boots.

Werner Co.

Airstage VU-V VRF Systems

Fujitsu General's Airstage VU-V outdoor units can serve either as heat pump or heat recovery systems with simple setting changes and the addition of refrigerant branch units. The new VRF platform offers broader size ranges, with single modules from six to 16 tons, and up to 36 tons per combined system. As many as 64 indoor units can be connected to a single system. Compressor lifecycle is increased due to its ability to rotate the starting unit across the modules in a system. Greater indoor comfort is achieved through intelligent refrigerant control corresponding with the heat load of the room.

Fujitsu General America



HinderRUST for Metal Fabrication and Welding

HinderRUST for metal fabrication and welding from Fluoramics is weld-through approved, meaning the rust-stopping product does not need to be removed and no priming is needed prior to welding. It is engineered using HinderRUST technology, going on as a mobile liquid that wets to surfaces and creeps into seams. Starts protecting and lubricating surfaces upon application, and keeps metals (aluminum, brass, alloys, cast iron, hardened steel and stainless steel) protected against rust before, during and after welding. It offers both short-term and long-term penetration protection against flash rust, pitting and corrosion. Removable for final finishing through normal finish coat preparation procedures such as sanding, grinding, blasting or cleaning with acids and chemicals.

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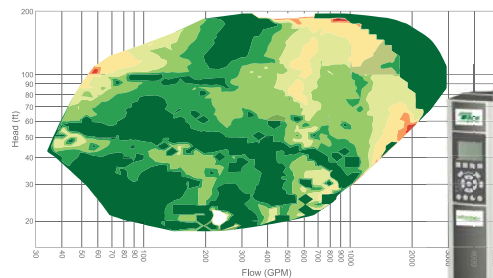
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Some Good News on Climate Change, for a Change

A new report claims the pandemic actually accelerated progress on net zero goals.



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In May 2021, the International Energy Agency published *Net Zero by 2050, A Roadmap for the Global Energy Sector*. Not surprisingly, it began with bad news, noting that, although the number of countries pledging net zero emissions kept rising, even 100% compliance would fall short of the goal.

Between 1992, when the UN Framework Convention on Climate Change was signed, and 2021, worldwide CO₂ emissions increased by 60%. Since then, most of the news regarding the 1.5° C global warming limit and the goal of net zero, energy-related CO₂ emissions has been disheartening, at best, or alarming, at worst.

Now, however, the IEA has given us a glimmer of hope with its newly updated *2023 Roadmap*.

The original document established more than 400 milestones to hit on the road to decarbonization. One such milestone then was the daily installation of solar PV systems equivalent in size to the world's then-largest solar farm.

Although, I had thought that sounded aspirational, the new report says:

Positive developments over the past two years include solar PV installations and electric car sales tracking in line with the milestones set out for them in our 2021 report. In response to the pandemic and the global energy crisis triggered by Russia's invasion of Ukraine, governments around the world announced a raft of measures designed to promote the uptake of a range of clean energy technologies. Industry is ramping up quickly to supply many of them. If fully implemented, currently announced manufacturing capacity expansions for solar PV and batteries would be sufficient to meet demand by 2030.

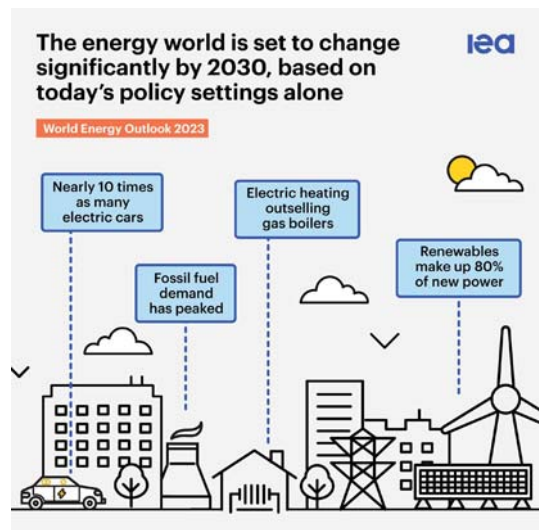
That's definitely good news.

The update also points out that the case for climate action is stronger than ever. Many of us just suffered through the hottest summer on record and other severe weather events, linked to climate change, continue to increase.

The political case is strong, too. In December, the next UN Climate Conference (COP28) will convene in Dubai, and it will see the conclusion of the first global stocktake (GST). According to *Nature Climate Change*, the GST "assesses

efforts towards long-term climate targets... The stocktake could also address current problems within climate governance and interact with other policy instruments."

The GST process is "designed to evaluate the collective progress every five years towards the mitigation, adaptation and finance goals set out in the Paris Agreement. Based on the outputs of the GST process, each party is expected to update their nationally determined contribution (NDC) with increased ambitions."



Although generally optimistic, the new *Roadmap* does still note that countries will have to spend more in order to transition from fossil fuels to cleaner forms of energy. Currently on track this year to spend \$1.8 trillion on clean energy, that amount will have to increase to \$4.5 trillion in the next 10 years or so, in order to meet the goals. According to IEA, increasing renewable energy installations by 300% will have the most significant effect on global emissions reductions.

Finally, the new report suggests that, although no new major fossil fuel projects are needed, "continued investment is required in existing oil and gas assets and already approved projects" in order to avoid what it refers to as "damaging price spikes or supply gluts."

Yes, an optimistic climate report, with a dash of common sense mixed in. **HPAC**



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