

Bri Colon: Welcome everyone. We're going to give folks just a moment or so to join and trickle in and we'll go ahead and get started.

[Silence from 0:00:17 to 0:01:00]

Bri Colon: All righty. So I see we're at the top of the hour now. We'll go ahead and dive in. Thank you for being here with us today and welcome to our 2022/2023 Better Buildings Webinar Series. We're dedicated to bringing you the latest in actionable insights from leading industry experts. This annual series is a chance to explore the topics, trends, and technologies that affect your organization as well as efforts to accelerate decarbonization and energy efficiency adoption. Next slide.

Today's webinar is called "Refrigeration Management for Fewer Leaks and Emissions." And before we get started, there's a couple of housekeeping notes here to start off. Today's webinar will be recorded and archived on the Better Buildings Solutions Center, and we'll follow up for those that have registered when that recording and the slides are made available. And the next, attendees are in listen only mode which means that your microphones have been muted; but if you experience any audio or visual issues throughout the webinar, please go ahead and send a message in the Q&A box located at the bottom of your Zoom panel and our tech team will be able to support. Next slide.

My name is Bri Colon, and I serve as a fellow in the Building Technologies Office at the Department of Energy. Within the Better Buildings world, I serve as a sector lead for higher education as well as retail food service and grocery sectors. I'm thrilled to be serving as your moderator today for today's webinar. We can go to the next slide.

A loose agenda of what we plan here for the webinar today, we're going to start off with some interactive polls to get folks acclimated to our platform Slido; and then we'll transition next into our wonderful lineup of speakers that we have specializing in a variety of different areas related to this topic of refrigeration; and then finally we'll have a space offer for Q&A and closing remarks. We can go to the next slide.

So without further ado, we'll start off first by utilizing our interactive platform Slido for Q&A and polling throughout today's webinar. So if folks could go to www.slido.com on either your mobile device or by opening a new browser window in your internet, today's event code is hashtag or pound DOE. And

throughout today's webinar if you'd like to post questions to panelists, you can submit them at any time throughout presentations and we'll be saving those questions towards the end. For the questions functionality, you can select a thumbs up icon to upvote certain questions and then the most popular questions will rise to the top for our panelists here to address. We will start off first with some polls. So we want to learn a little bit more about everybody that's in the room or auditing. So if everyone could again join us over the Slido to respond to our first questions. If you do have any issues, please go ahead and message our tech support team by utilizing that Zoom Q&A function.

So first to start off, we want to get a better understanding of who's in the room. So folks could respond to this question by answering which sector best describes the organization that everyone is joining from. It's really helpful for our presenters to understand this layout as well as just for us to know for statistics. So looks like we're off to the races here. I see a strong representation already from contractors, consultants. Industrials polling in close behind. I feel like a racing announcer. We've got some small but mighty representation coming from folks lower in – potentially lower local government. Could we scroll down a little bit. I'm kind of curious some other sectors. Great. I see higher education, utilities, K-12. All right. Feel free to take a moment or so and keep responding to this and thank you for scrolling down.

All righty, well, please feel free to keep entering those answers and that information and we can transition to our next question. We really are curious to learn more about from our audience what kinds of challenges that folks are experiencing within organizations related to refrigeration emissions management. So please go ahead and take a moment here. So this is short answer, so we'll start to see some responses here pop up on the screen.

All right, I'm seeing funding and recordkeeping as some of the initial challenges related to refrigeration emissions management, leaks, tracking, data integrity, the need to create a program overall. Yeah, that's helpful to know. And the high GWP that is associated with those leaks. Oh, this is wonderful. Yes, thank you for sharing all of this. Concerns about VRF systems and the O&M, operations and management there related. Regulations, yes, our speakers, too, are going to touch on that topic and being able to comply with upcoming regulations and existing regulations related to refrigeration. Managing old systems and updating those newer units, yes, seems like a common trend and challenge there. Leaks overall I'm seeing as being on of the more popular ones. Perfect.

Yeah, we're in the right place. We'll let those trickle in a little bit more. ESG in general, understanding what are the best practices out there and finding that transparency in site data, and understanding the landscape of upcoming refrigerants available, those natural options, too, which our speakers are going to also address here. Old techniques used on new equipment and the transition to those next gen refrigerants. Well, wonderful. Please go ahead and continue typing those. This is really helpful for ourselves and for our speakers to know, too, before they present what challenges others in the room and our audience are experiencing related to this emissions management. Wonderful. All right, we can transition to the next slide.

We'll start off now with our presenters. We have a great lineup of presenters. We're really lucky to have them join us here on today's webinar. We have Kersey Manliclic from US Environmental Protection Agency, the GreenChill Program. We're joined by Danielle Wright from the North American Sustainable Refrigeration Counsel and Dustin Herner with Weis Markets. We can go to the next slide.

We'll start off first with Kersey. Kersey has worked in various sectors before coming to the US Environmental Protection Agency where he is currently the program manager for EPA's GreenChill Advanced Refrigeration Partnership. Most recently he worked for three-and-a-half years at the California Air Resources Board implementing an incentive program for cleaner agricultural equipment and ensuring that the cap and trade incentive programs benefited disadvantaged communities. Prior to that, he worked with state agencies to plan hydrogen fueling infrastructure for fuel cell electric vehicles. He holds a Bachelor's of Science in mechanical engineering, a Bachelor's of Science in material science and engineering, and a Master's in Science and a PhD in environmental engineering, all from University of California, Irvine. So a UCI fan. I will turn it over now to Kersey. Thank you for being here with us today and feel free to take it away.

Kersey Manliclic:

Great. Well, first off, good morning everyone. Thank you, Bri, for that warm introduction. Thank you to DOE for this opportunity. So I've actually got about, I think, 30 slides. I'm going to have to be a little speedy. Happy to talk to anyone offline if there are any questions. I'm here today to share about EPA's GreenChill Partnership Program. Next please.

Okay, so I want to start off with a quick overview of the

GreenChill Program. Next. Last year was actually our 15th anniversary so I'll share some trends over that time span, then I'll jump into the advantages of being a GreenChill partner, and I'll also talk about some of the strategies that have made our partners really truly leaders in refrigerant leak reduction. I'll conclude by talking about the American Innovation in Manufacturing Act and how it's really bringing everyone together right now in this space of lower GWP refrigerants. Next, please.

So GreenChill is a 100 percent voluntary partnership program that worked collaboratively with the food retail industry to reduce refrigerant emissions and decrease stores' impact on the ozone layer and climate system. We're really doing it through fundamental means – lowering refrigerant charge sizes, finding ways to eliminate leaks, where it makes sense making the move and transition to environmentally friendlier refrigerants, and again, adopting green refrigeration technologies and best practices as best as possible. So you know, really just a core and a simple way to do it so. Next please.

GreenChill has three programs or sort of three prongs as I like to think about it. The first one is our corporate emissions reductions program where partners join GreenChill at the corporate level, they set annual goals, and they will report on their progress to us. Next. Secondly is our store certification program. This is where individual stores that are really meeting the highest standards and really doing a phenomenal job on their refrigerant management can apply to be GreenChill certified. Next, please. Then third we have our advance refrigeration program where we work to promote advanced refrigeration technologies and strategies. Next. And there might be two animations here. Fantastic.

And so, in the corporate program the focus has kind of been on the existing stores, finding leaks more quickly and what we can do to prevent leaks from happening in the first place. On the store certification side, we want to design leaks out of supermarket systems and find long-term solutions to leaks. So again, sort of here's the three parts of GreenChill. Next, please.

I have said this in the past and will continue to do so, but this is a banner I'm particularly and personally proud of. It shows all of our partners in GreenChill to date. And I believe this past year we've welcomed about four to five new partners. So just awesome to have everyone onboard. Next, please.

As I mentioned in a previous slide, any store in the country that is

truly doing a great job in refrigerant management and leak mitigation can apply to become GreenChill certified. We offer three certification levels, silver, gold, and platinum. These stores are using non-ozone-depleting refrigerants. And again, really they're the ones that are making great strides. So next, please. All right. Awesome.

So now I am going to jump into some data really – you know, leak rates, trends, and what our partners have really been able to achieve over the past 15 years that GreenChill has been around. Next, please. So I think I was getting out of high school back in '07 and since then GreenChill – there's one animation here – GreenChill has grown to be about one third of the supermarket industry. Just great growth over the years but really more retailers and more partners joining onboard. Next, please.

So the industry accepted average leak rate has been about 25 percent. As you can see here over the years, in particular the GreenChill partnership has hovered at about half of that. I do want to unpack that graph just a little bit because throughout this time, since 2007, our partners have been continuing to build new stores, add on additional stores to their fleet. We've also welcomed in new partners. So there's a lot going on behind that leak rate plot that we have. Next, please.

Moreover, it's also really worth looking at how the refrigerant mix within the partnership has evolved over time. So you'll see there what the refrigerant mix in 2007 and then the mix in 2021, excuse me, and we see a broader array of refrigerants since 2007. We take note of the decline of R22 per its prohibition. Really the take home message, I think here for us, was that the GreenChill partners were undoubtedly leaders in the ODS phase out. Now we have opportunities to make strides in addressing the climate crisis. I'm sure we'll see GreenChill partners and their leadership again in this phasedown. So next, please.

So as I had mentioned, our store certification program where individual stores can become GreenChill certified, in our first year of that and back in 2008, we had one certified store and we've just seen an impressive continuous growth over the years. Most recently we are at over 800 individual stores certified. Most now at that highest platinum level. It's really been awesome and commendable and what I also want to echo here is that the stores that are certified, they continue to recertify year after year after year. So it's not like a one and done thing. They continue to do a great job on their refrigerant management and they continue to stay

involved in the program each year. So want to make note of that. Next slide, please.

Oh, I have some animations. Awesome. And here's a spatial view of our certified stores. Again, just a great spread and a growing coverage across the nation. Next, please. And I do want to highlight just recently – again last year was our 15th anniversary of our program and GreenChill published a major 15th anniversary report really highlighting the achievements by our partners over the years. I invite all of you to just check out the report. It's a snapshot of our industry and we have just a nice statement from administrator Michael Regan there, so check it out. Next, please.

Awesome, so what are the advantages of being a GreenChill partner? Next. GreenChill truly has a strong data-driven core. All of the partners that are members and participate in our program receive customized individual data reports along with annual reporting of partnership trends. Next. I think definitely for the experts in the industry, I think it goes without saying that there are real environmental and financial benefits to leak reductions. So here you see just a few numbers on what could be achieved if every supermarket reduced its emissions rate to the GreenChill Partnership average; and so, we can definitely see those emission reductions and the savings in refrigerant replacement costs. Next, please.

Moreover, our program, our partnership, we are always putting together tools and resources. most recently we have updated advanced refrigeration information, best practice guidelines and we worked to put together a compilation of industry resources. Next, please. Of course, what's also important is being able to just create a forum for discussion. We do this through recurring partner meetings and webinars and much more. Next, please.

And each year we hold an annual recognition ceremony around September/October timeframe based on the reported data to us. These were the recipients this past year. A huge shoutout to all of them. We recognize progress and emissions reduction, store certification among a number of other categories. So that is, again, part of our program. Next, please.

All right, so how can you be involved? Well, if you are a food retailer, as always I invite all of you to reach out and apply to be a corporate member or have some of your stores certified. Certainly at the very least we would love to have you join us for all of our webinars and events. So reach out to me and let's make sure that

you're on that mailing list. Next, please.

All right, so what have been some of the successful strategies and technologies to reduce leaks that our partners have done? Next, please. I'm going to go ahead and just summarize some of those strategies and so there might be one animation here. Awesome, thank you. First and foremost, just being able to do frequent commercial leak rack checks; having really good manual leak prevention checks; immediate notification of refrigerant leak alarms through a really good refrigerant or energy management system; in the event when a leak is identified, immediate repair is conducted; having some multi-verification, multi-step kind of check of completed leak repairs. Next slide, please. And then use of remote leak detection systems; use of really good high quality equipment, training, and technician incentive plans; supervisors working closely with their technicians; and each store, if it's leaking above a certain threshold, having a dedicated amount of time to check high leak rate stores. Next, please.

All right, I am trying to be mindful of time here so I've got one more section I'm going to speed through. I do want to talk about the American Innovation in Manufacturing Act, also known as the AIM Act. Next, please. This act basically phases down the US production, consumption of HFCs by 85 percent by 2036. And again remember, HFCs were developed to replace ODSes and are a rapidly growing class of greenhouse gases. Next, please.

What the AIM Act does is it authorizes EPA to address HFCs in three main ways – phasedown of production and consumption of HFCS, facilitating the transition and technology through sector-specific rule makings and issuing certain regulations for purposes of maximizing reclamation and minimizing releases of HFCs from equipment. Next, please. This is a visual of that phasedown. So in 2024 the US will be reducing production and consumption by 40 percent below historical levels. So you can kind of see what's going to happen in the next 15 years. Next, please.

As I mentioned, there are sector-specific rule makings. We recently issues a proposed rule. What I've done here is I've excerpted here the proposed GWP limits for retail food refrigeration, and we really invite stakeholders to please check it out and please comment before January 30. GreenChill is also going to host a webinar topic on this next week. So please be in touch if you're interested. So again, one of those rule makings that I mentioned as it pertains to the AIM Act. Next, please. Then there is a subsection in the AIM Act called H which touches upon

certain areas such as reclamation. Please be on the lookout for a proposed rule on this this summer. Next please.

All right, so with that, I know I had to speed up a little bit at the end there, so I want to thank DOE. I definitely what to thank you, the audience, for your time in listening. I want to thank really the GreenChill partners. They are the ones with the boots on the ground making the progress. It's been a pleasure here to be alongside NASRC and Weis Markets which is a GreenChill partner. And also, lastly, definitely grateful for and I have the support of a lot of colleagues on this program, probably about 20 or so. So there's a lot of unnamed folks behind the scenes. So with that, thank you.

Bri Colon: Thank you, Kersey, for sharing that information. And congrats, too, on 15 years anniversary. I know that's a big deal for the program as it continues to grow.

Kersey Manliclic: Thanks, Bri.

Bri Colon: Great. Well, we can transition to our next speaker here. Next up we have Danielle Wright. Danielle is the executive director of the North American Sustainable Refrigeration Counsel. It's a nonprofit dedicated to advancing climate friendly natural refrigerants. Prior to her current role, Danielle managed large scale utility energy efficiency programs to optimize performance and reduce costs for grocery stores. Her focus has always been to create environmental and business wins. Without further ado, thank you for being here with us, Danielle. I will turn it over to you.

Danielle Wright: Thank you, Bri. And thanks to the DOE BBA team for organizing this. So I'll get started here. Just a little bit about NASRC, the North American Sustainable Refrigeration Counsel. We're a 501(c)(3) nonprofit organization dedicated to creating a more sustainable future for supermarket refrigeration. So all of our work is really centered around removing the barriers to the adoption of natural refrigerants such as CO₂, propane, and ammonia that all have the unique feature that they can't be patented. So there hasn't been a natural champion in the past making sure that these have a seat at the table. So ultimately what we're trying to do is really level the playing field for natural refrigerants by achieving our goals of cost parity, increasing technology solutions and ensuring service readiness. So everything we do, we do together with our incredible network of members and partners that include over 150 member organizations, food retailers and end users representing 38,000 locations. Go to the next slide, please.

So some of those end user members are listed here. Next. And then as well as equipment manufacturers, service contractors, engineering design firms, consultants, utilities, schools, nonprofits, and others. So really everybody that we need to work together on this problem. Next slide. The organization is led by a fantastic board of directors that's made up of industry leaders representing the same cross section of stakeholders across the commercial refrigeration industry. Next slide.

So a little bit about what we do. I won't go into all the details of this slide, but essentially we're focused on activities that will help accelerate adoption so reducing first costs by developing incentives and other financial mechanisms, increasing technology solutions through either data around performance validation studies or in some cases updates to codes and standards if that's needed. And then workforce development, so increasing training resources and coordinating events. I'll talk a little bit about our recruiting at the end of this. That's something that we're really focused on this next year. Next slide.

So why do we care about reducing leaks? I think there's really three important elements that resonate really strongly with our retailer partners. So number one, the environmental impact; number two, the regulatory impact; and number three, the operations impact. Next slide.

So if we look at the environmental impact, HFCs are known as super climate pollutants, have a disproportionate impact on global warming in the near term. Typical HFCs used in supermarkets have up to 4,000 times more global warming impact than CO₂ pound for pound, and the emissions are growing faster than any other greenhouse gas on the planet. So Kersey mentioned that 25 percent average leak rate. If we add that up across supermarkets and grocery store, just coming from the leaks the climate impact is over 55 million metric tons of CO₂e per year and estimate over ten years that adding up to about half a billion metric tons. Next slide.

So with this big problem comes a big opportunity. On the flipside, refrigerants represent a great opportunity to address climate change in the near term. It's been listed as the number one climate solution by project drawdown comprehensive, data-driven summary of strategies to address global warming. It's thought that by scientists that mitigating HFCs globally could help us avoid up to half a degree of warming by the end of the century. So big impact in the near term if we can solve this problem. Next slide.

Kersey also mentioned the AIM Act which is, you know, one of the big drivers from looking at leaks, definitely regulatory compliance and what's happening with the AIM Act is going to have a big impact. This is an overlay of the phasedown schedule which is the blue line based on the percentage reduction of HFC admissions from the baseline and the percentage GWP of typical refrigerants that are used in the industry. So at the red line at the top, kind of our baseline is this 404507. If you take a percentage reduction to get down to 448449 which are becoming kind of the new standard in the industry, you can see there's a little bit of a crunch here when we get to 2029 where just simply taking that step isn't going to be enough to achieve the goals of the AIM Act or respond effectively to this phasedown. Next slide.

Another regulatory impact that we're seeing is refrigerant pricing. And if we look at historically what's happened in Europe when similar regulations took place, you know, initially there was an 800 to 900 percent price increase for some of the typical refrigerants. Some of the trends that are being projected and what we're starting to see are mirroring that or even may go above that. So that's definitely something from a supermarkets perspective, not only regulatory compliance but the cost of leaks is going to go up significantly. Next slide.

And that's, you know, just at the federal level. If we take into account state regulations and some of the work that NASRC's been doing with our state partners here, you know, they're looking in order to achieve their own state goals, they must go above and beyond where AIM Act is going. And so, some states, for instance in California, we've seen this year, this past year of a new ban on virgin refrigerants. It's going to impact retailers economically in California and make those high GWP refrigerants more scarce. In New York, they're taking a look at setting a threshold of ten GWP for new systems and other mechanisms that could phase down HFCs much faster than the AIM Act phasedown schedule. Next slide.

Finally, you know, this all adds up to the simple fact that refrigerants have been and always will be bad for business. The main goal of a supermarket is to keep their food cold and you can't do that effectively if your system's not running right. So leaks translate to increased service and maintenance costs, potentially suboptimal performance and all this adding up to product integrity and making sure that the food stays cold. So this isn't just unique to HFCs. Natural refrigerant systems leak as well. Even though the

refrigerant itself has a negligible impact, it's still bad for business. And so we look at CO2 systems in particular and we've seen higher than normal leak rates. I would expect they'd be much higher than just that 25 percent average. you know, the high pressures that these systems operate in, the fact that a lot of that refrigerant is vented during service and there is effectively no CO2 refrigerant reclaim technology that's readily available today. Next slide.

So for this reason is one of the many reasons why NASRC has been focused on leak reduction. You know, this was a retailer driven initiative to look at reducing leaks over the lifetime of the system. You know, Kersey talked about some of the GreenChill best practices in terms of addressing leaks in an existing system. This is looking really at what we could do to design the system to be more leak proof to start with. So we've been working on this since 2020. We kicked this off at an event. I want to talk a little bit about what's included in the Leak Reduction Initiative. So next slide, please.

So one of the first things our retailer group did was get together and look at where these problems were occurring. So I'm not going to go through these one by one, but essentially they identified that 80 percent of the top leak issues were coming from these two sections, so either occurring at the cases and fixtures or occurring in the machine room and rack. Next slide.

There were two other areas where leaks were occurring at the condenser and then connecting pipes as well. So once they identified those top leak issue areas, we could set about addressing those and looking at solutions. Next slide. And so here, our retailer best practices group looked at what measures they could adopt and incorporate eventually as part of their standard equipment specification. The idea being if these national chains and regional chains came together and agreed on these set of measures, that could help bring down the cost of implementation, which I will talk about a little bit here in the next couple slides. But they identified six measures to address these top leak issues. So again, you can look at the report and get more detail here. I won't go into all the details on here in our presentation. I know I only have a couple minutes. So requiring 45 bar working pressure type K copper, making sure that tubing that carries the refrigerant doesn't come into contact with any other metal, and elimination of flare fittings on copper tubing. Next slide.

As well as eliminating rotolock fittings, installing a temporary

pressure gauge to visually confirm that the system is pressurized when it arrives, and this is unique to CO2 systems but specifying better CO2 relief valves to avoid those major leaks. Next slide.

And so really what we're finding is that in order to make these measures available, there's a couple of things that need to happen. Retailers will need to justify the increase costs that are associated with some of these measures. We think that some of that could come from standards and that standards are a great way to reduce costs all around. So that's something that we're definitely exploring. Manufacturers will incur additional costs as well from implementing some of these measures. So figuring out how these different parts can work together in order to see these measures through is something that NASRC is working on now. Next slide.

And you can read more about this in our Leak Reduction handout, get an overview of those top leak issues and the leak reduction measures and some of those considerations and challenges. Then finally I'll just point you to our Refrigerant Transition Hub where you can find a number of resources we have available on our website to aid in the transition. And then last but not least, just a couple of other initiatives if you're interested to get involved that relate to leak reduction. Something that we're looking at is utility incentives for energy efficiency and GWP, and this can include leak reduction measures as well. And technician training, resources, and events. So if you'd like to stay in touch with those updates, I encourage you to subscribe to receive them here. So with that, I'll turn things over back to Bri. Thank you.

Bri Colon:

Thank you, Danielle. A lot of great information shared there and definitely echo encouraging folks to utilize a lot of those resources from coming out from the NASRC. They also recently had a wonderful summit, too, and a lot of information coming from those diving deeper into the industry topics that were shared there. So without further ado, we will transition to our final speaker. And before doing so, just want to remind folks if you weren't hear joining at the beginning, if you'd like to enter any questions in Slido.com, the event code again is #DOE and we look forward to answering those questions here towards the end and upvoting any that you are interested in hearing addressed first off the most popular.

So our final speaker here, Dustin Herner. Dustin is the energy and sustainability manager for Weis Markets, a mid-Atlantic retail grocery chain of 197 stores. Since joining Weis Markets in 2013, Dustin has been one of the driving forces behind Weis'

commitment to energy efficiency and sustainability which has really helped Weis reduce greenhouse gas emissions by 50 percent and the diversion of 56 percent of its waste from landfill. Dustin holds a Bachelor's Degree in Energy Business and Finance from Pennsylvania State University and is a certified energy manager. Thank you for being here with us, Dustin. I will turn it over to you.

Dustin Herner:

Thanks for the introduction, Bri. And a little bit more for those of us who aren't familiar with us or are from portions of the country where we don't operate, Weis Markets was founded in 1912 right here in Sunbury, Pennsylvania, where I'm broadcasting from. We're still headquartered here which we think is pretty cool. But we have 197 stores right now in seven states in the Mid-Atlantic, so New York, New Jersey, Delaware, Virginia, West Virginia, and Pennsylvania.

And, you know, as you kind of alluded to, our sustainability program has been around for a little while. Started in 2010 with some of my predecessors and the crux of our sustainability program at the beginning was really based around refrigerant leaks, refrigerant management, and conversions away from R22 to mainly 404 at the time but now we're starting to transition to 448 and CO2. So Kersey and Danielle did a wonderful job, obviously experts in the industry, of kind of laying out why refrigerant leaks are important, what the leaks mean to businesses in financial terms and what the leaks mean to the environment and really everyone who shares our planet in terms of environmental impact.

I just wanted to follow up their conversations and introduce to you all what these practices look like for a retailer. We're not the biggest in the country. We're not the most technologically advanced in the country; but we can see a good opportunity when it comes to us; and we're really poised to take hold and just make solid progress on our leaks and want to share that with others to obviously raise the collective height of all boats, I guess.

So our refrigerant conversions and I include this chart here. It's an excerpt from our 2021 Sustainability Report which is available on our website and will be in the link tree that gets shared with this presentation later. So I encourage you to take a look there. But this chart shows our greenhouse gas emissions by type. One of the important things to touch on is sort of what Danielle talked about as well. The brown line and the red line are our refrigerant emissions, but the purple line and the black line across the bottom are our diesel and natural gas fuel consumption lines. And you can see that just our refrigerant emissions almost double the fuel that

our tractor trailers and our natural gas heating systems consume. So just to kind of further put into perspective how significant the impact of refrigerant leaks can be on the environment.

What we've done to try to manage those leaks is focus on, one, conversions away from high GWP refrigerants; two, manage leak reduction through detection and repair. We've changed our store design over the years. We are fortunate to design and build a significant portion of the stores that we operate. So now we focus on reducing charge size through secondary glycol refrigeration systems, transition to natural refrigerants in new stores using primarily CO₂ but propane and micro-distributed systems are also an option I would encourage listeners to look into. Three, making sure that we're running state-of-the-art controls and have a technician store staff who can manage those controls and understand the power that they have available. So with that, next slide, please.

So another way or how we start to implement all of this stuff is through hardware, and kind of the heart of our refrigeration management system is leak detection. We use these Bacharach multi-zone gas monitors. There are others out there. Kersey or Danielle had an example of one up there. Some form of leak detection is critical to your system. We saw it in one of the poll questions earlier where people don't know that they have leaks. You might not know that you have a leak until a system is underperforming. It's really critical to know.

So the way that we set these up typically eight zone detectors, so we have eight options of where we can look for a leak and we will monitor each refrigeration rack, each frozen food case run, upstairs on the roof, actually even in open air underneath the condenser coils, and in some new stores, depending upon construction, will be able to monitor more individual cases. So kind of all of the areas that Danielle referenced being prone leak points, we've got some leak detection. The way this works is it pulls back to our energy management system and tells us there's a leak and we can talk a little bit more about how that software works as I get through here.

But we also have handheld leak detectors. There's one on every service truck. Each technician has one, and we use those to pinpoint leaks via manual inspection. So if we get a large zone leak in one of those eight zones, we will send a technician out to pinpoint that leak and find out what portion of the system is actually leaking. We started using those in 2014. You kind of see

that if you look at that chart in detail later that we made a measurable improvement.

And then construction methods as well on the hardware side, as Danielle said. We eliminated almost the entirety of mechanical fittings in our stores. Our technicians are all, you know, very skilled in soldering and brazing pipe to try and keep the stores leak free. We also abandoned some older construction styles where refrigeration line sets were run underground underneath the store slab and moved those line sets overhead. Much easier to find and repair leaks when you can actually access the refrigerant lines.

And then in the middle years there we worked with some glycol as a secondary refrigerant. So instead of having refrigeration lines running all over the sales floor where you've got the actual refrigerant gas in the sales space, we use glycol which is like an antifreeze alcohol but food safe and use that to cool the cases and product directly.

Also, like Kersey mentioned, you know a PPM schedule is an absolute necessary best practice for refrigerant management. Our technicians all have dedicated time to walk their stores, visually inspect, electronically inspect for leaks, and makes sure that we don't have any leaks. Next slide, please.

In the event that we do have a leak, our leak detection systems are tied into our energy management systems. I've got a screenshot here from one of those systems. Again, a lot of energy management manufacturers out there. This so happens to be one of our older systems, but I like the way that it demonstrates the alarm. You can see, so even beyond our leak detection hardware, we are looking at the liquid receiver level in the refrigeration system itself. If that liquid – it's literally a float on the liquid refrigerant just like a gas tank in your car – gets below 5 percent in that tank for more than 30 minutes, it's going to dispatch an alarm call to a service technician.

For us, those refrigeration alarms that mention a leak are an immediate dispatch. Those leak detection systems, the eight zones that we talked about earlier, anything above five PPM for ten minutes or 50 PPM for ten minutes generate dispatch calls as well. And all leak alarms, like I mentioned, are critical alarms to us. You can see that kind of highlighted on the level. That gets them a higher priority dispatch to one of our service technicians. Speaking of service technicians, next slide please.

Another important way that we manage our leaks is through people. Even with all this technology and all this hardware and better store design, we focus a lot on the folks that work on our systems. So we have one manager parallel to myself and our office who is the overseer of our refrigeration service department. They have five field service supervisors, and we have 27 service technicians across our stores. So those guys, those folks have seven to ten stores kind of under their over vision; and they focus on solely those seven to ten stores. I think that gives us a good level of ownership and eyes on systems very frequently. It's a good way to keep track of what's going on. We also have two warehouse associates who just manage our own parts inventory. If a service technician needs to replace a valve or replace a controller for a case, we get it out to them pretty quickly and get that leak repaired.

How do we track some of this data? We saw some questions about that earlier in the presentation. Some of it's still manual. We've got an example of a receiver level tracking sheet that is on the door of every refrigeration control cabinet in our stores. And when the technician goes in to service a store, they will mark down what the receiver level is. Sometimes it is that simple. If you see a trend down in the receiver level over time, you might say, "Hm, we might have a leak in a space that's not monitored specifically by a detector or is a small enough leak," and believe it or not, we still identify some leaks that way.

Additionally, to incentivize our technicians to find leaks and manage leaks appropriately, we have a technician financial incentive program. And so we award those technicians based on lowest leak rate out of our group of 27 or the most improved. These folks get a cash bonus at the end of the year based on their performance. Kind of set up our own internal GreenChill program. Like we talked about earlier, I just want to – I can't stress enough the ownerships. Someone has to own the maintenance of these systems, whether you are a contract service company and you're a manager at a corporate level or you're the store manager at a small co-op, you know, someone has to take responsibility and know that these leaks are important to both the environment and your business. Danielle mentioned the price of refrigerant and it's clearly becoming a big challenge.

So I just want to encourage everyone to use the resources that Kersey and Danielle through the EPA's GreenChill Program and the NASRC provide. The GreenChill Program is really what guided Weis Markets down this path of being successful in our leaks. Next slide, please.

And through partnering with GreenChill and really taking a hard look and a focus, we've been able to take our leak rate from our 18 percent base year leak rate in 2008 all the way down to about 9 percent is where we expect to land this year. I don't want to falsely report before Kersey and his team get to verify that information, but we're wrapping up our reporting for this year now. We think we're going to land around 9 percent.

Like Danielle mentioned, there are still some challenges. We have four CO2 stores in our fleet now. You can see since 2019 we have a little bit of upward pressure on our leak rate. We think some of that is from the CO2 stores because of the challenges that Danielle mentioned. But at almost 4,000 times worse, we can handle a little bit of CO2 leakage knowing that the overall GWP is much better. Like I said, through partnering with GreenChill, we've got a multitude of stores certified. Our store number 16 in Hanover, Pennsylvania, I think Kersey would have to clarify for me, but might still be the record at 13 consecutive years so we're pretty proud of that.

So ultimately, happy to answer any questions that the folks on the call may have but this is kind of the practical application of what Kersey and Danielle have talked about. And can't recommend their offerings enough in getting started on a leak management program. So thanks, Bri, and thanks to the audience for their attention today.

Bri Colon:

And thank you, Dustin. It's great to hear, like you mentioned, some of that on-the-ground perspective, too, from Weis Markets. Perfect. We can go ahead and transition to our next slide. Thank you to Dustin again and all of our panelists for those insightful presentations. Before we transition to the Q&A period, I wanted to encourage everybody to download the additional resources handout. That will now be shared in the Zoom chat box. This handout contains a lot of the links already mentioned from our panelists and resources coming out of Better Buildings as well on this topic. We hope that you also find this useful. If you do have any follow-up questions related to any of these resources, please go ahead and reach out. We're happy to support as we can. Next slide.

Now we'll transition to our Q&A period. If you haven't already, please join us at [slido.com](https://www.slido.com) with that event code #DOE to submit and upvote questions. We'll pull up those questions now on the screen just to get to see the ones that are the most popular for our panelists to address. I'm seeing one of the first ones here, really

questioning is using potentially reclaimed refrigerant considered a good practice even with a higher GWP refrigerant? I know this isn't directed towards a particular speaker, so I'm curious if someone wants to maybe potentially tackle this one first. I see Danielle is unmuted.

Danielle Wright: Yeah, I can start with this. So I guess depending on what you mean by good practice or how you define good practice. If you're talking about in terms of the environmental impact, I mean technically it's still a high GWP refrigerant and so leaking that refrigerant is still going to be problematic. You know, it's not virgin so I guess there's that to consider. But in terms of good practice and sustainable for your business, the thing I would be thinking about is the price of that reclaimed refrigerant and the less supply there is and we see that demand is expected to continue to stay strong here as overtime we can expect that there'd be some economic pressures where reclaimed refrigerant prices would go up. So that could be a problem for your business and not be considered a good practice. So I guess there's different ways to look at it is what I would say.

Bri Colon: That's a great point. Thank you, Danielle. Kersey, is there something you'd want to add there?

Kersey Manliclic: I think, Bri, I'll just kind of add, you know, as with GreenChill and EPA has said in the past, we are kind of, you know, technology neutral. We're supportive of anything that gets to lower leaks and lower GWP refrigerants; but I do want to echo subsection H of the AIM Act, which again, directs EPA to kind of work towards kind of maximizing reclamation, minimizing the release of certain HFCs. And again, it guides us towards looking at and trying to increase opportunities for reclamation. So we actually kind of see that noted in the AIM Act.

Bri Colon: Helpful to note there, too. Thanks, Kersey. Great. Transitioning to the next question. I'd be curious probably honestly to hear from all folks on this one, to continue to make the case for natural refrigeration, would switching to natural refrigerants require more stringent safety practices. I'm curious to see, you know, Dustin's perspective, what's been happening in the field with that, as well as from others that have some of that broad perspective and interface with a lot of different partners in the field.

Dustin Herner: Yeah, absolutely. Like Danielle mentioned, CO2 systems operate at higher pressures. Because of that, there are similar but, yes, more stringent safety concerns. The processes that we have in place are just a little bit more robust, a little bit more of an

inspection process, a little bit more testing of leak detection but only because of the higher pressures. The types of safety and the way you need to approach the system is no different than a traditional refrigeration system, a traditional synthetic refrigerant system still operates near 300 or 400 PSI working pressure and sometimes higher in unfortunate circumstances. So CO2 is still in the same ballpark but, yeah, pressures are higher and a little more concern should be taken.

Danielle Wright:

The only thing I would add to that and looking at all the different natural refrigerants, so propane which is flammable and ammonia which is toxic, there are different safety standards, building codes that have been put in place to guide and make sure that those refrigerants can be used in a safe way. So each of those has those standards. Most recently, propane, where we saw an increase in the allowable charge limit, same thing with A2L refrigerants which are slightly flammable, not as flammable as propane. So we saw the safety standards, UL standards were updated as was ASHRAE and now building codes are being updated. So I would say, in terms of the codes and standards that guide those refrigerants, absolutely they are in place to make sure that there's safe use; and I don't think that changes anything in terms of the practices like Dustin mentioned in the field.

Bri Colon:

Great points. Thank you, Dustin and Danielle. I know there's a couple of questions about industrial applicability from folks in that sector and I can turn that over maybe to Dustin first to address there.

Dustin Herner:

Yeah. I actually neglected to touch on this in my section of the presentation. But we, as a grocer, have our own distribution facility and some of our own production facilities where we process our own milk, process some of our own meat, maintain our own fleet as well, and also have an ice cream production facility. And so through those processes, we have some industrial refrigeration systems. We've got some large ammonia systems in our fleet. And our industrial service technicians and our store service technicians perform pretty much the same process of leak detection, leak management, and the same sort of construction ideology.

So similar to the transition between safety of a synthetic refrigeration system or Danielle mentioned propane and some of those concerns, you will have some changes between the types but the best practices are often similar between eliminating potential leak points in construction, minimizing your charge size based on design and focusing on appropriate leak management and setting

that up. So industrial applications, food production facilities, large HVAC packaging, even some school and higher education chiller plants, all of these processes still kind of apply and are just as important.

Bri Colon:

Wonderful. Thank you, Dustin, and great to hear too about the variety of different systems, too, there are Weis not only necessarily the grocery store applicability but with those distribution centers as well. This is also maybe a good point to plug the Better Plants Program has an ammonia refrigeration in plant training program that could also apply for more of those industrial spaces and speaking to some of those elements that Dustin was sharing. So there's a lot of great resources, too, coming out of that training and a lot of those are recorded trainings and the resources are also on there with the Better Plants, specifically on something like industrial facilities. So definitely encourage folks to look into those. One has been held in the past. Another one will be upcoming, too, in the next month or so to refresh and also share emerging information on that topic. Great.

I'll jump down here to the third question here that's been upvoted on potentially having some additional clarifying information on the transition to those A2L refrigerants that were mentioned. If there's anything to expand on around the specific regulations that are driving this and potential timeline? I know this is a multi-part question here, but what exact applications that they're being targeted to whether it be residential, commercial, volume, et cetera? I don't know if this one maybe potentially for Kersey to start with. And Kersey, if this is something that you might not necessarily be able to speak to, happy to provide follow up too on this one.

Kersey Manliclic:

Yeah. Thanks, Bri. I think I may have responded to a question that's similar already in the chat but I will just echo I would encourage anyone to reach out to us if they have a clarifying question on this. And then I think what I'll do after this question is I'll put a link on the chat to the AIM Act website which, again, has all of kind of the currently proposed rulemaking that's on this. And then, again, if there's more questions, I'm happy to put folks in touch directly with the folks across the hall who are really on the policy side. But yeah, I think at least really there's a lot kind of going on with the AIM Act that's driving the regs and that's driving the timeline. It touches upon exactly those three topics, the residential, commercial, and so forth.

Bri Colon:

Wonderful. Thank you, Kersey, for sharing. I know Kersey has been going through a couple of those on Slido and adding in some replies there for folks. I know we are not going to be able to have time to get to all questions here. So we can end with just some closing thoughts here, but thank you everybody for submitting those questions and to our panelists too for answering the ones that we were able to get to. In regards to time here, I want to make sure that we get folks wrapped up here in a timely manner. So if we can go to the next slide.

Thank you, again, for everybody for being here, for our panelists for the insightful responses. This webinar, again, was part of our '22/2023 Better Buildings Webinar Series. As you can see, we have a great lineup of closing webinars to end this series and then we'll start up in our summer webinar series back in June. So please visit the Better Buildings Solution Center to learn more and register. Next slide.

Next up, we hope you join us on Tuesday, January 24, for the next in the series, "Make the Case for a Large Scale Energy Reduction Projects with ISO 50001." This webinar will be great to hear from Better Buildings partners to discuss how ISO certification garnered support and engagement from leadership to develop an organization-wide approach to energy data collection and efficiency improvements across multiple facilities. Next slide.

Next, we're pleased to announce that registration for the 2023 Better Buildings Better Plants Summit is now open. It will be held in the heart of Washington, D.C. on April 11-13. In addition to engaging in interactive sessions, attendees can look forward to plenty of opportunities to network with their fellow industry peers and experts. So please explore the session tracks and book your accommodations on the Better Buildings Solution Center. That link there is continuously updated with new information related to the summit. Next slide.

And with that, I'd like to thank again our panelists so much for taking the time to be here with us today. Please feel free to contact us with any additional questions if we couldn't get to yours in Slido for this Q&A period. I encourage folks, I like to say for consistency sake, we're hip here at the DOE. So if you'd like to follow us on our social media channels, the Better Buildings Initiative is present on LinkedIn and Twitter for our latest news. You can find our handles there on the left side of that slide. And then finally, you'll receive an email notice when today's recording and the slides and transcript are made available on our Better

Buildings Solution Center. I want to thank everybody again for joining, for our attendees. I hope everybody has a great rest of their day.

[End of Audio]

Additional Speaker Q&A:

Better Buildings does not endorse or recommend any product or technology provider. The answers in this document are solely the opinions of the speakers based on their professional knowledge and experience.

Additional Questions:

Audience Member: How did Weis achieve such a large reduction in electricity from 2018 to 2020?

Dustin Herner: We changed procurement strategies to a high blend of nuclear with emissions free energy credits from Constellation.

Audience Member: Dustin, Any recommendation on reliable leak detectors, how to calibrate those and what level of accuracy is good? Soap bubble is painful in the field and leaves lot of mess. thanks in advance.

Dustin Herner: We use the Bacharach models mentioned in the presentation, for pinpointing leaks the handheld models get you into the area of a leak but often times soap bubbles or physical evidence are still needed to find the exact source of small leaks. It helps to look for oil staining etc.

Audience Member: How are you tracking leakage rates? By volume of refrigerant purchased? Other?

Dustin Herner: We work with GreenChill methodologies and audit refrigerant by the pound every quarter. Each time refrigerant is added to an appliance it is tracked. whether added by in house tech or a service contractor.

Audience Member: What the challenges associated with deploying natural refrigerants right now for commercial food retail refrigeration systems (particularly propane and ammonia)?

Dustin Herner: Natural refrigerants pose similar challenges to any new technology. Its imperative to make sure you have qualified service technicians available and develop good education strategies. Our ammonia systems are only in our corporate production industrial applications. Propane for us is still limited to small self contained appliances but are treated similarly to other self contained cases.

Audience Member: Please expand the secondary glycol loops info, this may be a more durable solution as tech on outdoor units refrigerant change with advances?

Dustin Herner: Glycol secondary systems have been around for a while and while they are helpful in limiting charge size pose some challenges in being slightly more complex systems overall. However, refrigerant leaks can be contained to mechanical rooms. Any leaks on the sales floor are rare and only comprised of food safe glycol. We are seeing similar systems with pumped water loops in alternative natural designs with propane as the primary gas.

For additional questions please see speaker contact information below:

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Additional Resources

Learn more about the topics discussed on the webinar by visiting the resources below.

Better Buildings Resources

- Supporting the Use of Natural Refrigerants [Resource Page](#)
- [The Advanced Energy Design Guide](#) for Grocery Stores
- [Low Carbon Technology Strategies](#) for Supermarkets

Explore more resources on the [Better Buildings Solution Center](#)

Other Resources

- [HFC Policies & Refrigerant Regulations](#) By State
- The [Refrigerant Transition Hub](#)
- [Sign Up](#) for Updates from NASRC
- Weis Markets [Sustainability Page](#)

Up Next in the 2022-2023 Better Buildings Webinar Series

Make the Case for Large-Scale Energy Reduction Projects with ISO 50001
Tuesday, January 24th from 11am – 12pm ET

Better Buildings partners discuss how ISO certification garnered support and engagement from leadership to develop an organization-wide approach to energy data collection and efficiency improvements across multiple facilities.

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