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# REEF Presents: “Refrigerant Recovery – The Critical Next Step” Webinar - Transcripción

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**Zoe Dawson:** Um my name is um Zoe Dolson. the interm CEO of Reef. And just a couple of quick housekeeping notes that I'm going to share with you before we dig into the details. And as people start to trickle in, this uh webinar is being recorded and it will be shared on Reef's website after the event. because we have so many people um joining us across um the across the United States like all audience members are going to be muted uh throughout this webinar um proceedings um but we are encouraging you all to submit questions using the Q&A feature. So if you're not familiar with the Google platform please go down to the bottom right corner of your Google screen and you'll see this little Q&A button there that you can click on. when you submit a question um please make sure that you indicate if that question is going to be for one of our specific uh presenters that we have today or if it's meant for um general response we do have the ability through our Q&A format as well to upvote questions as So well. if somebody's already asked a question that you want to have answered as well, please upvote it so that we uh we can make sure that that gets brought to the top of our attention and you know ultimately addressed by one of our presenters. The goal today is to try and leave um at least 10 minutes towards the end of our conversation hour um to try and get through as many of questions as we possibly can.

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**Zoe Dawson:** Um so we really do uh appreciate the type of robust engagement that you all give us. So, please drop down those questions again for those joining right now. Make sure you make a note to the presenters if it's specific to that or to anybody uh generally in the topic. So, for those that just joined cuz it now looks like we've got a roughly around 10 more. Again, a quick reminder. I'm uh Zoe Dawson. I'm honored to

serve as the interim CEO at Reef. That's the refrigerant emissions elimination forum and I'm going to be hosting today's webinar. My goal is to actually try and talk as little as possible because we have an outstanding panel of experts from across the refrigerant industry that are joining us today to talk about the critical importance of recovery and how each of them is actually working through their organizations to strengthen um recovery practices from whether it's like addressing data gaps or improving reporting enforcement and most importantly I think you know for everybody listening here this is about generating value creating a value stream amongst all the different service providers, users and others. Um, the purpose really for everybody that's joining here today is to connect you with these champions um and to give you as much informations that you didn't already have around um recovery of what these key players are looking to do and what they're looking specifically do to help advance not just recovery but destruction and reclamation.

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**Zoe Dawson:** Um, and hopefully because the name of Reeves game is really education and inspiration, we're hoping that this conversation is going to inspire you all to take action and to ask some questions. Um, so quick note though, why should we all care about refrigerants? Why does Reef care about refrigerants? If you are new to the topic of refrigerants and this is your first call that you've ever um engaged in, quicker note on who Reef is. We are a non-profit uh collaboration. Um we are organised and dedicated to addressing the lack of solutions to eliminate refrigerant emissions um relative to HVAC heating, ventilation and cooling equipment through education, advocacy and market transformation. We work with a whole host of different partners um but specifically we work with corporation and real estate firms that are looking to actually address refrigerant emissions because it falls underneath their scope one emissions through better life cycle refrigerant management. That's LRM. It's an acronym that gets thrown out a lot by us and equally to push uh for addressing emissions by uh creating market demand for more innovative climate friendly heating and cooling solutions. And the reason that we do this is because refrigerants are currently invisible and we need to make them visible to the climate conversation because they are one of the most powerful and overlooked drivers of climate change. And they are everywhere. They keep your ice cream cool.

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**Zoe Dawson:** They keep your building nice and comfortable to work within. Um, and they are also in a lot of our heat pumps which are being deployed very necessarily. The challenge is um that they are superpollutants and HFCs and legacy refrigerants that you might hear the CFCs, the HCFCs, the things that created the Ozone hole, they have a global warming potential that is many thousands of times greater than CO2. And while most refrigerants are harmless when they're in pieces of equipment, um they leak and equally when they um at the end of a pieces of equipment retirement um they leak even more because unfortunately most refrigerant emissions actually occur at the end of life and equipment and if left under recovered obviously they're going to contribute massively to global warming. I think one interesting comparison for folks on the line is roughly 1 pound of leaked refrigerant of our current HFCs is the same as you driving your car a couple of thousand miles. So that just gives you a sense of how you know devastating these refrigerant emissions can be. Right now, in terms of why this is such an important conversation to be having, EPA reports that only between 2 and 5% of refrigerants are actually known to be recovered at the end of equipment life across the United States, which means we need to do more. And we need to do more not only because this is one of the most cost effective immediate and overlooked climate solutions today but we need to do more because we actually need to enable refrigerants to be reclaimed reused and safely because if we don't recover we cannot meet the growing demand for reclaimed HFCs from heat pumps and other cooling systems which have been phased down underneath the ACT like existing installed equipment needs recovered refrigerant to be

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**Zoe Dawson:** turned into reclaim refrigerants that are no longer being produced period. We also need to do significant amounts of recovery because we need it to actually hit our decarbonization goals. We need to do it because we need to comply with regulations and we need to recover because without recovery we functionally cannot manage our refrigerants in a life cycle manner. The chain simply breaks down. So on that note, I am glad to say that we have a couple of people here to talk about how they can save us or how they can help save recovery. And first up and probably appropriately named is Adam who's the co-founder and president from FM hero um which is a refrigerant tracking and management solution provider that um I'm very happy to say because I've had a sneak beat behind this is certainly going to be making great strides

to make everyone's job a little bit easier and he's going to be sharing some insights on exactly um what he does. Adam, over to

**Adam Dykstra:** Thanks, uh, Jamie, and the whole reef team. Thank you all for joining us today, too. Uh it's it's a pleasure to be here and we're excited to to partner up with Reef in uh in the goal of today's call, which is figuring out how to increase recovery rates and uh get more refrigerant back in the supply chain.

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**Adam Dykstra:** So if you all would imagine with me for just a minute, imagine if every ounce of refrigerant and every molecule of harmful gas had a digital fingerprint. one that let us trace where it came from, who handled it, where it ended up. What if the tools to eliminate emissions weren't buried in paperwork or legacy systems, but were accessible and intuitive as the phones in our pockets. Well, that's the vision that we've got over at FM Hero. My name is Adam Diker as always said I'm one of the co-founders of FM Hero and we're really trying to build the connective tissue between people, data, and the environment. In an effort to eliminate refrigerant emissions, we believe that FM hero is uh not just a participant but a multiplier, a scalable digital platform that empowers text to protect companies uh give regulators the confidence that the tools and data are available so that they can actually act boldly. Today I'm going to walk you through how quality refrigerant management platforms like FM Hero can transform the recovery refrigerant recovery process from a fragmented and manual process into a digitally streamlined compliant and frankly a monetizable operation and that's and why that's so critical if we want to see systemic change. As though and so clearly qualified, the real problem we're facing is that HFCs and other high GWP refrigerants are some of the most potent climate pollutants.

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**Adam Dykstra:** And yet in our industry often recovery is ignored and refrigerants are simply just vented. And even when recovery is performed, the document documentation stream is manual. It's it's unverified. It's inconsistent. In fact, recently I shared a story on LinkedIn. Uh I was going with some of my friends to their school to pick up their kid and there's parents and there's children everywhere and one of the major contractors in the area had three split systems sitting outside while people are walking within feet of these

units and they're venting them openly. Um they throttled it back maybe so it wouldn't be quite so loud. I'm not not certain why. They were throttling it back but because they did that it took even longer to event uh roughly about as long as it would have taken to recover. So, and I have a history of recovery, so I can speak confidently that they definitely were taking their sweet time, but it was open venting and as frustrating as that is, it's a really all too common practice. Um, the problem is these same people will be contractors will be the ones complaining in a few short years when they can't get fortune. They don't have service gas available.

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**Adam Dykstra:** So, the key here is that recovery is the first step in the process. then it goes to reclaim and then it becomes available again as service gas supply line. It's really that simple and recovery is the start of the process. So I mean from a contractor's perspective lost refrigerant is really lost money. It's lost it's lost revenue stream and ultimately it's also regulatory risk. When recovery is completed usually the paperwork is terrible the it's fragmented. It leads to poor visibility. They don't have good record keeping at the end and really their current systems while they're good at CRMs, ERPs, and accounting software, they're not designed nor are they capable of being good refrigerant tracking programs. So the next question you have to say is, "Well, okay, so where is all the gas at? What can we do about it? And who's really responsible?" And it only takes a quick look at a satellite image to see that the vast majority of refrigerants are going to be in all those tiny houses and all those uh residential buildings all over the city. all over any city. It's in systems that are under 15 pounds.

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**Adam Dykstra:** You know that 3 to 15 pound mark. And so really that's where the biggest difference can be made is figuring out how to encourage and increase accountability at the small unit level. And frankly to who is you? Uh if you touch refrigerant, if you buy it, if you install it, if you recover it, if you reclaim it, if you distribute it, you're responsible for those movements. You're responsible for that refrigerant. And so, you know, simply that begs the question, are you documenting those movements? Do you have a record of those movements and are you able to be uh able to show that you're accountable for those movements? So a little bit about Hero. Um we are a

scalable field platform. The idea that we we've set out to conquer is that we want to be a digital infrastructure on those front lines. So it's an app-based tool that's for techs in the field in the HVAC refrigeration space. And really we went with a field first mentality. We saw over years of experience in the marketplace. We been I've been in the marketplace since the mid90s uh that the real issue with data is in the field capturing good data in the field.

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**Adam Dykstra:** And so we said, look, if we're going to ask technicians to get good information, we need to make it simple. We need to make it quick. We make it need to make it intuitive and we need to make it follow their workflow. And so that was the start founding position for the FM hero platform. The system that we've built is scalable from that individual technician who can use the tool for free through mom and pop shops all the way up to enterprise level multinational organizations. Uh the one of the approaches that we've taken that's a little different than other software applications that are out there is we look at this and we say we need to make sure that the information that's that should be I'll call it public is available to other technicians. when I put refer into a cylinder or when I take it out of a unit that information should be available in anonymized way to the next person who interacts with that gas or that system. And so we've taken that approach to really uh ensure that there's a shared visibility and that there's a single source of truth. So that the one person who did the work now is passed through the chain from technician to contractor to equipment owner uh again to the reclaimer and then ultimately if if the the case arises to an auditor or to a regulator when demanded to do so.

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**Adam Dykstra:** So again, we're looking to find tools, create tools that enable policy grade documentation automatically instead of manual logs, paper logs, and incorrect documentation. So in our case, it's a digitally time stamped GPS tagged immutable log. Um and really again this is all about reducing the risk of fines or even the accusation of improper handling and giving that clean chain of custody and records throughout from a monetization perspective. Uh again the idea here is is that the contractor that the equipment owner can recapture um previously lost revenue that went out the back door

right so if you've got cylinders that tend to disappear out the back door or maybe the the vapor heels left in the in the unit in the cylinder and it ends up in the dumpster or as the say it's just let go into god's bottle um that's that's obviously a real problem and so we're designing a system where that those problems go way. One of the biggest complaints we hear in the field is that I bought 000 or I bought 100 PBS and I only could sell 90 of it. Where did the other 10 go or where did the other 100 PBS go? And frankly, that's sad. It's sad because they should know the answer and it's sad because the gas is gone.

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**Adam Dykstra:** And so really good tracking mechanisms, good systems and good tools can solve that problem. And not only is that a liability risk, but really that's lost revenue. Especially when you're talking about like a 454B nowadays, \$65 Sol a pound. You don't want to lose uh 20% of your stock out the back door or into the atmosphere. from a facility owner's perspective uh having proven cost reductions in refrigerant usage because of tighter leak rates um better service practices and then ultimately uh that having that realtime service tracking where you're able to know what was done on your system in real time as opposed to waiting for an invoice 5 10 15 20 days later and your clock has already started uh on your leak loss reporting on your accedance and now you have only 10 days to get through the entire repair process and reverification process. So that's a big deal. And of course cleaner ESG and GHD reporting is a a paramount uh for a facility owner. When it comes to regulators

**Kirk Reimer:** Ok.

**Adam Dykstra:** uh really understanding and knowing that there's high integrity audit ready data uh that can inform policy at a high level where you can see more information and have access to that kind of information.

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**Adam Dykstra:** And again, we're not sharing out private information, but we're looking to help drive policy with informed data sets. So, as we're learning more about the aggregate data in the system, uh we can help help in that regard as well. So again, realtime insights without adding a reporting burden onto small businesses is a really big deal. We uh we have a digital, you know, our footprint rather. Our our footprint is an international coverage. We are in the US and Canada at this point and we're really

seeking in a poised for a global coverage. Uh we've decided to partner with Reef. We believe in the mission of Reef. We also Hudson's on the call. We have a strategic partnership with Hudson uh to try to bring our users their value in getting their used gas value back. And so I think those kinds of things really help encourage uh the recovery rates in the industry. So I'll finish with a quick call to action. Look, I mean to the industry we really need to do better. Uh we need to adopt new tools that reduce refrigerant uh loss and liability now before even more stringent mandates come arrive and come about. To the policy leaders, we need to support solutions that meet contractors where they are digitally and financially.

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**Adam Dykstra:** And then to all of us really collaboration is key and it only happens where data flows. So we need to work together on that. FM hero can be one of the ways that is a connective layer. And I'll just end with we don't want we don't just want to help people recover refrigerant. We want to help them recover control, recover profits, and recover trust in the system. That's what FM hero is all about. Thank

**Zoe Dawson:** Adam, thank you. And I'm just going to make a a quick apology for the lack of sinking. I was doing my best, but uh uh as we all work remotely, sometimes our computers lag. So, apologies for those trying to figure out why the screen was boxing back and forth. I will completely own that. But that I think is just an amazing example of just like some of the really important and necessary like data collection that really helps us understand what is going on on the ground in terms of like active recovery and what types of refrigerant have been recovered and where they are and just having that accountability you know of all of the fingerprints I think is just like such you know a valuable insight that can be leveraged by multiple different players and I think you know next up you know I'm going to be introducing Ray and after Ray Kirk from Hudson just to talk about like how that you know obviously becomes like a very important and you know valuable insight for them as well.

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**Zoe Dawson:** So next I'm going to just you know introduce Ray very quickly. Ray as it says on the slide here he is the partnership manager with trade waters. For those of you who aren't familiar with trade waters, there a certified B corporation that's actually



dedicated to removing um greenhouse gases, greenhouse gases and ozone depleting substances including refrigerants. So CFCs, HCFCs, um from circulation and permanent destroying So they're them. a destruction um facility and Ray is actually responsible for um implementing um the strategy of their partnership program specifically and helping to maintain many of those relationships and relationships you know with individuals and entities like Adam directly. So I'm going to be asking Ray to come on the come off mute and on the screen right now to walk us through some of the um things that trade waters have been doing and how they're actually helping to create a really valuable monetization of these GHDs for customers and others across the refrigerant landscape. Right. M.

**Raymond Rielsing:** Excellent. Uh Zoe, thank you so much and thank you for reminding me to come off mute because I certainly would have uh start talking with the mute on without that. Um good afternoon everyone. My name is Ray Reeling and I am with Trade Water. Zoe, can we go to the next slide?

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**Raymond Rielsing:** Um uh I think it's very appropriate that we are speaking at this webinar because effective refrigerant recovery is a real cornerstone of our work as carbon offset project developers and we really think that the carbon markets offer a place for the value of recovered refrigerant to be realized and an incentive for effective and professional recovery. So I'm going to talk a little bit about trade water uh the carbon markets in general and how refrigerant recovery fits into that. Um Joey, can I have the next slide please? Uh so Tradewater is a carbon offset project developer. Uh our main focus is on the destruction of ozone depleting substances. We do some work with capping um orphaned oil and gas wells for methane leaks. But I'm going to stick with uh ODS destruction today. So to do this work, we collect uh mostly refrigerant gases and mostly CFCs and HCFCs. We generally do this through purchasing the material when it's at the end of life. We collect it all at our warehouse in Chicago where it's aggregated, weighted and sampled. so we know what we're working with. We then destroy it uh at a hazardous material destruction facility. We have the work verified with a third party auditor.

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**Raymond Rieling:** And for all of this, we are awarded carbon offset credits. Uh we sell those carbon offset credits either in the voluntary carbon market to companies and individuals who are looking to meet a net zero goal or in the uh compliance carbon markets like in California and in Washington states. slide please so it's just a brief a brief overview of uh trade water and what we do and we consider ourselves a real leader in the carbon offset space we've had 99 projects credited with ACR American carbon registry and two with Vera um and just real quick I'm going to say the word project a lot I mean by project is a destruction event basically so every time we ship a big bunch of gas to be destroyed um that's what we call that a project and that's what gets uh verified and issued for crediting Uh of these 101 projects, we've developed them on four different continents. So we have a global reach. I focus mostly here United States, but we work all over the world. And to date, we've prevented over 10 million tons of CO<sub>2</sub>e from being uh emitted into the atmosphere. So we consider ourselves a real leader in the space and we're proud of the work that we do. Uh slide Zoe the reason that we are focused on um refrigerant gases and ODS in particular is because it's an enormous problem.

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**Raymond Rieling:** Uh Zoe shared some similar stats at the beginning of this but like she mentioned refrigerant gases have tremendous global war potential. R22 has a GWP of 1,800 so it's 1,800 times more potent than carbon dioxide. R12 has a global warming potential of 10,900. So leaking 1 PB of R22 has the same global warming effect as driving 2,000 miles in your standard car. Um Zoe, I'm glad you use the same stat we are on message here. Uh and 1 PB of R12 is even more of that. So that's why we take refrigerant acid so seriously and we're such advocates for destruction because you know leaking even one pound has a big impact. And so it's very important that we control these materials. Um each gas itself is very potent and the scale of the problem is tremendous. In 2020 MIT uh put out a report that there's there's 9 billion with a B metric tons of CO<sub>2</sub> that stand to be released just from existing ODS alone. So that's just CFCs and HCFCs. We're not even talking about HFCs.

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**Raymond Rieling:** Um and that's just for context. 9 billion metric tons of CO<sub>2</sub> is the equivalent to burning 1 trillion gallons of gasoline uh in terms of global warming effects. So there's a lot of these gases out there uh even though they have their production of them has been eliminated and phased down since the Montreal protocol there's still a lot floating around that stands to release into the atmosphere if they're not captured. So the projects that we look at and by project I mean kind of destruction events are mostly made up of these CFCs and HFCs. buy R11, R12, 113, 114, 500, 502, R22. Um, about 50% of what we purchase is R12, which people are sometimes surprised of because it's been phased out of production for so long, but we buy R12 every day. About 20% is R11

**Presentación de Zoe Dawson:** Iron

**Raymond Rieling:** and the remaining 30% is a mix of those other gases that we've talked about. uh slides please Zoe. So that's why we focus on ODS and the reason that we advocate for destruction so strongly is because it's a very critical solution in the refrigerant problem.

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**Raymond Rieling:** Like we've mentioned, the production of CFCs and HFCs are banned. HFCs are being phased out. But there's no requirements on the end of life for these materials other than a prohibition on intentional venting, which as Adam walked us through, many people don't even go through that. Uh so as a result of the way these regulations have been written, these gases, if they're not vented, are at best. They're either stockpiled in old rusty cylinders that will eventually leak through, or they're reused in HAX systems that at this point are quite old. If you're still running an R12 or an R2020 suit system, it's been around for some time. So, they have a high leak rate. Everything has a 100% leak rate over time. So, those 9 billion metric tons of CO<sub>2</sub> that I talk about are going to leak unless we break the cycle with destruction and capture them end of life and destroy them safely and compliantly and make sure they're never released into the atmosphere. So, that's a little bit about trade water, our work and how we approach this problem. Uh slide please.

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**Raymond Rieling:** That's kind of the supply side um of where refrigerant how we do the work. On the demand side like I said we sell these carbon offsets in the voluntary compliance markets as revenue for trade water to fund our work. What we find are that these ODS credits are highly rated uh fetch a good price and are highly desirable. On the screen is a is a quote from Kalex Global which is a um a rating agency. Think S&P or Moodies for financial assets but KX rates uh carbon offset credits. Of the projects that they rate A+ almost all of them are ODS substances projects. The other project types are things like forestry projects, um avoiding deforestation projects, landfill methane capture, those sorts of things. ODS projects are consistently rated to highest in terms of integrity and effectiveness. Um, we find they're highly desirable to be purchased in the market and we get a good price for them as well. So, not only is there a lot of supply of ODS to be destroyed in the carbon markets, there's a strong demands uh on the purchasing side for the credits that result from their destruction. Slide, please, Zoe. And where this comes into recovery is that recovery is a cornerstone of what we work of our work. A lot of what we do is built on effective recovery on the most basic level, and this is obvious but I think it better saying, if the material is not recovered, we can't destroy it.

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**Raymond Rieling:** If it's vented, that's into the atmosphere and unlike carbon dioxide, ODS cannot be recaptured or there's no technology on the horizon to recapture it from the atmosphere. So, it's gone and it's not eligible for destruction. Couple other things that are very why professional recovery is very important to our work. One, purity levels are important. Uh the methodologies we operate under kind of the rules of the game for developing ODS projects require that material be at a certain purity when it's destroyed at the destruction facility. So if we send a cylinder that's 50% or 12 and 50% junk it won't be eligible for the carbon markets. They'll say this doesn't look right. It doesn't work. And this is also important for the uh economics of a projects. If we send a cylinder that's 50% R12 50% junk, we still have to pay for the junk to be destroyed and the junk to be transported, but we're not awarded any revenue, any credits for that. So, it's very important for us that refrigerant is not only recovered, but it's recovered professionally in a way that it's maintained its purity level to at least a certain extent.

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**Raymond Rieling:** Um the last thing chain of custody like Adam mentions is a challenge for many uh many HVACex very important for us for material to be eligible in the carbon markets we have to track the chain of custody all the way back to where it came out of a chiller so that's things like we need the model and the serial number we need the 608 search from the technician who did the work we need a clean Bol to show that it was shipped within DOT regulations. So having professionals uh do the recovery work is a cornerstone of a successful ODS destruction project uh and is very important to us. Next slide please. Z and then my uh I'll kind of end with tying it all together and a call to action. Not only is recovery very important to destruction project developers like us we think we can be very important to recovery text as well. Like I mentioned at the top we buy most of this material. So we are happy to buy your CFCs and your HFCs from you. We're happy to buy it from a tech or an atrac company or a reclaimer. So we are a place we are a revenue stream for these companies and we're a place where recovered refrigerant can realize value. I think the carbon markets have a real important role to play in that and we only see that growing.

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**Raymond Rieling:** more as more CF CFCs and HCFCs become less important to existing equipment because more of those older systems are decommissioned the carbon markets can be a much more attractive place to put those gases cause there's less end users who are going to be blinding them on the resale market so we only see ODS becoming more attractive uh to the carbon markets as a place where you can get the most value for it. Secondly in the future we see HCFCs becoming eligible in these markets as well. So that's a whole new type of gas that will be available for destruction projects. Uh and finally as we reach our 2030 as we come into 2030 large public companies have net zero goals that are coming to and they're going to need quality offsets to meet those. So we see a a bright future for the demand side of the credits also. So to kind of wrap it all up uh important professional recovery is very important to a successful ODS projects and the carbon markets and ODS projects are a place where recovered gas can realize value and incentivize good recovery. Uh and we're happy to work with anybody who wants to do that. So Zoe, I think I hit my 10 minut mark. Uh thank you so much all for your attention and for including us in this webinar.

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**Zoe Dawson:** My goodness Ray, thank you so much and I think you did just wonderfully connect the dots between you know that chain of custody you know execution that R FM hero just discussed and also I think you know importantly elevated you know the importance of recognizing monetization of GHG not just like the compliance or the enforcement aspect of recovery there's a real there and you know drawing attention as you just did right to the fact that you know the ozone depleting substances you know that you specifically focus your, you know, your market, you know, efforts on and your engagement efforts on. Like there's a tremendous amount that we still need to do here collectively. So, just thank you for bringing everybody's attention that Ozone Deplet Substances are still in circulation. They have an immense impact and beneficial potential monetary value to you if you have the ability to capture it and obviously like pass it off to uh a destruction facility like trade waters. So next up and and Ray, thank you for sharing that. We will be sharing everybody's um contact information afterwards and I'm seeing the questions trickling in. Next up and to round everything out is uh K R from Hudson Technology. vice president of sales and for again those of you who aren't familiar with Hudson technologies they're one of a national major um refrigerant uh reclaimer um that actively operates in the market to um reclaim and provide back to service providers um refrigerants that have been um successfully recovered and uh brought back to the necessary purity levels to be reused um as a reclaimed substance like in your HBA equipment.

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**Zoe Dawson:** So the name of the game here is ensuring that we can continue to maintain you know our assets, our HVAC assets that are installed across all of our buildings and our homes. And Kurt, I'm going to let you speak through obviously to some of the things that Hudson is specifically doing to help address the supply demand issues in the reclaim market directly. M.

**Kirk Reimer:** Great. Well, Zoe, thanks for having me. It's an honor to be here. I think our sustainability missions are are directly aligned um as we we talk a little bit about, you know, what Hudson Technologies does, if you go to the next slide, we've we've been in the market since about 1990. We think we were one of the first people ever to pay for recovered refrigerants back in in 1990. Uh we've been doing it for a long time. We have a lot of proprietary technology and equipment for both uh reclamation and recovery of refrigerants. From a size perspective, as though we mentioned it, we are one of the

largest refrigerant reclaimers in the country. We're also a large reseller of refrigerants. So you know that the product that we do reclaim we make available for sale back on the aftermarket. From a quality perspective really important when you get into the chemicals industries and the reclamation side of the business.

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**Kirk Reimer:** We have our own AHRI 700 uh lab here so we can certify and qualify all the refusions that we reclaim. And then we do like to participate across our organizations in webinars like this one with Reef and with other uh policy advisors to really spread the mission of of our business which is really around that circularity of refrigerants and bringing them full circle back into the market. So as I mentioned, we do refrigerant sales. We do buy back. So we we pay money for recovered gas to anyone who out who is out there will recover the gas. Um reclamation is really the center and cornerstone of the Hudson business. We also have a service business that will actually go out and do recoveries primarily on large chiller systems. And then we also do service on those large chillers really on the refrigerant loop. And that's really cleaning the refrigerant side of a chiller loop to make it more efficient, to make it operate more efficiently. Um, instead of taking the gas out, throwing it away, and putting new gas in, we actually clean the gas that's in the unit and put it right back into the unit. So, that's um that's one of the values that we offer. Go to the next slide. All right, Zoe did a great job at explaining what life cycle refrigerant management is.

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**Kirk Reimer:** Um, so I don't need to go into a ton here, but really it's all about that comprehensive approach. focus on minimizing refrigerant emissions throughout their entire life cycle from production to disposal by implementing refrigerant life cycle management practices um such as minimizing leaks, proper recovery reclamation, recycling, um reporting and disposal and destruction um businesses really can reduce the greenhouse gas emissions and mitigate their overall environmental impact and that's something that's core to everything that we do. is really important for everything we do and it's important for for everyone that's that's uh really talking here today all the presenters. So if we go to the next slide, Zoe, this is a um a report that was published last year by Rocky Mountain Institute, some people will call it RMI. That really highlights

what the power of reclaim 410A does by reducing the amount of greenhouse gas as compared to using newly manufactured virgin refrigerant. So basically choosing to use reclaimed refrigerant for equipment for first fill or for servicing needs are deriving the benefit of a of a lower carbon footprint solution and taking steps to reduce the impact of refrigerations on the overall environment. And you can reduce that by up to 70% in this report. And if you want to go to the report, you can go to our website and find it here.

**00:50:02**

**Kirk Reimer:** There's also the QR code if you want to um download the report and read it. There's a lot of great statistics in the report that uh that RMI was able to put together. Go to the next slide. Um there's a lot of terms on the reclamation side of the business and there's three of them. If you go back one slide, I jump too far. Um, there's recovery, reclamation, and recycling. One in between. Or maybe you went the other way. I'll I'll hit this one. That's fine. We're good.

**Zoe Dawson:** Sorry. Sticky fingers.

**Kirk Reimer:** There you go. That's ok. Um, a lot of people talk about reclaim refrigerant or recovered refrigerant. think it's all the same thing. But just so when we're talking about what these terms are, I think it's important for everyone to understand recovered refrigerant and and what everyone's talking about. That's taking the refrigerant out of an existing unit and um capturing it. So anything that we're asking contractors to do is to go out and recover refrigerants. There's also a lot of people out there that will recycle refrigerant.

**00:51:12**

**Kirk Reimer:** couple industries, automotive and really the um grocery store industry will recycle refrigerant. So take it out of one system and put it into another. You don't really see that in the HVAC space as much. Um and that's where reclamation comes in. So where Hudson technology lives is we'll take that recovered refrigerant and we'll actually reclaim it, bring it back to that AHRI 700 standard and make it available for sale again. Now you go the next slide. So talk a little bit about our reclamation process. Um we try to make this as easy and simple as possible for whether it's a a wholesaler who's out there who's collecting refrigerants or a contractor who's recovering refrigerants. We try to make it very simple for them to um get value for their refrigerant. So, we don't charge



any fees. Um, if you recover refrigerant and you send it back to us, we will never charge you a fee for mixed gas or bad gas or gas with oil or particulate in it. There should be no cost to you to send it back to us. We'll basically pay the freight to ship it back to us and then we'll send you back fresh recovery cylinders for the next time you recover um gas in your marketplace.

**00:52:26**

**Kirk Reimer:** You're going to get back a fresh, clean, and hydrostatically tested cylinder each time you do this from our factory. And we can usually turn this around within about 10 days from the time we receive the refrigerant to the time that you get your payment for your refrigerant. So, we try to keep it really, really simple and it really is about getting that value back to you for recovering refrigerant. Go to next slide. All right, a couple of things really about, you know, what are the keys to growing recovered refrigerant out there? How we going to get more people to do it? Zo mentioned it earlier, we're in the single digits for the amount of refrigerant that's available to be recovered that's actually being recovered, which is really sad. The US is one of the worst countries in the world in this practice. We we just have to do better. So I think um webinars like this, associations like Reef to bring that awareness to the contractor and training them on on what are those that best practice and the tools and I'll talk a little bit about that in a minute. Um but I think the kind of the biggest thing is really turning what's always been a cost center for the contractor into a profit center and really effective um reclamation or recovery for the contractor.

**00:53:44**

**Kirk Reimer:** It should be a profit center. shouldn't cost them anything extra to recover their refrigerant and they should be able to make money from it. So, it it's really about changing that mindset down to the contractor and the technician that's out there in the field. Okay, go to my next and final slide. I'll talk just real briefly about some of the tools. And there's been a lot of change in the tools and equipment that are out in the industry right now. Um, with all tools, you do actually get what you pay for. So, um, buying good tools does matter. You want it to work well, but you really need to match the type of tool to the type of recovery that you're going to be doing. So, cuz there's all different sizes, shapes, durability, availability options for for what you want. So, if you want to recover a

liquid, a vapor or a combination of both, you have to match that recovery machine really to the um the product that you're going to do. There's different size motors that also determine the ability and how fast you can actually recover the refrigerant. Um, and some of the newer ones are out there, the they're not crazy expensive.

**00:54:50**

**Kirk Reimer:** They used to be very expensive, but now they're they're getting to be more much more economical. And there's a lot of competitors in this space which are bringing those price points down and making it easier for contractors to get into the recovery business. Um, and that that's really it. Um, if anyone wants more information on recovery equipment, please reach out to Hudson Technology. We love to train you on it, but I'd say go to any of your wholesalers out there today. They're all stocking recovery equipment. There's there is new stuff out there and as as the refrigerants change, the equipment changes and gets better for the specific refrigerant that's in the market today. And that's it for Bien.

**Zoe Dawson:** and just make sure I unmute myself as well. So, thank you so much, Cut. It's it is going to be time for Q&A right now. that I before we jump into the questions that I've been seeing pop up, I did just want to, you know, like offer a quick, you know, question directly to you because obviously like where you rounded it us out was kind of coming back again into like how we can effectively ensure that recovered refrigerants um you know is done easily at value with value to the field technician, you know, but where we left off is then how do we make sure that there's a market demand for reclaimed refrigerant?

**00:56:07**

**Zoe Dawson:** So I'm just curious buuse like as we speak around this entire space like understanding like how to address some of the misconceptions right like how hard is it you know we talked about with uh uh with uh Adam at the beginning like it shouldn't be that hard to recover it shouldn't be that hard to make money off of it to Raymond's point like KK like it shouldn't be that hard to level set misconceptions around like is Vertin or reclaimed better and I would just love to pose that to you while I start looking through the other questions and and see what thoughts you have or how Hudson's trying to address that question of uh reclaimed purity versus a virgin and how we

**Kirk Reimer:** Yeah.

**Zoe Dawson:** address that to help really drive recovery even more. Ah.

**Kirk Reimer:** Yeah. It's it's a great question and and thanks for asking. I will tell you there's, you know, one a couple of the misconceptions are that reclaimed refrigerant is going to be much cheaper. It's going to be a value in the marketplace because it's used right it's recycled refrigerant and that's not necessarily the case. We do spend a lot of time and effort to bring that refrigerant back to the standard, the AHRI 700 standard. And the one thing about refrigerant that makes it really one of the harmful things the environment doesn't degrade over time.

**00:57:16**

**Kirk Reimer:** So once you clean the refrigerant and bring it back to that standard, there's no difference between reclaimed refrigerant and virgin refrigerant that comes uh from the manufacturers. So it doesn't really there's no really no major difference. Now in some of the markets um there is a there's a difference you go to California there's a requirement to use reclaimed refrigerant. You're starting to see a lot of the states now enact laws that are requiring re the use of reclaimed refrigerant as a as a as a use case. But from a from a use perspective it's it's really the same as buying virgin refrigerant. There's no difference.

**Zoe Dawson:** Yeah, thanks for sharing that. So for everybody else, I'm starting to look at some of these questions that have been um upvoting. reminder for everybody. If you want to know how to ask a question, go to the bottom right hand corner of your screen and click on the Q&A button and you can um upvote questions that are already in there. But I'm going to start with one that was actually um posed and has been upvoted a couple of times, Adam to you. which talks about like actually to kind of like tying together some of these compliance questions right at the state level is uh will FM Hero share data um with regulators and enforcement agencies um and or are user service records totally private and protected

**00:58:36**

**Adam Dykstra:** Yeah. So I think the key here is aggregated data doesn't that would that would and could be shared. Um and we again we would be pro doing that. We look to support the to look to support the regulatory agencies and having informed data for

making decisions and policy suggestions and so forth. Uh that that's anonymized in the fact that aggregated data. So how much uh how old are systems and leak rates as they age things like that that we that we can grab because we have users working on systems and often starting ages and so on. Um that that doesn't mean anything to the technician who did it. It's related to the fact that this was done and we have this data about a system. Uh as far as anonymized records, we the user decides what's shared and what's not. So if they're on a team, we have a different kind of structure here. If they're an individual user, then they can see everything that they've done. Um but anyone else would just see that something was done on that date and not who did it. And they would be able to see what was done. For example, a recovery was performed on this unit, but we don't know who did it.

**00:59:39**

**Adam Dykstra:** Nobody else would know who who did it, for example. Uh but if they're on a team then their team could see that information. If they're servicing a piece of equipment that is owned and managed by a client of ours, then the client who owns the equipment, who's authorizing the service can see that information. So the documentation stream is carried forward and through um where it where the the parties are in agreement, right? Where it's where it's designed to work together and the data is automatically unanonymized at any other point of contact. So that's kind of the gist of how we've structured it. Um I can go in more detail if there's a more specific question.

**Zoe Dawson:** Yeah. No, I think that was great, Adam. And you know the way that we've talked about it in the past as well. I mean I think for those that haven't uh been aware of FM here before I certainly encourage you to check out the QR code that Adam shared when we share the slides around but you know this is really is a technicians tool to help them do their job faster and easier and to do the reporting easier. Um it's it's not there to do functional reportouts underneath any of the state R&Ps.

**01:00:45**

**Zoe Dawson:** It can certainly be used in that matter. But I almost see this more as a valuable insight tool for any state that really wants to have aggregated data to understand what actually is the level of refrigerant that has been recovered at them. So that's that's kind of like where

**Adam Dykstra:** Yep.

**Zoe Dawson:** I see the value being of like how much really is floating around in our HFC banks you know versus you know what actually is ending up being uh vented to the atmosphere. So um next one that uh actually this is a this is a great one uh um directly for uh for trade autos and for ray. So um if you could provide some insight into what kind of destruction technology are you using I'm assuming this is like is it a kill like how are you actually destroying these ODS?

**Raymond Rieling:** Uh, absolutely. We destroy the ODS through incineration. Uh I'll preface this with I'm not a chemist by training so please don't push too hard on it. Um but we use two main incineration techniques. One is a rotary kiln incinerator and the other is a plasma arc incinerator which are two ways of superheating the refrigerants uh to a point where their molecules break down and their global potential is effectively rendered nerds. Um so there's a couple notes on that.

**01:02:00**

**Raymond Rieling:** In the methodologies, we take a haircut on the amount of offsets that we receive to account for project-based emissions. So the energy necessary to incinerate the refrigerant is taken into account and how much um uh carbon oxides we receive at the back ends. And then uh the last point is the um the emission the emissions of the incineration process are relatively negligible.

**Zoe Dawson:** Amen.

**Raymond Rieling:** Um it's a little bit of ash uh a little bit of um acid salts that are washed out in the process and neutralized and then a little bit of carbon dioxide which as we talked about is much less potent than these refrigerant gases.

**Zoe Dawson:** Yeah, that's actually really that's really interesting but there's a lot of conversation I'm sure of people who are on the phone here too when they're trying to understand the full GH of refrigerant life cycle including that um energy you know as well as like additional emissions produced at end of refrigerant destruction is is certainly something that's useful to consider there. Um the the next question that comes up here I'm going to I'm assuming that this is going to be aimed at Kirk which is kind of talking a little bit about you know some of the complexities of when you receive gas that's been recovered. Could you give a rough estimate, you know, of all of the gases that are received, like how much can be reclaimed versus how much of it has to potentially be sent off for destruction.

01:03:25

**Zoe Dawson:** So you know this is sort of digging into can you functionally reclaim um mixed gases uh cylinders that come in with mixed gases and a second sort of like lead on from that question is are you seeing an increase in the number of blended um HFCs that are coming in and how does that impact kind of the complexity you know and the process of of reclaiming them back to a purity level for resale on the market.

**Kirk Reimer:** Yeah, first of all, yes, we do accept mixed refrigerants back today. Um, and we'll pay back to the contractor for mixed refrigerants. So, we typically pay on a sliding scale. So, for the most pure refrigerants, you get the highest payout to the more it's mixed. So, when we talked a little bit about training, that's why training is important. So contractors understand when they do mix refrigerants they get less value for it. So the better practice they can get for keeping their refrigerant from being mixed into one jug or having a separate jug for each type of uh refrigerant they're reclaiming that that is important. However, um we can separate still separate that refrigerant. So the the more product it gets mixed with the more difficult it is. Um and and the more difficult it is to reclaim that refrigerant. But that like I said that's one of the technologies that we are very good at is separating refrigerant.

01:04:46

**Kirk Reimer:** So we can bring them back down to their um initial um refrigerant stages and and separate them out. Um it it

**Zoe Dawson:** Yeah.

**Kirk Reimer:** requires more work the more different types of refrigerant that are in it. Um which is why we we pay a little bit less. For those that do get mixed with things that we can't separate, we do run destruction programs as well. Uh we don't actually do the destruction. We work with someone like a trade water for example that would actually go and do the destruction for us. Um we do carbon offset programs as well um if if end users have the documentation but more often than not we get back cylinders that don't have documentation or on the way that we get back a lot of R12 and R11 today is in product cylinders that someone had in their garage and they just want to they don't need it anymore cuuse there's no use for it. So in those instances you can't really do a carbon project with those.

**Zoe Dawson:** Señor

**Kirk Reimer:** So there's and there are still a lot of end users out there who have R12, R500, R11 systems that um that are built systems or are in in the basement of a higher

rise and it's very difficult for them to replace it and they're going to use that for as long as they can.

**01:05:55**

**Kirk Reimer:** So that's why the you know this the circularity of these refrigerant the the recycling and reclamation is really important for those contractors. And I think as as Adam mentioned it's going to be super important for 410A as we get out in the lifespan here as the AAC impact starts to you start to see a bigger impact of that like 208.

**Zoe Dawson:** Yeah, for sure. And I think, you know, this next question that's been uh outvoted a number of times here kind of actually speaks to some of the things that we've been talking collectively about, you know, with the three of you and also underneath reef, which is like how do we functionally help scale, you know, recovery, how do we help scale LRM, life cycle refrigerant management? And so this question is kind of like really trying to like pose like for all of us um and for you specifically like you know what are some of the initiatives and or programs that you would see helping to boost recovery effort and this uh question you know specifically called out EPR so that's extended producer responsibility you know bills but I would equally put into that you know some of the recovery or use of reclamation requirements that we're seeing coming up in states such as California, New York. So just curious of you know where you see policy instruments and or other initiatives playing an important role in addressing um the amount that is recovered to try and get from that 2 to 5% here to what we're seeing in other countries like Japan where it's like 40. So what should we be doing?

**01:07:25**

**Zoe Dawson:** Who wants to go first with that? since you were

**Raymond Rielsing:** Ha.

**Kirk Reimer:** Yeah, sure. I'll I'll I'll jump in here. I I think a lot of the you know the the EPRs and the stuff that we're seeing within some of the states is having an impact. You know, in California there's still there's a lot of talk and a lot of discussion around the impact of reclamation. I had four questions yesterday just on what's going to happen to 410A in in the state of California. we going to have enough to um enough 41A to service this market if it goes and it's and I would expect it's going to go beyond California, right? You're seeing

Washington talk about it. New York rolled out their program last year and you know for all the challenges it had it did bring a lot of focus to the importance of reclamation and the really the requirements of having reclaimed refrigerant in the marketplace. So, I do think the more of these that roll out, the more conversations we're going to have um about that. We want to want to make sure that we we highlight those as we as we go forward

**Zoe Dawson:** And Adam, maybe I'll ask you to jump in cuuse we were talking specifically about EPRs the other day too.

**01:08:28**

**Zoe Dawson:** So what are your reflections on the EPRs or or other instruments that could help elevate

**Adam Dykstra:** Yeah,

**Zoe Dawson:** breaking

**Adam Dykstra:** I certainly

**Zoe Dawson:** awareness?

**Adam Dykstra:** I certainly think the EPR concept is is would be an effective tool. Um, and I think you know we're getting to the point as a as an industry say from a hero perspective, little pad on the back or self-couragement but you know having tools like that or that where you can track all the way from you know birth to death right the entire chain of custody is a big deal for that and making that practical but frankly I mean as an industry we have responsibility to it's not all the regulators writing new rules it's things like what reef is doing and partnering up with the organizations like this partnering up with uh groups like ESCO and training technicians and best practices. Um, you know, our in our world, we're we're giving away a free app. In Hudson's world, it's we're not going to charge you for mix. If you even if your stuff is terrible, we'll take it back. We'll handle it. You know, that's that's a uh a that's not just a financially motivated business decision, right?

**01:09:28**

**Adam Dykstra:** For them, that's a that's a means by the benefiting the marketplace. Obviously, they want good referant. They don't want the mix back. I mean, they, you know, if they have to choose, they take it all back perfectly pure. Um, and that's true of of



any of the reclaimers. But I so I think there's it's not just on the regulators. I think the rest of us need to continue to step up our game. It's doing webinars like this. So I do think the the regulators have a a significant role in the process, but I also, you know, want to encourage the people who are on this call to get engaged in organizations like Grief and get engaged with other educational bodies and getting those technicians as they're first coming into the field to be to have better practices. they're not venting the unit other side and so that they're actually sending back recovered refrigerant to the reclamation process or they're capturing that 12 and sending it over to Ray and Trade Water so that they can destroy it and not have it the atmosphere at 10,000 times GWP, right? Um so I think there's we all playart.

**01:10:22**

**Zoe Dawson:** I think that's very well said. It is a multilayered like multifaceted like problem that we will need to to be engaging with it. And Ray, I'm going to let you have the last say here because I think this pair is nicely just talking about, you know, what type of typical actors do we actually need to engage here? And I'm curious like if you want to just answer that question and tag on if you have any examples of how you have or how you would like to be working more closely with public sector organizations, you know, underneath their procurement requirements, you know, and or with their teams to make sure that we're actually getting rid of and destroying those uh those ODS. M.

**Raymond Rieling:** with how we can work with public sector uh bodies. I think is a great question. One thing I think that one thing that would make it relatively easy is by working with trade water unless you're buying our offsets which both most public sectors are not you're not necessarily procuring something from us. Generally we were buying refrigerant from you. So that makes the transaction somewhat easier. You know we don't you don't have to it's not like you're buying something else to go out to a bunch of bid. It's hey we have some R22 trade water will buy it from us.

**01:11:27**

**Raymond Rieling:** So hopefully that sets up the transaction to be a little bit easier from a bureaucratic standpoint. I think a lot of public set bodies are important because they control an enormous physical footprint. Right? The city of Austin, the city of New York, the state of Virginia have a lot of buildings with a lot of refrigerant and in many cases

public sector buildings are older buildings which will have might still be running an R11 chiller, might still have R22 rooftop units. So, public sector is a great place to for us to look because they they often have the kind of refrigerants that we are looking for because many times their building stock and equipment stock is a little bit older. The last thing I'll say is public sector uh entities like states and cities can also um influence their constituents, right? So they can encourage their constituents to have uh community turn days where hey you have R12 in your shed from the uh AC on your old Mustang bring it into a community turn day uh and we can source refrigerant through that ways. So there's just some of the ways that we work with public sector bodies uh currently do and would like to do more of in the future.

**Zoe Dawson:** That is a perfect way I think to end you know our call here today. Um you know everybody said this and I promise I didn't prime them at all but you know like get involved with us you know like Reef is really trying to elevate you know the conversation around the importance of addressing refrigerants in multiple different ways.

**01:12:49**

**Zoe Dawson:** This is just one example of how we seek to do that and to bring really the experts forward to explain what they do in the space and how that relates to you. You know, I'll just point, you know, Ray was talking about public sectors like we all have a role to play here. Whether it's the heat pump that you have at home that is old and leaking or you're looking to replace to the school that you're watching a technician vent refrigerants from to working, you know, across the city government structure. Like we can all start asking just the simple question, how are we managing refrigerants?

**Kirk Reimer:** Ah.

**Zoe Dawson:** You know, are you aware of you know what our policy is around active recovery? It is required by law I said like leaking refrigerants it's illegal but we're not doing enough to help make sure that it can be managed effectively easily and with added value to all of the players across um across that ecosystem. So please reach out to us, get in touch. Um, thank you so much for joining today. I hope this conversation was interesting and insightful to all of you as it was for me. And a huge thanks again to Ray Kirk and Adam for joining us um on this journey. And we're looking forward to bring forward many more important uh resources and pieces of information for everybody on this topic as we continue to bring in more partners uh around the conversation of active recovery. So, thanks so much. Have a great rest of your day.