

*Hannah Debelius:* All right, hello and welcome to day two of the 2021 Better Buildings Better Plants Summit. We're so glad to have you be here with us today. Next slide.

You're in the right place if you are looking to learn more about the greatest hits from DOE's waste reduction pilot. We've got some really wonderful speakers today in a rapid fire session. But before we get started, I do want to go over just a couple of housekeeping items.

The first is that this session will be recorded and archived on the Better Buildings Solution Center, so you'll be able to check out this recording in just a couple of weeks and also click on any links on the slides that you see during the session today.

Additionally you've probably noticed that you all are in listen only mode which means you can't unmute yourself. However, if you have any audio or visual issues or technology issues that we can help with while you're in the session, you can go ahead and chat us using the chat function in Zoom which should be on the bottom right side of your screen. Next slide please.

I'll be your moderator today my name is Hannah Debelius and I'm a fellow in the building technologies office in the Department of Energy, and I have the wonderful privilege of working with our Better Buildings Program, with our commercial real estate and higher education sector, and also in partnership with the advanced manufacturing office for the waste reduction pilot. Next slide please.

We have got an action-packed session for you all today. We're going to start with some program updates to let you know what the waste reduction pilot has been up to in year two of this effort. And then we have four wonderful speakers. They're gonna go through four different topic areas each covering the things that we've been hearing about and the things that our partners are most interested in around waste reduction.

We're gonna also be engaging you all through some polls that you can that you can give us some feedback and our speakers can learn a little bit more about who we've got in the audience today and there'll be plenty of time for Q&A at the end, so you can also ask our waste experts on the line. Next slide please.

Thanks. So we will be using an engagement platform today that's called Slido. So, to access this platform you're going to want to

open either your mobile device or a new browser. And you're going to go to slido.com. Then you're going to enter the event code, DOE. There's a little join button, so you'll join it and then here's the important part, which is from the drop down menu, you want to choose the name of our session, which is again Greatest Hits from the DOE Waste Reduction Pilot.

So right now, again, you should open up either your mobile device or another browser go to slido.com with the event code DOE. You're going to join and then choose our session from the drop-down which is Greatest Hits from the DOE Waste Reduction Pilot, excuse me, the DOE Waste Pilot.

So, with that we're going to go ahead and launch our first poll. So I hope that, again, you are joining for this because this is where we can see more engagement.

So we'll start out with an easy question for you which is just, what sector are you from? All right industrial manufacturing coming up strong and commercial real estate, which is great, government, multi-family, higher ed. All right. Oh yeah, but we've got all these sectors represented which is wonderful. K-12, no data centers out there? Come on, guys. All right, excellent. Well this is actually pretty representative also of our waste pilot and our speakers today are from different sectors, so I think that there will be something for everybody.

We can go to the next poll please.

We are wondering if your organization currently has a waste focused goal.

For the waste reduction pilot for Better Buildings, it was a condition to join that they either joined with a goal or set one while they're with us so we are curious to know if attendees on the line today have any waste focused goals.

Okay, a lot of people don't, but they're considering one which is wonderful. You've come to the right place. We'll definitely have time to talk about data and reporting today, which I think will be really relevant to that. Diversion goals that's definitely what we see is one of the most common goals, which is a diversion is the percentage either by weight or volume of waste that DOEs not go to a landfill usually.

All right great, and a couple of absolute reduction goals, which is

interesting. Wonderful. We're going to move over to our last poll before I introduce you to our speakers then, and this poll is what resources do you think will help you accelerate your waste reduction goals?

And this is really helpful feedback for us as we continue our waste reduction pilot effort and, you know, continue to bring in waste and the waste energy nexus into Better Buildings.

Okay, a life cycle assessment tool, a waste profiler, more solutions and case studies. I'll also have time to highlight some of the things we've been up to that are some of these resources for you as well that we've created in the last year. Okay and tracking guidance is coming to the top.

All right excellent. Thank you so much. That's interesting to hear that feedback and I think we've got some resources that will be of interest today.

So with that, we could return to our slides please. The first thing I'd like to do is just recognize and thank all of our waste reduction pilot participants. We've had many join us over this two-year effort that we are currently in the second year of in the industrial and commercial sectors. These partners have come together to share resources and knowledge with one another, to give us feedback at DOE and to really engage on waste reduction. So it's been a really robust effort and I'm excited to tell you more about what we've been up to this year. Next slide please. Thanks.

So this all, of course, would not be possible without our waste pilot team, so I'd like to also recognize a couple of my other colleagues that are in the advanced manufacturing office. Bruce Lung, Eli Levine, Ethan Rogers, and then also our support from ICF and Re Tech. If you have any questions about the waste pilot, you know, in the future, you can reach out to all of these people. My e-mail is going to be at the end of this session, and so you can always reach out to me and I'm happy to connect you with any of my colleagues on this. All right next slide please.

One of the things that we put together this last year has been a new resources page. So, on this page on the Better Buildings Solution Center you can access all of the resources and case studies that we've put together so far in this pilot. That covers both commercial sector and industrial and manufacturing sectors and all the resources we've been able to put together.

I also encourage you while you're on the Solution Center to check out the Better Buildings Progress Report for this year where we also share some more resources and data from this year from our waste reduction pilot partners. Next slide.

This year we also were able to host a series of working groups on plastics, outreach and engagement, and data and measurement. All of those names of partners that have joined us that you saw a couple slides ago came together to really dig a little bit deeper on some of these. And again, you can find what came out of those on this Better Buildings Solution Center.

But we are also hoping to use some of the feedback that we get today through those Slido pollings to assess what we want to do and if we want to have other working groups for this year and into next year. Next slide please.

We also were able to host the healthcare and pharmaceutical waste peer exchange. Based on some common interests and common challenges, we were able to bring this group together to really do a robust peer exchange to try to find solutions that could be available across sectors.

And finally, speaking of solutions, next slide please, we also were able to publish multiple solutions and case studies from our partners this year, from, you know, from engagement to waste audits and, you know, multi-step processes and the Hack the Pack creative solution from Steelcase up here. These case studies were brought to us with ideas from our partners and we're able to publish those.

So for all of you and your poll that just said that you are exploring this and maybe looking to set goals, this is a great place to start to learn more about what other people in your sector or maybe even other sectors are doing.

So without further ado, I would like to then move forward and introduce our panelists. So we have, again, four wonderful panelists today who all have been involved in the waste reduction pilot with Better Buildings – Better Buildings, Better Plants. And I'll be reading their bios as we get through this first section where we'll each introduce your waste pilot program. So one more slide please.

Wonderful. So first up in this introduction we will have Clare Lumkong, who is an experienced leader in building and leading

sustainability programs with over 30 years in the field. She's been with Bristol Myers Squibb for over nine years and is currently the manager of sustainability on the corporate team. In this role, she focuses on employee engagement, supply chain, global engineering, and third-party audit to drive improved sustainability performance. So Clare please share a little bit more about BMS.

*Clare Lumkong:*

Hi. Thank you. Thanks for inviting BMS to speak on the Green Chemistry Program. Green Chemistry is not unique to BMS, but you will see how incorporated key concepts into their product. Next.

So yes, first let me introduce BMS. We're a global biopharma company that develops oncology, hematology, cardiovascular, and immunology medicines to patients to help prevent serious diseases. Next. And our researchers are committed to adhering to the twelve principles of green chemistry in our drug development and manufacturing processes.

These principles incorporate safety, environmental impact, and efficiency into the program, and they're endorsed by the American Chemical Society, the Green Chemistry Institute. And BMS is actively involved in that, so I'll give you some more details on that in upcoming slides.

But it DOEs certainly embrace the drivers based on the three Ps, people, planet, and profits. So our R&D organization is committed to evaluating 90 percent of our new products in the new product portfolio using the green chemistry guidelines. And for BMS that approach is distilled down into four main principles, which would be familiar in the waste field. It's reducing waste wherever possible, reusing materials wherever possible, maximizing the effective use of resources, and encouraging responsible use of products. And we're happy to say that we exceeded the target by assessing a hundred percent of our new products in our R&D portfolio between 2016 and 2020. Next.

So very briefly, I'd like to show you how the design strategy is incorporated in the overall process of drug development. Through this Greenness by Design strategy, we've introduced several domains of new technology which include continuous manufacturing and predictive data analytics. The result is the reduction of consumption of materials, energy, and water while also saving time and increasing safety. So next. Yeah.

Next I'll give you some more information about how we use

predictive analytics on evaluating those processes and I'll hand it back over to Jason McIntyre. Thank you.

*Hannah Debelius:* Thanks so much Clare we're looking forward to hearing more from you about BMS.

The next for an introduction is Jason McIntyre who's the director of real estate operations and sustainability for USAA Real Estate. He joined the company in 2014 as a national property operations manager and now as sustainability director is USAA Real Estate's internal sustainability subject matter expert where he oversees sustainability initiatives from the asset level to the overall company level. So Jason, we're anxious to hear more about USAA.

*Jason McIntyre:* Absolutely. Thanks, and I'm glad to be here. We've been involved with the DOE and the Better Buildings Challenge for quite some time and excited to be part of the waste pilot. Next slide.

So a little bit about USAA Real Estate. We are a commercial real estate investment manager and investor. We co-invest on our deals as well. Currently a portfolio over 20 billion in assets under management with a national portfolio of office, multi-family, industrial, retail, and hotel assets. And our strategy around sustainability is longstanding. We're a 19 time Energy Star partner of the year and we've been focused always on expense management, on resource management and that dovetails very nicely with our sustainability strategy.

Also as an investor and fiduciary it's important that our strategy makes business sense and contributes towards risk-adjusted returns for our investors. And, you know, managing our waste is certainly a way to do that. It's also a way to, you know, contribute and minimize the impacts that that our built assets have on our portfolio.

Our portfolio waste goals really are pretty simple. They're five percent annual reduction or annual five percent diversion improvement I guess is the best way to phrase it. And you might be thinking, "Well after a certain number of years, how do you maintain that?" Well we have a churning portfolio we're always acquiring buying and selling assets and so, you know, we sometimes feel like our total diversion rate might hover right around the same area but it's because we often are onboarding waste programs at new properties, also partnering with new tenants as they may have their own waste goals.

So we actually added a secondary goal which is applicable not only to waste but other sustainability metrics, which is really a data coverage target, which is a hundred percent target by 2030.

So the reason why we make that – I mentioned that specific goal is that capturing this data can often be difficult when you have multi-tenanted or you know triple net lease buildings. If your tenant manages their own waste streams, you really need to partner with them, and we do that through our lease language and just realizing that we're both aiming for many of the same goals.

So I look forward to sharing a little bit more about what we're doing at USAA Real Estate and what we've learned through the pilot.

*Hannah Debelius:* Excellent. Thanks so much, Jason. Next up, we have Breitner Marczewski, who's a senior sustainability engineer at General Motors. He supports the Zero Waste goal for the company. He holds a bachelor's degree in energy engineering from the University of ABC Sao Paulo, Brazil and a master's degree in engineering and technology management from Louisiana Tech University. Breitner, tell us more about General Motors.

*Breitner Marczewski:* Thank you Hannah. Next slide, please.

Perfect. Okay, so thank you for the opportunity for us to share our Zero Waste program. I guess I would start off saying that for those in the Slido, one of the answers was defining or creating goals around zero waste. So I hope this helps you in your journey.

For GM, zero waste means zero materials going to landfill incinerators and also energy recovery. It kind of aligns with the Zero Waste International Alliance's definition for what zero waste means. In terms of our goal, GM aims to divert 90 percent of our waste from landfill incineration and energy recovery by 2025. Next slide, please.

So here you can see more about the scope of our program. The main objective is to move waste upwards in the waste hierarchy, and in our scope, we include all kinds of waste: solid waste, liquid waste, hazardous waste. The only waste streams we exclude are construction demolition because those are considered event waste. But to qualify for the zero waste definition, a facility must divert ninety percent of their waste stream, the contamination level should be less than five percent per waste stream that goes to recycling center, and they also need to engage in the cultural

engagement for sustainability, so it involves leadership, employee participation, and innovation.

On the right side you see our waste hierarchy and at the bottom you can see landfill incineration as in red color and energy recovery is yellow because there's a lot that goes on in there.

If you go to the next slide please, you see that energy recovery is tricky. But this process is what we envision for our future operations. We want to be fully circular from GM facilities, from engaging with suppliers, engaging with the dealerships, the users, and recycling centers. And more importantly, at the center of the circle, you see engagement upstream with our design team to reduce waste early in the processes. Next slide please.

This one is just digging into some of our data and I will get more deeper dives in the second part of the presentation. But for GM today, if we eliminate foundries at the highest waste stream we have, it's plant non-hazardous trash, and there's a lot of waste team that goes into that category, so anything that we can do internally in our processes to reduce the waste stream will contribute to the metrics to achieve the zero waste goal.

Thank you.

*Hannah Debelius:*

Excellent thanks so much, Breitner. Those were interesting graphics.

Next up our final panelist today is Elizabeth Cole who's currently a recycling and waste reduction program coordinator with the city of Beaverton, Oregon. With over 12 years of experience in recycling and waste production outreach and education, she works on numerous projects from assisting Beaverton businesses with recycling and waste reduction, to regional campaigns on food waste prevention, as well as collaborative projects to improve recycling at multi-family communities.

So Elizabeth, please tell us more about the city of Beaverton.

*Elizabeth Cole:*

Yes, good morning and thanks for having me here. It's great to see all the panelists and the big crowd.

Beaverton is located about ten miles west, it's a little suburb of Portland, Oregon. It's kind of northwest corner of Oregon. And our population is right around 100,000 right now.



For the waste pilot project, we decided to focus on our internal operations within the city. Our staff is around, I want to say five to six hundred and we set a diversion goal of sixty percent, a total waste diversion goal of sixty percent. And our goal was to really kind of engage our staff and to come up with some creative employee engagement and education opportunities around that diversion, and then kind of test it out at our city hall building and then expand to our other buildings and operations, that sort of thing.

And I will get into a lot more detail later about our goals and what we ended up doing this year and kind of some challenges that COVID gave to us. So that's it for my interest. Next slide.

*Hannah Debelius:* Wonderful. Thank you so much, Elizabeth.

Well, now that you've learned a little bit more about who our speakers are that we have on the phone today, we want to do a couple more polls to get your thoughts about some of the things that we'll be talking about for the rest of this session.

So, this next poll is, in one to two words what tools or programs are you using to measure waste and track data? So from our poll earlier, I know that a lot of you are already either measuring data or maybe working towards a goal. So what tools are you using? All right, Excel. You know, not surprising. I think that's our go to. The warm model. We know that's from the EPA, and actually we'll be hosting them in our summer series later. Invoices, I think that's monthly invoices from waste haulers we definitely know is a common one. Energy Star. A big, big shout out for Excel here.

Okay, so a lot of different tools, and hauler records. We know that data can be one of the largest challenges, to get data and then make sure that that data is accurate. It's interesting to know all these tools that you are using. All right and again, to participate in these polls you go to [slido.com](https://www.slido.com), enter the event code DOE and then you choose our session title, which is Greatest Hits from the DOE Waste Pilot. You can also click the direct link that's in the chat box and then you won't have to put in the event code. All right thank you.

I think we'll go ahead and launch the next poll here which is, what metrics do you use to report internally or externally related to waste? Okay, diversion coming out on top. You know, as I've mentioned, that's definitely the most common goal that the partners in the waste pilot have been pursuing, and it's, you know, whether that's by weight or volume, diversion rate is definitely a very

popular metric. Doing reduction, maybe that's total reduction. Makes a lot of sense. And energy recovery. We know in particular our manufacturing partners have been on exploring energy recovery and I think that's something that we'll also continue to explore in the pilot. And a couple of people also are including waste as part of their Scope 3 emissions, that is Scope 3 carbon emissions reporting, which is interesting.

All right but not surprisingly, diversion remains on top. All right, I think we'll move to our last poll before the next section now. This question is, what methods have been successful in your outreach and engagement programs? This is an open answer and we just want to know what you all have been doing to engage either employees or customers or residents, you know, whoever it is that is the recipient of your waste efforts, what have you been doing for engagement? Sustainability scorecards.

Okay, that's interesting. And visual aids, we definitely have talked a lot about signage and we have some engagement in signage solutions that have some out of our discussions with pilot participants this year. Environmental month types of campaigns, which makes sense. You know, we of course see a lot on Earth Day and the EPA also hosts National Recycling Day in November. Videos of landfills, tours to facilities. We've also had a couple of partners that have done videos and integrated that into staff training and HR practices. E-waste events. That's great. Using social media, that makes sense especially if you're reaching a customer base. Okay, excellent.

Well, I'm glad to see that we have engagement in all three of these topics because these three topics are the next ones that we're going to be tackling. So we're about to go into kind of a rapid fire, you know, round robin type structure with the next part of our session here where each of our four panelists will be weighing in a little bit deeper on three topics. So this first one we know is the thing that rises to the top as a challenge for a lot of our partners and a lot of the Better Buildings Better Plants network that we've spoken with. And it's getting data and making sure that data is accurate.

So, with that I will turn it over to Clare to kick us off, to dive a little bit deeper into data and management.

*Clare Lumkong:*

Thank you. So we're talking about green chemistry, right, and data management. So in the previous slide, we saw that it's important to utilize the green by design early in that chemical synthesis development process. So let's take a look at how the Greenness

Score is calculated. And the KPI that we use is process mass intensity or PMI, and that's the key metric or the green yardstick as the ACS refers to it and that drives more sustainable processes.

So the PMI is defined as total mass of materials used to produce a specified mass of materials, or in our case it's active pharmaceutical ingredient or API. So you can see the ranking criteria involved for each ingredient in the process that incorporates safety environment, you know, the hazard of the ingredients here. We're going back to that people, planet, profit, as well as the efficiency and the waste streams that are generated as part of the process. So you can see all of this criteria is a rather complex calculation, and what I'll show you next is the predictive analytic tool that takes all of this complex information and helps facilitate in decision making. Next.

*Jason McIntyre:*

So I'll tackle the waste data and measurement. You know, most of our commercial buildings have a pretty traditional set of waste streams. You know, obviously landfill recycling often is mixed or comingled, then some specialty waste streams. I think also based on tenant demand and tenant, some regional preferences, there might be composting or there might be segregated recycling. I think the biggest thing that we have to realize is waste streams, a lot of it's being isolated or siloed based on tenant design and preference and especially in different lease structures, whether they do their own.

You know paper used to be a building kind of waste stream and most of the time paper, if people are still printing a lot, assuming they're in the office, they are doing their own shredding. So that waste stream is still occurring but it's often private or on a separate contract than the building. So, you know, I'll touch on data coverage in a moment. Also the question that's come up about, you know, how do we capture this data for from our tenants.

Other waste streams might be e-waste. Again, a lot of that is private where the tenant really wants to oversee how their e-waste is handled. You know we have certainly done those types of events.

I show here on the picture you know this is - someone saw posted up on the Slido, you know, dumpster diving. We do conduct waste stream audits on occasion. This is really to help us understand the data quality, what's the accuracy of our reporting, and I don't think it's much of a secret that data waste data is not real sophisticated. Right? We often think about how large is the container and how frequent is it being picked up. I think it's improving. Certainly

where you're paying unique fees based on volume or weights, you know, it's getting more accurate, but we're seeing technology is available where we meter dumpsters and getting much more accurate data.

And so, when we talk about data and measurement around waste it's important to think about the quality of that data, how reliable is it. When I see a building with the same waste data for two years in a row, we know that is probably because it's being estimated based on frequency and capacity. So that's a challenge but an opportunity as well.

The last thing I'll share here, and I touched on it briefly earlier, was the data coverage. So, you know, capturing these tenant waste streams is a challenge. You know, it's also a great engagement opportunity, which is one of our sections what we'll touch on in a little bit, but you know what might be perceived as a challenge or at odds with a tenant request could actually be a really strong opportunity for engagement and to partner with your tenant, share with them what you're doing what technologies or what options they might have.

I put joint ventures. We're also a limited partner in a lot of our investment deals so, you know, we're an equity investor, but we may not be operating the asset and so capturing data from properties where we have limited visibility is also a challenge. And so as we look at requesting not just waste but, you know, maybe energy or other data metrics, we're trying to incorporate, you know, the right language into those engagements so that the request is kind of automated, it's expected, and we capture a better picture of the waste.

So that's it for now.

*Breitner Marczewski:* So for GM, this is what our data collection system can capture. Can you hear me okay? Okay. Thank you.

So yes. So we know where the waste is being generated. We have data IT for each waste stream. We can define whether the waste is hazardous or not hazardous. We can categorize the waste in primary categories such as plastics, and then you can sort of categorize in, you know, what kind of plastics are you referring to.

Management method refers to what happened to the waste stream once it leaves our site. It either goes to recycling or it can go to landfill so you want to capture that. Exemptions, what waste

streams are exempt. In our case, it's construction, demolition, and remediation waste. And the data comes in a monthly format with totals at the end. So this way you can kind of track seasonality on your numbers and find opportunities for diversion. Next slide please.

And this is kind of a step-by-step we had to go through in defining our baseline and this will greatly help you when you think about creating your waste diversion program. The first thing, it seems obvious but what is waste for your company? How do you define that? In our case, it's anything that leaves the GM facility that is not salable.

So only, you know, the vehicle itself, it's a product, it's not a waste. And how you wanted to report for example reuse, do you have systems in place that can track the same waste stream being reused elsewhere? And then you want to define whether you want to have a baseline from an intensity perspective, kilogram per unit, or absolute intensity. It's very easy to explain the manufacturing layout because they think about kilogram per unit, but it absolutely resonates better with people reading your sustainability report because it clearly shows whether you're going up or going down, your waste generation.

You also want to define, do you want to use the average of past years or one single year, that our pros and cons comes with both approaches, and the policies you want to establish to create your baseline. You want to strictly follow the GHG protocol or your internal policies.

This is an equation we use to calculate the diversion rate and again what is non-diverted for us is anything that goes to landfill in terms of processing. Next slide please.

Pros and cons. Very quickly, the pro is the – the equation actually tracks the performance over time, but it's hard on the con side because you're eliminating incineration waste to energy as a means to divert your waste streams. Next slide please.

Oh, there you go. Thank you.

*Elizabeth Cole:*

Great, thank you. Yes, a little bit about our data and measurement. I'm kind of going over some results that we got. So we kicked off our pilot with kind of a baseline waste audit in January of 2020, and measuring, you know, that waste from the previous week or so. We measured our curbside accepted material, which for within

Beaverton is obviously garbage. We have a mixed recycling, glass is collected separate for recycling, and then we also collect food scraps at our city hall building. In addition to that we have a few other programs to collect additional waste, which included batteries, fluorescent bulbs, and then electronics, computers, that sort of thing. So those we manage outside of that kind of curbside program that the hauler collects outside and then those additional materials.

So we looked at all of that. We did a waste sort, several of us dug into that pile. You can see that was beforehand, and spent the day going through garbage. It's a lot of fun if you've never done one. Fun. And, we found that about 31 percent of the landfill waste that was going to go to the landfill could have been diverted through either the existing curbside programs or one of those additional programs that we already had identified, so either the batteries or electronics, etcetera. And then there were a few reuse items which were sort of anomalies.

I won't get into a ton of detail about those, but basically identified 31 percent which was kind of our target, but, you know, we already had programs for these and really wanted to target how we could get those out of our waste stream that, you know, additional percent. And next slide.

*Hannah Debelius:* Excellent thank you all so much.

As I mentioned, data has just been a really big challenge and a big topic of conversation over the last year and a half of the waste pilot, so I appreciate you all sharing more from your different perspectives there.

I'll also mention to our attendees that we're also taking questions throughout the session utilizing Slido, so you can put in questions there or if you see a question that you like and would like us to answer it at the end of this session you can also hit the thumbs up and that will increase its votes and it moves to the top so then it's more likely that we'll, you know, prioritize that when we get to Q&A at the end. So again you can put in questions anytime to either an individual panelist or the whole group and we'll get to that at the end.

So of course, alongside with data and measurement hand in hand goes tools and reporting, whether it's reporting internally with your organization or through a sustainability report or if you report to a larger entity. I know I just heard Breitner mention the greenhouse

gas protocol. We want to know more about it, so that'll be our next topic for our round robin here. And so I will hand it over again to Clare.

*Clare Lumkong:*

Thank you. So just as a reminder, you know, in the in the last slide we looked at the criteria that went into the greenness score of materials that are incorporated in that process mass intensity calculation, and this is a snapshot of the web-based tool that we have and the output of that PMI predictor. So the PMI predictor is a web-based tool, as I mentioned. It calculates and predicts the potential root and outcomes for small molecule reactions, and it's very – it's a powerful tool that is utilized tremendously by the team.

On the right, you can see the dashboard output for one of our drugs when it was in the development process, and you can appreciate the complex processes and calculations that are represented in those simple KPI, red, yellow, green, and how useful that can be for providing data to researchers who are in that chemical synthesis development program and how to make good sustainability decisions for the processes as we go through the early stages of the development.

Jason, let me hand it to you.

*Jason McIntyre:*

Yeah, thank you. So, to speak to tools and reporting, I'm sharing an example here. You know, most of our waste hauling efforts are, you know, outsourced through vendors that come to the building and pick up. We do certainly rely on the data capture from those waste haulers, but I have an example here. This this may seem a little boring to folks, but this is essentially an analysis – it really is an economic analysis more than a recycling or waste diversion analysis – where we look at a waste hauling program at one of our buildings, service costs for example, 1,200 a month.

We're working with a service provider that's actually doing kind of a contract review and analysis. Are we getting the right service, the right rate, the right tier, and just through a program like this, we're finding a savings of \$592.00 a month and so this is a great expense tool. But I share this because we're using this actually to help fund some of our waste diversion efforts.

So one of the questions I saw, I'm jumping the gun, Hannah, was you know, how do you fund these programs or do you have to have an ROI? Well, you know, we are a fiduciary for real estate. Obviously we want to do the best and reduce our environmental impact, but we're finding ways that we can actually push a

program, maybe do an annual waste audit, do some tenant engagement and pay for some of these services or extra costs through finding savings. And we can code this type of additional engagement to the same GL, the same line item on an expense report to our tenants.

And so it's still a net savings solution and I think it's a really interesting way to use an expense management tool to really drive diversion improvement and sustainability performance. Next slide.

Here, just to kind of talk a little bit about reporting, you know, we do an annual sustainability report. We report properties at a property level certainly for things like certifications, tenant engagement. A lot of tenants may have a green team or, you know, there's inevitably a handful, probably most of the folks on this call, a handful of people in our buildings that are really passionate about waste, and so they'll come to the property manager and say, "Hey, I'm seeing like a lot of recycling contamination. What can we do to help?" And they kind of drive it from inside.

That's really, you know, helpful. We do roll up our performance into fund and portfolio property types. Some of you may or may not be familiar but GRESB, the Global Real Estate Sustainability Benchmark is an ESG assessment for property and fund managers to evaluate the sustainability, but also the social and governance components of their portfolios where they invest, and waste performance is part of that.

And, you know, as a company we certainly also focus on it and we disclose – I just did a quick screenshot from our last sustainability report. This is our office portfolio waste diversion and it's an ongoing effort to always improve that.

*Breitner Marczewski:* All right thank you Jason. For GM, in terms of tools and reporting, the things that you want to look at is again, defining your zero waste strategy, what circularity means for your company. You want to look at your data and assess the gap that will give you a good information how to assign targets. Communications, training, and engagement is really critical for your success. And then you want to integrate your waste reduction projects into your business plan.

That's how it's gonna get measured that's how it's gonna get tracked and if you want to tie that into compensation for plant managers and others, that would really drive participation in a waste program. For implementation tools you can use benchmarks



against your different facilities or even other, I would say other OEMs when we compare their waste performance through their sustainability report which is public.

The meter data and dashboards, if you do have systems in place that can track your waste diversion. You want to promote continuous improvement in your operations and you want to define the budget to, like I saw questions about funding the opportunities, you definitely want to separate aside some funds to implement some recycling activities. And sometimes those recycling activities can be really hard, to be honest with you, because some wastes are tied to commodity prices then if oil pricing goes down, normally the price of plastics go down and it makes it more hard to accomplish some – to make sense of your business case. So you most likely won't have a good ROI.

And then the recognition piece is really important. If you see people doing the right things that can help your program, you want to recognize them. You see that GM participates in the EPA Waste Wise program. It's good to keep track of how you're performing over time and then your program should be based on a PDCA cycle where you plan, develop, and then you continue improvement, and then you assess your program at the end to correct any errors. Next slide please.

And these are some of the reporting frameworks where we disclose our data. The first one is the CDP. GM has been reporting to the CDP for more than seven years. The last report we scored the highest scores for climate change A and something for water. We are also disclosing our data with the EPA Waste Wise. GM is the only OEM in North America to be listed in the Dow Jones Sustainability Index. The other reporting frameworks we use the SASB, GRI, and then the United Nations Sustainable Development Goals.

So those are tools you can use to take with you read their guidelines, EPA. It's free to participate the, the GRIs, that are very good information that can help you creating your zero waste program.

I'll pass the torch to Elizabeth now. Next slide please.

*Elizabeth Cole:*

Great thank you. On this section, I kind of wanted to talk a little bit about why and what for tools and reporting um and then a challenge that we had obviously with COVID, but our why kind of really drives what we do and we have several. I've listed a couple

on this slide, but we have our Beaverton Climate Action Plan with a really high level goal that kind of drives our work. We also have our Oregon Department of Environmental Quality has – I posted their vision here but they have a lot of goals and their vision and et cetera that also drive kind of what we do in our program and why we're looking at waste reduction and diversion.

So as I mentioned earlier for this project we did look at our landfill diversion and wanted to look at a total waste generation and reduction there and identifying kind of new opportunities. A big challenge we ran into was COVID. As I mentioned, we were looking at our city hall building for this pilot, you know, really to look at that engagement and employee education and what we could do that would kind of increase that enthusiasm and engagement, you know, to reduce waste and divert correctly basically.

And COVID was really a big hit for us on this program because shortly after we did our initial baseline in January of 2020, March hit and everybody kind of went work from home. So we didn't do a follow-up waste sort, which we had planned to do in January of 2020 so we had a year of data and education and outreach. And we decided to not do that because we just didn't think that the data would really be reflective and, you know, equal to each other because considering in January of 2020 we maybe had 50 percent of staff in the office.

So we would have had really great waste reduction numbers. It would have looked wonderful, but not an apples-to-apples comparison. So we kind of opted to do that and backed out from that a little bit and um in the next section I'll talk a little bit about what we did do that year that kind of redirected some of our energy. But – and I'm happy to get into more details on the what and why and all that kind of stuff, but yeah, just kind of wanted to talk a little bit about why I think everybody else in the panel has really gave you some great tools, but I just think having those driving or supportive goals and kind of your mission is really important to help you kind of keep moving forward with your waste reduction goals. So next slide.

*Hannah Debelius:* Excellent thanks so much, Elizabeth. And, Elizabeth, I'm glad you of course mentioned the, I don't know, year-long elephant in the room of COVID because of course, you know, we've seen disruptions and changes in patterns and, you know, I think we all know that it's really just shifted where our waste is coming from. And, you know, with commercial real estate we've seen maybe a

little bit less but more in our multi-family partners because people are working from home and that sort of thing, a need for disposables and what that means for healthcare. So a ton of implications and I appreciate you bringing it up and if attendees have more questions about that or want to hear from folks, I encourage you to again put that in the Q&A in Slido.

I do see that we have a couple of questions on the Zoom chat, so just a reminder that we'll be using Slido for the Q&A at the end, so if you put your question in there you can copy and paste it over to Slido either by choosing Greatest Hits from DOE Waste Reduction Pilot in the dropdown or you can follow the link directly and you don't need the event code at DOE.

So with that we are going to be moving forward to our last, you know, rapid fire round robin topic here which is engagement and outreach. So even if you have a baseline and know your data and all of that, you still probably want to improve it and that means that you need to speak to your staff or employees or customers or residents or whoever it may be. So, looking forward to hearing more from our panelists on this topic.

We'll start again with Clare.

*Clare Lumkong:*

Thank you. Yeah certainly outreach both internal and externally is absolutely critical. And you know Breitner mentioned the continuous improvement mindset and of course that applies here in the green chemistry area as well. So, you know, how do we sharpen that tool?

Internally, we have training and tools. We hold – I say we, the R&D organization holds a summit and it's widely attended. It's focused on sustainability and it includes cutting edge technology updates as well as trending topics, internal advances in the area, and there are also internal annual and quarterly awards for new sustainable process development. This is an additional to internal training, you know, the tools, the meeting updates of new information from the PMI predictor. So, internally there's quite a robust communication program.

And then externally, a number of our sustainability team members are also in the American Chemistry Society, the Green Chemical Institute, Pharmaceutical Roundtable and frequently contribute either with speaking or for publications in scientific journals such as, you know, *Green Chemistry* or *Nature and Sustainability* or even *Organic Process Research and Development*. There is such a

publication.

So BMS continues to actively learn, improve the technology, share the knowledge both internally and externally, and I hope that this program overview has been useful to share some insights into this ultimately waste reduction space.

Jason, I'll hand it over to you.

*Jason McIntyre:*

Excellent. So on this as it relates to outreach and engagement, you know, really our client is our tenants and our residents in our buildings and so the way we engage with them around waste is certainly collaborative. We want to understand what their waste needs and demands are and there's - I put here, you know, landlord tenant synergies. As a landlord and owner, we're, you know, excited and want to report and communicate our waste progress and we've found that our tenants have that same goal.

In fact, many of them have their own diversion strategies and programs. They have stakeholders that they're expected to report on. So really, there's a synergy there where we can partner. And I put you know real estate partner of choice because we have, you know, a lot of large tenants across our portfolio S&P 500 companies that, you know, have multiple spaces with us and, you know, the more that we can be that real estate partner of choice, the more engaging and better value we deliver.

I put this graphic to show, you know, some of our waste metrics as the year of 2020 has dropped off. You know, ironically though, some of it has stayed the same. Right? We still have the trucks coming at the same frequency and it's identified some opportunities where in most of our commercial space I would say at least office occupancy has been very low. Retail in in some cases low, maybe not our grocery anchors or some of those things.

But, you know, outreach and engagement, we've done case studies. Of course we've done the tenant events, Earth Day events, e-waste events, and I think just the more that you plug in and understand your tenant and understand what their goals are, you'll realize there's synergies and opportunities to partner together and get a mutually beneficial outcome.

*Breitner Marczewski:* Thank you Jason.

So for General Motors, in the sustainability team, our client is the manufacturing and all manufacturing employees. And here's one

case of how we engage with them. This is for the Earth Day, April 22nd, and we partnered with one of our suppliers, Battery Solutions, to have this webinar going on where people could join. And now we have a program in our tax center where employees can bring in batteries from home and we will be recycling them on their behalf.

So this is for all facilities in Michigan and we plan to expand this to all the United States. Next slide please.

Now from a global view, the square box here on the side shows all of the outreach activities that GM supported last year, so more than 15,000 employees participating in our outreach activities. We touched 21 states in 10 different countries. I guess those activities generated one million dollars' worth in value for 300 nonprofits, and also the volunteer hour surpassed 100,000 hours for the year. In the little chart below the bar chart, there's a little dip, most likely because of COVID and maintaining social distancing. It was a struggle to have this outreach happening throughout the year. Otherwise this number would have been following the trend up.

On the left side, you see the program GM sponsors with the NWF, the National Wildlife Program. It's a program where we partner with schools across the United States closer to our manufacturing sites and kids can go to local, in this case a river stream to analyze the health of the water, do some science experiments and this is a way to create the sustainability leaders of the future. This is another thing that our group is involved with.

And on the bottom right you see that GM is a proud member of the America Recycles Day, so we signed up this pledge last year and we're engaging with them in three different groups to improve data, to improve secondary markets, and also to improve our own process as well. So those are the three main things that we do to engage with our employees and community where we work and live.

And I'll pass to Elizabeth now.

*Elizabeth Cole:*

Great, thank you. So engagement and outreach, this is where we spend most of our time in my line of work, and we spent a large portion of last year working on a regional – so our kind of area around the Portland metropolitan area is three counties. I think it's like 25 cities. And several of the jurisdictions all kind of work together often and we worked together on this project to really update our signage and really focus on outdoor signage, so what

actually goes on you know stickers for the big containers that are outside that waste goes into as well as some signage for inside like shoot rooms or enclosure spaces, you know, whether they're outside or inside.

So we kind of took a step back from engagement with our employees given everybody was in different places and, you know, not sitting at the office necessarily and decided to really look at this. Our signage hadn't been updated in, I don't know, a decade or more. It was very old. And while the materials accepted hadn't changed, you know, things have changed and they needed improvement.

So we kind of spent a lot of time on that. Metro, which is our regional government, led this project and we as a local city participated and we had several stakeholders were involved, so as I mentioned our regional government, we had our local city and county governments. We involved our hauling community, so our waste haulers were involved. And then we engaged several community-based organizations to really help with kind of transcreation of our materials and the languages that we put on the signage.

And then in an ideal world we were going to do focus groups in person and get feedback on a set of three designs that we came up with and due to COVID, we decided to not have an in-person focus group. Well, we couldn't. And so we actually mailed packets. So that's where the community-based organizations really came in. They helped us identify some engaged individuals. And we mailed packets of sample materials to them, asked for their feedback and then incorporated that.

The pictures you see here are just a couple images of what our final product was. We created – traditionally we had just a ten by ten or an eight by eight that would go on the really large, you know, containers outside, so we've made a much larger decal. I believe it's 24 inches wide now, so much larger so easier to see from, you know, further back.

They act as both a wayfinding tool and as, you know, what goes in the bin kind of tool. So like I said these are just two images. There's a big suite of materials. We did create the solutions at a glance, which I believe if you just search for the title you'll be able to find and I'm sure we could plug a link in somewhere.

But that has our playbook which has all of the materials that we

created, all the different sizes of decals. There's indoor posters, outdoor signage as well as kind of how we got there and a lot of details around how we engaged and who we engaged with to use that.

So these are going to start being rolled out this summer in the region and we're going to start with our multi-family community but then it'll come into our commercial including our city hall and looping back into that engagement with staff. Eventually when we get back to the office we'll have new refreshed look of stuff. So I think that's it. Next slide.

*Hannah Debelius:*

Perfect thanks so much Elizabeth. And I will say that we on our resources slide the end of the session, we do link your case study as well as other ones mentioned today. So thanks for plugging your own solution at a glance and in the recording and slides our attendees will have access to that link.

Wonderful. Well um, before we get into Q&A, we do have one more poll for you all, but I'd like to thank all of our panelists so far for sharing on all those topics. We've had a really robust Q&A so I'm excited to get into that.

But if we could launch the next poll please. This will be the final poll for the session. And again you can answer that in Slido. You all know the drill now. The passcode is DOE and drop down is Greatest Hits for the DOE Waste Reduction Pilot.

The question is, with one being most difficult to overcome and five being the easiest to overcome, rank the following barrier categories for your waste reduction or diversion program. Cost. Okay, so cost seems to be one of the biggest barriers, which is interesting. And I know that in the Q&A we've got a couple of questions around cost, so we'll definitely have time to dig into that a little bit more. Organization or management and culture. That is interesting that that's coming to the top. Maybe we can have our panelists speak to that a little bit more of how you got buy-in internally. And also availability of technologies. I know that we've mentioned a couple of technologies today but we can also dig a little bit deeper into that in the Q&A.

All right so it looks like cost and internal buy-in are kind of the top challenges here, which is interesting. All right great. Well thank you so much to our attendees for interacting with us on Slido for all of those polls. I think it helps our participants understand a little bit more about who's aligned with us.

With that said, I think we're gonna switch over to our Q&A. We've got about 20 minutes for that. It's not too late to add a question into Slido for Q&A. And again, you can also click on the thumbs up to vote for the questions that you think are most interesting and we'll pretty much go in order for that.

So our first question was pretty popular on this, Jason. So people are very interested. But, the question is can Jason share how he's implemented waste goals into his multi-tenant buildings' lease agreements.

*Jason McIntyre:*

Yeah so I'll touch on that. As we've looked at incorporating green lease language into our leases, it's primarily around data sharing. You know, obviously the first step in a performance improvement program is to capture data and get the coverage and that's why, you know, I shared two with one of our goals really being better more complete and full picture data. We've gone through that approach to expect our tenants to provide these type of data streams including energy, but also waste, so that we can provide that transparency to our investors.

So I think, you know, without, I guess, I don't know that I can, in this form at least, share the specific languages, not because it's confidential or anything. I just think there's great resources available. I know we've used the BOMA Green lease guide. And there's other resources, likely at the DOE is, you know, incorporating this data transfer piece. I think the last thing I'll say on this is when you're trying to capture data from tenants, I think there's really two main things you're trying to overcome.

One, which is the right or authority to ask for the data, and it's not that our tenants are saying, you know, "No, we won't give you data," it's just, is there a mechanism and are they already authorized to give it?

And then the second piece is the kind of administrative piece, how do you actually get the data, where does it go? Is it easy? Are you collecting bills or is it, you know, an Excel spreadsheet? So, as you think about your tenant data capture process, think about it at least what we found is think about it from an approach of the right or authority to ask for the data, again from tenants or joint ventures, and then how are you going to actually capture the data and report it.

So that's been how we've tackled that approach and we've started



obviously with more of the gross lease where we manage the stream and then they may have isolated waste streams like batteries or paper. But then as you go to the other end of that spectrum of lease terms would be like a triple net lease where the tenant handles everything. And so we've had success through that path.

*Hannah Debelius:* Awesome. Thanks so much, Jason. And I will put in a shameless plug for another session here at the Better Building Summit that tackles green leasing, which is that we have a special event on Thursday at 12:45 Eastern where we're going to hear from some Better Buildings partners about green leasing specifically, so we can all go learn more then.

The next question is, how do you evaluate and track waste reduction and reuse numbers such as reusing fluids in a closed loop system, reusing packaging or utensils, right sizing products. This sounds a little bit more manufacturing focused so maybe Breitner, would you like to kick us off on this?

*Breitner Marczewski:* Sure, yes. Excellent question. We go through the same hurdles collecting this type of data. I would say in the end, if you collected your data on a monthly basis and if you're promoting, if you're not promoting reusing, what's going to happen is your waste numbers will be very large. Right? So let's say you have a process, you generate 100 units of waste; however, if you cut that on a monthly basis through a reusing opportunities, you will see the reductions in your waste numbers. So it kind of goes both ways.

The person mentioned an average cycle. I don't think that's a good way to measure circularity. You can do a mass balance using what the Ellen McArthur Foundation put together so you can track circularity within your processes. It's actually something some reporting and frameworks are requesting from companies. So it's not an easy task and in your example with fluids, it happens in one of our facilities. We do have reuse opportunities and in our unit of time we use a monthly data, so anything that we can reuse we think that month will be categorized as reused and once the material cannot be further reused, then becomes a waste and then you manage that differently. Either it goes to the landfill or energy processing facility, if it cannot be recycled.

*Hannah Debelius:* Thanks so much Breitner. Would anyone else like to weigh in on that? Okay, then I'll move on to our next question here, which is waste to energy displaces thermal processing energy and electric energy. Waste to energy in zero waste goal, if there's waste energy in zero waste goals how are the sustainability concerns of primary

energy addressed?

Would any of our panelists like to chime in on that?

*Breitner Marczewski:* Yes, I think we talk a lot about waste to energy and it's just a trend we see in the sustainability around things. A lot of companies are seeming to be moved away from thermal processing, I call them thermal processing because it included incineration with and without energy recovery. There are some instances where when you do a life cycle analysis on incinerating specific waste streams, and a good example would be paint sludge for GM, it can actually have a positive CO2 savings associated to that instead of landfilling the material. So, it comes down I would say for the zero waste program of the future, it comes down, if you unify everything into CO2 metrics, right, if everything is under this base unit, then you can run your life cycle analysis and determine whether you may send some materials to a landfill or energy recovery, or even a distant recycling center.

Sometimes if you choose that, the transportation costs will emit CO2 and moving this material from Point A to Point B is larger than landfilling the material. Excellent question again. Thank you.

*Hannah Debelius:* That's great. Thanks so much, Breitner. And I actually think we're going to keep you in the hot seat, pun intended, for our next question which is directed to you, which is could Breitner share an example of diverting from waste to energy or energy recovery for a specific waste.

*Breitner Marczewski:* Yes, as I mentioned, paint sludge, because it's a very large waste stream we have at GM and unfortunately you can dry the sludge as much as you can to reduce its mass, but the main, I guess that the end of life is that thermal processing facilities are few, if – there are no thermal processing facilities nearby.

Another waste stream that is very common is wood pallets, especially if your supplier is overseas. There is this case where we import parts in plywood and plywood unfortunately comes with formaldehyde, which is a chemical element where you cannot shred your wood pallets and make mulch out of it. So when your pallet is either with that type of material or composite with other cardboard materials, it's really hard to segregate. So although it's cheaper up front, it will cost you more to dispose that waste stream than if you had purchased a pallet made of natural wood so you could shred here and reuse elsewhere.

Good question. Thank you.

*Hannah Debelius:* Great thanks so much for that specific example. So the next two questions we have on our list here I think are actually a little bit related. So I think I'll um start with Elizabeth, since the first one's directed to her but then I'll have all our panelists touch a little bit on this question about costs and funding and return on investment.

So Elizabeth, why don't you kick us off.

*Elizabeth Cole:* Yeah great question. Thank you.

*Hannah Debelius:* Sorry I'll read the question out loud. Sorry. Can Elizabeth speak about the economics of Beaverton's recycle program, how much does it cost, how much is recovered, is there a net cost or benefit in hard money dollars?

*Elizabeth Cole:* Yeah, great question. So our waste recovery is measured as a waste shed so Beaverton's specific numbers I don't have, but we make assumptions based on the waste shed numbers. So our waste shed includes our tri-county region, that includes metro region, includes Portland, and then the three counties within that and all the cities. Our department of environmental quality does those waste audits and I can share a link to those if somebody wants to dive into those. They're very detailed.

Right now for our waste shed the diversion rate is at just under 50 percent for the region states, slightly lower than that statewide. The cost question's a good one. So within Beaverton our cost structure set up is basically a pay as you throw. What individuals, companies, you know, pay is based on their garbage size and then we've bundled the recycling and food scrap collection into that. And so in a sense, garbage sort of subsidizes, depending on the market, you know, the other lines of collection. And for probably the past couple years since china really closed doors on receiving material, recycling has been a cost. That wasn't traditionally, you know, always the case.

Our, you know, recycling was – haulers were making money on the, you know, recycling material and our recycling sorting facilities were, but yeah, for the past couple years, recycling has been at a cost, and it's basically supplemented by our garbage collection.

We internally for the city do annual reviews. We have a franchise

system with our haulers citywide. We have five haulers and we complete a review of costs annually and then adjust our rates as needed. So those go up occasionally as needed to kind of adjust for any increased cost to the system.

And as far as the net cost or benefit question in hard dollars, I don't know the answer to that one. I could dig around and see if I could find one, but I'm gonna guess our department of environmental quality might have an answer, but off the top of my head I definitely don't know that one.

*Hannah Debelius:* All right thanks so much, Elizabeth. So if we could highlight the next question, I'm going to give our other panelists the option if they'd like to weigh in which is, do you have funding for waste program efforts or do waste solutions have to have a return on investment?

*Jason McIntyre:* I can take this one off.

*Hannah Debelius:* Great.

*Jason McIntyre:* You know I talked a little bit about one of our strategies or tools that we're kind of piloting right now which is looking at our hauling contracts, looking for waste, no pun intended, contract waste or contract overages where we're paying more than we should. And so by securing better rates and right sizing our service delivery and watching those contracts we're identifying savings, which we're using towards these initiatives.

I think for us too, waste is an expense to the property regardless of landfill or recycling, and so we're looking to, you know, certainly improve the diversion rate but also, you know, a lot of this is intangible goodwill that we're, you know, partnering with tenants, and it's um the engagement with the tenant and, you know, some other stakeholders around waste is just as valuable as, you know, the benefit, the environmental benefits of this type of program. And so we do typically have budgets for tenant engagement at properties, whether it's an ice cream social or, you know, some kind of event. So as we look at that and look at what ways are successful and engaging, we found this to be a worthwhile effort.

I wouldn't say it's a, you know, payback analysis, we invested a thousand dollars. Are we saving a thousand? But it's more about contributing to the strategy and the goal of the property with tenant engagement.

*Hannah Debelius:* Great thanks Jason. And Clare, I see you've unmuted. So you might also be able to weigh on this.

*Clare Lumkong:* Yes I wanted to weigh in. You know, when we're talking about the green chemistry program, of course we are also talking about hazardous waste and solvent usage, so, you know, part of the decisions are tied to risk management. Right? However, cost is also an impact because when you're generate – if you're can potentially use less hazardous ingredients, less hazardous solvents, then the cost for disposal, the potential risk is liability to the company gets reduced.

But an interesting aspect in the green chemistry program and what we do with our waste streams once they're generated, of course, is the risk tolerance of the company as well. And we're seeing that evolve over time. I think with the added importance of sustainability and sustainable options, that we can come to the legal department, to the risk management organizations and talk about the sustainability benefits of other waste disposal options such as potentially reuse, which has been very, you know, not widely accepted, at least in the BMS space.

*Hannah Debelius:* Excellent. Thanks so much, Clare.

The next question we have here I think will be the last question we take from the audience, which is do you conduct waste audits internally or is it through a contract or hauler?

I believe Jason you spoke most about waste audits if you want to briefly address that.

*Jason McIntyre:* Yeah. We typically use external contractors. I think, you know, look at who's excited about this. If you have stakeholders, tenants, employees, departments that are really keen on this, there may be some willing to contribute or volunteer. I think too, you know, you don't necessarily need a, you know, environmental science expert to do a waste analysis. I think, you know, your janitorial provider may be able to do this and honestly it's really good to have your janitorial team involved because in our space a lot of times, if you're in an office building a janitor, you know, collecting waste bins can be your front line of defense and tell you, "Yeah there's a lot of recycling contamination," or, "People could be putting their soda cans in the recycling and they're not."

So they may already have an idea, but, you know, when we look at re-upping our janitorial contracts we try to include, you know,

some kind of scope there. So, you know, there are experts that do this and they'll produce a nice report and the idea is an audit is going to give you a snapshot of the opportunities that you have. You know, it doesn't make sense to do this weekly or monthly analysis, but if you see trends improving or issues coming up, then you can kind of work on the education and engagement piece and make the appropriate changes.

*Hannah Debelius:* Great thanks so much, Jason. I understand I might be having a video freezing issue, but I'm still here with you all. Don't worry. I just hope it's a good facial expression if I'm frozen.

So to close out here I actually am going to ask one more question of all of our panelists. If you could just really, really briefly tell me one thing that either you are looking, you know, thinking about for the next year or something that you think you'll institute the next year so look ahead real quick and anyone who's ready to go can pop on we'll do it popcorn style.

*Breitner Marczewski:* Okay um I think I've been quiet for a while. Oh, go ahead.

*Hannah Debelius:* Breitner, let's start with you because Clare kicked us off on all our topics.

*Breitner Marczewski:* Yes. I'm very excited that the zero waste program's something new that we're just launching at GM. For next year, my main goal is to develop a methodology to assign reduction targets for each plant, and it's a very interesting and somewhat cumbersome exercise, plants differ in nature, number of people, so once we complete that portion, we will be much more confident on strategizing how to implement different waste streams.

And I would leave you all with this quote from an anonymous Greek proverb. Society grows great when old men plant trees whose shade they know they shall never sit in. So the journey may be hard, but keep doing it. If you have any questions, want to engage offline, you have my contact information. Thank you very much.

*Hannah Debelius:* Thanks so much Breitner. And Clare, I will kick it over to you.

*Clare Lumkong:* Okay, in keeping with the theme of green labs, I wanted to, you know, in this upcoming year, I'm really hoping to do a deep dive into the laboratory waste streams and find, I think that there's a lot of new ways and unique ways to segregate the waste streams and find solutions for recycling or reuse of materials.

So we are going to be spending a lot of time in our laboratories and also working with our suppliers, our third-party suppliers to find good solutions for some of the wastes that are currently being generated.

*Hannah Debelius:* Great. Thanks Clare. Jason, would you like to pop in on this and then we'll close it out with Elizabeth.

*Jason McIntyre:* Sure. I guess a closing comment remark would be, first would be maybe just a parting word of advice would be, you know, as you are evaluating your next steps in your waste programs, it kind of goes without saying, but we've found it to be really helpful to listen to your stakeholders, whether it's the people operating your buildings, people in those specific expertise fields that are using consumables, whether it's again an office building or a manufacturer building or otherwise, you know, if someone in a recycling team is deciding the program, you may be too far from the actual use case to understand what needs to be done.

And I guess parting word of what I'm excited about is again just would be, you know, partnering with those that are passionate about this and finding those synergies to be, you know, find mutually beneficial outcomes. Thanks Jason. Elizabeth?

*Elizabeth Cole:* Yeah, I'm really excited to actually implement our signage program that we spent the year developing, so that's a big one, and I think everybody had some good tips on – and finding those who are kind of your champions and really engaging with them. I think that's important in anything you do and a good place to start if you're, you know, looking at any of these waste reduction goals.

*Hannah Debelius:* Yeah for sure and I think that can speak to the challenge we saw about getting internal buy-in. Excellent. Well, thank you all so much to our speakers. We've just got a couple of conclusion slides here, so if we could hop over to those additional resources slides. Thank you.

All the links we talked about today are available here, so you'll see this on the Better Buildings Solution Center. Speaking of the Solution Center we have over 3 000 solutions to help you find proven and cost effective strategies to help you reach your energy water and waste reduction goals. So these solutions you can all find on the waste page and tons more on the Better Buildings Solution Center.

Go to the next slide please. This is just a plug for our wonderful Better Buildings Summer Webinar Series, which will start after Summit. And I do want to in particular draw your attention to on August 3rd, we are going to be having a waste focused session, which will include actually going over the warm model which at the very beginning in one of the polls someone mentioned using that for metrics. So you can tune in on August 3rd for that.

And finally, next on our final slide please. Again, thank you so much to all of our waste pilot partners, in particular the partners that you all stepped up to share so much today about data and engagement and tools and all of those insights. So thank you so much for our attendees. I appreciate you answering all our polls and you're welcome to engage with all of our speakers or if you'd like to reach someone on the, you know, DOE side of things, please reach out to me and I'm happy to either answer your question or connect you with the right person.

So thank you so much and I hope that you all enjoy the rest of Summit.

*[End of Audio]*