

Hannah Debelius: All right. Hello and welcome everybody to the Better Buildings Better Planet which is a virtual leadership symposium this year. I'm really excited to get started with this session so next slide, please.

Today we're going to be talking about early best practices from the Waste Pilot which is a wonderful initiative that's new to Better Buildings this year.

I want to welcome all of our Waste Pilot participants that are on this call but I also really want to welcome the many, many new voices that we're going to have in the room that are showing an overwhelming interest in waste management.

Before we get start I have just a couple of housekeeping items that I'd like to go through. The first is that this webinar is going to be recorded and archived in the Better Buildings Solution Center so if you miss anything you'll be able to check back with us or share with a colleague.

Also all of our participants are in listen only mode which means that you're currently muted and won't be able to change that. However if you have any issues that come up with tech or with your audio you can go to the chat function that's at the bottom of the Zoom screen and you're going to go ahead and chat to the tech assistant or a panelist and we'll get you set up.

All right, next slide please. Well, as you can probably tell I'm your moderator Hannah Debelius and I'm in the Building Technologies Office at the Department of Energy. And I'll also be joined today by my colleague Bruce. Bruce, would you like to introduce yourself?

Bruce Lung: Hi. Thanks Hannah. So as Hannah said I'm Bruce Lung, also known as Robert Lung, and I'm a Lead Senior Technical advisor at Advanced Manufacturing Office supporting the Waste and Reduction Pilot.

Hannah Debelius: Excellent. Thanks so much Bruce. You'll be hearing from him a little bit later. Next slide please.

This is our agenda for today. We are going to start out with just some introductions and a program overview especially since we have so many new faces on the line with us today. Then we have an excellent panel set up of Mark and Bill who are both

representing the commercial and the industrial side of the Waste Pilot so we'll have lots of wonderful things to share with you.

And finally at the end you're going to have an opportunity to ask questions of our panelists during Q&A and discussion. So without further ado let's get started. Next slide, please.

I want to give a special welcome again to our 30-plus partners who joined the Waste Pilot. We are very fortunate to have them really across all sectors. Of course you can see we have an industrial and manufacturing sectors represented. In commercial we have commercial real estate, multi family, retail and healthcare, so thank you again for all of our pilot participants that our early results are going to be based on. Next slide, please.

This is just a little bit of an overview of the pilot. It was launched last year at the Better Buildings Summit for those of you that joined us in Virginia last year. And we're committed to help partners develop and work on their goals, determine their metrics, validate those results and also as always convene partners around solutions and advancing the knowledge base here.

Currently the pilot is closed to new full participants; however if you'd like to get involved you can still audit the pilot with us and by reaching out to Bruce or myself we're happy to add you to that list so that you can join quarterly calls, get our monthly newsletter and be in communication with all of our pilot participants. And Bruce and I will have our contact information listed at the very end of this presentation. Next slide please.

So Bruce and I are also joined by a whole team of people that work on the Waste Pilot. We have myself, Andrea and Zach all work on the commercial side and over on the industrial side supporting those manufacturing partners is Bruce, Eli, Ethan, Kate and Clifton. So for those of you that are in the pilot these names are probably all looking familiar to you because we've been working collaboratively with this cross sectional approach. Next slide, please.

If this is not your first Better Buildings session hopefully you're getting use to this tool but we'll be using Slido to do both a couple of polls to keep us engaged and learn from you all and also accept questions for our panelists that we'll be doing at the end. So at any time you'll be able to toggle in between those questions for our panelists and also the polls.

So right now you can open up a new browser or your mobile device and go to Slido.com, you're going to enter the event code BBSummit and then from a dropdown you'll select the Early Best Practices from the Waste Pilot. So I'm going to give you just a couple of seconds to go ahead and bring that up now, it will make things a lot easier going forward and there's also some more directions for that in the chat box in case you miss it.

So while you're bringing that up – next slide please – I also want to encourage you to engage with us on social media. You can follow both Better Buildings and Better Plants with our Twitter handle. We're using the #BBSummit2020 and of course you can also engage with us and share this knowledge over LinkedIn.

Excellent. Without further ado we are going to go to our first poll – again, this is on Slido.com with the event code BBSummit and the Early Best Practices from the dropdown and to get us started we would love to see what industry's represented in the room today – the virtual room that is.

All right. A lot of industrial. That's great. Over 30 partners – a little bit more than half – are from the industrial sector so I'm glad to see you all tuning in. Mark, that will be a lot of pressure on you to deliver some great resources to them. All right, contractors, local government. Excellent. So far this is lining up a little bit with our partners in the program which is wonderful, I know we have many other voices in the room. Excellent. Great.

I'm going to go ahead and launch our second poll then so we can dive a little bit deeper. So the next one is going to be a word cloud. So in just one or two words you could let us know what challenges you're currently tackling in waste management.

Yes, measurement. I'm not surprised to see measurement as the first one in there. We know that data and measurement remains a really huge challenge both getting it and making sure that it's accurate. Yeah, contamination, that's another big one. Yeah, data accuracy. I'm seeing a lot of themes here around the data and around contamination.

Yeah, also measurement of emissions is a big thing for those of you pursuing Scope 3. Verifying recycling. Excellent. I'm going to give that just a couple more seconds to populate before I go to our next poll. Recycling center not accepting contaminated waste – that's definitely a challenge and of course can also affect results whether or not you get that data back from the recycling center.

Packaging. I know that's one that's a big focus especially in our industrial sector. All right great, thank you all so much. I think that a lot of these we're definitely going to be tackling during the session today and it's also great feedback for us as we move forward in the pilot, so thank you all so much for your responses.

And we do want to just launch one more poll here which are "What are the challenges to setting and measuring a reduction or diversion goal?" since we know that the data measurement can be such a challenge. And yeah, great, it looks like they're already showing the live results for that.

Cost. Okay. Yeah, the lack of data for sure. We do know that it can be very difficult to set a baseline and your regional facilities might also be shifting or changing while you're working on those goals.

Yeah, lack of local facilities. We know that that's definitely a particular problem for those of you trying to compost.

Cost, yeah definitely can be a regional issue as well. I know Bill is in San Francisco and so they have a little bit different cost analysis than others so maybe he'll talk on that.

All right, excellent. Well, it's looking like data and data accuracy remains the big challenge in the room so I'm hoping we can tackle that a little bit more today.

Great. Thanks so much Andrea, and you can close down that poll and shift back over and we're going to get into speaking about some of our actual early results.

So for those of in the pilot you know that the first thing we did was interview all of our partners in the pilot to really learn about where you are in this process and what's on your mind.

So from those interviews we have a couple of insights. We know that many partners already have goals and have started waste efforts to reduce or mitigate waste impact. We also know of course as we've already seen in these polls that accurate data remains a really large challenge; however about half of our partners – more than half are already tracking their data.

We'll also share that the most common measurement and the most common goal was a diversion goal. And again for those of you that might be new to our waste management discussion diversion is the percentage of waste that is not going to landfill so that diversion is

measured by a percentage and most of our partners are choosing to calculate that based on weight as opposed to volume, however we do have a couple that are also using volume.

Excellent. Well, I'd like to share some more findings, so we can go to the next slide please.

Of our pilot – so again, we're just in the first year here – about a third of our partners were able to submit waste data to us so a lot of these conclusions are based off of that. Of those partners about half of them had to diversion rates that are above 50 percent which is really interesting and it shows that we can learn a lot from these partners.

Additionally outreach and education seem to be the most popular mitigation efforts that people have undertaken so far. I know Bill's going to talk a little bit more about that today but across commercial industrial that outreach to occupants and employees does seem to be a popular effort although one that people are struggling with.

We also know that a few of our partners have been involved in energy recovery and we're interested in exploring that more.

The graphs on the right just show us that the total diversion for all partners is 41 percent right now and for the bottom graph which is in the commercial sector we saw that the highest rates of diversion were with our city or public partners, and then second to that was office and retail spaces, so there's also probably more we can learn from those spaces that might translate elsewhere.

Excellent. Next slide, please.

I'm very happy to say that we do already have a couple of resources out there available in the Better Buildings Solution Center, and in fact two of ours were authored in part by our panelists on the phone today so I hope that in addition to hearing from them today you'll check out those solutions on the Better Buildings Solution Center.

Again, these slides will be available and recorded on the Solution Center after the fact so you can go back and click these links if you're interested in learning more or catching up and listening to our previous quarterly webinars.

Great. Thank you. So as far as next steps for us in this pilot in alignment with the spirit of the Better Buildings Better Plants program you can expect us to continue collaboration between these partners and developing and pushing new resources to the Better Buildings Solution Center is still going to be our hub for information.

And of course being the Department of Energy there's also going to be an increased exploration at the waste energy nexus: us learning from our partners about what they're doing there, exploring that in our own space with DOE's resources and hopefully also tackling a lot of the challenges that we're hearing from partners along the way.

So with that in mind I'm actually hoping for a little bit of feedback about what resources would be the most useful to you, so Andrea if we could go ahead and launch that next poll. And again to participate in the poll you're going to go to Slido.com and you're going to do the event code BBSummit – you're going to have this memorized later – and then you're going to select the early best practices from the Waste Pilot from the dropdown.

So what research, resources and tools would be most helpful to you all in your effort to mitigate waste? This could be something that you think DOE could provide or something that maybe you're looking for from another partner. Educational tools? Interesting. I'm interested to know if that's for the building operators or educational tools for occupants or employees?

Connection to recycling vendors. That's simply something that's a challenge regionally. Checklists and guidelines. Absolutely. And I think some of those you can actually see in Shorentein's solutions at a glance that we've published already – they've shared some of their guidelines and also some of their education material.

Yeah, compost definitely is a challenge, absolutely. It's also the thing that I think is the most new to most building occupants and that can create a challenge and a lot of contamination.

Consistent messaging. All right, great. I'm going to give that just a couple more seconds to get your feedback before I move to the next one. Excellent. Uniform signage. Absolutely.

Great. Well, thanks so much for all of your feedback. We do have one more poll before I turn it over to Bruce so if you could go ahead and launch that Andrea.

So we know that a lot of pilot partners are taking on waste audits or hiring a third party to do those waste audits. So if that's something that you're doing what sort of information is included in that? And I believe on this one you can select all that apply so it could be that you're getting all of this information.

Yeah, definitely the categorization of items is the real basis for a waste audit. Okay, interesting to see that cost is a little bit lower and energy recovery estimate is the lowest. That's definitely something we're looking to explore more through this pilot.

Great. I'm going to give it just a couple more seconds here for people to share their responses.

All right, excellent. Well, thank you all so much for this feedback and without further ado I'm actually going to turn this over to my colleague Bruce who's going to speak a little bit more about some current work and then we'll get into our wonderful panelists for today. So Bruce, go ahead and take it away.

Bruce Lung:

Thank you very much Hannah. I would like to reiterate a warm welcome to everyone who is attending. The Better Buildings Better Plants Summit is a great occasion. We're really glad to see so many partners from around the country who are joining us and in other sessions during the week.

I'm going to go through a few slides to discuss how the DOE's Advanced Manufacturing Office is contributing to waste reduction. First on the partnership side we have about 20 Better Plants partners from a variety of sectors who are in the pilot. And we started working with them to understand how they monitor, track and assess waste reduction in their plants.

So far we've noted that a fair number of them are using the waste conversion of the metric but we're also seeing some absolute reduction – volume reduction metrics as well as metrics we use in energy recovery.

We've also been collecting best practices from within sectors within individual partner companies. One good example is the principals of green chemistry from the American Chemistry Society that we have here today. This was actually forwarded to us from Bristol-Myers Squibb which applies these principals in their waste reduction efforts.

And then lastly we are working with AMO's Strategic Analysis Group to learn from some of their cyclical studies of waste generation to understand the waste energy flows and possible opportunities for improvement. Next slide, please.

So we've been doing a lot of work in terms of analyzing and contributing to circular economy. Beyond the work with our partners AMO is doing a lot of analysis particularly through data analysis, modeling, as well as finding existing best practices, technologies and materials that can impact waste reduction as well as some sectoral impact analyses.

One question we're asking or examining is whether there's going to be a revolutionary approach needed to take place so that some of the interloops such as design for longevity can be more successful. Some companies have strategies around them already – we've seen that with Xerox and Caterpillar Equipment Company.

But some companies are also looking to identify ways to use recycled materials as inputs or streamlining the supply chain to bring them quality recycled materials. One good example of this has been Patagonia so far.

Another question we're examining is how strategies for designing or for reuse or material recovery can take hold. We're looking at a range of practices and technologies such as waste-free culture that we've seen in Japan, zero-waste landfill approaches that identify a products value at the end of life, and as well as recycled clothing, adding to the manufacturing and materials as a service.

We are looking at the manufacturing sector in particular as we feel that's going to be a key to the success of any of these different strategies to say provide a pathway for these products that come to the market. Next slide, please.

One of the examples of the work the AMO – Advanced Manufacturing Office – is doing is in the special area of emphasis with respect to plastics. November 21 of 2019 the DOE launched what's called the *Plastics Innovation Challenge*. The objective of which is to dramatically reduce plastic waste and to position the United States as a leader in advanced plastic recycling technologies.

The PIC as we call it is intended to be a comprehensive and coordinated effort that spans fundamental and applied research that takes advantage of capabilities within the national labs, academia

and industry. DOE will use a variety of funding opportunities, partnerships and other programs to feed the goals of the Plastics Innovation Challenge. Next slide, please.

So through this Plastic Innovation Challenge DOE is going to advance basic and applied research to enable polymer upcycling and circular lifecycle to achieve Plastics Innovation Challenge and objectives.

A good example of this is going to be reverse engineering so they can deconstruct existing plastic products, find out what these products are that we can reuse or remake, but also looking at design of new polymers and plastics and resin and stuff that can be easily recycled or reused once their initial lifecycle or initial purpose is done with. Next slide, please.

To help achieve the goals of this Plastic Innovation Challenge the DOE is going to be partnering with a variety of stakeholders for cross-cutting, gap filling and corporate analysis associated with the research development, demonstration and deployment of EERE technologies across DOE with our government agencies and external stakeholders. Next slide, please.

A great example of this is what we call the *Bio Optimized Technologies to Keep Thermoplastics Out of Landfills and the Environment* – or the BOTTLE Consortium. The BOTTLE Consortium has completed an assessment by current economics, market sizes, supply chain energies and greenhouse gas emissions associated with 19 major commodity plastics.

This work establishes the baseline for economics and supply chain energy for all proposed work in this consortium through fiscal year '21 through '23 and fills the need for baselining for the broader community.

BOTTLE's leadership so far has established key partnerships and structure for the consortium and is reaching out to industry to expand it's membership. One big difference between partnership and the program of Better Plants versus BOTTLE is that Better Plants Better Buildings companies joined the technical assistance, recognition and networking opportunities. However when a company joins BOTTLE or a consortium like it it's really more for the opportunity to perform research than to benefit from the consortium's research efforts.

So we encourage folks to go to BOTTLE's website there www.bottle.org and learn about what they're doing and just opportunities to partner with this consortium. Next slide, please.

But now we're going to get to our panelists. I'm going to introduce Mark Pannell from Volvo Group North America and when Mark finishes Hannah is going to jump in and introduce Bill Whitfield from Shorenstein Properties. Next slide, please.

So Mark Pannell is the Environmental and Energy Manager for the Volvo Group Trucks Power Train Production Facility located in Hagerstown, Maryland. That means they make engines and transmissions for their trucks. He has over 30 years of experience in environmental and energy issues. He manages the ISO 14001 Environmental Management System as well as the ISO 50001 Energy Management System at this site.

This includes participation in the BB Summit's Better Plants Challenge Program as well as the North American Power Train Performance Commitment and Volvo Group's Global Participation in WWF.

At his current position Mr. Pannell was found constantly initiating and supporting energy and waste reduction projects to exceed this facility's goals. Since joining the Hagerstown facility in 2013 he has helped achieve a total improvement energy intensity of over 28 percent. Mark Pannell also promotes and utilizes Maryland's Energy Rebate Program and since 2016 he has procured over \$1.2 million for the facility and energy rebates to help fund various energy reduction projects.

So Mark whenever you're ready take it away.

Mark Pannell:

Great. Thank you Bruce, I appreciate that. Thank you folks for joining today and I'm glad to see everybody out there – over 160 folks – that's wonderful.

Just a little bit about the Volvo Group and who we are and what we do. Most people relate us to the Volvo cars which we're no longer actually a part of. The Volvo Group has over 100,000 employees in over 190 markets with production facilities in 18 countries. So we are the world's leading manufacturer of trucks, buses, construction equipment in marine and industrial engines. Next slide.

So one of our goals is driving prosperity in all aspects of the world. As you can see it means that we can impact the environment and the usage of our limited resources and are also considered in all the activities that we do which is part of the circular economy that Bruce is talking about there. Next slide.

So as you can see here our environmental journey all the way back to 2003 here in North America you'll note that we have started the process with our ISO 14001 and moved steadily through getting into the energy management side of things with ISO 50001. We have made great strides when it comes to waste water recycling to moving into landfill free, working with DOE on many of the projects and many of the reductions that we have here. Next slide, please.

Moving forward from 2014 until currently as you can see we have worked closer with DOE with the Better Buildings Better Plants Program, also with the WWF. Many of our facilities here in North America have begun and achieved the Landfill Free Certification journey which we're very proud of.

Also with Hagerstown we are looking to recertify this year for our third platinum level for our ISO 50001/SEP certification. Notably also we have also achieved our secure goal with our WWF commitment to reduce 13,487 megawatt hours worth of energy consumption here at the facility, so we have reached that and that would be – I think the six-year period closes out at the end of 2020 so the Volvo Group continues to add towards that commitment on a global basis. Next slide, please.

So this right here is just a quick overview of where we are with the Department of Energy's Better Plants program. As you can see we've made some great strides by committing to that 25 percent reduction over the 10-year period. We were able to meet that early with our first program that we signed up for and then of course the reward for hard work is more hard work so we signed up for another 25 percent in 10 years, so as you can see we're also tracking very well towards that. Next slide, please.

As far as renewable energy most the facilities that we have here in North America as you can see are working towards getting more renewable energy when it comes to solar panel installations. Fortunately here at Hagerstown we do have two systems in place. One is our parking lot canopy on the north side of the plant with the 1.3 megawatts and also a ground mount installation on the backend of the plant that is 2.2 megawatts.

So as we continue on we do continue to make investments to look for more opportunities for renewable energy here at our site and other sites throughout North America. Next slide.

So some of our landfill free facilities. Our New River Valley Operations became the first to receive the Volvo Group Landfill Free Certification in 2018. The New River Valley site is where the Volvo trucks are actually assembled and produced. Lehigh Valley Operations was also certified landfill free in 2019 – that is where the Mac trucks are assembled and delivered from, as well as our Middletown Remanufacturing Operations was also certified as landfill free in 2019.

Last year in 2019 here at Hagerstown we began our landfill free certification journey which is a 12-month journey and we are monitoring and hoping to be able to close that up sometime in quarter four of this year. Next slide.

So just to show you a little bit about what we actual perform or build here at the facility – let's go ahead and go to the next slide. So was you can see here we produce the rear axles as well as the engines and transmissions for the Mac trucks. These are the large over-the-road trucks that you will see out on the highway.

For the Volvo trucks in North America we produce as you can see the 11 and 13 liter engines as well as the transmissions.

Now for the Prevost and Volvo buses we produce engines and transmissions for those as well. We do machining here of crankshafts and camshafts and all of the gear components that go into these transmissions and engines as well as performing testing, the painting operations of these engines and we do research and development. Next slide, please.

So our customers at this facility here as I've stated earlier – Mac trucks – up in Lehigh Valley, Pennsylvania is where they take and install the engines, transmissions and axles that we produce here into the Mac trucks. Also in Volvo trucks in New River Valley down in Dublin, Virginia, is where those are installed into the Volvo trucks.

Volvo buses in Mexico City and Prevost is in Sainte-Claire, Canada as well as Plattsburg, New York. Next slide.

So, again, just to restate, we are a very unique campus here. The fact that we do have our technology side of things to where we are

researching and developing the next generation of engines and transmissions for the Volvo trucks, the Mac trucks as well as the Prevost and Volvo buses and motor coaches. Next slide.

Now to move onto landfill free. Volvo Group has basically established our definition as many industrial facilities and other places have that are landfill free definition is going to be where less than one percent of our material ultimately goes to the landfills as the final disposal. Now this is production waste that we have here. Generally the one percent can only occur when those residual materials cannot be recycled or treated or managed in any other way. It's basically a last resort.

Now, this does not apply to any type of construction and demolition debris so it is not subject to that one percent. It is only the normal daily production waste that we have. So sometimes we do make strides also when it comes to construction and demolition to always recycle when possible and to avoid landfills if at all possible when it comes to that. Next slide, please.

So historically when facilities, especially large industrial facilities want to go down the landfill free path the natural progression or the natural way here in the United States has always been to go to waste energy which is essentially to where you are taking your plant trash and you're sending it to a waste energy facility where we're going to take this trash, they're going to put it into a large area where they're going to burn this, they are going to generate heat which then is going to generate steam, run a turbine and you're going to generate electricity off of it.

One of the drawbacks to that is that many times in these waste energy facilities there is still fuel that has to be used to ensure that this waste is able to generate the proper amount of BTUs to be able to create the steam to be able to create the electricity ultimately. So you are still burning these fossil fuels to be able to do this.

So Hagerstown did explore the waste to energy option but due to the high cost of some other developments that we had in our particular area we chose to go the route of the solid recovered fuel to get our plant to the landfill free – to our destination. Next slide, please.

So, just to take a look at how we manage our wastes here – and I'll work from the right to the left here – so our used oil, wood pallets, cardboard and of course our scrap metal, whether it be bulk steel or other turnings here from our operations of course are recycled.

As far as our hazardous and non-hazardous wastes such as our manifested waste if you will or our drummed wastes those are actually sent out for incineration and/or energy recovery when it comes to how we manage those regular type wastes.

Looking at our general site – our plant trash, if you will – again, switching from the landfill going to the facility in Entsorga that we use here locally we were able to achieve the solid recovered fuel. Now, we'll get into a little bit about what that is.

If you were present during the last summit that we had and presentations that Volvo did we talked a little bit about our total waste elimination program where we focused on not only our trash and waste but we also focused on our recyclable items as being just as detrimental to the facility here as basic trash and the fact that we would attack any material that came into our facility that left that was not an engine, transmission or an axle because to us that is a waste and it's something we paid for and now we're having to pay to manage it again out the door.

So anything that we can is either going to be recycled or is going to go to the solid recovered fuel and it is our goal to always be looking and saying, "What can we eliminate?" Next slide, please.

So some of the recovered fuel just as an overview and basically utilizes a mechanical and a biological treatment to convert your waste into an EPA-recognized alternative renewable fuel called SRF – Solid Recovered Fuel.

The good part about this is it does not combust the waste in any way during this manufacturing process. It uses a combination, as we will see, a lot of it is sorting equipment, some enhanced biological composting and mechanical refinement. Next slide, please.

So in the SRF process, as you will see, first is the mechanical pre-screening. Our material is delivered to the Entsorga facility where it is dumped into a large pit where some basic sorting can be done when it's dumped onto the tipping floor to see and make sure that we don't have any gross contamination in those particular loads. Go ahead and hit the next slide.

It goes through a refinement process. Next slide. To where they start to sort out a lot of the obviously recyclable materials, a lot of the metal is pulled out, any big bulk items whether it be wood or whatnot is pulled in this process. Next.

From there the material is transferred and it goes into the biological treatment side of things. Next. To where it is picked up after the sorting and placed onto this bio-oxidation hall. If you will note in the floor there that's concrete but there are slats or slits cut into the concrete there that allows for oxygen to be drawn down through the waste material that is sitting in this very large pit to be able to speed and help that oxidation process. Next slide, please.

Here are the bio filters that are outside of the facility. This right here is mulch that is placed into it and you can see the various fans there on the left. Next slide. That are actually helping to pull and filter this air that is drawn off of the material that basically eliminates all of the odor that you will encounter on the outside of this building. Next slide.

So then comes the mechanical refinement and sorting that occurs to where they're going to continue to shred this material, to do refinement sorting, pull out any metals that may have been missed through the initial sorting process. Next.

So there's various stages, whether it be the shredding portion or whether it be the continuous drying of it, also where it becomes into the right sizing of the material. Next slide, please.

Here's the load out. So here it becomes the material being deposited into these 100-cubic yard walking floor trailers that will ultimately be delivered to a customer. Next slide.

This right here is an example. This is a picture of our waste material once it has been – it has gone through this mechanical process – the biological process, the refinement, the shredding and the drying. This particular material basically has no odor to it: it's almost like fluff if you will.

It can be turned into fuel pellets but they choose to actually run this loose. Next slide.

So some of the benefits then for SRF is basically that our plant trash is now turned into a product that will ultimately be sold. So before it would be something that would be sent to a waste energy facility and it just simple goes right into it. It is incinerated to the point that we get the BTU values when we have steam and we generate electricity and it's done.

This right here is almost turned into a product or a commodity now that can be shipped either a couple miles down the road or it can be

shipped hundreds of miles down the road as a product that we're selling to somebody or they are selling to someone.

The good point is that the high calorific value of this? One ton of coal is equal to approximately 1.5 tons of this SRF. Next slide.

So when you're marketing this SRF you're marketing it to industrial users that are currently using these fossil fuels. So cement industry, lime kilns, steel mills, for example, so when you have a facility that let's say is using coal to fire their kilns there to create their products such as the cement industry which is exactly where our material goes it goes to this particular cement kiln and they cannot purchase enough of this material. They cannot produce enough – I'm sorry – of this material to feed this particular cement kiln because they are consuming so much material all the time to produce the cement that they have there.

So the benefit of that is that we're no longer using – or they are no longer using coal to fire this. Normally this material would have either went to waste energy or it would have went to the landfill, so you're able to basically offset the use of that coal there at that facility. Next slide.

So I guess if anybody has any questions I will be happy to answer those.

Hannah Debelius:

Thanks so much Mark. And actually we're going to hold questions until the very end for both our panelists. However we've gotten a lot in on Slido which is great. I'm writing them down so we'll be good to go.

Wonderful. Mark, thank you so much. I really appreciate all your insights there and of course the perspective from the industrial side.

Next up is Bill Whitfield. Bill, of Shorenstein, which is a commercial real estate company and he is responsible for managing and overseeing the company's sustainability program and is also General Manager of the Russ Building where Shorenstein's corporate offices are located. So Bill go ahead and take it away. We'd love to hear more. Bill I think you might be on mute.

Bill Whitfield:

The first of many faux pas you will see as I go through my presentation. It was great to hear Mark's presentation because I see you did a great job of some different perspectives here because I'll

be talking about a whole different angle about our waste management and what we do and how we do it and it's obviously not industrial: it's really much more with talking about how I interact with people and try to get them to participate in the program so that we can be better recyclers.

I also may mention a few basics that I see you guys we've got a pretty astute audience here that already knows all about diversion rights and stuff but I still may mention a few basics for those who don't as I go through things because that really is kind of the point of what I'm trying to get participation in this program of reducing our waste is really teaching people from knowing nothing about recycling and how to deal with their waste to try to become active participants in the program. So next slide.

So ten things I'm going to talk about just to kind of shoot for some different topics here is what we do at Shorestein – I'll tell you who we are and what we do in a moment and how we do it – waste reduction.

Composting as a specific item. It's more important than you would think in the office building setting.

Messaging, which is kind of the core about everything I'm going to talk about today is how to get the information and the knowledge of how to participate out to the audience that I'm dealing with.

Sustainability as a larger picture above and around waste management and recycling.

Shorestein successes.

And then at the end I will do a little bit of ranting although I was happy, the first poll you did today everybody has a lot of the same issues I have so you'll just hear me rant about them for a minute too because they are sometimes stumbling blocks in our success. And then I'll say thanks for having me. Next slide.

I promise this will probably be the only little cutesy cartoon I have but I always like to start whatever presentations I do about recycling and sustainability with this. It is the simplest concept. It really says it in a way which is "All that we are doing in the end is trying not to do something now that's going to come around and bite us in the ass later." I mean it's the whole concept of recycling and sustainability and kind of the core of what I'm thinking while I'm passing on all the information I pass on.

Shorenstein is an owner and manager of office properties across the nation. We're generally in major markets. So what the leaves me with as far as the audience I'm dealing with on recycling is my corporate entity, the offices where I work and the employees that are there in the corporate office running the company. I have to deal with the building teams that are out in each building managing each building – Shorenstein employees – and then the largest group I think that we have to deal with of course in sheer quantity is the actual tenants and trying to impart the wisdom to them of how to participate in our recycling program and how important it is for us to see better statistics when it comes to waste management for our buildings.

There is a touch of retail in some of our buildings and of course that is only interesting in that it is our one link to the public which is a whole other situation in trying to get people to participate in recycling programs when they're just stopping by for a minute. But the retail and that aspect create a lot of waste that we have to figure out what to do with or impact the waste that leaves the buildings a lot so it is worth mentioning. You can go to the next slide.

The other thing that is worth mentioning is that our corporate headquarters are based in San Francisco, California, and when I Google Recycling San Francisco it gets credit for being a very advanced city and I think it's great that we're located there and that I can work so closely with them in taking some of the mandates that they do and try and trying to send it across to our other major markets and our buildings.

So what we do at Shorenstein. I'm really just going to kind of talk about the stuff and list it because as of the beginning of the program here you put the link up. Better Buildings Group was kind enough to do a spotlight on us and put up many of the programs and policies for you to take a look at if you want to explore them more.

But I will tell you what we do which is – and why I think our program is kind of doing well and successful are these reasons.

Employee sustainability training. So first of all the great thing for me about my company is that I don't have to convince my executives and my corporate entities that recycling and sustainability is important. It's kind of already imbedded in our company so it's great that I have free range to go do what I need to do to get everybody else onboard and not try and convince my own company that this is important. They seem to have that as a core

component of the way we operate and so that I think shows in our employee sustainability training which starts as a new hire. On your first day of training sustainability is mentioned and taught and recycling and the importance of it explained.

That training is also ongoing after you've worked for a while. The sustainability program which is myself and Kelly spend a good three hours over three sessions with every new employee teaching them about the sustainability program and what our expectations are and kind of just instilling that it's just kind of a core value.

We have our policies – I think those are listed on the website so I don't need to go through in detail too much but there are four main policies and I love policies because they're really rules and guidelines: if you work here you better stick with what we're saying here in our policy.

We have an overarching kind of sustainability policy expecting everyone to participate with our objectives and our targets related to energy, greenhouse gas emissions and water waste, indoor air quality and the need to provide tools, leadership and communication to our tenants.

Energy Star is its own policy. Our commitment to having every property fully involved in Energy Star is very important. It's very important to the success of our program for waste management and energy use and everything. I'm sure our audience out here is very familiar with portfolio manager in Energy Star but it is a fantastic tool and a requirement for all our properties to participate in and hopefully are Energy Star certified.

We have a waste policy. Clearly that's what we're here to talk about today and that is that policy really just states that you will implement a waste management program at your building that either meets Shorenstein's standards or your jurisdictional standards – whichever is more stringent. So be as mindful as possible in dealing with the waste of the building.

And then a tenant engagement policy and that of course is that we expect all of our property teams to engage tenants and to support them in every way to make waste and recycling and anything sustainability related a priority.

We have our goals of course. There's four simple goals that we are all striving to meet in the company and using as a tool to motivate people to meet them. I'm sure again most of our audience members are familiar with basic goals. We have a waste reduction, water

reduction, greenhouse gas reduction goal – I missed the fourth one – water waste – you know, we've got goals. The point is we've got goals.

Excuse me for talking quickly because I don't want to waste people's time so I'm kind of powering through my presentation.

We collect data monthly. Again, not only through Energy Star but in every way. In many ways we are making sure we're monitoring what each building is doing.

We also collect data from a quarterly perspective. We take the data that we collect monthly and our business information team helps me make a really nice presentation of that data which is the key tool in motivating the properties to be involved in everything we do sustainability wise. That quarterly report gives all the buildings a comparison to how they're doing relative to the other buildings and it also gives them a perspective of how they're doing – if there's any trends we're seeing or a problem area – so it's a real great tool to look at and see where we need to spend some time and where I need to support properties as needed.

We have a pretty robust recycling training program specifically. Recycling is kind of my particular passion so I'm proud of that program. Again, you could see that online but one I was involved with is a really great tool and it's produced in such a way that it's a useful tool for employees and tenants and anybody who wants to watch it as far as how to participate in recycling in an office building and it's interactive so it allows the person viewing the recycling online to dig deeper into topics and issues and questions that they have as well as it asks you questions to make sure you kind of learned what you needed to learn.

We do in-person training. We provide that. I love to do an inspirational recycling training whenever I can. It's a training program that is available kind of as a PowerPoint. It's customizable because each building sometimes has its own way of dealing with recycling or community.

And then we have other forms of support like our brochures. We provide all our buildings with customizable brochures so that they have something when a tenant moves in to hand them and say, "Here's our program and here's how it works and here's how you are expected to participate."

We allow our property teams to support the tenants in any way that they need to make sure that they participate in their recycling program. So we don't want to give a tenant any excuse not to participate. If they need bins we'll provide the bins. If they need signage we will help participate and provide that signage. And we have a specific online website at each building that a tenant can go to that provides how recycling works in that building and how they can participate in sustainability and the larger picture.

And then our annual trash audits. I expect every building to do an actual audit of their trash annually. This kind of course verifies what's actually going on, kind of verifies the diversion rate and – you can go to the next slide – and is a useful tool for us in making sure that we're doing what we're doing.

So don't let this slide scare you. It was interesting to make. I was basically asked to do a presentation to my executives and property managers about what sustainability is at Shorenstein and it was suppose to be a simple flow chart saying "Here's what we do" and it got a little complicated but the story is very simple that it tells which is that from the building – basically the program in a nutshell collects information, reports that information to the appropriate agencies and local jurisdictions and wherever it is required to report, tries to get and receive as much recognition for that information that we collect with all the certifications and programs that we can be involved in.

And the key that I learned from this is how to get that information and bring it right back here to the beginning so that it gives the appropriate tools to the buildings to improve on the data that they put out.

What stood out for me in this particular drawing was how important property management engagement, which is something that we're going to focus on more, is to the success of a recycling program or any kind of environmental program in the building.

It kind of needs the enthusiastic support of a person in order to pass that on to the tenants. Just passing something on if you really don't care about it doesn't do as well as becoming motivated to do so. So I'm working on that as our what we're doing next kind of approach. Next slide.

So a lot of what I think I went through my list and said I was going to talk about – messaging – a lot of what makes our program successful or the only way we can see improvement in our waste

program is by messaging to the tenants the right way. All the training and education is – I'm constantly thinking about how I'm going to get this information to them.

And one of the things is I think that recycling is the gateway into sustainability as a larger thing but – so they're all willing to say, "Okay, how do I recycle?" but the training immediately covers much more than just the actual recycling part of course. We've all heard reduce, reuse, recycle but it is just so important to emphasize to everybody that waste management starts with trying to consider everything that you potentially bring into the building or that you produce, if you can reduce what you get you obviously are going to have less that you need to deal with in the end.

And then of course of those things how many of those are one-use items? Is there any way to try to view everything you utilize and do in your workday to be reusable? Obviously the one that comes to mind is why a paper coffee cup when you can have an actual mug? You're only in your office. You know, it's around you all the time, the coffee place is right down the street, why don't you just bring a reusable mug instead of paper cups? That type of idea.

So the concept of this is just that it's a lot bigger than just simply recycling. And then when we get to recycling if you have to do something with it sorting is the key to recycling – that is the message that I send. Anything put in a pile of only itself can probably be recycled and it's just a fact that it gets all mish-mashed and has to be separated somewhere else or dealt with in another way that makes recycling not as effective.

I also of course came up with one more word starting with an R but it really is compost – you can go to the next slide – because composting is far more important than the average office worker thinks especially, even in an office building.

If I had an office building or we acquired one and they had absolutely no waste management program the first thing that we would like to make the most effort to implement would be composting because it really can change your diversion rate from zero up to 50, 60 percent immediately.

It is surprising how some tenants are kind of scared of composting. Like they think that these things – these myths about flies or bugs or smells – it's the same stuff that's already in your office: I'm just asking you to put it in a different colored bin and we'll take it from

there. So we try to put a big emphasis on our recycling program. Next slide.

This slide is basically about messaging and I was so glad to hear Mark speak and give me such inspiring information about landfill. But when I messaged information to the tenants about why they need to recycle a lot of them just want to know – a lot of training may just say "Put this in this bin and put this in this bin" and really not tell them why and I think it's super important that instead of just memorizing what goes into what bin understanding why you're dividing it into the way that you're dividing it and that starts with understanding some of the bad news which is why landfill is bad and what a diversion rate is.

And the story's told very nicely in this slide which is that if you diverted all the stuff in this landfill breakdown you only end up with 14 percent of the landfill that you would have otherwise had and that way you're not burying recycling to never be seen again and burying paper or compost which both can be composted if you wanted which could be used in a more valuable way all if you participate in our sorting program – from the source.

Of course I don't think I need to rant to this audience too much about this but there are a list of reasons why landfill is bad and I kind of start my training with tenants on that with that message. Next slide.

Sustainability and the bigger picture. Another thing we try to impart to all those who want to participate in our waste management program is that there's a connection. I find that some people don't even realize why they're recycling, it's just the right thing to do, but not long ago it was inappropriate for me to talk about climate change or greenhouse gas emissions, it was kind of politicized, but I have definitely started trying to make that link for everybody that I'm trying to get onboard with our recycling program that the most involved thing you can do – or the way that you can be most involved in creating an Earth that won't have climate change and pollution is by recycling.

It's the one thing that you can do as an individual that just – and I try to associate the link and how that plays out to "Doing this you're really doing your part to reduce greenhouse gases" and I explain the slightly scientific connection there which this group understands quite well. Next slide.

So in a nutshell our successes which I think is why I was suppose to kind of come here and talk at Shorestein are simply that we have a really robust – well, I want to start with something that's not even here which is that our corporate commitment to if you're in our building you will participate in our recycling program is a real success because – and tenants like it – they like to be clearly directed on how to do the best thing they can do as far as recycling.

We have robust programs in place which I discussed some of those already. We have our policies which I went over. Our individual statistics. Again, I'll probably state that this is a picture of the Russ Building in San Francisco and the Russ building maintains an 87 percent diversion rate.

I think you all know what diversion rates are but that is how much of the waste that leaves the building is diverted away from landfill. So the fact that we have a very small percentage of what leaves the Russ Building goes to landfill is impressive.

Portfolio wide we're up above 50 percent. Thank you very much Better Buildings for helping me figure all that out. But that's not bad too when you average it all out across the portfolio knowing that half of what would otherwise had gone to landfill is diverted due to the efforts that we do in our buildings.

And then success is the Better Buildings Waste Pilot. To be asked to be in that program and to be asked to talk to me is a real honor so thank you very much. Next slide.

Oh, we made it to the ranting part, haven't we? I was happy to hear that it's not just me. Already in this program today many of these things that drive me nuts and make it difficult and in some ways stumbling blocks to succeeding is – the rest of you know about it too so that's fantastic.

But statistics. Diversion rate is a touch statistic. I have to teach people what it means prior to actually achieving it. And of course it is the diversion of your waste from a landfill in general, so that's always tough. It would be great if there was some better ways of measuring or different ways of looking at things.

I think one of the issues is that it doesn't account to how much trash we make: it just accounts to how much of it we divert which takes me to root causes. I think that just like energy these days we're starting to say thank you for reducing energy in each building but we also need to look at where the energy we are using

is coming from – that's almost just as important if not more important that if it's from renewable sources it really is a more affective way of looking at your energy use than just reducing what we use.

Same thing with trash. Try to look at not just let's be good recyclers but let's look at the bigger picture of seeing if we can reduce the amount of trash we use in the first place.

National guidelines. It is very difficult having 80 to 100 buildings across the nation and having every one of them have kind of different guidelines in their community. So if there was some sort of cross the nation perspective on the right way of good recycling and managing your waste that would be fantastic.

Initial responsibility which is really what is talked about a lot and hopefully we'll see some progress on but it's kind of like if somebody sells a product it would be great if they were responsible for the end-life of that product as well. That would really be a fantastic thing and I think as an example Amazon, they deliver a box to your door and then the empty truck goes back to the warehouse every night. Why wouldn't we want to put the empty box from the other delivery out front so that they leave your new box and take your old box?

I think that in the end it would be, as Mark taught me, it's financially wise if companies can deal with their own waste and it also makes them think of better ways of doing things. I'm sure if we did that with Amazon you would find that there'd suddenly be reusable boxes that they'd just use over and over rather than the fact that they'd have to take back the other box.

Plastics. Thank you Bruce. I was so excited to hear that there is a conversation going on and efforts about plastics. Plastics drive me nuts – don't even get me started. There's so many plastics in the world and there's so many better ways of doing things essentially over packaging so that is something that drives me nuts.

People's behaviors. Of course that's what I'm dealing with in general. I'm trying to teach people how to be better recyclers. It is interesting to me that some people go through the sorting bins with their item and say, "I don't know so I'm going to put it in the landfill item," which is like that's the worst choice. You could have put it in the recycling bin where it's going to get sorted.

And then education. Recycling really needs to be taught to children. I think it is and I think it was and I think we've kind of lost it because I'm finding some of my millennial tenants right now aren't as pro-recycling as I would expect them to be and to me they're the kids these days but they're a little bit more "Do it for me" than "How do I do it?" But, that's me ranting. Next slide.

Good, that cuts me off from ranting but thank you very much for listening? How did I do on time? I hope I didn't talk too quickly but I want to mostly again thank – you know, recycling is my passion. I really love to teach it and be involved in it and do as good as I can so I want to thank all of you folks whose numbers I see down here for listening to this because that really means that you're all just as passionate as me so thank you so much.

Hannah Debelius: Excellent. Thank you so much Bill, I really appreciate that and also of course hearing from different perspectives and sectors and also the way you're approaching it.

We have about 20 minutes for some Q&A. I see that we already have about 30 questions lined up which is great but it's not too late to contribute your own. Again, if you go to Slido.com #BBSummit is your event code and then you're going to choose Early Best Practices from the dropdown.

As our questions are coming in I've been trying to kind of combine the ones that are similar and pick out what seems to be the hot topics. So I'm going to start with a question – back over to you Mark – one of the hot topics people seem to pick up on from your chat was this idea of the landfill free certification.

I know you spoke a little bit about it and it's definition of being less than one percent going to landfill but is that something that's a third-party certification or is that something that's internal? If you could just tell us a little bit more about that that would be great.

Mark Pannell: Sure. And actually a great question. The certification that we speak of is more or less an internal certification for ourselves. So it's something that was established by the Volvo Group – Volvo AB out of Sweden. We worked with all of our sites to come up what our internal definition would be on this and how we would apply it to ourselves.

So each individual company I think would need to understand their definition of that is going to be. Some could be a lot looser than the one percent. So as far as is there an actual sanctioning body out

there that could give you a certification – official one – kind of like we do with ISO right now – not that I'm aware of. I don't think that there is anything out there.

So yeah, with the one percent – just to kind of restate and clarify a little bit on that also – something I failed to say was that was one percent of the residual going to there but also one thing that did not count towards that would be any type of beneficial reuse. A lot of times with materials that you have that cannot be recycled they cannot be readily burned or incinerated for their BTU value can be used such as for alternate daily cover at a landfill.

So in lieu of using dirt to cover the waste at the end of the day a lot of these landfills will take this un-recycled material and use that as their alternate daily cover, so something like that would not qualify as going towards that certification. Yeah, good question.

Hannah Debelius: Great. Excellent. Thank you so much Mark. And then I'll also just mention this about our Q&A is that we do have so many questions and I know that so many of our pilot participants are on the line so particularly for a pilot participant if there's a question that you feel like you could also contribute to there's a reply button under each question.

I know we've had a couple about healthcare so if there are any other healthcare partners on the line you can go ahead and reply to that person directly since we won't be able to get through all of these.

So my next question is one that came up here and it's of course a big topic of conversation across the globe right now and it's basically how has Covid impacted your waste streams if at all and in particular with things like single use or disposable packaging? I know that's something that maybe we don't know the answers yet of how that's been impacted but if either of you could weigh in or maybe guess, happy to hear it.

Bill Whitfield: I can't imagine it's good. There's been a lot of disposable. I mean it's been promoted greatly – just it's producing a lot of stuff – so that can't be good. I have not noticed it in our waste stream yet because in all honesty we haven't seen the return to our buildings that we are expecting to see soon. I think largely tenants are spending even more time away.

In preparation for that I have provided a new bin – a red bin, which is technically hazardous waste but which is a place that everybody

can feel that they can put their stuff and we can deal with it in a more careful manner. I do however think it's going to end up in landfill – that's the ultimate path for that bin in our building.

One quick story I was going to tell in my rant – sorry to bore you guys again or take the stage – but I went to Safeway – my supermarket is not allowing to bring in your reusable totes and bags. I guess they feel there's some sort of contamination issue with that. And one day after waiting in line and wearing the mask and doing everything they had run out of their disposable bags to provide any way of carrying your groceries so I had to load all the groceries back up into the cart and then bring them out to my car and put them in the trunk and when I got home I got a box and carried them in and I was thinking, "This is kind of great. I don't know why we need bags at all?" It seems like just changing the behavior of just having to have a bag is kind of dumb. It was not hard at all to deal with no bags.

Hannah Debelius: Great. Mark, anything you'd like to add to that?

Mark Pannell: Actually one thing I will say is with the Covid and especially on the age and that side of things with our health and safety folks – our team out of Greensborough that put in some obscene hours trying to prep and plan for this Covid response when we returned to the factory to continue building – those guys were really thinking through a lot of the things too when it came to the logistic side of things to understand that – we were in good shape on a lot of stuff when it came to certain containers – it's a five-week lead time for us to get parts from Sweden – so for five weeks these parts stay on a container ship. Well, that's great.

But then the question that arises is okay, so with a lot of our reusable containers that we have where do we get to the point to who was the last person who touched this? What do we do?

The good part of that is it falls into our thinking about where did this part come from? Where did this piece come from? Where did this box come from? Why do I have a box? What happens to this box now? So inadvertently a lot of people on the manufacturing floor kind of going back to what was said earlier, it allows these folks to be able to question and see and realize, "Wow, I never really paid attention to how many bags this part came in. How many parts are in this box and why do we have bags and why do we have all this and what am I going to do with this and who touched it?"

So it lends itself to being able to expand that knowledge of "This is why we try to get rid of all the materials that are here." And does challenge some things also to sit there and say, "Okay, is there a better way to do this because of the Covid? What can we do to reduce these touches, reduce these potentials for having areas of contamination?"

So I think it's actually been a beneficial thing that – to be able to address some of these issues and kind of bring them up to the forefront and maybe some people can now kick out some ideas of how they would solve these solutions.

Hannah Debelius: Excellent, thank you so much. Mark we have just a quick question for you which is that someone was wondering whether you count scrap steel in your recycling rate or how that's counted.

Mark Pannell: Scrap steel is actually compounded two different ways. First we have our recycling numbers with and without scrap metal. Then we further break scrap metal down a little bit differently because recycling of scrap metal is more so based off of our process because it's a natural process that we have.

So we kind of look at our general recycling when it comes to our cardboard, when it comes to our pallets, when it comes to any kind of plastics and that kind of stuff – that is the number that we focus on for our KPI – our Key Performance Indicator. How well are we doing? Are we increasing? Are we reducing based off of that.

Any of the scrap metal recycling that we do we are basically going to focus on in a different way to where we have recycling based off of production volumes, we know how much recycling should come off of a crankshaft, off a camshaft, off of any other gear machining, shaft machining that we do when it comes to transmissions. But we also look for a breakdown when it comes to the cost of poorer quality.

So sometimes you might have a month and it's like, "Hey, this is great. We increased our metal recycling by 20 percent." The question is how much did volumes go up? Well, it didn't. Well, that could be the cost of poorer quality to where we scrapped that part – that's bad. It could be that we actually got rid of some machinery and we scrapped that machinery and brought in new stuff. Well, you have to account for that to understand those ebbs and flows of your recycling – where does that come from?

A lot of times you can take a look at the projects and see to where – especially with our PRI reporting and whatnot we have to look at how much material we removed from a plank of steel to make a crankshaft or camshaft or whatnot. So there's opportunities there to see how can we lower that recycling number but yet see an actual improvement because we now do not have to remove as much metal from a piece of equipment already – basically like a product – therefore we're more efficient and things like that.

So we do break our recycling down multiple ways.

Hannah Debelius: Great. Thank you. It appears that person was aware of some of those intricacies so that's wonderful, thanks so much Mark.

Bill, we have a couple of questions of course around engagement for you. So the first one if you could provide just a brief general outline of what the three one-hour sessions to new employees cover, and specifically if it's just recycling or if it's more waste streams?

Bill Whitfield: It's actually sustainability in the larger picture that we cover in our new employee training. We have a sustainability kind of how-to book at Shorenstein so we just – a little bit of go over what you all had to sit with me for now – we teach a new employee everything that we feel is a strong commitment on our company's part to ensure that everybody's just kind of understands our sustainability program.

We leave them to come back another time after they've gone through the book and we kind of chat about questions and concepts that the book provided them.

So it's a PowerPoint presentation that covers that and I have to say it doesn't deep dive into recycling in that new employee training as much as the recycling trainings that I do separately.

Hannah Debelius: Is that something that you've partnered with human resources on in order to be able to reach those new employees?

Bill Whitfield: Yes. Well, HR is cooperative and involved but luckily our property management and construction group has a really robust training manager and team that helps us develop these training programs and almost does it for us – I guess we help them. So it's just a real big – training in general is a real big support to all our buildings that Shorenstein provides from the corporate offices.

Hannah Debelius: We've got one more question that is about engagement then I'm actually going to put up a poll about engagement to our audience because I'm curious about their input on this. But, so Bill for you also mentioned some requirements and some policies that you all have. Is that something you include in leases? How are those enforced or strongly suggested?

Bill Whitfield: No, they're really in the employee handbook. We just have a lot of policies that are available and often you find yourself just referring to them and pointing to them through the other training and policies through the other trainings and interactions you have with employees. They're not for tenants they're just internal policy for employees.

There was kind of a second part to that question I wanted to touch on. What was the question again?

Hannah Debelius: So essentially if it's in leases and how are those policies maybe enforced?

Bill Whitfield: Yes. So our leases – although we have changed our language a little bit it could be a lot more robust. In our leases we have an attachment called *Building Rules* so that is different for each building so we encourage each property to have a “tenant must participate in our recycling program” as a building rule rather than having incorporated it into the body of the lease.

But we're recognized for being a Green Lease leader so our leases are in some way green.

Hannah Debelius: I'm glad you pitched the program and I didn't have to. Excellent. Thanks so much. So as you can see we've launched this poll and how affective to you feel your signage and occupant engagement efforts are? It's something we hear a lot about from partners and also I want to encourage you all to check out the solution that Shorenstein worked with Better Buildings on.

It looks like about 40 percent feel like it's – okay, the numbers are a little bit out of order so I'm reading this as most people feel like it's decently well affective if you will. That's interesting to know and I hope that if you've answered that you feel like they're affected and you're a partner of ours I do hope you'll reach out to – my e-mail's at the end – because we'd love to share in those resources and hear from you. Excellent. Thank you so much.

All right we can go ahead and take that poll down and we're going to bounce over to the other big hot topics for Mark. Your Solid Recovery Fuel of course was a big part of your presentation and it generated a lot of questions and interest. So just a couple of more questions for more detail in there.

One question was can a Solid Recover Fuel be used onsite such as replacing natural gas? Is that something you've considered?

Mark Pannell:

That could be a possibility here. As far as here at Volvo our natural gas consumption primarily revolves our boilers as well as some of our process equipment when it comes to our heat treat department, so the quality of that natural gas also have a lot to do with what we're purchasing, how well it works.

We also do a lot of – we create atmospheres here when it comes carburizing our parts – so that natural gas is critical to that operation.

This particular facility, again, just to talk about this specific one, Entsorga, that produces this SRF, they have a customer right down the road from them that will purchase every ton – every pound that they can generate. So their capacity – they are going as hard as they can and still cannot feed their customer with enough material.

So as far as using it onsite is that something that would be thought about down the road? Absolutely. We would just have to try and find the right scenario to be able to use that because right now primarily our fuel consumption is either going to be (A) natural gas on those items I talked about, or (B) it's going to be diesel fuel.

Hannah Debelius:

Excellent. Thank you. And so when you were looking at that process or evaluating it particularly in comparison to waste to energy was there a cost advantage or emissions or pollution advantage that you all identified?

Mark Pannell:

So cost wise it was a little more expensive to go with the Solid Recovery Fuel. So what we were able to do is we were able to put into place some additional I guess efficiencies to make some different changes so that we were able to offset it. Now that's not going to be unique for everybody or possible for everyone.

We ended up coming out at about \$800.00-some more expensive per year which in the grand scheme of things of what we're spending when it comes to our waste and energy budget it was pretty incredible that we were able to do that. But, again, this came

with efficiencies when it comes to how do we transport, are we using wall containers, are we using transfer trailers, are we using industrial compactors or what have you.

So we were able to pull it off but generally you may see a little bit of an increase when it comes to it. In the grand scheme of things looking at our 2030 plan and our 2050 plan for Volvo it looks to be "Where are we going with our CO2 emissions? What are we doing with our going after the greenhouse gases?" So it's a long-term plan that we have that just puts us into a better place because what we're doing, again, is we're replacing that one ton of coal with the 1.5 tons of SRF.

Hannah Debelius: Great, thank you so much Mark. And I'm going to ask Bill our next question. If we could bring up a second poll which is going to look at all of your considerations and the waste energy nexus. While we're doing that Bill, it's of course really clear that we have different perspectives on the line here and I know that so much is the work that you all do in waste is really set within your sustainability goal, so I was wondering more from an even like philosophical standpoint if there's something that's connected waste and energy at Shorenstein – whether that's a corporate sustainability plan or effort and how those might be kind of connected more philosophically since you all are less involved in the literal connection?

Bill Whitfield: Huh?

Hannah Debelius: I think what I'm asking is I know that you all have your waste goals set within these larger sustainability goals, so are you considering your waste goals alongside your energy efficiency goals or are those separate? Kind of philosophically how is that?

Bill Whitfield: Well, first of all for me the waste stands out in that it is truly the main way that a tenant can participate in the building – an individual tenant can participate. And we have a large sustainability program – at one point it was called our *Flip the Switch Program* – training program that we provide tenants with – all the tenants that we can get to come and listen to us.

We're currently changing the name of that to our *Environmental Responsibility Training Program* to kind of speak to what you're asking which is the bigger picture. And I have to say it always – after giving the presentation it always comes back to recycling for the tenants. That is the question and the thing that they want to know about and want to – have a ton of questions about.

So although it does and obviously energy reduction is probably the more serious and impactful way that we can participate in being good environmental building operators. But recycling is just super important as kind of the gateway into that larger picture.

Hannah Debelius: Great. Well, thank you so much. For our last question here if you could just answer in 5 or 10 seconds are you using any particular tools for the measurement side that you can suggest to our other audience here?

Bill Whitfield: I will just go back to Energy Star which I'm sure everybody is already well familiar with. We've had other means of doing measuring and tried different kinds of things but it really all comes back to it's best to have everything all in one place and in a beautiful system that is already there and each building can participate in on their own.

Hannah Debelius: Great. Thank you.

Mark Pannell: So with Volvo here at our facility of course in Hagerstown we manage all our own data and collect our own data when it comes to this. For now all of this does get rolled up to a larger I guess collection or larger database when it comes to Volvo Group as a whole because of those big corporate sustainability goals that we have. We do our sustainability data reporting really on a monthly basis and it goes over everything from cost to energy use to waste, recycling, how we're impacting the environment when it comes to our CO2 emissions and whatnot, so it is literally looked at on a monthly basis at Volvo Group as a whole and at all our locations in all the countries.

Hannah Debelius: Great. Thank you all so much. I know there were a lot of questions we weren't able to get to today but I really appreciate again all the insights from our panelist. I want to of course again plug our solution center where you can check out the solutions from our panelists today and I know there were some questions on compost we didn't get to in our quarterly call from our second quarter of Waste Pilot does talk a little bit about food waste and compost so you can also check out that for additional resources.

Yeah, so thank you all so much again to our panelists, to everyone who joined us today, and I look forward to hopefully sharing some more results with you next year at the Better Buildings Summit.

Bruce Lung: Thank you all.

[End of Audio]