Paul Sheaffer: Hello, and thank you for joining the webinar today. We're gonna give folks another moment or so to log on and we'll be starting soon.

Okay, let's go ahead and get started. Hello, everyone, and welcome to the 2022-2023 Better Buildings Webinar Series. Dedicated to bringing you the latest actionable insights from leading industry experts, this annual series is a chance to explore the topics, technologies, and trends that affect your organization, as well as efforts to accelerate decarbonization and energy efficiency adoption. Next slide, please.

Today's webinar is called "Make the Case for Large-Scale Energy Reduction Projects with ISO 50001." Before we dive in, there are a few housekeeping points I would like to cover. Please note today's webinar will be recorded and archived on the Better Building Solutions Center. We will follow up when today's recordings and slides are made available.

Next, attendees are in listen-only mode, meaning your microphones are muted. If you experience any audio or visual issues throughout the webinar, please send a message in the Q&A box located on the bottom of the Zoom panel. Next slide, please.

Hi, my name's Paul Sheaffer and I'm an engineer, program manager, and principle investigator with the Lawrence Berkeley National Laboratory. My areas of research include energy efficiency, emerging technologies, and energy management systems. Our building and industrial application department was instrumental in the development of ISO 50001 and we also develop programs, tools, resources, and training related to energy management systems. Next slide, please.

This is the agenda for today's presentation. We'll start with introductions and we'll have some Slido welcome polls. And we'll have three exciting presentations from our three speakers, and then we'll have some time left over for Q&A at the end. But first, what I'm going to do is introduce you all to what an energy management system is. Next slide, please.

So what is an energy management system? First, maybe let's go over what it's not. It's not a building automation system. It's not a piece of software. It's not a piece of software, either. An energy management system is a set of business processes that enable organizations to better manage their energy and sustain persistent energy, carbon, and cost savings. Organizations use energy

management systems to establish policies and procedures to systematically track, analyze, and continuously improve energy performance. Next slide.

So what's ISO 50001 all about? ISO 50001 is the energy version of the ISO management system standards series. Others include 9001 for quality and 14001 for environmental compliance. And if your organization is already using one of these ISO management systems standards, implementation of 50001 will be quite a bit easier. 50001 is really a set of business processes that provide an overall framework for an energy efficiency program using sort of the classic plan, do, check, act cycle that's part of all the ISO management system standards. 50001 is systematic, it's data-driven, it's a fact-based process that will touch on all parts of your organization. The standard itself, the wording in the standard itself allows for both third party certification by an accredited body, but the standard also allows other measures of conformity, things like self-declaration. And don't be scared by the standard. It's not that long. It's only 21 pages or so. And 50001 concentrates most of your efforts on the significant energy-using systems within your facility or site. Next slide.

So what's the value of using a 50001-based energy management system? I've been involved with energy efficiency for my entire career, and I can tell you 50001 is best practice and it does work. We have data and reports that show persistent year-on-year continuous improvement in energy performance for organizations that have ongoing 50001-based energy management systems. I'm an engineer by training, and it did take me a while to get my arms around the management system pieces of 50001. But it really does all work together to save energy, including what we call the engineering core of the requirements of the standard. We've seen very positive results from all types of organizations using energy management systems: industrial sites, commercial buildings, institutional sites, federal and state agencies. And you'll be hearing success stories from three very different sectors from the three great speakers we have lined up.

Another thing about energy management systems is they lead to a lot of low- and no-cost energy conservation measures as well as identification of larger capital projects. And it also helps with employee turnover because your organization will have a documented, standardized approach to managing energy.

Recently, a lot of organizations that are implementing 50001-based systems are doing it for decarbonization reasons. For most

organizations, managing energy is managing carbon, and we really see that as the future for 50001. That's the great thing about the system and the standard. It's flexible, and it can be used for more than just energy. Next slide.

What's 50001 Ready? The US DOE saw a bit of a slow uptake of 50001 in the United States for a variety of reasons. So we worked with DOE and developed the 50001 Ready program, and the main tool that's part of program is the web-based 50001 Ready navigator where we've broken down the 50001 requirements into 25 tasks. The great thing about the navigator is that the standard itself tells you what you need to do, but the navigator gives guidance on how to do it. The navigator can also be used as a reference document, checklist, and as a way to manage your energy team.

A few other things about 50001 Ready: It does not require a third party to come and certify you. It's based around self-attestation of conformance with the 25 steps of the navigator, with subsequent recognition by the Department of Energy. And Berkeley Lab and the Department of Energy also have developed other energy management system programs, tools, and resources, including free web-based cohort implementation training where we have coaches step you through the 25 steps of the navigator over a period of six months or so. So please contact me if you're interested.

Now let's go on to the Slido. Today we're gonna be using an interactive platform for questions and answers in polling. Please go to www.Slido.com on your mobile device or open up another tab in your browser, and today's event code is #DOE. I think the hashtag is on the screen already when you go to log in. If you would like to ask our panelists any questions, please submit the questions anytime throughout the presentation. We'll be answering your questions near the end of the webinar. You can also select the thumbs-up icon for the questions that you like on the Slido, which will result in the most popular questions moving to the top of the queue. Next slide, please.

So we want to learn a little bit more about you, so let's get started off with some polls. Please join us over at Slido to respond to the following questions. If you're having any issues, please message our tech support team by using the Zoom Q&A function. So we've go the first poll up there. If you all could respond to it, we'd appreciate it. And it says, "Does your organization have a formal energy efficiency program?" We'll give a few seconds for you all to answer. It's really jumping around quite a bit. All right, so we've

got about 57 percent that have some kind of program at at least some of the sites.

Let's move on to the next poll. "Does your organization have an ISO 50001-based energy management system?" Okay, it looks like mostly no, 69 percent. Fifteen percent are planning to implement, 14 percent some sites, 4 percent all sites. Thanks.

Let's go on to the next one. "What is the sector of the majority of your sites or facilities or buildings?" Wow, the folks at Federal must have a good email list. Thirty-two percent federal/state, a good portion commercial buildings. Just behind that we've got industrial, and then taking up the rear is institutional, which is – might mean different things to different people, I guess.

All right, let's move on to the next one. "Has your organization set formal carbon reduction goals?" So almost half of you have, and another 21 percent are planning, and 15 percent at some site.

Okay, let's move on to the next one. That might be the last one; I don't know. Okay, I think that was the last Slido poll. Thank you all for participating.

So we have a great lineup of presenters today. Speaker number one is Pete Baum. Pete has worked with Loews Hotels as director of engineering in Atlanta since March of 2020. He's a member of the corporate energy committee and served as leader in helping the company achieve 50001 recognition from the US DOE in 2021. Pete recently attended the Behavior, Energy, and Climate Change conference in Washington DC as a panelist to speak on behalf of Loews Hotel and Company. Thanks for joining us, Pete.

Speaker number two is Jim Henry. Jim Henry is senior manager of global risk and compliance at Iron Mountain Datacenters. Jim is primarily responsible for enterprise compliance and risk management, external audit and assurance, and also leads the overall program management and development of all global ISO-certified management systems. Jim has been with Iron Mountain since 2016, holding various roles within the compliance department, and is a certified information systems auditor, certified information security manager accredited by ISACA.

And finally we have Andrew Hejnar. Andrew Hejnar is 3M's energy manager with more than 19 years of experience in leading sustainability initiatives at 3M. Hejnar's focus on improving energy performance and reducing greenhouse gas emissions at 3M's

facilities enabled 3M to achieve many ISO 50001, AMS, and Superior Energy Performance standards. Andrew was named an Energy Manager of the Year by AEE and is a fellow-grade member of AEE. Andrew holds a master's degree in energy management, has a bachelor's degree in electrical engineering, and holds many energy management certifications, including CEM, CEA, Certified Carbon Energy Manager, Certified Practitioner in Energy Management Systems, and he's an SEP performance verifier.

Thanks to all of you for being with us today, and next slide, please. And with that, I will hand it off to Pete to kick us off.

Pete Baum: Yes, thank you. So hi, my name's Pete. I work for Loews Hotels as director of engineering at the Atlanta property. The purpose of my presentation is to just kind of share who we are as a brand, describe our energy reduction efforts, and explain the importance to us of achieving 50001 recognition.

So Loews Hotels owns and operates 26 hotels and resorts across the US and Canada. The company is headquartered in New York City and is a wholly owned subsidiary of Loews Corporation. Loews Coral Gables just opened in November of 2022 as the company's first LEED-certified building. I include this as part of this presentation because this certification is a focus when looking forward to the future of Loews Hotels. The company strives to be an industry leader in environmental sustainability for many reasons. It's good for the company, it's good for the comfort of our guests, and it will have a positive impact on the environment. Next slide, please.

So our mission at Loews is to be a dynamic and sought-after company committed to bettering ourselves for our guests, team members, partners, and communities, and that's kind of why I just wanted to share this slide about our Good Neighbor Program. It basically says that we want to do the right thing, and as a brand we have created initiatives that are focused on being a positive member of the communities we are in with an emphasis on sustainability and green practices, which takes me to my next slide.

So sustainability at Loews. I think we're all aware that participation in programs such as 50001 is only successful with the buy-in and support from the corporate level, and fortunately our company has that support from the CEO as well as my direct contact, Joe Thomas, VP of engineering, who spearheads the long-range approach to energy efficiency. As a hospitality company, our team

is constantly looking for ways to reduce energy costs, lower our carbon footprint, and become a more sustainable and efficient operating organization. So this slide provides some examples of what we're doing to achieve this. So $6.5 million in energy reduction projects were approved and completed in 2022 with a focus on water conservation, energy, climate, waste reduction, and responsible sourcing. Loews also joined the Energy Star program more than a decade ago, and participates in the US Department of Energy's Energy Efficiency Initiatives. The company is also an active participant in the Better Buildings Challenge, committing to improving energy efficiency by at least 20 percent over 10 years based on a 2012 baseline, which we've surpassed at 24 percent in 2022.

So one of the highlights on this slide is the recent installation of six new state-of-the-art Trane energy efficient rooftop AHUs and controls at Loews Minneapolis. The hotel received a $100,000.00 credit from the city and $7,500.00 from Excel Energy. So a couple of things to point out about this project. Reduction of electricity consumption from the upgrade is estimated at 50,400 kilowatts annually, and the natural gas consumption is expected to have a reduction of 1,069 therms annually. So overall, this reduces annual emissions at the site by a little over 28 metric tons of carbon dioxide equivalent. So this is just one of the many successful energy stories from Loews Hotels. There were nearly 30 energy reduction projects completed in 2022 throughout the brand and more to come in 2023. That takes me to the next slide please.

So 50001 Ready recognition at Loews Hotel, why did we want to participate? The program leads to a greater understanding of energy use, savings opportunities, and commitment to our energy investments, while helping to develop a structured plan to reach our goals already in place. I think that's a key phrase in answering the question of why we want to participate. It's to help develop a structured plan to reach goals that we already have in place, because these are things that we – you know, we already had goals and were already trying to do. So with the 50001 program, we've been better able to understand our buildings and have the structured needed to implement an energy management plan at every hotel. The process has reaffirmed the importance of tracking energy and showed us how to use the results to develop strategies and enhance our current processes. It's helped us become more proactive than reactive. So our current goal is a brand is to see a 30 percent energy consumption reduction by 2030, and this builds off of the goal that I mentioned earlier of a 20 percent reduction by 2022 based on the 2012 baseline.

So Loews Hotels believes that the 50001 recognition is a successful step on the path towards achieving our sustainability goals in a more effective way. And I just want to share a little on the next slide about our accomplishments and partnerships.

Just simply wanted to give some examples of the partnerships that we've created in an effort to become a more sustainable company. All of these combined have helped us be successful in meeting our goals, and we feel that 50001 recognition is a valuable addition to these accomplishments.

So then I have one final slide, implementation and improvement. So we continue to look at opportunities at each hotel from the top level down. Corporate has again approved over $6.5 million in 2023 capital funds towards continuing improvement in our energy reduction strategic approach. So we understand the value in tracking and reviewing our energy performance as a brand. DOE's bonuses are tied into equipment PM performance to ensure focus on the importance of operating equipment at peak energy efficiencies. But we also focus on ensuring the BMS controls to all AHUs, chiller plant, cooling towers, and other equipment are being maintained at a high level to optimize energy savings. And we've recently leveraged several outside resources to assist us in developing a three-year emission reduction plan for each hotel.

So the conclusion is would be where we are today without 50001? Well, we say no, because we believe we're in a better position after achieving 50001 recognition to reach and even exceed our goals with a structured plan. So 50001 Ready can be customized for each hotel and used indefinitely for ongoing, continuous energy management efforts that have positive result beyond financial savings. For us, it adds to our presence as a good neighbor in our communities and has become an important marketing tool for partners and clients that care as much about what we're doing as we do. And that's all I have, so thank you for allowing me the time to participate and share this on today's call.

Paul Sheaffer: Thanks, Pete. That was great. And now we will hear from Jim Henry.

Jim Henry: Good morning, afternoon, and possibly evening for some of you. And thanks, Paul. Pete, really enjoyed everything you just went through as well. As mentioned earlier, my name is Jim Henry. I'm senior manager of global risk, compliance, and quality management, Iron Mountain Datacenters. We are a colocation data

center hosting organization that is part of the greater Iron Mountain Company based out of Boston, Massachusetts. Next slide, please.

I wanted to talk about 50001 in depth, and I'll probably end with a little bit about Iron Mountain Datacenter or IMDC as I call it, because we do have some neat things that were outputs from 50001. But first and foremost, one of the questions I often get is how does an information security guy or a risk management guy get into energy management? And really this stems from the strategy that I've built at Iron Mountain for the last nearly seven years with integrating compliance with operational stability and sustainability.

Oftentimes in the datacenter market now, we're facing a lot of questions about energy consumption. A quick fact about the datacenter industry: you know, I often say for someone who doesn't know what the datacenter industry is, we are the cloud. So if you send something to the cloud, it does physically live somewhere. You know, for us that's in these giant buildings that are massive energy consumers. The fact that I want to tell folks about today is a couple of years old, so I'm sure it's gotten a little bit larger than what it was back in 2019, 2018 when we started saying this. But the datacenter industry has more carbon emissions than the airline industry. So when you think about that in scale, it's pretty sobering to know how much electricity is being used on the technology that supports our applications, our software when you use Netflix, when you do your banking transactions, when you use online shopping and gaming and things like that.

So with that being said, in the datacenter industry it's wise to manage that chaos in a constructive way. So the perfect way to do that is through ISO management systems. At Iron Mountain, I have had the pleasure of implementing these three that are on the screen. 50001 is the one that I'll talk about the most, but there are – there is a nexus between all of these that I'll talk about as a theme throughout, and it's how to garner management support from the top leadership in your organization to drive change.

So the three that I have on my screen: quality management ISO 9001, pretty prevalent in manufacturing, will do a really great job of fostering process-based solutions to the way that your organization operates. 50001 I'll mention next even though it's at the end of the page here. You know, to what Paul went through earlier, it's the implementation of processes and policies that organizations use to track, quantify, take ownership, and anticipate energy utilization related to your significant energy-using

components of your business. And then 14001 is the environmental management system that could be implemented, you know, processes, policies, documentation that essentially does the same thing as 50001 but with a broader scope. And it looks like, you know, environmental impact from water to air, et cetera. And when I talk in the next slide about this and as I go through, I might mention some things that aren't on the slides, because 50001 can be the basis for building something like 14001 or 9001 which can drive organizational efficiency, not just energy efficiency. Next slide, please.

So what are the benefits of management systems in general? Whether this is 50001 or 14001, whether you're making it broad for management systems, you know, for environmental impact, because I think the more and more that organizations are building, scaling, operating, using energy, you know, energy is not restricted to just electricity. There is water. Water's out there. I saw a question about carbon. I'll talk a little bit about that as well because, you know, ultimately when you implement a management system, especially ISO 50001, you're driving policies, procedures that should be approved by your leadership that are getting all levels of the organization engaged in energy efficiency. Acknowledging and realizing what your energy use is – and if we're talking about 14001, overall environmental risk – and then setting goals, setting objectives and initiatives, plan in order to improve your risk profile. And I don't see improve energy efficiency; I say risk profile because ultimately more energy use leads to more risk, whether it's operational, financial, or reputational. I think everyone that's probably dialed in to the webinar today has a stake in energy management some way or another in their organization or in someone else's organization. And I think as more organizations are churning out sustainability reports or environmental social governance reports every year, those are for your external stakeholders to indicate the level of risk that the organization is getting into, inherent risk when you're talking about diversity, equity, inclusion, et cetera, social factors, and then also sustainability. So the more that you can set initiatives and plan to mitigate risk around the environment, the better. So that's why 50001 is really a great basis when you start with energy, you know, start from the ground up, get your leadership's support.

Next bullet point is around KPIs, key performance indicators, or in the case of 50001, energy performance indicators, ENPIs. Communicating those to all levels of management, your frontline personnel – it doesn't really matter what level a person is within

the organization. They should know environment goals so they can be a part of that, so they can be engaged; they can help.

Implementation of continuous operation, internal audit program – another requirement of the standard. Internal audit's imperative in any ISO management system. It's inescapable. It doesn't matter if it's 9001, 1450, 45, 22301. You're going to have to do an internal audit, you know, track recorded reporting on corrective actions, and then maintaining a legal register. And then of course if you choose to, as Paul mentioned earlier, you can engage an external audit firm for third-party validation and a third-party audit of the management system so that you can demonstrate through that certification that you're walking the walk regarding your sustainability performance, environmental risk, or just energy performance. Next slide, please.

So this is kind of the slide that I want to harp on the most. When we talk about 50001, a lot of the folks that I've talked to about the standard over the years have expressed that they're having trouble getting it off the ground. Maybe they're having trouble getting support for projects and initiatives. This is my ten-minute attempt at characterizing the value of leadership support. Much like most things, if your organization's going to do 50001 or implement an energy management system, the tone must be set at the top. I would argue that very few EMSs or energy management systems have been properly established lacking leadership support. This really does take the whole community in the organization.

One of the things that I found out in having our multisite, global certified management system over the years is that folks that have a stake in P&L are your best friends. Tying kilowatt hours back to dollars is a sure way to make a statement. And this obviously goes a little bit from the wayside of just environmental performance, environmental social responsibility, et cetera. And then ever-evolving regulatory changes as well, you know, this is a good way to track that. You have to keep a legal register, all those other things. And then consider using this as a roadmap to track your sustainability goals, 2030, 2035, 2040, whatever they may be. And then, like I said earlier, it could enable other management systems such as ISO 14001, 9001, and then also a gateway to ISO 14064, which is the world's own and only GHD verification standard. Next slide, please.

So these are just some common management review agenda items, and I won't run through all of these. But basically the key here is you have required inputs and outputs that your management, your

top management and leadership should see. So if you go through these things, and these are things that I've already mentioned, you're going to have a way to communicate build notes on what needs to be done in your organization. Next slide.

And then these are some of the outputs, so new projects, ideas to improve efficiency – my visuals are somehow on top of this but that's okay – gained efficiencies, confidence and verification of compliance, and then a formal initiative and company policy to improve energy performance and reduce environmental risk by quantifying things that relate to your product and your service offering. Next slide.

And then in the last minute that I've got, I want to just walk through some of the things that we have at Iron Mountain that drive our energy efficiency. We have an underground datacenter in western Pennsylvania that uses an underground lake for geothermal cooling. Next slide.

We also use air containment, hot and cold air containment for energy efficiency in all of our datacenters. But in the underground datacenter, ambient temperature is around 57 Fahrenheit year-round regardless of the outside temperature. So it is a nice climate for datacenter operation. Next slide.

This is just more of the underground lake. I can talk more about that. We have tons of resources talking about how this is utilized, the ins and outs of it, as well as a case study that we did with DOE last year. Next slide. More visuals because they're really cool to look at. Next slide please.

And then tech and innovation in the last 20 seconds here that I have, you know, we are constantly trying to use AI, building management systems, tuning in order to drive efficiency because we do use so many kilowatt hours. The electricity bills are massive. We do source green energy. I would talk about that if I had more time, but all good ways to drive your 50001 program. And I think that's my last slide. If not, feel free to the moderator – yeah, renewable power. This is my very last one. We can move on and I'll address any questions in the Q&A.

Paul Sheaffer: Thanks, Jim. That was great. A quick reminder to the audience to send in any questions you have at www.Slido.com with the event code #DOE. We look forward to answering your questions at the end of the session. We've reserved some time for that. Now we are

going to hear from our final speaker, Andrew Hejnar. Please take it away.

Andrew Hejnar: Hello, everyone. I'm happy to be here and to share some experiences we've had with ISO 50001 and energy management programs overall. I just need to mention that this presentation wouldn't be possible without contributions from my team. Prasath, Kalie and Tanmay were assisting me with this presentation. Can we go to the next slide please?

So I have to tell you a little bit about our company. Pretty much everybody knows who we are. We've been around for over 220 years and our purpose is to unlock the power of people, ideas, and science to reimagine what's possible and to also improve life by helping solve the world's greatest challenges. Nothing really big here, you know, as I mentioned before, so can we go to the next slide please?

We have a very ambitious sustainability goal. My team and I deal in climate and energy. Science for climate is one of those areas we focus on, and the first goal is to improve energy efficiency index to net zero by 30 percent from 2015, this year, to 2025, increase renewable energy or electricity to 50 percent of total electricity we use by 2025, and then be 100 percent renewable by 2050, reduce scope 1 and scope 2 market-based greenhouse gas emissions by at least 50 percent by 2030, 80 percent by 2040, and be carbon neutral by 2050, and also help our customers reduce their greenhouse gas emissions by 250 millions tons of CO2-equivalent emissions through use of 3M product. If we can go to the next slide, please?

So talking about our products that can help with sustainability, one of the products we make is a 3M sun control window film. I will not spend too much time on here. But if you need any more information, just contact me, please, and I will be more than happy to point you to our experts on window films. If we can go to the next slide?

We are part of RE100, which is an organization that we committed to be 100 percent electricity renewable by 2050. We are also partners with Better Buildings Better Plants program on low-carbon pilot, and we are part of the Better Climate Challenge with Department of Energy as well. Can we go to the next slide please?

So our main strategy for carbon energy-based carbon emissions reduction is basically we have a carbon reduction taskforce which

includes our senior executives. And then when we talk about carbon reduction emitted by energy consumption, the energy efficiency really is the key. We need to start to – you know, with this piece. We've been working on energy efficiency for quite a few years, improving our efficiency at our manufacturing locations. Also, renewable energy can help us with reducing carbon footprint, and there are a couple of areas we focus on: purchasing PPA's from grid and utility companies, and we have a few – our own onsite generations when it comes to renewables, and of course energy carbon emissions, reduce fossil fuel dependence by switching fuels, employing geothermal and solar thermal, wherever we can switch to biofuels, biogas. Clean, green hydrogen when it's generated from renewable electricity is also something we are looking at, very early stage. And renewable electricity, electrification, so some of our systems that consume fossil fuels can be converted to renewable electricity. And then we are also working on carbon capture, very early stage, but we think this is part of our overall strategy for carbon emission reduction. Can we go to the next slide please?

We have three classifications of our manufacturing sites. Tier one is 85 percent of global energy consumption. Tier two and tier three are smaller sites and our sales offices and some of our labs and stuff like that. Can we go to the next slide please?

Well, when it comes to data requirement really – and I will talk about this a little bit more in my later slide – is that data is key. We have three major systems where we collect the data and collect information about the health of our management systems. The first one is called site energy data system, where we basically enter energy costs, consumptions, and variable data, relevant variable data on a monthly basis. And that relevant variable data is basically different production outputs from different facilities. We also have a database for energy cost reduction projects where we keep all our – this is – if you can think about an energy project helper, that's exactly what it is. And then we also ask our facilities to do facility energy management, reviewed and uploaded quarterly to our SharePoint, and it provides insights on strengths at our sites' energy management programs. If we can go to the next slide please?

Energy performance based on the fact that we want to 30 percent more efficient by the end of 2025. We've been doing quite well, almost 30 percent at the end of 2022. We are sitting at 22 percent. When you look at where our goal for '22 was, actually it was 21 percent, so we improved that goal by one percent. If we can go to the next slide?

Now when it comes to energy management systems, and the vehicle for it is ISO 50001 and Superior Energy Performance, we see it as three pillars: metering, technology, and projects. And probably the most important part of any energy management program – any management program – are people. So if we go to the next slide…?

So if you look at what we've been doing in the past and many companies did that in the past as well, they would have, like, a leader who – energy leader, that is, who would identify some programs, some projects, and they would implement those projects. And then when they changed positions or moved on to another company, there was basically a gap and then we would be again at high costs and high energy consumption or efficiency. And if you go to the systematic approach in energy management, that's on the right-hand side of this slide. You basically need to have senior management backing. You need to sustain savings. You need to implement low-cost improvements, low-hanging fruit first. And then you need to build into company culture when it comes to any management system, and ISO 50001 and energy management system is not different. If we can go to the next slide please?

So 3M's energy management system, and Paul mentioned that on one of his slides, is based on plan, do, check, act continuous improvement cycle. The main thing is that we want to establish a system for – and processes for energy management, improve and sustain energy performance, and then because all of our sites are ISO 9000 certified and certified in ISO 14001, we didn't really have to build the ISO 50001 system from scratch. We based our ISO 50001 on a similar framework to those two standards. And the main I guess message here is everyone has a role to play. And we see our customers moving toward the standard as well. So if we can go to the next slide please?

The first pillar, metering and monitoring, is one of the most important pillars, of course, because what you don't measure you can't control. This is very true for energy because energy is invisible for most. And then you need to establish energy baselines. You need to provide real-time energy information and then provide energy consumption reporting for management and sourcing for tracking and budgeting, so a very, very important piece of energy management system. If we can go to the next slide, please?

The second pillar was technology and projects, and we focus on a few areas here: HVAC and chillers, compressed air, LED lights –

everybody does that – steam system optimization or elimination. We moved onto efficiency as a service kind of a scenario with some of our plants where we have a third party assessing plant energy efficiency performance, and then they provide a turnkey implementation and ongoing monitoring and optimization to ensure savings. And then design and procurement is another part.

Just a couple of I guess points here on some of those areas. Conditioning of air, and I'm not talking about air conditioning. Conditioning of air means that we humidify, we dehumidify, we cool, and we heat air coming to our facilities. This is very, very expensive. It could be up to $5.00 per CFM per year, and imagine that we have 100,000 or 200,000 CFMs going to our factories. In many occasions many, many sites do that and the cost is just tremendous. Also when it comes to compressed air optimization, the compressed air systems are the most expensive systems to have. Seven horsepower of electricity is used to produce only one horsepower of compressed air. And we see that we have sites that have air leaks at about 20 to 30 percent. So not only that six horsepower of electricity goes to generating heat and a little bit on friction, but also we have about 20 to 30 percent leaks, which we have to fight with. And then the steam systems, we tried to eliminate steam from space heating altogether, and basically our goal is to have steam only for those processes that require direct steam injection into those systems. When it comes to heating or humidifying, we want to move away from steam.

And then we do – for design and procurement, we assess our energy efficiency in equipment, so we ask for our vendors to provide us with efficiency performance numbers, and then we reevaluate needs for like-to-like replacements. Really we don't want to replace a boiler which has been with us for 50 years for the same size of boiler but made in 2023, and then include other practices for energy in terms of processes in design phase, so I will talk about that a little more. But the main thing also is that we implemented continuous – well, we implemented energy manual – we call it manual 81 – and we have best practices for all sites to follow and metering requirements for new equipment and also existing equipment at those sites. So if we can go to the next slide please?

Employees, they are probably the most important part of an energy management system. The production staff operates and works with energy-consuming equipment. They know those pieces of equipment the best. We see better employee retention and satisfaction when we include them in an energy management

system and increased trust in management. We have employee suggestion programs through Tier Tags electronically or just – what you can see on the right-hand side, just a Post-it note basically. Conservation and awareness campaigns – we have them often, energy training. For some countries like Canada, for example, every employee of 3M Canada's got to go through a basic energy training, and that training repeats every three years. And then let – let the employees know that they matter. If we can go to the next slide please?

So probably many would ask, you know, do we see any savings coming from – or improvements coming from ISO 50001 sites, and yes, ISO sites perform 2.2 times better than non-ISO sites. We keep track of our energy performance for ISO sites and for non-ISO sites, and if you look at this graph, you know, justification is right here. So really, really, you know, double performance from ISO sites, that's even more than we anticipated, to be honest. If we can go to the next slide?

We have 58 sites globally certified to ISO 50001, most of them on this continent. But as you can see on this map, we basically have certifications in all areas of the world. If we can go to the next slide?

So this is a very important concept, enterprise model for ISO 50001. Right now we have Americas model implemented, so that means that sites in the United States, Canada, and Latin America are under enterprise model. And what it means that is for those 42 sites, there are multiple benefits. First of all, all common elements like training or energy review sessions or things like that are standardized across all those 42 sites and managed by the corporate – my group, basically. Also when you have 42 sites under one umbrella, when it comes to external certification, it's basically a sampling concept where the external certificators only sample sites using equation square root of N. So as you can see, you can significantly reduce amount of sites required to be externally certified, and that not only – it drives the cost down of maintaining of ISO 50001 programs, and also resources on sites, significantly lower resources. So I would encourage to look into this enterprise model for those companies which have multiple sites certified. Can we go to the next slide please?

We also are integrating sustainability impact into early design process. So the step one has been completed. We have what we call engineering work requests. That's when all or where all projects start. And we basically – my team's got visibility to all

EWRs generated by our facilities, and then when we see that a project might affect energy consumption or sustainability at all, then we basically get connected with that team and work with them to make sure that we provide the most efficient, most sustainable results. Manual 81 – I talked about that. So authorization for expenditure is a formal document where we ask for copies. So we added changing sustainability in the template of presentation to our top management. And then process standardization, again I talked about this a little bit. We don't change new equipment like for like. We do the system evaluation, then we renew the right size or the right type of equipment when we need to. Can we go to the next slide?

We also have an energy management network, a SharePoint where everybody from 3M can go to and look for information on energy management. Can we go to the next slide? And we have also a quarterly an energy management newsletter sent to our facilities. There is an example of the letter we sent out about a year ago to one of our facilities in Brookings. Can we go to the next slide? And we also hold a monthly energy management web conference available to all facilities around the world. And then can we go to the next slide? And basically we teamed up with Department of Energy and with their help we conduct energy treasure hunts at our locations as well. You can go to Department of Energy Better Buildings Better Plants website and search for energy treasure hunts for more information. If we can go to the next slide?

So this is my last slide. For those who are interested in development in energy management, I guess, profession, there are a number of certifications which you can get, Certified Energy Management, Certified Measurement and Verification Professional, and Certified Energy Auditor. They are all done by AEE. Then you can go to ISO 50001 Certified Practitioner certification program or Lead Auditor, Superior Energy Performance Verifier, and Certified Sustainable Development Professional. So this slide will be posted. For those who are interested, please go to those – just research those certifications because they are really great.

And this is the last slide, I think, so I went slightly – 20 seconds more than I was supposed to, but thank you so much, really appreciate your time here. And if you need any more information, please don't hesitate contacting me.

Paul Sheaffer: Okay, great. Thank you, Andrew, and to all of our speakers for your insightful presentations. Before we move on to the Q&A, I want to encourage you to download our additional resources

handout, which is shared in the Zoom chat box. The handout contains links to resources from Better Buildings and from our speakers on today's topics. We hope you find it useful. Next slide, please.

Now time for Q&A. If you haven't already, please join us over at Slido.com with the event code #DOE to submit your questions, and I think we're gonna pull some of those up. And if, Pete, Jim, and Andrew, you can come back in with your video and speakers, we can try to answer some of these questions together.

So the highest-rated one is, "Are there any competing standards that we should be aware of, something that ISO 50001 approach may be replacing or complementing?" I can't think of any replacing. When ISO 50001 was developed in 2011, there were a lot of national standards. The US had one, Ireland had one, some other countries had one, and those all kind of went into the development of the original version of ISO 50001. There certain are a lot of standards that complement 50001, and if you look at standards from ASHRAE or ASME that have to do with energy assessments, things like that, those can be used in the energy review part of 50001. I don't know if anybody else has any thoughts on it.

Andrew Hejnar: Superior Energy Performance also adds additional requirements for 50001 or for energy management standard implementation. And I would really encourage everyone to research that because all our sites on this continent are certified to Superior Energy Performance and it's a really great addition to ISO 50001.

Jim Henry: Yeah, I would just add, Paul, probably 14001. We kind of did it backward. You know, some organizations will do 14001 before 50001 because they'll narrow the scope, because they might be an energy-intensive organization. But I mean, if you're someone deciding between 14001 and 50001, with a lot of companies having forward-leaning approaches for holistic sustainability with air, water, energy, you know, 14001 does require risk assessments that include all of those things. However, they don't go into the detail that 50001 kind of narrows you down the path for for energy. But, you know, at least in my industry where we're using tremendous amounts of electricity, folks are starting to say, "Well, what about water? And what about air? And what about biodiversity and land use?" And that's really where 14001 will start to highlight those things.

So, you know, it just depends on your approach, but 14001 would definitely be a competing standard and theoretically someone could replace 50001 with 14001 and still track energy performance the same way. The standards are almost the same, other than section eight, operational control, you know, so.

Paul Sheaffer: Good point. All right, let's move onto the next one. "Are there local jurisdictions using ISO 50001 for any building performance requirement standards?" I am not aware of any.

Jim Henry: I've got one. It's in the UK. The Energy Savings Opportunity Scheme otherwise known as ESOS is a regulation that we comply by in the United Kingdom. We're right outside of London in Slough. Everyone in England is subject to the ESOS, and basically they mandate an energy assessment. So while 50001 isn't required, if you do 50001, you're actually excused from the regulation. But everything in the regulation points at basically having an ENMS in place. They basically took the standard, slapped it into a regulation, and said, "Hey, you have to do this." But if you're certified by an external party, then you're not subject to their regulation.

Paul Sheaffer: Okay. Let's go on to the next highest one. "Can 50001 help reduce emissions?"

Andrew Hejnar: So if you have onsite generation like combined heat and power, for example, and you improve your efficiency of your electricity use, you will reduce your NO x's and all those good things which are emitted by those jet engines and internal combustion engines. So that's one I can think of really quickly. Also, when you have a steam boiler, a similar thing. You know, if it's natural gas steam boiler, some of those nasty things emitted by those boilers, when you improve efficiency and you basically lower your steam output or eliminate a boiler or two, then you can also improve your other GG emissions.

Paul Sheaffer: Yeah, and 50001 is also flexible enough to include things like refrigerants or fugitive emissions as part of – there's a section called legal and other requirements, and you can cut other things that are part of your overall energy management system as well. Yes, we are gonna be sharing the slide used. Let's go to the next – I don't know how much time we have to go through the Q&A. If somebody will just let me know when we should move on to the final slides – well, I guess that's now. Well, good. Thank you.

Well, thank you, everyone, for your questions, and to our panelists for their insightful responses. This webinar is part of the 2022-

2023 Better Buildings Webinar Series. As you can see, we have a great lineup of presentations through March. Visit the Better Buildings Solutions Center to learn more and to register. Next slide, please.

We hope that you will join us on the 31st for the next webinar, "Tapping into the Power of Utility-Scale Solar: State and Local Perspectives." Join this webinar to learn about the strategic partnerships used by state and local governments to meet ambitious climate and energy goals through utility-scale solar investments. Next slide.

The Better Buildings Better Plants Summit – this is a great annual event. Next we are pleased to announce that the registration for the summit is now open. It's being held in DC this year on April 11th through 13th. In addition to engaging in interactive sessions, attendees can look forward to plenty of opportunities to network with their fellow peers and experts. Please explore the session tracks and book your accommodations soon. Next slide to close things out.

With that, I'd like to thank our panelists very much for taking the time to be with us today. Feel free to contact our presenters directly with additional questions or if we couldn't get to your question during the Q&A period. I encourage you to follow the Better Buildings Initiative on LinkedIn and Twitter for all the latest news. You can find our handles by the respective icons on the left half of the slide. You will receive an email with today's recording, slides, and transcripts, and it'll also be available on the Better Buildings Solutions Center. And I just wanted to thank everyone for attending. I think we'll close things out then.

[End of Audio]

Make the Case for Large-Scale Energy Reduction Projects with ISO 50001

Additional Resources

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

Better Buildings Resources

- Read 3M's Showcase Project with ISO 50001
- Read Lawrence Berkeley National Laboratory's Showcase Project with ISO 50001
- The ISO 50001 Brochure
- ISO 50001 Fact Sheet: Enterprise-Wide ISO 50001 and SEP

Explore more resources on the Better Buildings Solution Center

Other Resources

- EPA's Emissions & Generation Resource Integrated Database (eGRID)

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Tapping Into the Power of Utility-Scale Solar: State and Local Perspectives
Tuesday, January 31st from 11am – 12pm EST

Join this webinar to learn about the strategic partnerships used by state and local governments to meet ambitious climate and energy goals through utility-scale solar investments.
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