[Begin transcription at 0:05:25]

Eli Levine: Hello, everyone, and welcome. We will get started in just about one minute as I wait for the room to fill up. Thanks for joining us today.

So, welcome and thank you so much for joining us today. My name is Eli Levine and this is the Best of the Betters, the 2021 Better Project Presentations. As many of you know, our Better Project Awards recognize partners for outstanding accomplishments in implementing industrial energy, water, and waste projects at individual facilities, and for us at Better Plants, it's just an outstanding way to showcase all of the amazing things our partners are doing every year and turn them into replicable solutions.

So next slide, please. That is me. I work at the US Department of Energy. I lead our Better Plants Program.

Next slide, please. And we had eight winners this time around, so I hope you're excited. These are some really outstanding presentations. If you like these. I hope you will join us tomorrow at the same time for our Better Practice award winners, which presented to partners for innovative industry-leading accomplishments and implementing and promoting practices, principles, and procedures of energy management. We have a great group of a half-dozen winners there, too.

And if you like this, I hope you'll stick with us. At 3:45, we have a really interesting session that we're trying out something new. It's gonna be like one of those choose your own adventure books that you used to read as a kid, all about different common barriers that we're facing. We're gonna leave it up to the audience to vote on all of these things.

So allow me to introduce our awardees this time around. We have 3M, Flowers Foods, Graham Packaging, Lockheed Martin, Nissan North America, Owens Corning, SugarCreek Packing, and Tyson Foods.

Next slide, please. So as you know, if you've reached here, everything we do is based on slido, so please go to slido.com where we've recorded all these presentations ahead of time, so I know we will have time at the end for questions. I encourage you to submit questions as you're listening to the different presentations. One request that I would make is that if you could identify, "Hey, we'd like to ask this question to Flowers Foods," just so we can know which presentation you're referencing, and feel free to enter it now. We'll just have them all queued up for when the presentations end.

It's #DOE and then we're choosing the Best of the Betters Better Project session. So thank you very much for doing that. I know we have a great group with us here today.

Next slide, please. I think I will get to kick this off and turn this over to the 3M team for their presentation. So, thanks again, and we look forward to having you with us today, and please submit questions.

P. Vinayagamoorthy: I am Prasath Vinayagamoorthy working as a senior energy engineer at 3M Corporate.

Brian Mohr: Hello. My name is Brian Mohr. I am the senior utility maintenance engineer at the Brookings 3M plant.

P. Vinayagamoorthy: Thank you for the time and opportunity, and we are going to give you a quick update regarding our project related to a real-time, batteryless, cloud stream trap monitoring system. So before jumping into the project, I just want to give a background about 3M Company. The 3M Company is a science-based company from since 1902. Our vision is 3M technology advancing every company. 3M product enhancing every home. 3M innovation improving energy life.

3M has committed to various corporate sustainability goals. My area of focus is climate and energy. So under the climate and energy, we are various goals. So improve energy efficiency index to the net sales by 30 percent from 2015 baseline. Increase renewable energy to 50 percent of its total energy use. Reduce Scope 1 and 2 market-based GHG emission by at least 50 percent by 2030, 80 percent by 2040, and achieve carbon neutrality in our operation by 2050. Help our customers reduce their GHG by 250 million tons of CO2 equivalent emission through the use of 3M products.

How we are going to achieve this? So we have developed some strategy for these climate and energy goals. So for the first pillar is energy efficiency. The more focus is on energy efficiency and how we are going to do this through three different way. One is energy management system. So we are trying to implement ISO 50001 and superior energy performance at our 3M facilities. And the second major pillar is energy monitoring and reporting. We are trying to develop more and more monitoring and reporting strategy across 3M facilities. And the last pillar under energy efficiency will be design and technology projects implementing different technologies at various site.

We know that energy efficiency is a key factor here which will contribute both to renewable energy which is RE100 and GHG emissions. For renewable energy, we are working with the grid and the utility companies to get renewable power and also 3M will be installing their own renewable at their site. And for GHG emission, again, we are working to reduce our fossil fuel dependency.

And I think Brian will start from here.

Brian Mohr: Yeah, thank you. So we want to talk to you about the Everactive system that we are trialing here. The system consists of three different components. You have the sensor in the field, a gateway that's in proximity to the sensor, and then Everactive's cloud system. So the sensor will send data to the gateway and the gateway will get it on to the Internet where the cloud can read and store the data and provide some analytics. The particular sensors we're using are steam trap sensors. What's shown here is their Gen 2 system that consists of a thermoelectric generator, a pair of thermocouples, and the transmitter.

The thermoelectric generator will clamp onto the steam pipe and it uses the heat or the temperature differential between the pipe and the ambient air to generate enough power to run the sensor. The sensor provides data back to the Evercloud system and now the Evercloud system will make the determination based on the thermocouple's data if the trap is bad or not. If the downstream pipe is hot, it will assume the trap might be open when it should be closed, or if it's constantly cold, it will assume the trap is failed shut.

Next slide, please. Here's a screen cap of what their cloud dashboard looks like. It will show you the status of the traps, if there are any failed how many you have in the system, and they calculate energy loss. And that calculation comes from data you plugged in ahead of time such as your steam pressure, the type of trap that's being monitored, and your cost of steam per thousand pounds. We have our system set up to provide us with e-mail notifications. You can do summary notifications. You can do text messages and other real-time notifications.

Next slide. So we've monitored 50 traps as part of this pilot. We've had them in for over six months now. During this time, we've detected 12 bad traps, which is about 24 percent. We estimated that without this system, we would have a bad trap installed for about 45 days before we could respond to it, meaning 45 days of energy loss. With the system in place, our average time until we could get a trap replaced was 12 days. So with that, we saw a cost savings of 74 percent from reduced steam loss, or in other words, 10,600 thousand-pounds.

There is a maintenance time reduction for us. Our technicians no longer have to go out and check these traps manually. They can rely on the system to tell them if they need attention. And there is no safety risk to this system, so it's been a very good addition for us.

Next slide.

P. Vinayagamoorthy: So again, you hear the benefit that we looked into it from Brookings, so we, as a corporate, we want to expand this to the other 3M facilities to start monitoring the stream online. So we just did it, together the proposal for the top management. So we just started calculating some of the benefits, how it looks like when we implement this across the US and Canada sites. So about the sites, we have about 9,300 traps and more. So we just quickly calculated what will be the cost savings, the benefit if there's a 15 percent failure rate, so we are achieving 24 percent of cost savings on it. The emission reduction by that is about 160 kilotons of CO2 and the payback is about 4.2 months.

And we also calculated the similar type of assessment for 10 percent failure rate, if the trap fails at the 10 percent of total traps. So we are able to calculate the savings of about 12 percent reduction in cost savings, and the emission is about 94 kilotons of CO2, and the payback is 6.2 months. So it's something about between 6.2 to 4.2 is where our failure payback comes in. So we are trying to do this as globally and we are working with the different regions to see whether we can implement this project across 3M to benefit.

This is a quick snapshot shot of how our 3M energy management have been recognized across globally. So we have couple of awards that we receive from CEM, Clean Energy Ministry Global Awards for 2019. Dow Jones Sustainable Index, we are on 20th consecutive year we are getting that award. And we have one few award from DOE, and Association of Energy Engineers, and so on.

Thank you for your time, and if you have any question, let us know.

M. A. Marsh: Good afternoon. I'm Margaret Ann Marsh, vice president of sustainability and environmental at Flowers Foods, and I'm pleased to share the story of the conversion of our Lynchburg facility from a traditional bread bakery into a facility capable of 100 percent organic baking. Before I start, I'd like to take a moment and thank the DOE for this honor. The Better Project Award is particularly special for two reasons. First, it's a detailed and data driven award and it's rooted in metrics. Second, it's such an honor to be recognized among such notable sustainability leaders. Congratulations to all presenting their projects today. We are learning from your examples.

Now a bit about Flowers Foods. Flowers operates 46 bakeries in the US. Some bake traditional loaf bread and buns. Others specialize in baked snacks or gluten-free bread products, and some specialize in organic bread, for which the consumer demand is growing rapidly. That brings us to our organic upgrade in Lynchburg. To meet this increasing demand for organic bread, we converted an existing traditional bread bakery into a state-of-the-art energy-efficient organic bakery focused on Dave's Killer Bread, the number one organic bread brand in the US.

We selected our Lynchburg bakery for two reasons. First, a stable and reliable team of 125 dedicated employees, and second, the bakery's strategic location. Its proximity to key interstate highways helps reduce transport miles and improves access to important Mid-Atlantic and Northeast markets. The Flowers engineering team incorporated many sustainability features into this conversion.

These include heat recovery to heat the proof box and provide hot water, eliminating the need for gas-fired boilers. A new refrigeration system that saves energy and eliminates the need for a cooling tower and saves water. An oven with a high-efficiency collerator system and independent burner control. An energy-efficient air compressor with half the horsepower of the old system. More than 800 LED lights that save energy, improve lighting levels, and reduce the heat in the plant. And other exciting upgrades, including a new pan cooler, an enclosed dual-cooling tower. This also reduces heat levels in the plant, especially during the summer months, making a more comfortable working environment for our bakery team.

As we measured our outcomes, I find the numbers speak for themselves. Based on four months of operational data, these energy saving features decreased the energy intensity and water intensity of the bakery significantly. Overall, the upgraded sustainability features in our Lynchburg facility are predicted to reduce annual energy 22 percent and water consumption 64 percent.

But our most important metric, it's our people and the energy they put into this work. In fact, the results of our engineering and planning teams are outstanding. Due to COVID-19, construction was originally delayed three months. However, our dedicated corporate engineering team worked closely with vendors, and as a result, the bakery opening was only delayed by one month. That allowed our experienced and long-tenured bakery employees to return to work quickly and bake quality organic breads for the region. Throughout the project, we had unbelievable support from so many and we say a heartfelt thank you for making this conversion such a success.

Our story doesn't end here. This is a journey in continuous improvement across our entire bakery network. The Lynchburg organic conversion is the next iteration of past projects and learnings, and it serves as a platform to share and implement best practices during our next sustainability projects. On behalf of our team, I thank you, again, for this honor, and we look forward to seeing you again next year.

Scott Christensen: Good afternoon. My name is Scott Christensen. I'm an operations engineering manager with Graham Packaging Company, having responsibility for operational improvements within our North American plant operations. Graham Packaging was founded in the '70s with the conversion from oil fiber cans to plastic containers. Our company now provides plastic containers for the food, beverage, home care, and industrial markets. Graham Packaging is an expert in sustainable, innovative, and creative packaging solutions. At the heart of this new Graham brand is the idea of being always inspired to create a better product and cleaner world.

At Graham Packaging, our commitment to sustainability goes beyond just the bottle. Recognizing that climate change is real, we are taking steps to reduce our greenhouse gas emissions by light-weighting our containers, diverting plastics from landfills, developing lower-carbon products, locating facilities on site with customers, and energy reduction. Graham Packaging is driven to minimize our impact on the environment and work with consumers to create a circular economy. Graham Packaging was named best of all rated plastic, glass, and metal packaging companies in a risk profile in the areas of environmental, social, and governance from Sustainalytics.

Our goals are your goals. We work to always be the partner of choice by helping customers meet their sustainability goals now and in the future. Our sites are set on protecting the planet and meeting the needs of the markets we serve. Our commitment of creating a better tomorrow includes strong sustainability partnerships and we are committed to several long-term goals. These long-term goals include 100 percent recyclability by 2025, 20 percent increased use of post-consumer regrind by 2025, 25 percent energy reduction by 2028, and 30 percent greenhouse gas emissions reduction by 2030.

Graham Packaging Florence, Kentucky plant produces 283 million PET bottles and 384 million PET preforms annually. An internal project team was formed and tasked with looking at operational efficiencies in the Florence, Kentucky plant, and evaluate energy and water savings potential. We started by completing an assessment and in-depth audit of the facility. During this process, the team compiled records of production demand, kilowatt usage, and water usage.

The analysis showed that significant energy savings were attainable through power and water usage controls. We identified that a set of comprehensive energy-efficiency measure packages instead of a standalone measure would have an estimated return on investment of less than 24 months. A multidisciplinary team of different stakeholders include a technology company, a control system developer, and a utility company, was formed to execute the project.

During the team's discussions, it was determined that an energy savings measures implemented needed to also ensure that the plant could continue to operate the equipment at peak performance. The project included variable speed drives on cooling tower pumps, variable speed drives on chiller pumps and cooling tower fans, replacement of an older inefficient centrifugal chiller with the new variable speed magnetic-bearing technology chiller, and precision airflow regulators on all blow machines. Also installed comprehensive systems management controls for both air and water systems to meet production demand requirements using temperature, flow, and pressure with real-time data.

The project was not without expected challenges. Significant barriers included the need to maintain precise water temperatures, flows, and pressure to key systems and production equipment. The need to limit the downtime of the equipment during implementation as to continue to meet customer demand. We overcame them by building to the project thermal control valves, combining the developed project timeline with other projects that were completed during scheduled shutdowns of the facility in order to lessen the impact of production.

Implementation execution. Graham Packaging worked in partnership with IZ systems, Johnson Controls, and Duke Energy. Graham was able to create and implement a vigorous timeline. We started the first quarter of 2019, completed in July of 2019. To help stay on budget, the maintenance staff of the facility was trained in the operation, management, preventative maintenance, and limitations of the newly installed system. This also provided to be a cost savings in the future by allowing Graham staff to continue to provide the proper care and maintenance of the equipment.

Johnson Controls provided the York YMC2 VSD chiller, which can handle condenser water temperatures below 50 degrees Fahrenheit. This allows the plant to take advantage of colder environmental temperatures within the region to lower energy usage while maintaining a production chilled water temperature and increased cycles of concentration of the cooling towers due to less evaporation by heat load of the system. IZ Systems provided the audit, instrumentation, and measurement systems, along with assistance in engineering, installation, and implementation of the new system, and assisting the plant to work with Duke Energy to secure any and all rebates and incentives.

The outcomes. We were impressed with the real savings that were recorded and tracked using remote access to the management system. By putting in metrics to track water and kilowatt usage, Graham was able to recognize and reduce the required energy to produce air and chilled water for the process of bottling preform production. We saw an 11 percent reduction in kWh usage from 2018 to the end of 2020. We saw energy usage drop from an average 1,267 kWh per thousand pounds produced in 2018 to 1,127 kWh per thousand pounds produced in 2020. Total kWh savings since project implementation of roughly 7.4 million kWh in 18 months.

Pre-project energy spend was $1.2 million per year. The proposed project would drop energy spend to just over $891,000.00 per year. Proposed savings dollars were $381,000.00 per year. Actual energy savings ended a little over $470,000.00 per year.

With the projects assessed of the Florence, Kentucky facility, Graham has strengthened its commitment to investing in more of their facilities with this technology. So far, Graham has implemented similar energy savings projects of five plants throughout the United States, with plans to grow the program even further. While this technology is not a one-size-fits-all solution for eliminating excessive energy usage, it is an example of Graham's commitment to reduce energy usage throughout all of its 60-plus locations and it's worked towards its long-term goal of achieving 25 percent energy reduction by 2028.

Thank you. I'm happy to answer any questions if there are any.

Michael Stein: Hello. Just as a quick introduction, my name is Mike Stein, and I'm the energy manager at Sikorsky Aircraft, which was acquired by Lockheed Martin in 2015. I'd like to start off by saying Lockheed Martin was beyond excited to learn that our central utility plant optimization project at our Sikorsky facility in Stratford, Connecticut was selected as a winner of the 2021 Better Project Awards. Sikorsky is an American aircraft manufacturer based out of Stratford, Connecticut and we build helicopters for our nation's military. This particular facility, at over two million square feet, is the largest site in the Sikorsky portfolio, and one of the ten largest Lockheed Martin sites in the country.

One of my primary roles as energy manager is to oversee our energy conservation initiatives. Over the years, Sikorsky has introduced dozens upon dozens of conservation measures at our various sites. However, one area that showed tremendous opportunity was within the central utility plant. To provide a bit of background, Sikorsky introduced a ten-megawatt cogeneration system to our plant in 2012. Up until recently, the system produced close to 75 percent of the facility's electricity annually. The waste heat from the system offsets a significant amount of energy to satisfy our heating loads.

This slide provides a high-level overview of how Stratford recovers the waste heat from our ten- megawatt generator. This cogen system produces 50,000 pounds of steam per hour when operating at full capacity. If more heating is needed, the supplementary firing of a duct burner can be called upon to produce 30,000 pounds of additional steam. In the past, the high-pressure steam was mainly used for heating the plant. Cooling demands were also partially satisfied by a pre-existing absorption chiller that operates off low-pressure steam.

However, in 2017, we began to explore additional alternatives for maximizing the value of the waste heat. This became Phase 1 of our plant optimization strategy. One area of focus for utilizing the steam was replacing a 395-ton electric chiller that created the cooling required to maintain the temperature of the inlet air to the cogen's turbine. In 2018, this unit was replaced with a 400-ton absorption chiller that makes use of excess low-pressure steam. By switching from electricity to waste steam for cooling, this site expects to save approximately $116,000.00 per year in operating costs.

During the same year, we also introduced a steam-driven air compressor which utilizes the high-pressure steam to drive a steam turbine that is coupled to a centrifugal air compressor. The air compressor generates 800 CFM of compressed air that is used throughout the manufacturing facility. Medium-pressure steam is then exhausted from the turbine and is used for facility heat, process loads, and absorption chillers. Running the new air compressor allows Stratford to avoid operating an existing 200-horsepower electric compressor, which significantly reduces electric consumption in peak demands. This system upgrade should result in reducing annual operating cost by $132,000.00.

The last major piece of equipment that was purchased during this Phase 1 was a steam turbine generator. This unit also uses high-pressure steam to drive a turbine that is coupled to an induction motor which is capable of producing an additional 550 KW of onsite electricity. Medium-pressure steam from the turbine is again used for facility heating, the process loads, and absorption chilling. Based on the projected full-load run hours, this new generator is expected to save an additional $243,000.00 per year.

During the early stages of the design for this comprehensive project, it was understood that our existing interconnection agreement with the electric distribution company would have to be modified since we were introducing a new generator. This was considered Phase 2. When the original application was submitted ten years ago, it was set up for import only. To ensure that power was never sent back to the grid, Stratford was required to import a minimum of 600 KW at all times. If for any reason the load were to drop below 600 KW, the site would be automatically forced into an island mode, and this would be extremely problematic for production activities at the site since the cogen's maximum output capacity could only provide partial power to the facility during the normal business hours.

The site also had to be mindful of maintaining enough load on the cogen. To keep the unit in a stable condition, it must operate at a minimum of five megawatts. During on-peak hours, this requirement is typically not a problem. However, there was a growing concern that this could create issues during off-peak hours since electric demand drops during these times. Maintaining enough load on the cogen was also starting to be more of a challenge in recent years since the site was very active in reducing demand through energy conservation.

It was also understood that running the new 550 KW generator would reduce our demand even lower. With all this in mind, it was evident that permission to export power back to the grid was necessary and the decision was made to include this request within the interconnection application to the utility.

Over the course of two years, Sikorsky worked closely with the utility company on satisfying the design and construction requirements for the interconnection. During the interconnection application process, various studies were performed by the utility and it was determined that they would allow Sikorsky to export up to one megawatt of power back to their distribution system. By doing so, this eliminated the 600 KW import requirement, which should reduce annual operating expenses by $770,00.00. Given these new permissions, operators are now able to shift a significant amount of load back to the cogen, which results in a safer, more efficient operation of the equipment.

During the times of the day that the total onsite generation capacity exceeds the facility load, power can be exported back to the grid. This will be received as credits on our electric bills, which should equate to approximately $85,000.00 per year. In addition, Sikorsky is expected to earn close to $140,000.00 per year in rec sales based on the increase in onsite production. In total, this new agreement is expected to save at least one million dollars in operating costs.

This last slide provides a summary of the projected savings that will be achieved through the integration of the new major mechanicals and the interconnection enhancements that were introduced into the central utility plan. As shown on the right portion of the screen, Sikorsky is now geared up to reduce purchase electricity by close to 10.3 million kilowatt hours annually and send 3.2 million kilowatt hours back to the grid. This should equate to about $1.5 million in cost avoidances year after year. Should the cost of electricity remain flat, the overall project offers a 2.2-year payback.

Since completion, Sikorsky has exceeded the projected savings month after month. Operations has also seen major improvements with the performance of the cogen since the load profile has adjusted and remains much more uniform. This has also prevented system trips. Prior to closing of this new interconnection agreement, trips were a common occurrence. However, we have not seen a single trip in over four months and this has helped us avoid huge demand spikes in our electric bill.

Overall, this comprehensive project has been a major success. It has also prompted a review of potential cogen use at several of our Lockheed Martin facilities.

In closing, Lockheed Martin and Sikorsky would like to thank the Department of Energy for this award recognition and we look forward to the opportunity of nominating our future projects. Thank you.

Brett Rasmussen: All right. It's great to be here today to talk about the award that the US Department of Energy has given to Nissan. It's a Better Project Award. Just to give you a little bit about Nissan, basically we have three major manufacturing facilities in the United States, one in Canton, Mississippi, where I'm at, one in Smyrna, Tennessee, and one powertrain plant in Decherd, Tennessee. And then we have test facilities and our headquarters is in Franklin, Tennessee, and the test facility is in Arizona, and we have a number of other facilities across the United States.

Just to give you a heads up of what we manufacture, here at Canton last year, we manufactured the Altima, the Titan, the Frontier, the cargo van, and the passenger van, and also, the Murano. In Tennessee, they manufacture the Rogue, the Leaf, the Maxima, and the Pathfinder.

One of the big things that is going on with Nissan, we have a 2050 carbon neutral goal across all of our manufacturing across the world, and some of the things that we're going to develop in this is that we're going to have more electric vehicles in the market by 2030, also developing a battery ecosystem. So it's one of our goals to be carbon neutral by 2050.

Now here at Canton, this is a picture of our facility. It's close to five million square-foot facility, and so we have a lot of air to maintain for quality, and temperature, and humidity. And so we had this project come to us about upgrading our controls on our AHUs.

Here is a blowup of the plant and I have one of the units circled, and then we'll blowup on that unit. And this particular unit is a 60,000 CFM unit with a 75-horsepower motor on it. And so what we do is these temperatures maintained so that workers can work, as summers in Mississippi do get hot. Here is a cross-section of one of the air handling units, and you can see the OA stands for outside air, RA is return air, and then you have SA for supply air to the space. And so with this unit, you have the return air coming in and you have it mixing with outside air to maintain air quality. And then you have a heating section, and then a filtering section, and a cooling section before the air is delivered to the space.

We have done this upgrade on our air handling units, and the ones in black, the numbers, are the units that we've upgraded the controls on. And what we've done for the upgrade of the controls is that now the units are maintaining themselves. They have a logic in them so that when the temperature is met, they back off the variable speed drives some so that the energy used is dropped. And so these are the units that we did and I'd like to go to Zone 1.

And this is the Zone 1, and you can see the hertz on the different units, and I'd like to go zoom in on Zone AHU 40-08. This is a breakdown of the unit to show the fans that it's operating, and also the space temperature, and the relative humidity, and we're also monitoring the air quality so that we know if we need more outside air or not to be able to feed the space. And if you look at this one, I have it circled and we're at 37.8 hertz that the unit is running at. And the set point for the space is 76 and we're at 73.8. So it's maintaining the air temperature and humidity below the set point right now and that's why it's able to back off the variable speed drive.

Before we started this project, we did one unit, and so we first did a test where we didn't have the controls turned on on an air handling unit, and the unit ran for roughly two days and we averaged 51.1 amps is what the unit drew. And then after we turned on the controls, the unit averaged 22.186 amps, which is roughly a 24-kilowatt drop. And when you have a lot of air handling units and you're able to have them control themselves, not have to wait for somebody to set the temperature, it saves substantial energy.

Now here is our trim shop and this is the power readings that we have there. We went back to August of last year and that's before we started on any of the units, and that line is on the left top and you can see where the power use is at. And then as you go over, you go to current readings in March and you can see that the power usage has dropped drastically and that's because of the units being on controlling themselves.

Another thing that came about by this that was not as much anticipated was if you go to the left side and look at the bottom of the graph, this is on weekends. And then you go over and look at the current weekends that we're running, the energy drop there, also. So a substantial savings 24-7 basically is what this project's able to do for us. And roughly, it's about five million kilowatt hours that it saves us and 1,800 metric tons of CO2.

So it was a very good project. We appreciate the recognition that the Department of Energy gave us. Thank you. I appreciate it.

Don Scarsella: Good afternoon, everyone. My name is Don Scarsella and I'm the energy program manager for Owens Corning's Composites Division. I would like to thank the DOE Better Plants Program for honoring us with this award today, and I'd like to congratulate all the people at our plants and our corporate engineering organization who made these projects possible.

First, a little bit about Owens Corning before I begin. We are a $7.1 billion company in 2020. We have 19,000 employees spread across 33 countries all over the world and we've been on the Fortune 500 index for 66 years. We have three main businesses, insulation, roofing, and composites. Owens Corning innovation is all around us, in how we move, where we live, what we do, and how we power our lives. You can find our products in automobiles, homes, watercraft, and wind energy, just to name a few.

What does sustainability mean to us? We want to be a net-positive company. That means that our handprint outweighs our footprint. We want to meet the needs of the present while leaving the world a better place for the future.

Before I start talking about the projects, I'd like to talk a little bit about demand side energy management at Owens Corning. We think these themes are critical to accomplishing our results and you'll see some of them in the project when I talk about it. The first thing is a foundational item. It's plant energy teams. This is very, very important. It's how we get projects done, how we get low-cost/no-cost implementations. Without plant energy teams, a local plant energy leader, a team that meets at least once a month, it would be hard to accomplish much.

The other thing that's a big focus for us are assessments and kaizens. So we do assessments on energy-consuming systems and then we have kaizens or treasure hunts to look for low-cost/no-cost opportunities where we can implement things right away to save energy, things like shutting off lights, turning off equipment that doesn't need to be used, adjusting set points, and fixing leaks, and things like that.

Another best practice that Owens Corning has in the energy program is a dedicated energy capital project fund. This is money that's allocated every year for energy projects so they don't have to compete against other productivity-type projects. And so that we make sure that we continue to make progress every year. No matter whether it's a good year for funding or a bad one, we're always doing something.

Low-cost and no-cost implementations oftentimes come from energy kaizens, and we talked about those before.

Best practice sharing. We've had a monthly call in composites since 2006 every month where we get all the plants together, share what they're doing, and things like that, so that all the plants can hear success stories.

Reporting metrics scorecards and software tools. We have a lot of those. It helps keep us focused on what we're doing, where we've been, and who needs some improvement to get to where we need to go.

Another important thing is we're working across the organization to achieve goals. It just can't be the energy manager or one person in the plant. It's important that many departments share in this work. Everybody has something to offer.

Another theme is replication, that when you have something good like a good project or a low-cost/no-cost opportunity, you need to translate that across your organization to deliver the maximum results.

Benchmarking against internal plants and externally is another way to find things, opportunities for improvement and areas where you're already good.

And one of the really important things that we like to use is taking advantage of the Better Plants Program. We've had many implant trainings assessments from the industrial assessment centers and use their software tools all the time to analyze our systems and look for opportunities for improvement.

On this graphic, you can see what our chill water systems look like. There's a lot of components. We have chillers, pumps, valves, and piping, cooling towers, dehumidifiers, controls, drives, and sensors, just to name a few. In the past, what we had were proprietary systems from HVAC vendors that controlled parts of these components, but those systems were really never set up to control the whole system altogether. And the other thing, the problem we had with those, were they were kind of closed systems. Our people couldn't go in and look at them, or edit them, or make changes, or understand what was going on. It required outside support all the time.

The new system is PLC based, and our electricians and maintenance folks can easily understand it, and it takes all the components and puts them together in real time so that they are giving us the required amount of cooling at the absolute lowest possible energy cost. The system is able to detect things like when we can use free cooling. Say the atmospheric conditions are right. We have a low humidity outside and the temperature is moderate. We may not really need to run the chillers that day. We can just spray water in the dehumidifier and get the required cooling via the evaporative effect.

Here, you'll see a project timeline from 2016 up until now. This project started out with an assessment in one of our plants. The energy engineer went to the plant and he noticed that there was actually a fog in the conditioned space they had the air conditioning turned down so low. Air conditioning is necessary for our process and for operator comfort, but this was a really, really low set point and we were clearly wasting energy.

At first, we treated this as a low-cost/no-cost savings opportunity. An adjustment was made. But when we started thinking about it a little bit more, we understood that if we could just automate all this together and tie together all the equipment so that people wouldn't have to touch it and constantly be tweaking it, we'd be better off. So the next year, our energy engineer started working with an internal subject matter expert and an external HVAC controls vendor to define requirements and start planning something out.

In 2018, we had a big brownfield project coming up and what that was was roughly a doubling the size of one of our plants, so we put a new production line in. So what we ended up with at the end of that was one side of the plant, the new brownfield side with the new control system for HVAC, and the other one on the other side of the plant with the old way that we used to do things. In 2019, when the brownfield plant finally started up, we were able to easily measure and verify the differences because the two were staying right together, and we could see that the new system was saving significant energy on the order of 36 percent over the way we were doing it before, so it was very exciting.

In 2020, we were able to replicate this system at two plants in the United States. Even with the lower energy costs that we have here with the amount of energy that we were saving on the system, the paybacks were still good and we did both of those plants in parallel. We liked it so much, we actually found some more money this year and we're going to do another system, and then right now, we're planning on what we're going to do in 2022 and beyond.

If you look at the last slide here, you'll see four operator interface screens. The one on the top left is a system overview. It shows the chillers, the pumps, and the fans, and valves, and things like that with a bunch of different flows just to kind of get a system overview. On the top right hand side, that screen shows the energy consumption of every subsystem. So you can see how much energy the chillers are using, how much the cooling towers are using, and so on and so forth. In the bottom left-hand screen, we see a trend of efficiency in kilowatts per refrigeration ton that goes continuously, and you can go back into history and look at that, and then we have meters for efficiency of each subsystem component.

And then finally, on the bottom right-hand side, another overview graphic that shows climatic conditions and the efficiency that we expect during different parts of the year. It also plots where the system actually came in during those times to see if there's any long-term problems. It also keeps track of the energy that we're saving over the old way that we used to do things and it converts that into greenhouse gases and other equivalents.

So with that, again, I'd like to thank the Better Plants Program for honoring us with this award and I congratulate all the people in our plants who worked on these projects. Thank you.

Todd Jackson: Hello from SugarCreek Packing. Through the Department of Energy's Better Plants Program, we were able to utilize the Fluke II900 ultrasonic leak detector. This piece of equipment allowed us to inspect all of our equipment, piping, vacuum systems throughout our entire plants in a matter of days versus months or years. The process previously was if you had a listening device, headphones, you were hoping to find something. If not, you had to do hand over hand and soap every joint, every connection. If you got lucky, you could find four or five a day.

But with the ultrasonic leak detector, you can find every one of them in a matter of time. It just it's quick, it's easy, it's to the point. The equipment, it looks like a handheld video game, nothing fancy, very little controls. You can walk through a building. Like we said, we did 55,000 square feet in about 20 hours while we were running production, and it took us 20 hours because we found leaks we fixed and went back and tested everything, again.

Here is a picture from the ultrasonic leak detector of one of our high-temperature areas. Personnel are limited to this area. Usually five, ten minutes is about all the heat you can take. But we can walk in there, we can find the leaks, and then we can have a plan for a down day when we're not running and we can go in and fix those leaks without having to worry about heat exhaustion.

With this piece of equipment, we were able to reduce our contractor visits because we could tag exactly where the leaks were on our refrigeration systems, as well as our fire-suppression system because they're air over water. This reduced the costs of many of our visits. We could have four or five leaks fixed at a time versus one every other day. This helped us, like I said, reduce our costs, save our energy, and spend more time actually making bacon versus fixing stuff.

This is one of our hard-to-reach areas. It's about 15 feet down to this area. We try and stay out of it as much possible, but it's easy to get in there with this piece of equipment, scan it, move on, and we have a plan for another day.

With this being newer technology, it's a very I wouldn't say it's a severely expensive piece equipment, but about $21,000.00. It's limited on how many you're going to buy and how often you're going to use it. With borrowing it from the DOE, we've had it twice now. We've used it at three of our plants. Our plan is to keep borrowing it as much as possible so we can continue to survey the rest of our plants. Because at SugarCreek, we have new buildings and old buildings, and it doesn't really matter which one it is, we find the exact same amount of leaks whether it's a brand new system we just put in or one that we've been running for 20 years. We find the leaks that previously we weren't really paying attention to, we weren't noticing.

It was easy to see the water leaks, but the nitrogen, the steam, the vacuum, those were a little harder to find. So with the with the Fluke II900, we are able to process many rooms in our processing facility within hours and get a game plan with our maintenance staff to go through and fix all those.

Thank you from SugarCreek Packing and have a nice day.

Alex Floyd: Hello, I'm Alex Floyd with Tyson Foods, and today, I'd like to share with you a project that we did across all of our sites that have ammonia refrigeration. So between our processing plants and distribution centers, we're talking well over 100 facilities.

I ran across this quote that really sums up with what we're trying to accomplish. It's, "Continuous learning is nothing without continuous doing." So we've all sat through training classes and webinars where we took in some really great information but we never actually took that and implemented that at our facilities. So how do we solve that problem?

Now just like all of you, we were faced with unprecedented challenges in 2020. Some of us had to learn how to work from home. We were no longer allowed into some of our facilities. And at Tyson Foods, safety is our number one priority for both our team members and others, so we spent a large amount of capital on the response to COVID-19 to protect our people.

I have to give a large amount of recognition to our Better Plants technical account manager, Wei Guo, for this project. We got together to really answer the question how do we draw success and energy efficiency during this pandemic. There was no option to do an in-plant training, anymore. So what does a virtual in-plant training look like in ammonia refrigeration?

So between Eli, Tom, Wei, and I'm sure countless others, they put on and hosted a virtual in-plant training on industrial refrigeration and we had all of our facilities participate in this. It took place over four weeks. It was two days a week for just a couple of hours, and we really relied upon the training to help us learn and then we would actually go out and do in response to what we've learned.

At Tyson Foods, we developed a calculator that would help us quantify the savings potential associated with these energy conservation measures that we were learning about. First, we had to establish a baseline to quantify the energy consumption associated with our refrigeration system. At most of our facilities, we don't have sub-metering to help us isolate the refrigeration system, so we did have to rely upon engineering calculations to do so. I have to give our facilities full credit for any success that we had in calculating the potential and also realizing those savings that came from that, and it really took a lot of work, so take a look.

As you can tell, there's a lot of columns that we asked to fill out, and this is not as simple as just filling out equipment data. We had to look through logs. We had to look at trends. We also had to interview operators to help us come up with the operating parameters that we had to put into our systems. And this is just for compressors. We did the same for condensers, as well as evaporators. And once we got all this input in, it would roll up into our energy consumption that we have within our refrigeration system.

Now once we have this information, we can now begin to quantify the energy conservation measure impacts that we have. Can we reduce our discharge pressure? Not only do we want to know what that number is that we can reduce it to, what is the limiting factor? Can we operate our systems more efficiently to overcome that or is this an opportunity to plan for capital expenses to help us get better? Can we increase suction temperature?

Now this is really similar to what you would see with retro commissioning. How are we performing versus how the system was designed? We have a lot of plant operators that have to respond to production needs in which they do change set points, but just like any other system, do we go back and reset that back to how it was designed? Do we have opportunities to sequence our compressors more efficiently? Can we run a smaller compressor versus a larger compressor? Do we have an opportunity to turn the compressor off that's operating at a low slot valve position? This sheet will help us to run those scenarios.

Are we balancing our system properly or are we overworking our compressors? Do we have any non-condensables in our system that's directly impacting our head pressure? And now once we get all of these inputs in, we can now calculate the impact that we have with energy efficiency.

Now I did mention that we do have over 100 facilities that are participating with this project, and so we are comparing what they've identified in the training versus what those real-life savings are. So at the conclusion of this training, we identified 2.9 percent overall energy savings coming from our ammonia refrigeration system, and up until this is October to February, we have realized 3.2 percent savings.

And you'll see an even better number on this next slide as we take out those plants that are really skewing this data. And in just the first five months, we have seen over 73 million kilowatt hours' worth of savings, which is 4.8 percent of our total electric consumption, and with this data, we did exclude new plants, plants that have gone through major expansions, as well as plants that we've recently acquired.

We'd like to thank both the Department of Energy and Better Plants Program for this recognition. This has been a great opportunity for Tyson Foods and we look forward to the continuous partnership.

Eli Levine: All right, well, welcome back, everyone. I guess it's not welcome back because you've just been watching this, but thank you for those wonderful presentations. That worked out really great, and some of you are very talented at presenting and recording yourselves. I was very impressed with the high quality of those. But now we have a bunch of questions, and so I encourage you to use your time now. Go into slido and ask more questions, and also to upload questions you're particularly interested in.

So, Alex, I guess I'll start with you, since you were just fresh for everyone. Do you have an EMIS system installed on your ammonium refrigeration system and how do you plan to sustain the savings from those assessments?

Alex Floyd: Those are those are really two great questions. As I mentioned in the video, we do have well over a hundred processing facilities in the United States. A lot of those have come through acquisitions. We do not have an EMIS system at the majority of these sites. We do, of course, have SCADA systems in which we're able to pull that in. That is a goal of ours is to be able to bring that all together and that's something we're building out in the next couple of years.

The next question, and that's a good one, too, how do we sustain those savings. Again, with refrigeration, it's highly impacted upon outdoor air conditions. We started that training in October, so we're really into those shoulder months of being able to get a big impact. So we're coming up on the warmer seasons in which, again, we're gonna go back and start responding to production needs more often. So that's definitely a concern with sustaining those numbers without a good system in place. So we will be monitoring those.

It's really it's difficult to stay on top of this many facilities without the needed data coming back in kind of a real-time mode. So, again, that's something that we're building out.

Eli Levine: Thank you, Alex. I appreciate that. That makes a lot of sense.

For the 3M team, two questions for you guys. Did your IT team have any concerns or require additional security to implement the Everactive system? And then, as well, what was the source of power for the sensors and is Wi-Fi or some other means used to upload the data to the clouds?

Brian Mohr: Sure. So every sensor talks directly to an Everactive gateway and that gateway has several options on how to get information onto the Internet. One is through Ethernet, the second is Wi-Fi, the third is through an LTE cell connection and that was what we opted for so that the Everactive system and our three MIT systems stayed independent of each other.

Second question on the type of traps. My understanding is that – oh, sorry. Power source, excuse me. Each sensor has a thermoelectric generator that clamps onto the condensate pipe and that generator relies on the temperature differential between the pipe and ambient air to generate the power. So if you're a steam system, it will cycle on and off like ours does. Each sensor does have a built-in power source that charges from the generator, and after a certain number of days, it will shut down and the system will tell you, "Hey, I haven't heard from the sensor in a while."

Eli Levine: Thanks, Brian. That's great.

Margaret Ann with Flowers Foods. One question we got that you let me know if you're comfortable answering. They acknowledge that your project required what they describe as a massive investment and they wanted to know if you found any financial support from local government or elsewhere or if you had any success tips to share with us on how you financed the project.

M. A. Marsh: Yes. Yeah, that's right. It was a massive investment and we recognized that a lot of our success was by working with our local –

Eli Levine: Margaret Ann, I think you cut out for me. Would you just mind repeating that? It might have just been my computer.

M. A. Marsh: Okay, can you hear me now?

Eli Levine: Yes.

M. A. Marsh: Okay. We received a performance-based grant from the state of Virginia, but in terms of success tips, I would say with COVID, I know it can be difficult, but if you're able to have those face-to-face meetings and really develop those relationships, that's key to getting those types of partnerships to make these projects successful.

Eli Levine: Yeah, that's great. I appreciate that, and it's nice to see my home state of Virginia chipping in and providing that type of incentive.

Lockheed Martin, a relatively quick one for you. Did you consult with IEEE 1547 in obtaining the interconnection agreement?

Michael Stein: So that's probably not my area of expertise, but I can tell you that we did have to work with the utility to satisfy there's various interconnection requirements that are set forth by the Connecticut Public Utility Regulatory Authority. So they basically established technical requirements, guidelines, and these were developed not only by the EDCs, but also the state. They also involved electrical engineers, ISO New England, manufacturers, other key stakeholders. And so we actually did have to satisfy these requirements before we made our DG resource operational.

Eli Levine: I appreciate that. Thank you. I appreciate all of you handling the rapid-fire questions that we're doing here. We're moving through these pretty quickly, so if the audience has additional questions, please fire away and we'll keep them on the hot seat.

SugarCreek, and I know you may have answered this in the chat, but it might be good for everyone to hear. Are you able to estimate the avoided emissions or energy and costs associated with detecting and fixing the leak?

Todd Jackson: Roughly on our first walkthrough of our first plant, we concentrated on the compressed air system and the fire suppression system, and the rough estimate's about $60,000.00 a year of avoidance on those two systems alone, much less the nitrogen or the vacuum systems that we evaluated, as well.

Eli Levine: Excellent. Back to 3M, is the steam trap monitoring system for your F&T traps only, or can it be used on thermostatic traps, as well?

Brian Mohr: To the best of my knowledge, their literature says they can be used on any type of trap.

Eli Levine: All right, and a new one that we got for Tyson. I'm just skipping around here. For Alex, with so many facilities in your portfolio, what strategies have you used to engage all of them?

Alex Floyd: Honestly, right now, we do have a lot of wastewater treatment facilities within our portfolio of processing facilities, so we have a really robust environmental group. And so we've really been teaming up with the environmental department to help plug us into the facilities, as well as share best practices and get information out.

Eli Levine: For 3M, Brian and Balaji, did you need to receive any special training to operate the monitoring system?

Brian Mohr: Not really. With COVID being around, we didn't have any one-on-one in-person training, but we did have some virtual online training on how to navigate their website. And the installer who helped us install the equipment did show us the technology and how to hook it up.

Eli Levine: All right, fantastic. A couple of questions for Lockheed Martin, but one that we got in was what is the long-term plan regarding cogeneration at the plant described? For example, provided cost-effective battery and solar. Would that be considered an acceptable alternative to fossil fuel primary input?

Michael Stein: It's something that we have explored at Lockheed Martin at the Sikorsky site. We're always looking for opportunities with renewables. We have several sites in the state of Connecticut that we may decide to move that direction. In Stratford, Connecticut, where we've implemented this project, we've worked for a number of years with the utility on introducing this new interconnection agreement with the added generator. We have a large cogen. We also have a 75 KW solar array.

But at this time, we pretty much maximize the amount of onsite generation, and that we've kind of understood this working with the utility. It's also difficult to make the business case work when you have mixed generation sources. Some of the tariffs or the riders that you can take advantage of to actually bring down your costs through maybe let's say net metering, it may not be available for these Class 1 renewables if you have other sources onsite.

So it's really we gotta look at the business case. I don't think it's gonna work for us here in Stratford, but that's not to say we wouldn't choose to do something elsewhere

Eli Levine: And are you comfortable speaking to the dollars per kilowatt hour in your area? That was another question we saw.

Michael Stein: Yeah. Actually, I worked at the utility for about ten years and very familiar with the commercial rates. I could just speak in general terms. And this is the blended cost. This is not only just the kWh component, but this is also demand charges. The blended cost ranges anywhere from 15 to 18 cents per kilowatt hour.

Eli Levine: Excellent, thank you so much.

For, Nissan Brett and team, did COVID impact any of the design or the operation of your HVAC project?

Brett Rasmussen: That was one of the reasons when we looked at it that we wanted to make sure that we could monitor the air quality. So we added sensors in the zones so that you could get a feedback if the air quality was being maintained, the carbon monoxide level and other things in it, to make sure that everything was fine.

Eli Levine: Excellent, thank you.

Back to 3M, for the remote steam trap monitoring – sorry. The screen keeps moving. I'm curious to the signal framework, for example, how the remote signals get back to the system, and also, where monitoring is set up.

Brian Mohr: So, forgive me if I'm not understanding the question or interpreting it correctly. Yeah, there's a gateway within 30 40 feet of the sensors that the sensors will talk to. Where we have our stuff, there's a lot of piping, and mechanical infrastructure, and building steel in the way, so the coverage isn't as great as it could be in a perfect situation. Luckily, all of our 50 sensors talk to one gateway and that one gateway has enough signal from the cell tower to transmit back to the cloud.

Eli Levine: Great. Thank you so much.

So I guess for Owens Corning and Graham Packaging, you managed to produce such stellar videos that there were no questions for you, but any final reflections? I'll leave you guys the floor, if there's anything that you felt you wanted to add or extend your remarks from seeing yourselves give your presentation. And if not there's another question for SugarCreek.

Don Scarsella: Yeah, thanks, Eli. No, I didn't have anything else.

Eli Levine: All right, well, for SugarCreek, what was the process for borrowing that Fluke equipment? Did you end up buying one of your own?

Todd Jackson: We processed the request through the DOE. The standard paperwork, I was going to respond to that question so they would have the e-mail for it. Basically, you put in the request for it, you get on the list. We are looking at purchasing two of the units for some of our – we can use a little more often, but getting the unit from DOE was painless. There's a waiting list because this is an in-demand unit, but it wasn't very difficult at all.

Eli Levine: Excellent. Well, thank you, guys, so much. This was a really great time. If someone wants to answer this question about the predictive model based on time varying change of temperature, happy to open the floor if someone wants to take that, but otherwise, I just want to thank everyone for joining us today, and I hope that you will join us in a half an hour or so for our next session, which is the Choose Your Own Solution. Interesting. I'm really excited about it. I think it's going to be a really dynamic, fun way to showcase some interesting stuff that our partners are doing.

So we also have our summer webinar series here. I encourage you to sign up, and if any of these are interesting for you, signing up for one of these or any of the other upcoming webinars that Better Plants will be offering. This was a really great session. I want to thank and congratulate all of the awardees. So if there was a question we didn't get to or something you feel more comfortable reaching out to them privately about, you have all their contact information. You have our contact information, as well.

Thank you, everyone, for being a part of this, and congratulations once more to all of the awardees. It's really a job well done during a very challenging year. So we look forward to having you at our next session in about a half an hour.

[End of Video]