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Holly Carr: Hello, everyone. I'm Holly Carr, with the US Department of Energy. I'd like to welcome you to the October edition of the *Better Buildings Webinar Series*. In this series, we profile the best practices of Better Buildings Challenge partners, Better Buildings Alliance members, and aligned organizations who are working to improve energy efficiency in buildings.

Today, we'll be stealing a few pages from the playbooks of our Better Buildings Challenge partners, who are seizing the opportunity to capitalize on common milestones in their building portfolios. Such as building purchase, or aesthetic upgrade, or even organizational policy changes. To sneak in – or integrate, let's say – energy efficiency improvements, and achieve higher performance in their buildings, as well as lower energy costs.

So, let's move on to the next slide, and I'll introduce our presenters, today. Well, actually, next slide is the agenda, so we're gonna show you the order of our presentations, and then – There we go, next slide, to the presenters.

Our first presenter is Jesse Warren, who is an engineer and the Sustainability Program Manager for Buildings and Operations at the University of Virginia in Charlottesville. Jesse is responsible for the university's recycling, electric Demand Response, and building sustainability programs. He leads a team of energy engineers, who identify and implement energy efficiency and retro-commissioning projects across grounds, at UVA.

Next is Peter Brandom, who's a senior project manager for the city of Hillsboro, Oregon. Starting in 2008, Peter Brandom led the development of Hillsboro's first comprehensive sustainability plan, encompassing all city departments. Key work and initiative include establishment of citywide sustainability governance, the city's first inventory of greenhouse gas emissions, long-term sustainability goals, and various engagements and incentives for city residents and businesses.

He also leads Hillsboro's Mayoral Sustainability Task Force, a component of the Hillsboro 2035 Community Plan. This work includes external program such as the Better Buildings Challenge, and the Workplace Charging Challenge, another DOE initiative for vehicles.

And finally, last but not least, Frank Inoa, who has been with Arby's Restaurant Group since 2005, and is currently serving as the senior director of engineering. Frank is responsible for kitchen, facility, and equipment design, and oversees many of Arby's energy efficiency initiatives related to their Energy Matters program, which is Arby's commitment to energy reduction.

Frank has been in the food service industry for over 30 years, and his experience includes roles in design, manufacturing, and consultation within the quick serve restaurant and cruise line industry. Frank is based out of corporate headquarters in Atlanta, Georgia.

So we're all over the country, today, with our panelists. Thank you very much, to each of you, for joining us, today.

Before we get started with our presentation – we can move to the next slide – I do wanna remind our audience that we will hold questions until near the end of the hour. Please do go ahead and send in any questions that you have, through that chat box on your webinar screen. We will collect those throughout the session, and will kind of divvy them up to the right person. We should have plenty of time, towards the end, to get a lot of those questions out to our panelists, and responded to.

With that, let's kick things off with Jesse Warren, from University of Virginia. Jesse will tell us about UVA's Delta Force program, which functions somewhat like a green revolving fund. In some cases, Jesse and his colleagues are able to partner with interested departments, or others, on campus. And provide additional funding to planned renovation projects for energy efficiency upgrades that wouldn't make it into the projects otherwise.

As Jesse says, they kind of help clean up the rough edges from these projects, from an energy efficiency perspective, after they've been completed. So, Jesse, why don't you tell us more?

Jesse Warren:

Thanks a lot, Holly. Can I get the next slide?

So, we're gonna be talking a little bit about how we do business, here at UVA. But really we're gonna talk about is our Delta Force program. Delta Force is a green revolving fund, hence my cool graphic. But I'm gonna tell you guys a little bit about how we got there and sort of what their current successes look like, and the successes we're working on today.

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Now, we are in the Office for Sustainability, at the University of Virginia. The Office for Sustainability is actually located within facilities management, which is a really convenient place for us, because we are also the utility biller and provider to the university. And that comes into play as part of our cost recovery model.

But just to give you a little bit of background, we're a large research institution located in central Virginia, with about 44,000 faculty staff, students, researchers, and about 16 million square foot of building area.

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Now, historically, the university's had funding available to invest in buildings, but the funding source was very rarely the entity that was gonna benefit from the efficiency improvements. And so, that was really the genesis for our Delta Force program.

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Because we came up with the idea that we would go ahead and invest in these buildings, and then we'd recover 125 percent of the cost, through energy savings. We would hold the customers' base year utilities constant, and then, as those utilities fell, facilities management would capture the difference between the billed utility cost and the actual utility bill, until we recovered 125 percent of our investment.

At that time, all of the holds re released, and all of the remaining savings goes back to the university. Since we're really working on the difference between the old energy costs and the new energy costs, we focused on the name "Delta Force."

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So, this is Bryan Hall. Bryan Hall is the project that I really wanna kind of do a deep dive and discuss, today. Bryan Hall was designed in the mid-'90s by Michael Graves, and built in about 1996. That makes it kind of prime in terms of building age, for a major maintenance milestone.

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So, what we did was, Delta Force and others came through, and we

revamped this building. First, we were looking at ways that we could put in lower-wattage fluorescents or lower-wattage LED lamps.

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We're also focused on where we can repair insulation or add insulating jackets, particularly on steam or hot water equipment. Traditionally, we didn't insulate a lot of that stuff because of "service reasons," but insulating jackets allow us to get a lot of the value out of that, even in a replaceable format.

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But our biggest upgrade is to upgrade the building to digital controls. We do this through our Building Optimization Team. They're an in-house group who is focused on basically stripping pneumatics off these old air handlers, and replacing them with modern DDC systems. This team is interdisciplinary, in that they've got controls technicians, they've got programming folks, they've got pipe fitters, they've got HVAC techs, they've got electricians.

So they can come in, improve the controls on these buildings, while continuing to have the systems hotwired to operate, so the users and the occupants don't ever see the change as we're making the upgrade.

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Now, let's talk about how we actually brought all this together to fund it. Really, the genesis of this project was that DDC upgrade through the Building Optimization Team. That was funded from a different pocket, a deferred maintenance pocket. But once we identified that they were going to be completely reworking the controls in this building, that gave us a huge opportunity to come in and do energy work.

Once they were done, we could come in and we could retro-commission that system – well, really, commission that system – to make sure that it was functioning at its best. We could also, like Holly mentioned, clean up some of the rough edges around the project. Like, come back with insulation, where they had removed it to install valves, and things like that.

So with that, that's how we kind of arrived at our project budget.

\$215,000.00 was being provided by deferred maintenance to do that building optimization work, through deferred maintenance. Furthermore, we invested another \$145,000.00 into the building, through Delta Force. That pays for not only our staff engineers' time and the relamping, and the stuff that you guys saw. But we're also looking at doing, like I mentioned, retro-commissioning, lab work, and some other stuff, with that funding.

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So let's talk a little bit about results. The base year is the first year that you see, there. That's the one in red. That's the year that we're basically repeating, in terms of billing, to our customer. And that's why you see that peak year over year, in light blue. I went ahead and showed it behind the remainder of our utility bills.

The purple section is where we wanted relamping and scheduling. Because of the way our schedules lined up, we were actually able to get in and do relamping and scheduling of equipment and things like that, before the Building Optimization Team was able to come in and do the DDC upgrade. Since those two are separated by about a year, you're gonna see those differing results, based on that limited set of ECMs.

And then the final portion of the graph, you'll see the dark blue utility use, which is the utility use we saw after the DDC upgrade and retro-commissioning were complete.

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Since we measure all of our utilities at the building – chilled water, hot water, and electricity – I'll be able to give you guys very discreet numbers for those. But chilled water is our biggest success, here. We were able to cut chilled water use, in that building, by 75 percent.

We were able to reduce some chilled water use through the relamping and the scheduling, that's certainly reduced our summer usage. But once we switched over to digital control, now we had access to all kinds of resets and fun controls parameters, that we could tweak in order to reduce the chilled water use in that building, further.

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If you see electricity use, again, we also have some reduction, but

it's not as dramatic. We saw some reduction in electricity during relamping. We saw further reduction in electricity as we got to the DDC upgrade, and all the variable frequency drives and whatnot were working correctly. Overall, we've seen about a 14 percent reduction in electricity, last year, which is pretty good.

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And I'll be honest, this one was kind of a kick in the pants. We chased this heating hot water use for the longest time, because our base year showed very little hot water use in that building. And then, every subsequent year after, we showed significantly more hot water use. I've been through this with the building metering guys and, basically, I've reached the conclusion that our base year probably under measured our total hot water use. But that said, we're just living with that, in the project results.

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So, this is our total energy cost, at Bryan Hall. All in, we saw 34 percent reduction energy use, last year. I'm including the 150 percent increase in hot water, so basically we're taking the penalty for that, and we're still showing a 34 percent reduction. With that 34 percent reduction, that means we got \$38,000.00 in energy savings, last year. And if we're able to continue at that rate, then we can pay back 100 percent of our investment in under 4 years, and we can pay back that 125 percent of our investment in under 5.

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Now, today, the projects we're taking on are a little more substantial. Clark Hall is our newest project, and this is really where we're relaunching Delta Force. Not just as a standalone program, but as a part of our bigger, what we call, Building Sustainability program.

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This next slide just gives us kind of the same funding look of how we pursue this work at Clark Hall. We're gonna get \$150,000.00 for the DDC upgrade. Again, we felt it made sense to partner on this project, and we're bringing \$300,000.00 to it. If you notice, compared to the previous job, we're bringing a lot more money than we brought to Bryan Hall, and I'll explain to you why.

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In this project, we're not just bringing Delta Force, we're bringing a lot of other pieces under the umbrella that we call Building Sustainability. Delta Force is still gonna happen. I mean, that 125 percent cost recovery vehicle sort of opens the door financially to a lot of the things that we wanna do, here. But we're not focusing on it as the crown jewel. We're just referring to Building Sustainability as the umbrella.

Through Delta Force, we're gonna fund the Building Optimization Team. A portion of that upgrade money is gonna come from deferred maintenance. But where there are upgrades that we want to do beyond their minimum needs – that is, add additional sensors, and things like that, so that we can get additional energy conservation measures – we're paying for all that.

Furthermore, this is gonna be our first LEED for existing Buildings Operation and Maintenance project. We're really pursuing LEED EBOM hard, in this building. Our upper level administration wants to see us doing a deep sustainability dive that's also focused on third-party vetted tools. So this is gonna be our first EBOM LEED project, even though we've got almost 40 LEED certified buildings here on grounds, already. Those are all new construction jobs.

We're also gonna bring our Green Labs program, which, at this stage, is not even fully developed. Its pilot is going to be in Clark Hall, but, again, we're gonna do all this under this umbrella of Building Sustainability.

The idea is, we're really going to leverage our infrastructure and the personnel in our buildings, in order to bring these energy savings projects to the next level. It's not just good enough for us to go through and improve the infrastructure in a transparent and visible way. Now we really wanna bring the occupants into it, and get their effort, as we're trying to improve our results.

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And the last thing I'll show you is some of the marketing work that we're kind of giving to these customers. This is an update that we're gonna blast through the building. You have to understand, this is a mockup, so some of the text on there doesn't make technical, perfect sense. But this is the kind of communication we want those occupants to see, as we're making physical improvements in this infrastructure.

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So that's it for me. If you all have any specific questions, here's my contact information. And we'll hold any additional questions to the end of the webinar. So back to you, Holly.

Holly Carr: Great, thanks very much, Jesse. And, Jesse, I wanna be clear to our audience. When Jesse's talking about customers, you're talking about your departments and those building projects on campus, right?

Jesse Warren: That's absolutely right. We're decentralized enough that I view each of my departments as a respective client.

Holly Carr: Okay, thanks.

Let's see, let's zoom across the country, here, and head over to Hillsboro, Oregon, and Peter Brandom. Peter tries to insert energy efficiency into the conversation, at many points in the city – construction of new buildings, major renovations of existing city buildings. He gets the conversation going within ongoing maintenance programs, and when the city considers policy changes affecting buildings, or as the city's energy infrastructure.

Peter, can you go ahead and give us some of your specific examples, here?

Peter Brandom: Absolutely. Good morning, everyone, and welcome to the Pacific Northwest. I'll go ahead and ask to go to the next slide, please. Actually, the next slide beyond that. That's my title slide.

I wanted to start, just to orient folks, perhaps some of you have been to Portland, Oregon. Hillsboro lies within the greater Portland metro area. In the upper left-hand image map, you can see where the Portland region lies, relative to the mouth of the Columbia River, which is in the upper left-hand portion of that map.

Hillsboro's one of 25 cities within a 3-county regional area. We're home to Intel, the largest private employer in Hillsboro, in Oregon, with 18,000 employees. And we're now the fifth largest city in Oregon, just under 100,000 population.

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I think that cities have a unique position, in terms of being the entity that provides critical services to a community. Our city is a

full service city. The only thing that we don't do is wastewater treatment. We do everything else, from police and fire to parks, streets, street signals. We have just over 800 employees, just over half a million total square feet of facilities, and a large portion of that is enrolled in the Better Buildings Challenge. We've been a leader in installing electric vehicle charging infrastructure for our community.

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And all this within the context of the broad sustainability program that we established in 2010, that has very ambitious, tangible environmental sustainability goals for the year 2030. We're doing what we can, within the reality of our world, to move toward those goals, including Better Buildings Challenge goal of achieving 20 percent improvement on EUI for all our facilities – actually, most of them – by 2020.

We are currently – at least, as of last year – 16 percent reduced energy use intensity since 2009. So we're getting very close to achieving that goal.

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The three areas that I'd like to talk about – in terms of building milestones and the opportunities they're in – are new construction and renovation, operations and maintenance, and then a couple of related policy opportunities. There are probably numerous other policy opportunities, but I'll touch on a couple.

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So first, regarding new construction and renovation, we started out, back in about 2006, built a new civic center here in Hillsboro, and achieved LEED gold status for that building. It was just the second LEED gold certified municipal building, at that time. Our community really voiced its intent that that new building should be LEED certified, and we achieved that.

What we've learned in the interim is that, designing a building to a certain standard certainly doesn't mean that it will operate to that standard. So we've really refocused our efforts on, essentially, marrying the design and the operation of the building. A couple of important aspects of that are energy modeling and third-party commissioning.

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What we have found, over time, is that if the designers are not designing a new facility or renovation with the reality and knowledge of existing systems – including controls, as Jesse was talking about – then, we can run into some big problems once the building is completed. So that has been a renewed emphasis for us, is to make sure that the operators are involved in the design of new buildings and renovations.

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With that, I wanna talk about our Better Buildings Challenge showcase project, which is one of our two libraries. It's called the Shute Park Library, and it is an architecturally significant building that was completed in 1972. It's a very cool building. But by 2010, 2011, it didn't look so cool anymore, because it was very tired and had a lot of, particularly mechanical, but also lighting workarounds, to make it more functional with all the changes that had been made through the years.

So I've included a few photos that give you a very limited, but hopefully helpful, snapshot of some of those kinds of years – what years have done to the building, and some of those workarounds.

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So when looking at upgrading this building, the city looked at what it would cost to totally replace the building. Or to basically strip it down and rebuild it on the existing frame, preserving that architectural significance. I'm personally pleased that the city saw the opportunity to simply – well, it wasn't simple, but to – rebuild it on its existing architecture.

It's an absolutely beautiful building, now, with new lighting and mechanical systems, and including, also, significant daylighting. And we are in the process, now, of looking at the pre- and post-renovation – or beyond the one-year mark – where we can see what the energy improvement will actually have been. We anticipate that to be close to, if not exceeding, the 20 percent improvement that was envisioned at the outset.

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Now, as regards to operations and maintenance, we, last year, completed the city's first energy management plan, and within that

plan are a couple of key policies. One being that we will have a third-party commissioning agent for any significant new construction or renovation of a city building. We also really focus on how buildings are maintained, focusing on energy management and occupant behavior. We have quarterly meetings to review the prior quarter utility data, and to identify areas of opportunity and aberrations.

That energy management plan prescribes a process and calendar, and so forth, and we continually track that data.

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One example of a building milestone that we leverage, actually, each year, now, is our aquatic center. It's a larger facility with a large outdoor swimming pool and multiple indoor swimming pools, a recreation center. There are unique energy challenges and opportunities, there.

The snapshot, here, from our Better Buildings Challenge data dashboard reflects that we have achieved quite a lot of energy improvement from prior actions. But, again, this year, every fall, the building is shut down for regular maintenance, for a couple of weeks. So we really try to time energy efficiency upgrades for that. We did it again this year, and we went through and did pretty major mechanical and lighting upgrades, and should achieve, again, very significant energy improvements with that building.

So that's one very specific milestone for a building that we try to take advantage of every year.

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Then, in terms of related policy opportunity, our council has made a dark sky a high priority, and we've been working on new standards, both for community and city development for lighting, to make sure that at least everything going forward is dark sky compliant. At the same time, with the maturation of LED lighting, in particular, we've seen a huge opportunity for improving our energy performance, with lighting improvements. We've done that both for exterior and interior lighting, and have seen some significant gains, there.

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Then before I close, I just also wanted to mention something not

unlike what Jesse was talking about with the Delta Force program. We have an internal sustainability revolving fund that we established a few years ago. It's a separate line item fund that was originally seeded with energy savings from a few different projects, and continues to reap the benefits of the energy improvements from historic energy improvements.

Then those funds are made available to employees, actually, to identify areas of opportunity, whether they're energy-related or not, if they advance our sustainability objectives. This is a source for funding for projects, and we're currently considering, for example, a proposal to install bike maintenance stations at our libraries, for people to use.

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With that, I will close. And thank you for your time, and welcome any of you to reach out to me directly, or to come and visit us in the beautiful Pacific Northwest. Thank you.

Holly Carr:

Thanks so much, Peter. Folks, you've heard mention of these implementation models in Peter's previous slide, and talking about his green revolving fund. So, implementation models are actually little case studies that all of our Challenge case partners put together with us, highlighting some of their best practices.

So, University of Virginia's implementation model is around their Delta Force program, and Hillsboro developed a model talking about their green revolving fund. You can find all of those implementation models, and a lot of other case studies and resources, at our Better Buildings Solution Center, which is pretty new. It was launched in May, this year, and is really kind of the online headquarters for all things Better Buildings, and certainly for all of our partner resources.

The easiest way to find that is to google it, "better buildings solution center." From there, you can do all kinds of searches, by your sector, by your energy efficiency challenge. You can look for "show me all of the solutions about financing energy efficiency projects," for example. So, I encourage our audience to check that out, as well.

Let's move on to the next slide, and our next presenter.

I also wanna give folks just a quick reminder to send in any questions that you have for our panelists, through that chat

window. We're collecting those, and we'll answer them during the Q&A period at the end of this session.

So, for our presentations from Arby's, some of our audience members may have noticed a new look at your local Arby's restaurant, in recent months or years. While many of the Arby's restaurants are getting an aesthetic facelift inside and out, our presenter Frank Inoa makes sure that they also receive an energy efficiency boost at this important building milestone.

So, Frank, can you tell us a little more about what you're doing across the Arby's portfolio?

Frank Inoa:

Absolutely. Thank you.

Good afternoon, everyone. So I don't have a lot of slides, but I do have a story, which I think it will be compelling and interesting to you folks. I'll start off by saying that Arby's Restaurant Group is the franchisor for the Arby's brand, but is also an operator of over 900 restaurants. So a lot of what I'll be talking to you about, today, are really related to the 900 and plus restaurants that we operate. The data, the savings, the stories, and the wins that we have, we share those with our franchisees, of course, but these are basically mostly corporate-related.

So, I'll start with that, with the story of how we got to our current program, Efficiency Matters. Back in 2012, when sales were a little slack throughout the industry, we were looking for ways to achieve some savings. One of the items we discovered was energy usage. Our typical restaurants consume about \$35,000.00 to \$42,000.00 a year in energy spend. That's a lot of money over 900-plus restaurants.

Our goal, at the time, was, "Let's look at ways to make some small wins, and extrapolate those over many restaurants, and begin a program there." Again, sales were flat, so there wasn't a lot to invest in these programs, but we didn't think we needed to. We thought that just changing the culture, bringing education to our staff members, our employees, and developing some behaviors, we could start off this program.

In 2012, we reached out to various companies that specialize in consultation of energy efficiency, and we partnered with a company called Ecova. Ecova helped us analyze our restaurants, and helped us develop a short-term and a long-term plan. The short-term, of course, was low-cost or no-cost solutions. That was

the first way we could get our foot in the energy efficiency door, if you will, so that we could start getting some wins, and then looking at ways of investing in the future.

One of the things that they helped us work on was, for example, the hot water temperature. Most of the sanitation in the restaurant is done by chemicals, so hot water is really for the comfort of our patrons and our staff. So we said, "Let's standardize the temperature across the portfolio, and that will provide some savings."

We also relooked at our on/off schedule. We had one for many years, but many of those were in the back office, not being really looked at by our employees. So we had an opportunity to pull that out of the files, relook at it, reconfigure it, and see if we could increase some of the savings that we weren't achieving, to begin with.

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From these early winnings, we started to look at other ways of implementing small- or medium-size initiatives that would, again, give us immediate wins, and get the program rolling. So some of the things we looked at, for example, were gaskets in our refrigeration. We also installed, across the system, low flow aerators in all our public faucets. Pre-rinse spray valve, for example, is another inexpensive solution that we implemented across all 900-plus restaurants.

These small savings, again, allowed us to see some of the savings we were doing energy wise, and allowed us to reinvest some of those savings into many medium-sized investments. So from those small investments, we were able to perform a little bit bigger ones. For example, programmable thermostats, which in itself grew to a little bit bigger program of an asset management program, or asset management system, that we deployed across all restaurants.

We also installed, in all our walk-in boxes and freezers, electronically commutated motors, or ECMs. Also installed vinyl strip curtains.

As this program took hold, we then developed an energy policy. And from that policy, we developed goals of a 15 percent energy intensity reduction, by 2015. And an energy policy – not only a policy, but a program – a pillar, if you will, and we called that Efficiency Matters.

We raised that level of pillar, within our organization, to that of training, to that of food safety. To us, energy efficiency not only was a financial plus, but it's also the right thing to do. It's the responsible thing to do, with a portfolio of 900 restaurants. And if you extrapolate that to our whole system, we're talking 3600 restaurants. So we're hoping that a lot of the programs that we initiate here at corporate, are implemented by our franchisees. Which many are, as a matter of fact.

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So, here we are, 2015. Our program has been very successful, thus far. Our goal of 15 percent by 2015 is very close to achievable, and we've had many, many savings in the area of energy. That has allowed us to rollout equipment such as low oil, energy-efficiency fryers. We've upgraded, or retrofitted, over 260 parking lot lights, from HID's to LED's.

We've converted over 350 of our restaurants from t12 to t8, and even within that conversion, we upgraded to LED wherever we can, in our interior lighting. When we're remodeling, we're using a lot of membrane roofing that provides a lot of savings. So, as we're rolling out equipment, as we are remodeling, as we're building new buildings that we are doing now, we're also incorporating a lot of our energy efficiency initiative.

This year, for example, we had the opportunity to replace almost 400 rooftop units. Again, those kinds of projects weren't really possible without all the savings and the planning achieved from this Efficiency Matters program.

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So, as I mentioned, our goal in 2012 was a 15 percent reduction in total energy consumption, by 2015. We are very close. Last year, we upped that a little bit, if you will, and joined the Better Buildings Alliance and the Better Buildings Challenge, to raise that reduction to 20 percent by 2020.

As you know, we get a lot of the low hanging fruit, so now it gets a little bit more creative. But we think that, with that program in place and a culture change, I think that will be very feasible.

This slide, here, shows that at the end of 2014 we had achieved 11 percent reduction. Thus far, we're close to 14.5, so we're very

confident that we will hit the 15 percent by the end of 2015.

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So, some of the things that we've partnered with, some of the partners have been Ecova – for example that was our energy consultant. Powerhouse Dynamics – I don't wanna plug'em, but these are some of the folks that have helped us get to where we are, today. And, of course, the Better Buildings Challenge and Department of Energy has helped us, providing us a lot of guidance on how to maintain this program.

That's it for me. Thank you very much. My information will be available at the end of the presentation. Feel free to contact me, and I'll be happy to share anymore stories. Thank you very much.

Holly Carr:

Thanks so much, Frank. You helped us plug, also, a number of initiatives [*laughs*] that are important, here at DOE, that we're trying to reach out on. Including LED lighting and upgrading/retrofitting, both interior lights and exterior lights, to LEDs. This is one of the big, big wins for US energy reduction. We have two campaigns, through the Better Buildings initiative, that are open to the public and available resources that folks can download and use.

The first campaign is our LEEP campaign, which is energy efficiency in parking. So we're really encouraging folks to go to that website, to download technology specifications and other technical resources. To help you upgrade your outdoor parking facilities, either parking garages or parking lots.

And then the second campaign is our interior lighting campaign. So we just took it all indoors and provided a lot of resources for folks who are interested in doing those LED troffer replacements, preferably with controls. So I'll also encourage folks to take a look at our interior lighting campaign. Again, Google is your best friend for finding those on the website.

And Frank mentioned massive replacement of RTUS, across their portfolio. That is another place where DOE certainly agrees with Arby's, that there is enormous potential to both upgrade, retrofit, and replace rooftop units, rooftop HVAC units, that are ten years old or older. They have made so much progress with those units, that it really makes a lot of sense, in many cases, to look at replacing those. So, check out our Advanced Rooftop Unit Campaign, in addition, and download resources there, too.

Let's go on to the next slide, and I think there are a couple of additional resources from our partners, that we wanna highlight. So, next slide after that.

Yeah, so, these are links to the homepages for each of our partners – for Arby's, for Hillsboro, and University of Virginia – that show the implementation models and showcase projects available from all three of our presenters, today. If you're interested in learning more about their green revolving programs, and so forth, you can find that information there.

Okay, so, now is the time where we can really dig into some of the questions that we've gotten from our audience members. Jesse, since your questions have been waiting the longest to be responded to, I'll ask a couple of questions for you.

First one is kind of a technical question about your software. What software did you use, to track these savings and to generate the graphics?

Jesse Warren:

You know, this is, like, the most boring answer, but we have a huge metering component. Because we provide district energy at UVA, we've got meters, we've got meters at every building. They've got a huge sort of software database system that they keep all of that information in. That's where all of the utilities are measured, metered, and our savings is calculated.

On the graphics side, really, everything you saw, I did in Excel. That said, we're probably moving to Tableau for all of that. Tableau will let me kind of cut a view into that utility data, and sort of work with it directly, and then I'll be able to generate visualizations off of that. But we haven't really scratched the surface, what we can do there.

Holly Carr:

Great. And we had a question about how you kind of reach out about new projects that are coming up. Obviously, the building milestone at UVA, that your team tends to capitalize on, is this retrofit of an existing building. Where you find out that something is happening, and your sustainability team kind of swoops in and helps out with additional funds, to get better. Or, in some cases, just get energy efficiency upgrades into that project.

Can you speak a little bit about sort of how you make those connections? Who do you work with on campus, to make sure you

know about those projects that are up and coming, so you can get involved in time?

Jesse Warren:

Yeah, well, let me kind of start with just this brief bit of background. You know, I'm an engineer, and my background is construction. I'm now over in operations and maintenance, which isn't where I've spent the majority of my career. So, although I've only ever been in maintenance, here at UVA, I've been involved in design and construction my entire career, especially LEED work.

So, one key way we've done that is sort of build those relationships among our project managers and the folks who are actually executing these projects, so that we can provide value on their projects. But they also help us understand what's in the pipe.

The second two partners that are really important to this is, first off, our controls group. I mean, I talk about our Building Optimization Team, those five or six guys and what they're able to achieve. But we do other retro-commissioning projects at UVA, and so we have to work with the entirety of the control team.

The associate director for building automation and I talk, like, daily, because I need to know where they're headed, just like they wanna know where I'm headed. And that's sort of my most direct relationship, because anything that's involved with energy, HVAC, and, I'll say, a loss of efficiency, building control is usually one of the first folks who know about it.

The third piece that I work closely with is what we call Work Management. They're, really, the group who divvies out the deferred maintenance funding. They also worry about our facility condition index across the university. They are often planning both capital projects and small and large renovations, into a five-year timeframe.

So my process is something like, we look through all our buildings, we look at who's got the high utility bills, we look at where we wanna be from sort of a utility interest perspective. I then take it and I vet it with all these different partners, in order to figure out whether or not that work aligns with where they're going, prior to bringing any of this to prospective clients. Any one of them can shut that down by telling me that there's enough work going on that's gonna undo what I've done, that I move on.

So, to give you a real short answer: to arrive at the, probably, 10 projects we do every year, we probably start with a list of 30,

before we can find 10 that give us the right combination of things that make us move forward.

Holly Carr: Okay, thanks. And I think, you know, this is just another example of – Better Buildings has been around, now, for 4-ish years, and so we're starting to see some consistent best practices, across sectors, across all different kinds of organizations and geographies. And one of the things I think we are starting to see is the importance of those internal partnerships. Of Sustainability working with Work Planning, of Sustainability working with Real Estate, or working with Finance. And really reaching out, inside the organization, to make energy efficiency happen.

Jesse Warren: Yeah, that's really been a big focus for us, trying to get to the place where we're one large facilities management group, not a bunch of individual silos. As that approach has changed, that has greatly increased the impact of what we can do from the Office for Sustainability.

Holly Carr: Right.

Jesse Warren: Thank you, Holly.

Holly Carr: Thanks.

Peter, we had one question for you, regarding – you mentioned reviewing your utility bills on a monthly basis. We had a question about, who is involved in those reviews, and how do you take action on that review, each month?

Peter Brandom: Sure. We who assemble and manage that data are in the city manager's office, so it's sort of a central function in a decentralized organization. We facilitate those meetings. We have a monthly meeting with our facilities maintenance group, who are the folks who are on the ground managing the buildings. And so, every third meeting, once a quarter, we dedicate more time, and invite a few other folks in to review the prior quarter's utility data. That's for electricity, natural gas, and the water.

Then, in addition to the maintenance facilities team, folks from our parks maintenance groups, because they manage all of the irrigation of all our parks and buildings. Our water utility is also, it's an internal utility, it's our Hillsboro water group. And so we have folks from our water department, so that they can also help troubleshoot, and so forth.

And then, if we have any issues, questions, and so forth, the first level of action and investigation is with the facilities maintenance group, or with the water irrigation folks. And then, if they can't figure out what the anomaly or the issue is, then we contact the utility, in the case of water it's internal, and figure that out.

Just one quick example of what can be found, or what can happen if you don't look at your utility, if those bills are simply just getting paid. We had a water leak go undetected for months, a few years back, and that ended up to the tune of about \$14,000.00-worth of lost water, because there was a wetland near the facility. It was going underground and disappearing into the wetland, so it never became apparent until we started looking at the utility bills.

And so, we're able to catch things, if there is a problem.

Holly Carr: Great, thanks, Peter. I'm gonna turn it over to Frank, for just a moment. A couple of questions on how you identify those low- and no-cost opportunities, particularly since, unlike Hillsboro that's all in one utility territory, Arby's is all over the place. So, how do you identify those opportunities, given the various utilities and energy efficiency program regions?

Frank Inoa: Well, they weren't really identified individually, or even regionally. It was, again, we had a consultant visit our restaurants, see our operations, see our behaviors. And from those, make some recommendations. We just took the first couple of low-cost ones and implemented those, because those were easy to implement.

Like I mentioned, the on/off schedule is something that we had in our system long before we took on this initiative. But, again, we didn't have the culture, we didn't have the focus. Thus, we had a nice laminated on/off schedule in the back office, not present in our employees' visibility. So we brought it to them. We also added things like stickers, for example, that we added on certain pieces of equipment, that reminded them to turn it on, turn it off.

Little things that we didn't do in the past, very low-cost to do now, and those were implemented. And the success rate, for example, was much higher.

The restaurants that they visited saw an array of temperatures on our hot water heaters, and we saw that that was an easy one. That was just, really, a communication across the system, where we told our operators, you know, "These are the various types of water heaters that are in our restaurants. Here's how you adjust them."

That alone was a simple communication and a simple directive, and followed, probably, by 95 percent-plus of our operators.

It wasn't a lot of thinking, to put those to work right away.

Holly Carr:

Great, and you must've read my mind. We had another question asking about specific adjustments that have been made, to train Arby's employees on sustainable behavior. So, you just mentioned a lot of those, on very low- and no-cost items and quick training that can be done, for staff and managers.

Frank Inoa:

We have a weekly newsletter. We've always had one, and now we have our own section, if you will, called "Efficiency Matters." So, a lot of our weekly communications is to reinforce and remind some of the things that are in place, so that our operators continue to perform these adjustments, or whatnot, in the field. It's been very successful.

I think, ultimately, when you include everyone, and the operators understand the importance of it, it's like their own home. A lot of these operators think their restaurants as their own, so as you would in your house, you know, they now appreciate shutting off the outdoor lighting at 12:00 noon. You know, where before, it was just probably left all day, and no one really noticed or realized the importance. So our operators are really engaged.

Holly Carr:

Great. Thank you so much, Frank. And thanks to all of our presenters.

Before we wrap it up, here, I want to go on to the next slide, and make sure folks know about the plan for our November webinar. This is "Taming the Energy Hog: What Every Organization Should Know to Address Data Center Energy Use."

You may not think of yourself as an IT company but, in this day and age, just about all of our organizations are becoming IT companies, to a certain extent. We are all processing so much more data, holding so many more e-mails in archives, than ever before, and that's just exponential. And, therefore, our data centers are becoming a part of life for all of us, whether they're big data centers, multiple data centers, whole buildings of data centers, or small little closets of a data center. They are all energy users, and they're becoming an increasing slice of the energy pie.

So, I encourage you to join us, next November 3rd – first Tuesday of November – and hear from some of our partners working with

us on data center energy efficiency, specifically. You'll hear from organizations that are not data-focused organizations. So you'll hear from the Home Depot, and also from Michigan State University. Both of them will be providing us with some case studies, and talking about what they are doing to reduce data energy use in their organizations.

And then we'll hear from our own Department of Energy data center folks, talking about kind of the basics, giving you a primer on what to think about, how to start looking at your data center energy use. And, perhaps – again, we're talking about partnerships – who to partner with in your organization, on the IT side, that can really help you make a dent in that energy use.

Let's go to the next slide, please.

So, with that, I'd really like to thank our panelists very, very much, for taking the time be with us, today. And, also, our audience.

You can feel free to contact our presenters. If we can go to the next slide and show the contact information. You can feel free to contact our presenters directly, with any additional questions that you might have, or anything that we didn't get to during the Q&A period. You can also look for an archive of this session, to be posted within the next week. And you'll receive an e-mail that that archive is available, so you can access any of the hyperlinks, as well as the audio and slides for this presentation.

If you'd like to learn more about the Better Buildings Challenge or the Alliance, please check out our website. Or feel free to contact me at the e-mail shown below. I'd be happy to talk with you about it. And I encourage you to follow the Better Buildings Initiative on Twitter, for all of the latest. Down there, on the bottom.

You will receive a notice when this archive is posted. And thanks, again, for joining us. Take care.

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