

Holly Carr:

Hello. I'm Holly Carr with the U.S. Department of Energy. I'd like to welcome you to the December installment 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's webinar is titled "Making Utility Energy Efficiency Funds Work for You." We probably should have added a teaser to this title. We should have called it "Free Money: Making utility Energy Funds Work for You" because that's really what we're talking about here is how our better business challenge partners are really making the most of these available incentive funds which are out there for the taking and often go at least partially unused.

So today we're going to hear first from Whole Foods Markets and their utility incentive strategy. It is the holiday season and Whole Foods literally created a Christmas list of their grocery focused incentives or requests for grocery focused incentives which they presented to Northeast Utility NTAR and said "Hey. Why not incentivize these conservation measures which aren't currently on your list?" We'll hear about how that went in just a moment and following that we'll hear from our Better Plants partner at General Motors. As you may know industrial plants have very unique operating constraints that require careful timing for energy upgrades and detailed coordination with utilities.

So today we'll hear about how GM makes all of that come together and learn about some best practices that are applicable to other sectors as well in terms of working with utilities. Finally we'll hear from the city of Houston and they'll describe their partnership with local utility CenterPoint Energy to replace streetlights citywide with LEDs which will result in significant energy, greenhouse gas and cost savings for the city. We'll also highlight some associated resources and have a question and answer period at the end of the session. So next slide please and we'll introduce our presenters from each of these three organizations.

Mike Guldenstern is the founder and director of e2s Energy Services and the firm operates a national workforce providing engineering consulting services, commissioning energy capital upgrades and TAB for new and existing facilities. E2s serves as a consultant to Whole Foods Market and will be describing the Whole Foods utility work with NSTAR. Gary Londo is the senior energy engineer at General Motors Corporation and works in the global facilities engineering group located in Warren, Michigan. He's also a member of GM UAW global facilities engineering

joint task team for improving the company's energy performance. They have a goal of 25 percent energy intensity reduction in over ten years that's associated with their better plants program and we're very pleased that he has the better plants logo in his background of his photo there.

Alex Heim is a management analyst for the city of Houston's department of administration at regulatory affairs. He's been involved primarily in transport and utility issues with the city and the city of Houston is also a Better Buildings Challenge partner. So thank you to all three of you for joining us today. Before we get started with our presentations I do want to remind our audience that we will hold questions till near the end of the hour. You'll see on your webinar interface that there is a little chat area for sending questions in and we'll collect those and we'll distribute them to the appropriate parties hopefully for the last 10 to 15 minutes of the session.

Also want to note for our audience that this session will be archived both the slides and the audio so you can sit back and listen and you can check details, access the details later online through the Better Buildings Challenge website. With that let me turn it over to Mike Guldenstern for the story of how Whole Food developed a unique collaboration with Northeast Utility NSTAR. Mike?

Mike Guldenstern:

Hi. Good afternoon. As Holly mentioned my name is Mike Guldenstern and we at e2s operate collaboratively with Whole Foods Market and manage and implement globally for most regions in the country that energy efficiency retrofit programs. So next slide please. The presentation outline today we're going to cover briefly prescriptive versus custom incentive that I'm sure the audience has been exposed to and what we've done specifically with NSTAR and we propagated this to other utility markets as well with a memorandum of understanding that helps speed the process along and again this is all focused on achieving utility incentives for custom efficient measures that we've deployed.

We'll touch on our experience of how people geographically benefit from this what types of properties make sense for this process and then some barriers that slow down the process and some things that help drive success. Some of that's utility internal stresses as well. Two key people that I believe we'll have later as references in this program were Kathy Loftus global leader for sustainable facilities at Whole Foods and Robert Donnelly which

manages the north Atlantic which is the northeast region for Whole Foods Market.

Next slide please. So what we've seen specifically with Whole Foods and even after e2s with other clients, most property owners have begun to exhaust sort of the simple one for one prescriptive measures, the low hanging fruit in the incentive stream from utilities and there's more things they want to do to be efficient but they fall out of the cookie cutter process. Utilities have had custom incentive programs – most do that can allow current market efficient technologies to be deployed into buildings and achieve funding against that. However we've seen that custom path can be a little painful. Next slide please. It's oftentimes quite frankly it can be a mountain of paperwork, analysis time and if you're not careful there's more effort trying to get there than the value of the incentives all together.

Next slide please. We've had some projects and utility territories take almost two years for approval and along the way we may have even – if we had deployed rapidly the savings we would have achieved in the year and a half say of a rapid deployment of six months were on par with what we finally got for incentives and it almost wasn't worth the exercise simply because we were hamstrung with sort of antiquated process with the utilities for how to move outside of the box and got through a slow painful custom process where they'd bring in third party reviewing engineers. And often times the third party reviewing engineer doesn't understand your specific market. They don't understand General Motors industrial buildings. They don't understand college campuses or grocery retail. And more than half the time is educating them on what your basis of operations is and then moving forward to the efficient side of the project and the details and what we're trying to achieve.

Next Slide please. So in the Boston market and actually in the Eastern Massachusetts market, what we were able to achieve was what was labeled with NSTAR as a memorandum of understanding that really was a pretty short document that said we have societal benefit incentive funds that we need and want to pay out to rate paying customers. We understand you want to efficiency projects. Absolutely anything you want to do is up for debate. The utility still had to approve the projects with their own internal or sometimes third party engineers but it was a much more collaborative discussion. We came to them and said "We've exhausted your other programs." Like Holly mentioned "Here's

our Christmas list of things we want to do. How can you work with us?" And NSTAR said "We can do that."

So what it – when we had an established level of trust which I think was important through doing some of the other prescriptive measure originally. We were able to take the ideas with simple, clean, clear cut easy to follow engineering backup support that oftentimes would get approved on paper and we could move forward within the matter of a month even if they were fairly complex. Other times we had to do a little monitoring of verification of a pilot before we could replicate it. And very rarely NSTAR brought in a third party engineering firm to validate something, run some data analysis separately to make sure that they were satisfied with what they were seeing. One of the core tier was that nobody was trying for them to put forward refrigerant snake oil stuff or things that violated thermodynamics. We were gearing it for success on what was commercially sound to begin with and then asking for utility approval of the same applications. And what we created were classes of projects that we could replicate.

Next slide please. As far as who can benefit really for us what we found is it's helpful to have a portfolio of buildings within a utility territory and then whether that's a college campus or a bunch of manufacturing facilities or in our case we have grocery retail if you only had one and it wasn't large enough it may not make sense to go through all the effort to get through the initial realization and approval of projects that you could then replicate. And the key to some of this for us was even if we had a little over and back with the utility engineers to get them to understand or we had meetings where we had to do a little M&V we could then replicate it as if it was an approved prescriptive measure across 20 stores for example. And there was no barrier to that. There was no more second guessing or custom application required for the next project. That worked out really well for us.

Next slide please. Some barriers that we've seen as we operate across the whole U.S. utilities won't and don't share information. NSTAR for example is extremely reluctant for us releasing their successfully implemented projects with other utilities even if they're noncompeting clear across the country. Another utility somewhere else in the country doesn't want to review something that we did with NSTAR and take that under advisement or take it as gospel. There's a real island effect of information and project savings penetration where, ok, we saturated a bubble. Now we need to move to another utility. And at times we have to start the

process sort of all over again because they won't share and they won't believe shared information that well. They're not used to doing that at least in our experience. And we don't have – we don't have some national archives for allowable references so if we did a certain measure – whatever we're doing for grocery retail is replicable by lots of grocery retail and the same would follow suit for any other building class. And there isn't a good place to put in a gold standard that says we did a project, maybe it even had some M&V, it proved out, put a gold star on it and we can use that almost like case law anywhere else in the country. We unfortunately don't have that today.

And I think legitimately the public utility commissions of each state put a pretty heavy burden on the utilities, burden of proof for the efficiency gains and the strain relief that they're achieving which I think makes them gun shy of sort of just labeling things approved without really fully understanding it and digesting it themselves. What I see as some bright spot – oh and then some territories like Texas they'll actually demand sub-metering on every single project, not even just test cases of project which can be cost burdensome to the role out when you're seeking their incentives. There are models in our mind for how the repository labeling so to speak works really, really well.

And I know this is oversimplified but the Energy Star labeled programs for whether it's light fixtures, lamps, cooking equipment, other electronic equipment in process utilities take that as gospel. They don't question it and they will gear incentives against it because the faith of engineering and whatnot from the government is behind it and it's understood and it's qualified as an auditable file trace for them. Same thing with the sign lights consortium for LED lights. If the LED light is DLC approved 99 times out of 100 it simply qualifies no more questions asked and now you're looking at wattage differences from whatever you had to whatever you're going to. You don't have to reprove something or sub-meter that light fixture. And if we could develop that level of faith and trust in some other type of repository for the semi-custom and custom projects I think it would really speed implementation across geographies within the country and utility sectors as well.

Next slide please. There's also some internal stresses for utilities that we've seen that helped push success. Many utilities struggle to spend their societal benefit funds, this incentive pooling of money and they're simultaneously under scrutiny to relieve current and future grid consumption pressure and demand. So the more active and aggressive utilities like we experience in the northeast

and similarly on the west coast they want to help customers utilize these funds and increase the efficiency of the system. We see some older plants are closing with no replacements scheduled which increases the pressures of the above items.

And on a more personal level oftentimes the people at the utility or even the third party people representing the utility who are directing these programs are incentivized on their performance to fund well performing projects and pay out this pool of money. So there's a personal vested interest to help these things move forward. And frankly this section of the utility wants to be in the good news business. They want to share hands and hand out checks and be in some headlines and do those kinds of things. So we through dialogue and conversation and being very honest and good partners we're helping them transform the market and allow the incentive money to flow faster for technologies that don't fit the traditional grids and matrices they help set up for incentive measures. And that's all I have.

Holly Carr:

Ok. Thanks Mike. I think that this story really sums up one of the great lessons folks can take away from the webinar as a whole which is just ask. If incentives offered don't really match the conservation measures that can really have a big impact in your building type or space use ask about custom incentives. And this is really applicable to all sectors. I'd also say kudos go to NSTAR for being open to these alternatives and for simplifying their incentive application process for custom incentives and making this possible. Next let's here from the industrial sector and from General Motors. Gary, can you tell us how you've developed a relationship with your utilities that allows you both to benefit from these efficiency incentives?

Gary Londo:

Yes, I can. So I'm Gary Londo and I work for General Motors and we've been working with utilities now for the last, I don't know, 25 years? Helping to reduce energy consumption in our regions that we operate in. And we've had a lot of success partnering with utilities. One thing that you start by saying it's free money. Well this is our money. We're going to the marketplace and we're getting it back. We all pay riders on all of our bills so we're paying into the utility, into these funds, and it really behooves us to figure out new and creative ways to get it back into our pockets where we can do great things with it.

The public service commission like the previous presenter was talking about, puts a lot of stress into utilities to use up all of these funds. And they just can't do it without our help so they're very

motivated to help us and when they're asked for help them we usually get it. So I'm going to go into my presentation a little bit. The first couple of slides – excuse me – are very humbled by working for a large company but we're going to go through them really quickly. My PR folks always want me to tell you what GM is all about before we start with any kind of presentation so we'll go through it really quick but the first couple of slides just really show us where General Motors is at in the marketplace. We're a very large company.

Let's go to the next slide. We operate in 140 global markets. We have over 100 vehicles. About half of our business is done in North America and about half of it is done elsewhere. Next slide please. We build a lot of vehicles. We consume a lot of energy, about \$1 billion in energy globally. About half of that is spent in our North American region, U.S., Canada and Mexico. Next slide. So as I said we operate in four global regions, North America, South America, the European Union and India and Asia. We operate 166 countries or sites, 30 countries or regional teams and we have 120 utility managers spread throughout the globe. Each utility manager on average is responsible for about \$7 million worth of spending. Most of our folks that operate in our plants they are oftentimes the largest consumer of energy in their region. So we have a huge presence in the energy marketplace and we offer some pretty unique perspectives on what that does for us.

Next slide please. So our customers are really focused on helping us reduce energy. We get a lot of input from our customers. We get a lot of input from our employees and other people helping us reducing energy, a lot of input asking us to improve our use of renewable energy. We're one of the largest users of renewable energy of any industrial producer, certainly of any auto maker. And then reducing emissions on our end products. We work very hard to do that and we've been pretty successful over the last few years and feel like we're going to be doing much better with that over the next five years as we strive to make the corporate average for economy standards.

Next page. Next slide please. All right. So we've had some pretty good success since 2005 to 2010 we reduced our energy consumption by 28 percent. Since 2010 our reductions have slowed a bit. We're at about a seven percent reduction since 2010 to 2012. Next slide please. And we – looking back from 2005 to 2010 this is the emissions. We continue to reduce the emissions. We no longer burn coal and since 1990 we've reduced our total

emissions by 60 percent. It's been really, really a good run for us over the last 25 years.

Next slide please. Ok. So a lot of the talk earlier was how our projects approved and funded and how do you work with utilities in order to get them in the mix. We commit funding and resources. We work on a continuous basis. A lot of utilities like working on the calendar year. We work on a continuous basis and we work with our stakeholders. Stakeholders could be the employees, could be the engineers. We developed these projects with a lot of collaboration like the previous presenter was saying. We all have a common desire to save the most amount of energy with the least amount of cost and so does the utility. So if they can work with us to incentivize a very large project and spend their incentive money quickly that's what they're going to do so they can reduce as much energy with as little effort as they can.

So we budgeted and schedule the work accordingly. The problem for industrials is we have very tight windows to do the work so we have like a summer shutdown and a Christmas shutdown and that's about it. So this is getting to be a very busy time of the year for us as we get ready to get into the holidays and get working a lot more with energy reduction. We're committed to working with everybody to reduce it responsibly so we want persistent energy reductions. We don't want something that just comes and goes and evaporates and the utilities have helped us to do that with their incentive programs.

Next slide please. So we spend a lot of our own money to help reduce energy. So this is our – talking about our direct funded projects. If you look at incentives they're about 15 to 20 percent of the overall spend for energy projects. And when you talk to utilities that's where they all seem to want to end up, about 15 to 20 percent of the project. Some will say 10 to 15 but most of them at 15 to 20 and that's how they – that's how they work their prescriptive programs.

So next slide please. So we have four buckets of projects that we do at General Motors. We have direct essentially managed projects where we're using our own money to invest and we operate in a two year or less payback window to fund those projects. Longer term projects energy performance contracting we do quite a bit of energy performance contracting. Those are two to five year payback. And then we'll do something that's not really driven by energy reduction like direct product program changes or changing from one production method to another where we're

changing out an old piece of tooling for a new piece of tooling. And companies, utility companies will incentivize you for doing that type of work.

It's very hard to capture because we're a very large organization but we want to try to apply more for energy reductions as a result of product changes. We want to try to do that more as we develop our program. And then we have locally managed behavior changes, small projects, projects that have a quick payback of less than a year and projects that have a lot of behavior changes. They're not incentivized. I don't know how a utility would do that but I'm open to any kind of conversation around that. But those are pretty good projects to reduce energy and they are part of how we reduce energy in North America.

Next page. So as you can see we talked about four different types of projects, behavioral changes, lowest costs, lowest complexity, centrally funded projects. So as you can see each of those four buckets increases in the level of effort it takes to execute the projects. So we are a very engineer focused company so we have a lot of engineers. We have a lot of people out there doing all of this type of work. And as I get higher in the level of effort I also have more resources to tap on. So I'm very fortunate in that if I'm doing a product program I have a lot of engineers that can calculate how much energy we're saving and energy performance contracting again have a lot of resources. You don't really have a lot of resources at the behavioral or the small level to help work with the utility to save energy. And we somewhat solved that.

Next slide. We've developed – we talked earlier about our utility manager and the utility manager, he's managing a complex industrial structure. He's managing all of the energy consumption and managing perhaps boilers, chillers and other large energy consuming equipment and he has working for him – he has an energy engineer. He has a local facility engineer. There might be a project manager. There might be a local utility rep that he can tap on. So those are all people that are really integral into the project execution and project planning functions. Smaller projects with limited investment and complexity have these type of resources. If you could advance the slide on please.

As projects get larger, right, more people are available. We might have some more subject matter experts. We might have a central energy engineer capital project so as projects tend to get larger, right, we have more resources that can come in and help not just with getting the utilities but executing the projects and getting the

projects done. So we have formed a team around energy reduction that gets larger as the projects get larger and that really helps us.

Next slide. So the – here we apply. There's certain steps that are common to all energy projects and I borrowed this from a company called Green Grid. It made a lot of sense to me when I saw it but we apply, analyze, approve, implement. So these are the steps that one needs to take when they go and they work with the utility to try to get utility incentives and the earlier you're involved in utility company in the process, the easier it is and the better the project flow. So we start a project – the earlier presenter was saying some projects took up to 18 months and some projects about a month to get approved through the utility company. And I would say the more complex the project is the longer it takes. Also generally the more complex the more energy you're going to save as well.

So those projects take 18 months. If you're just going to go into and to a lighting retrofit typically it takes about a month to get a utility to give you incentives if they're available. So we apply for the incentive, the utility company sends someone out to analyze it. It's always helpful to have one of your own folks step the utility company through the analysis. That helps them get through it and also the level of confidence and trust. It really helps if you have one individual at the plant talk with the utility all the time, have like a central point of contact and that way they can develop a relationship with the utility company and they develop that level of trust. They know what each other is looking for and it really streamlines the process. Then they approve it.

The utility company will give you a commitment. It could be a commitment letter. It could be a commitment email. But typically it will be in writing. Some utility companies particularly in New York State they'll give you an actual purchase order which you charge against once the project is done which is kind of unique. And then you implement it, implement the project. You have to notify the utility when it's implemented. Many times they don't – the utility company isn't calling until the end of the year or until the end of their commitment period. So if you complete it earlier than that you need to give them a holler back. Utility company incentives require verification. That verification can be something very easy as to going out and counting the number of lights you have. Sometimes it requires a lot of measurement. The more complex the project is and the more money the utility company projects to pay out the higher level of verification they will require to give you your incentive.

Next slide. So how we prioritize our projects is we have financial considerations which we talked about. We have strategic goals so we prioritize projects primarily on our strategic goals and financial considerations. Does it meet our pay back requirements? Does it get us to our 25 percent goal? We also have to look at risk and timing. We might sit on a project for several years because we can't, we have no way to implement it. Energy for us is about two percent of our cost of producing a vehicle so we can't go in and let's say shut a plant down for a week while we re-lamp. We cannot do that so we have to be very smart about how we go ahead and implement projects. We also need to be very cognizant of utility incentive caps. Most of our projects are large and we routinely hit our annual incentive cap every year so we time projects with all of those things in mind understanding that the utility company operates in calendar years and we operate on a continuous planning basis. We're always planning projects.

Next slide. So some of the advantages of utility company incentives is we use them to buy down projects that have longer payback so they can get them improved inside of our company. We use them to improve projects. Let's say lighting systems. Indiana is very good at giving great incentives for motion sensors. So when I put lighting system in in Indiana I put a motion sensor on every single light because their incentives pay for the motion sensors. So a lot of the times you have to get the utility company involved early on so you can figure out what you can afford to do. Again the utility company incentive buys down the project so that you can afford to do it or do it better.

Some utility companies like in Ohio they allow you to opt out. Opting out is a way in which you can reduce your overall energy rate. Some states let you do it. Some states don't. So like I mentioned earlier you pay like a rider on your electric bill or your natural gas bill that goes to the electric company or the gas company and that rider in turn funds utility incentives. So opting out allows you to not pay that rider and but then again on the other side you don't get any kind of utility company incentives. So some states allow you to do that. Some states don't. Opting out even with as much money as generate through utility company incentives option out many times is better financially than using the incentive. Most companies, most states don't let you do that though. The problem is is when you opt out of a program and you don't have that incentive it makes projects harder to justify so it makes your longer return on investments which is ok if your company is ok with that and you're still able to get projects done.

Next slide please. Ok. So we have a lot of differences between state to state and region to region like I said. They have program annual caps depending on where you're at. You might be able to only use a couple hundred thousand dollars a year. Some states there isn't a cap so that you can go based on the energy project you can get limitless incentives certainly within their rules but you don't have a cap that's preventing you from getting more incentive. You might have a cap by facility. You might have to do third party measurement and verification. You might have to pay for engineering in large projects. And sometimes that engineering includes calculations for energy reduction so you can go and get your incentives.

Some utility companies pay for – some utility companies will pay for the engineering. Like in New York, New York will pay for the engineering to determine how much incentive you have which is kind of cool. So utility companies have difficulty committing across financial years or fiscal years. Like right now if I was to ask anybody in Michigan what was the incentive for 2015 they would laugh at me because at the end of the year those programs will not be published here for another week or two. They're trying to move it up, move it up and work with us but there's like a month dead zone in there where the old programs are expiring and the new program for the new fiscal year is coming in so it's – trying to get utilities to work on a continuous basis is difficult.

Some utilities have short implementation windows. So in like Michigan or Ohio they say you have to complete the project within 90 days. That's tough. I always ask for extensions. I've always been pretty able to get them but that's a risk. They could always say no and you don't have any recourse and if you've already started a project and you can't implement it in 90 days you risk losing your incentive. Each utility is flexible mostly. Some of them are willing to work with the rules and change the rules like we talked about earlier and program rules change from year to year. So when you have large projects keep your eye on utility company incentives. They might get away from you if the rules change.

Next slide please. Ok. So these are the biggest problems, opportunities for improvement I should say, right. So we're asking utility companies to lower the risks for customers so by having longer implementation windows, mostly, like I said earlier most utility companies offer some extensions. Next slide. Little animation here. Ok. Fiscal year funding is problematic. This is

kind of restating some of the stuff that I talked about in the last slide. Most utility companies will not approve projects in the last quarter of the year. Engineering in large projects is costly, particularly when you're talking about HVAC and stuff like that. Some states help you work through that. NYSERDA is a real good example. I had a lot of really complex projects up there and they paid for the engineering up front which was really helpful. I didn't have to put a lot of risk into the project. I found out immediately when engineering was done that was fundable with very little investment on my own part.

Next slide. Annual maximums, that's a big deal for us. We tend to hit the annual maximums and then the utility companies complain because not enough people are, if they can't pay it they can't use all of their funds. But that's a big problem for us. We want to help the utilities use their funds but we're hitting the annual maximums especially when you hit a really aggressive projects that have great energy reduction potential and you're hitting your target that stops you from doing those things.

Next slide please. So this we want to increase certainty and increase the accommodation for larger projects. That's where we're trying to drive out utilities and this doesn't happen in a vacuum. We have energy engineers at all of our sites. We have managers and we talk to the utilities constantly about this. We operate I think like about 16 different utilities and we're talking to them constantly about providing some increased certainty and increased accommodation for large projects. One thing that we've done over the last 25 years is we've been able to put an energy engineer in all of our significant plants in North America and that's helped us with the single voice and the single point of contact. And in many cases the utilities are actually paying for part of their wage because –

Holly Carr: Gary.

Gary Londo: Yeah.

Holly Carr: This is Holly. Sorry. We need to move on to make sure that we have time for Houston as well. Could you give us a couple more minutes to summarize?

Gary Londo: Sure. Let's go to the next slide. I think we're just about done.

Holly Carr: Yeah. We are.

Gary Londo: All right. So there's some construction incentives. You guys got to keep an eye open for construction incentives. You might be doing construction anyway but you can get incentives for construction that reduces energy. Next slide please. So we look at ROI. We use energy incentives to buy down the ROI. We maximize our utility incentive by coordinating with the utility for both planning initially on the project and planning throughout the project. We opt out. It makes financial sense sometimes but more to the point most utilities won't let you opt out.

We require certainty, all of us business planners and we need the utility companies to be able to tailor programs sort of like our previous presenter was talking about. Work with the utility to help tailor the program to your needs whether you're doing a large project, small project, working with foods or automobiles. You can work with utilities companies to help tailor the incentive programs to meet your needs. They've been very willing to do that. That's all I have.

Holly Carr: Great. Thank you. Lots of good advice there. That's I think applicable not just to industrial but across sectors so let's move on to Alex over at the city of Houston and let us about the citywide lighting retrofit that's happening in collaboration with your local utility. Alex?

Alex Heim: Sure. Hello. My name is Alex Heim and like Holly said I'm a management analyst with the department of administration and regulatory affairs for the city of Houston. I'm going to be talking about the recent LED street light conversion that was negotiated between the city and between CenterPoint Energy who is our local electric utility. Our department was involved because we are in charge of administering and managing the city's public right of way. So we are – we're already involved on all sorts of utility franchise issues.

So next slide please. The conversation about LED streetlights really began in 2008. At that time the administration, former Mayor Bill White was looking really for three main things. First of all to transform Houston from being just the energy capital of the world to being the energy efficiency capital of the world. At the same time the Clinton Climate Initiative also had a group looking at the potential energy savings that could possibly be realized in outdoor lighting projects. The CCI had developed cost models as well as analytical tools to estimate the potential energy and cost savings. The city wanted access to these models and data in order to begin the conversation about what would be possible.

Secondly in anticipation of tighter budgets the city wanted to realize cost savings wherever possible. The city streetlights were a pretty big target with a lot of opportunity. The city was spending around \$38 million annually on the electricity cost for its streetlights so it made financial sense to investigate potential savings there as well as making sense from the environmental perspective. And finally while he was serving as U.S. Deputy Secretary of Energy Former Mayor White had seen a lot of improvements in LED technology. He personally believed that the technology was mature and that it could also help reduce light pollution which he viewed as a significant problem in Houston.

Next slide please. And so some of the project challenges that we faced during these negotiations we can go over quickly. First of all the city had to demonstrate to the electric utility that LED technology was mature and that a citywide conversion was feasible. Other advances in LED technology have now strengthened the case for converting that was not always the case while we were having these negotiations. Secondly the city also had to demonstrate that such conversion was feasible and cost effective for an investor owned utility. Up until that point when we were still having these discussions the majority of cities which had converted to LEDs had done so through municipally owned utility.

Since the tax and accounting rules are different for investor owned utilities the city really had to make the case that this was a fair comparison and that it was still doable and Houston was an investor owned utility. It was also important to negotiate a reasonable per unit cost. Thankfully technical staff from Los Angeles were able to draw upon their field experience to aid in negotiating a fair price and they were very helpful. Finally several external disruptions also delayed the project that we really didn't have any control over. A change of administration as well as the global economic climate all created significant challenges in implementing the project. Persistence really was key in making this conversion happen.

Next slide please. So the city used these three points to talk to the Clinton Climate Initiative about getting access to their cost models and data. The city pointed out that an LED streetlight conversion project would be both scalable and replicable in other jurisdictions. Furthermore a widespread LED conversion had not been done before in a hot and humid climate so Houston could provide a lot of valuable field data for other cities. The city also felt that not

only was LED technology mature but that it could also improve residents' quality of life as well as realize energy and cost savings. LEDs for example provide a better quality of light than sodium or metal halide lamps and are more sophisticated in directing the light to the ground. This reduces the glare and the perceived haziness of the light. CenterPoint on the other hand did not believe that LED technology was mature at the time. More so the city had created a large scale conversion CenterPoint highlighted had done so through a municipally owned utility. As an investor owned utility CenterPoint was not eligible to claim the same tax exemption the utility in Los Angeles claimed. They felt that this invalidated the comparison. The city however proposed to continue to provide CenterPoint with further research on best practices as well as facilitating access to technical staff in other jurisdictions who had been involved in similar streetlight conversions.

Next slide please. In the meantime though the existing cost models were significantly redefined due both to the field experience from Los Angeles' streetlight conversion as well as improvements in the production of LED technology itself. The life of LED lamps was extended even further than had been. An LED lamp was now warranted somewhere between 10 and 12 years. The older sodium or metal halide lamps in contrast both had an expected life of between two and three years. Because of the shorter life cycle the maintenance costs for the older lamps were now much higher than the maintenance costs for LEDs. LEDs were clearly a cost improvement now for the city since these maintenance are included in the tariff rates that the city pays per lamp. Essentially the city – CenterPoint installs the lamp and the pole and over the life of the lamp the city pays CenterPoint for these assets and the tariff rate and that's paid on a monthly basis and that does include the maintenance costs as well as the physical cost of the asset.

Next slide please. The improvements in LED technology coupled with the success of Los Angeles' citywide streetlight conversion led the city to approach CenterPoint again about seriously considering the issue. CenterPoint agreed to test out the idea on a pilot program basis first. The city insisted that a pilot program should take place in a residential neighborhood for several reasons. First of all the lighting in a residential area is less critical for the physical security of people and property. Secondly the traffic in there is generally lighter which makes installation and maintenance of the lights easier. Thirdly it's easier for engineers to make calculations for the residential area. And four, it's easier to survey residents about the quality of light and other issues related to the

implementation. CenterPoint agreed, a neighborhood was selected and the pilot program launched on September 9, 2009.

Unfortunately there was a broad discrepancy in the quality of the lamps used. Some did not hold up well during the field test. The city had suggested using a controlled number of vendors but CenterPoint did not feel that we should restrict the number of vendors at that time and thus there were only minimal controls for entry. The city also suggested several testing methodologies for the lamps. CenterPoint adapted a number of them but not all. However the pilot program did provide useful information. Attitudinal surveys found that residents liked the quality of the light as well as the coloration of the light. And these surveys helped the city better, get a better understanding of consumer preferences.

Next slide please. After the pilot program had concluded several external changes delayed the discussion about the cost and scope of a potential citywide deployment. In 2010 we had a change in administration. Mayor White was replaced by Mayor Annise Parker. Also due to the financial climate budgets were tight on both sides. CenterPoint did not think that a citywide deployment was feasible at that time. Also some of the problems in the pilot program caused CenterPoint to doubt whether LED technology was in fact mature and as a result not much progress was made during 2010.

Next slide please. Discussions resumed again seriously in 2011. Instead of pushing again for citywide rollout the Clinton Climate Initiative proposed a new strategy. They decided to work the central Houston tax increment reinvestment zone or TIRZ. A TIRZ is a special zone that's created by city council to attract new investment to an area. The TIRZ helps finance the cost of redevelopment and encourage new development in an area that otherwise would not attract sufficient market development in a timely manner. Taxes attributable to new improvements these tax increments are set aside into a fund to finance public improvements within the boundaries of the zone. The new approach focused only on streetlamps at 16 intersections downtown inside the central Houston TIRZ.

The city would continue to pay its normal tariff rate for these streetlamps but the TIRZ would pay the difference for the conversion to the LED. Both the TIRZ and the CenterPoint agreed to this project which proved to be highly successful. Both businesses and customers in the area rated the quality of light very

highly. The success of the lighting downtown conversion was really encouraging and its success led the city to approach CenterPoint again about a citywide project. Before beginning on a citywide conversion CenterPoint insisted on conducting a second pilot program. As in the first pilot program the city wanted it to be held in a residential neighborhood for similar reasons.

The second pilot program kicked off in late 2011 and lasted for around six months ending around 2012. CenterPoint had learned a lot from its experiences during the first pilot program. Unlike in the first pilot CenterPoint prequalified vendors on the supply side for lamps. These improved quality standards insured that there was much more consistency in the lights performing well in field conditions. More so Las Anegles' LED conversion had begun in 2009 and then been underway for about two years at that point. Technical staff there had collected a lot of data and then developed best practices based on their field experience. Los Angeles was very transparent and allowed CenterPoint to engage their technical staff to implement best practices.

This pilot was overwhelmingly successful. Responses from residents continue to be positive and prequalifying vendors helped avoid any inconsistency in lamp quality that was seen in the first pilot program. Unfortunately a citywide deployment was again delayed due to unrelated litigation from both sides. In mid 2013 the legal issues were being settled. During the same time the city and CenterPoint also began on and off negotiations over what was possible. Discussions were helped by the fact that CenterPoint underwent a change in leadership. The new CEO of CenterPoint really wanted to close the loop on the streetlight LED project as a part of the legal settlement between the city and CenterPoint.

In October of 2013 the city formally engaged CenterPoint for the purposes of resolving the LED streetlight issue. That main challenge that needed to be solved was the price per lamp. Based on the field experience of the municipal utility in Los Angeles the city was able to demonstrate that the lamps were cost effective and that this batch should be reflected in the tariff rate. CenterPoint eventually agreed and the tariff rate for the LED streetlights is not any higher than the tariff rate that was paid for the older sodium or metal halide lamps. In May of 2014 Mayor Parker officially announced that a deal had been reached.

Next slide please. Sorry. A couple more. Now one more. And that November 2014 CenterPoint received approval for the new LED streetlight tariff structure from the Texas Public Utility

Commission which is responsible for regulating electric utilities statewide. Starting in June of 2014 CenterPoint has six months to sort out the procurement issues and finalize logistics of the conversion. It was very important to the city that this be a smooth rollout and so the actual conversion of the streetlamps began in January of 2015. 155,000 streetlights will be replaced in total during five phases. So a certain percentage of lamps will be replaced each year from 2015 to 2019. The streetlight conversion will help the city recognize significant cost and environmental savings.

The streetlight conversion is estimated to reduce the city's total municipal greenhouse gas emissions by five percent and to reduce the city's streetlight energy usage by at least 50 percent. The direction and energy usage is projected to save the city over \$1.2 million a month. This represents a savings of \$28 million over the life of the project. The city of Houston is very proud of this accomplishment and the Clinton Climate Initiative's current analytical models on LED streetlight conversions which are backed by the Department of Energy are based on the work done in Los Angeles as well as the work done in Houston. And I believe there's a link included to those in the rest of the presentation. And I'm welcome to answer any questions.

Holly Carr:

Great. Thank you so much Alex. That's a great story of tenacity in getting that project to completion for the city so congratulations to everybody there and huge savings on a number of fronts. I'd like to go to our additional resources and just point those out since Alex has given us a hint as to what's there and then let's take a couple of questions. First of all want to note that we have an implementation model from Whole Foods Market. There's a link here on the slide before you. Implementation models area really case studies with detailed how to information that our Better Buildings Challenge partners put together. They are meant to be replicable by folks out there so if you have heard the presentation from Whole Foods, you'd like to try putting together a customized incentive program with your utility this is a great resource to check out on the Better Building Challenge website.

And then secondly the resources that Alex pointed out, a link to DOE's municipal solid state street lighting consortium. This page has a number of fantastic resources for local governments interested in pursuing streetlight upgrades. The resources include lighting specs for deciding what you want to have installed as well as financial analyses models which were created with the Clinton Climate Initiative and as Alex mentioned used both the LA and

Houston examples as case studies and hopefully cities moving forward can have access to recommendations for a smoother transition to LED lighting and the associated energy savings.

Let's go to the next slide John. So for our Q&A we do have a couple of questions coming in from the audience. One is for Mike at e2s and Whole Foods Market. You mentioned difficulty transferring the work that you've done in the northeast with NSTAR to use in other utilities or with other utilities for incentive. Have you had some success transitioning or using the work that you've done in that region to help Whole Foods do similar work in their stores across the country?

Mike Guldenstern: We have. We've had success like Gary from GM had mentioned with other utility areas that are more aggressive like for example in the New York State sort of territory. In Chicago with ComEd and out west with PG&E. Those folks have been decent partners with helping us propagate this custom approach.

Holly Carr: Great. And one follow on question, Mike. Can you give us a little bit more detail on the ECMs, the energy conservation measures that have been most successful that you've used in Whole Foods stores?

Mike Guldenstern: Yeah. So once we exhausted sort of the standard fare of lights and motors and anti-sweat heat controls and things like that we've really moved into some of the larger systems that in some part they're due for replacements due to age. But as technology has moved on things like compressor racks, condensing systems, dedicated outside air, efficient HVAC systems that can handle high latent removal capacity and responsibility have been areas where we've successfully crafted custom and repeat incentive streams with these utilities. And that's sort of moved us into our next level of implementation past the easy measures.

Holly Carr: Great. Thank you. Alex, a couple of questions for you regarding your work in Houston. You described the back and forth over a number of years between the city of Houston and CenterPoint to get to a place where you were doing a citywide conversion to LED. Can you provide some suggestions to our city and state representatives who may be out in the audience now that we have the example from Houston, we have the example from LA? What would you suggest that these folks do to try to shorten that implementation time to go from idea to citywide implementation more quickly?

Alex Heim:

Well I think based on our experience in Houston the first thing I'd point out is that persistence really is key and that you really just kind of have to stay on top of the project to make sure that it gets done. In terms of Houston what really dragged the project out from the beginning of discussions to starting implementation were – some of it was due to external factors such as a change in administration which you can't avoid as well as the unique financial climate of 2009 and 2010.

I think thankfully going forward negotiations with municipalities have should be a lot easier now that you have the example in LA of a municipally owned utility and then in Houston of an investor owned utility both finding a cost effective way to convert these streetlights as well as a continued improvement in LED streetlight technology make the case really, really or a lot easier than it was at the time for us to show the cost savings. So I think really just pointing to the fact that the improvements in technology and the cost savings your can recognize there should help the projects, the negotiations go a lot smoother.

Holly Carr:

Great. And you'll see in a slide or two we are providing contact information for all of our panelists today and they're all open to your questions via email and your contacts. So if you do want to move forward with a project that's similar to what you've heard about today please don't hesitate to reach out. And Alex one more question. Folks, I realize we're just a little bit after 4:00.

We're going to go ahead with a couple more questions and I hope you can join us for just a couple of extra minutes but we did have a question regarding the applicability of this LED street lighting program to a university campus or a hospital campus where you have a lot of buildings kind of like a small town. Do you know of any examples where utilities have collaborated with universities or hospital campuses to do a similar lighting retrofit? Do the resources or the example of the city retrofit, is that applicable to this sort of campus?

Alex Heim:

I don't know of any examples of a utility collaborating with a hospital or college campus off the top of my head but I think the lessons we learned from this project would definitely still apply. Kind of before we finalized negotiations with CenterPoint and when the Clinton Climate Initiative worked with the central Houston TIRZ to really just focus on several, I think around 16 streetlights downtown in basically an area called Market Square that has a lot of shops and other small businesses. I think that shows that this kind of project can be used successfully on a small

scale. I don't know of any utilities that have collaborated but it might be possible to again work through a TIRZ if there's something similar in those local jurisdictions.

Holly Carr:

Ok. And I think definitely the resources that Alex has pointed out on the DOE website, the specifications and so forth and even the financial analyses models would be applicable to that sort of application on a hospital of university campus so check it out. We are coming to the end of our session, certainly a little bit past the session. But before we finish up I want to make sure you are aware of our January webinar which is focused on water. Next slide please. As you may know the Better Buildings Program expanded this year to include a water pilot program and some of our partners have stepped up to set a water reduction goal for their portfolios in addition to their existing energy savings goals.

At this webinar you'll hear from Better Buildings partner national church residences, Better Plants partner Cummins and Better Buildings alliance affiliate Environmental Defense about their successful strategies for reducing water use in the multifamily industrial and commercial building sectors and how these reductions impact energy use. This session will take place on Tuesday, January 6 from 3:00 to 4:00 PM Eastern Time and you can register for the session from the Better Buildings Challenge homepage. With that I would like to thank our panelists very much for taking time to be with us today. Please feel free to contact our presenters directly and let's move to that last slide there where we have contact information.

Again this will be posted to our website so you can access it there forever. And if you'd like to learn more about the Better Buildings Challenge or the alliance feel free to check out our website or to contact me or Kristin Taddonio shown here at the email shown. I also encourage you to follow us on Twitter at the Better Buildings Initiative for all of our latest information and look out for an email which will give you a link to the archive of this session when it becomes available online. Thanks very much for joining us today and we hope to see you in 2015.

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