Jeff McCullough: Good day, everyone, and thank you for joining us today. This is Jeff McCullough speaking with the Department of Energy's (DOE) Pacific Northwest National Laboratory (PNNL). Later, you'll be hearing from Michael Myer, also from PNNL. Today's topic is going to be on the Federal Energy Management Program's (FEMP) Exterior Solid-State Lighting, but specifically high performance parking structure lighting. And so today's topics are going to be – you are going to learn about the FEMP Exterior Solid-State Lighting Initiative. There is an Army policy that is being developed that is taking a leadership role in specifying minimum levels of performance for exterior lighting.

You are going to learn about FEMP designation or FEMP designated performance levels. You are going to learn about the Design Lights Consortium and how FEMP intends to use the Design Lights Consortium as a resource for vetting high performance products and setting performance levels. You will also learn about the resources that are available to you as end users for exterior solid-state lighting. I will provide a brief update on the L Prize design competition. And then we will also – from there, we will move into Michael Myer's presentation talking about high performance parking structure lighting.

At the end of the presentation, there will be plenty of time for questions and answers. So we would encourage you to go ahead and enter those questions as they come up for you. So with that, thank you once again, and let us get moving here. So the first topic I wanted to make you aware of is that FEMP has launched an initiative to promote exterior solid-state lighting and moving it into the de facto position for federal agencies. And one of the first activities, and frankly one of the first entities to take us up on this opportunity, is the U.S. Army via its U.S. Army Corps of Engineers.

They are in the process and have developed a policy that states that all exterior lighting shall be of a certain performance level. It is not specifically solid-state or LED, if you prefer, but it does try and move the market into higher performing and emerging technologies. So this approach is using solid-state, but you could also use induction in certain applications as well. So this policy is the result of a partnership between the FEMP and the Army Corps of Engineers. The image to the right shows you that it is a policy announcement. We anticipate that becoming public here shortly, and to support that policy there are a number of resources that are necessary.

So one of the things that I talked about is this FEMP designation, and we will talk about that more here in a minute. But there are also deployment types of resources that are necessary to be able to rollout not only the policy but also the technology. And so DOE via the FEMP Program is developing those. In some cases, we already have that material available on the main DOE website. So once you have those resources in place, you also need to do some level of outreach, and that could be in the form of training and/or webinars. Ultimately, the goal is to move solid-state lighting into the de facto position for federal facilities.

So let us talk about the status of this effort. So we have talked about this policy that the Army is taking this leadership role in. In support of that, there are construction standards specifications that are being developed. And for those of you that have been involved in specifications and construction of facilities, you may be aware that there is a standardized format that those documents take. And it is what is called CSI, or Construction Standards International, which has a format that is commonly used for communicating how projects are executed, the performance levels, the materials – all those types of things are put in the standard format.

So one of the things that are being developed is this CSI format for exterior lighting. So that will be a resource to you when it is completed. We expect it the first quarter of 2012. The main activity is having the Federal Energy Management Program define FEMP designation or FEMP designated levels of performance. And that effort is currently underway, and the intent is to go out and do benchmarking of the incumbent technologies, and from that benchmarking set performance levels that are cost-effective

for federal entities to meet. So you can envision going out, doing this data mining, and then setting a performance level of the average technology – the average performance of the incumbent technology and then setting a level that is some percentage greater than that. So what FEMP intends to do is to set those performance levels for you and in doing so will be utilizing the Design Lights Consortium.

And for those that have not heard that term before, the Design Lights Consortium is a grouping of utilities and market transformation groups that have come together and developed a – not only specifications, but a qualified products list. And you can find the Design Lights Consortium and their qualified products list at DesignLights.org. FEMP intends to use this well-established, vetted procedure and will simply designate levels of performance above and beyond what the Design Lights currently has. The reason being is that in some areas the Design Lights Consortium (DLC) the levels of performance are not as cost-effective specifically for federal entities, and so FEMP will be setting levels in some cases that are higher than the DLC levels, but we can still take advantage of the database and the vetting process necessary.

And so more to come on that, in which we expect that first quarter of this year. What are some of the outreach and education types of opportunities? I should inform you that the DOE has a robust solid-state lighting program. There is a great deal of information out there to end users considering solid-state lighting not only for exterior, but also for interior applications as well. There are training materials, field guides, fact sheets, etc., that are available to you, and so if your interest is more broad, I would encourage you to go look at the main DOE solid-state lighting website, and from there you could go to pretty much anywhere you need to go.

There are lots and lots of unbiased information out there for you. One of the other activities that we are taking on in 2012 is a federal market assessment for exterior lighting. We know that in the private sector about 20 – 21% of energy consumption is lighting, but we do not know what it is specifically for the federal market. So that is one of the activities that we are undertaking where we are contacting the various federal entities and trying to get a better handle on what percentage their consumption and like was, and the opportunity for solid-state lighting in exterior applications. The resources from those that are involved in this FEMP effort – you can see here on this website. I won't articulate it for you; it's fairly long.

But nonetheless, you can go to the main FEMP website, and underneath Technologies, and then specifically Solid-State Lighting. You can see where this information is gathering. We are adding more content as we move forward, but this will be your source for resources in learning about the FEMP Program. Materials, training, etc. – all that information will be placed out there. Okay – let us talk more about the Design Lights Consortium, or the DLC, and I told you that it is a group of Northeast utilities, but actually it is not just Northeast. It is all the various market transformation groups across the country as well as the utility companies that support this effort, and it is really for commercial applications or nonresidential applications.

They have developed Table 1.6, and Table 1.6, which is the most current version, and it really should be construed as being not only specifications and minimum performance specifications, but also what is behind this is a database of some – I believe now 4,500 products that meet these specifications. I am showing you category or applications one through six, which are the exterior lighting applications. In fact, there are 19 different categories. But for the presentation today, our interest is in exterior lighting, and so I am only showing you those. But you can see there that it breaks down minimum light output requirements, and zonal lumen density.

For those who have not heard that term, that is the amount of lumens – the amount of light – in certain zones. And the reason that we even raise that is that it is important that the products that are utilized have a similar performance not only to the incumbent

products that they are trying to replace, but we also want to make sure that they are well designed and well intended for their application. Minimum luminaire efficacy – you can see there the numbers of net light output from the luminaire divided by the input power. And it is important that you kind of change your mind a little bit on how you communicate lighting energy efficiency.

Up until this point, we have used generically what we call "system efficacy," and that is just the lamp ballast or the lamp by itself – that is just simply the amount of light from the light source divided by the power in, and that number could be frankly fairly high. The problem is that when you put that inside of a fixture – you have an omni-directional light source, and you put that inside of a fixture, there are fixture losses. You are redirecting. You are re-aiming. You are redistributing that light, and so inherent in that process are fixture losses.

And so at the end of the day, by looking at luminaire efficacy, you are looking at the light that is for the task or the application with the least amount of power, and that is really what we are trying to get at. And it is important that you understand that there is a difference between luminaire efficacy and system efficacy that you have kind of heard about up until this point. So it is kind of a paradigm shift, but nonetheless I want you to be aware of it. But there are color metrics – you know, correlated color temperature, which is the relative warmth or coolness of a light source, color rendering – how well color is rendered – and then from a life standpoint, as I think you probably have heard by now, LEDs don't generally fail catastrophically.

They typically get dimmer and dimmer over time, and the industry defines the point at which 70 percent of the initial light output is still maintained as the useful life, if you will, for that light source. So you see here some numbers that try and get at that. What are some of the resources that are available to you now? One of the ones that I think is pretty important – yesterday, we did a webinar for parking lot lighting. Today's webinar, of course, is for parking structures. There has also been a recent webinar on street and roadway lighting. The effort actually falls underneath the Department of Energy's Municipal Solid-State Street Lighting Consortium, and they have developed a new performance-based and product-based specification that is available to you.

You can go out to the main DOE website and look under the Street Lighting Consortium and learn more about that. They also have a webinar that is available to you. And so if you're interested in street lighting, that's where I would direct you. There are what we call "gateway demonstrations," and these are high visibility demonstration projects where DOE partners with a local entity, perhaps the utility company over a municipality, does a demonstration, does measurements, does cost analyses and then makes that information publicly available in a report.

So you can go again to the main DOE website and learn about these gateways and perhaps glean some information if you are considering solid-state lighting in certain applications. The next program I wanted to talk about briefly is called CALPER, or Commercially-Available LED Performance Evaluation and Reporting. This is where the Department of Energy goes out and purchases solid-state lighting products on the open market. We then send them off to independent third party test laboratories. Those results then are made public, so if you are interested in seeing kind of how the industry is performing as a whole you can go out there and see what the actual results are.

It is important to note that CALPER cannot possibly test all products. So if you are looking at CALPER, and you are looking for a specific product, you are probably going to be left wanting. There are other resources that get at that. You have got the Design Lights Consortium, and you also have what are called the Lighting Facts. The Lighting Facts label which is starting to show up on products out there in the market – so there are other resources for you. My point here is that CALPER cannot possibly test everything. And as such it is just so that we can look at particular types of luminaires or applications,

and so we tend to focus in on those applications rather than just trying to capture everything that is out there.

Parking lot and structure lighting – again, the gateway demonstrations that I talked about are resources for you if you are considering parking lot and/or structure. The other DOE program that comes to bear is what is called CEBA, Commercial Building Energy Alliance, and there are three different groups underneath the Commercial Building Energy Alliance: there is one for retail, there is one for hospitals and there is one for real estate. And what these are are large entities that are interested in saving energy for their facilities. And you will recognize some of the names. For example, under the retailer alliance, you have got the likes of Home Depot and Wal-Mart and Lowe's and Target.

Likewise, on the hospital side of things you have people in clinics, and so these large entities are interested in saving energy in their facilities, and so they have come together with a partnership within DOE and developed specifications. And so you will be learning about structural – parking structure lighting here shortly. As for general resources – you have got the main DOE Solid-State Lighting Program, and I would encourage you to go out there and take a look. There is a huge amount of information out there, and again, the Design Lights Consortium if you are interested in not only exterior lighting but also interior and qualified products list that are available to you.

Okay – let me shift gears now and talking about the L Prize Program. I recognize that it is not specifically an exterior lighting application, but it is a very exciting program that we want to provide an update for you today. So what is the L Prize? It is the first "X Prize", if you will, for lighting. And when I say that, the term "X Prize" it is used to describe incentives that are placed out there for innovation. And you have heard of things like – you know, there was an X Prize for the first person to go around the world in a hot-air balloon. There was an X Prize for the first private entity to launch a spacecraft and have it be recovered, etc., etc.

And so similar to that concept, there was a legislative mandate to the Department of Energy created by the Energy Independence and Security Act of 2007 that developed the first X Prize, called the L Prize, for lighting. And there are two key lamp replacements that were identified in that effort. One was a $1 million prize for the 60-watt A-lamp replacement. The 60-watt A-lamp, of course, is ubiquitous, and there are literally billions of them out there. There was a $10 million award designated for that effort. For the Par 38, parabolic aluminized reflector 38, which is kind of a spot flood light, which is very common, there is $5 million that has been set aside for that.

And there is also a future focus for a 21st century lamp. We do not know what that looks like. It may be a square lamp. It may be a luminaire. That has not been decided, but basically it is kind of setting the bar high for a future product. So as I said, there are cash awards available, and these are all tied to federal purchasing and utility and energy efficiency programs. So let me just kind of move through that a little bit more with you here. Okay – so when we talk about the L Prize, it is important that we understand what levels of performance are being asked for.

And if you look at the table on the right-hand side here, you can see that those numbers – especially if you are familiar with lighting – are very high. So you have got an exceptional efficiency level. You have got life, and you have got requirements that the form factor to be similar to the products they are intended to replace. And I will go through just the 60-watt A-lamp example with you so that you can get a better sense of the context here. So a 60-watt A-lamp has a system efficacy or a lamp efficacy of 15 to 18 lumens per watt. The typical CFL is in the 50 to 60 lumen per watt range.

So the L Prize is actually asking for 90 – greater than 90 lumens per watt, so almost twice as good or twice as efficient as even a compact fluorescent lamp. It must use less than 10 watts. It must deliver greater than 900 lumens. The typical A-lamp is about 900, so

from a light output standpoint those are equal. And it must deliver – actually, let me pause there and say that at 25,000 hours of operation, it still must deliver 70 percent of its initial light. That means it is still operating, and it has to still be delivering 70% of – color rendering, which is how well colors are rendered underneath a certain light source, which has to be greater than 90, and the color temperature has to be very similar to incandescent in that 2,700 to 3,000 Kelvin.

Well, the good news is that in August of 2011, an L Prize winner has been announced, and Philips Lighting of North America has won the L Prize. The image that you see here is actually the production version of the L Prize lamp, and so this lamp will be coming to you soon. But I wanted to point out a few things about it so that you are not alarmed when you see it out there on the showroom floors. One of the questions that we are asked is, "Boy, it looks yellow," and I am here to assure you that if you energize this lamp, it looks anything but yellow. In fact, it looks very, very close to an incandescent lamp.

If you put them side-by-side, even a trained eye would have a hard time discerning between the color of an incandescent lamp and the L Prize lamp. The reason for the color is that it is using an innovative technology. Yes, it is LED-based, but rather than having the phosphor, which is what we used to convert the wavelengths to visible light, it actually has a remote phosphor. So rather than the phosphor being on the LED itself, it is actually remotely mounted, so that is the reason for this kind of yellowish color is that there are LEDs behind this thing. When they hit the backside of the lens and the phosphor that is part of that, it shifts the wavelengths to be a nice warm, uniform light.

So I just wanted to make you aware of that as you start to see these products coming to the market. So Philips is planning for a commercial rollout in February of this year, and then they are going to first target the commercial sector. And then coming in about April of this year, you will start to see these products available – I am assuming there will be some web-based locations. You might start to see them permeate themselves in the market and show up in big box stores and such. I have also learned that they are planning on manufacturing the majority of this lamp in the United States, so that certainly is good news.

But they will be ramping up the development of the L Prize lamp, and you will be able to have access to it. One of the things that I would also share with you is that as part of the testing that was undertaken, there was also partnerships with various utilities and market transformation groups where they were given some of these lamps, and surveys were conducted where they looked at them, they tried them for dimming, and they did surveys on customer acceptance and that type of thing. And frankly, the performance of a lamp not only from an energy efficiency standpoint, but also from some of the aesthetic standpoints was very, very high, so you should have confidence that this lamp will indeed perform as advertised. And we believe that people will like it. So keep that in mind.

I will point you to a tool that has also been developed by Philips in support of the L Prize effort, and in fact I have got the URL here so you can go out and look at. Philips has its own website where they are promoting this lamp. Likewise, you can also go to the main DOE website, and from that website you can go to – sorry, the DOE Solid-State Lighting website, and from that you can actually go to the L Prize Program and learn more about not only the testing, but also as we move more into the deployment side of things you will be able to see what those resources are. So this Philips tool allows you to do a kind of a site survey and look at your energy savings potential of using the L Prize lamp in certain applications. So I would encourage you to go out there and take a look.

So with that, I continue to thank you for your time. At this point, I am going to hand the presentation over to Michael Myer, and he will be talking about parking structure lighting and learning more about what details you need to be aware of if you consider doing solid-state lighting in those applications. So take it away, Michael.

Michael Myer: Thanks, Jeff. We will spend the remainder of the presentation talking about parking structures and the Commercial Building Energy Alliance high performance parking structure specification. We will quickly walk over some estimates about parking structure, review the specification and we will also spend some time on financial incentives. Financial incentives are important for parking structures because there's actually a fair amount of them, and they are applicable to government and federal facilities, and not a lot of people are aware of them. So the first slide is just energy use – it is always good to walk through what we know about.

The first thing we realize is that lighting represents the bulk amount of energy use in a building. It is estimated to be about 21% of commercial building usage. Something to think about if you have a parking structure, parking structures are probably being lighted 24 hours a day regardless of whether people are there or not. It is definitely a place to think about controls, which we will discuss a little more later on. Here we are going to move onto some estimates about parking structures, because it is really good to have some background ideas, and it is important to think about it in its entirety so you really understand what some of the benefits are.

There are about 110 million spaces, but those are not structures. It is how you correlate them. We do estimate somewhere between 18 to 24 hours a day – parking structures are believed to use about 28 terawatt hours per year. That is definitely why there is a large interest in them. And as I mentioned earlier, they are again frequent occupancy times, there is also low occupancy times, and there is a great place for daylight and controls potential. Other things to know about a parking structure is that currently most parking structures are lighted with either fluorescent, high pressure sodium or metal halide. Based on this table, we see about 4% are LED.

This is from a 2011 report on each type of lighting by the Department of Energy. We are seeing that number go up, and it is definitely a great place for LEDs. Other things to know is that utility costs in parking structures roughly constitute about 10% of the annual cost for a parking structure. You think about that – most parking structures are not heated, so if they're not heated or cooled, what are the utilities? Mostly lighting, and if it is 10% of your bill, it is a great place to make some cutbacks. The other thing to point out is, which is a non-lighting thing is to think about your materials. The image on the left is dark, and the reason why it is that dark is that it is just untreated concrete that has oil stains on it, drip stains on it, and other stains on it.

The image on the right is a white painted ceiling and columns parking structure in Arizona. Light bounces off surfaces, so it is better to bounce off a white surface than a dark surface. It is pure math. The higher the reflectivity of the surface, the more light you get directed back to the parking surface. So it is really important to think about, "Hey, maybe we should just paint our parking structure," and that is some of the easy steps we can do to make it seem brighter. Or if you are going through and renovating, you should also consider painting it as well.

As I mentioned, possible use of controls – this is the Department of Labor. You will hear about it in and out throughout this presentation. It is in my opinion a very successful demonstration. It is a subterranean parking deck in Washington, D.C. It has directional flow of traffic, meaning as you enter you keep going in one pattern until you leave. It is parking for an office building. Originally, it was lighted with C12s, then it was lighted with high-pressure sodium, and now it has been – a portion of it has been lighted with LEDs. It does have occupancy sensors, and it does celebrate another DOE program: the next generation luminaire. We will discuss more on that in a second.

The results – we saw a 55% saving just by converting from high-pressure sodium to the LED. We did see average illuminance go down a little bit from the high-pressure sodium to the LED. We did see the minimum illuminance go up from the high-pressure sodium to the LED. That is really because the LED has a better distribution, and the high-pressure

sodium really dumped a lot of light, and averages can be really skewed by one peak value. Again, it is more than just the type of lighting. Controls, controls, controls!

This is from a FEMP criteria for rating different technologies. In it, 0 to 5 in the first three columns is a rating criteria, 5 being high, and in the far right column 1 to 100, 100 being high is the probability – a weighted score. And they found both LEDs to have a weighted score of 61, and bi-level garage parking lot lighting and pedestrian lighting value of 53. Now, those things are done separately. If you add them together, they are going be even more effective. This is a great graph of control sample data from January 27th of 2011. Again, this is a government parking structure for an office building. So what do we see here? Well, there are some people who either get here really early or trigger the control around 2:30 a.m.

And then between 4:30 a.m. to about 9:00 a.m., there is a high use of the space. So the fixtures were operating in their high state a fair amount of that time. Then about 10:00 a.m., when most people are at the desk, it dropped down to the low state. And then you see some – you begin to see some spikes, and then you see the lunch hour, and then some more afternoon spikes, and then you see the lull. So from like 5:00 p.m. to 6:00 p.m. most people are not leaving, and then you see a big exodus between 6:30 p.m. and 7:30 p.m. And then after 8:00 p.m. it is in the low state until some last straggler is leaving at 10:00 p.m.

It shows that parking structure – so think about how long you are in the space. You drive in, you park, you get out of your vehicle, you walk into the building – you are probably spending less than five minutes in the space. You do not need to light it for 24 hours a day because people are just not in there, so why are we lighting that space. And these controls could really help that. What is great is contrasting that slide to a Saturday. So this is a graph of Saturday compared to the previous one, which is a Thursday. Again, this is an office building, but what is very telling here?

Well, most people are not working on the Saturday shift. It is either a security patrol or one or two people doing some work. Pretty much somebody shows up in the morning, somebody shows up in the evening or leaves in the evening and that is it. The rest of the time it is operating in its low state. That is a great way to save energy by just operating in the low state when no one is there. We have found that roughly 30% of the time it is operating in its high state; 70% of the time it can operate in its low state because of overnight and on weekends and just during the day when there is no one using the space.

The timeout definitely affects the savings. Timeout is essentially when it waits ten minutes before it does not see motion and then it goes to a low state. We realize that ten minutes was actually a lot longer than it needed to be, and we have actually worked with the Department of Labor, and they are reducing it to either five minutes or two minutes to see what it is like. Again, you pull in – and these are all reserved spots, so it is the same spot every day. You pull into your spot. You grab your bag, your lunch, your phone, you leave your car, you walk to your building – it is not a lot of time.

The one-way traffic also affects the usage, so the fixtures that are very close to the entrance are on more than the fixtures near the bottom of the structure, so that is definitely something to think about. There are some challenges with controls and parking structures. Pipes and signs affect coverage. We also had an air handler causing a false positive; it was triggering luminaire when it really was not. And we had the columns where the luminaire cannot see – or actually the sensor cannot see around columns, so it is definitely something to think about when doing controls in a parking structure with all of the objects that you have to deal with.

Moving into the Commercial Building Energy Alliance specification – for those of you who did not attend yesterday's presentation, I will go over what is a specification again. There are really two types of specifications: one is a performance specification, and another is a technology product or _____ specification. The performance specification is adopted by the end-user, whether it be Wal-Mart or Walgreen's or GSA or the Army. Products must deliver X. In this case, X is lumens or foot-candles or a certain amount of light and uniformity. For Y, and Y is an energy unit, which could be watts per square foot, or it could even be kilowatt hours.

The National Renewable Energy Laboratory (NREL) developed a parking structure where they actually required it – the way it was designed, to use so much energy per year – or could only use so much energy per year – versus a technology or product specification. This is done more by a RFP or mass procurement. It is easily incentivized by utility or an energy efficiency program. It is really something basic like, "Delivers 10 lumens per watt." Energy Star is a great example. Premium TA is another good example. A technology specification is only focusing on the fixture and not how the space is being lighted, and so it is important to know the distinction.

And a performance specification looks at it as a system, whereas a technology specification is looking at it on a component level. The specification sets the power density at 0.18 watts per square foot. This is 40% below most energy codes except for Standard 90.1 2010. What is important to know is that this value allows people to apply for the maximum EPAct tax deduction, and the Internal Revenue actually passed a rule back in 2008 saying that parking structures are covered by this, for those of you who are not aware that EPAct includes tax incentives for people lighting below Standard 90.1 2001. But it is only applicable for interior spaces.

Most of us tend to think of parking structures as exterior spaces because they're not conditioned spaces, but, you know, it is enclosed by a roof and walls, so it really is an interior space. And the IRS affirmed that, and so it is really good to know that this incentive is applicable. We are going spend a little more time on the incentive because it is actually a really good way to make most projects really cost-effective really quickly. So the parking structure specification focuses on different parts of the parking structure. In covered parking areas, with the ramps both day and night, with the view by both day and night, and then the uncovered or your top deck.

It sets both a horizontal minimum illuminance and a vertical minimum illuminance and then uniformity requirements of maximum to minimum. RP20 is the IES, which is the Illuminating Society of North American. Their recommended practice for parking facilities – they set requirements – or recommendations for parking – for many spaces, and they are in the process of revising RP20. And depending on how RP20 this value might change as well. I would like to point out that the parking structure specification as it is currently designed does focus on allowing fluorescent, induction or LED technology, but I know that the focus of this program is only for LED.

But I just wanted to mention that there are elements in it for these other two technologies and that if this specification is used, the idea is that you would just redact those sections as not needed. The specification does require that within 20 feet of the perimeter and if the wall is roughly 40 percent open then it must have a daylight control. The image is a great example of why. This is a parking structure in California at a hotel. Clearly, there is enough light through that window, and yet they are burning a metal halide fixture all the time. And that is energy that they could be saving. So that is required. It also requires occupancy sensors to be used.

Currently, it is written as one occupancy sensor per luminaire for maximum coverage. We recently had a parking structure meeting about this specification, and there was some feedback that they would like it to possibly be enlarged for more than one sensor, but we are trying to figure out the language. How do you say, "More than one, but not so many,"

because the problem is with ganging sensors is that you could have columns or you could just have obstacles that the sensor could not see around. But the pro situation is that is not something you want as you walk out the door – all the sensors in a row – or all the fixtures in a row or within a certain space to turn on at the same time.

So definitely something we are trying to fine-tune. So control requirements might change a little bit with the next revision of this specification. As I mentioned, there are a number of financial incentives, and we will walk through those really quickly. So the parking lot specification – so EPAct offers $0.60 per square foot when your lighting is 0.18 watts per square foot. This is applicable to covered floors; the open-to-sky floors are not applicable. It is extended through the end of 2013. It is retroactive.

So if you have recently completed a project that has this power density, you can do it. It does actually include a provision for government structures that the money can go pass through to the design team, and we will discuss that a little more because it is based on a tax deduction. So if you do not pay – if you are a tax-exempt organization, you cannot apply for it. But they did create a mechanism for government. Parking structures are actually low-hanging fruit. If you think about them, they are a large footprint, but with low equipment density.

You cannot think of any other space in your building where – you know, if you think about an office, you have fixtures much closer together per square foot. In a parking structure, it is not unusual to have a fixture per 200 square feet or more. And so you are essentially maximizing your dollar value in the incentive and minimizing your capital costs in your equipment. Here is kind of how some of those numbers work out. This is for a rather small parking structure at 41,000 square feet. The federal money is for the tax deduction.

You do have to deal with the tax bracket in there, but if you were lighting a 41,000 square foot parking structure to 0.18 watts per square foot, depending on your tax bracket, you could see an additional $2,000.00 to almost $9,000.00 incentive. That is money on the table. It does add up quickly. There is great information out there. NEMA has a website, LightingTaxDeduction.org, which provides a lot more information on this subject. They have draft letters. They have IRS bulletins. They have FAQs. They have resources. Also GE has a tool that will do some calculations for you.

This is not an endorsement of it, but it is a pretty good tool that works. There are other ones out there, but this is one that I am familiar with. As I said, that it is applicable to government structures – this is actual sample text that GSA has used before, and I just kind of held this up here. I think this presentation will be downloadable so you can actually go back and grab most of this text if you want it. But notice how they print the specific document numbers. They also say that you are going to get $0.60 per square foot. And then how they do it is they give 15% of that $0.60 to the contractor, and then they have the contractor credit the GSA balance of the other 85% or 51%.

So essentially, this allows them to pay off – reduce the cost of their equipment through – by being credited for it. So that is very helpful, and again it is a way to bring down the cost of some of your projects.

Specifications in progress – this is an overview of Cleveland, Ohio – specifically the Cleveland Clinic. They have a project in the works. They have a hospital with almost one million square feet of parking space – now again, they are a hospital, so they are a nonprofit, so they do not actually apply for the tax deduction. But imagine if they were, that'd be almost $600,000.00 that would be money on the table they could work with.

They have about 1,500 spaces that they are converting from high-pressure sodium, which is shown on the top, to LED on the bottom. They have about 140 fixtures. They are using 620 with occupancy sensors and 218 with daylight sensors. Security was definitely a concern of theirs as well as user feedback. I do not know if you are familiar with the

whole hospital incentive programs, but Medicare and other federal programs actually rate how people like your hospital as part of their payback mechanism. So anything they do is very much customer-focused.

They want people to feel secure and also enjoy the aesthetics of it. And overall, the feedback we have gotten from the Cleveland Clinic is that security loves the new lighting and likes these controls as well, the customers or the patients like it as well too. They are going to see about an 82% energy savings and a payback of about four years with simple payback. It is also interesting to note about parking structures versus many other spaces is that – and this is how Cleveland Clinic is doing it – they are just doing it in phases. So essentially, they are taking a portion of the structure offline every weekend and maybe doing two or three bays, and then just next weekend moving over to another two or three bays.

So it allows you to stage the work with a minimum amount of disruption, and so that reduces your cost and your burden to everybody involved. Another specification in practice is Washington Metro. This is the D.C. subway system. They currently have about 13,000 high-pressure sodium luminaires. They are all on about 24 hours of operation. They have 24 parking structures ranging in 300,000 to 1.1 million square feet, ranging in construction from as early as 1980 to 2011. They actually incorporated the specification into their RFP directing people who are responding to their RFP to refer to that and certain sections of it.

There is the link for the full 100-page RFP if you are very interested in reviewing it, adopting elements from it. It is always good to end a FEMP presentation with another federal demonstration. So this is the one I have mentioned before, the Department of Labor. I will just touch bases on some more details that I have not provided earlier. It is intermittent sensor, and it goes from full power to 10% power in low output. We did see a minimum horizontal increase by 21%, and I did say the average decrease by 53%. It is again the hot spot high-pressure sodium that is causing it.

But it is a much more uniform – the LED system over the high-pressure sodium. And we did see much bigger savings in terms of energy: 80% is expected. It was a one-for-one replacement, and we are seeing about an eight-year simple payback for retrofit and a five-year for new construction. And hopefully in a year or two when the prices come down, those numbers would be even different. Actually, maybe – this is a two-year-old demonstration, so I bet those prices have come down as well. But LED prices tend to come down every year.

[End of Audio]