Timothy Unruh: Hello, I am Timothy Unruh, Program Manager for the Department of Energy's (DOE) Federal Energy Management Program (FEMP). Welcome to the 2012 series of First Thursday Seminars. This year FEMP is expanding its training course offerings to help you gain the core competencies necessary to fulfill the Federal Building Personnel Training Act.

Furthermore, we recognize the ever-increasing challenge to making our buildings the best performing they can be. We believe that expanding our training and building performance improvement, especially in energy efficiency, can make our workforce best in class. This training will focus on core competencies to meet key job performance goals. We want to provide you with real on-the-job skills that make a difference.

First Thursday Seminars will help you: obtain project funding through a streamlined ESPC process tailored to meet the needs of small sites; place UESC task orders under a GSA area-wide contract; identify, select, and deploy new and underused technologies to drive markets and accelerate change; achieve the greatest possible energy and cost savings through deep retrofits; and identify critical opportunities and implement action plans to achieve energy security in federal facilities.

The new knowledge and skills in these seminars will help you do your job better; help your agency reach its energy, water, and other building performance and sustainability goals; and help our government save taxpayer dollars. Through our efforts, we want to make the federal building stock a place of innovation and high performance and efficiency, basing our success on the measured results that we achieve.

Visit the FEMP website for the most up-to-date information, view archive seminars online 24/7, and register for upcoming seminars. We also hope you will take a few moments to provide us with important feedback through the evaluation at the end of this program. Together, we can continue to learn, improve our core competencies, and meet new energy challenges with confidence. Enjoy the seminar, and thanks for joining us.

Kathy Hyland: Hello, welcome to the Federal Energy Management Program's First Thursday Seminars. I am Kathy Hyland and I will be your moderator today. This is the third course in the 2012 series focused on selecting and evaluating new and underused energy technologies. If you would like to call in a question, do so immediately after the presentation. From time to time on your screen, you will see an e-mail address, a fax number, and a phone number to pose your questions.

We have two instructors today. Michael Holda is employed at Lawrence Berkeley National Laboratory where he assists in the deployment of emerging technologies of ESPC projects. Mike has more than 30 years of experience in facility design engineering, and project and program management at DOE National Laboratories. Mr. Holda is the past chairman of the Energy Efficiency Working Group for DOE facilities.

We also have with us Steven Parker. Steven is a chief engineer with the Pacific Northwest National Laboratory where he supports research activities in the assessment and deployment of new and emerging energy-efficient technologies. Mr. Parker is a past president of the Association of Energy Engineers, where he is a member of the Energy Managers Hall of Fame.

We also have with us live in Washington, D.C., at the Department of Energy Shawn Herrera. Shawn will be answering questions along with Mike and Steve after the presentations. Shawn manages FEMP's Technology Deployment Program where her main area of focus is to accelerate the acceptance and deployment of innovative products and technologies into the federal sector, supporting the transition of clean, energy-efficient technologies from research and development to successful commercialization.

Listed on your screen are the core competencies for this seminar.

[Next slide]
I will pause a minute and let you look at those.

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As a result of completing this seminar, you will be able to employ ideal energy-saving technologies in your facility or facilities based on an analysis of the options that best meet the facility's needs.

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And here is a little more information on our results expectation today: that you will be able to take advantage of the Technology Deployment Matrix to select ideal scenarios.

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So without any more ado, I would like to turn the presentation over to Mike Holda, who will start talking about the Technology Deployment Matrix.

Michael Holda: Thank you, Kathy. Thanks for joining us this afternoon. What I want to focus on or the focus of our discussion today is going to be on new and underutilized technologies. These technologies are applicable to existing federal buildings, so it is applicable to retrofit opportunities in existing federal buildings. These are commercially available technologies. They are off-the-shelf, so there is no experimentation here. The only challenges are that they are not fully deployed in the federal sector, so they are under-deployed in the federal sector. So our goal is to get these technologies out there in the energy managers' hands to help them meet their energy use reduction goals.

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So let me talk a little bit about the Technology Deployment Matrix. It is an Excel-based tool, which is also available on the Web as a Web-based tool that assists federal agencies/ESCOs/utilities in identifying and evaluating new and underutilized technologies. It identifies 50 of the top-ranked underutilized technologies for Federal ESPC and UESC projects. And it is not just limited to Federal ESPC and UESC projects. If you were a fortunate enough agency to have federal funds available to do energy projects, obviously these technologies would be applicable to your site. They are ranked to maximize the energy-saving impact in federal facilities, and they can save you time in researching the technologies and help you make better decisions on your energy conservation measures.

I think it is a great tool. It has all the information you need on the technologies in one place. I prefer the Excel version of this tool, as it has all the information in one place. It has resources, points of contact for subject-matter experts, case studies, as well as links to additional references, all in this one location.

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So here is a list of the top 20 technologies that are on the Technology Deployment Matrix. As you can see, a lot of these technologies are in the lighting arena. Steve will talk about a number of these technologies in a few minutes.

Let me just tell you how the Technology Deployment Matrix was developed. Some of my colleagues at Lawrence Berkeley Laboratory surveyed existing energy technology evaluation programs at state, federal, and utility programs that are in existence. They have looked at those technologies. I think there were over 250 various technologies that they looked at. They were able to distill those down to the 50 technologies that we have in the matrix. These technologies are there because they are applicable to federal facilities and have a high impact on federal energy savings.

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As I mentioned, this is available on the FEMP website. There is a Technology Deployment web page, which includes both the Excel version as well as the Web-based version of the matrix.

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Okay, I just want to say a couple words about FEMP-designated products, and this was a subject of an earlier First Thursday seminar. FEMP-designated products represent the top 25% of efficiency in their product category. Those FEMP-designated and Energy Star products are required to be used by federal agencies. But the Technology Deployment Matrix is not a requirement for federal agencies, but it has a lot of recommended technologies in there, so we certainly encourage you to use it.

A number of the technologies that are in the deployment matrix may migrate over to FEMP-designated products, if it is applicable, because some of them are design approaches versus a particular product line, but there is a process in place for migrating those technologies over to the FEMP-designated status.

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Okay, here are some of the attributes for the ranking that was done in the matrix. The first three bullets or categories here – overall federal market impact, energy savings potential, and cost effectiveness were the most heavily weighted of the ranking attributes, obviously, so they are the most important. The next four: strength of supply chain, past demonstrations or pilot projects, available reports and publications, and receptiveness of potential buyers fall into the probability-of-success category in the ranking, which I will show you in a minute.

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Okay, here are the Energy Conservation Measure categories that are included in the matrix. You have building envelope, HVAC, lighting, water heater, and then other miscellaneous technologies. There is a plan to have some additional technologies added to the matrix. CHP, I believe, is planned for next year. And, again, keep in mind these are technologies for retrofit opportunities, primarily. It does not exclude them from being used in new construction, but the primary focus is for retrofit opportunities.

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Okay, here is the relative ranking and weighting of the various categories. You have energy savings potential and the impact on the federal sector, and that obviously takes the heaviest weighting at 50%; cost effectiveness is an important aspect, and that is at 30%; and then, as I mentioned, those other characteristics, the probability of success at a lesser percentage of 20%.

Okay, with that, I will turn it back over to Kathy.

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Kathy Hyland: Thank you, Mike. We will hear more from Mike later in the presentation. But next, listen to Shawn Herrera, and then we will be hearing from Steven. Shawn?

Shawn Herrera: Hello, I am Shawn Herrera, the lead for DOE FEMP's Technology Deployment Program. FEMP's Technology Deployment Program is designed to increase the use of innovative products and technologies, and speed the transition of clean, energy-efficient technologies from R&D to successful commercialization. This program focuses on new but proven technologies that are now commercially available but not widely used. By adopting these technologies, federal agencies can increase wider market acceptance of technologies that save energy and reduce costs.

To provide timely and important input to this effort, the federal Interagency Technology Deployment Working Group focuses on market conditions, communication strategies, technical assessments and tools, barriers to deployment, and best practices. FEMP works closely with the Interagency Senior Executive Technology Deployment Committee and the DOD tri-services panel to share information and resources about various agency technology evaluation programs and to coordinate policy and acquisition strategies. Agencies represented on these working groups include the GSA, DOD, Army, Navy, and others. The program coordinates with industry to identify technologies that meet the requirements for broad acquisitions through project financing vehicles such as energy savings performance contracts and utility energy service contracts.

FEMP has also teamed up with the DOE Building Technologies Program to pioneer the DOE Technology Portal. In the future this great resource will provide credible technology performance data to building owners and operators so they can determine how technologies fit in their business case assessments and decision-making.

Of course, FEMP's Technology Deployment Matrix, which you are learning about today, is available now to help agencies select reliable, cost-effective, off-the-shelf new and underused technologies. The matrix identifies and ranks emerging and underutilized technologies in six product categories. You will find the matrix most helpful in providing information related to the application and benefit of the technology, case studies, technical assessments, expert points of contact, and other resources. Those tools and resources will be invaluable as you select and implement technologies to meet goals in new areas, such as deep retrofits and net-zero energy.

FEMP looks forward to helping your agency innovate, adopt the promising technology, and meet your energy-saving mandates. And I look forward to answering your questions later in the seminar.

Kathy Hyland: Thank you, Shawn. Now let us hear from Steven Parker, who is going to be talking about some of these promising technologies.

Steven Parker: Thanks, Kathy. Okay, so in the next half hour or so, I am going to try to cover 15 of the top 20 technologies that are on FEMP's Technology Deployment Matrix. Okay, you can do the math; it is not going to be a whole lot of time to spend on each technology. So let us just consider this a form of speed dating. Not a whole lot of time to get into a whole lot of substance, but in the next half hour or so, maybe you will be intrigued by one, two, or possibly even a few, enough to get back in and learn a little bit more details.

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So the first thing I want to get into is lighting. Now, lighting is not the biggest energy consumer in federal facilities, but it is certainly the most visible, all pun intended. It accounts for around 20% of energy consumption in federal facilities, and eight of the top 20 technologies on the FEMP Deployment Matrix cover lighting as a technology.

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So the first one I want to get into is spectrally enhanced lighting. Now, spectrally enhanced lighting – DOE and other research have shown that by selecting lamps with enhanced color spectrum in the higher color temperature range, generally in excess of 5,000 Kelvin, increases visual acuity from the occupant, which basically means that you can see just as well but with less light, and thereby with less power. In fact, DOE studies

have shown that you can save between 20% and 45% savings in lighting energy by moving over to spectrally enhanced lighting.

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So in essence here is what we are talking about, which is specifying lamps that use 5,000-Kelvin or greater – and that is much more towards the blue spectrum – in place of our conventional 3,500- or 4,100-Kelvin lamps. Now, the energy savings is achieved by then reducing the light output. Now, that can be done either by using lower-wattage lamps or by specifying ballasts with lower ballast factor ratings or, my personal favorite, applying occupant-controlled dimming capability. So this makes it ideal for application in office environments, especially for those that allow for occupant-controlled dimming. For much more information on this technology, I would refer our audience to the First Thursday presentation done in February, where the first half focused on spectrally enhanced lighting.

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The next technology I want to get into is called low ambient/task lighting. And in essence, this is a design strategy. In a conventional lighting design, we would be prone to design the lighting system to be uniform light throughout the area. Another approach, the low ambient/task lighting, is we would reduce the amount of lighting – say from 50-foot candles down to 30-foot candles or below – and then in order to meet the lighting requirements, we would then add occupant-controlled task lighting, either on desk or some other focused mechanism, that the occupant can then utilize to meet their lighting needs. Now, one of the main reasons that this provides energy savings is, the closer a light source is to the task, the brighter it becomes with less power. FEMP estimates that around 15 to 25% of lighting energy can be saved through the appropriate application of low ambient and task lighting.

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So, again, as I said, task lights then are lower wattage. You would just reduce the overall general overhead lighting to a lower level and then make up that difference by applying user-controlled task lighting. Now, one of the key aspects that makes this even more energy efficient is then also applying controls to that task lighting, either user controlled or through occupancy sensors, to turn off that task lighting either when it is not needed or when the occupant is no longer there.

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Moving on to the next technology, we have solid-state lighting, specifically light-emitting diodes, or LED. Now, LEDs are becoming more efficient almost on a monthly basis. So they offer particular energy savings in terms of enhanced lumens per watt. But they also offer a lot of benefit through improved directionality. In fact, I am going to give you a case study here coming up soon to give you a lot more information on that. But solid-state lighting also provides better cold-weather performance, excellent color rendition, extremely long life, and, because of its instant-on capabilities, also gives you multilevel switching opportunities.

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Now, in this picture here, we actually have two demonstrations I am going to talk about. This was a demonstration sponsored by the Department of Navy's Technology Validation Program at a base down in southern California. This is a parking lot for a Navy exchange and commissary. The original lighting system on this consisted of pole-mounted 400-watt high-pressure sodium. That is about 415 watts when you include the ballast energy.

The lights were replaced on a one-for-one basis with 207-watt LED. Now, that is a 50% reduction in power. At the same time, they increased the minimum light level by 20%, not actually through an improvement in efficacy but through an improvement in effectiveness due to the directionality of the lights. If you look at the lighting distribution in this photo, it is very even from the intensity right under the light poles to the slightly dimmer spots in between the light poles. That is known as the uniformity ratio, the ratio of the brightest spot to the least-brightest spot. And with the LED it is now a 7-to-1 ratio, whereas with the high-pressure sodium it was 42 to 1.

Contrast that, then, with the demonstration of another white-light technology, which is in the background in the upper right-hand side. And that technology has a uniformity ratio of 68 to 1. That is characteristic of the intense bright spots you see under the light poles and then the dark spots in between the light poles. That is a sign of poor uniformity.

Now, the LED actually rates out at about 66 lumens per watt, whereas the light source in the background has an efficacy of 109 lumens per watt, so you would think that the other light source would have been more efficient, but it is not as effective. The LED lights actually are using 26% less power to light the area while providing double the light level. So that is just a sign of the effectiveness of LED and how it uses that to save energy.

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For a lot more information on LED lighting in outdoor applications, I would refer you to the links on this particular slide. First and foremost, FEMP is sponsoring the Outdoor Solid-State Lighting Deployment Initiative, and there is a link for more information on that. There were two excellent on-demand training videos, now available on FEMP's website, on applying solid-state lighting to exterior applications: one on parking structures, primarily parking garages; and the other one on parking lot lighting.

And then certainly for much more technical information, I would refer our listeners to the Solid-State Lighting Program at DOE where they provide technical product testing information through their CALiPER program, demonstration information through their GATEWAY program, as well as model specifications and a lot more technical information.

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Next up I would like to talk about solid-state lighting, but now in indoor applications. As I said, the efficacy of solid-state lighting is improving on a regular basis, and it is becoming very competitive, much more efficient than incandescent, and now even much more efficient than compact fluorescent, and providing significantly better dimming characteristics than compact fluorescent. But you can find this technology cost effective in downlights, otherwise referred to as recessed cans or high-hats; under-cabinet lighting, and other forms of task lighting.

Specifically, I would like to highlight the L Prize winner. The L Prize was an award contest put together by the Department of Energy, recently awarded to Philips Lighting, where they have now come out with a replacement for the 60-watt incandescent lamp, with an LED product less than 10 watts providing over 900 lumens, rated at 30,000 hours, fully dimmable down to 10%, a very high-color rendering index, and the traditional 27 Kelvin, making it comparable to the basic 60-watt incandescent light.

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Of course, the Holy Grail in interior applications right now is the replacement for the 4-foot T8 light. LED lighting is just now reaching that threshold, with a couple manufacturers coming out with 2-foot-by-4-foot and 1-foot-by-4-foot replacement troffer lights, consisting of LEDs, fully dimmable, long life. Okay, the price is a little on the high side, but the price is coming down. But if you can take advantage of the directionality, if you can take advantage of the instant-on capability and the long life, it can be cost effective in the right applications, and certainly as the prices continue to come

down and the efficacy continues to increase, there will be more and more cost-effective applications out there.

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Okay, next up are integrated daylighting systems. Now, what we are talking about here is, for facilities that have access to daylight or have been designed for daylight, now we are talking about integrating control systems into the lighting system so that the lighting system can dim in response to the amount of daylight that is available. So now we are talking about integrating dimmable ballast, photo sensors, workstation controls, even full integration into the building management system, so that the system can dim or undim according to the available light. As you dim lights, they draw less power, thereby saving energy. They also add less heat energy to the cooling system, thereby saving even more energy.

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Now, one of the cautions to be aware of is, daylighting is or can be a source of glare. So I highly recommend the use of an experienced design team; good commissioning practices in the design and integration, particularly of the control system; and certainly need proactive maintenance, because these technologies and design strategies do require regular proactive maintenance. Now, this technology is easy to supply to fluorescent and LED lighting, again, because of the dimming responsiveness and the energy savings associated with dimming. The other thing I would like to point out is that this technology integrates very well with the task-ambient design strategy I mentioned earlier.

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One other technology I will mention is bi-level lighting technology, applicable to parking garages, stairwells, pedestrian lighting ways, and parking lots as well. Again, what we are talking about here is a luminaire that has two power settings for a high-light level and a lower-light level, in addition integrating with that some type of motion-sensor control, so it is just an occupancy sensor.

This should be applied to an area where you do not want to turn off the lights, for safety/reliability reasons, but you can still take advantage of reducing the light level when the area is unoccupied. Again, because of the instant-on capabilities, you want to apply this to a technology such as fluorescent or LED. And obviously, the more the area is unoccupied, the more savings potential there is.

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So, again, I would apply this where it is inappropriate or unsafe to completely turn off the lights, but in areas where everyone feels comfortable that you can at least reduce the lighting level during periods of unoccupancy. Cautions to be aware of is, occupancy sensors do have limited fields of view and can be obstructed, so they require full commissioning. They also require continuous maintenance, or at least ongoing maintenance. There was an excellent case study presented in the February First Thursday seminar on new lighting technologies, specifically talking about an application going on in the Department of Labor's parking garage located in Washington, D.C.

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Getting away from lighting and moving on to heating, ventilation, and air conditioning. Now, HVAC energy is the largest energy consumer for federal facilities, accounting for around 40%. On a nationwide basis, heating is the largest energy consumer, for a little over 30%. But of course, that depends upon your geographic location. Southern climates are going to be much more dominated by space cooling.

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So one of the technologies on the deployment matrix that we would like to point out to you are condensing gas-fired boilers. These are boilers designed with enhanced heat exchangers designed to extract more heat energy from the products of combustion, sufficient enough to fully condense the moisture that forms when hydrogen combusts. And that improves the combustion efficiency by over 10%, generally in the range of 12 to 15%. I should also point out that this is the same technology that can be applied to water heaters; it is just a slightly different application.

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The key things of which to be aware on condensing boilers are that the efficiency of the system becomes very dependent upon the inlet water temperature, so the cooler the better. In fact, the systems may not fully condense when you have an entering water temperature above 120 to 130 degrees. Now, the system will still be more efficient than a conventional boiler. You just may not be taking full advantage of the condensing capability when you have higher inlet water temperatures. Now, a lot of engineers get very concerned about the potential acidity of the condensate that forms, but most manufacturers have inline neutralizers, generally consisting of crushed limestone, that fully neutralize the moisture before it goes down into the drainage system.

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Now, here are the results of a demonstration that is currently ongoing at a Marine Corps facility in southern California, sponsored by the Navy's Technology Validation Program. This replaced a conventional boiler. Again, it was a hot water boiler system. It improved the boiler's thermal efficiency from 69% up to 79%, thereby reducing natural gas consumption used for heating by 12 to 13%.

I would also like to point out that, in this particular demonstration application, the entering water temperature from the facility into the boiler ranged between 140 and 157 degrees Fahrenheit. So the system did not fully condense, which is why the efficiencies are only up to around 80%. They could further increase the efficiency of this particular demonstration if they could lower the hot water supply temperature, which would then lower the return water temperature, or if they would have replaced the heating coils to allow for a larger temperature differential, thereby reducing that return water temperature. But still, a 12 to 13% reduction in energy savings was very significant.

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The next technology I would like to talk about is duct sealant, and this is actually a technology that was developed at the Lawrence Berkeley National Laboratory. It is an aerosol-suspended sealant. Okay, think of it as Fix-A-Flat for your ductwork. It allows the heating, ventilation, and air conditioning system to deliver more conditioned air to the controlled zone as opposed to it leaking out on the way to get there. So it is useful in older facilities where ductwork is not sealed by today's standards. Today's standards are for very well sealed ductwork. But in older facilities, you may have an opportunity for this technology. I think it is very important to test ductwork for the amount of air leakage before moving forward with this technology.

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I would also like to note that it works really well with variable-air-volume HVAC systems, because they automatically rebalance as you reduce the leakage in the ductwork, whereas when you apply this to constant-volume ventilation systems, you may need to manually rebalance, re-shiv, do a full test-adjust-and-balance, slow down the fan, in order to fully realize the energy savings that become available.

In a series of demonstrations by the Navy Technology Program, they documented savings between seven and as high as 50% with simple paybacks of six to 11 years, but again, that was in limited applications that were tested beforehand.

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This next technology is actually one of my favorites in HVAC. Yes, it has a long-winded name. We use a neutral name called variable-speed, water-cooled, oil-free, magnetic-bearing chiller compressor. I personally like the name that GSA is calling it, and that is simply the MagLev chiller. But just to be clear on this, we are talking about the compressor known as Turbocor, manufactured and distributed by Danfoss Turbocor. But do not worry; it is available from multiple manufacturers, integrated into chillers, so you do not have to worry about sole-sourcing issues by specifying chillers equipped with this compressor.

Now, it has excellent part-load efficiency, which is where it gets its benefit, because chillers spend most of their time operating at part-load to extreme part-load. The great thing about this is that they are also integrated in a modular so you can multiple-stack these compressors. As a matter of fact, in the picture that is on the slide, you see a chiller that actually has two of the compressors stacked on it to enhance its capacity.

Demonstrations sponsored by the Navy Technology Program have documented reductions in cooling energy of 40 to 60%. In fact, here is an example of one particular technology.

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In this particular case, a single compressor chiller was retrofitted with three of the new compressors, as shown in this photograph, and the data that we have plotted off to the side is one month's of actual comparative data. On this particular section of data, you can see it only loaded up to 120 tons. The capacity on this system was 240 tons. On the vertical axis we have kilowatts per ton, so lower is better. And you can see that the efficiency, as the chiller becomes less and less loaded, the benefit becomes greater and greater because of the extremely favorable part-load efficiency profile that this new technology makes available. And, again, the Navy results on a series of demonstrations of this technology have shown a 40 to 60% reduction in cooling energy.

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Moving on to our next technology, this is wrap around heat pipes. This is a heat exchanger technology designed to wrap around the cooling coil for the purpose of enhancing dehumidification while reducing reheat energy, as well as reducing the load on the chiller. How this system operates is, humid air enters the system, gets pre-cooled by going through one side of the heat exchanger. That reduces the load on the cooling coil, which can be much more effective now at draining the water out of the air by subcooling it. And then the subcooled air then passes through the second side of the heat pipe, which then reheats the energy, reducing the requirement for reheat energy, so that you are not overcooling the space as you are trying to control humidity.

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So, again, this technology is best applied where humidity control is important and where reheat energy is required. This will reduce the energy on both the cooling system and the reheat system. It is most cost effective in new construction, where it can offset capital costs. But it is also cost effective in retrofit applications. The other thing I would like to note is that this technology is available in a wide range of capacities, from as low as 1,000 cubic feet per minute, which gets it down into the residential size, to well over 20,000 cubic feet per minute, which are very large built-up air-handling systems.

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The next technology I would like to mention is energy recovery ventilation, ERVs. In essence, this is just a series of different types of air-to-air heat exchangers to exchange heat energy between exhaust air and make-up air. As a matter of fact, it can reduce the

energy required to condition make-up air by 50%, by utilizing energy that is available in exhaust air systems. Different types of technologies are available, anywhere from, again, heat pipes to energy wheels to energy recovery loop systems and other air-to-air type heat exchangers.

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Now, this is most effective applied in cold climates, but that is primarily because you have larger temperature differences in heating applications than you do in cooling applications, but it is also effective in cooling applications. This can be applied in facilities where you have centralized make-up air systems in close proximity to centralized exhaust systems. Now, one caution to note is you need to watch for conflicts between the energy recovery ventilation and outside air economizers, because you do not want to be recovering unwanted energy when you want to be utilizing the economizer.

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Now, let us move on to service water. Now, water heating is like the unknown, unseen energy consumer in federal facilities. It is like out of sight, out of mind. But water heating accounts for about 15% of energy consumption in federal facilities, so it is no small animal.

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So the first technology we would like to highlight, again, is the condensing water heater, just a variation on the condensing boiler. Again, we are talking about an enhanced heat exchanger to absorb the additional heat energy, improve combustion efficiency by ten to 15%. Obviously, you want to utilize this technology in places where you have high hot-water use, such as hospitals, lodging, and gymnasiums. Just look for high hot-water uses.

Now, the Navy is currently doing some demonstrations on the application of this technology. I do not have access to any results right now, but I understand that it is going to be presented at the upcoming GovEnergy in August of 2012 in St. Louis, so hope to see you there.

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There are similar limitations with the condensing boilers. You need to watch that entering water temperature. So on demand-flow type systems, where entering water is a function of when someone opens the hot water tap, you have a large temperature difference because you have a low entering water temperature, and so those systems work really well with condensing water heaters. But on storage-type systems and recirculating systems, again, you need to be concerned about what that entering water temperature is, in order to maximize the benefit provided through condensing water heaters.

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So let us move on to building envelope. Now, the building envelope does not consume energy directly, but it does directly impact the energy required by your heating, ventilation, and air conditioning system and, indirectly, your lighting system.

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So the first technology up that I wanted to highlight here is high R-value windows. Now, we are talking about windows that have an R-value of five or greater, because windows account for 30% of the load on heating, ventilation, and air conditioning systems, so it is very significant. And high-performance windows can reduce that by half. Again, the definition right now of high R-value windows are an R-value of five or greater, although I understand that Berkeley is doing research to come up with the R-10 window, and I hope to see that one relatively soon. By contrast, current energy codes only require, in the best of areas, only an R-value of three, and, in some geographic locations, much less than that.

So high R-value windows are rather expensive, but they can be highly cost effective in new construction. In fact, they can almost be a no-cost item because as you improve the windows and you reduce the load on the heating, ventilation, and air conditioning system, you can actually end up with smaller chillers, smaller boilers, and smaller ductwork, which means a less expensive HVAC system, to cover the cost of the more expensive, better windows.

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So, again, what makes these windows more efficient, higher resistance value, is triple-pane, spectrally selective glazing, and thermal breaks to, again, reduce the heat transfer through the windows. In addition, they also provide benefits such as reduction in solar heat gain, reduced infiltration, and, the best benefit, improving occupancy comfort.

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Another envelope technology is cool roofs. Now, cool roofs are a technology designed to decrease the way a roof absorbs heat energy. Specifically, a cool roof can lower the roof temperature from 50 to 60 degrees during peak daytime, thereby reducing the heat flow from the roof into the conditioned space. So this technology is especially beneficial in warm, sunny climates.

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Now, a key thing to point out is, a white roof is not a cool roof, and not all cool roofs are white roofs. As a matter of fact, cool roofs are available in a multitude of colors. What you should focus on are the specifications. The two key specifications are solar reflectance – you want a high solar reflectance; you will see the term "albedo" for that – and a high thermal emittance.

So because a cool roof is at a lower temperature that means it does not expand and contract as much, and that ends up extending the roof life. Now, this technology is much more cost effective when you can combine it with either new construction or an existing re-roof, but it can be cost effective in other applications. But certainly if you are reroofing, you should be looking into a cool-roof technology.

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There are other technologies on the top 20, and which one might be right for you really depends upon the type of facility that you have and what geographic location that you are in. So I highly recommend that you go to FEMP's website and read through the Technology Deployment List, the Technology Deployment Matrix, where you will find much more information on benefits, applications, key factors of which to be aware, and links to much more technical resources on the information. And with that, I would like to hand it back over to Kathy. Thank you.

Kathy Hyland: Thank you for that, Steven. Now let us go back to Mike Holda, who will talk about how some of these technologies are being used in federal applications.

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Michael Holda: Okay, first I am going to start with some lessons learned from deploying new and emerging technologies and energy savings performance contracts. And if we use Steve's analogy to speed dating, this is what you need to know before you get married. Okay, and these lessons learned are not only applicable to ESPC projects, but they would be applicable to projects done via utility financing or direct financing if you are, again, fortunate enough to have appropriations to do this work.

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The first bullet present projects that require a mix of motivation and tolerance amongst the partners; you either have to be motivated to have the technology as part of the project, or at least tolerant to have it as part of the scope of work. If you have somebody on the project team that does not want that technology as part of the scope of work, you have a high probability of not being successful with incorporating it into your project, so keep that in mind.

The technologies are typically either the idea of the agency, the ESCO, or a third party, but typically it is the federal agency or ESCO or utility that suggests the technology. And then, obviously, perceived risks need to be identified, managed, and/or mitigated in order to be successful.

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Continuing on with the lessons learned the risks could be reduced by being properly shared amongst the parties. And I will give you an example of this at the House Office Building case study in a little bit, and how those risks were shared amongst the ESCO and the agency. And you can reduce risk by acquiring more detailed technical information, and obviously the Technology Deployment Matrix is a tool for gathering additional information about the technologies. And the more information you have, that reduces uncertainties and increases confidence in the technologies that you pursue.

And then demonstrations during the investment-grade audit phase or early in the development phase of a project can help reduce risks and uncertainties. I will give you an example of that with the U.S. Coast Guard-Puerto Rico project. And if you think about it, you can do that with technologies like low-flow fixtures, a lot of the lighting technologies where you, on a limited trial basis during the development of the project, you instrument a relatively small area with the technology. And then once you have tested it out during the development phase, you would deploy it on a larger scale during the implementation phase.

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Okay, continuing on with the lessons learned, utilize technology experts from the National Labs and private sector to educate your stakeholders, emphasizing the value and benefits associated with the incorporation of the technology. This is done routinely. The National Labs provide support to high-tech buildings, labs, data centers, renewable energy technologies, ground source heat pumps, and a variety of others.

These next three bullets are applicable to really any type of project. Positive relationships and trust amongst the parties is critical. You need to be flexible and provide a customized approach to meet customer needs. And then applicable financial incentives can help reduce and offset those first costs.

And new and underutilized technologies typically qualify for the standard financial incentives that are available through utilities and state energy commissions. Typically, they have a program that has a prescriptive or technology-based rebate, or they will have a program that has a customized or whole-building rebate, and those programs will – the technologies will typically qualify for those programs.

And then most programs will also usually have some measurement-and-verification component associated with them. And the majority of the technologies on the matrix fall under the standard measurement-and-verification protocols, options A, B, C, and D. And you may need to modify and customize a protocol in order to manage some perceived risks associated with a technology.

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I want to give a little plug here for the Technology Deployment in ESPC Working Group that I happen to chair. Some of the goals of the working group are to increase the utilization of FEMP-designated products – again, that is the top 25% in efficiency – for selected technologies and energy savings performance contracting; and also to accelerate the deployment of new and underutilized technologies into ESPCs, with particular emphasis on the Technology Deployment Matrix.

The working group is made up of representatives from the ESCOs, federal agencies, National Laboratories, and DOE. We get together about every two months or so. Normally we have a subject-matter expert that speaks on one of the technologies from the matrix. And we are open to new participants.

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Okay, next I will give you some project examples of technologies that have been deployed in energy savings performance contracts. And, again, playing on Steve's analogy with the speed dating, these are successful marriages.

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Okay, U.S. Coast Guard-Puerto Rico ESPC project; a very interesting project. Down in the island of Puerto Rico, the U.S. Coast Guard has three major locations down on the island. All of those were part of the overall project. Part of the challenge down there was roof maintenance. Because of the fact there is a lot of rain and hurricanes, it has a tendency to shorten the useful life of a conventional roof. And then you have humidity problems associated with being in a tropical environment.

So what was proposed was to install some cool roofs on the housing units, as well as variable-refrigerant-volume air conditioning units that have the capability of wringing out the moisture relatively efficiently. Those two technologies were demonstrated on a limited scale, kind of on a pilot, in a few of the housing units during the development stage of the project. This is prior to award of the project. And we were able to get both baseline and post-retrofit conditions. We were able to measure those prior to award of the project for each of those ECMs. And by doing that, you were able to reduce a lot of the risk associated with the installation of those ECMs, reduce the price risk, installation and performance risk. The ESCO was also able to make his installation process of the cool roof both more efficient and safer, so there was a lot of ancillary benefit there.

The demonstration was funded by the U.S. Coast Guard, and as you can see in the picture on the right, those are the housing units. There was also an installation of about 2.8 megawatts' worth of photovoltaics on those cool roofs, and that was done via a renewable energy services agreement underneath a task order. So a very interesting project, very motivated project team both on the Coast Guard as well as on the ESCO's side.

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This is the House Office Building ESPC project. This is about the aerosol duct sealing that Steve had mentioned earlier. In this particular case, the scope of work of the original project was to include that energy conservation measure in one of the wings of the House Office Building. That was going to be done on a limited trial basis, and that would be done post-retrofit. And if that proved successful, then they were going to do the remainder of the wings of the House Office Building with that retrofit.

Well, it turned out the ductwork was in better condition than was originally anticipated, and the savings were less than anticipated. So they elected not to pursue the ECM in the remainder of the wings of the Office Building. Option A measurement and verification was used post-retrofit, and the performance was held constant for the term of the contract. And this helped mitigate some of the ESCO's performance risk in an example of risk sharing associated with these technologies.

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All right, this next project is GSA Region 7. This project affected the majority of the GSA federal buildings in Texas, Louisiana, Oklahoma, Arkansas, and New Mexico. This project was procured through three concurrent ESPC projects that were done by three separate ESCOs. This was leveraged with ARRA dollars, so it was on an accelerated schedule. They are actually just finishing up the projects now.

They were able to incorporate a variety of new and underutilized technologies, including the LED lighting and induction lighting for exterior applications; the Turbocor MagLev, Steve's favorite technology; chillers that are also oil-free. They included a wind ECM, as well as roof-integrated photovoltaics, which is a technology where thin-film photovoltaics are adhered to a cool-roof membrane, essentially. And cool roofs were also incorporated in there, as well as data center efficiency measures. And data centers as well as laboratories are very high-energy-density spaces. Data centers are getting more and more energy intensive every day, so there is great opportunities there for improving the efficiency with relatively simple solutions. This, again, had a very talented team from the GSA supporting the ESPC project here.

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This next example is on spectrally enhanced lighting at NASA Jet Propulsion Laboratory. On the left you can see the existing conditions were the 3,500-degree Kelvin lamp installation. On the right were the post-retrofit conditions, with the 5,000-degree Kelvin lamps that were utilized there. The NASA JPL was so impressed with the results that they decided to make spectrally enhanced lighting a standard at the facility, and a standard at a number of other locations, and used quite extensively in Southeast Asia. But this was also one of the case studies that we have recently prepared. We have a number of other case studies that we will be doing on cool roofs, the Turbocor chillers, and variable-refrigerant-volume air conditioning.

[Next slide]
Okay. I am going to be talking about here a number of other technologies that have been deployed in ESPC projects. Let us talk about outdoor LED lighting, a number of these have been mentioned by Steve earlier. Outdoor LED lighting at the U.S. Army in Korea, where they were so impressed with that type of technology, they were – at least at the time I was associated with the project – trying to make the LEDs a standard for installations in Korea as far as exterior applications were concerned. It has also been proposed at the U.S. Coast Guard facility. We are going to be doing a case study at the Forrestal Building, and also including the scope of work at GSA Region 7.

Induction lighting is attractive because of the service life or useful life of the lamp ballast combination. That, again, is an exterior application. And there are a number of facilities that – including the Coast Guard project in Puerto Rico – that have included that technology in the scope of work.

And then I mentioned, earlier, laboratory facilities; again, a very high intensity facility, and energy dense facility. There are opportunities in airflow management and low-flow fume foods. A number of DOE National Labs have made improvements in those areas, utilizing ESPC contracts. And this picture on the right here is a picture of a Berkeley hood, a hood that was invented at Lawrence Berkeley Labs that is being tested. It is a low-flow fume hood.

[Next slide]
Okay, again, more technologies. And, again, this is just a sample. This is not a comprehensive list. I know there is a lot of this type of technology deployment that is done under the Navy's Technology Program. Those are not necessarily funded via ESPC.

This is focused on ESPC projects, but this is still not a comprehensive list of all new and underutilized technologies that have been deployed in ESPC projects.

We talked about the variable-refrigerant-volume technology at the U.S. Coast Guard-Puerto Rico. That is also being proposed at a large steam decentralization project at Tinker Air Force Base in Oklahoma City.

Again, we have the Turbocor chillers, which were magnetic-bearing and oil-free chillers. They have been installed at the USDA in Gainesville and NASA JPL, again; GSA Region 9; and being proposed at the U.S. Coast Guard facility in Elizabeth City and Portsmouth.

Roof-integrated PV. I talked about this being a thin-film photovoltaic that is fused to a cool-roof membrane. GSA Region 7 had that technology as part of their scope of work, and it was a very large installation at Luke Air Force Base. I believe it was a few ESPC task orders that incorporated that in the scope of work there.

And then LED airfield lighting. There has been a lot of development in this area. A lot of installations have included LED taxiway lighting and some of the other ancillary lightings at an airfield. In this particular case, the U.S. Coast Guard at Elizabeth City, what is being proposed is essentially for the entire airfield, including the runway lighting, to incorporate LED technology. That technology – I believe it's scheduled to be approved by the FAA this month, and hopefully that will be the case, at least for the runway application. The other applications, which have already been approved by the FAA, so that will be an interesting project if the timing works out on that.

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Some other technologies that have been deployed in ESPCs; we talked about the duct sealing at the House Office Building. That has also been done at the Architect of the Capitol.

Here you have biomass cogen and biomass boilers. You have to be careful when pursuing this technology. A couple of the risks that you should be cognizant of is, one is the fuel source – and you are looking at long-term fuel source here; if you are going to be doing this for ESPCs, you are looking on the order of 20 years – and the fuel price variability, which nobody really has control over that. So those are risks that need to be identified, again, and managed, associated with biomass applications. A number of DOE National Labs have done biomass boiler projects. The Savannah River project was one of the largest ESPCs ever awarded, and at that time it was a very large cogen and biomass boiler application.

And then we have, again, cool roofs, green roofs. There are a number of facilities here that we have already mentioned, and at the PJKK Federal Building in Honolulu, Hawaii. Again, as Steve mentioned, it is a great application when you have a sunny, hot environment.

[Next slide]
Okay, rounding out the technologies that have been deployed in energy savings performance contracts, and, again, this is not a comprehensive list. And a number of these have already been awarded. Some of them are still under development. You have wind power that has been done at a variety of locations. In fact, that picture on the right is a picture of the first wind turbine installed via an energy savings performance contract at the Bureau of Prisons facility in Victorville, California. Also, Pantex is exploring a large wind farm outside of their fence in Amarillo, Texas, via energy savings performance contract.

Spectrally enhanced lighting. Steve covered that. That is high on the Technology Deployment Matrix as far as the ranking is concerned. We talked about NASA. That is also being deployed at U.S. Army in Korea. And then GSA Region 9 has a number of facilities there you see listed that have incorporated spectrally enhanced lighting as part of an energy savings performance contract.

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Okay. That is it for the examples. Let me talk about resources that are available to support you in deploying these technologies into your projects. These are FEMP resources.

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We touched on the FEMP Deployment web page earlier. This web page has the Technology Deployment Matrix in both the Web-based as well as the Excel version that you can download from the web page.

Also, there is information on the Tech Deployment Working Group that Shawn Herrera chairs. That working group has a broader focus than the Technology Deployment in ESPC Working Group that I chair. Hers has a focus of deploying technologies into all federal facilities regardless of the contracting mechanism. Ours is primarily focused on using energy savings performance contracting as the contracting vehicle. And there is the URL for that website.

[Next slide]
And then there is a variety of training opportunities on the FEMP website. Steve had mentioned a couple of these. There is information on the demand on compressed air assessments, cool-roof calculators and how to calculate energy savings associated with cool roofs. Then the solid-state lighting information, and that is an excellent resource that is available on the DOE website on solid-state lighting that – CALiPER is like a *Consumer Reports* for solid-state and LED lighting, so I encourage you to access that. And they are all available on the DOE and the FEMP website.

[Next slide]
Other resources: Steve had mentioned GovEnergy that is happening in St. Louis in August. GovEnergy normally has a technology track associated with it, and a variety of experts in various technologies normally speak during that track. Also, you have all the vendors that show up to the convention centers that try to market their wares there. Some of them – well, I will not say anything. I will qualify that. And then also, you have the FEMP news that is available on the FEMP website that also has information regarding technologies.

[Next slide]
Okay, here is the contact information, and I guess I will turn it back over to Kathy for Q&A.

Kathy Hyland: Okay, we have time now for your questions, so if you would like to give us a call, you could speak live with Shawn or one of the instructors. And if you prefer, you can e-mail or fax in your questions, so we are open to answer your questions at this time.

I have one already ready. It is actually a two-part question. I am going to ask Steve and Mike both to weigh in on this one. The question is: Which of the new technologies, in your opinion, have the greatest potential impact for immediate implementation? Steve, let me start with you.

Steven Parker: Okay, thanks, Kathy. In the process of answering that, I almost want to think of what is the motivation for asking that question, and there are all sorts of motivations. I spent some time as an energy manager at an Army facility, and a big motivation is "I have to show something better, faster, quicker, sooner; I need to show results."

So with that concept in mind, I would say I would look to some of the lighting technologies that we discussed earlier, maybe something as simple as the advanced T8 light, or it may be something a little bit more advanced, such as the solid-state lighting. But the reason I mention lighting is it is done quickly on a project-by-project basis. They are inexpensive. That introduces the better, faster, quicker, sooner.

And the big thing is, the impact is visual. Everyone sees the lighting, and that gives a boost to the result of the energy program. Things that are done back in the mechanical room, only the technicians get to see, and it just does not have the boost that lighting does. So I would probably say you can look to lighting, but do not look solely at lighting, because you want to be able to take advantage of the synergistic effects. I do not like doing just only one thing, but that would be my response.

Michael Holda: Yeah, and I would agree with Steve. Lighting traditionally is one of the most cost-effective energy retrofits you can do, and it is one of the few energy retrofits that people actually can see and you can point to. And that makes a big difference. It is great to have high-efficiency motors in the mechanical equipment room, but nobody can see them and nobody realizes it. When you change out lighting, most cases somebody is going to discern something different, and you can have something to point to that people can visually see that improves the environment as well as makes the space more energy efficient.

Kathy Hyland: Okay. The second part of that question was: Which of these technologies do you think has the potential to give you the biggest impact for your investment? Go ahead.

Michael Holda: Again, I would say lighting because I guess on a watt per dollar invested; it is typically on the high end as far as energy savings is concerned. Steve pointed out that it is not the largest energy user out of all the technologies, but every federal facility has lighting. And so I would say it would have the biggest impact.

Kathy Hyland: Okay.

Steven Parker: The big concern I have with thinking of it that way is, what is great about lighting is it is generally lower cost and it gives you a great return on dollar. But I like marrying that with the heating projects and the cooling projects, and that way if you focus on the things that give you a three-year payback, then you can not do the things that require eight to 11-year payback. But when you merge them all together and say, "We are going to concentrate on this big building, my big energy consumer on the site," then you can get the whole thing done and maybe you can get it done with a five to six year payback, whereas if you only did lighting, then you could not afford the other thing. So marry them together and look at a holistic project.

Michael Holda: Yeah, that is an excellent point. We call it bundling projects, where you take a comprehensive approach to a building or a campus, if you will, and use lighting, which has a pretty good, simple payback, to leverage that savings to pay for your chiller or boiler improvements that may not be as cost effective in and amongst themselves. But when you take a comprehensive approach, the overall project has a good payback.

Kathy Hyland: Okay, great. Shawn, this one is directed towards you. Are some of the technologies more useful to certain agencies than others? Is there any relationship between a type of agency and specific initiatives for new and underutilized technologies?

Shawn Herrera: Yes, absolutely. That is the purpose of the matrix, which is for the agency to pick and choose which technology best fits their needs. Also, the overall scoring was based on the overall impact to federal agencies for widespread applications.

Kathy Hyland: Thanks, Shawn. I have a question from Tony Trentini, and this question is directed towards you, Mike. It says: How can I learn more about getting involved with the Technology Deployment in ESPCs Working Group?

Michael Holda: Send me an email.

Kathy Hyland: Okay, his contact information is on the final slide, so that was an easy one. Okay, the next one is directed towards Steve. Steve, lighting seems to have a very large focus right now. Can you tell us why, other than some of the things you have already mentioned?

Steven Parker: Well, in my speed-dating profile, we focused on 15 of the top 20, and because they were ranked based on the priority system that Mike Holda explained, there is a big emphasis on bang for the buck, and so they sort of floated up to the top.

But if you look at the overall list, the whole 50 list, lighting accounts for 13. Okay. But HVAC accounts for 22. And if you add envelope, because envelope is just a variant on HVAC, that is another 7, so there are twice as many HVAC technologies as there are lighting. Of course, water heating and other round out the top 50.

So the matrix itself is a very comprehensive list, covering a wide range of technologies. But as was said by Shawn, I would go through the technology, think about where you are located, your geographic region, what types of facilities are at your site, and then you can pick and choose the technologies that are most relevant to your application.

Kathy Hyland: Okay, great. Mike, this one is directed towards you. It said: We are thinking about an ESPC project. What are some of the best ways to include these new technologies in the ESPC? How do you go about doing that?

Michael Holda: Well, I would suggest utilizing the matrix. What you want to do is introduce that to the team early on in the project development process. You want to make sure your ESCO has a copy of that, as well as the members of the project team, so they can all be exposed to the same information there.

You can also utilize the resources that are contained within that technology matrix. There are subject-matter experts in there that you can contact to gain additional information about the technologies. If there is still some concern about risk or uncertainty associated with the performance of the technology, you could then, as I suggested, demonstrate that technology in kind of a trial basis or on a limited scale early in the development phase of the project, before you take the big leap and roll out that technology on a larger scale and on a larger implementation of it.

Kathy Hyland: Right. Shawn, I have another question for you. It says: What is the additional equipment or technologies that you believe may be added to the matrix in the future?

Shawn Herrera: Yes, we are looking at the DOE R&D technologies that are five years or less to market. And so we keep track of those technologies, and share information that we know to other agencies. The next technology that we put out, including on our matrix, this fiscal year – and I think Mike said next year, but actually this fiscal year – would be combined heat and power technologies. We are working with the Advanced Manufacturing Office within the Department of Energy. They are conducting R&D on CHP, and I believe there will be some improved efficiencies for CHP. And we also coordinate with the Building Technologies Program, and they have something called the High-Efficiency RTU Challenge. And we expect that the RTU would be on our list maybe next fiscal year if the performance data are good.

Kathy Hyland: Thank you, Shawn. Mike, this question is directed towards you. It said: How do you meet the challenges of doing your measurement and verification, your M&V, in these emerging technology projects?

Michael Holda: Yeah, like I explained during the talk there, typically utility programs have both a prescriptive or technology-based rebate program, as well as a comprehensive or whole-building approach or rebate program. So these technologies will normally either fall under the prescriptive or the whole-building approach rebate program financial incentives that are available. So that is how I would characterize it.

Kathy Hyland: Okay. Steve, this individual indicates that they are going to replace their HVAC system in the next couple of years. Do you have any suggestions for thinking about these technologies in light of a replacement?

Steven Parker: Well, if you are going be replacing the HVAC system, then there is certainly a host of things that make itself available to you at the same time. Certainly if you can minimize the capacity requirement of the HVAC system, you save not only energy dollars but you also save capital cost dollars.

So there is your opportunity, then, to look outside the mechanical room and see, okay, is there some lighting I can take advantage of? Is there a different way of doing PC management, which is also on the matrix; I believe it is like number ten on the list. So as long as you can turn off plug loads within a building, then you reduce that load, thereby you can buy a different size chiller, making it less expensive.

Then you can integrate that with, like, the Turbocor chiller that we mentioned on the cooling system, or instead of going to a steam heating system, go to a hot water system; integrate that with some of the building automation controls and take advantage of the condensing boiler opportunities, therefore getting a more efficient system as well as a smaller-capacity system.

So when you are jumping into the mechanical system, you really have an opportunity to look at the whole building all at once. And I guess my last little plug would be a great opportunity to look at the windows, because, again, the windows are 30% of the HVAC load. You can cut your mechanical equipment costs significantly at that opportunity and save even more energy.

Kathy Hyland: Okay.

Michael Holda: Kathy?

Kathy Hyland: Yes.

Michael Holda: Real quick. The last question you asked me, was that on financial incentives or measurement and verification?

Kathy Hyland: Measurement and verification.

Michael Holda: Okay, well, let me just clarify, because I gave a response that dealt with financial incentives, and financial incentives normally have a measurement-and-verification component associated with them. And typically, those that are familiar with M&V, you have your four options: Option A, B, C, and D. Normally those are going apply to these technologies. But depending on the circumstances and depending on the perceived risk, you may have to tweak those or modify those in order to make all the parties comfortable with that technology as part of the scope of work and make sure they are comfortable with the M&V methodology associated with it.

Kathy Hyland: Thank you.

Steven Parker: The other thing that I would add onto that – and Mike mentioned it early – is, if there is some perceived risk, either on behalf of the ESCO or on behalf of the site, before jumping full-bore into one of the new technologies, then a pilot on that is a nice way of everyone gaining a level of comfort. And the M&V approaches to a pilot, then, can be done usually fairly easily, measuring the effectiveness of whatever equipment's being offset. So you can study that little microsystem a little bit, and therefore reducing the perceived risk by all parties before going into the full project. So it is a nice approach to M&V, which is to look at pilots for things if you want to share the risk.

Michael Holda: Right.

Kathy Hyland: Makes sense. Shawn, this one is directed towards you. It says: I get a lot of vendors that are proposing new technologies to me. Can FEMP help assess technologies and tell us whether they are appropriate or not?

Shawn Herrera: Well, at the Department of Energy, we are developing a Technology Portal, which would gather credible energy savings for a certain technology product category. And that portal is expected to be ready February of 2013. And then later we will add other information from other agency evaluation programs, such as from the Navy Technology Program, the Army ITT program, the DOD ESTCP program, and the GSA Green Proving Ground and others, and gather that information and get that onto our portal so that agencies have an idea of what the performance data are for certain technologies and obtain the credible energy savings from that portal. This project is being developed by the National Renewable Energy Laboratory in partnership between FEMP and the Building Technologies Program.

Kathy Hyland: Thank you, Shawn.

Shawn Herrera: And hopefully that should be helpful.

Kathy Hyland: It sounds like it.

Steven Parker: Kathy, the other thing that I would emphasize to federal energy managers when they do get hit with something new is, certainly take advantage of your local utility. Energy managers should be on a first name, "howdy-doody" basis with their account representative, because most major utilities have their own energy assessment programs. Generally, it is internal, but if you had something you just did not know about, I mean, certainly you can call me, or you can call Shawn. But contacting your local utility, they will be familiar with the region. They will want to be familiar with the technology. So I would certainly jump on what information your local account rep can provide you.

Kathy Hyland: Okay. Last question. This one is directed towards you, Steve. It is pretty specific. Are the benefits available – and this is from Matt Rudder. Are the benefits available in wireless lighting controls, compared to hardwired control solutions, significant enough for the additional cost in an exterior application?

Steven Parker: Oh, wow, an exterior –

Michael Holda: Exterior.

Steven Parker: That is a new one on me. Okay. The big advantage of wireless controls is the reduction in capital costs generally in a retrofit application, although in even new construction, if you do not have to string wire, that is just so much capital cost that gets offset. The control itself is a little bit more expensive, but stringing wire gets even more expensive after a while.

I do not really know that much about exterior applications, although I have seen a few. Generally what you are looking at is savings in maintenance, in terms of ongoing maintenance of the control, but being able to control exterior lights in different fashions. I know there are a lot of municipal utilities that use a wireless-type technology to monitor the effectiveness of street lighting systems, so I am familiar with that. If it is added to the cost – I would really have to get into the specifics. Too many unknowns.

Kathy Hyland: All right, Steve, thank you. Thank you to everyone. Thanks to Mike Holda, thank you to Steven Parker, and thank you to Shawn. Let us go to the closing roll, and then we will return for some final comments.

Thank you. Please take a moment to complete a brief evaluation to help us determine what future training topics you would like FEMP to offer, and help us learn ways to improve these seminars. We would also like for you to complete a quiz to reinforce your learning, and then you can print a certificate for your training records.

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We would like to thank our instructors, Mike Holda, Steven Parker, and Shawn Herrera. And we would like to thank you for participating in this seminar. And we will see you on Thursday, May the 3rd, for Energy Security in Federal Facilities.

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