State Climate and Energy Program—State Technical Forum
Opportunities for Clean Energy in Water and Wastewater Treatment Facilities

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Opportunities to Reduce Energy Use and Greenhouse Gas Emissions in Wastewater Treatment Plants

[Beginning of presentation not recorded due to technical problems.]

Slide 28: Untitled

Jason Turgeon: …but they haven't really been maximizing the potential. Without a lot of work, most plants are being more efficient in the way they run their plants. And, by using more of their sludge as an energy resource, they should be able to take themselves to a net zero state in the grid. So most days they'll be plugged into the grid, but most days the meter will look just like this. It won't spin because they'll be producing all of their own power. And for those of you guys who are skeptical, it's almost already that way in Oakland, California. They are 99 percent self-powered. Pittsfield is going to be about 50 percent self-powered here in a year or two. We have several other plants here in New England that are getting close to that 50 percent mark. Stanford, Connecticut, has actually broken ground on a project that will be an energy exporter. They're actually going to make money by selling energy generated from their sludge back into the grid. So that's where we really want people to go is to this really modern, new technology, this really efficient way of treating water and then also using their waste products as an energy resource.

So that is my spiel. I will do some quick photo credits and then I will go over to my contact information, which I'll leave up for a second, and that's it. Are we going to leave questions for all together at the end?

Catherine Morris: No, I actually would like to open it up for some questions just for you Jason before we go on to our next speaker. I've actually gotten a couple coming in online, for those of you who want to use the Q&A option, we can read your questions online. But, let me open it up for any verbal questions. Again, I think the best way for us to keep the background sound down is if everybody uses *6 or your mute button if you're not speaking. And then you can unmute yourself with #6. Do we have any questions for Jason?

Matt Yule: This is Matt Yule from EPA Region 8. We just had a sustainable infrastructure workshop last month here in Region 8. It was sponsored by 6 and 8. I think that we don't necessarily have a point of contact as an initiative leader and as a champion for this kind of program in EPA Region 8. Do you all know if the regions have that? It sounds like there's some great success in the California example that you gave. Are others leading the way to help state partners and municipalities just jump into this and do this kind of thing?

Jason Turgeon: Right now we're seeing some. I was, I think, the first regional employee in the country dedicated to this. In Region 1 when our RA started eight years ago, he put in place an energy team. About a year and a half ago he created this position that I have, which is just to focus on water and wastewater. So, I got a head start. Shortly after I started, Region 9 started really looking at this. They have nobody working full time but they have more full hours spread out over a few people working on this than we have. So they're splitting it up and are seeing some really good results there right now. Other than that, I've received a couple phone calls from other regions but not much. Region 10 has hired a contractor to help them with some

benchmarking. Region 6 (Kansas City)—I've talked to somebody there about six months ago and never really heard back from them. Right now it's kind of up to the individual RAs to make this a priority or individual folks in the water or FI program at the regional level to lobby to have it be their priority. I met with the FI work groups from all of the regions a couple months ago, and we're hopeful that they're going to start putting this on a broader national scale. So, is that the answer you were looking for?

Matt Yule: Well, it is an answer, and I think we're starting our conversation with someone in headquarters that's not you and I'm forgetting his name.

Jason Turgeon: Jim Horn—he probably helped put on the workshop you did. I skipped that in the interest of time.

Catherine Morris: Yes, let's step in and see if they have some questions as well. We have one online that came in—Christopher Anderson—asking Jason if you have looked at the possibility of inline hydro for effluent, essentially using fluid flow as a hydro resource?

Jason Turgeon: We have but haven't really talked about any other renewable energy except for the sludge in this presentation because we really feel that the best opportunity is always efficiency, and the next best is to look at your sludge as an energy source because they're paying for it anyways and if you can do anything to destroy it and get energy, that's a double financial benefit. There's a very simple generic calculation you can do for inline hydro to see if it's going to work or not. It is almost entirely impacted by the head. So, even though you stand it over that outfall and go "Wow! There's a lot of water coming out of there." If there is no head—it's not falling a significant distance and getting gravity to help it along—then there's no payback on it because all your going to do is reach some of the energy that the pumps put into it to make it move really fast. So, it's much better in general at the drinking water side where they tend to have big drops in a reservoir somewhere and then they have a long gravity drop to get the water in the system and provide the water naturally. That we see very often. There are a handful of wastewater facilities that have their effluent falling 360 feet and then it might make sense, but if your effluent is only falling from 10, 20, or 30 feet it's probably not going to pay for itself.

Catherine Morris: Ok, I think we have time for one more question from the floor.

Dale Plumber: I have a question. This is Dale Plumber at the Minnesota State Energy Office. One of the things that I've seen with that in the state here is anaerobic digestion converting the sludge into biogas and injecting it into natural gas pipelines. Have you looked at that at all?

Jason Turgeon: I've read papers on it. I haven't seen anyone do it in my region. My first question is why would you not use that on-site? Why would you want to purify it and sell it to someone else? I mean your economics would probably be better to put it through a combined heat and power application and burn it on-site. There are people who are doing exactly what you're talking about but, like I said, the economics aren't going to justify it. You're going to build all this equipment and find out you're losing money and watching this long contract to the pipeline. I'd be very careful proceeding that way.

The other thing is if they don't have anything like anaerobic digesters, a newer technology—well, it's not new, but it's making a comeback from 100 years ago—is gasification, which completely destroys the sludge and you get a lot more gas out of it. You could probably, depending on how much sludge you had, run your plant and still sell some gas back. When you start changing your mind and thinking how much energy can we get out of this stuff and how can we completely eliminate our sludge disposal bills, the economics just completely change and you see some really cool stuff happening. One of the things that happened is keeping as much as you can on the primary side and not letting it get to the secondary because there is more energy in the primary side. So, you digest…because you're having less sludge to put through the books. Also, these benefits add up on top of each other. There's a whole field of it. My personal feeling is during the next 10 to 20 years every plant will have at least evaluated their sludge for energy potential, and a huge number will be operating that net zero way—connected to the grid but not actually drawing from the grid.

Massachusetts Energy Management Pilot for Water & Wastewater Plants

Catherine Morris: Thanks a lot, Jason. I'm going to turn it over to Michael DiBara, who is going to talk a little bit about some specific projects or adaptations in Massachusetts. Michael has been working as an environmental manager for over 15 years in the public and private sector. He's currently overseeing the Massachusetts energy management pilot for water and wastewater. So, he has on the ground experience and case studies that he can share with us. Michael I'm going to give you two options because we're up and running again. We can show you're slides if you'd like us to?

Michael DiBara: That would be great. Thanks, Catherine, and thank you all for listening in.

Slide 1: Massachusetts Energy Management Pilot for Water & Wastewater Plants

Michael DiBara: As Catherine said, I'm the project manager of this pilot. I just want to address that; it is an energy pilot, and we're working through the details right now.

Slide 2: Summary

Michael DiBara: Let me just give you a sense of what I'll be talking about. We'll talk about our role as MassDEP, and this project, and a little background on how the project was started, the main components, and—as Catherine said—we have some on the ground results. And certainly, we'll have time for questions and answers.

Slide 3: MassDEP's role

Michael DiBara: MassDEP's traditional role through the eyes of many of these water utilities has been that of an environmental enforcer. I put this picture of a grim reaper because I'm not sure if you heard, but there's an explosion going off there. But again that's really a perception of us trying to pull this off. I'm happy to report that that's not our role in this project.

Slide 4: Public Water/Wastewater treatment in MA

Michael DiBara: Our role is really more of coalition building, builder, and a facilitator. We're basically looking at how can we link and leverage all the multiple government and non-governmental pieces. Figure out how this can be linked, leveraged, and then leading a pathway to energy efficiency and sustainability. So, we're literally right at that brink trying to push these communities in the right direction. Again, we don't have all the answers and sometimes we don't even know all the questions, but that was the intent of this pilot to work through that.

So, background to give you an idea of some of the issues and put this into context. Over the course of treating 650 billion gallons of water and wastewater in Massachusetts, utilities spend a lot of money. We estimate in the kilowatt-hours, and our numbers coincide with national numbers, so in most utilities the carbon footprint associated with that activity is about a million carbons and air pollutants associated with it. So, that can give you the context of the environmental and economic impact.

Slide 5: Project Development

Michael DiBara: As far as the development, we were the very lead. What's unique about this program is that we brought together three levels of government. We're in partnership with a university, a nonprofit, every major electric and gas utility across our state, all with the full intention of helping 14 municipal water and wastewater facilities. And that's seven water facilities and also seven wastewater facilities. In total there is about $326,000 of in kind services that were brought together for this project.

Slide 6: Massachusetts Energy Management Pilot for Wastewater and Drinking Water Facilities

Michael DiBara: This map of Massachusetts shows illustrations of the 14 facilities across the state. To give you an idea of how we selected these and why we selected them, we looked at getting involved with every electric and gas utility across the state and were able to do that with this illustration. But we also wanted to look at the size of facilities (small, medium, and large), different treatment types, and facilities that are already under LEED control or are moving forward with LEED or energy management, so that they can become an example for other facilities. So, some of these facilities are at different levels of the process. We wanted to not just focus on the large plants, but we wanted to look at all different sized plants. It was tricky trying to figure out all the different pieces here.

Slide 7: Project Components

Michael DiBara: On the size of facilities, the Upper Blackstone wastewater treatment plant, which is a regional plant here in central Massachusetts, that treats about 30 million gallons a day versus in Falmouth is a 400,000 gallon per day plant. We did similar things on the water side. 5,000 customers and then there was 175,000. Again, we want to get all those different facilities.

As far as the major goals, we really want to reduce energy consumption and costs by 20 percent. Wanted to be aggressive on greenhouse gas emissions and the carbon footprint of these facilities. We wanted to develop a model for strategic utility and public funding to look at the financial side and see how all the different public, private and other resources could be leveraged as we moved these projects from planning assessment into the 'do' stage. The different pieces, as Jason mentioned, as far as the concept of this project was coming through, EPA had just come through with the benchmarking tool for water and we wanted to lower that. So, Jay provided the benching of all seven wastewater facilities. He actually went down there and met with them. So each of the seven were benchmarked, and six of them received scores because of the size of them. The next piece, on the utilities side, the investor-owned facilities and our sister agencies—the Mass. Department of Energy Resources. What's provided is energy audits to every facility—all 14 facilities. And the utilities agreed to basically provide up to $10,000 an audit to each of these facilities. And where we couldn't fund because of the systems benefit charge that they receive and they can only pay for electric audits and gas companies can only pay for gas. The Mass Department of Energy Resources and their auditing folks had just included wastewater as eligible, so we partnered with them and they filled the gap on the utilities side.

The next piece, as Jason mentioned, we not only want to look at energy efficiency but we want to look at renewables. We've brought in the Mass. Tech. Collaborative, which is a state agency that handles renewable energy development for the state. They collect a small user fee and it goes into a fund that is $25 million a year. What they provided was renewable assessment. They looked at all the 14 facilities and looked at the potential for solar, wind, hydro, and biomass. And again that's not been a role that they play; usually they just provide funding for the projects. Our concept was, what state resources can we bring that are very integrated and how to find a way to help these municipalities under our charge?

On the academic side, the University of Massachusetts has a renewable energy sector and as part of that they have a power program that agreed to provide two feasibility studies for us for combined heat and power free of charge. The last component with the financial assistance piece is we really want to look at the utility programs and the considerable amount of money they bring to the table and it's increasing now with the initial greenhouse gas funds. We want to take all those tools at the state level and put the gloves on and look at how these can help green the water and wastewater facilities.

Slide 8: Project Schedule

Michael DiBara: There are four phases of the project. Just under a year ago we had started a coalition which was internal and external. The secretary of energy and environmental affairs and our commissioner had a public announcement last December. The assessment phase—we did the benchmarking of all sites; two combined heat and power feasibility analysis were done; all the energy analysis were done; and the renewable screenings were all done within six to eight months. We're pretty much in the financial assistance phase right now with the ultimate goal of these projects being moved forward and being developed.

Slide 9: Auditing Recommendations

Michael DiBara: From the auditing recommendations we have from all the 14 facilities, it just shows conservation measures were identified and sure fitting of existing multipliers and variable speed drives can be a huge job. There were also process and optimization opportunities and some operational opportunities. It just gives you a snapshot of different conservation measures and opportunities that were identified at 14 of these facilities.

Slide 10: City of Pittsfield Wastewater Treatment Plant

Michael DiBara: I want to go through a couple examples that Jason mentioned. The city of Pittsfield had wastewater treatment facilities that has anaerobic digestion in the mid-60s and have gone through some upgrades. It's about 17 million gallons a day, and there are a couple energy saving upgrade projects that are moving forward. These are things that they've budgeted capital funds for, and we'll see some additional state assistance. Bubble aeration—they had a single speed mixing system. They were looking at going to dual speed, and looking at going to fine bubble aeration, which by the way costs five times as much. But, looking at the long term benefits of treatment, the higher effluent quality and more product control, they said it was a

good investment for them to make. That's going to save them about $141,000 a year, about 20 percent.

Then the next project that they're going to move forward on is they're upgrading their anaerobic digestion. They're putting in a 360 kilowatt microturbine to really capture the methane gas. On average they're up about 35 percent. On that project, they're looking right now at groundbreaking costs. Between those two, there's nearly a 50 percent savings of electricity. You can see the carbon reductions associated with that. What's interesting about this is, for those folks that are out there, the state revolving loan fund program is really the major financial assistance tool that we have for this whole project on the water and wastewater. Which, when you think about this, the city of Pittsfield had basically taken a project, some headwater improvement projects at their plant, they bundled them together with this fine aeration efficiency upgrade and the anaerobic digestion upgrade on one SRF application. I think it's close to $6 million and it had been approved and that's the package of leveraging different resources. At least in Massachusetts this is the first time this has ever been done, and our program has provisions to make these upgrades available. Any efficiency or renewable projects that can be bundled into the loan is eligible.

Slide 11: Falmouth Wastewater & Long Pond Water Facilities

Michael DiBara: One of your leaders here. They've been working on a 1.5 megawatt turbine for several years. Just last summer they've gone off the bid; it's going to be a 1.5 megawatt, immediately owned turbine. It's going to take care of 100 percent of the energy needs at the plant. Through some favorable legislation our administration passed, they'll be able to sell that. So, they're looking at revenue generated of $500,000 per year from this turbine. It went under construction this year. There was also a small water plant. It was part of our announcement ad; it's one of the oldest water treatment plants in the country and they installed variable speed drives.

Slide 12: Greater Lawrence Sanitary District Wastewater Treatment Plant

Michael DiBara: Greater Lawrence Sanitary District. This is a large plant again. Variable speed driving. These are some numbers from the audit. It is a large pump station that potentially could benefit considerably from installing a variable speed drive. About a 20 percent savings at the pump station, and they are also looking at saving about 31 percent with some sludge drying and ventilation improvements. What's interesting about this, on the other opportunities for hydro—I know someone had mentioned earlier about hydro in the outfall opportunity. There is a potential here based on the renewable assessments that we did with a 100 kilowatt turbine, a 60 inch outfall, so were' looking at potentially—there is more work that needs to be done on that—but there is the potential there for a significant hydro opportunity at a large wastewater plant.

Slide 13: City of Worcester Water Filtration Plant

Catherine Morris: Michael, we're over a little bit, and I'm wondering if we have one minute left, want to hit the high points?

Michael DiBara: I think basically what it is what we did is put all the pieces together for the municipalities, and they're very busy trying to figure out their regulatory requirements. We brought all these pieces together in a very coordinated and targeted way and get them moving in the right direction or kick start what they've already done. We're in a financial assistance stage here, and the bottom line is that we're looking to see what else we can do, but these are certainly some really tangible projects that I think are setting the stage for all the plants across the state. If we skip forward three or four slides here to show the total opportunity.

Slide 16 [3 slides later]: Summary: Energy Savings Opportunities

Michael DiBara: I'll close with that real quick and open it up to questions. The total: There's about $34 million worth of investments when we look at energy efficiency. And the energy savings here is about $2.8 million in the carbon reductions. The total right now with the projects that are already moving forward and made that commitment is $9 million in total wrapping up it's about 14 percent in savings and CO_2 reduction. It's pretty significant and very valuable for the municipalities.

Slide 17: Building a financial assistance model – the hole in the donut!

Michael DiBara: Do we have time for one more slide on the financial assistance? Just real quick, this has been a learning experience for us and we've identified the importance of auditing and the renewable assessments and the opportunities, so structurally there's a lot of things in place but really what's missing is the financial assistance piece. But we're hopeful, as we go through this, that a model is based on taking energy savings from these plants, utility money that is available, and adding other incentives to that whether its government incentives, so that the cost of that could basically cover the project finances. That's in essence looking at it from a profession basis, so that it would be an opportunity lost if that business model, that economic model is too convincing to not go forward. This is something that I think is really important, and we're looking at how can we really make this model work.

Catherine Morris: Thanks, Michael. We have a lot of questions that are coming in online. Let me just throw out one for you to start out. How many full time employees do you have actually working on this pilot project?

Michael DiBara: Primarily myself, and I do have several colleagues that have helped me with technical support. Primarily we start off with a blank piece of paper, work its way all the way up to the evaluation, all the way up to the secretary's office.

Catherine Morris: Other questions from the participants? Again, I'm hearing some typing. Hit *6 if you're not speaking. That would help us all.

Questioner: Yes, on many of your projects you seem to have somewhere in between several thousand dollars and a couple million dollars that you invest and your return might be substantially small in that. What is the range of break even on these projects?

Michael DiBara: Some of these can actually be one or two year payback, others on the energy efficiency side on average can be seven or eight years. On the solar side it's considerably higher, probably about 20 years. But on the biomass project in Pittsfield it was approximately five years. So, it varies but if you bundle some of the higher payback projects with some of the lower ones—that's what Pittsfield did and it allowed them to go forward with the fine bubble aeration. Even though they could have went to two speed and actually made money right off the bat, they were looking long term. It's looking at all the opportunities and bundling them all together.

Questioner: How did you determine the CO_2 reductions? Was there measurement before and after, or is that just a calculation?

Michael DiBara: That was a calculation based on the kilowatt-hours avoided.

Catherine Morris: One of the other questions that came in online is what kind of model you might use or do you know of models that you can use to evaluate the costs and the revenues?

Michael DiBara: I'm not sure. What we did is literally looked at the actually estimated costs and anticipated savings and then from there we had actual estimates based on the retrofitting or the upgrades. It was very project and site specific and equipment specific. I'm not aware of any additional model.

Jason Turgeon: Mike, can I jump in? We have on the ENERGY STAR Web site a fancy spread sheet called the cash flow optimizer and it's designed to answer some of these questions from different tactics. You put in how much you're spending on power and how much power you think you can save and it will tell you how much money that translates to. Then you say, I want to keep some of that for immediate cash flow savings and spend the rest on financing over X number years and X number percentage rate. It's a pretty simple calculator. You can say we're spending $100,000 a year now and I want to save 25 percent of that. That's $25,000, we'll keep five, but 20 towards financing, and over 10 years at three percent interest that will give us whatever it works out to—a quarter of a million dollars—that you can spend on energy efficiency improvements. It kind of flips the whole equation on its head.

Then another thing. Mike, who's done a great job of working with the electric utilities who, by and large, fund efficiency items through a line item surcharge on your bill, it goes into a big pot of money and then the electric utilities collect that money and give it back to their customers. If you have a project that doesn't have a good enough payback, you'll help buy it down to a payback that's attractive.

Slide 19: Questions?

Catherine Morris: And one of our questions, Michael, was how do folks get in touch with you. So we just put up your last slide with your contact information for everybody.

Michael DiBara: Okay, great.

Clean Energy Opportunities at Water/Wastewater Facilities

Catherine Morris: With that, I do want to turn it over now to Joe Cantwell. Joe is our final speaker, and he's with Science Applications International Corporation (SAIC). He's a consultant, but his main responsibility is as an engineer with the Wisconsin Focus on Energy Program, specifically with their water and wastewater cluster program. He's going to talk a little bit about what they're doing in Wisconsin. He's going site to site performing a lot of the site audits, making a lot of decisions or recommendations about what the efficiency opportunities are, and he's going to share some of those case studies with you. So Joe, we're going to go ahead and show your slides for you so just tell us when you want to forward them.

Slide 1: Focus on Energy

Joe Cantwell: Sounds good. Michael's polar bear looked appropriate for today because where I am its minus 25 to minus 30, so something like that would be very nice. As we said on energy and energy efficiency, I'll present the information that will focus on energy program waterways water cluster.

Slide 2: Presentation Outline

Joe Cantwell: I'll talk about the program, our approach, implementation, some of the real world comments we've received back. We'll talk about our best practice manual along with another tool that's out there, and likewise get into questions.

Slide 3: Focus on Energy: A Part of the Solution

Joe Cantwell: So, the Focus on Energy program in its entirety is a public private partnership offering energy information and services as part of a statewide energy efficiency and renewable energy project. It is overseen and controlled by the state's public service commission and is referred to in the end of Michael's presentation. The program is funded by the benefit package on the bills, about 1.2 percent of the rate. The particular money goes to a fund that was run by each electric utility in the state. In 1999 the state saw that they wanted to combine and have a uniformed program for the entire state. They wanted to focus on energy for the entire state. In 2000 to roll out a statewide program, they initiated the beginning of the water/wastewater program. They wanted to have something available for municipalities and private industries as well that would help them in an area where initially there seemed to be very little attention or limited attention paid to. So our program is set up for obtaining resource acquisitions. They also promote market transformation and increase awareness for operations personnel for energy.

Slide 4: How Does It Work?

Joe Cantwell: One of the questions is how does our program work? As indicated, we do have the funds. So, we do provide prescriptive and direct incentives. Prescriptive grants became more available this past fiscal year of the program. We did provide some direct values for VFD drives, for motors, for the type of units where there was a dollar value per unit that you put in. There are custom incentives similar to the presentation that Michael was doing. Some of his examples of

the projected savings—that we provide so much money per kWh or per kW on a project where savings have been identified. Again, it's an incentive branch. So, it's partial funding somewhere between 10 but not greater than 30 percent of the energy efficiency components of the project. Not the entire project cost, but the components that relate to energy efficiency. There's technical support. That is principally our cluster, which do perform the surveys. We call them energy surveys, not energy audits, because we want to learn in a short time frame what's the plant doing; what's going on; what are the opportunities, and get the large low hanging fruit captured and move forward from there. When we do provide a report to them, if the municipality or the industry say, "Yes, that's a good idea" or "We think we want a refinement of the numbers or some other additional studies," we also do fund 50 percent of the feasibility study to take that energy saving opportunity and hopefully ratchet it down closer to the cost. We include other alternatives, just so they're comfortable doing it. And also information and education. Part of that was development of the best practices manual. In 2002 that got started. There didn't seem to be a lot of documentation out there available to assist people in energy awareness, energy efficiency, and energy management. We have presented a number of classes in the state to personnel operations groups, as well as working with universities on some of their webinars and seminars as well.

Slide 5: Energy Baseline

Joe Cantwell: As far as education programs and awareness, we want to get out to people to learn and understand baseline and benchmark. What they are and what the difference between them is. When we do a site review, we do talk to them and say "Ok, your baseline is what are you doing today and your benchmark is what you want to get to." There are some benchmark tools out there. As stated earlier, the EPA program, there is a tool that will give you some ranking of where you're at and how and where you should improve—what are the values.

One of the education styles was at probably well over 90 percent of the people in compliance are focused on their duty of meeting effluent limits or water quality at the water facility, but they rarely ever see their power bill. So they're unaware of what they're spending, or how they're spending, or how they're using it. We're trying to get to that point by getting them to understand baseline and get to where they can go with it to benchmark.

Slide 6: Water/Wastewater Approach

Joe Cantwell: As I indicated, our approach is a site survey, which is basically a walk-through. What is going on in your facility? There is particular data that we request to get an understanding of how the facility is loaded—what they're doing, how they're operating it. We have found out some clients, the majority of treatment facilities, are operating at about 30 percent of what they're designed at, yet the majority of equipment is operating. So there's those types of efficiency opportunities available. Generally, every operator knows where they could save if they had funds or if they had someone to defend it or design it for them. Our assessment approach is to identify what they can do to operate more efficiently—possibly change equipment, possibly a change of operation—and we provide them a short report so they can take it to their decision makers and provide them that support.

Slide 7: Assessment Approach

Joe Cantwell: We really look at the major energy uses first. We address the operations. Some of the key questions I always ask operations personnel: What's giving you problems? What's giving you mechanical problems? Usually a machine will have problems because in its operation is not working efficiently at what it was made to operate at. So it may be cavitating, it may be being pushed to hard, too little, anywhere in between. And that's always something that gives us focus on identifying what kind of problems might be.

Modify and adjust operations. Again, getting back to…operate what you need to treat what's loaded, not just as they're running. It's always important to identify the interests of the operator, administration, or management because if they're not interested they're not going to go forward, and it's just not going to happen. You need to identify, promote, or push the energy advocate on the site. Then there's always the acceptance of the assessment of the report because that's what leads to implementation. As stated earlier, you can make as many reports, go to as many sites as you want and you can produce as many reports as you want. Nothing really hits the road until it's implemented. That's how we do it in the approach and installations we've had to really show that.

Slide 8: Energy Savings at Northern Moraine WWTF

Joe Cantwell: This is a smaller facility, actually a small mechanical plant. After improvements were made here—recourse bubble, 100 horsepower blower and some other air digestion ramps 7/24 all the time—made recommendations. They changed the fine bubble system on the 20 horsepower blower and, while meeting their effluent limits, dropped their energy consumption 60-70 percent.

Slide 9: Village of Palmyra WWTF

Joe Cantwell: This is an aerated lagoon. Two aerators, change that to fine bubble, floating tube. They received a letter from their utility asking them what happened because the utility said, "You just dropped your consumption 50 percent. Was there some breakdown or some operation you're violating?" No, we just became more efficient.

Slide 10: Barriers

Joe Cantwell: So what are some of the barriers? Any good program has to be pushed to be put in place. In this case, efficiency in energy. There's nothing that's codified and there are not rules and rights. It has to be the proaction of the people understanding and moving forward. These are some things people ask: It's not mandated, so why should I do it? My plan works, why change it? Who gets the benefit from it? Why should it be my job to save energy? I'm already running a water plant or a wastewater plant, I'm meeting my effluent limits, why do I have to do more?

The next two bullets about not seeing utility bills. Most smaller facilities when you look across the board, I know Massachusetts and most of the Northeast is the same. I know NYSERDA/New York's the same as Wisconsin—85 percent of our plants are 1 MG or less with about 80 percent

half MG or less. We have some real big ones, but the multitude are small ones where those people have many opportunities and that kind of savings for them is the same as the percent savings for the large guys. Small facilities saving $10,000-12,000 as much as the big guys saving $100,000. There's a lot of value there. There's always competition, and there's always energy efficiency. As we've seen, it is looked at as a one time action and we need to get over that barrier, and say, "No, that's continuous savings."

Slide 11: Energy Management in the Real World

Joe Cantwell: As they call it, energy management in the real world. What are the kind of responses you get from folks? "Bet you can't find anything at my plant." That comment actually came from someone who had just started a brand new plant, it was only there 90 days, and it was a smaller facility. But, one of the items that he missed was that when they installed the blowers for the aerobic digesters, they put on the 100 percent instead of the 60 percent and after the first year he save $8,700 on his electric bill. So, we did find something that was brand new.

"I know there's not energy savings available at my facility because I already changed to fine bubble." Well, that's common, but that's only one component. You have to look at systems. And I know Michael was talking about that in their pilot. You know, you have to look at the system. It's not just change the blower, just change the diffuser, just change the control. You have to tie the system together because everything dependent on each other.

"The mayor told me I've got the grant." "I've got to pay for everything." "I've got to run it." These are true responses that I've received. "It's not required why bother." So these go along with barriers. Just human nature to go through this to get the practical stuff put together.

Slide 12: Water and Wastewater Energy Best Practice Guidebook

Joe Cantwell: As I said, we developed and were the author of this particular text: Water and Wastewater Energy Best Practice Guidebook. It presents many things similar to the EPA book. It came out in January 2008 as well. Some of the things we did: We have three components of the book.

Slide 13: General Facility Energy Best Practices

Joe Cantwell: We have general best practices—these are the headings across in a little different style than the EPA manual. EPA manual is very good, very great for how to get everything started and what's stuff for—how to get a good start. I think this will supplement these descriptions that are in the manual. Why look at these? What are the general level of savings you can obtain?

Slide 14: Wastewater Treatment Energy Best Practices

Joe Cantwell: Likewise, the best practices in wastewater here. It's not a design manual. It presents you with best practices and ideas of why you should do this. I've had some people say

that what they want to get into is covering all the information that they ask the designer to do, while they're putting the system together.

Slide 15: What We Learned with Focus

Joe Cantwell: What we've learned. Again, awareness in energy management. They know electricity but not a lot on energy. We have to work on that item. Knowledge of energy use is critical. The savings are long term. We have to get that part across and also publicize the need for energy efficiency.

Slide 16: What We've Also Learned with Focus

Joe Cantwell: Normally, we've seen where a municipality leads and gets something energy efficient, that leads the private entity into it. We've also learned as the program has gone through the past eight years that you continually have to overcome the barriers. Designers have to become aware of the value in it. Agencies need to address energy efficiency as Jason talked about. EPA has been doing it earlier; they're doing it now; they're doing it more; they have to continue to do it.

Slide 17: What is THE Next Step?

Joe Cantwell: So what's going to be the next step? This is a chart from our best practices manual. This is the result from about 80 sites we had visited. What we identified was 20 to 50 percent savings across the board on savings as a best practice benchmark. Not necessarily 100 percent benchmark. This is similar to ENERGY STAR where you get the 25th percentile—25 more than you, 25 less than you—so these values can get even better than this. But, these are still good targets and these are still what we've seen. I guess another point here is irrespective of the type of system, there are savings. So, with that, there's questions.

Slide 18: If You Have Questions, Please Contact

Catherine Morris: And for those of you who would like to have Joe's contact information that's his last slide. One of the questions that popped up while you were talking is what specific benchmarking tool were you referring to in your presentation?

Joe Cantwell: The benchmarking tool I was referring to is what Jason had referenced in his. The benchmarking tool that's out there right now is the EPA one. The other benchmarks that are available if you want values is…look through some of the EPRI publications. They have benchmarks, and Pacific Gas & Electric has some values too.

Catherine Morris: Thanks. We had another question asking how to get your best practices guide and I just want to direct everybody on the call to the background document and a resource list that is posted on the Keystone Web site. It was in your login chat. The link there is also at the bottom of your agenda, which we can show you again. But, if you go to Keystone… oh we're showing you the link right there [now showing agenda slide]. Additional materials for this call

can be found at, and if you go there you'll be able to download the presentation materials as well as the background documents, all of these resources. Other questions for Joe?

Questioner: Yes, just one. The market transformation that you alluded to at the beginning of the presentation, is that the implementation of new practices?

Joe Cantwell: It is educating operators, educating vendors to sell the energy efficiency, telling the operators that when you are developing your replacement program that you don't just replace in kind, you look at what's energy efficient. The other transformation is for those updating their water code, and previously it might not have had the term energy-efficient or energy efficiency in it. We've been sitting on their meetings and getting that terminology into their design so they do begin looking at it.

Jason Turgeon: To that I would also add educating regulators and the people who are on this call. As a regulator, you have a lot of sway over people. Even if you can't write the efficiency, you can certainly encourage it and be sensitive to it when you're looking at technology.

Joe Cantwell: The only comment to that I would add is if you have the desire to look at our best practice manual in the appendix, there is basically a review of it from the DNR that I know states like to have from the reviewing agency or regulatory agency that says they encourage it. They do admit that it's not codified, so they can't require it. But they do encourage it as long it doesn't adversely impact the water quality, which utilities agree with. One of the values of that was that on the committee that helped develop the manual, we did have regulators sitting on it, so they were aware from the start. In fact, it's really fun because we have DNR people recommending communities to our program and say "Hey, be sure to look at this as you're putting your program together."

Questions and Answers

Catherine Morris: We've had a number of questions come in both for Jason, Michael, and Joe about the payback issue. One of the questions that just came in is: Are there incentives that get utility managers to look more at the long term, facility-wide savings, rather than the eight year payback that you referred to Michael?

Michael DiBara: I think that municipalities are a little different compared to a businesses, so they're in it for the long term. They don't necessarily need to go with a two year payback, but if they can bundle multiple projects together with high and low payback and look at getting the best financing possible. If they can literally look at it from a cash flow basis rather than what's coming in, what are they spending right now, and what's going out. If they could literally look at it from that model, that's what we're trying to encourage. It's not really based on payback. It's about how much money is going out right now and could you basically spend the same amount and pay for those upgrades that can save you money in the long run.

Jason Turgeon: One thing we sometimes talk to people about is thinking of it more as an annuity than as a payback. If you buy a piece of equipment with a 20 year lifespan and it takes three years to pay for itself, the next 17 years are putting money in your pocket. That's one of the things we talk to people about. We also point out to people that water and wastewater plants don't generally go out of business, so they should be thinking very long term. It's a harder sell if you're going to an industry such as a paper mill that might not get any business for six months, that something with a one year payback would look very good to them.

Joe Cantwell: I guess my comment for the Focus Program is for industrial projects you have to have a four year or less payback period. Municipal we allow up to 10 years just to acknowledge the long term, non-moving. I guess I would say most of the the aeration system—controls and diffusers—are probably a three to five year payback. We try to find incentives to make that less. I have municipalities that have taken on things with a 10 or 12 year payback knowing that they're not going anywhere. That's based on the static electric unit cost or charge, and we all know that's not happening. So they look at it and that 10 year that you projected on the static cost all of a sudden is back to eight or seven or six. Just, you've got to pay for it quickly.

Catherine Morris: We also had another question about the Portfolio Manager. Jason, you might be able to answer this. Is Portfolio Manager also able to demonstrate the emission reduction for air quality attainment purposes?

Jason Turgeon: Not for attainment purposes as far as I know. You can use it to demonstrate greenhouse gas reductions, but of course right now those aren't something we have standards for. But, I don't think for the NO_X and SO_X and particulate matter stuff that we have capability built in, unfortunately. There may be a way to kind of back up some numbers, if you really investigate it, but I'm not sure how we would do that.

Catherine Morris: Let me just take one more question from the group verbally before we close out today. Well, then let me turn it over to Julia Miller to talk about the next one. Thank you very much. I do apologize for the technical problems we had in advance. That's the first time in five

years that our whole internet system went down before the start, but thanks Julia for pulling us out.

Julia Miller: Yes, I'll just reiterate Catherine's sentiment and thank all the participants for joining us. Thanks for being patient through the technical issues. I also want to thank the speakers for all the time they spent putting their presentations together and spending time with us today. Next month's call is going to be on clean energy workforce development. It's looking like it will probably be February 24th. We'll have that date confirmed in the next week and we'll send a notice out. For future calls, we're tossing around a couple ideas here at EPA. We're thinking about doing a call on lead by example programs in states. Another idea, this would be after the stimulus package is released, what the stimulus package means for state clean energy programs. Another idea is doing a call on quick start energy efficiency programs. Somebody else suggested implementing climate action plans. We're also looking at energy building mandatory energy disclosure programs. And we're always open to suggestions. Please let us know if you have any other ideas, or contact me or Catherine if any of the items listed…if you have any priority or preferences, we'd love to hear from you. Thank you very much.

Catherine Morris: Alright, thanks everyone. We're signing off.