Recorded Voice: The broadcast is now starting. All attendees are in "Listen Only" mode.

Bruce Lung: Good afternoon and welcome to this July webinar. My name is Robert Bruce Lung and I'm with the US Department of Energy, Better Buildings, Better Plants Program.

I'd like to welcome to this special edition of the Better Buildings webinar series. In the series we profile the best practices of Better Building, Better Plants Challenge and alliance partners and other organizations working to improve energy efficiency in their facilities.

Today's webinar entitled "Mission Complete; Outcomes from the Challenge to Develop a $100 Wireless Submeter." We'll present results of the DOE's low-cost wireless metering challenge that engaged electronics manufacturers to produce a cost-effective, accurate and wireless system capable of measuring the various electric loads within a building and wirelessly communicate the data.

On May 15, 2017 the DOE recognized wireless technology company, Meazon, for their exemplary performance in meeting the specifications. Although Meazon is the only company to meet the specifications so far the performance specifications stand as an opportunity for other organizations to enhance the market for low-cost metering devices.

Today's panelists will discuss the challenge and the wireless submetering technology that won the contest. As many of you are aware submetering is very important in order to accurately measure where energy is going within a building or a manufacturing plant. However, traditional wired submetering instrumentation may not be doable due to inadequate cable infrastructure and limiting input-output availability. This is why wireless submetering devices can be a very good option.

In recent years the submetering technology has become much more sophisticated and easier to install in remote locations. This makes it possible for a wide range of building owners, plant managers, and maintenance staff to understand where they are using energy and to help keep their energy costs inline.

In today's webinar we will discuss all these benefits. We will also have a couple of polls to help us understand how the markets are

approaching this topic. So we do ask that y'all participate in these polls.

Lastly we will wrap-up with a question and answer sessions and remind everyone about some upcoming events with Better Buildings.

Before we get started with our presentations I want to remind our audience that we will hold questions near the end of the hour. Please send in your questions through the Chat Box on the webinar screen on the right side through the session and then we'll try to get to as many of them as we can. Also we would like to remind you that the session will be archived and posted to the web for your reference.

Next slide please.

So today's presenters are going to be presented in two different batches, myself as your moderator and then Anne Wagner with the Pacific Northwest National Laboratory. Before we get to Anne's presentation we're going to start our first poll right now. So Question Number One: Have you ever submetered? Please select one of these answers and we'll give everyone about 10 seconds.

Okay and we have the results so far. It looks like 52 percent said "Yes" and 38 percent said "No." Great, thank you very much.

Next question. The next question is: Are you considering submetering in your facilities?

Ah-hah and we have an answer so far, 97 percent of y'all are saying "Yes," wow excellent.

Next question please. What is the biggest obstacle in implementing energy submetering? So please select all that apply.

Okay and we have some results so far. Just a very small number don't see the benefits. Some people have said that submeters are expensive and big. Hopefully you'll have a different understanding after this webinar. Installation and effort and other costs are high. I would argue that this is actually a real concern especially if you need to have an electrician in and install the cable infrastructure and all that. Energy monitoring applications are expensive. That's probably more true in the past. I think the cost is coming down. That was part of the Challenge to see if we could make it more cost effective for folks and I think you'll gain a better understanding of

that after today's webinar. And then lack of expertise and resources to analyze the data. That's where we come in. We're providing these webinars and we're developing new resources. We'll show a couple of websites about the DOE's Challenge and where you can get some more information on this.

Okay so next question please. Okay so that was the first poll. I want to thank everyone for participating in today's initial poll. Today now I'm going to present Ms. Anne Wagner from the Pacific Northwest National Laboratory.

Anne is an energy efficiency engineer with PNNL in the building sciences area where she supports energy technology development and implementation projects. While working with the US DOE's Building Technologies Office she has been involved with several of their challenges, including the wireless metering challenge and the high-performance rooftop unit challenge. She also supports several of DOE campaigns and programs aimed at increasing new technology application, including the interior lighting and the lighting energy efficiency in parking lot campaign. Anne additionally provides support to the US Army Reserves Energy Resiliency Program as a mechanical engineer. Anne has worked over 25 years of experience in the buildings industry. Prior to joining PNNL Anne worked with Utility Energy Efficiency programs and in the commercial building HVAC arena.

Anne go over to you.

Anne Wagner: Thank you Bruce. Today I'd like to share with you a bit about the wireless metering challenge effort. So you can go ahead to the first slide please.

In my portion of this webinar I'll provide some information regarding the objective of the project, giving you some background, as well as discussing the process and results. I'll conclude by summarizing several of the lessons learned from this work. Next slide please.

$120 billion, that's the cost for electricity consumption of commercial buildings in 2012. This is a screenshot of the CBECS data. It helps gives context when we discuss the Better Building Alliance's focus on reducing energy cost. Next slide please.

First I'd like to highlight the fundamentals for reducing energy use. Our focus with the wireless metering challenge was on the measurement of electrical energy consumption. That no matter

what energy you're considering you need some essential information. You first need to establish a baseline so you know your starting point. Whether you're using actual data from measurements or creating a simulation your first step is to acquire data. The second step is to analyze your information. Finally in order to reduce energy use you must take action. Next slide please.

Today we're addressing the type of metering commonly referred to as "submetering." This slide provides the GSA definition that "Submetering is the application of metering technology below the level necessary for utility billing." In other words a submeter can measure the energy consumption of a whole building, at the panel level, at the system level, or even at the device level. Next slide please.

How did the wireless metering challenge get started? Well several years ago the Department of Energy recognized the benefits of submetering system. These include getting information on energy use, not only to determine baseline operation, but to see the effect of any system changes or adjustments. They also realized the benefits of continuing to monitor energy use to confirm persistence of savings.

DOE installed submeters in the Forrestal Building and had a bit of a sticker shock. They determined that the installation of each submeter cost thousands of dollars. DOE realized part of this cost could be attributed to the hardwired communication system. With a requirement to reduce energy use in federal buildings DOE recognized that the high cost of installing submeters could be a concern across federal agencies and so the wireless metering effort began.

Initially we talked to representatives from many federal agencies to determine their essential metering requirements. Additionally, we received input from the private sector. Then a specification was developed. Next slide please.

On June 16, 2013, the Wireless Metering Challenge was issued. This challenge included three primary requirements, low cost, measurement of electrical energy, and wireless data transmission that would not use any existing building networks. Next slide please.

Following the launch 30 manufacturers indicated interest in participating in the challenge. Of those 9 submitted product information, including feature descriptions and product cost. Of

those, 3 companies provided information that both met the technical requirements and offered equipment that is close to the cost target. Two manufacturers provided the required documentation for accuracy testing and UL certification. Then 1 company moved to the final stage, which was a testing of their system's data transmission within an actual building. Next slide please.

The intent of the spec was to just require features that were essential in order to keep the cost down. In other words we developed a specification that would incorporate the technical requirements needed to support energy management in real working environments while balancing cost considerations.

This table we've noted several of the key system specifications in the left column, with the primary benefits of those requirements in the right-hand column. For example the spec requires measurement of watt hour energy consumption for a three-phase circuit to provide actual measurement instead of just calculating the energy as some metering systems do. The requirement for the reading accuracy of the device, coupled with the sensors allows a deviation of 1 percent compared to a revenue grade meter that only allows 0.2 percent deviation. While the 1 percent requirement is not as tight as a revenue grade it should be good enough for practical energy management. Also this allows for a lower cost than if the requirements for revenue grade accuracy.

Data security is important so both data encryption using at least 128-bit Advanced Encryption Standard and a communications network that is independent from any facility's network are spec. Next slide please.

To avoid being limited to one brand or provider an open communication protocol was required. Several requirements helped minimize system complexity. These include requiring that the meter gets it power from either the system being monitored or the panel it's connected to. Also, only one-way communication is mandatory. Next slide please.

Once all of the documentation showing compliance, including the accuracy test reports and the UL Certification was accepted arrangements for the In-Building Communications Test began. The test was run at the GAS Headquarters in Washington, D.C. Next slide please.

The testing entailed the installation of one meter with current transformers at a lighting panel on the second floor of the building. A second meter with three current transformers was installed at a lighting panel on the fourth floor. The slide shows one of the panels and a meter during installation. With the sensor and meter installation an electrician is required and all safety procedures should be followed. Next slide please.

The top-left picture shows the repeater. These were installed to transmit the data from the meter to the gateway. The gateway served as the collection device for base station and it's shown in the bottom left-hand side picture, as well as circled on the right-hand side there. The gateway was then connected to the user device which is that computer. The metering system was setup to provide measurement at 15-minute intervals for a two-week period. We then analyzed the data to determine the communications success rate.

The specification required that at least 95 percent of the data be successful transmitted over that time period. The communication success rate for the system that was tested was 100 percent. Consequently it exceeded the requirements. This resulted in a system successfully completing the challenge. Next slide please.

The successful technology company that completed the challenge is Meazon. You'll be hearing from them shortly. Next slide please.

To wrap this effort we worked with a variety of folks on many tasks. It was an interesting experience and we learned a lot. I'd like to share just a few of the key lessons from this project.

A successful project requires a champion and the wireless metering challenge was no exception. Even though the DOE project lead changed several times over the years all of the DOE leads consistently understood the potential of this effort and supported it fully. This support made the success possible.

I also want to recognize the strong support that we received from the GSA staff at their Headquarters Building. They too realized that the benefits of the wireless metering. They were extremely helpful with the coordination and implementation of the In-Building Communications Test.

Manufacturers were reluctant to change their existing products. The first rounds of submissions included feature-rich products which significantly exceeded the price target. When we reviewed

the equipment information we advised that we features exceeded our requirements and the product could be modified with some of those features removed to lower the price point. However, the companies decline this option.

A common thread with the both the large and small companies was the continuous determination of what direction they wanted to go and what they wanted to focus on. In some cases the pursuit of wireless submetering was put on the back burner so that other business opportunities could be explored. Everyone has to consider their time, resources, and objectives. As you know this project has taken several years. Need I say that patience and persistence were essential?

Over the course of the project companies faced challenges. The three companies whose offerings qualified were all small businesses. They were all developing new products and that takes time. They experienced financial and staffing constraints throughout the process and that extended milestone completion timeframes. Additionally certification such as UL takes a fair amount of time. In the end the goal was achieved but it did take patience and persistence.

The Challenge addressed to technology, the intent was to spur industry to provide a system that was low cost, measured electrical energy, and transmitted data wirelessly without leveraging any networks. Today we're happy to hear from the company that successfully met this challenge. So I'll turn it over to Bruce. Thank you.

Bruce Lung: Yeah thank you very much Anne. So that was a really good presentation. Thank you for clearing all that up and talking about the Challenge.

I now want to introduce our next two presenters. They are with the company that won the Challenge, it's called "Meazon." For those of you who don't know Meazon is a Greek word which means the maximum. So I'm sure our two presenters are going to give you a hundred percent in their presentations today.

First speaking for Meazon is Mr. John Gionas. John is the co-founder and Chief Commercial Officer of Meazon. He has a bachelor's degree in electrical engineering and a master's, an MBA, is a technology business enthusiast with the expertise in information engineering, automatic control, telco engineering, and marketing. His background is in market introductions of new

business concepts, corporate governance, strategic alliances development, and leadership of commercial and delivery organizations. Gionas worked for more than 14 years in executive positions at Erickson and ABB. He is a graduate of Berkeley's Executive Program in Management.

Following him will be his colleague Stelios Koutroubinas who is also a cofounder of Meazon. Stelios has a bachelor's in engineering, electrical engineering, and a Ph.D. He's also an expert in embedded electronic system design. He once worked at ATMEL, ending up as a general manager for their 150 person research and development division in Greece, where the team achieved breakthroughs in Wi-Fi chip design miniaturization for clients like D-Link, Cisco, Hewlett-Packard, Netgear, 3Com, and AT&T. Stelios is the author of 12 peer-reviewed papers and two patents. He also went on to senior leadership roles at ByteMobile working on restructuring and product design.

So John please go ahead.

John Gionas: Thank you Bruce. I'd like to start with putting things a little bit under our perspective and how we see things. Next slide please. The next one.

Energy submetering is a concept that exists several years in energy management. It connected some metering though in the sense of an IOD internet of things wireless _____ cloud connected entity, having local intelligence and control capabilities and small size is a new concept that is enabled by the latest technology advancements.

Increasing trend in the real estate management is the centralization of full tasks related to metering and energy management processes. Organizations with distributed portfolio for buildings find extremely useful being able to centrally manage all operations remotely and in almost real time.

Installing energy submeters scenario such as heating, ventilation, air conditioning, lighting, electrical equipment, and various electrical loads provides organization the ability to review and evaluate their energy use strategies. They can establish energy KPIs for particular loads, as well as provide tenants with energy building.

Energy retrofits require interventions based on real data with a clear payback analysis. Smart _____ submeters play an important

role in facilitating the in-depth analysis required by owners, investors in order to proceed with building energy retrofits.

Another important application of smart submeters is demand side response. Since they can provide valuable real-time feedback of power consumption needs enabling the utility to implement the demand management strategies. This load-controlled plans can be implemented over the same submeters, but although it was not in the scope of this challenge this could potentially play the role of the controller. I mean our submeter can also be a controller. Next slide please.

On the other hand it is essential to learn how to take all the data and transform it into insights and results to improve building performance for owners, managers, operators _____. This is mainly what cloud analytics is doing at true scalable, flexible, and cost-efficient manner. Cloud is important here since there's no need to invest in expensive hardware and software infrastructures, but rather capitalize on huge existing cloud technology investments in the market.

In the age of information overflow distinguishing useful insights between bulk data can provide powerful business intelligence and support sound business decisions. High solutions energy meters generate thousands of data points per operational day that need to be interpreted accordingly. In a single commercial building with many submetering points, a values measuring parameters and value environmental attributes finding actionable insights in the manual manner can become a demanding and time consuming task. The insightful findings can lead to improve operational efficiency, new revenue opportunities, and competitive advantages of significant value. Next slide please.

So someone could safely argue then that energy efficiency is capitalized in the transformative manner by the new building data position technologies that we're talking right now based on the internet of things, enabling gathering of real-time large amounts of energy and environment data. This combined with big data analytics cloud technologies that provide the intelligence for creating energy efficiency actionable insights, KPIs, and strategy follow-ups can really end up in considerable energy savings and improvements in building operations and facility management. Next slide please.

So this slide looks a lot with Anne's slide. I have added a couple of components taking into account that what we mentioned before

energy efficiency can be seen as a process and this is how we see it with value steps that end up enacting based on the insights generated by building data acquired from the field in a systematic and analytic manner.

As one of our ESCO, Energy Service Company partner stated real-time measurement is the only way to find out how the building really works and see how our actions such as changing the internal characteristics of the building, heat pump for example, are being applied.

So the first thing that you should do if you want to reduce energy consumption to install real-time submetering on your premises being maybe the only way you can address the low-hanging fruit of energy efficiency and maybe add my edition is that you can also address the high-hanging fruits, not only the log-hanging fruits.

The next slide will be presented by my colleague Stelios _____. Stelios?

Stelios Koutroubinas: Next one please. Hello everybody. So here we see on the left part of the slide more-or-less the DOE part of the installation. We have our meters that can measure the panel where we have different loads. We can measure the total power consumption or we can measure some of the subloads on the panel. This data wirelessly are transmitted to a gateway and as an extension to what happened in the DOE case this data can be transmitted to a cloud where we can organize them in _____ or we can drill down to what's happening where a building or even to load.

On parallel some other tools that we should develop can be used in order to _____ the steps of the system. Next slide please.

Here we see on a bigger detail how the panel looks like. So we have on the left the electrical panel that we want to measure things and then we have a subpanel where we have our meters. What we did there is powered in order to measure accurately we needed to have the three phases, the neutral and then we need to with the current transfers to read the current value. So both that's in current can give us data for all the parameters we need to measure.

We have done a very small design so it can fit everywhere, because usually there is not a lot of space available to do things so it should be a small meter. We have done a lot of work with this kind of configuration to simplify the installation, make things

easier for the installer and be able to control things and to fix any problems that may arise.

With our devices we can measure from let's say 63 ampere which we feel is the smallest you need to measure with a three-phase meter, but we can go to thousands using Rogowski coils. As it was the requirement in the Challenge the accuracy should be better than 99 percent. We tested we have done we see that the error is about 1/2 percent.

As we said our meters can store data internally so there is a data logger inside. Data transmitted to a gateway and the gateway also has the capacity to store data at this level, but also data transmitted to a cloud if needed not only in the case of DOE, but on a similar with different protocols we can transmit this data for further analysis. Of course all this on the very low total cost of ownership. Next slide please.

Why we are different. As you can see this small meter it includes about 6,000 line of embedded software. Of course in order to have an embedded system like this and to be there and do consistent this job it needs to be a robust system, Wireless method working is necessary to cover big buildings as the Challenge was looking about. Of course the size is really small so that we can fit more meters and do the submetering as in the maximum let's say extensions. The data logger and scheduler is also some add-on features that might not be necessary for the Challenge but we can support them. Next slide please.

A few more things for our gateway. It is a Linux based device. We can support tens of meters with this gateway. It really depends on the measurement you want to have, the distance you want to cover, I mean the sharing of _____network with the hopes will ____ a load on the system.

The parameters you can just measure just the power or you may want to measure ____ _____ power all the other parameters and all the by phase. Then it's how often do you want to measure. So all this may have some effect on the meters you want to measure on the gateway. But usually we have about 20 meters per gateway.

We do local monitoring and of course we can transmit data to the cloud. You can easily characterize the loads connected on the meters through an interface we have with our regular part of the gateway. It's fully configurable and controllable. Then the maintenance of multi-meter installations is really easy based on the

tool we have developed. We support Demand Response features through this gateway. There is an automation workflow scenario builder available in our gateway. Next slide please.

A few more things from the cloud side now. We have what we call a Software as a Service energy monitoring and analytics tool. With this tool you can have multi-branch or multi-location of organizations controlled from the same slide. You have a map you can see where the properties are located. You can select one property on the map, then you can see what meters are under this tool. Then in general you can see all the data you have stored there and try to do also other things. We monitor the data, but we can also do post-processing reports on this data. We can identify the energy trends, the baselines, the base loads and of course we can connect on-line services, hardware devices and API on this tool. Next slide please.

This is a visualization, example based on the Power BI. What we see here is two meters. It is a building we measure the lighting in these two floors let's say. One meter is measuring Floor One and the other Floor Two. What we see here this is two weeks, but we start from Tuesday. As you can see on Saturday and Sunday, the weekend is very low. Monday it was a day off for US, it was President's Day. For some reason the power consumption on this one floor was much higher from the other.

If we look the rest of the week it looks more or less similar to beginning of the previous week. But then on the weekend we still see that the power consumption was much higher. Of course on this it's what the meter is measure. I believe that the building management guys sharing more information for us that's why there is occupancy of the building these days could have more useful results because if there was people in the office on the weekend then we can say there was a good reason to have high power consumption on lighting, but if there was no one there probably some lights were on without any good reason. Next slide please.

John I think you can take the rest of the presentation.

John Gionas: Yes thank Stelios. It's one of the two last slides if you would about the company. We are a young company. We exist since 2012. Up to now we have shipped around 10,000 units of these meters that you have seen in five continents. We have contracts that usually with large system integrators and ESCO that they provide energy efficiency services for large multi-branch organizations. We plan to deliver another 20,000 units in the coming 12 months.

The way we expand in the markets is through distribution partners and value-added resellers and this is something that we're looking for also in the US market. Next slide please.

In order to make things a little bit easier for our audience the contact details you can see them on the left-hand side. You can do it also through our website on the contact page. We have developed three trial packages. One is the DOE Package and the other two are a little bit more advanced. We have also included some professional services, some analytic services that maybe interested companies or _____ utilities could come to us, get this trial package and really see what can be done and what we can do.

Two things before I finish. The first one is that the system is open, meaning that we use our energy submeters and gateway, but we also have our own analytic and monitoring tool that someone can use also third party wanting an analytical tool. The other one is that analytics the way we do it we try to capitalize on existing tools. We use today the Micropower BI. We have developed an interface through our system with Power BI so someone can use our own visualization, our own develop, but also they can develop their own. So next slide please.

With this I handover to Bruce. Thank you very much.

Bruce Lung: Thank you very much John and Stelios. This was excellent information and I think that our audience has gotten a lot out of it. We've been collecting some questions and we want to get to them all. I think if you can get to the next slide I want to do a couple of things and then we'll get to it.

I mentioned earlier that we had some additional resources and I believe these slides will be available later on for y'all so you'll be able to see this, but if you want to do a screen capture right now you can take a look at these links. These describe the Challenge and some of the activities that went on and how it was met. These are good resources to have in the future. Keep checking these web pages and you'll see if there's additional technologies and companies that are available. So next slide please.

Okay before we get to the Q&A I believe there was a final poll that we needed to execute. If you can bring up the first question and each one will have about ten seconds to answer and then we'll give y'all the answers.

The first question is: If you ever have submetered or are submetering right now what challenges are you facing? Select any and all answers that are available.

Okay and we have our first results. The challenges were financial justification was a big one. Value determination interestingly enough. Complexity of system design and installation was also a big one. Fragmented delivery of the chain on hardware level and on fragmented delivery chain on analysis level. So great thank you very much.

Our next question right here, there we go: What new opportunities for energy savings have you identified from the data, presumably from your submetering installations?

Okay and we're ready for the answers. Okay so they haven't helped you identify high energy use loads. Anomalies is a good one. Assessing system performance, affirming energy use reduction from implementation of energy, okay that's a very good one. And then verifying persistence of energy saving measures, okay great, excellent.

Next question please: Would you like to connect directly with Meazon after this call? Yes or No?

Okay so a lot of you said "Yes," good. So we will you know make these slides available as I said and the contact information for both John and Stelios will be in those slides and they will be able to follow-up with you afterwards as well.

I believe that was our last question as a poll. If you're ready now we can start with the Q&A. The first question that I noticed here I think Anne would be really interested in answering questions that deal with the specifications, what was required by specifications. I don't see any right now, but you know if those come in we'll definitely send them out to you. The first question I have for John is: When will these be available for purchase in the US? A search yesterday produced no viable sources even in Greece they said. Do you want to take that on John?

John Gionas: Yes, thank you Bruce. The systems are available right now and this is why we mentioned these trial packages. We actually have more installations in US we're actually starting. As I said in Europe we are a lot bigger. If someone wants to get in contact with us this can be done through our website in the contact information, but also the e-mail that I just presented a little later on. Thanks.

Bruce Lung: Okay. The next question also for you: How is Meazon distributing its products with field support? So presumably you've got representatives in the US that help support it?

John Gionas: Yes, correct. Our strategies are the following. First of all as Stelios also mentioned our products can be maintained in great percentage remotely and commissions sometimes. Why? Because we have included in our gateway some capabilities in order to be able to really commission and support the operations of the system. Of course we do need cooperation with the energy service company, electricians, et cetera, in order to be able to do onsite support. The _____site support that we need this may be a replacement and maybe some testing rarely. In most of the cases we can prove that as I said remotely, so the only need is to be able to install physically the meters and maybe replace them.

Bruce Lung: Okay great. Then one more quick question for you John: Is there a subscription for the cloud data system?

John Gionas: Yes there is a subscription for the cloud data system. It is a yearly subscription per meter which is three-phase meter. This subscription is $45.00 per year, per meter. Of course we have some value-based discounts, it depends on I mean if somebody has a project with 1,000 meters then the price will be different. This is something we need to discuss.

Bruce Lung: Okay. This may be a question for Anne: Could you describe the data storage capability on the winning unit, whether the intervals maybe specified by the user?

Anne Wagner: Well the specification did require some interval data and it asked that the selectable data be one minute, 15 minutes, or 60 minutes interval data selectable. Then there was a requirement for storage, 4 gig is what the requirements was for storage.

Bruce Lung: Okay great. Another question here, this may be more for Stelios: Why is the power limited to 63 A, approximately 65 horsepower? We have three-phase motors well below this size.

Stelios Koutroubinas: No what I said is we started measuring from 63, this is the lowest motor we have, but as I said this can go to 1,000 times per phase, so this is just the smallest possible meter we can do, we can measure. We have versions on 6300, 125, 250, 400, 600, and then we go with Rogowski close to thousands of hundred. So we can measure all the devices.

Of course when I say "63," I'm in the 0 to 63, so then I'm ____ _____ we think accuracy we want to measure. I mean the smallest model it's here 63 is the upper limit.

Bruce Lung: Mm-hmm, okay great, thank you.

Stelios Koutroubinas: Of course all of them measure from zero.

Bruce Lung: Okay. Another question for you: Does the gateway have to be plugged in or connected to a computer in order to collect the energy data?

Stelios Koutroubinas: There is no need to be plugged in a computer or to the internet. It can be a stand-alone. Actually this was the case in DOE. Data was transmitted from the meters to the gateway. Gateway stores data internally, there is a database where you can store data in different intervals. If the user wants to configure this to store data. Of course when you connect you can get the data in an Excel File. You can work with this data as you wish. If the device is connected to the internet then of course it gets transferred data to service and wherever we wish. We have to program this tool.

Bruce Lung: Okay, great, excellent, good. Is there a power factor or other metrics or just KWH or KW that it measures?

Stelios Koutroubinas: It measures as I said it measures all the characteristics of an open power line, full touch current, appliance power, energy, frequency of the data. We don't measure only on analytics. We compare it to let's say some of the devices that are on high-cost and they do this kind of thing. We measure _____ all these parameters I mentioned.

Bruce Lung: Okay, excellent. Can you tell us some ways that this system might work without an internet communication network? In other words can these devices collect data and store it onboard that would then the available download at a later time?

Stelios Koutroubinas: Yes all – you configure your level. You have your meters they talk to the gateway, you can put names on every load. We sell the meter itself can have beta logging inside, because let's say there is no wireless connection for ____ zone. So for three weeks the meter can look data inside. When the connection, the wireless connection to the gateway will be back again this data will be downloaded to the gateway and the gateway has a lot of space and the database there where we stored and of course we can extract this data in the different files for months as the simplest way of doing this.

Bruce Lung: Okay. One more question for you real quick is: How difficult is it to reconfigure the submeter if you want to move it from one panel to another?

Stelios Koutroubinas: The meter can leave from one network and join to another network. I don't think this is the problem. If we want to make it more technical in the discussion this is a Zigbee network and what we do we leave, we asked the device to leave from one network and then join to another network and then it will be part of second network. As we said in the gateway we provide some tools that make all these things easy for the user and the installer.

Bruce Lung: Okay very good. We have a few more questions real quick here and I'll leave it to either John or Stelios to answer them. How can this wireless system be integrated into an existing metering software system and networks that our government system behind a firewall? So presumably if other government agencies want to install it.

Stelios Koutroubinas: I can take this. In general as I said the gateway is a Linux machine. So if we know what is interfaced maybe we can support these thing. We usually support interfaces like HTPS or MQTT. We have done, we have implemented interfaces to I don't want to say now specifically about – most of the known let's say cloud services have very – they have let's say IOT extensions that we're able to send data there through the authentication mechanism, you know the highest possible security. So there are ways to do this. We have implemented some of them. We can implement most things if needed.

Bruce Lung: Okay, very good. Another question that came in here is: Can these systems be setup for residential use in conjunction with solar power panels?

Stelios Koutroubinas: Yes. Actually one thing that our meters can do we have some features that we can distinguish energy produced from energy consumed. So if needed we can see how the times that the PV is generating energy and goes back to the system. We can separately measure these two things. So the meter can work very well in such an environment.

Bruce Lung: Great okay. Another question that came in and this may be for Anne: Is the DOE looking to pilot this at other locations?

Anne Wagner: At this time they do not have any specific plans for any pilot locations, but DOE is definitely interested in getting any information from folks that have had metering experiences. DOE always likes opportunities to look into possible case study development in such as that.

So specifically as far as how –

Cindy: Hey Anne this is Cindy from DOE, I just want to jump in and actually let everyone know that we are planning to host a pilot demonstration of this technology within a US building and that we will plan to do measurement and verification around that too.

So that's all I'll say for now, but we'll definitely put that information out there and let everyone on this call, as well as the Meazon folks know about that too.

Bruce Lung: Great. Thank you Cindy. Another question for John or Stelios: Is the gateway's demand response capability open ADR 2.0 certified compatible?

Stelios Koutroubinas: Excuse me, the question again?

Bruce Lung: Let me rephrase it: The demand response capabilities of the gateway are they compatible with the open ADR standard, 2.0?

Stelios Koutroubinas: Open ADR 2.0 is one of the first time we were working. We don't have let's say a fully ready solution, but we have done a lot of work so I think it will be easy for us to have the full let's say solution ADR 2 ready.

Bruce Lung: Okay, very good. Is there a possibility of purchasing the analytic software with licensing that allows an owner to do monitoring and analytics in-house without continuous software as a service?

Stelios Koutroubinas: John may take this.

John Gionas: Yes I can answer that. We have designed and produced this system with cloud monitoring in mind. On the other hand we have developed some in-house tools that run on the gateway and give the capability to someone to have a look and see the consumption and see the data from the energy meters. This can be done either by using our gateway tool or some particular tools that we are using and they're already open. But it's not with the same user interface and the same experience. Yes you can see but not that sexy.

Bruce Lung: Okay, very good, thank you. We have a couple more questions I want to try to get them in before the end of the hour. One question here is: Has this meter been tested or piloted or used in situations in which existing buildings are sub-divided into apartments, like in multi-family housing or for businesses and need to be wirelessly submetered so they can communicate from the panel to a main?

Stelios Koutroubinas: Actually this is the case of our let's say Castaway in Spain. There is a utility in Spain that uses our meters to do these things in a common environment and now they move it to small enterprise environment. So yes the answer is "Yes" it can be used in these kinds of environments.

Bruce Lung: Okay. Another quick question here is: Does your system work with water meters or all-flow meters or with other outputs?

Stelios Koutroubinas: As I said our system is based on Zigbee and our effort was mainly on the energy part of this, but right now we try to integrate water meters or other sensors let's say, not only water or gas meters. Any other essentials that need to be based can be easily integrated in our gateway. So the answer is "Yes" and if something is not a hundred percent there we can easily add these things.

We worked with some extensions of the Zigbee standard for let's say something you've got here is radios which makes this even more interesting, because I think this is much closer to gas and water metering systems.

Bruce Lung: Great, okay. Then the last question we'll get in is: Have you tested this in data centers?

Stelios Koutroubinas: One of our customers is using this to measure actually a lot of data centers in Greece. He's monitoring the different things and yes the answer is "Definitely yes."

Bruce Lung: Great, thank you. All right, well I want to go ahead and thank all of our panelists today. I want to thank the audience for attending, as well for staying through much of the presentations. Like I said earlier this is going to be recorded and the slides should be made available at a later date.

Please feel free to contact us or the presenters. There should be a contact screen, there we go, you know if you have any questions both for program support, as well as on the technical side, either Stelios or John or Anne.

We are going to have another series in the next coming year. So stay tuned. We're still fine-tuning all the topics, but we hope to bring you some more exciting topics and webinars that will help you improve energy performance within your facilities.

So with that I'd like to wrap-up and thank everyone and we look forward talking with you in the future.

Stelios Koutroubinas: Thank you very much everybody for ____ _____.

John Gionas: Thanks.

Cindy: Thank you.

Anne Wagner: Thank you.

Stelios Koutroubinas: Thank you, bye.

[End of Audio]