

**NWX NATIONAL RENEWABLE ENERGY**

**Moderator: Susan Hinnen**  
**August 26, 2009**  
**11:00 am CT**

Coordinator: Good morning. Today's conference will be recorded. If you have any objections please disconnect at this time. Your lines will be on a listen only mode.

Now I'll hand the call over to (Michelle Suttleton). Thank you.

(Michelle Suttleton): Good morning. My name is (Michelle Suttleton), and I work for the American Public Power Association managing its research and grant programs Demonstration of Energy Efficient Development, or DEED for short.

I would like to welcome all of you to the ninth in the series of Wind and Renewable Energy Webinars sponsored by the American Public Power Association and its DEED program, National Rural Electric Cooperative Association, Western Area Power Administration, the Department of Energy's Wind and Hydro Technologies Program, the National Rural Electric Laboratory, and the Utility Wind Integration Group, and American Wind Energy Association, and the National Wind Coordinating Committee.

The subject of today's Webinar is Municipal Utility Wind Project Cost Studies. Among the topics we will be discussing are the challenges and benefits in owning and/or partnering to own wind generation assets.

The discussion will focus on both large and small utility scale wind installations. I will be the moderator for today's session. We will have a distinguished panel of speakers today, that includes John Richards from the Nebraska Public Power District, and Julia Blankenship from the American Municipal Power.

NPPD is Nebraska's largest electricity supplier and provides rural electricity to 80 community and wholesale and electricity to 52 towns and 25 rural power districts. AMP is a non-profit organization providing wholesale electricity and services to 128 member municipal electric systems in six states, Ohio, Pennsylvania, Michigan, Virginia, West Virginia and Kentucky.

I encourage you to submit questions electronically at anytime during the Webinar and we will try to address as many as we can at the conclusion of the speaker presentation. Instructions for how to submit a question during the presentations are on the current slide.

Let me see, not quite yet. Oh yes, here it is, question and answers. Okay, sorry about that.

We are currently working on posting answers to questions that we are not able to get to during the Webinar session on the repartners.org Web site. The Web site also will allow you to go back and replay the audio recording and view the presentations from this and prior Webinars in the current series.

Finally, I'd like to let you know that the next Webinar in this series will be held on September 23. The topic will be Electric Cooperative Wind Project Case Studies.

Before we get started with the presentations, I'd like to provide a little background for those that may not be familiar with Public Power the American Public Power Association, which is the trade association representing the interests of public power utilities.

APPA is going to have its 70th anniversary next year. We represent the interests, as I mentioned, of about 2000 public power utilities across the country and 49 states except Hawaii. And we help our members provide low cost, reliable electricity to their customers in an environmental responsible fashion.

We have a diverse membership. It includes 98 out of the top 100 public power systems in the U.S., and most of the members serve less than 5000 meters, so most of our members are quite small. APPA provides professional information to our members in critical areas to assist them.

And I wanted to also tell you specifically on the renewable energy area that we have an area on our Web site that anyone can visit, under utility operations, go to renewable energy, and we talk about the different renewable energy options and things that would be of interest to utilities in that area.

Now I'd like to introduce John Richards, who is the Renewable Development engineer for NPPD. Mr. Richards has a wealth of knowledge with regard to NPPD's Wind Development. He's familiar with a variety of issues from wind power generation interconnections to project financing mechanisms.

John has been with NPPD for five years. Prior to joining NPPD, John worked for 27 years as a substation engineer for the Public Service Company of Colorado and is a registered professional engineer in both Colorado and Nebraska. John is a native Nebraskan and received his electrical engineering degree from the University of Nebraska at Lincoln.

John also spent four years in the U.S. Air Force as an electric lineman. John is also an IEEE member. Mr. Richards will present on NPPD's past and current wind power development. Feel free to take it away John.

John Richards: Thank you very much (Michelle). I appreciate everybody's joining us this morning for those of you on the Central Time Zone, and further west and this afternoon for those of you on the Eastern Time Zone.

I'll talk to you a little bit about what makes Nebraska unique, and I'll talk to you a little bit about what we're doing in the state for wind development, some incentives and laws, and basically give you an overview of how public power and municipal work together in Nebraska to provide electric service and we follow some of the same guidelines (Michelle) talked about. Outstanding customer service, low cost, reliable electric power.

We are the only state in the nation that is 100% public power that started back in the 30s in the Depression, and at the same time as we changed our House and Senate legislative system into a single body unicameral during that same decade we changed our public power structures such that investor owned utilities could be purchased by public entities and were give the right of domain. That was the enabling legislation and mechanisms that allowed public entities to assume ownership of private utilities in the state. Of course through the laws they were compensated accordingly.

That's just a little bit of the history that explains why Nebraska Public Power District, which is a big utility in this state, is also providing some of the same kinds of services that you would expect to get from a smaller system, such as a municipality or whatever.

We are one of two municipal - of the main municipal providers in this state. Municipal (Energy) Agency of Nebraska is another big municipal provider. They provide services to quite a few of our states. And altogether in Nebraska we have 121 of those municipal systems, one federal agency, of course which is (WAFA), 32 public power districts, which NPPD is one, one public power and irrigation district and 15 cooperatives, mostly in the western part of the state served by tri-state generation transmission out of Denver.

NPPD serves about half of the electric power consumed in Nebraska. We like to be known for our low rates, 9.81 cents national average and 6.51 in Nebraska as of the end of last year and our average firm wholesale rate, 4.16 cents a kilowatt hour. So very competitive rates, primarily due to both good management and low cost (Potter River Basin) coal. Nebraska Public Power District is able to provide that low cost electricity. We have a nuclear plant that also provides a substantial amount of non-carbon emitting resources.

And in all of this structure our board decided last year to set a goal of 10%, which was previous at 5%, and to set a stop date or an end date where we would have this achieved at 2020. Prior to this work that our board did last year we just had a 5% goal of renewables and there was no date to achieve that. We now have the date, 2020, and the goal of 10%

If you look at the potential for wind development in Nebraska, there's a Pacific Northwest laboratory study that's a little bit older maybe than what we'd like to work off of, but it hasn't been updated comparing all the states on

a national level on the same criteria, and they rank Nebraska sixth. Well, we still have that as our reference point. It's a little bit dated, but still the only national reference which ranks all of the states on an equal footing.

U.S. regained the lead at the end of last year in the installed wind capacity, and I say regained the lead because California used to be the leader in the world and the U.S. used to lead the world. We just overtook Germany to regain the lead at the end of last year.

Nebraska, however, was not a - one of the big drivers in that. We are still at 152 megawatts, so. This is the chart that shows the top 20 of those states and if you rank them all, there's the big 12 and the little 38 others. If you add up everything from Idaho down through 50, all of those together do not equal 868. So Nebraska has the potential to provide a significant portion of the electric energy in the United States according to this study.

But what are the benefits of wind power? Well, we talk about hedging the risk of renewable portfolio standard, or (carbon) tax or (cap) and trade, and a lot of people don't even really understand what that means. Well, what that means is should federal legislation or state legislation require that a certain percentage of your generation be carbon free? Or there is a price on carbon that isn't shown in other generating sources and you've already started with a wind development program. You're a little bit ahead of the game, so.

Another thing we know that wind does not have fuel costs. There's no water, emissions are very small and little or no waste requiring disposal. It does also provide economic benefits. It provides payments to land owner where the wind farms are located. And it provides money for investors.

Still a lot of challenges on the other hand. There is a short term rate impact almost always, particularly in a low cost state like Nebraska, and that's one of the first things that everybody asks, how much are my rates going up if you add that wind resource to my (generation) portfolio that I'm paying you. And I'm a public power person, and I'm a owner of your company, your business, and I want to know what you're doing to both serve me and serve me wisely.

So, we have to explain those short term rate impacts and then we have to figure out how to put the transmission in place that connects those wind farms to the electric system. Both of those are probably our biggest challenges.

The other challenges we face are it's a variable resource. We have to locate them close enough to a transmission line where we have the capacity to get the electricity to the load. There are environmental concerns and then of course there's the ongoing maintenance of any kind of generation facility.

Maintenance might be quite expensive. You see in this picture the crane's erecting the original system in left and the top right, and then you see a lightning strike in the lower right. Sometimes lightning strikes if they get to be extensive and destroy a blade, gets to be very expensive removing the blades, dropping them on the ground, replacing them is very, very expensive operation.

Some of the technology, well wind energy has been used for a long time as you see from the windmill and wind turbines. Some of the newer kinds of wind development systems shown in right and we're very happy and proud to be a part of the wind energy that's being developed in the state.

So what is it that you take - that it takes to build a wind farm? Well, as you can see from this overview aerial shot, quite a bit of construction going on

around each one of these places and quite a bit of land that isn't useful for other things. And then the roads have to stay there permanently.

Most of this scarring of the earth that we see here gets healed by the time the construction is done and the impact we'll see in another aerial photograph a little bit later, as a matter of fact the next one, goes down quite a bit once the farm is built. But during construction we do quite a bit of scarring of the earth and we have to have lay down areas, construction areas, but we fix that all back really quickly. The transmission that needs to be built, the substations need to be built to put them in service.

This is an aerial shot of Ainsworth Wind Energy facility in the north-central part of Nebraska. You can see a couple of lakes toward the middle of the picture. You see a MET tower right in the forefront, it's the thing closest to you and it's right next to that closest windmill off to the right. And so not easily seen there, but that MET power is an integral part of operating this wind farm, too.

You can see about half of the turbines at Ainsworth here. You can see now that the land has been healed a little bit better this is still not the way it is today. We're much better off today than we were at the time this picture was taken and the roads are only as wide as they need to be. We've replanted, re-sodded, reseeded, and replaced a lot of what you see here, the temporary disruption of the earth. So now we have a really clean wind farm about 3-1/2 years later after Ainsworth went in service and extremely cost effective renewable electricity.

This is the map that shows Nebraska and some of the transmission overlaid in the interior of this map. This is done by AWS True Wind on behalf of National Renewable Lab and is available on the Web. Seventy meters happens

to be the hub height of our Ainsworth Wind Energy facility. And so you can see where the wind exists and where some of the transmission exists. There is some commonality there, but there are still some challenges where we see some greater wind resources toward the western part of the state.

And actually Omaha, Lincoln, Grand Island, are our three biggest cities, except for football Saturday, when Memorial Stadium in Lincoln becomes our third biggest city and Grand Island moves down to fourth temporarily for that Saturday. Oop, sorry, (Larry). I can't really talk too much about Nebraska football. (Larry Flowers), I see, is online.

Anyway, we are serving a lot of the state here with most of the transmission line you see here. This happens to be a slide of two of the utility scale wind turbines in existence in the state today. The one on the left is the Ainsworth facility and the one on the right is the new Bloomfield facility.

They're both Vestus turbines. The one on the left is a 1.65 megawatt turbine. The one on your right is a 3 megawatt turbine. So those are the two facilities we have in service today on the utilities scale. We have a third facility in the state that's municipal under the agency of Nebraska in the western part of the state near Kimball and toward the west, so.

If you look at the history of wind power, Nebraska Public Power District and the other public power partners in the state and National Renewable Energy Lab and Department of Energy put Springview in service in 1998. We did two 750 kilowatt generators at that time and put them on a distribution line. This might not be very far from what a municipality might want to try to do today. It's not unusual to maybe think that a 750 kilowatt or a 1.5 megawatt might go on a distribution line, so.

Springview is probably a really good example of what a standalone municipality might want to think about doing. That happens to be a picture of one there, to that little girl's left. Black blades we had on that turbine, and I say had in the past tense. We had the opportunity to salvage and re-sell this facility to an entity that wanted to reconstruct these turbines and we only had two of them and that utility had many more of them.

So they took our two turbines and paid us a fairly good sum of money compared with the prices of new generators at the time. They were getting a pretty good bargain; we were getting a pretty good bargain. We had maintenance issues with these things, only having two on our system. Spare parts issues, primarily because these spare parts were available to them and some of the stuff that we had salvaged and stock-piled, they found it of a great value and we found it of a good business sense. The partners and NPPD decided to sell these.

That having been said it was a very successful project. It gave us about 1 cent per kilowatt hour of electricity over its lifetime of almost ten years. Since then we built Ainsworth, put it in service in 2005. It's been an excellent facility. First year of operation had a 42% capacity factor, which is outstanding. It's among the top 5% of the performers in the United States.

We thought in 2007 to do proposals from independent developers. We put Bloomfield online through a power purchase agreement in February of this year. We sold about half of the output from Bloomfield to other public power partners in this state, including the city of Grand Island. The city of Grand Island took about 1 megawatt out of the facility, so.

That's the way in Nebraska where it's the most cost effective today, or one of the most cost effective ways to have a municipality participate in a wind farm

and we deliver that energy through our network agreement with the city of Grand Island.

Right next to Bloomfield in the northeast part of the state is a (cropped) and wind farm, that's a 42 megawatt wind farm that we have a power purchase agreement with and we're still working with that developer hoping to get that online here shortly. We issued another round of proposals for projects in November of last year. We got those bids back in April of this year, April 15, and we're still working on those. We'll have a complete announcement of our final selection.

We're negotiating with one developer for two end farms, one of them at Broken Bow and one of these new (Petersburg) and (Elgin), and those are both 80 megawatt facilities and we have - our board has given us certain guidelines under which we are working to finalize those negotiations with Midwest Wind, Edison Mission, and get those two projects in service. So we are just now in the throes of finishing our PPA negotiation, power purchase agreement (associations) and talking to our other power partners in the state to make available half of those two facilities for our other power partners in the state to participate in.

So if we look at the total of all the facilities we have now, we have Lincoln Electric System, shortly after we did Springview, put two turbines up near Lincoln. Omaha Public Power District near Valley put up a turbine a couple of years later, and Municipal Energy Agency of Nebraska put up seven turbines over near Kimball in 2002. So, that was actually the first utility scale large scale wind farm in Nebraska, 10.5 megawatts.

You can see excellent capacity factors on the Kimball facility at 35%. Our facility last year, 2008, had a capacity factor of 35%, it's 59.4 megawatts and

you can see our partners are Omaha Public Power District, Municipal Energy Agency of Nebraska, and Grand Island and (Jacksonville) Utility, they're now known today as JEA, (Jacksonville) Electric Authority, when we signed the contract with them.

So we have power purchase agreements on the last project at Bloomfield with the developer Elkhorn Ridge Wind, and we sell half of that to OPPD, meaning Lincoln Electric System and City of Grand Island, so. That's a way where LES and Grand Island could both get very, very respectable and cost effective wind energy. They are full financial off-taker of that facility under our power purchase agreement with them. We actually call it a power sales agreement to distinguish it from the power purchase agreement, which we signed with Elkhorn Ridge Wind.

So, in the state we find that is a very cost effective, very good model, and it allows a wide range of participants from across the whole state to participate in wind energy facilities. We're following that same model in off-takes off of our two current contracts that we have under negotiation right now.

So, why do other states have more than Nebraska? It's really a combination of reasons. Federal production tax credits are available to those with tax appetites. No utilities in Nebraska being all public power really have a tax appetite, per se, so private parties have to have that tax appetite in order for them to work in Nebraska. We'll talk about what our legislature did and how that works in Nebraska.

Some states have production tax credits so they supplement the federal PTCs with. Some states have renewable portfolio standards or public utility commission requirements. Transmission lines always either have to exist in good areas or the ability to build transmission lines from the good wind areas

to the areas of power needs. So there's the additional drivers in other states as well as Nebraska, needs for additional generation or cost of wind versus alternative renewable energy. Actually, wind is - we're seeing the most readily available cost effective renewable energy.

In addition, we talk about what is the equivalent of the Federal Production tax credit, well, there are a couple of models that have been tried. One of them is a Renewable Energy Production incentive. Well, equivalent is really not a good word. As soon as a private developer puts a wind farm in service, they have a ten-year ability over ten years to claim the production tax credits. For the public utilities what that means is we have to rely on Congress to fund each and every year, year by year, the same sort of incentive. And it really doesn't get funded.

(Repute) payments have dwindled to nearly nothing and it's a Department of Energy and other entities ability to gain congressional approval for funding, that funding to be made available to municipalities and public power and then a applications have to be made. And what we actually had is two years ago is about the last time that we have records for when we submitted for (repute) payments. About a third of the amount of money came as what we had submitted for.

So another alternative that's been tried by congress is Clean Renewable Energy bonds, but once again we have the same sort of problem. They still have to be funded by congress and some of them are funded and some of them aren't. And we're not really sure that the funding's going to be renewed over the same time period as what the facility will be in service for.

So those are some of the challenges for public power versus private power. Nebraska had a unique situation where we knew that this probability of being

seized by eminent domain and compensated based on fair market value, laws that we have in place in this state probably gave private developers pause in order to think about coming to Nebraska and building facilities here.

So in May of 2007, by a vote of 49-0, our unicameral passed legislative bill 629. This gave those parties that have private money and a federal tax appetite the ability to negotiate with public power entities in the state, and we were able to contract away our right of eminent domain based on the power purchase agreement. They were also give the ability to claim sales tax exemption if they qualified as a C-BED or community-based energy development project.

So, as I've heard in other - of my cohorts in the power business say, when you see a good law in another state and you think it's probably going to be workable for your state, well why do you need to reinvent it? So we actually borrowed this from Minnesota, the C-BED concept from Minnesota. And we had (Dan Jewel) one of those authors of Minnesota and testify before the legislature.

So tweaked that a little bit in this legislative session, it just got over (LB 561) gave us a little bit broader range of contracting away our right of eminent domain. Give us a little wider range of size of facilities for review of this, and a little bit different structure for financing. Basically, a good tweaking of the law that had passed previously in May of 2007. Put in some protections for land owners, put a 40-year maximum agreement and 10 years of inactivity would cause a wind farm to be - to have to start the decommissioning process, and that will become law here very, very shortly.

So it's a very, very recent thing and we're getting ready for that to become law here and we're looking forward to that. We think it will give us a lot more

flexibility in Nebraska to work better with our public power and private partners and build wind.

Legislative, resolution 83 was created in order to talk about land usages in the state, financial and environmental and transmission impacts and address some of the ways of looking at perhaps exporting some of this wind, this very, very good in Nebraska out of state, and then allowing the public power entities in the state to work with private developers in order to make this process work better for the other 49 - or actually 47, 48 states that might want to purchase power from us.

Nebraska Power Association and NPPD are actively involved in this process and we have white papers, technical committee going on. So it's an ongoing process we're working on here.

We think there's probably some chance that congress will get to federal legislation on climate change probably quite soon. Our own legislature might do something also, so we think in the state and federal areas we're going to see some shifts in environmental laws. We think that Co2 being declared as a pollutant and harmful to public health by the Environmental Protection Agency and through the court system might have a significant impact.

We also think there might be some changes in legislation to reduce Co2, such as a cap and trade or carbon tax or renewable portfolio standard, renewable energy standards. Any of those changes on a national level might give NPPD and the public power partners in the state incentive to do a little bit more in renewable.

Some of the numbers that we're looking at, and we like to stay on top of these to make sure that we understand the consequences of some of the things being

talked about, involve pretty substantial changes to the way we do business, some of them. So, we're continuing to monitor cap and trade proposals, carbon tax, you know, legislation and cap and trade legislation. So, hopefully we'll be well prepared in the state to respond very positively to any of these things that come out of Washington.

If you look at our portfolio mix now and 12 years out when we do have 20% of our renewable energy by 2020, and some of the other things that will be going on in the state, we do see that there are scenarios in which our coal generation percentage mix goes down quite a bit, and wind picks up quite a bit.

We see nuclear percentage changing, not necessarily because of more nuclear power plants, but just because of the way they're dispatched and generated. And so those are the three changes we see in the next 12 years and our mix of generation in the state, how that will actually work, I don't think anybody's crystal ball is 20/20.

We do have some editorials that kind of talk about these kind of things and kind of give us a little bit of pause sometimes to reflect on what's some of the things we talk about or are being perceived at by our citizens of state. So you can see that one of our citizens (here) was kind of blown away our talking about 20% wind by 2030 and \$20 billion dollars.

So, anyway, editorials keep us back in line a little bit sometimes and nice to see a little humor and maybe a little gut check on what we're doing. In the meantime, our goal is still to get 10% renewable generation by 2020. The majority of that will be wind generation based on what we're seeing today, in 2009. Omaha Public Power District has the same goal of 10% by 2020, and

combining NPPDs and OPPDs goal will be about 1000 megawatts of wind in Nebraska.

These are two big drivers in today's world. A national renewable energy standard or carbon tax or cap and trade might require a substantial change in that planning process and that 10% number might change from 10% to something else. But based on the 10% this is how we see the process working over the next 9 years to 10 years to get this all done. And then by the 11 and 20 year, how we will meet our 10% goal by 2020.

This leaves us with the basically the odd years in between to maybe fill in with something additional if it should be required. So, there's flexibility in this plan, it's an ambitious plan based on what we had before. It's not necessarily ambitious based on what, say, surrounding states are doing, but on the other hand we're working toward the goals that we have set by our management, which is 533 megawatts by 2020. And we're helping OPPD meet their goals as we continue to partner with them. We're helping the other entities in the state meet their goals, too, by continuing like I say to sign additional agreements with them so we can share this.

We currently are evaluating, as id discussed earlier, either an 80 or 160 additional wind energy in Nebraska. We have the two agreements with Elkhorn Ridge and (Croft and Hills), those are 20-year agreements and they were evaluated for low cost, environmental factors and access to transmission. We're using the same evaluation criteria for these that we're currently negotiating for. Those are Broken Bow and Petersburg.

We installed MET towers, metrological towers to study the wind and we're securing land rights at several locations across the state. These happen to be locations we have highlighted here are the locations where we currently have

active monitoring going on. You can see Elgin is otherwise known as Petersburg, so that red dot or red mark there is Elgin-slash-Petersburg. Those are two cities very close to each other.

And then Broken Bow, as you can see more toward the west, is the other site where we have active negotiations going on. The other places we have either monitoring up or land rights up or plans for land monitoring, wind monitoring. Land rights we're still securing additional land rights, and one of the first things that we did is hire a consultant to help us secure these land rights. And we go to a neighborhood or a community and talk to the landowners and the community leaders and find out if there is interest in an area and where we have pushback we're going to have people saying we are not interested.

NPPD and our partners are very happy to say, well, thank you very much. We appreciate your input, and we're not here to bother you if you're not interested. Where we have seen this happen is actually no place yet. It's pretty much been very, very widely accepted across the whole state. So, most communities we go in we'll get 90-95% acceptance rate, very, very happy to see us and we usually work very, very well with all the communities that we've been in.

The land option that we propose to our landowners is the 5 year plus the 5 year extension agreement. We study the wind and we tell them that there's a potential for a NPPD developed project, such as Ainsworth, a community based energy development project or non- C-BED project, privately owned. So if we signed a land option agreement with a landowner, we think it gives them more options to work with NPPD.

In addition we have several people across the state that want it in their backyards. So we've created a Web site and a landowner interest form that

they can go on and fill out this landowner interest form. We keep that in a database also and we have several hundred entries in that database today. So this gives us an additional source of places where we can look at more land to be developed in the state.

In addition, we just issued and will receive back by September 1 of this year, which is coming up here very shortly, a small renewable RFP, request for proposal. We require that those be PURPA, Public Utility Re- ah, PURPA, I will look that up. It's a federal mandate that they be renewable or heat recovery generation.

We have different criteria that we have there. We want them to be greater than net metering site, which is 25 kilowatts, but less than 10 megawatts and our wholesale partners we have an agreement already with them, and that might be a municipality or it might be a smaller wholesale that any projects less than 2 megawatts, greater than their net metering, they have the first rights.

So that might be a place where when we get these back we will learn where our partners in the state, municipalities in the state, might want to choose to be the only off-taker. We would facilitate that discussion and basically say we appreciate your bidding with us in our process here and we'll get you and the municipality together and help you get this project in service.

We're the partner, our wholesale partner does not wish to be an off-taker, and where it's greater than 25 kilowatts then the rest of public power district would be the negotiating party with the developer that would put that project in service, so. Anyway, that's kind of one way that a municipality in Nebraska could become a wholesale and owner of a wind facility.

This gentleman here is (Danny Cliffy). He owns this cat generator off to his right, right off of his shoulder here, happens to be a off-taker and a provider to Nebraska Public Power District under a previous proposal that we worked out a separate contract with him. So, we let our wholesale customers know about this small renewable RFP in May.

We issued it May 19, the proposal due like I say September 1. We tried to coordinate this with United States Department of Agriculture and the USDA Ag Loan program, and so that they could basically coordinate this and perhaps get some funds from the federal government in order to help pay for these projects. Hopefully that will work very, very well for us. So that's the smaller RFP process once again, new here, very short period of time.

We talked about moving energy from customers - from the generation source to the customers and this is only one of probably hundreds or maybe even several hundreds of proposals that we've seen where we've put extra high voltage, 765,000 volt transmission lines in place to move large quantities of wind to the low centers.

So this happens to be a Southwest Power Pool, one of the many proposals there and the purple is the 765 (KV), that goes to the center of Nebraska, (Cherry EHV). (Extel EHV) as in south central Nebraska, and Fort Calhoun is Omaha Public Power District's nuclear plant. And so those are three of the terminal points of this (EHV) overlay on the Nebraska system. Cooper (EHV) as a Nebraska Public Power District, Cooper Nuclear plants.

So, it basically gives us the ability to move more wind energy out of the state and onto the electric grid. Whether this gets built or who pays for it or how that takes place is still yet to be determined within the state.

Southwest Power Pool has basically a lot of work to do basically to get this to happen. We're hopeful that something like this will happen.

So, in the end new legislation from Washington or from Lincoln will cause us to change our timetables and our processes perhaps somewhat. We're looking at the new legislation we had just this year to maybe bring about larger scale projects in Nebraska. We're studying wind for export to hopefully put that power out on the grid and provide it to other customers and other states.

We still have to resolve who's going to buy, who's going to build the lines, and who's going to construct the wind farms. And as we find a timetable for state or federal legislation, we'll start changing our plans to match those requirements. We'll always keep track of the environmental factors in there to make sure that we do the right thing and do it smartly. And we think public power will continue to be involved in wind energy in Nebraska.

And with that I will turn it back to (Sue) and (Michelle). Thank you very much. I appreciate your attention.

(Michelle Suttleton): Thank you, John. That was really interesting. I know I learned a lot about the NPPD wind that you're doing.

Now, our next presenter is Julia Blankenship, and Julia is the manager of energy policy and sustainability for AMP. In her current position she's responsible for evaluating energy and environmental policy impacts on the organization and its members, developing strategic responses, assessing clean and renewable energy options, and identifying and promoting sustainable practices for AMP and its member communities.

Ms. Blankenship joined AMP, which was also used to be called AMP Ohio. They recently changed their name just to AMP. She joined in October 2005 after over ten years with Synergy Corp, and five years representing both investor owned electric utilities and independent power producers on legislative and regulatory matters in Washington DC.

And prior to joining the private sectors, she served as Deputy Assistant Secretary for Congressional Affairs at the U.S. Department of Energy and spent 9 years as a legislative policy analyst and advisor to three members in the U.S. House of Representatives. She has a B.S. in Biology from (Muskingum) College, and currently serves on the board of trustees for Green Energy Ohio and is active in a number of local charities.

Julia, I would like you to feel free to start whenever you're ready.

Julia Blankenship: That's great. Thanks, (Michelle), very much and thanks to everybody for participating. Looks like we've got quite a crowd here.

As (Michelle) pointed out AMP-Ohio was - who we used to be, but we have six states now that we represent and so our Board of Directors in July decided that we needed to be more representative of our bulk of our membership as opposed to our basic membership which started in Ohio. So we are now American Municipal Power. We have dropped the O and Ohio, but we obviously still are headquartered here in Columbus.

Let me see if I can get this to do. So we're going to talk a little bit about wind power development experience from AMP's perspective in Ohio and Pennsylvania, which is where we have the bulk of our wind resources. If you go - remember back to John's slide where he had the top 20 you probably

didn't see any of AMP's member states in that list. We operate currently 128 municipal electric systems in six states as (Michelle) pointed out in the intro.

We are formed as a non-profit corporation in 1971 and we serve a variety of services for our members. We own and operate electric generation facilities, including fossil, hydro, wind, landfill, gas and distributed generation.

We develop, and manage and coordinate a wholesale power supply and interconnection agreements and then we serve almost as a trade association function providing member services in the form of finance, project engineering, environmental, safety training, communications, legal, legislative, regulatory, analysis, et cetera. We wear multiple hats in trying to serve our members needs and there's always another idea that comes along, so we try and be flexible to serve them.

Our current memberships serve more than 570,000 customer meters, so we're almost a small utility in the IOU world. Plus we have members that are located in both footprints of MISO and PJM RTOs. Something you may be aware that the first energy which is a major IOU here in Ohio and Pennsylvania area have just announced there plans to leave MISO in June of 2011. That will obviously be something that FERC needs to approve, but it will certainly impact how our member power supply needs are structured through the RTOs, so it's something we're watching very, very closely.

Project development at AMP is varied. We - our members essentially decide on which projects they want to be involved. AMP does not dictate power supply agreements with the members and when we have a project come to our generation development folks we essentially subscribe the project prior to construction. That means that we are trying to essentially assign all of the

megawatt hours in advance, so we don't have any external risks on the project side financing wise.

We take a one side does not fit all approach. Project development can - and project ownership approaches can vary between projects that AMP owns and operates, joint ventures among the various members, so they could be member owned, but AMP operated. Can you guys still hear me?

Anyway individual member owned projects, AMP supported projects and PPS which generally would mean that there's AMP financing involved.

Our wind projects that I'm going to talk about today are focusing on two. The first is the AMP - AMP/OMEGA JV6 Wind Farm, which is located in Bowling Green, Ohio. This was originally a partnership with Green Mountain Energy Company. It is 7.2 megawatts and it's been operating since 2003. We added a second two turbines in 2004.

The second project is the Berlin Wind Farm, which is currently under development in Berlin, Pennsylvania at 5.4 megawatts. And we have a number of other locations under consideration, but I'm going to focus on the first two for the bulk of this.

This is a great photo of our Omega JV6 Wind Farm in Wood County, Ohio, Bowling Green, Ohio. At 7.2 megawatts it's not very large, but it was the first commercial wind project in the state of Ohio. It is currently the only commercial wind project - utility scale project in the state of Ohio. That is going to change, but right now it remains the only one we have in Ohio. Again unlike Nebraska we don't have great wind resources here.

This is a wind map from again TrueWind Solutions that essentially shows the difference in - you kind of look at this one and think comparatively to the one that John showed. You'll see that we - our wind resources are very minor by comparison. Bowling Green is located in the Northwestern portion. You see that orange dot or an orange blob kind of in the Northwestern with Bowling Green marked. So we're a Class II to Class III area. We get about 23% capacity factor which actually is pretty good for Ohio.

The city of Bowling Green of which is one of our members worked with Green Energy Ohio, which is the state wide non-profit to promote renewable energy to install 50 meter - wind monitoring tower. That was in 2000 - in 1999 and 2000. Over the 16 months that, that was operational they collected data that essentially proved that the project was feasible. Average speed of about 13 miles per hour, that actually is pretty windy for the state of Ohio. So it sounded fairly good for us.

The project is somewhat unique, because it's located on a landfill. The property was owned by Wood County Solid Waste Authority and AMP worked with the city of Bowling Green and the Wood County Solid Waste District to get a lease agreement for the land near the landfill. The site accommodates four units. Again installed in 2003 and 2004, the FAA needed to permit the project, because there's a small municipal located very close to the site, so we were able to get that a (common push). Local obviously permits were achieved also.

AMP also arranged financing to move forward the construction of the first units by having an agreement with Bowling Green to purchase the output and then later the project was transferred to what we called OMEGA 6. OMEGA is Ohio Municipal Electric Generation Agency and this is a joint venture

between ten of our municipal members and joint venture six just refers to the fact that it's the sixth joint venture that we have done.

So here's the membership here. You can see the ten communities are listed as the OMEGA JV6 participants. They take varying output from the facility and all have an ownership share. The project is operated by AMP currently and initially the project partners were AMP, Green Mountain Energy Company and Wood County, so worked pretty well for them.

Here's some photos of the construction of the project - the - you can see a little bit about the size and scope of the tower pieces in this photo. And then here's a very interesting one with the blade assembly being - getting ready to be hoisted. These pictures are fascinating. And here's the blade assembly going on top for the (MSL). We had a lovely November day in, you know, Northwestern Ohio with winter, so pretty cold.

Anyway operational characteristics of the units, we have Vestus units that operate at wind speeds between 8.9 and 55.9 miles per hour, but it can withstand a wind speed of 133.1, full capacity at 31.3 miles per hour, again the site has a 23% wind availability or capacity factor. And the rotation speed is 16.8 RPM.

This project is somewhat unique for of its size, because we were able to locate it on the distribution system for the Bowling Green electric utility which is a great benefit to us in developing smaller scale projects, because we can avoid the interconnection issues associated with the RTOs. Now this is proved a great template, if you will, for some of the things that we're looking to develop.

Operating history, we've obviously had a number of issues with the turbines themselves. Our biggest current issue is gear box replacement, which we have a one unit and we've had a number of lightning strikes to the blades. And you saw the photo that John showed how bad that can be, so our long term maintenance issues with wind.

Again generation and OMEGA 6, just some numbers here, the last one is probably the most important. We're averaging 14,000 megawatt hours per year with a 23% availability. It's not great, but it's again pretty okay for Ohio, obviously not base load capacity. Our wind characteristics are obviously more in the winter and more at night, which is - doesn't necessarily help load following.

This is a graphic showing hours, the verticals and megawatts, the horizontal. And as you can see the (baby) 760 hours per year, the bulk of our availability which is 40% performance is going to be in the very, very low megawatt range. So we're - most of the time we're producing very little energy. The other point is that the 3.4% is in the seven to 7.5 megawatt range, so this just shows a little bit about, you know, the characteristics of the wind project that we have and the ability of our folks to match that to customer needs.

All right, this next slide shows - it's a little dated, because it looks like we're missing some 2007 and obviously 2008 data, but it does show some of the wide range of the variability in the month that we've been operational and I think it's particularly telling that in November of '07 we were at almost 2.5 million kilowatt hours and you look at November of '04, just the year before and we were under one million. Some of that is unit availability, but again the wind resource can be quite variable as well.

Making the project work, because we don't have great wind speed in Ohio we had to be a little creative on some of the, you know, putting the package together. The total project cost us \$10 million, financed for 15 years. The participants pay a monthly demand charge, but no fuel cost or energy charge. We have a very lucrative agreement with Green Mountain Energy to sell the RECs from the project for the first five years.

That agreement did expire in December of last year, but the revenue from the sale of the REC succeeded the annual operating and maintenance expenses, which really made the project pay off and made it very attractive for the members.

We did have a very successful partnership between AMP and the member communities, including the City of Bowling Green as the host and the (Interconnection sites), all the Wood County officials, Green Energy Ohio and Green Mountain Energy making a successful partnership is very important to AMP. We do not want to projects where we're going to have issues with obviously local folks or people who don't want the project - I mean will go elsewhere.

Again as I mentioned Green Mountain Energy purchased the RECs at above market rates, which certainly helped finance the project and our experience in financing and asked us to affordable helped on our end on the financing side. What's the availability of land? Because it's a small project we didn't have to go out and seek land owner approvals. It was on county land, so that worked out very well for us.

Now briefly on the Berlin wind project, this is a project that's currently underdeveloped. We have 5.4 megawatts planned for three turbines. These are also (Baptist). It's in the borough of Berlin in Somerset County on a forested

ridge top 4.5 miles east of the borough. The project is within view of three other wind projects of 5 to 20 turbines each, so this is a very - this ridge is very popular if you will, for projects and we're also getting some product development experience learning from what works and what doesn't work with the others.

As compared to Ohio the capacity factor here is projected at 32 to 35%, which is a huge increase and should make this project much more attractive. We have some siting considerations to date. We've needed to move the turbines to avoid adjacent township restrictions and property set back restrictions. The project site was chosen because it avoids wet lands and high quality surface waters and sensitive ethological features.

We also entered into a voluntary cooperative agreement with the Pennsylvania Game Commission to do some population studies for bats, and birds and raptors. And this actually has proven very helpful, because we needed it. You know, you never know what you're going to find when you do a project, but we found we needed to do some additional work on the bat issue.

We did require the necessary permits from Pennsylvania Department of Environmental Protection, Somerset County and the Borough of Berlin that as I mentioned we did find a Indiana high (binocular) in the railroad tunnels close to the project and so we're currently undergoing additional monitoring and we have to apply for an incidental take permit from fish and wildlife service. And that is delaying our project 18 month, our current - projected online (daters) 2011.

Additional projects that we have under consideration include a fairly sizeable project in North Central. We have already collected one year of wind data and that is continuing. We feel that the site could support up to 100 megawatts

project, compared to (unintelligible) about 27% so slightly better than we have at Bowling Green, but not as good as Pennsylvania.

In addition we are looking at private developers that are bringing projects to us in our area. In 2009 actually - past a wind siting ordinance - I'm sorry not an ordinance, a law, which set up new exciting recipients and that has brought a number of developers to the table, which weren't out there before. Plus Ohio now has an RPF, so that may make other projects more financially attractive, because there might be a better market for the REC.

(Gail's) not up to considerations for wind - John covered many of these, but I just wanted to reiterate that there's a number of issues in addition to the source of the wind and, excuse me, the strength of the wind resource, including interconnection options.

Again as I mentioned we - if we can like to try and put projects behind our member's meters and that way we can avoid some of the interconnection issues and financial constraint. A big one is location diversification, because we operate in six states we even look at potential projects that can be located that benefit from (all fitting) wind patterns and also LMP and congestion considerations within the RTOs, obviously member interest is very important to us. We don't build projects without member subscription, so that's (P).

Environmental and other siting issues, again John mentioned the carbon issues and the renewable portfolio standards. In addition to that though is like I covered, the birds and bat issue is huge. As you may recall from the map, Ohio's bulk of their wind resources is located along the lake, but especially in Western Lake Erie we have a major flyaway for north/south migration for birds, so that may automatically take one of the best resources out of tension for project development.

Obviously the financial viability of the project is key and again the new area that AMP is looking at includes RECs. We are in the process of contracting to sell RECs for the JV6 project, under the renewable portfolio standard in Ohio. Not at quite the price we got from Green Mountain, but one that certainly will make a big difference to the project participants.

And then finally potential partnerships, we can find interested members obviously and then a good potential project developer if we're going to look in the PPA. We like count on peoples reputation and make sure that we have knowledgeable folks in this area and folks who are going to do their due diligence and work closely with us as we develop projects, so folk's don't get surprised and upset.

Finally we can talk about (NIMV) and (Banana), some of my favorite terms. We all see these all the time. Transmission is difficult - transmission isn't so difficult in Ohio, but Interconnection can be more complicated. I shouldn't say sighting isn't difficult in Ohio - sighting is difficult in Ohio, but transmission bought the - there's much more transmission available in Ohio, because it is still built up.

Again I mentioned the wind projects rules in Ohio are relatively untested. There are two fairly sizeable projects that have their applications before the Public Utility Commission of Ohio at this point for siding approval. So we'll see what happens with those and again new challenges to especially environmental.

We see all the time in our area were we do have a higher concentration of population, many of the good wind locations are encroaching upon populated areas where you would, you know, 10, 15, 20 years ago would have a corn

field, now you have suburbia encroaching. And so it makes it very difficult for visual issues, noise issues, etcetera, so we're finding that more and more folks don't necessarily want their backyard impinged upon by the viewing of a wind turbine. It's interesting.

And finally my contact information and I'd be happy to answer any questions. And I've kind of raced through that, but that leaves more time for questions. So thanks, (Michelle).

(Michelle Suttleton): Thank you, Julia. I especially liked learning this new term (banana) that I hadn't heard before.

Julia Blankenship: That's a good one, huh?

(Michelle Suttleton): Well thank you, Julia and also John. Now we're going to turn to the question-and-answer portion of our webinar presentation. We have been receiving questions right along, so that's great.

If you have any questions for the speakers feel free to continue submitting them now. Use the question-and-answer tab at the top of the live meeting window. And I'm just going to start at the top and work my way down here. I had - the first question is for John. How does the CREB financing option look to NPPD as compared to an IPP arrangement?

John Richards: Thank you very much for the question. Can you hear me?

(Michelle Suttleton): I believe everyone can, yes.

John Richards: Okay good. Let me apologize. Public Utilities Regulatory Policy Act is the acronym I could not identify in my presentation. So the question is how does

CREB financing compare with independent power producing arrangements - producer arrangements?

Probably the biggest difference between CREB financing and claim renewable energy bond financing and private financing is the fact that privates have the ten-year escalating at inflation, pretty much in their pocket as long as they continue to have ten years of financing and ten years of paying of taxes. Pretty much guaranteed once a project starts.

Our experience with CREB financing is only one time that we tried to do CREB financing. We tried to get the two towers that we took down at Springview replaced with some direct dry turbines that we applied for CREB financing. We found that financing level would have been at about 25 to 33 cents on the dollar compared with what a private would have gotten if they would have done a similar project.

So I would say the disparity probably continues to exist. It still requires congress to fund it. And funding probably didn't really reach the levels that we thought were satisfactory to go forward with the project. So basically private beats it out.

(Michelle Suttleton): Julia, did you have anything you could add on that based on has AMP-Ohio had any experience with that?

Julia Blankenship: Actually we have had a little experience and we're actually just getting ready to issue bonds for CREBs. We were awarded CREBs for the Berlin project and also for an additional turbine at the JV6 project.

In the first and second rounds of the CREB allocation process through the IRS, but we have had similar experience I think to John, in the fact that the

cost of issuance for CREBs, you're going to be actually paying a 2 to 3% premium above your rate and so it's not free money, but it still can be an attractive resource if you can find somebody to take the placement of the bond.

And I'm not a finance expert, but I think one of the things that folks will find is that if they go out and try and find financial institutions who are looking at CREBs they'll find very few. We know Bank of America's doing it, but I don't know very many others.

(Michelle Suttleton): Great, thank you. The next question I have here is - this is for John. It was something you mentioned on your presentation. Someone's interested in finding out where to get a copy of the Pacific Northwest Laboratories study that you mentioned at the beginning of the presentation. And if you don't have that handy we can follow up with that and post it to the Web sites that we've mentioned.

John Richards: Actually I do not have access to that actual study, government printing office or some other sort of federal source might be a way of doing it or perhaps National Renewable Energy Lab in Golden might have some insight into that. And Larry Flowers might be able to send us an email maybe with some of that information perhaps. So sorry I can't provide that.

(Michelle Suttleton): Okay the next question here is can you talk about integration costs? Have you had problems with this because the wind doesn't blow consistently? Also have you had any problems with third-party wind developers wanting to construct wind projects in your electric service territory? If so how did you resolve the issue? So there's a couple of questions there. And I'll start with John and then maybe Julia if you have some comments you'd like to make on that to.

John Richards: Let me go with the first one, integration costs. We are doing a joint study with the federal government, National Renewable Energy Lab and the National Power - Nebraska Power Association to actually determine what those integrations costs are and that basically is a cost of running our existing generation to compensate for the fact that when the wind isn't blowing we still have to generate and provide electricity.

We've done a look at a lot of those stages have been done by Excel. They've done quite a few of them and we've basically picked a number out of the air of \$4 a megawatt hour for integration cost and we have an agreement with our partners that are off taking from our wind facilities that when we finish this study, which we're doing jointly with all of the parties in the state and we find out that it's something other than \$4 we'll correct accordingly, but we basically use that as a place holder for now.

We'll true that up when we find out the true cost. We hope to finish that study in very short order and no better what it actually costs to integrate wind in Nebraska. So as far as third-parties we have worked cooperatively with all of the entities that have approached us to date, so we don't really have an issue at this point of third-parties coming into our area and not working with us, so.

(Michelle Suttleton): Julia, did you have anything you wanted to add?

Julia Blankenship: Well I can not unfortunately address the integration cost question. With our JV6 project essentially we're integrating that into the distribution system at Bowling Green when it's operational, so you know, we're doing the time management here in our control center to make sure that we are tracking that and you know now having issues with intermittency and again I'm not the engineer, so if somebody needs more details we can get that for you.

As to the third-party developers, we don't really have service territories, because we're a municipal system here. You know, our footprints are fairly well defined. I think as it relates to potentially constructing an adjacent area is absolutely - that's going to be more of an issue, but we would hope to work with them and if there appears to be an opportunity for a partnership, a PPA or something like that we would like to do that.

(Michelle Suttleton): Great. I did get a response in here from Larry Flowers. The (PNL) State Resource Ranking study is being revised based on the high definition state wind maps that have been developed over the last five years. And a new ranking is due out from NREL by the end of 2009. And Northeast ranks three to six depending on the class category one chooses, so I just wanted to mention that.

The next question is for Julia. Have there been any voltage quality issues having the wind turbines connected to the distribution system. And if so what was experienced and what was the remedy?

John Richards: This is John. Why don't I take a stab at that? We had are two 750 kilowatt generators actually installed on a 12,470 volt distribution line, so let me talk to you about a couple of issues we found there. We did in fact have in 1998 and 1999, when we first put those two on line, a little bit of a telephone interference problem and those were not on a real strong (12-5) distribution line and so we did have a little bit of tweaking that we needed to do on our (bar) control system. So those are a couple of the issues that we addressed and found solutions for as we worked through that process.

Julia Blankenship: Thanks, John. I was talking to my mute button.

John Richards: Sorry for talking on top of your mute button.

Julia Blankenship: No, you saved me. Thank you. I was just going to point out that I can get you details if there are any, but from the operational reports that I've seen on the project we have not had that. I don't know if it's because the project is relatively small and the capacity factor is relatively low. My guess is that we may even see integration somewhat, but if somebody - the person who asked the question needs more details we can get you an answer.

(Michelle Suttleton): Okay, there's also a question for John here. Have any of these projects been located close to population centers and if so, what has been the public reaction to having wind turbines changing their view?

John Richards: Good question. I would say in Nebraska we probably have more vacant spots than most states do. And the two closest turbines that I can think of to population centers are down in Lincoln that LES put in very close to the interstate. So they weren't really located within very close proximity of any residences.

And I think really what the questioner is probably asking is, what if it's in my backyard or very close to my backyard, where I live and what if I see it on my way driving back and forth to work kind of a thing? And so I think if they see it on the way driving back and forth back to work in Nebraska it's kind of a no brainer. It's just something there that they see on their view out of their windshield. If it's in their backyard I don't think we'd quite have enough population to say that we've had this issue come up.

(Michelle Suttleton): Great.

Julia Blankenship: This is Julia. Just to - again I think it's the difference between Nebraska and Ohio. View shed has been a big issue in Ohio. There's one fairly large project that has been under development, not by AMP, but by a private developer in the east - I'm sorry the central - West Central Ohio if you will. And essentially folks want to see their pristine views of the hills and they do not want to see wind turbines, so that project has been on hold now for a while, in large part because of view shed issues. So again it really depends on the acceptance of your population to the opportunities provided by a wind project.

(Michelle Suttleton): Okay. There's a question here, can - would either of you be able to provide anymore financing details for a few example projects?

John Richards: Actually we do not ask for a financial pro forma per say for our projects at Nebraska. We basically are an off taker of just the energy and so as far as the project financing the only thing that would have to do with us as far as why we would be concerned with it would be, do they make the requirements for C-BED, Community Based Energy Development projects.

And what we do is we rely on our state to make that determination and then tell the NPPD, yes they do in fact qualify as a C-BED project. You can go ahead and sign the contract. They submit that financial pro forma to the state. They do that analysis and give us back a green light or a red light. So as far as financial pro formas from projects that we've done in house, those are probably more business proprietary than we'd like to share.

(Michelle Suttleton): Okay.

Julia Blankenship: And I would say the same for AMP-Ohio, we don't necessarily share our financial stuff. Gentleman has a specific question we'll be happy to answer it.

(Michelle Suttleton): Okay. Julia, I have a question here. Since AMP participants sell their RECs can you legitimately count the Bowling Green generation as renewable for our RPS requirements?

Julia Blankenship: Yeah and that's a great question. And the answer is technically no. RPS in Ohio though does not apply to municipals, so we are able to serve essentially as a resource of the IOUs for their REC needs. We do have one AMP member that retains their RECs and does not want to sell them, because they have their own renewable portfolio commitment internally to the municipal and that's the Village of Oberland.

So Oberland does not sell their RECs, but the others are looking to do that. But again those of you who know what the rules behind renewable energy, one megawatt of renewable energy generation generally equals one REC, but you can not separate the renewable energy attributes, the green attributes from the generation and still call your generation green. So it is a big issue, it is a tracking issue, one that we are going to have to get involved with PJM GATS and other things. So new rules for Ohio, but we're figuring it out.

(Michelle Suttleton): Great, thank you. There's one final question here and I think we kind of answered the beginning part, but I'll just read the whole thing. Did you experience any power quality issues with the wind farm? Was there any problems regarding stray currents and voltages, which I think we kind of covered. And what corrective actions were made? And this part I don't think we've discussed, are the wind turbine equipment - are wind turbines equipped with power electronics? If so, is the power electronics used for voltage or reactive power control and support?

John Richards: This is John. Let me go ahead and take this first stab at this and then Julia can chime in at the end. Let's go to the last part of that first. Most of the stuff that

we connect is - requires that they maintain a 3% voltage dip on any occurrence criteria and so that requires a pretty substantial commitment on the wind farm operators part to maintain voltages within a very prescriptive limit. It keeps our other customers from seeing this wind farm affecting their quality negatively.

So for the most part the way the wind farms that we've had installed to date count for this is they put in dynamic volt-amp reactive, DVAR active equipment. Yes, it is solid state. It is power electronics and yes it requires capacitors and reactors and it requires an electronic switch to switch the capacitors on anytime there's a low voltage of currents and switch the reactors on anytime there's a high voltage occurrence.

And requires a pretty sophisticated breaker to close without causing a big power surge, for instance the second harmonic charging current on a transformer, now that's a little maybe too technical for most people, but that's kind of the reason why there's a pretty substantial voltage dip during energization of transformers. And mitigating that second harmonic surge in (rush) is a problem that the power business as been dealing with for lots of years. So we understand the phenomenon and we're working to mitigate that.

As far as stray voltages and currents, no more than normal with the exception that we did have a little bit of a problem, like I say, with a phone line at our Springview facility and any other power quality issues? None that I can think of that would really jump to mind.

Julia Blankenship: And this is Julia and I should have started off my talk saying that I'm subbing for an engineer that had to be on the road today, so again I don't have an answer to that, but we can check on our system and provide one. But I think John's answer sounded really good.

(Michelle Suttleton): Great. Well with that we've answered all our questions and we've had two really great presentations.

Thank you so much to John and Julia, for your time today. So we're going to conclude this webinar and I wanted to let you know that if you did have questions that you haven't had a chance to post up there you can go ahead and send them to me.

My email address is on the Web site here and we'll try and get answers to the questions on the Web sites where we're posting these presentation. And I wanted to remind you again that the next webinar is scheduled for September 23 and the topic of discussion will be electric cooperative wind project case studies.

And we will begin our next year of webinars on October 21 with wind turbine maintenance. We'll have three additional webinars over the next year in January, April and July. And we're planning on those webinars to cover economic development, interconnection issues and partnering to develop wind power.

So for more information you can continue to visit the [repartners.org](http://repartners.org) Web site. We'll keep that Web site area updated with new information as we get more further along in the webinar agendas. And again you can also as I mentioned earlier go to the APPA Web site, where we will also post this information under the utility operations and renewable energy area of the [APPAnet.org](http://APPAnet.org) Web site.

And right - we actually also have a lot of other reports, articles and other resources that could be of interest to public power utility members and other

as well. They're not all member protected. Some of them are available for everybody to view. So with that I'd like to thank you all and wish you all to have a great day. Thank you so much.

John Richards: Thanks a lot, (Michelle).

Julia Blankenship: Thanks, (Michelle).

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(Michelle Suttleton): Thank you. Bye-bye, everyone.

John Richards: Bye-bye.

END