Electric Cooperative Wind Project Case Studies Webinar

September 23, 2009

Coordinator: Good morning and thank you for standing by.

All parties will be in a listen only mode for the duration of today's conference call.

Today's conference call is being recorded. If anyone has any objections you may disconnect at this time.

I would now like to turn today's call over to Mr. Bob Putnam with CH2M Hill. Sir you may begin.

Robert Putnam: Thank you. Good morning or afternoon as the case may be. My name is Bob Putnam from CH2M Hill. And I would like to welcome all of you to the latest in a series of webinars sponsored by the National Rural Electric Cooperative Association, the American Public Power Association, Western Area of Power Administration, the Department of Energy Wind and Hydro Technologies Program, National Renewable Energy Laboratory, Utility Wind Interest Group, American Wind Energy Association and the National Wind Coordinate Collaborative.

CH2M Hill is a technical support contractor to the NRECA for wind energy outreach.

The subject of today's webinar is Cooperative Case Studies. We'll be discussing the challenges as well as the benefits of developing, owning and/or purchasing power from Wind Projects as part of Electric Cooperative Resource Portfolios.

We have a distinguished panel of speakers today from Iowa Lakes Electric Cooperative, Minnkota Power Cooperative, Illinois Rural Electric Cooperative and Great River Energy.

Please feel free to submit questions electronically and we'll try to address as many of them as we can at the conclusion of all the speaker presentations.

The repartner.org web site will allow you to go back and replay the audio recording and view the presentations from this and previous webinars in the current series.

Finally I'd like to let you know that the next webinar in this series will be held on October 21, 2009. The topic will be Operation and Maintenance of Wind Projects by Consumer-Owned Utilities. So be sure to visit the repartners.org web site for future updates and registration information.

With that I'm going to introduce Rick Olesen who's Vice President of Operations and Engineering for Iowa Lakes Electric Cooperative. And Rick has held this position since 1992.

Rick has 27 years of experience in the electric utility industry. He started his career with the Texas Utilities in 1982 working for Dow's Power and Light Company progressing from helper (T&D) to upgrade to (Slimeman T&D).

In 1987 Rick moved back to Iowa to accept a position with Iowa Lakes Electric Cooperative in 1987. He progressed from Work Order and Materials Agent to Engineer and Coordinator from 1987 to 1982.

In 1982 Rick accepted a promotion in his position that a Vice President of Operations and Engineering.

Along the way Rick has completed business degrees from Iowa Lakes Community College in 1994 and Buena Vista University in 1996.

He also represents Iowa Lakes Electric Cooperative on the Advisory Board for the Iowa Lakes Community College Wind Energy and Turbine Technology Program and the Iowa Lakes Community College Scholarship Foundation.

With that I'll turn it over to Rick.

Rick Olesen: Okay. Well I'm going to try and give you folks an idea about some of the issues and challenges Iowa Lakes Electric Cooperative faced in our pursuit of a Wind Energy Project.

And with our project it involved what we would call distributed generation although variable with wind and what might be defined as a community wind application.

It utilized CREBs Financing to facilitate our (program). Because of our timeline constraints we also had to utilize what you'd call a virtual MET Tower analysis for our wind resources which is more of a simulated type MET analysis.

We're a distribution cooperative. Our system voltage is 12,470 volts. And I also want to highlight just how we acquired our turbine switch again was one of the unique challenges that we faced.

This is our footprint in Northwest Iowa. We have a fairly large geographic area that we covered.

And I wanted to highlight this slide in particular because when we look at wind resources another slide that will come up a little bit later will make a little bit more sense.

That's one of the questions I get often is did we have to despite our Wind Projects, did we have to compromise on resources.

And we'll see how that comes into play later on.

Again we're a very, very small utility and I think the rest of the presenters would probably agree that when you talk about wind energy and wind energy development the numbers get very big.

And in the utility and again we're a very capital intensive industry but when you get to the wind industry the numbers get even bigger and again we don't really - didn't really have a reference point for that at first.

And we have about 4600 miles of line, over $80 million in plant, and again that's kind of a reference point for us. It took us 60 years to develop that. And yet with the Wind Energy Project in about 18 months we spent $43 million so a little bit different price point than we're used to in our industry.

Our system demand is about 106 Megawatts. Actually this slide is a little bit out-of-date. Our sales now exceed about 600 million Kilowatt hours. We're a little bit unique in the cooperative industry in that about 60% of our sales are commercial industry customers.

And again one of the attributes of our system is we do have very, very good wind resources available to us.

We have looked at or had looked at wind energy or renewables for quite sometime. We do strategic planning with our Board at a minimum of every two years.

And renewables, wind energy especially came up quite often in those discussions as a very high priority and one of our top initiatives that we would come out of our strategic planning with. We did do a formal business plan in 2004.

And that was a no go though. The economics just did not work out for us. We couldn't get it to pencil out.

But our Board again did have a very high interest in maintaining, you know, the pursuit of some renewable energy or especially Wind Energy Project for the cooperative and for our member owners. We saw a lot of outside companies coming into Northwest Iowa both nationally and international companies leveraging the resources that were available to us because of our area here and so the Board kept asking if those companies can do it why can't we do it.

And so again every strategic plan definitely had wind energy or renewables as a high priority item.

From 2004 to 2007 we did have some changes across our system that did impact how we looked at pursuing a Wind Energy Project. One of them was the development of the ethanol industry. We have three large ethanol plants

that are on our lines and I guess as we've all found out in the upper Midwest if you get an ethanol plant on your system you face some challenges.

But there are some things that you do that definitely enhance the potential for wind.

And one of those for us was larger substations and the related infrastructure that goes along with it. And once we had a few of these plants on line we had some history with them. We found again very high load factors, sometimes exceeding 94%.

So you knew you had a load that was going to be there if you could couple a generation system to it.

Another thing and probably one of the major items was the development of Clean Renewable Energy Bonds or CREBs as they're known. And a way, a mechanism for a non-profit like our selves like a cooperative to facilitate the financing which is extremely critical. Again it's a very, very expensive undertaking with a Wind Project.

And while they aren't the financial equivalent of a Production Tax Credit which has traditionally driven the wind industry and has been kind of up and down but those are close to 2 Cents a Kilowatt hour I think right now, the PTCs. But again they have no value to us and then the development of other alternative incentives either on a state or federal level.

And with that those changes in mind in 2007 we did come up with a concept and again a way to answer our Board's desire to pursue a Wind Energy Project.

And that concept involved two sites at two of our existing ethanol plants at the Superior, Iowa, excuse me, and at Lakota, Iowa.

And the issue or the concept was since we couldn't take advantage of economy of scale like the outside corporations that the Florida Power & Light, Iberdrolas that come into our area and will put up 100 to 200 Megawatt project, we couldn't afford to go to that level of economy of scale.

How could we leverage our existing infrastructure and deploy as many turbines as possible without adding the transmission level connection?

And again some of those larger substations that we had to build to provide energy to an ethanol plant were an early target along with a high load factor that they provided.

We did apply in 2007 for a CREB, actually two CREBs applications and that became kind of our go or no go factor for Iowa Lakes. Once we had financing a lot of other things would fall into place.

But with us we needed to be able to have that access to capital before we could take the next step.

We had two Wind Energy Projects and that was a strategy in itself. We could apply for one CREB but in watching earlier applications we found that they approved these from the smallest CREB application to the largest.

And we looked in the previous year what had happened and usually there were more CREB applications than there were funds.

And so we did split our application into two $21.5 million applications and with each individual application being for one Superior and one for the Lakota site.

And we found out in December of 2007 that we would - we were successful and our - both applications were approved. If we would have had one or the other be approved then we would've went forward with just one project.

But however both of them were approved and it worked out real well for us. Once we found out of course we had capital available. People did work with us in a little bit different fashion in that we did have capital available and they took us a little bit more seriously.

Here's what the slide that I was talking about as far as the - our location in Northwest Iowa and the average wind speeds that are available.

And you'll see that in Northwest Iowa that yellow area there, we have excellent wind resources in our area so we did not have to compromise as far as wind resources where we sited these two plants.

And the next slide, I'll kind of show you again where those two ethanol plants are at the northern end of our system where we do have better wind resources in our area.

And the next slide I'm going to go to you'll have to kind of bear with me. We'll go to this slide. That's going to show, this is how we summed it up for our members.

And again there was a lot of public relations involved in setting this strategy out there.

But again we have our two ethanol plants with a traditional coal-fired plant for the most part providing energy over our facilities to energize that. Our concept was to put as many wind turbines in this case seven GE 1.5 Megawatt turbines in place to serve that facility. Again it was a very complementary project in that whenever you have wind you have a load there that is willing to take all that energy provided.

And so again the concept was very simple, very straightforward but again gave us the ability to forego putting a transmission level connection out there, leverage the facilities that we already had in place and serve a customer in a way that we couldn't before.

Go down to the next slide.

In our area this is a very common theme of large industrial type wind farm. We have these, several of these across our service area. Actually we serve them for their collection stations.

And again with our plant instead of the large industrial look like this. This is actually our Superior site and you can see the (real) site and going into the ethanol plant but again seven 1.5 Megawatt turbines providing energy to a renewable - another renewable energy facility, an ethanol plant.

And I'll give you a little background on the other issue that we came up with right off. Even though we had our CREB Financing in place and people were a little bit more willing to listen to us, turbine availability was severely limited in 2007. This was before the economy crashed.

And the wind industry was feeling the pinch with more orders than turbines were available.

So you're talking at that time about a two year lead time to get turbines and with an order of our size, 8 to 10 to 14 turbines, we had a very difficult time getting interest from vendors. In fact we had two vendors that pretty much laughed at us when we talked about 10 to 12 to 14 turbines.

So we did have to look at developing a partnership and again I - one thing I'd like to make very clear and if it wasn't for Basin Electric stepping in and allowing us to ride along on a RFP that they were issuing we would not have a Wind Project.

And we did - we were able to carve out a position on an RFP that Basin was issuing. We needed 14 turbines at the 1.5 Megawatt level.

And then actually turbines became available when somebody else reneged on an order and in January of 2008 our 14 turbines were offered to us as long as we took delivery by September of 2008.

So that presented a whole another set of challenges to us.

We did look at turbines. We looked at all the major manufacturers and we found. You can see there's quite a difference here with the different variety of manufacturers in a business model that we utilized. Different turbines did provide different performance factors.

And so that's one thing we found out that there was quite a difference. Our consulting, when we were trying to acquire turbines and we weren't garnering much interest, kind of came up with a statement that summed it up pretty well.

Sometimes the best turbine is the one that you can get because at that time with turbine supply being very, very constrained, we were just trying to get anything we could.

But however we ended up after working with Basin came up with a very good reliable turbine and worked out, in the end worked out very good for us.

As far as financing again you have to have turbines. You have to have the wind resources available.

But also you have to have the money to make the project a go. And again we did apply for CREBs in July of 2007 and December of 2007 we were awarded $43 million in CREB Financing.

A couple things that you need to know about CREBs that again it was all new to us. We hadn't done anything like this in the past and there isn't actually a whole lot of history with CREBs and CREBs being issued by cooperatives for these types of projects.

Again they're meant to be the equivalent of the Production Tax Credit but they aren't. The legislative intent that was developed when they came out and again our state senator, Iowa Senator Chuck Grassley was one of the instrumental people in developing CREBs, was that there was supposed to be equivalent of a zero interest loan with 100% financing in the project.

Payback period that could float between 14 and 17 years with levelized payments; you make one payment per year.

And that interest rate is subject to change as we found out later. We requested 100% financing on our project and again applied for two separate CREBs which we were successful on.

Again one of the things that you really want to be aware of is that the terms of the transaction because it is a bond issue, will not be known until the day that that transaction closes.

The CREB term is set monthly. So every month the Treasury Department will set the repayment term and that could be anywhere between 14 and 17 years. Our particular term on ours ended up being 15 years which is what we had projected.

But again when the economy tanked that kind of floated around a little bit. The other thing is the actual rate that those bonds would be issued at. That's all dependent on the treasury.

And we had a very, very difficult time when we first decided to issue our bonds in the spring of 2008. We pulled them back. Because at that time there was significant what they call investor discounts that could significantly impact the amount that you would yield from that bond issue. With ours it could have affected ours by about $3.5 million that it would have negatively impact our bond issue.

And so we held ours back and again worked with NRECA, (CSC) and Senator Charles Grassley to reconcile the issues that treasury was having in pricing these bonds.

And in December of or January of 2009 Senator Grassley's office was successful in having treasury reassess how they price those bonds and we did

issue our bonds in March of 2009. We waited that entire time because of that pricing issue.

And we were successful though in acquiring or issuing those bonds and it does yield 100% financing at a zero percent interest rate.

We ended up issuing those bonds and they were purchased wholly by CoBank.

And again that worked out very well for Iowa Lakes and a lot of thanks to go out to Senator Grassley, NRECA, (CSC) and especially CoBank to make that happen.

The other thing again when the business plan we did in 2004, again I said that was a no go, and this will illustrate again the financial impact of having CREB Financing available over conventional financing. And again for us in 2004 that was a negative. So that pretty well - I hope this slide is again its all relative. Not specific to our project. But again that will show the relative impact of the CREBs alone on a project.

Next issue that came up, since we - when we got access to turbines, one thing you'll find out in the wind industry is when you purchase turbines its 20% down and no refund.

And so we had to place $7 million down as a down payment on our turbines in January of 2008 and take delivery of those same turbines in December of 2008.

With us that meant we had some issues. Usually all the large wind manufacturers want usually one to two years of MET Tower information or

wind data from your specific site before they'll allow you to purchase their turbines. That was not available to us because of our timeline.

So we did an initial wind analysis with a company called AWS Truewind out of New York. And to show that the resources would yield a certain amount of production on our sites. Our micro-citing and complete analysis was done by a company called WindLogics out of Minneapolis, Minnesota. A company I'd highly recommend.

But it took a lot of cooperation and collaboration between WindLogics, ourselves, our landowners, GE Wind and our techs out in the field because we did have to kind of scramble to get our system designed, our road designed and make sure that we have the simulated MET Tower information to GE so they would accept our project.

And that didn't take place until actually October of 2008. A lot of phone conferences with people from across the GE organization and both domestically and in Europe but we finally got that job done.

And I really got to take my hat off to the folks at GE and WindLogics. They really were cooperative and made things work.

Here's an example of one of our wind sites. And you'll see the red areas where we ended up with turbines. This site encompasses about 7-800 acres. One of the issues that came up is you sign people up for land leases for about 7-800 acres you can see these areas here, these are the setbacks on a road. And I'll show you are other site.

When you finally incorporate all the setbacks for houses, for roads, right-of-way, the actual land that you can actually place a turbine on gets squeezed down by almost 50%.

And so again when you're out there signing land leases that's something to take into consideration working with your zoning folks a little bit ahead of time to make sure you do have enough land leases to actually place the amount of turbines you're trying to site because things are going to come up and you're going to have to move a turbine here or there.

And in ours we had a very, very compact design and so moving one turbine affected all turbines.

Also the next things is again just the effect of those wind resources. Wind is variable and it's variable from year-to-year.

One of the benefits by being in Northwest Iowa and I assume probably the same thing if you were in Southwest Minnesota, there's a lot of wind data available. You can get 40 years worth of data hour by hour.

But again your Board needs to be aware that the wind resources from year-to-year can really impact what your project looks like and it's how you site those turbines on here can affect how you utilize those wind resources.

So there is a wide range over the best resources and average resources on the financial production of your plant.

And so it's something that you want to - if you have a down year, again you want to be able to account for that.

We did run into just a few issues also with sighting. Large wind farms again have come in ahead of us.

And so they did cause some problems for us. When we were trying to sign leases we were welcomed with open arms but however when we went to a Zoning Meeting to get a conditional use zoning permit for our project, one of the things we did run into is we ran into some opposition. That kind of surprised us.

And just a few people and that's all - just three people, can cause some roadblocks for you when you're dealing with a County Board or Supervisors and zoning folks. However we did work through that in a proactive manner trying to address the issues in a reasonable and practical manner to address concerns.

And then actually we had one Supervisor, County Supervisor who was just anti-wind. And so we had to address those on a different level.

But again that was something that we weren't quite prepared for. We worked through it. But our initial response from the community was so good that we kind of overestimated that it was going to be received at the - with the same manner at the political level with both the Zoning Board and the Board of Supervisors.

And again a lot of people are for wind in Northern Iowa but there's a lot of people that have issues with it as well. A lot of them if they aren't receiving a land lease, again there's that factor where they don't like to see something happen maybe that's positive for their neighbor and that they missed out. Politics to be involved; even though there's a great increase in property value

and taxes that go to the county, some people actually see it as a reduction of their property value if they have a nice home or whatever.

And we were out in a very industrial area. And these three people all tried to play the issue of property value reduction.

There's also the perceived value or issue that the utility is coming in and doing something I guess in the name of big money interest. And again with a cooperative that didn't fly very well and we again were local. We've been here. We have a good reputation and so that didn't catch much momentum there.

Voltage issues again, ethanol plants are great loads. However they're very, very sensitive to power quality issues. We did our due diligence with our own engineering consultant and also with GE Consulting.

Our actual worse case scenario is to have 10 or 12 Megawatts of generation on line and then have a fault or something on the collection system that would take that 10 or 12 Megawatts of generation off line in an instant and then provide some sort of flicker or blink to the customer. With an ethanol plant would cause probably a shutdown.

And then the noise issue. And again all these were thrown up as being possible issues. And we refuted them with data and now with our performance in the field, we've had the County Supervisors out there. And again all of them are very, very happy with the end result and that noise, the other flicker issues that customers were worried about are not an issue.

And so it is something to be aware of though. There is a movement nationally that tries to push this wind turbine syndrome and some of that came up in our

zoning discussions. You have to work with the FAA microwave towers, again the shadow flicker which hasn't turned out to be an issue. Lightning hasn't turned out to be an issue.

And then just the visual esthetics, again ours we think is fairly esthetic in how it blends in with the area. Of course we're parked right next to an ethanol plant and so we actually look very well, very good compared to that.

One last thing as far as considerations for - and that's the revenue stream that you're going to have. You know you've got your finance and you've got your turbines and you went through the sitingissues. How are you going to pay for the plants in an ongoing manner?

And there is quite a bit of difference. Because you're looking at kilowatt hour production, everything is very, very rate sensitive. And your production contract is your primary source of revenue.

And just looking at a chart, again this isn't our project specifically but it does show you the different price points and how it can significantly impact the financial production of your plant.

And again we did quite a bit of modeling, a lot of what-ifs scenarios. And showed our Board different issues on how we would repay our CREBs.

Our revenue streams come from a variety of sources.

And back one here; kind of skipped over.

And again there's federal incentives, state incentives. We were able to access what we call a 476B state incentive and definitely improved our payback period and our breakeven point by about five to seven years.

And but the big thing is your (PPA) rate from your - and we're a distribution cooperative so we technically can't own generation so we have to actually sell our generation back to Corn Belt Power Cooperative at the substation bus.

And subsequently they've joined Basin so we do have a (PPA) now with Basin Electric.

The green tags are a very, very new area. There's not a lot of history there and again very volatile, up and down. Right now they're down.

And so we have kept those as an option. Right now we sell them as a part of our (PPA) but that's something again you want to consider. If there is a potential upside the green tags may be a big part of that.

And then of course your federal incentive is REPI and talk about that a little bit. We were very conservative on that because that's been over subscribed over the years and we looked historically at what was paid out. And so we've estimated that we'll get about an 18% portion of that available incentive because again a lot of Wind Projects are coming on line and do try and access that renewable, that federal renewable energy production incentive. So we figured out about an 18% portion of that that would come back to us.

The other thing that you want to be aware of, when we first started down our second try on a business plan we were just going to do one or two turbines. And the first thing the consultant came back to me with was well how much money do you want to lose.

And that's where we kind of made the turn from a one Turbine Project that was more of a public relations issue to a, what we call a mini wind farm that is really an investment and a future revenue stream for the cooperative.

Yeah, a decision point for us. Do we want to just do one and maybe lose money on this deal or do we want to go out and do something a little bit bigger, make a bigger commitment?

Again one of the things that we avoided that as you get into the large wind farms, our system integration. At our level both on the state and even within the MISO Group we kind of flew under the radar here. Now that Corn Belt has gone to Basin we did do a System Impact Study to make sure we could get our system accredited.

And that was for us in excess of six figures but very, very inexpensive when you look at the larger wind farms. By connecting to existing substations we avoided about $2.5 million per substation per site to build a standalone collection station.

And as you go with the larger projects of course that would be a pretty small number I'm sure compared to what the 100 or 200 Megawatt wind farms would invest in both their substation and transmission facilities.

But again we had no transmission cost because we utilized our existing facilities.

And I guess to kind of sum things up, you know, the wind industry has changed a lot over the last five to ten years. We've seen that physically in our area and we've experienced it by doing two business plans. What was

common sense a few years ago really doesn't apply any longer and with the financial meltdown that occurred last year I think the rules kind of got changed again.

It's a very dynamic environment, not a lot of experts in the wind industry. A lot of people may say they are but not a lot of people you can go to for a template.

And again distribution wind, especially for cooperatives like ourselves is something that the larger developers kind of overlooked. I know the vendors like GE are I guess who are interested or maybe curious about distribution wind especially when the financial markets tumbled last year. A lot of projects got put on hold.

And actually GE and some of the other vendors kind of turned to utilities as a, again a future area for sales even though they may not be the big sales, a lot more reliable way to sell your turbines and assure that payment is going to be made.

And again not a real sweet spot for large developers though but it was a sweet spot for us. And again sitinga Wind Project with an ethanol plant was a very complementary project.

I would like to acknowledge again our consultant, Skip McClimans with WorleyParsons. Again we all learned a lot on this. But again Skip was a very, very good resource, did things right.

GE Wind for a company that was supposed to be very inflexible turned out to be very flexible with us. And they were intrigued by our project and the concept and supported us all the way through.

WindLogics again that's our wind resource analysis, again very, very flexible in their approach to things, and just because it hadn't been done before they - doesn't mean that they wouldn't try and they did work through us with that.

Basin, a turbine acquisition, provided us a way to get turbines.

And Wanzek was our balance-of-plant contractor. We built our own collection system because that's what we do. We know how to do that. But everything else was all new to us and we needed an expert and they provided that expertise in a very, very good manner.

So with that I'll move onto the next speaker. Thank you.

Robert Putnam: Okay, thanks Rick. Our next speaker is going to be Wally Lang from Minnkota Power Cooperative. (Larry) or Wally graduated from the University of North Dakota in 1974 with a Bachelor's Degree in electrical engineering.

He's been a Minnkota employee for 35 years. Started as a Project Engineer in the Substation Department and has had various positions over the intervening years, Director of Engineering in 1992, recently VP Transmission since 2002.

So with that I'll turn it over to Wally. Thanks.

Wally Lang: Thank you very much Bob. As Bob indicated my title is Vice President of Transmission.

And you may be asking yourself what's a transmission guy doing talking about wind?

Actually the presentation or this webinar was supposed to be done by (Al Chapin) who is our wind guy here but he was busy today and I was very involved in our Wind Project.

And he asked if I would do that for him.

And I also remind my peer who's the Vice President of Trans or of Generation that the power system, like a high performance car is only as good as its transmission so transmission certainly plays a big part in any kind of generation development.

If you were to summarize Minnkota's experience, I did it this way. I said it was from dabbling to whole hog emersion. And I'll get into a little bit about what I mean when I say that.

And I'll also say that a lot of times you hear the expression North Dakota, the Saudi Arabia of oil or of wind, I - not exactly sure what that means.

But I guess I take it to mean that what oil is to Saudi Arabia, wind is to North Dakota.

And I'd also like to point out our service territory straddles the North Dakota/Minnesota border. We have 11 member owners. We're a generation transmission cooperative.

Our primary base load generation is in Western North Dakota, lignite-fired coal. We also have an association with municipal agency of 12 small communities or smaller cities in our service territory.

Minnkota as you might expect being as far north as we are, usually winter peaking system, and just keep in mind that we live here so that you don't have to.

And it is sometimes an advantage to be a winter peaking system especially if you're in a summer peaking pool because of the diversity that you get.

Minnkota and again talking about the dabbling part of it, Minnkota does have some bragging rates. We did actually get involved in the first commercial scale wind turbine in North Dakota. It was a 900 KW unit along I-94 built in 2002 and it's connected to the Minnkota 69 (PV) sub-transmission system.

To get an idea what we're talking about in terms of where Valley City is, it is actually just basically west of Fargo roughly about 60 miles to kind of give you a perspective of where that turbine is.

And if you ever drive along Interstate 94 it's very visible. In fact the landscape of North Dakota is changing. I've heard North Dakota is sometimes described by people driving across it as a sea of (sameness). With all the wind turbines going up, I guess it isn't the sea of (sameness) anymore.

The second turbine that we got involved in was also just a single unit; identical turbine, same manufacturer, everything. But the big difference between the two was that it was connected to one of our member owners distribution line at 12.5 (KD) line and certainly we didn't know what the impact might be in terms of power quality.

And we have kind of a nice case study about connecting a turbine to a distribution line. That's about ten miles out from a distribution substation. We

did quite a bit of analysis. And there certainly were some power quality issues but nothing too major.

Again to give you a perspective of where that second turbine is, it's along Highway 2 of about 70 or 80 miles north of the Valley City turbine.

The two turbines that I was making reference to grew out of member interest especially in the service areas around our urban areas, Fargo, Grand Forks, Bemidji; seemed like people were really interested in being able to say that they get some of their wind power from or get some of their electricity from wind power.

And to respond to that we agreed to put in some wind turbines and under a subscription program through our member owners we installed these wind turbines because at that time the market did not support the cost of wind generation.

And so it was dedicated to subscribers that were willing to pay a little extra on their power bill each month to basically finance that.

Between 2002 and 2007 kind of the novelty of actually having the first wind turbine kind of wore off a little bit. And as a result Minnkota kind of went from being the first, you know, having the first commercial wind turbine. We were basically last in terms of the wind production. There's other wind farms were taking hold in North Dakota.

However during that kind of timeout period if you want to call it that there was kind of a city drum beat that utilities should be adding wind generation to their resource portfolios and especially with the mandates and the objectives that were being instituted by the state legislatures, Minnesota hits 25% by

2025 and actually a mandate in North Dakota is 15. It actually should be 10% by 2015.

And the fact that electric energy markets were steadily increasing we made a change in our direction and so in a sense we were kind of seeing the writing on the wall and the fact that these energy markets now supported wind, Minnkota felt that it was in a pretty good position to grab some of the low-hanging fruit.

And if we don't get involved early on in light of these mandates and objectives it would be important that we get going on it.

And so when you consider that we're in a wind resource rich area, we have a lot of transmission infrastructure, it made sense at least it seemed to us to get involved in a bigger way.

I'd like to point out. This is a wind resource map of North Dakota. It's one that you see if you go on a web site that is common. I'd just like to point out the - what is referred to as the Pembina Escarpment.

And I pointed out here because I make reference to it later on so I wanted you to be able to see what I'm talking about. And if you remember the slide where I talk about our service territory you recognize that this Pembina Escarpment which is a wind resource rich area, basically is within our service territory.

Getting involved in a big way was a little different than what Rick's presentation was in that we opted not to put our energies into actually becoming a wind developer. Rather we went out and sought RFPs and we evaluated many.

And there's a lot of stories to tell about that. And my favorite one is one individual or one developer who claimed that he could not only set up a wind farm but he would also produce hydrogen and store it and then burn it in a gas turbine.

And so we'd effectively have a base load totally renewable unit and he was actually wanting - and he was quoting prices that were competitive with other wind developers that didn't do all that aspect of wind generation.

And it seemed a little hokey at the time and we really realized it was hokey when all of a sudden one day three people showed up at our office, a lawyer and a couple other people, finance guys and they're asking if we know this individual.

And we said, "Well yeah. We've been dealing with him."

And they said, "Well we're looking for him. Can you tell us where he is?"

And we said, "Well no. We don't really know where he is." But we said, "Why do you ask?"

And he said, "Well he's taking some of our money and he's left with it basically."

And so there's a lot of kind of shysters out there that we had to sort through and find out which ones were for real and which ones were not.

The two that showed the most promise however were related to a Langdon site which is in the north end of that Pembina Escarpment. And the other one

was a more community-based group at the south end of that Pembina Escarpment that I pointed out earlier.

To give you a sense of where those are, the Ashtabula site is the star on the south side and the Langdon site is the star on the north side of that Pembina Escarpment.

In both cases of the development we had a partner with an investor on the utility of Otter Tail Power. Otter Tail service territory and Minnkota service territory overlay each other. Otter Tail and Minnkota operate a joint transmission system because our service territories overlap.

And Otter Tail is also interested in expanding or adding wind to it's generation portfolio because they were faced with the same mandate that Minnkota is faced with.

The thing that drove us to going with a developer, again Minnkota is a non-taxable cooperative at least income tax. And so we could not take advantage of the Production Tax Credit the way a taxable entity could.

And so it made sense for us since we have not focused any of our energies in terms of becoming a wind developer ourselves to turn it over to somebody else that kind of had a lot of experience and also was able to take advantage of the Production Tax Credit.

The Langdon Project required the construction of 35 miles of 1.15 (KD) line.

And it turned out that Otter Tail had a 41.6 line basically along that same route that they didn't need very much anymore and made their right-of-way available basically to construct this 1.15 (KD) line. And that was a big plus in

terms of meeting timeline because we had access to the right-of-way from the get go and it just made the going a lot easier for getting that line built.

Meanwhile this other developer, the one at the Ashtabula site had trouble getting it's act together. But we continued talking to them. Again we had a fairly significant appetite for wind and wanted to diversify it a little bit in terms of not putting all of our eggs into one developer basket.

The Langdon end of things actually developed beyond our original amount that we had requested in that NextEra which was the developer of the Langdon site and again NextEra for those of you who aren't familiar with it is really Florida Power and Light.

And they said we could put another 40 Megawatts up there if you are interested. We again were having trouble with the other developer getting it back together. We said, "Well sure, we'll sign on for another 40 Megawatts."

But at that point that was kind of the limit because our transmission was maxed out at that point.

Negotiations were somewhat stalling out with the Ashtabula site developer. And as it turned out NextEra, the one that we were working with the developer, we were working at the Langdon site was also planning a wind farm just adjacent basically to the other developer that we'd been dealing with.

Again with Minnkota's appetite for wind being quite large Minnkota offered and Otter Tail together to build a generator outlet line that basically tied the sites that these two developers were working together on to a - to the grid near Fargo.

And you can see it's a nice straight line. The Mpower site, the Mpower was the company that we were - one of the developers with the NextEra site was just south of that.

And we had proposed to build a generator outlet line from between those two sites into the Fargo area.

The concept was to build a line that followed a railroad track which happened to go through there. The idea was great but it didn't turn out nearly as straight as we had hoped it would but as you can see by the red line on this map, the line with a lot more jogs in it and not nearly as straight as we had hoped it might be and which of course added to the cost.

The generator outlet line we dubbed the park-n-ride line because if you go to an airport and you have long term parking you can park your car offsite and they'll give you a ride from that parking lot to the airport. This was a park-n-ride sub in that it enabled the developers to connect to a convenient central point and we would take the responsibility, we being Minnkota and Otter Tail, take the responsibility of getting it connected to the grid about 60 miles away.

Getting a generator outlet line built in the timeframe we're talking about was a huge challenge, ten months from idea to reality. And it was a race to beat the PTC, the Production Tax Credit because at that point there was no assurance that the PTC would get extended.

And it also became the subject of a (FER) complaint because of other developers in the area were concerned about what was - what Minnkota and Otter Tail were doing.

End result was that Minnkota signed on for another 99 Megawatts in the - in 2008 again with NextEra as it turns out. The original developer, the Mpower Group, was still having trouble getting its financing put together. And eventually they folded their tent and they basically sold out their project to NextEra and Otter Tail because again Otter Tail is also interested in developing generation. And being a taxable entity they could take advantage of the Production Tax Credit as an owner also.

Minnkota ended up with close to 360 Megawatts of wind generation, virtually all that under contract.

And I'll just step through. Again the first two are the ones that we own whereas the remaining ones are all owned by developers.

And you can see how they stacked up into our resource portfolio. So in a matter of basically you could say three years we went from virtually nothing to about 360 Megawatts and again that's name plate capacity.

One of the things that we are active in doing is educating the public about wind generation. Originally when the Infinity or the Valley City and Petersburg sites were put on, we actually connected it to our web site so that anyone could go on the web site anywhere in the world and actually look at the last 24 hours of production from our wind turbines at both Valley City and Petersburg.

And we also did get permission from NextEra to display the output, at least Minnkota's part of the output of the wind farms so if you go on our web site which is www.minnkota.com and look under Wind Energy you can look at the last 24 hour productions of any of our wind sites.

And Minnkota being a 1000 Megawatt system wind resources comprise roughly 30% of our energy sales to our member owners which I understand is probably the highest in the nation in terms of percentage wise.

The general info related to these wind developments, we have information that the annual capacity factor is roughly - is actually over 40% more like 42%.

Minnkota has an extensive load management system which complements the wind resources. Minnkota does have any gas-fired peaking plants. But we have a significant (unintelligible) peak time of 350 Megawatts.

Minnkota did retain all the green tags which right now are not very valuable but we do have them.

Certainly some of the biggest challenges we faced and getting a grid connection approval is a very daunting undertaking. Minnkota is not a member of MISO. We are part of (MAP). And so that was the governing authority. We had some advantage from not being part of MISO because we're able to get the studies done more quickly than if we had been in the MISO (queue). And even at that it still took a very substantial effort to make it all happen.

Certainly getting over 100 miles of high voltage line built in two years was a big task that we undertook.

And it took a year to settle the (FER) complaint.

So I'd like to think that, you know, this kind of has a happily ever after story. Well its not quite that - at least not yet. And I'll allude a little bit to that and certainly Rick mentioned it also that the economic recession put a lot of dollar

pressure on the power pool prices. And they've dropped 2 Cents per Kilowatt hour and sometimes more.

And as a result Minnkota will actually have to institute a rate increase because the revenue that we were expecting from our surplus sales from the wind is not paying for itself the way it was envisioned when we entered into this contract.

I'd like to summarize by saying that there you have it. This is really the good, the bad, and the ugly of Minnkota's wind experience.

And with that I'll turn it over to the next speaker.

Robert Putnam: Thanks Wally. Our next speaker is going to be Sean Middleton. Sean is the Manager of Engineering at Illinois Rural Electric Cooperative, a midsized co-op serving approximately 10,000 meters and 3,000 miles of distribution line in West Central Illinois.

He's currently responsible for all new technology applications at the cooperative including engineering and IT.

Sean received his Bachelor's Degree in electrical engineering from Bradley University in 1996.

He currently is a member of the Institute of Electrical and Electronic Engineers, (IEEE) including the Power Engineering Society and a member of the National Society of Professional Engineers in the Illinois Branch. Additionally sits on the Information and Digital Technologies Communications Member Advisory Group which is a branch of Cooperative

Research Network under the National Rural Electrical Cooperative Association.

With that I'll turn it over to Sean.

Sean Middleton: Thank you very much Bob. Now I think what we're going to do here is we're going to - with my presentation of course we're going to shift gears completely and, you know, these guys have all talked about pretty small projects or large projects I guess.

And, you know, the scope and size that they're talking is much different focus than obviously what we put in when we did this project.

I got to set this thing back to the front. It looks like it started at the end.

All right, I apologize for that. Okay. Again our take on trying to utilize wind technology, we were at a different focus. We're a distribution electric cooperative as well.

And we have about oh 10,600 meters, something like that here in Western Illinois. So we're a pretty medium sized distribution cooperative.

And we began looking at wind and try to see what we could do or if there was an opportunity. And I could tell you, one of the things that brought this up was, you know, we began pulling our membership. And this is in back as early as 2002, probably, you know, one of the times they were talking about putting in one of their turbines.

And asking our membership, should we be involved in wind?

And the overwhelming response was of - yes, we wanted it. It was that they wanted to see us do something like that.

So we've been looking at this for a while. And trying to see what we could do with our scope and size. And really it's when we took on the position of possibly doing a distribution and a connection but doing a small project. And we were thinking of a one Turbine Project.

And I'm kind of used to doing some of this background just to kind of let you know as a - you know, differentiate our project from the other guys that have spoken a little bit. You know we brought this up. We wanted to do something with wind and connect on distribution side.

And because of that, you know, and the time when we did this the game was a little bit different back then, you know, as far as what we were able to do.

Let me just jump into this then because of why we brought this up. Why should we get involved?

And it was kind of talking back to the discussion what I was bringing up and what our membership, they said they wanted to see us do it.

But we know there's all kinds of other great benefits that comes out from doing something like this that you can read there. And we also know and of course the U.S. is now a leader with wind technology. But we know that the more turbines put into use the more development is driven by that.

And we believe it's going to help, I mean steel increases - steel price increases haven't helped some of the things. And we know lead times are out there because the demand is so high.

But we believe that that's going to help promote technology changes to making these things better, more efficient.

One of the neat characteristics of the turbine that we got, and I'll speak to that in a minute, was the fact that it was able to cut in at a much lower wind speed. I would love to have the 40% plus capacity factors that my colleague there was speaking about but unfortunately here in Central Illinois I'm lucky to get 30. And that puts a whole different spin on how we're able to do a project like this. And obviously we've got to make it still financially feasible.

So I'm going to kind of jump through and mention first thing is first. Obviously and, you know, one of the guys was talking about identifying the wind and that being one of the key factors. We did, when we first decided we were going to look into this we did start studying wind then.

We were either able to coordinate with some existing towers that we had or I found it interesting to just find local radio stations that had an existing tower and rent some space off them for a pretty good price rather than buying expensive MET Tower equipment and things like that.

So it's kind of interesting how you can jump into relationships like that with the community.

But we're able to start studying wind and find it out. And he's right that most people want to - most bankers, financing authorities want to see a year, two years, they want to see some real data before they put up over money on something like this.

So I say that's one of the key factors. We also know I guess just kind of stepping through my slide at first thing is first, what's going to be the interconnection. You've heard some guys with some pretty large connections but yet still distribution level or transmission level connections. You know that's a very key question to be answered as you're jumping into a project like this.

The scope and the size of the project really is dictated by internal factors and some of these other logistics as well. In our case like I said, I guess I'll speak to that quickly. One of the things in our area they've been looking at wind for a little while and so there was a determination of, you know, would it work. Would it be feasible? And people had questions and concerns, you know.

So as a result of that scenario that's when our turbine decided to seek a single Turbine Project just to we call it more of a springboard project. Trying to stir development and see what we could do with that.

Okay, as far as my other key things there, back to my slide is trying to figure out where the money comes from is another key factor. I am going to jump through back since we're going into the wind. This is the NREL, National Renewable Energy Labs Map Study of Illinois.

And this is the map we looked at back in 2002, 2003 when we began looking at this.

And again this isn't real wind data. If you want real wind data you're out there with anemometers and wind measuring equipment to determine what is there.

But these are studies of topology to make a rough assessment of where they believe wind resource is. Obviously it's got to be field verified with real equipment.

But when you look at this territory if you look toward West Central just west of Springfield and south of Quincy, our territory looks kind of like Texas. I've got it outlined in blue there.

And in that area most of those resource, again Illinois doesn't have near the resources that Minnesota, Iowa and those places have but the darker orange is more of a Class IIs and IIIs.

But there's a pocket of pink there which they consider to be Class IV resource in our territory.

And it was when we looked to this map trying to see, you know, would that work, is that real and could we quantify that and could we make a project like that work there?

So that's kind of was the springboard for us to see where we could - what we could do with it.

I've kind of talked to this slide here. But we also know that in order to measure the wind correctly we got to get your own data. It's got to be pretty close to the site. We started measuring wind to the tower ten plus miles away from where we ended up siting the turbine.

And you can use that data to help correlate but again going to a financier here over who's going to help provide money for something like this, they really

want to try to get - a lot of times they were mentioning, you know, fairly close within a few miles of where you're actually going to site.

In our case we ended up finding another tower, one of these radio towers I mentioned that was within a mile of the site and was able to get data from far away sites, local airports and some others and do a pretty good correlation on verifying our resource.

So that's kind of, you know, the logistics of that. The interconnection then, you know, obviously there is a potential for transmission interconnection. The larger farms are going in that direction because of the sheer scope of magnitude.

You know there's a funny side note to a project like this. And you heard about the long transition line had to be built to bring it to where it is because you can have the wind but if you don't have load it doesn't do any good.

In our area where we're at and we're very - I saw that one slide, 60% or 40% commercial. In our territory we're less than 10% commercial industry so very high residential agricultural. So we don't have a lot of that type of load center, I would dare say, in our whole region.

If we built a 50 to 100 turbine farm which is possible they believe with the resource that's there, there's not enough load in all of the towns close to us. The only possibility in our area would get on a transmission line that sends power to St. Louis or up to Keokuk, Iowa or somewhere there that they've got a load center because right where we're at in West Central Illinois several 100 Megawatts of energy is way - we don't have a load for it I guess is the point I'm trying to make.

But obviously with the transmission interconnection several key things to consider that you've heard lots of detail about, and of course that's not my focus so we'll kind of jump on through to our side. On the distribution side and there was some interesting logistics to how we built this turbine and what we were able to do. We do know that manufacturers are all talking about this proximity to your substation.

And it really is, I've heard it described on our turbine which is Vestas 1.65 Megawatt turbine, that it's in essence similar to a 1000 horse motor coming on across the line. Now that would be a pretty big motor start I guess to bring that on without doing something or having the right controls in place like some of the guys were talking about.

And in our case we actually had a unique challenge because and they mentioned, the manufacturers will tell you, they like to be a couple miles from the substation because of that sheer startup value.

And that is one side note to these - this technology people don't realize. They think well if there's no power at least the wind spinning, we got energy but that's untrue because these do need energy to get started I guess. The wind will start getting momentum in the blades but it does take an initial surge of current if you will to bring these things up to full speed and get things going.

So in our case we built this five and a half miles from a substation. And because of that we did rebuild a distribution feeder for that. It was one slated for reconductoring any way so it was a good fit.

And we put in a technology called Dynamic Bar which is basically capacitors that switch very fast and help eliminate blinks and things like that. As a result what we've done with this there's no impact.

I tell people when we talk about this turbine if you didn't - you can't tell anything then I've done my job right because we did read about some lessons learned about some people that put turbines in an area where they had excessive blinking and everybody in the country knows it when the turbines are kicking on. And we didn't want that.

Knowing that like I mentioned earlier that we consider this kind of a springboard project, a lot of eyes are going to be on this. We ended up we were the first co-op owned project in Illinois and the first one anywhere in downstate Illinois. So a lot of eyes watching this project so we knew we had to dot all Is and cross all Ts.

Another interesting requirement of interconnecting with distribution is getting the loading correct. I mentioned that we don't have a high commercial industrial load. So in this case we actually had to expand a rural distribution substation area to have enough load to handle it because it's kind of a funny side note. On these turbines that we know that in the summer I guess is the less - least amount of wind we're going to get. The winter has the most. That cold dense air has more energy generating capacity if you will.

But in those light spring days, it turns out in the fall we have grain handling load. In the spring though - in the summer we have plenty of load because air conditioning business. Spring there's not much load on our system.

And we have to make sure that there's enough, if we have a windy spring day that we can use all the energy from this. Otherwise what's going to physically happen is I'm going to back-feed by substation. It's going to be back on the transmission grid.

And I'm probably going to buy it back from the G&T, the generation and transmission co-op that serves several of my substations on a loop there. And that just didn't set right with any of us wanting to put a project like this in place so several issues like that to mention. I'm speaking briefly to this subject but I'm just kind of mentioning some of the logistics going into it.

Also with that then those interconnection type things, and then putting in the (SKATA) type monitoring devices where we can keep tabs on the device and know things are working and what's going on with the system.

Okay, the scope and the size, you know, I kind of have spoken to this already a little bit that a lot of those logistics come to play based on other factors than what you're looking to do with the turbine.

You know one of the gentlemen mentioned and it is a different game today. When we approached vendors back in '03, '04 this turbine, our turbine went on line May of '05. Back in then the world was a little bit different place. I approached the company like Vestas and they were anxious. We were coming out of, you know, we talked about the Production Tax Credit. When it was in it kind of boomed and when it's out it's kind of a bus cycle in building these. It's been in for long enough now that it's continued to boom. The industry has.

But when we were doing this the developers were hungry for business and believe it or not, by the time we signed contracts we had this thing built in here in less than a year, about a year. So it's pretty unheard of and today we wouldn't have the same experience probably.

But we were able to do that and make things go. But as far as scope and size we know there's lots of things on our own limitations.

Another thing I will mention, we being a - we're a all power requirements contract distribution cooperative, meaning we buy all our energy from one generation transmission cooperative. And they have a contract with us that says in that you're only allowed so much percentage of distributed generation, meaning a device like this that self generates.

In our case it was about 5%. Well our total system load is somewhere around 30 to 40 Megawatts. So basically what we did, one turbine there's about all we were going to be able to get in there. So we put in the biggest turbine we could to fit underneath that limitation. At the time it was the 1.65 Megawatt Vestas unit, was Energy and MICON at the time that fit that bill.

And so we're able to make that work for our contractual requirement. Now we've been working with them since to try to open that up and to possibly get another one or two.

But I mentioned the other constraint. In our case if you're doing distribution with us being a lightly loaded rural distribution cooperative I can't put another one in that substation. It would be too much load.

So I've got to take it some - to another load center where I can actually handle the power output (side); interesting challenges to have to overcome with stuff like this.

Okay, so now the financing, you know, we mentioned about what it takes to pay for stuff like this. We had same kind of thing you've heard the other presenters, again a cooperative. We didn't have the ability to take the Production Tax Credit. And at the time I mentioned CREBs weren't available.

So looking at this that's when we decided to get inventive and see what was out there. It turns out we did seek financing under - for USDA under the Farm Bill which is called the Section 9006 Grant. And it was good for 25% of costs.

And I will mention that 1.65 Megawatt turbine in '05 cost us just under 2 million. Today that would cost more. I don't know how to quantify, at least 2.5 probably. But at that time we were just under 2 million.

So we got 25% from the USDA. And the sad side note to that with our load capacity, 30% capacity factor winds, we still couldn't make this thing pay. So we needed something else and without - with doing a single Turbine Project we weren't going to involve investors. And there was no CREBs.

So we actually found two other agencies from the State of Illinois to partner with Illinois Department of Commerce and Economic Opportunity, we were able to receive another 10 to 15% from then.

And then the Illinois Clean Energy Community Foundation is another group, not-for-profit, that they weren't set up to give grants for projects but it turns out just like one of the other guys mentioned about what can we do with the green tags, they had structured a program to purchase our green tags for upfront funds. So it was like a grant but not really. So we got another 10%.

So final tally on our Turbine Project we were able to get just under half of this finance which is grant funding. At that rate we believe we could make this thing pay for itself in probably 10 to 15 years.

So we went from a project that we couldn't financially make a way to make it go to one that is going to be a good investment for us we believe.

So kind of interesting to see how you're able to continue to do your homework and come up with ideas where you can make things like this work.

Other issues, this is just a very busy slide to mention lots of other logistics and details that we had to go through to make something like this work. And it is pretty amazing how many things are interrelated when you start developing something like this. Obviously it's environmental and doing your homework with fish and wildlife and all the other places that have a stake in, you know, or have a say.

And I will say that since we had federal and state financing we had to go through every hoop that could possibly be jumped. I mean for our own benefit the due diligence is a good thing. But, you know, it was required in order to get those financing (agents).

So it's amazing how many different things we had to go through and check for archeological and even FAA, that was an interesting one. We were within a few miles of a small airport, regional airport. It turns out I was 30 feet too tall in one of their runway procedures they called it.

And so instead of an 80 meter tower I ended up with a 70 meter tower so that put me about 235 feet tall to my hub. You know not a deal breaker but it just, you know, at that moment boom, FAA and there's a time constraint to, you know, there's usually a 30 day window to reapply. And when you're under the gun with deadlines for grants and other things it's amazing how several of these things could've killed the project.

But other zoning issues and of course working with the local zoning body, we were working with a county that had never dealt with this before. They had a -

they had been talking about it so they had something on the books but this was definitely still a learning curve for them as well.

Our lessons learned probably from that process would be to sit down with them even earlier and begin working with this process because, you know, just like one of the other gentleman mentioned, a couple people came up and there was some questions and concerns at the local meetings. And you're talking about just, you know, small town America, rural area, county seat has got 3,500 people. And, you know, not - you know we're talking small areas and their local small town issues can be deal breakers for things like this.

So those things definitely need time and effort to sort out ahead of time to make sure a project like this is going to run smoothly.

And obviously going through the turbine manufacturer selection process and who's going to even be able to quote like one of the guys mentioned, determining your capacity factor.

We used my good friend Bob Putnam on the line, with this moderator when he was with the agency he was with was able to help us with performing feasibility studies and interrelating some of the wind data so that we could, you know, show to the lenders or to the grantee agencies and the lenders that we were able to make a feasible project.

It's interesting to see. I mentioned dispatch or storage type issues. And, you know, things are going to be coming down the pipe from that which is going to I believe make wind turbine technology even more viable.

But it's still pretty early on for a lot of that and expensive. But it'll be interesting to see where some of that goes but a lot of that's been talked about. Could be a couple stuff with that.

So I guess I'll kind of take a step back and mention more reasons for getting involved. We know the more utilities like us and other people that are able to get involved, it's not really going to take off. Now Illinois is really growing. We've had one more - it's mostly Northern Illinois. Believe it or not, we're really not having the development in Central to Southern Illinois. And it could be partially the wind resource that you saw in that earlier map.

But we have a few developers starting some projects. We have one of the largest, they call it the largest project east of the Mississippi, its north of Springfield in a town, Bloomington, Illinois. There's a 240 Megawatt project there that's on line. So there is more taking off.

And, you know, Illinois was never looked at in the past. When you saw wind turbines back decades ago, obviously it was, you know, it's where the wind was. California, Texas, the Great Lakes. But no one would have ever thought a place like Illinois could work.

But new technology that allows lower cut-in speeds. You know the turbine we got, it's amazing to me that about a 3 mile an hour wind which does - it barely feels like a breeze on your face, is enough to start gaining momentum in those blades.

And, you know, those blades on our turbine are 130 feet long. And I remember the crane operator telling me the day they did the crane (pick) to lift all three blades in the hub. But that weighed 100,000 pounds so it's a pretty

amazing fact that a 3 mile an hour wind will start generating just a little bit of momentum in those blades, not enough to generate.

But at about 5 or 6 mile an hour wind, we're generating just a little bit of electricity. And at 22 to 25 we're putting out full power.

And so, you know, it's pretty amazing that the technology has come so far that we're able to utilize that resource in a place like Illinois that would have been overlooked in decades ago.

So back to my slide there, we know that we can continue to get the word out that this can work even for and I know the game is a little different today but there are other manufacturers coming, you know, coming to the table wanting to do stuff like this and more community scale type wind projects because I hear all the time about it in schools and other places that would like to do something like this.

But it is a tough sell. There's definitely hoops to jump to be able to get through things like that.

And we know that economic development options continue to abound for bringing in things. I love to see and read the articles about the large wind developers like GE and others and Vestas particularly, now building blade and manufacturing facilities here in the States and moving their operations from Denmark and other countries here and doing this work and bringing those jobs in. I mean what a great thing.

And bringing a farm into an area, it's not just bringing in the job it's going to take for maintenance and other things but everything we're able to do with that, just a great piece to the puzzle.

Public education continues to be a fun aspect of this kind of project. It's amazing how many calls I get from schools and local organizations that want me to come out there and just show it off and just be wowed by the presence by one of these things especially in our area where there's really nothing close without driving several hours to where they're up. Up in Iowa I'm sure you can throw a rock and hit one. But down here there's not too many.

So people are pretty excited. And really take ownership in something like this.

So what's the public response been?

Just overwhelmingly positive, people - it's amazing to me. If I am down for any reason, maintenance or whatever, how many people are already calling the office saying, "Hey do you know this thing is not working?" And they just - they continue to kind of, you know, treat it like its part of their community and something they're really proud of. So we get lots of traffic through the site as a result of that.

So status today, there's some shots of the construction of ours. We've been on line like I said since May '05. And, you know, with our 30% capacity I'm happy to report that that was our estimate on what we thought we were going to get.

And we're pretty much right on target now. We've been, you know, in place several years. And every year we've been very close to the 30% level. So it's doing what we projected. That's all good news. We know the wind resource is what we thought.

So it's a great testimony to all the hard work that went in to getting things going in the first place.

And I will just kind of mention here also that, that is our (call) web site. And we do have links with some information, pictorials and things. And we've even put up a webcam more for security but it turns out we put it on the web site and people love to just sit there and watch it spin so it's kind of funny how that works. That's a view from looking back at it and now we can keep tabs on it as well our self.

So I believe that concludes my project as well Bob if you want move onto the next speaker.

Robert Putnam: Thanks Sean. Yeah, let's move onto, our final speaker is going to be Mark Rathbun. Mark is a Renewable Energy Project Leader at Great River Energy as a member of Great River Energy's Resource Planning Team.

Mark identifies and recommends renewable energy resource opportunities to help GRE meet the 25% by 2025 Minnesota Renewable Energy Standard. He also assists their 28 member cooperatives with renewable energy opportunities.

He oversees GRE screen pricing and solar (PV) initiatives. Mark worked to bring an urban turbine to GRE's new lead platinum headquarters building in Maple Grove, Minnesota which I think we'd all be interested in hearing some more about.

So with that I'll turn it over to Mark.

Mark Rathbun: Thank you Bob. I'm also going to take a second here and there we go, move to the beginning of the presentation.

I'm going to take an approach from Great River Energy's integrated resource planning process to explain how we look at wind.

And then also talk about where we expect to go in the future as a result of that plan and with some other inputs.

In the integrated resource plan involves some regimented modeling. But actually to come up with a real life plan requires a delicate balancing act to provide our members with affordable rates, reliable service, all in harmony with a sustainable environment.

So with that I'd like to give you a little background about Great River Energy. We are also a generation and transmission cooperative. And we serve 28 member distribution cooperatives. And they in turn collectively serve about 633,000 distribution customers.

Our sales are split up between residential, represents about 60% of our sales and farm, commercial and industrial represent the other 40%.

We are as you may not think from - as a Minnesota utility, summer peaking and we peak at about 2600 Megawatts in a real summer when we have some real hot weather.

We have about 318 Megawatts of wind in our renewable resource portfolio. And they are all under Power Purchase Agreements. The only wind facility that we actually own is the 200 KW wind turbine. That is outside of our building that helps provide somewhere in the neighborhood of 12% of our

annual energy needs for our building. We couple that with 72 KW of solar photovoltaic tags to achieve about 15% of our annual energy needs coming from onsite renewables.

A little bit more about our - the renewable resources, we did also start kind of dabbling in renewables and in wind power with a project in Chandler, Minnesota. It was a 2 Megawatt facility to begin with, three 660 KW Vestas turbines. And that project was built to supply our Wellspring Green Pricing Program Renewable Energy.

We were one of the first utilities in the region to have a Green Pricing Program. The State of Minnesota liked it so much they passed a law here in Minnesota that required all utilities, electric utilities in Minnesota to offer a Green Pricing Program or renewable energy option as a voluntary option to its members.

The project had such great success. It's been increased to 6 Megawatts so there are nine total Vestas 660s there.

We've also added a couple other smaller 6 Megawatt facilities in Southwestern Minnesota. One has six MICON turbines; the other has six Suzlon turbines.

Then we started getting into some larger facilities through Renewable Request for Proposals. We've issued RFPs in 2005, 2007 and 2009.

And the first couple have resulted in three 100 Megawatt facilities, two of them in the Trimont, Minnesota area in Southwestern Minnesota just off of the Buffalo Ridge area. Those projects were developed by Iberdrola.

But actually the origin of the development was with the local landowners. And once they realized they needed to secure large amounts of capital, they brought in PPM Energy at the time which then became Iberdrola Renewables.

We also purchased the output of 100 Megawatts of 1.65 Megawatt Vestas machines from Prairie Star Wind Farm which is owned and operated by Horizon and that project is in the southeastern corner of Minnesota in the Rochester-Austin area.

Our renewable resources also include some biomass, some very small projects all the way from a 150 KW Anaerobic Digester Facility up to a 3 Megawatt Landfill Gas Facility.

We actually purchased the output of five Dairy Anaerobic Digester Facilities. And those are great distribution interconnected systems that can come on line pretty quickly and it's nice to be able to purchase that energy from our cooperative members.

We also have a lot of opportunity with some smaller distribution interconnected wind resources and that's been a very active area for our member cooperatives and we try to assist them with those projects and look at the purchasing of that - of the power.

Great River Energy registers all of its renewable resources in the Midwest Renewable Energy Tracking System or MRETs. There we submit the meter data and the production of the renewable facilities is tracked and verified and then we generate certificates from that meter data and we retire those certificates to comply with our Minnesota Green Pricing and Renewable Energy Standard goals here in Minnesota.

Now I'd like to just lay - well I'm going to back up one more. We are a MISO member, Midwest Independent System Operator.

And that really means that we purchase all of our load from the wholesale market in MISO. We also bid all of our generation into the MISO market.

And we've turned over operational control of our transmission facilities to MISO and they manage all of the interconnection requests so any new renewable resources or any resources for that matter, interconnections are handled by MISO.

A little foundation about the environment that we operate in Minnesota, Bob mentioned that we have a 25% by 2025 renewable energy standard. We also have a conservation goal where we need to save 1.5% of our members' retail energy sales each year through conservation and efficiency measures.

And we also have some greenhouse gas reduction goals. It's really appropriate that the conservation and efficiency goals are there for us because if you think about it, just consumption, consumption, consumption and no conservation really doesn't make a lot of sense. We'd have to build an awful lot of generation both renewable and conventional to keep up with the way things have been going before economic downturn.

So it's really great to work on conservation and energy efficiency first so that the new renewables that we add make an even greater contribution.

The next chart is a representation of our compliance with Minnesota's Renewable Energy Standard. And it's a graduated standard. It will jump to 7% here in 2010, 12% in 2012, 17% in 2016 and on up to 25% in 2025.

And the green bars to the left show our existing resources and the power meeting compliance. We're actually positioned pretty well. We're ahead of the Minnesota Renewable Energy Standard as I think a lot of the electric utilities in the Midwest are.

And the greener bars to the right represent some forward banking of the Renewable Energy Credits that are available from our existing resources. The State of Minnesota PUC allows Renewable Energy Credits to be valid or viable in the year that they're generated plus four years so we're able to take some generation.

During these times the RECs aren't worth a lot in the market so we're taking a banking approach and putting them towards future compliance.

You'll also see from this chart that when you use a Power Purchase Agreement approach those Power Purchase Agreements have a fixed term. And as those terms expire your resources go away.

So we recognize that we have a big job to do, have a big job in front of us. We really need to probably keep running just to stay in place. As those PPAs expire we either have to look at extensions or new Power Purchase Agreements or ownership and possibly build facilities ourselves that we'll own. That will have some residual value from the projects and keep us compliant with Minnesota's Renewable Energy Standard well into the future.

So this is just one of the many inputs that goes into our integrated resource plan. Our planning here in Minnesota is a continuous process, always incorporating new information.

And here in Minnesota electric utilities need to report their planning to the Minnesota Public Utilities Commission at about two year intervals.

For Great River Energy and co-ops in Minnesota the Public Utility Commission's review is really advisory. We're not regulated by the PUC in terms of rates for new facilities.

So our approach is really to be informative with them, not definitive. It's not a plan that's cast in stone. We like to have a little bit of flexibility in that plan and the way Minnesota treats co-ops we have that flexibility.

Now a lot of modeling goes into that integrated resource plan. Models are really guides. A true plan requires some judgment.

And as I heard Bob Thresher from NREL recite, all models are wrong. Some give useful insight. I think that's pretty appropriate.

Our capacity expansion modeling takes into account a lot of different inputs. And we won't go through everything on this slide. This is pretty busy.

But it does take inputs related to our forward-looking scenarios. Our member's load forecast. What are the financial parameters that are with us today?

What are our future fuel costs, our future emission costs, the percent renewables that the State of Minnesota requires, and our capital costs?

Then we also look at what are the potential new resources both fossil fuel nuclear and renewable.

And then we take a look at our existing generation fleet.

And then we actually turn off the market interaction and we go into a mode where we're really just looking at serving our load.

And out of that modeling comes our expansion plan. What type of generation are we going t o need in the future and at what dates?

And how will those units be dispatched? How will they run? How will they consume fuel?

What percent renewables will we have?

What will our future CO2 emissions be?

And all with the thought in mind that we want to operate all of our generation on a least cost or minimized cost basis.

So we start out with our planning with some basic benchmarks. And the first one is that we'll meet or exceed Minnesota's Renewable Energy Standard. The next one is that we'll meet Minnesota's 1.5% conservation goal.

We'll add generators and fractional shares. For instance wind facilities are modeled in 100 Megawatt increments. And the transmission costs for all future generation is included in the plan, in the modeling.

And in the benchmark scenario we model CO2 costs at $10 a ton. Minnesota's Public Utilities Commission just updated their range of CO2 costs for Minnesota utilities for resource planning purposes to use $9 to $34 per ton.

We'll also assume that the wind Production Tax Credit, a federal Production Tax Credit is available until 2012.

And no retirements of our existing facilities and that those contracts for renewables or other facilities will expire at the end of their term.

We also take a look at some other scenarios. What is the status quo? What if we added no new wind? Did not invest in new conservation or efficiency? And what if CO2 costs were zero?

Some other scenarios include CO2 costs at increasing values anywhere from zero all the way up to $70 a ton. And we also look at scenarios where gas prices, wind costs and loads are all at higher levels.

So the results of our capacity expansion modeling tell us that wind and gas facilities are sufficient for the near term, about ten years. We have a pretty good fleet of natural gas peakers that allow us to not have to look at building any new natural gas facilities in the immediate future.

The plan also tells us that we'll need base load out to about 2020 and of course all of those base load facilities are non-carbon emitting type facilities.

The plan also shows how sensitive the amount of wind that the plan calls for is to the price of wind. And of course the price of wind is sensitive to the incentive availability. Earlier speaker mentioned that the federal Production Tax Credit is worth roughly $20 a Megawatt hour for the first ten years of operation of a facility and that really does help bring the cost of new renewables down for our members.

We can take a couple of different looks at future renewable resources or wind resources. One is that there could be discretionary wind if the opportunities are right. We've had more wind resources.

And at a bear minimum we'll want to make sure that we meet or exceed Minnesota's Renewable Energy Standard.

So why would you go longer or proceed with - maybe with some opportunistic wind?

Well there's quite a bit of tail wind for renewables right now. The federal incentives that are there, of course the Production Tax Credit is difficult to take advantage of today, been replaced by the Investment Tax Credit or in lieu of that the Treasury Grant. That would represent 30% of roughly the capital cost of the project.

Again Great River Energy is not able to take advantage of that incentive. So we look to other developers for now to take advantage of that incentive and lower the cost of wind for us.

There's also some low-hanging fruit in terms of transmission, availability. Of course we're far behind on some transmission in some areas but there are some opportunities out there.

We also want to take advantage of the best wind sites. As compliance levels of renewables come into play utilities continue to work towards meeting their renewable energy goals. The best wind sites will get used up.

And right now there may be a slight opportunity to take advantage of a weakened market for suppliers. Turbine prices really increased a lot and

probably peaked last year and hopefully now the prices have come down a little bit. So we'd like to explore that.

Another reason to proceed is continue on a steady course. It's kind of that dollar cost averaging approach. We know that it's difficult to time the market but we also know that we're not at the peak of the market right now so by adding new renewables now we can try to avoid the peaks. Maybe not always time the (values) but at least keep a good average cost, affordable cost of wind additions.

And we also want to remain proactive. We know that there are some fee and tariff proposals, some community-based energy development carve-out proposals out there.

And we'd really like to be proactive so that we don't have legislation forced on us. We'd rather be proactive with that approach.

We also have pending federal policy that will affect the price of future wind and renewable resources once a CO2 policy and a national RPS are about us.

So why pause? There are some reasons to either pause or to slow down or some headwinds. We have an uncertain economy right now. It was mentioned that MISO prices are depressed, wholesale electricity prices are depressed.

We also maybe haven't seen economies of scale. There may be some mega projects out there developed in the Dakotas and there may be some economies of scale there where some lower cost wind may become available.

And I also listed federal policy uncertainties again here with greenhouse gas or CO2 legislation and a national RPS. Until those are passed it's - it causes some uncertainty.

So we have some concerns about wind. We've been a great adopter of the technology. But there are some concerns in terms of cost. The cost has nearly tripled since one of our first projects in 2005. But those costs are now contracting a bit.

And we have some developers that we've dealt with and we'd like to see long term deals, 20, 25 year Power Purchase Agreements. Some are reluctant to offer that length of a PPA which could point us in the direction of ownership.

We also have to look at the timing issue, the timing of transmission interconnection and just general transmission network additions. The transmission cost and availability is an important concern and it's going to be a contentious issue as far as expanding the transmission system in the MISO area and assigning the costs. Who is going to pay for the transmission and what increments or how is that, the cost sharing going to be achieved?

And those will be issues that we'll have to stay on top of and make sure that they don't inhibit our ability to meet the Minnesota's Renewable Energy Standard.

There's also some concern about the long term viability of projects, the equipment, reliability. Some manufacturers have had issues with gear boxes and blades. And we want to make sure that we pick projects that have good equipment reliability and top tier turbines. And partners that also have great economic viability.

It was mentioned that wind integration can be a challenge. That mismatch between wind production and our consumer's electricity consumption patterns. We're fortunate to be a part of the Midwest Independent Transmission System Operator Network that allows the wind in the region to be dispersed amongst a lot of load in the area but it is a challenge at least right now to manage some of the wind generation especially during (offbeat) times.

Here's a look at just generally how new wind prices compare to say the MISO price forecast. And as was mentioned earlier we were not able to collect the power cost in the market. It's actually below the new wind PPA price.

And so there's some early pain in adding new wind at this time. Hopefully over time as that graph extends, market prices will go up. That new wind PPA may escalate a little bit.

But we'll have market prices above the PPA and it will become a better economic situation for GRE and its members.

Also addressing cost we can look at wind ownership. There are some pros there. We can have some control over the timing of new additions and of the operations and maintenance of the projects. Hopefully it will help reduce the project default risk. We don't lose the residual value of the facility at the end of the Power Purchase Agreement. And we expect it would provide us with lower overall cost energy versus the PPA approach.

The cons are the large capital requirement upfront. There are financial transactions that get very complicated in order for us to use the federal incentives that are available. We obviously need to partner with an experienced developer on our first project or two. We don't have the in-house expertise but we think we can develop that.

There's also some project risk now on our own both initially and developing that project and ongoing in the operations and maintenance.

The concerns with the transmission include wind farms of course can be built a lot faster than transmission so there's a disconnect there. We also have to consider the MISO interconnection queue. It's gone through some reform so that wind projects now progress through as they meet milestones so that projects now can progress through the system on a first ready, first served basis. That helps. That is going to help speed some of the projects along.

I mentioned the large transmission investment needed. But there are a lot of competing visions and those need to be worked out.

We'll have to work out how the costs are allocated whether they go to the developers, to the utilities but ultimately the end user pays.

Transmission we think in the MISO region or in Minnesota for sure will be - the permitting will be difficult especially for exported wind. If the benefits of the transmission don't hold local benefit, then there may be some opposition to transmission siting. And we've seen opposition to new wind farm siting.

So here's our current thinking on new wind. We are well positioned. We're ahead of the Minnesota Renewable Energy Standard. With the banking of Renewable Energy Credits we're good through about 2013, 2014.

So we can be a little more picky about when we acquire more wind and how we do it. But we realize we have a very big job ahead of us. We need 8-900 Megawatts of wind by 2025 and more later as those Power Purchase Agreements expire or as our load increases.

Our near term strategies are to monitory the prices for new wind and we took a step there with the issuance of a renewable RFP again here in the early summer of 2009. We're down to a short list of projects right now and in discussions with those developers.

We'll pursue new wind as the prices fall closer to those MISO market prices. And we're considering the buying and banking of Renewable Energy Credits to defer wind if those prices are too high. And again we can bank those RECs for up to four years.

Longer term our strategies will include ownership of the facilities. And we'd like to complement wind with higher capacity factor renewables. Renewables that operate a little bit more like a base load facility as some of the biomass and maybe hydro projects do.

With that I'd like to show you our web site, greatriverenergy.com. There you can login and see some operational history of our small turbine here in Maple Grove and of some of our larger wind facilities.

And with that I'd like to turn it back over to Robert.

Robert Putnam: Thanks Mark. I want to everybody to submit questions. And we've got a lot of good questions. So I'm going to open this up to the panel now and get right to it.

One question, what would you like - this is for the panel. Anybody can answer. What would you like to see large developers do to better serve the co-op community?

It's an open-ended question but interested in your feedback on that question.

Rick Olesen: Rick with Iowa Lakes. And I think there's two distribution systems here or three. We can't actually work with large developers as far as the PPAs that have to go to our G&T because we can't buy or own any generation.

So it, you know, for Great River and Minnkota I guess they would be able to deal with them in a different manner.

Mark Rathbun: This is Mark Rathbun at Great River Energy. You know we've seen large developers actually work very well with the communities. They get engaged early. They work very hard to compensate the landowners. The projects that we're a party to we know that the developers work more on a project footprint basis.

And so if a landowner is impacted by the project at all they receive some type of compensation. They - even if they don't host a turbine.

So they're really compensated based on the amount of impact whether it's just a road or the collection facility, they're compensated. And then that compensation goes up as they maybe host turbines on their land. So I think they do a pretty good job.

Robert Putnam: Does anybody else have any comment on that?

So if I was going to paraphrase what was just said we could say a couple of things. Engage early with the co-op and compensate landowners for the use of their land or other landowners even if they're not hosting a turbine in terms of (doing that).

Is that what I heard? Would you guys agree with that?

Mark Rathbun: Yes.

Robert Putnam: Okay. Okay, let me ask a couple questions. We heard the word daunting. How daunting is the transmission interconnection issue?

Wally Lang: I use that term. This is Wally speaking. And certainly just finding the resources available not only locally but nationally to be able to do the study work is a major aspect of things but aside from that it is the fact that you have different entities with jurisdiction over these issues and they don't all have the same rules.

A reference was made that MISO's queue reform is changing things from a more queued process to a first come, first served type of arrangement.

But other transmission owning entities in the area don't necessarily have that same philosophy or that same procedure.

And coordinating between these different entities that have different ways of approaching it is just a monumental challenge to get everybody to kind of be on the same page.

And so the third party impacts also referred, you know, also referred to as network upgrades, are a or off system upgrades are really a major thing and who is responsible and how to evaluate exactly what did your project do to somebody else's system. It's pretty daunting.

Robert Putnam: Does anybody else have any comments on that?

Rick Olesen: Well for us we started out with MISO and ended up in MAP. This is Rick with Iowa Lakes, and again but we were at the distribution level connection where we're not - we weren't even required to do it. The only reason we did it is to receive accreditation. There was a minimal revenue stream that came along with that.

However if either of those ethanol plants, each one of those ethanol plants is about a 6 to 8 Megawatt load. And our plant can generate anywhere, you know, up to 10, 11 Megawatts at full production.

So almost all the time all of our load goes directly to the plant, however if that plant would shut down and we had one of our three plants not the ones we're interconnected to, one of them went bankrupt. And so if that plant load goes away then again all of our production would go up to the transmission. There's plenty of available load there for it to go to in a region.

But it puts us at a different level where again we did need the accreditation if the plant load wasn't there.

However even with our two 10.5 Megawatt projects, 21 Megawatts total, very small, small project, the System Impact Study was kind of an eye opener. And what it showed that we were going to be required to do because of the thousands of Megawatts ahead of us in the queue, some of it - a lot of which will never happen.

However they're there. So when you throw your 21 Megawatts on top of that there's a lot of system improvements that could be required of you. In our case we were able to avoid those.

But again it is kind of an eye opener for a small project what you can be accountable for for transmission improvements.

Robert Putnam: Well that's a good point. Let me follow-up with that. Any of our speakers can chime in.

Is there any way to break the backlog on Interconnection Studies?

So we heard about like first come, first served as opposed to first come, first filed or something like that.

So if you're ready to go you can get on the system. And this is in response to what you just said Rick.

So is there any - what do you see as the solutions for this transmission bottleneck that we see to integrate more wind?

Rick Olesen: Well for speculators, this is Rick again, I guess we had some discussions on that and because of the amount of - I think there was 6000 Megawatts in a queue ahead of us. And again a lot of that is never going to happen.

You know its very costly to do the study. But to some of these larger projects that project cost or that cost isn't prohibitive.

And so perhaps we thought maybe making them put up deposits for infrastructure improvements would make them either, you know, remove that project from the queue as pure speculation because that's what it was or put the deposit up and go forward with the transmission improvements so everybody can move on.

Robert Putnam: Right. Let me go ahead. Okay, well let me ask a couple more questions.

Do you see - what do you think the - what's the current status of - I mean this is a small sample on this call.

But in terms of distribution co-ops getting - having flexibility in their All Requirements Contract to install local generation, is that - where is that trend going?

Sean Middleton: This is Sean. I would say, you know, when we first put ours in ours had a 5% cap. And since ours obviously was a catalyst to try to bring that discussion further and we've now got another cooperative that was a part of our G&T that's done the same thing, put a single turbine and another one that's looking at a single turbine or two. And so we've, right now gotten ours expanded 15% so from 5 to 15.

I'd say that that is going to be the trend. That's our understanding and like I said that's (Oregon) (unintelligible) and so I would say that's going to continue.

Rick Olesen: And this is Rick. Yeah, we tried to go down that road and once we got on a tighter timeline, once again we got our turbine approved in January of '08 and we were generating or yeah, we were generating in March of 2009.

And we had to get a PPA signed in that timeframe. And our power supplier would not consider it at all.

So we had a PPA with them that later transferred to Basin.

Robert Putnam: Okay. So the - where does the nature of that Illinois or I mean Iowa Lakes is a member of Basin.

((Crosstalk))

Rick Olesen: Through - yeah, as a member...

((Crosstalk))

Robert Putnam: Excuse me, as a distribution cooperative.

Rick Olesen: Correct, yeah.

Robert Putnam: And so you're - the facilities that you developed, that Power Purchase Agreement got transferred to Basin.

Rick Olesen: Correct.

Robert Putnam: Okay. So it's not absolutely an Iowa Purchase Agreement, Power Purchase Agreement or anything like that.

Rick Olesen: No. We're a part of it. We sell it to Basin.

Robert Putnam: Right.

Rick Olesen: Sell the energy at the (12.5) bus in our substation to Basin.

Robert Putnam: Right.

Wally Lang: Minnkota does allow flexibility in the All Requirements Contract towards member owners.

However the flexibility also says that it has - they have to be capable of load following and so it in a practical sense doesn't work very well for a renewable resource that's intermittent like that.

And so I don't see it being much of a ground swell in our area because of that. You know if there were some way to have their resources be more load following, I could see where it could expand. But I just don't know if the technology available to make that happen would be.

Sean Middleton: Right. I don't believe that is - I mean I understand that. And I think probably part of our catalyst here in Illinois is the fact that, you know, we don't have the capacity factor. So no one is engaging in a large project.

So the onsie-twosies are probably pushing our discussion with PPA more so than maybe you guys might.

Mark Rathbun: This is Mark with Great River Energy. Our All Requirements members also have the option for a 5% renewable self-supply. And a couple of the members have taken advantage of that mostly in the good wind resource areas down in Southwestern Minnesota and they were also able to secure the funding like the projects that were discussed today both the USDA and CREBs Financing.

Wally Lang: Mark is your flexibility targeted toward renewable or is it flexibility or (any) generation?

Mark Rathbun: The 5% is a renewable self-supply option.

Wally Lang: I see. Ours is we don't distinguish. It's just 5% wherever they get it from.

Mark Rathbun: Okay.

Sean Middleton: Yeah. And ours is wherever you get it from too. It's just like I said they just expand it to 15.

Robert Putnam: All right. Let me ask another question. I think we have sometime to stay on the line here.

Any questions that we don't get to we'll - I'm going to ask (Susan) to move to the next slide so you can send your questions to me by email.

I want to ask, how do we or are we getting the word out that wind can work for small or medium-sized consumer-owned utilities?

And this is a question based on some comment that Sean and others made during their presentation.

And what can we do? What do we need to do to educate people in terms of, you know, the challenges and benefits of integrating wind into consumer-owned utility portfolios that we're not doing now?

And if anybody on the call has a suggestion that, you know, from the utility participant, I'd appreciate to hear that.

Wally Lang: I guess one of the things that we try to convey to people is that people have the sense that, you know, wind energy is free. I think that's somewhat of an eye opener to a lot of the general public. They just assume that, you know, there's no cost associated with it and that's not the case.

And the other thing is to make people aware of just how heavily subsidized the industry is.

At one of the dedication of the wind farms the NextEra representative there basically said in the comment period of the dedication ceremony that roughly half the revenue that's required to support the wind farm development is public money. And I don't think people realize just how much public money is involved in wind generation.

Sean Middleton: Yeah. And I'd echo that. I mean obviously like I kind of mentioned on ours, I mean that is exactly what we've had. We couldn't make a way to make it pay for itself.

And, you know, the other tough part is us being a fairly rural average sized distribution cooperative it would be unwise or unfair for us to expose our rate pay membership to such a high debt level just to do it because it's the right thing to do.

So until we can make a way to make it pay and, you know, that became on our side being very aggressive to seek out those incentive options like you're kind of mentioning.

So really that's a very true statement. It's heavily and on the side trying to use the incentives to be able to make something like this go. So even though we know the boss always said, we had two or three main bullet points. We knew it was the right thing to do right by the environment, you know, right by those other standards. But if we can't make a financially feasible project then we're not going to do it.

And so there is - there are ways to do this and jump the hoops that are necessary but yeah, I echo that, that there's definitely concern to try to make that go.

Rick Olesen: And this is Rick. And, you know, I don't know how you raise the profile of distribution wind because as you said there's so many challenges and especially financial. We had over 50% equity in our co-op and we wouldn't have been able to take on this size of project without that strong financial position.

And even with that it eroded our equity quite a bit. Now it recovers fairly fast too. But you have to have the right Board and again your membership has to be behind it.

But I think for us we looked at it again as additional revenue stream. And it's got to be done on a business-based decision.

And it's either going to be again a very, very expensive public relations project for you or else it better turn a profit or a margin. And that's the way we approached it. It has to be done as a business decision.

And so I know like Sean has probably found out in Illinois, he explained, you know, that when a distribution system gets involved with it you do capture quite a bit of attention. But a lot of questions too that come right away are, you know, is this profitable? How can you make this profitable?

And I think that's part of the education or communication that you have to access every revenue stream you can. A lot of that is public incentives.

Robert Putnam: Let me ask a question. This is, you know, just because I want to be provocative.

But how short or long term is the decision horizon? Like if you had 50% subsidized and you kind of made it currently competitive, winds competitive given a 30% let's say capacity factor with other generation technologies.

How - what is the - what does the time horizon come into play in terms of, you know, you have a low O&M resource like nuclear that's going to last 20, 30 years and you've made a capital investment.

And, you know, what is the, I guess how is wind seen as the hedge against wholesale power prices in the co-op community?

Sean Middleton: Boy, that's a tough one. I don't know that we viewed it that way more than, you know, viewing it from the perspective of it's the right thing to do. And if we can make a financially feasible way to make it go then we were going to do it. And if it spring other development into our territory than that was even better decision.

But to just put it against another because of the variability that's a tough sell would be my take.

Wally Lang: If you have mandates, price is really no object. You got to do it regardless of what the price is.

Sean Middleton: That's true.

Wally Lang: You know that's where if you try to avert that, price only matters in that you're trying to get the best deal you can to basically meet that mandate.

But if the price isn't there and there's a mandate there you still got to do it.

Robert Putnam: Yeah, that's a good point.

Rick Olesen: And this is Rick. And again since we're under All Power Requirements Contract and they're not allowing any part of that to be opened up, we really can't look at this as hedging against future costs which have increased significantly lately.

So we would have liked to have done that. But again we had to look at it as we're going to make this investment. This is the yield or the revenue that we can acquire off this plant. Here's our cost and it's again just basically a business decision for us.

But it does provide a revenue stream that goes to your bottom line. And through that you can offset some of the impact of future power supply increases.

Robert Putnam: Right. Okay, let me ask...

((Crosstalk))

Rick Olesen: I'm sorry. But I have to go another...

((Crosstalk))

Rick Olesen: ...so I'm going to have to...

((Crosstalk))

Robert Putnam: Well you go ahead. Go ahead.

Rick Olesen: Hey Bob this is Rick. I'm going to have to leave. I have another...

Robert Putnam: Yeah, sure.

Rick Olesen: ...appointment so I'm going to have to sign-off. And thanks to everybody for participating. And it was a good experience for me I know.

Wally Lang: Thank you Rick.

Robert Putnam: Let me ask one final question I guess, compressed air energy storage. Do any of the speakers have - I know there's been thoughts about a project in Iowa and, you know, where does that technology stand as you're involvement or any ability to - you know, where does storage I guess fit into the wind equation on your, you know, service territory or in your portfolio?

Mark Rathbun: This is Mark at Great River Energy. You know we're monitoring and tracking the technologies, compressed air energy storage, pumped hydro, different battery technologies.

And, you know, it's going to be an important factor in integration of wind once we start achieving those higher compliance levels.

You know we're considering some participation in projects. But, you know, right now we're just kind of just taking a wait and see approach but believe it has great potential and will really help wind realize it's full potential.

Wally Lang: I have a question for you Mark. Of the three that you'd mentioned there, my sense is that the pumped hydro or the - you know would be the most economically feasible at this point in time. Is my sense right about that or is battery technology close to pumped hydro?

Mark Rathbun: I would agree with you. I think we found that pumped hydro is probably projected to be the most cost effective.

But again it's also difficult to find the right site and then to also deal with the environmental aspects of it. Not aware of any local compressed air energy storage geology opportunities in our area.

But, you know, we are interested in the project down in Iowa as well.

Sean Middleton: And I can tell you. Even though there's a single turbine we were looking at storage on ours. And even our area had some geological advantage to doing some compressed air.

But its just it's all still so expensive that we were looking seriously about battery technology as far as doing more of a, you know, a test case on a single turbine and be able to experiment with technology a little better.

But, you know, I guess I would equate it to this. Wind technology right now is over the curve as far as they're making it better but it's the viable technology today ready to go versus storage is still kind of climbing the mountain. That would be my way to describe it.

And I don't know if you echo that as well or not. But I think it's coming and it's going to really open the floodgate sort of speak with wind but we're not quite there yet.

Wally Lang: I would agree with that. This is Wally. I think your assessment, at least I agree with your assessment.

Robert Putnam: All right. I think we're past the two hour Eastern Time so I want to thank everybody for participating especially our speakers. I want to certainly thank Rick Olesen, Sean Middleton, Wally Lang and Mark Rathbun from Great River Energy.

And this will be available on the repartners.org web site, the presentations and the audio recording for future reference.

And hope you all join us next month in October for our webinar on O&M practices and programs by consumer-owned utilities.

And with that I guess we'll sign-off.

Wally Lang: Thanks very much for the opportunity.

Robert Putnam: Thank you.

END