Historical Challenges of Wind Energy/Wildlife Interactions: How This May Affect Distributed Wind
August 12, 2014

Coordinator: Welcome everyone and thank you for standing by. At this time all lines are open and interactive. When not speaking it is suggested that you utilize the mute feature on your touchtone phone or if you do not have a mute feature you may press star six to mute and unmute. Today's conference is being recorded. If you have any objections to the recording you may disconnect at this time. And I'd now like to turn today's conference over to your host Ms. Karin Sinclair. Thank you ma'am. You may begin.

Karin Sinclair: Okay thank you. Hi yes this is Karin. I'm not sure who all is on the phone line because we don't see the names but just to introduce myself in case some of you don't know me. Karin Sinclair, I work at NREL. I've been here for over 20 years and my focus is on two research areas, wind and wildlife issues and distributed wind. The webinar today is going to focus on that and this is one of the last ones that NREL will be hosting at this point as part of the ASES Wind Division webinar series. Maybe in the future there will be some additional webinars hosted through the ASES program but at this juncture this is the last one that I will be focusing on or spearheading.

So I just wanted to let everybody know that I'd like to engage the people who have called in as much as possible. So if you feel like you have a question as I go through these slides please feel free to ask the question as we go through them and then we'll have some time at the end to ask some additional questions. Also please stay on the line at the conclusion of this webinar and the conclusion the recording of it because we will hold a Wind Division business meeting and the agenda of which I have already sent out.

So let me begin. The purpose of this presentation is really to focus on providing some input to you all on the historical challenges of wind wildlife interactions and how what we've learned over the last 20 plus years primarily on the utility scale side may be of value to the distributed wind sector going forward. So I'm trying to switch to the next slide. There we go.

So the presentation is going to include basically a historical overview and then a little brief background on the Fish and Wildlife Service statutory authority. I'll describe some of the challenges that are being faced by the wind sector and give you a sense of where some of the key species habitat distributions are across the lower 48. Give you a brief background on some of the research that we've been engaged with and most of that has been primarily with collaboratives because we see this as being very valuable. And then just sort of an idea of what do we mean when we say distributed wind and how all of this fits together. So throughout this presentation I've tried to find pictures of distributed wind turbines that we have in our photograph database and so there's sort of just a range of photos here.

So distributed wind, you know, could be in the old days a 50 kilowatt turbine would have been considered a utility scale turbine at some of the first wind facilities. And today they're considered smaller turbines within the small range. And then also not likely to be utilized in a utility scale wind facility. So what's the overall concern? The main concern is that our interactions between wildlife, in particular birds and bats, that we have observed, we've had to address over the years. And also not only direct collisions but habitat impacts that could therefore result in impacts to the birds and bats. So in other words if you disturb a habitat you could then though it's not through a collision affect the birds in that area that utilize that habitat.

And the major impetus for this research started back in the late 80s and early 90s with the first wind facility that was built in California called the Altamont Wind Resource Area near Livermore, California. And there was a large number of fatalities that was observed which crossed a whole range of species. And the question was is this typical or was this sort of specific to this site? Today, you know, small and distributed projects may face some of the same challenges that the utility scale projects face depending on where they are as proposed sites and depending on what species might be of concern or being used in that—that are utilized in that area that the project's going to be built.

So here I show a couple photographs of individual turbines that are deployed as residential turbines or also known as distributed wind might be community wind projects that utilize utility scale turbines, in this case the GE1.6s. So a small cluster of utility scale turbines deployed as a distributed wind project may face some of the same challenges as a larger utility scale project depending on where it's built.

So the U.S. Department of Energy's wind program mission covers a lot of areas but within the context of what we're talking about today, wind wildlife interactions the focus is to reduce those challenges so that development can proceed appropriately. So understanding that there are going to be impacts within human deployed structure we still need to come up with ways to avoid, minimize and then mitigate where necessary for those impacts. So the wind program's mission is looking for solutions to reduce those challenges. The mission also supports the 20% Wind Energy by 2030 initiative and under the Energy Policy Act of 2005 supporting the accelerated deployment of wind.

The main points that I'd like you to think about while we're doing this presentation and maybe take away is that these wildlife impacts can be real

but they can also be perceived. And in either case they create a challenge for a development, again whether it's a single turbine, whether it's a cluster of utility scale turbines in a distributed wind application or whether it's a utility scale wind farm. And there's a lot of misinformation out there that we have to address in this sector. So this misinformation can accelerate the discussion of these impacts whether they're real or not.

What we have learned over the last 20 years is that these impacts are both species and habitat specific and more importantly they are site specific. So micro-siting, really honing in on the details of the project site are critical to reducing these impacts. The movement of a string of turbines from just, you know, right on the edge of a ridge back 50 meters could significantly reduce the interactions between raptors for example at a particular site. This is a true example that I'm citing. These impacts that we might observe at large wind farms are going to be different in most cases than a single—small wind turbines. But to be honest we have had situations where single 10 kilowatt turbine projects have been delayed or forced to be abandoned as a result of the perception of potential impact or interact native interactions with a particular species, in this case I'm thinking about the Indiana bat.

And then developers of distributed wind projects really do need to be aware of these potential issues and not just assume that because it's a small project or a small turbine that you don't need to be conscious of these potential issues because as I mentioned they actually have resulted in projects being delayed which causes additional costs in many cases or causes a project to be abandoned. Oh sorry.

So from a historical basis we've got these—this slide here represents on the top bird mortality, on the bottom bat mortality across over 40 projects where publicly available information was available to us. And what we see here is on

average three birds per megawatt per year and eight bats per megawatt per year have been found across these 40 plus projects. These projects go back as far as the 90s and as recent as just a few years ago. And well using a metric of per megawatt may not be the best metric, perhaps operational time or rotor swept area might be a better metric, at this point we don't have data available that way. So this is the way we can characterize it.

So with that in mind we will move forward and try to understand, you know, what's the differences between bat mortality and bird mortality across these projects and what can we do to take lessons learned from those projects and implement way—strategies to avoid and minimize impacts in future projects and then perhaps develop mitigation strategies where needed. So in terms of a statutory authority that the U.S. Fish and Wildlife Service thinks about when they were developing these wind permitting guidelines there's three that I'd like to draw your attention to.

The first is the Endangered Species Act and if a species, if a bird or a bat is listed as threatened or endangered under this act then the Fish and Wildlife is required to address it and protect the species and the ecosystem that that species lives in. So for example we see in this—on this slide we see the Whooping Crane which is currently listed and Fish and Wildlife needs to expend resources to further protect that bird from extinction. Below we see a Bald Eagle which used to be listed and is no longer listed. So over several decades of effort the Bald Eagle is now not only thriving, it's not only not endangered but it's thriving and in fact there's very good data on the population and the distribution of the Bald Eagle to suggest that, you know, it's stable now and actually the population is growing.

At the same time the Migratory Bird Treaty Act the majority of bird species are covered under the Migratory Bird Treaty Act. And here there's no

requirement that there be proof of intent or knowledge or negligence that results in the fatality of a bird that's protected under the Migratory Bird Treaty Act which means that if you take—when I use the word take that means you've killed a bird of a particular species that's protected by the Migratory Bird Treaty Act at a wind facility that triggers the potential for a enforcement action by the Fish and Wildlife Service because even though it happened by accident because of the way this is written there is the option for enforcement action. At this juncture there haven't been many of those taken but it's just important to understand that it could happen.

And then if we look at the Bald and Golden Eagle Protection Act this provides additional league protection for Bald and Golden Eagles and as I just mentioned Bald Eagles are doing fine right now and there's not a lot of fatalities that have been reported as a result of interactions with wind turbines although there have—there has been at least one or two that I'm aware of. Golden Eagles on the other hand we have had situations multiple projects where they have been multiple fatalities of Golden Eagles. And that's a major thrust right now within the U.S. Fish and Wildlife Service addressing Golden Eagle take at wind facilities.

So these wind energy guidelines that were developed by the Fish and Wildlife through a process is very convoluted. It included the triggering of the Federal Advisory Commission Act which required an open process. It took quite a few years, more than five years. In the end this—what this document does is it provides a platform for assessing potential impacts or potential risk at a wind facility to wildlife. And it's written in a way that's best described as a tiered approach with tier one being sort of the lowest level of effort that would be involved and tier five being the most comprehensive and coincidentally the most expensive.

So if you go from tier one to tier five you're going to be spending more money and you're going to be putting in more effort and it could be—take a longer period of time. So tier one is really what we would call a desktop assessment looking for best available information within the area that your project—that you're proposing to build your project using resources like universities, local ornithologists, museums, information from other projects that might be in the area.

And then once you have that fundamental understanding of the project site tier two is what we would call boots on the ground where you go to the site and do a—you look at the site and do a site characterization and hopefully if you're tier one evaluation is comprehensive enough your visual observations at the site will confirm what you think about that particular site. And let's say for the example that you feel like there's very little activity or utilization of this particular area. There's no threatened or endangered species. There's no large pond that might be a stopover for some migratory birds. And now you've convinced yourself when you go out to the site that that in fact is the situation.

If you documented all of this typically but not always—typically for a distributed wind project this may be all that you need to do. The reason I want to make sure that you understand the requirements of documentation is that at that point you build your project should something happen like let's say a Whooping Crane gets killed at your project which would be very problematic for you you've now got some documentation to present to the Fish and Wildlife that you did do your due diligence and the way that they will evaluate that situation will be different if you've done due diligence then if you just built your project and now you're coming to them with this problem.

Tier three would be something that would be more likely to be done at a utility scale project. This would involve a full assessment of the project site

and what we call a pre-construction assessment which will help you evaluate the potential risk of impacts at your site at a more detailed level.

And then tier four would be what you would do after the project is built presumably to evaluate what is actually occurring at the site and confirms your estimates of risk or estimates of impacts to certain species are at or lower than what you predicted and what your permit was given to you for.

And then tier five would be let's say at a large utility scale project I will give you a real example. Your—you've done your pre-construction assessment and you feel that there's very low probability of impact. During your post construction surveying and monitoring you find large numbers of bats. What happened was this triggered a serious concern and led to some very complex and expensive research. That would be characterized as tier five and typically would involve multiple parties such as potentially Department of Energy through NREL, Fish and Wildlife or the Department of Interior's USGS, U.S. Geological Survey arm, and maybe the industry at a wider scale than just the project developer because it's a very—it could be a very sensitive and complex study.

And I'm going to just talk briefly about this next slide and then stop and see if there are any questions. So this next slide is too much to read on the screen here but basically what it's—the purpose is to try to identify what the primary roles of the developer would be under tiers one through four and then the primary responsibilities of the U.S. Fish and Wildlife Service. And generally speaking under tiers one and two the developer would use the service for access to information and data that they might have, tools that they might have like landscape that have developed some tools that will help you assess whether a project—a proposed project is in sort of a high risk area or a low risk area. Thinking again about the idea of micro-siting just because the

project might be defined by these tools as in a potential high risk area you still need to go down and to the lower level of—or a higher level of detail to understand the reality of the proposed site versus a mapping tool that's sort of an aggregate of multiple databases.

And then tiers three and four the role of the service would be more comprehensive and more involved than at the lower tiers. So let me just stop there for a minute so I can catch my breath and see if there are any questions that have to deal with the topics we just talked about. Okay so let me move on.

What do we know about the challenges? We do know that the challenges are as I mentioned before are species and habitat specific and also will vary—they're so variable. They'll vary by climate. They'll vary by topography. They'll vary by location. And with all that said this makes it more complicated in that there's no single solution to address those impacts and those challenges. And the other thing is that as more wind is deployed whether they be small projects, single projects or utility scale projects across the country we know that the impacts are expected to increase not an absolute—not on a percentage basis but, you know, just the sheer numbers of impacts will increase number of fatalities. But there are ways to manage that. Specifically some of the micro-siting that I've already discussed and some of the mitigation strategies that are in development stages could be very useful in managing those impacts.

In terms of addressing the challenges what we are looking at currently is near term research needs. Because there's such a wide range of species that we need to be concerned about across the country which I'll get to in a couple of minutes how do we prioritize our limited resources both at the national lab level, within the industry level and then the NGOs who are very concerned about various species. So we need to prioritize our research needs and focus

on those. Multi-pronged approach is also a way of addressing the challenges. So there—I mentioned tools already, strategies for avoiding and minimizing and intersecting this other technologies where solutions might have already been developed or in development stages, doing work at the lab level and then rolling that out to site—a full site research level.

And then the other thing is multi-stakeholder. One of the things that we've learned over the years is that when you try to just do things on your own whether you, you know, think you're doing it right if you haven't engaged that sort of wider range of stakeholders you may have missed something and just by virtue of not engaging you haven't created a community around solving a problem. And this is why I'm very, very firm about this collaborative approach that we've been doing over the last few years.

Working in a collaborative situation allows you to leverage and pull in the best available resources and also develop a trust relationship. So some of the collaboratives we've been supporting are looking at both field research, refinement of methods and metrics, development of tools, development of mitigation strategies and one of which is a deterrent for bats. So not only developing it but testing it out in the field. And then very importantly is information dissemination. If you don't have the information out in the field you can't offset the misinformation that's out there.

So some of the challenges that are being addressed I've already mentioned, bats, raptors, looking at migration pathways, habitat for prairie birds and then cumulative impacts is important. A lot of the data that we have is at project specific level and how does that play into the cumulative impacts is something that hasn't been addressed yet. Tools that are available include the guidelines that have been developed by the federal—at the federal level but also states

that have developed guidelines and some of them directly relate to the federal guidelines and some of them are different.

Looking at the pre- and post-construction validation and using that information to develop predictive models is another tool that will help avoid problematic sites. These predictive models don't exist right now but the more data that we can get the closer we are to developing one of these—some of these models. Mapping of the migratory pathways is important. The pre-construction assessments to help with risk assessments and then getting information that's scientifically based, peer reviewed and then into the archives for use by all different groups that might have a concern but don't have information. So that's something that's really important.

So I mentioned that there's a wide range of species across the country. This map here reflects seven sort of key species that we're concerned about having potential impact with wind development across the country. For the lower 48 this is about half of the land and these are—this map does not depict no build zones. What it depicts is areas where there's additional challenges and considerations that need to be made for these species. And now I'll show you five of these seven species, habitat distributions.

This is the Golden Eagle which as I mentioned is on Fish and Wildlife's list as really important right now. It is true that the Golden Eagles don't turn around at the border of some of these states and go back west but this map here is based on the best available information. So I think what we can take away from this is that the Golden Eagle habitat is virtually the western states.

If we look at the Bald Eagle habitat it's much wider spread but again I mentioned that they're not as—at as great a risk as the Bald Eagles—I'm sorry as the Golden Eagles. Here we're looking at the sage grass habitat distribution

and which is just a small percentage of what the historical distribution used to be. And in some parts of the—of this northwestern part of the U.S. there's actually a moratorium right now on wind development in sage grass core area.

Whooping Crane has a migratory corridor that goes down the middle of the country and is overlapped with great wind resources. And then Indiana Bat while the population is really centered in Indiana bat—in Indiana that bats' habitat distribution is across 11 states. So this is where a couple very small distributed wind projects were significantly challenged by virtue of the Fish and Wildlife having concern for potential impact to the Indiana Bat from either a 10 kilowatt wind turbine or a 1.5 megawatt turbine.

So because of the bat issue that came up in the—around 2004, 2005 the National Academy of Sciences funded a study in the mid-Atlantic highlands to look at the cumulative impacts to bats. And if we look at some results from two different modeling scenarios, one done by NREL and one done by a utility we see that potentially 2000 to 4000 megawatts might be built by 2020 in the mid-Atlantic highlands. And this could result in, you know, 30,000 to over 100,000 bats being killed per year. So the critical issue is what does this mean in terms of cumulative impact to those bats.

And so we looked at three individual species that are most frequently found at wind facilities, the Hoary Bat, Eastern Red Bat and Silverhaired Bat. And we see the range is anywhere from 1500 to almost 40,000 bats per year depending on the species. The question is what is the cumulative impact and the answer is well we don't actually know what the populations of each of those bat species are. So it's really hard at this point to talk about the cumulative impacts but what we can see is that there's potential for quite a few bats just in this one area of the country. And I'm wondering if there's a question out there. I thought I heard something. Okay.

Going—moving forward. What are we doing about this? So we're involved in a number of mitigation research projects, acoustic deterrent development which I mentioned and potentially other deterrents which are maybe going on in somebody's garage right now. We don't know what those are but we'd like to find out. Correlating wind speed to utilization. We found that bats are more active when the wind speeds are low so this provides an opportunity to utilize operational mitigation to reduce the potential for impact to bats. Correlating weather patterns, similarly if there's more fatalities during certain types of whether patterns this can be used to manipulate the operational characteristics of the wind facility, and again I'm talking about a utility scale project here, to reduce those impacts.

For offsite compensation this is more in line with Golden Eagle take at wind facilities. What can we do to offset a known take that's permitted at a wind facility? Strategies are being developed. Micro-siting I've mentioned. Is there something that we can do about turbine size or is there a correlation to turbine size. This requires some more study on the data that we have available. Are there ways to make the blades more visible to reduce the impacts? Seasonal shutdowns and is an operational strategy that I mentioned. Habitat manipulation and developing artificial roots to help move a certain species away from the risky areas are other strategies that are being evaluated.

And in addition we're looking at technology and model research. So radar has been used for a lot of work. It's difficult to identify or to isolate what the signature is but we're still working with radars on some of the work that we're doing. Looking at how thermal imaging and near infrared cameras can be used as tools to help us understand the—what's going on at a wind facility, particularly at night, is something that we're doing research on.

And looking at indirect fatality indicators, so what would cue us in that a fatality might occur so that we can then mitigate for it. Stable isotopes is something that we've been doing with grouse species to understand whether the wind facility is creating an impact on genetic dispersal and then the development of predictive models I've already mentioned is a key area of research. So again if we look at the country we see that pretty much wherever you are you're going to need to be thinking about some species and so we are trying to develop strategies to make sure that wind can be deployed responsibly and especially in areas where there's a lot of wind.

One thing we haven't talked about is the breakdown of the species composition. The graphs that I showed you early on that depicted three birds per megawatt per year on average, 3/4 of that is made up of passerine songbirds. And we haven't done any research in this area yet. And only 6% are raptors. So raptors are pretty important. They're longer species, small clutch size reproduction. Is it possible that there may be something that comes up in the future with respect to passerines? This is something I'm—I've been curious about for a few years now just because of the breakdown of the species that are being found at these wind facilities.

The collaboratives, wrapping up here these collaboratives have been pretty valuable to moving the state of the knowledge forward. We've got the National Wind Coordinating Collaborative which encompasses the full breadth of organizations that are involved with wind and interested in these wildlife impact situations. And within the National Wind Coordinating Collaborative two species specific collaboratives were enacted. One is the Grassland Shrub Step Species Collaborative which focused on the Lesser Prairie Chicken and that research was done in Canada and completed. And the Sage Grass Collaborative is work that's wrapping up now with looking at sage grass up in the Montana and—Montana area.

The Bats and (unintelligible) Cooperative was formed in 2004 as a result of that—those impacts that I mentioned earlier and we've been looking at operational curtailment. So trying to optimize the strategies for operational curtailment, deterrent research and then looking at these relationships between utilization and weather patterns, etcetera. The American Wind Wildlife Institute is an industry NGO cooperative where 50% of the board is industry and 50% is NGO and they have five major areas that they're working on and part of it has to do with offset mitigation for eagle take at wind facilities. And then most recently an international collaborative was formed that's looking at wind wildlife issues both on shore and offshore. And at this point it involves half a dozen countries. So it's a pretty interesting collaborative.

So finally what's—what do we mean by distributed wind? This really is about where the project is located and how the power is used. It's not about the size of the project or the size of the turbines. And so I tried to emphasize that within the presentation but I think it's important to mention again here that a single small turbine could be a challenge just as a 300 megawatt wind facility commercial—utility scale wind facility might be a challenge. And a community wind project 20 megawatts let's say of utility scale turbines could be also be challenged by these wildlife—the potential for wildlife impacts.

So in conclusion I would just like to say that this is a very complicated topic. I've been working in this area for close to 20 years and some of the questions that we're dealing with today are some of the questions we dealt with in 1994. It's not to say that people haven't put a lot of effort into this. It's just very complicated. Micro-siting is really the—one of the key strategies to keep in mind to avoid and then to minimize as best as possible the impacts. And then into intersecting with a facility going forward that has done everything it can to avoid and minimize those impacts may need to enlist some mitigation

strategies. But at the same time you may find that some sites just are not appropriate for wind development and they should be avoided at all cost because there's a lot of land left to develop in the United States.

We are working hard on research and the development of tools and then these guidelines as I mentioned, these Fish and Wildlife guidelines, do include a call out for distributed wind. But as I mentioned it's most likely that tier one and tier two evaluations are going to be sufficient for a project developer of a distributed wind project to make a decision on whether to move the project forward or not. So with that I will once again ask for questions.

Paul: Hey this is Paul here. Can you hear me?

Karin Sinclair: Yes.

Paul: Okay. Is there any research or papers that have been written on documenting the impact of smaller scale—small to mid-size scaled turbines on wildlife acts or other species? I've never actually seen anything and I know even the data in your presentation here today at least seems to come from data from utility scale wind farms. Are you aware of anything out there where there's been any studies?

Karin Sinclair: So the definition of a study ranges. So, you know, we're a national lab and we want to do things that have—we deploy research at a level that will have scientific rigor. We're looking for statistical significance. This is difficult when you have single standalone small wind turbines or small clusters of turbines. You can't really get statistical significance with a sample size that's really small. So that's the first thing. The second thing is there have been what some would call studies done on a couple of single turbines and with given

what I just said it's really hard to draw any conclusions from that—from those papers.

They weren't done—they were done as best the individuals could do it at that time. And so they gave—give us a snapshot into the fact that we do know that birds collide with small wind turbines. We don't know at what level and, you know, we don't know all the characteristics that would lead to that situation compared to what we have learned with the utility scale projects where you have many, many turbines and you have a sample size that's where you can get some statistical significance from the results.

So I hope that answers your question but if I can take it a step further it is something that many people have asked for over the years. It hasn't been a high priority on the—from the funding—from our primary funding agent which is the Department of Energy. That doesn't mean that it won't be in the future.

Paul: Because there's an often made claim that distributed wind projects which are typically smaller to mid-size turbines but even if it's a megawatt scale turbine in a distributed project that's just a single turbine somehow has less impact than a utility scale—on wildlife than a utility scale project. And it seems to be generally accepted but can't really seem to ever back that up.

Karin Sinclair: I think what I—the point I was trying to make in this presentation is that it's all variable. There's no sort of common answer. You have to really understand the site where the project is and if there's no data, you know, it's hard for us to really have an informed conversation about whether that is true or not true what you just said. So I'm sort of like throwing my hands up right now because I hear what you're saying. We've discussed this as with many of the stakeholders in the distributed wind sector over the years. I've gotten the

feedback that it's not an issue. I don't have any data one way or the other. I'm not trying to make an issue where it doesn't exist but I don't have any data to tell me that it isn't an issue. (Heather) are you on the call?

(Heather): Yes I am here.

Karin Sinclair: Okay because I just saw your email sorry.

(Heather): Oh right.

Karin Sinclair: I was like oh, she missed the whole thing. Anyway sorry so are there any other questions?

(David Stouter): This is (David Stouter) and I'm on the call. I still can't get into the computer system for some reason.

Karin Sinclair: Okay well the presentation will be posted but do you have any questions.

(David Stouter): No I have a statement basically. Some years ago a small wind group here in Buffalo was looking to put a turbine up in an area that may have bird impacts. The DEC at the time—that the Conservation Department of the State of New York was collecting information about what we knew about the location and what they knew about the location. And then it appeared that over time they were going to create a database that might be useful to new installers if they're interested in information about a particular location. So this kind of and within New York state anyway partially addresses the question of we don't know anything. How could we tell? Well we do know something and somebody can tell you something anyway.

Karin Sinclair: Yes and so that's the type of information that one would use on the tier—at the tier one level?

(David Stouter): Right.

Karin Sinclair: So that'd be an excellent example of best available information at that point in time.

(David Stouter): Right.

Karin Sinclair: And then as projects are deployed and things are learned, information is, you know, evolves, you know, sharing of that information is really valuable. So people have told me things sort of offline it's like well I had this project that was, you know, this happened at this particular project. Blah, blah, blah whatever. But, you know, we don't have the—that's why we focus on scientifically based, peer reviewed, get it in the literature, try to develop, you know, sort of understanding of patterns and then the development of a predictive model. All of those things could be very useful but it takes a lot of time and effort and data—real data.

(David Stouter): They made it clear that the conversation department is trying to do that sort of thing.

Karin Sinclair: That's great. Okay well if there are no more questions let me ask one more time and then we'll end this webinar and go onto the business call which means don't hang up because the business discussion will happen right after the webinar series is closed out. So are there any other questions.

(Heather): Karin I'm sorry if I missed this but did you address if there have been any updates recently with the environmental reviews for the USDA program?

Karin Sinclair: I didn't address that. I didn't talk about that at all.

(Heather): Okay. Do you know if that has been improved in the recent year or is it still pretty tough?

Karin Sinclair: Unfortunately I don't really have any insight into what's going on in that program.

(Heather): Okay.

Karin Sinclair: If you'd like I can try to find out.

(Heather): I'm just curious. I know that was a hold up a year or so back on some projects but maybe with the new additional wildlife guidelines things are getting better.

Karin Sinclair: I think that the—I don't want to speak out of turn but the—that was the region three's interpretation of the Fish and Wildlife guidelines which include—region three includes Indiana that habitat and since it's so highly endangered. And then you have the combination of not only impacts from wind turbines but white nose syndrome which is moving across the country. They're just very, very sensitive to potential impacts. And so that was what triggered that USDA Fish and Wildlife discussion and I know the Department of Energy was involved in those conversations.

(Heather): Yes. If you have any updates I'd be interested in.

Karin Sinclair: Okay. I'll check.

(Heather): I know they're expected—USDA is expected to come out with their final rules sometime this fall just in general about the (REIT) program but I don't know if it'll address that issue.

Karin Sinclair: Okay.

(Heather): That'd be good to know.

Karin Sinclair: Okay.

(Heather): Thank you.

Karin Sinclair: I'll get back to you that offline.

(Heather): Great.

Karin Sinclair: All right well if there are no other questions I'd like to thank everybody who actually called in and are listening. If you couldn't get onto the Web site I'm sorry. I apologize for that. I'm not really sure what's going on but we will definitely be posting the recordings and the PowerPoint presentation as soon as possible. Because I work at NREL it has to go through a review process and it was in the final stages of review before today. So I just need to sign off. So I suspect it'll be posted within a week or two. And if anybody that's on the call has any questions that they come up with later I've put my contact information on here. So you can either call me or send me an email and I'll do my best to answer your questions.

So with that (David) the operator if you would go ahead and stop the recording of this webinar. I want to thank everybody and let them know that

we don't have any planned webinars going forward just as an FYI. And thanks everybody for joining all of these years.

Coordinator: And ladies and gentlemen this does conclude the recorded session of today's conference.

(Heather): Thanks Karin.