

**IMPACT OF WIND POWER PROJECTS ON RESIDENTIAL PROPERTY VALUES  
WEBINAR**

**May 5, 2010**

Coordinator: Good morning and good afternoon. Thank you all for standing by. At this time I would like to inform all participants that your lines have been placed on a listen only mode until the question and answer session of today's call.

I would also like to inform you that today's call is being recorded. If you have any objections you may disconnect at this time.

And I would now like to turn the call over to your first speaker Mr. (Bob Grace).

Sir, you may begin.

(Bob Grace): Thank you. So, this is (Bob Grace) at Sustainable Energy Advantage. I will be the moderator of today's session and we are going to start by quickly giving an overview of the New England Wind Energy Education Project or NEWEEP.

What I'm going to quickly review here is an introduction to the NEWEEP project touching on our objectives, description of the project and our sources of funding, the roles of the grantees and the steering committee, our project philosophy and approach and the project resources and materials that will be available online.

And then I'll introduce us to the first Webinar. We'll touch briefly on some call mechanics and the mechanisms for us dealing with the question and answer session and then introduce our topics and speakers.

So the New England Wind Energy Education Project is designed to provide siting decision-makers and the potentially impacted public with objective information on which to make informed decisions about proposed wind energy projects through New England.

And we intend to do this by collecting and disseminating accurate objective and up-to-date information on critical wind energy issues impacting market acceptance of the many land-based as well as offshore wind projects being developed throughout the region. And ultimately the objective is to enhance the regions public acceptance of appropriately-sited wind energy generation.

The project, as it's been funded, is a two-year project through the end of next year, December 2011. It's intended to include a series of eight Webinars as well as a full-day in person conference next spring and it will also include an outreach and awareness component. We'll be creating a Web-based home for the Webinar related materials on a National Renewable Energy Laboratory, Wind Powering America Web site that already exists called the New England Wind Forum.

The potential Webinar topics that we'll touch on are going to be driven by surveying our steering committee members to help prioritize the most important topics to the region. Examples of those topics include the one we'll be talking about today - residential property values - as well as other important topics such as understanding the impact of wind turbine sound and wind power variability and its impact on the electric grid and effectiveness in meeting environmental objectives, visual considerations and so forth.

Our funding comes from the Department of Energy. Back in May of 2008 DOE issued a report, 20% Wind Energy by 2030. It was really a roadmap to increasing wind energy's contribution to the US electricity supply and explore

the feasibility of reaching 20% wind penetration in the national electricity portfolio.

They concluded that the US has more than enough affordable wind energy to meet that target, but that there are major challenges to be overcome. As part of the next steps in overcoming those challenges in December of 2008 DOE issued a financial assistance funding request, “20% Wind by 2030: Overcoming the Challenges” and one of the topics in that funding request included Market Acceptance.

This project is the result of a proposal in response to that request for proposals. It was selected in 2009 for grant funding as part of the market acceptance program. So, importantly this is something that is - a program that is not industry funded.

Now, to introduce the grantees and the steering committee. The co-applicants were my firm Sustainable Energy Advantage and the National Renewable Energy Laboratory or NREL. And NEWEEP is ultimately going to be coordinated by our staff and directed by a steering committee that consists of New England State agencies, regional and national research organizations and New England’s Regional Grid Operator, ISO New England, each of whom is committed to participate in the project.

The Webinars will be moderated either by myself or one of my staff, by somebody at National Renewable Energy Lab, or from time to time by guests with particular expertise in the topic at hand.

NEWEEP is directed by the Department of Energy as well as the steering committee, the members of whom are listed here ranging from the National Organizations, National Renewable Energy Lab, Lawrence Berkeley National

Laboratory, the Utility Wind Interest Group as well as state agencies at a number of the New England states, academic institutions such as the University of Massachusetts Wind Energy Center as well as other organizations, the Clean Air States Alliance and the Renewable Energy New England which is an organization consisting of environmental advocates and wind businesses. Through that organization, the wind industry has a very diluted voice in identifying potential issues for us to explore but at the end of the day NEWEEP is neither industry funded nor industry driven, as you can see.

The role of the steering committee is to direct and guide the process; ultimately to convene and plan and implement the execution of our deliverables; to provide guidance regarding the content, the image, the tone and our general execution; to offer speakers from within their organizations or identify other idea speakers and provide support in planning the Webinar and conferences; as well as recruiting the best speakers on the topics; and finally recommending topics and helping to schedule everything. And finally, in terms of outreach, getting the word out to potentially interested audience.

The philosophy of the New England Wind Energy Education Project is one of objectivity. Wind energy clearly has benefits but not every place is the right place for wind generation and ultimately we framed our approach to this project as the reality exists between two extremes. The consequences of wind power are rarely as dire as made out by organized opponents, and neither are they as free of consequences as their proponents would hope and sometimes represent.

So, our approach, in order to attempt to achieve that objectivity, is to seek out knowledgeable speakers who can convey credibility on the topics, objectivity and address research with various points of views including those counter to

their own conclusions, to focus on the content and identify what is known and what's not known. To ask speakers to focus on their own research as well as reviews of literature and our focus here in terms of credibility is to emphasize scientific or peer-reviewed research and studies conducted from an inquisitive perspective.

The steering committee, in addition, has identified what they'd like to see addressed. Many of them are in the various states throughout the region dealing with wind energy siting on the ground and are hearing concerns and are aware of the issues so they are raising concerns, highlighting research or other writings that have been brought to people's attention or are getting circulation within communities where wind projects are cited.

Identifying what information or what lack of information is worrying people in communities or information that the setting regulatory authorities are craving and what information the experience on the ground is creating in terms of a need for objective research.

We're looking to have our speakers address a literature review. We're providing an annotated bibliography and references on the works and writings that have been done to date on the various topics.

And during our Webinars we'll discuss mitigation and identify research needs. We will welcome during our Webinar's participant questions and answers for our speakers and we will keep a repository for the Webinar materials on the New England Wind Forum Web site, where the presentations and reference materials will continue to be available to the public.

Now, I noted on our goals for the project. Objectivity is ultimately in the eye of the beholder. Collectively the NEWEEP team, the grantees and the steering

committee are aiming to deliver on that goal, but at the end of the day you can't please everyone.

It's important that we acknowledge that even though NEWEEP is not industry driven or funded we, the coordinators, are involved in activities to support wind industry growth. It's the job of some on the steering committee to implement policies to expand the role of wind power in the region. And our funder, as discussed, has established objectives for increasing the role of wind power.

We're hopeful that we can diffuse concerns that if we're moderating this, if we're coordinating this, we're not objective and therefore, by association, the whole Webinar series is an objective.

First, despite or perhaps because of the roles that the grantees and many of the steering committee members play that they're looking to increase the role of wind, individually we all acknowledge that like any electricity source wind power does have impacts.

Our stake is in the process and not the outcome. There are going to be hard decisions to be made, and decision-makers and the public need to be armed with good information and not information from parties whose goals are to either build or obstruct a specific wind project.

And ultimately unless wind projects can be sited appropriately the policy objectives can't be met. So we're doing the best job we can to try and get at objective knowledge and the best way we know how to do this is to put ourselves in the shoes of those who are being asked to be neighbors of the wind power facility. Because someday we may be wearing those shoes.

If the wind turbines proximity is problematic I'd rather know what those issues are and where they should be expected based on research, data and facts, not on fear of change on unsupported assertions on arbitrary setback distances, or poor data or lack of data, as the basis of those decisions.

We want a good outcome and that's why we want a fair presentation of the issues. Now, we'll never be able to convince everybody that NEWEEP doesn't have a bias, but we're going try to demonstrate that in the way that we gather our speakers, the way that we provide annotated bibliographies, including gathering data and positions that are counter to the speakers conclusions, and posting all of that on the Web site, and the way we conduct our Q&A sessions.

We're going to do our best job to make this a search for the answer and not one that starts with the answer.

So, turning over to today's Webinar we will have two speakers. The first is really setting the table for our whole Webinar series, Heather Hunt the Executive Director of NESCOE, the New England States Committee on Electricity. We'll talk about wind power's role in achieving regional policy objectives. And then the headline of today's Webinar, Ben Hoen, a Consultant to Lawrence Berkeley National Labs, will speak on the impact of wind power projects on residential property values.

As far as the mechanics of the call we will have a Q&A session to address questions having to do with property values. We won't be having a Q&A focusing on the introductory topic.

We understand that many people are passionate about the subject matter but to encourage a respectful dialogue and to not allow individuals to monopolize

the scarce time - after all we have about 440 people registered for this Webinar - we're going to proceed as follows; participants may post succinct questions in writing using the Webinar's Q&A chat box. We'll review those instructions to use that as we start, but they were on the intro slide and I'll return to that momentarily.

We ask that in typing in your question you identify yourself at the beginning of your written question ideally with name, organization, or if you're a member of the public you can simply put public, and the state that you're in.

If you wish to remain anonymous please at least enter your first name and your state. We'll ask to limit to one question each please. There are a lot of participants here and we want to get a diversity of input and questions. The questions will be read by the moderator, myself, in the order asked until we run out of questions or time, whichever comes first.

We're not going to screen or prioritize the questions but we may skip questions that we feel have already been asked and answered.

The moderator, again myself, may also ask a few questions that have been posed by the steering committee and I will identify the questions as coming from the steering committee. And at the end if there's still time left we'll ask participants to pose questions directly and if we get to that point and have time left the operator will announce the instructions.

So, on that note it's time to turn over control here to Heather Hunt. Heather is New England State Committee on Electricity's Executive Director. Previously she had a regulatory law practice, was a director of State Governor Affairs for UTC Corporation, vice president of Southern Connecticut Gas and earlier she

was a public utilities commissioner in both Maine and Connecticut and worked for the Connecticut governor.

So, Heather I'm turning it over to you to introduce us to wind power's role in achieving regional policy objectives.

Heather Hunt: Thanks (Bob). First, let me just thank you for inviting us to give a few introductory remarks today about some of the things that we've been working on at NESCOE relating to facilitating renewable and wind development before we hear from your primary speaker today.

Here in New England, as in frankly the rest of the country, where we've been spending a lot of time looking at renewable and wind development. Citing, as you all know, is central to developing our wind resources so your current efforts to talk really objectively about citing and the surrounding issues is really timely and important.

I'm just going to spend a minute on what NESCOE is for those of you who may not be familiar. I'm going to talk about kind of why we are talking about wind and some of the policies that drive these issues and then give you a very high-level sense of what we refer to as a governor's renewable energy blueprint.

First my standard disclaimer NESCOE is an organization that really only speaks for its managers. A note on what NESCOE is. We are New England's regional state committee and our purpose here is really to advance policies that would help provide consumers with electricity at the lowest possible price over the long-term, consistent with both maintaining reliable service and caring for environmental quality. We have a Web site at NESCOE.com where we post just about everything we do.

A fast word about NESCOE. We're governed by a board of managers, each of which is appointed by one of the New England governors. And then on an issue by issue basis governor's energy policy advisors and other state officials also participate in our activities, which is really helpful.

To date, there's been a lot of agreement across New England on these issues, and there is a strong motivation to work closely together. We also work very closely on a regular basis with the New England governor's conference and with NECPUC which is the New England Conference of Public Utilities Commissioners.

NESCOE's substantive focus is on system planning and expansion and resource adequacy.

So why are we talking about wind? There's sort of a common state and federal interest in wind these days and that is an interest in reducing carbon emissions, an interest in diversifying our supply and reducing our reliance on foreign fossil fuel.

I would add to that a few other New England specific interests and that is as a region we have an interest in making sure that our consumers are assured of clean energy resources that are most able to serve them cost effectively. And we also have a strong interest in relying on competitive markets and processes to identify those resources that ultimately serve consumers.

So today, we're working together to facilitate, resource, renewable resource development, for a few reasons. We want to help meet the renewable portfolio standards and other clean energy goals across New England, looking to achieve environment policy objectives, and execute programs. I'm sure most

of you are familiar with what's been called RGGI, the Regional Greenhouse Gas Initiative.

And we are looking to identify ways to bring those resources to market that have sort of emerged as the most cost-effective options for consumers, because at the end of the day, this is about consumers.

Onto the next slide. New England's interests in this area are not new. All the states have historically encouraged development of our renewable resources both within and outside their state's borders with a variety of programs and policies in place, clean energy grants, net metering rules, renewable portfolio standards I am sure most of you are aware of state entities that work hard every day to help support the development of renewable resources.

Wind is eligible under all definitions of renewable energy credits in our current state laws and in the proposed Federal Renewable Portfolio Standards. With respect with sort of getting here to there, there is a variety of resources that are RPS eligible. I think wind is very broadly considered to be really central to meeting the overall policy objectives.

We're going to take just a fast look at RPS standards to get some context. This slide shows you a nice snapshot of the RPS standards across the country and I also give you the Web links. For those of you not familiar, it's a fantastic resource for all sorts of information about renewables.

If you take a quick look kind of across the country, you'll see Colorado has a goal of 20% by 2020, Kansas 20 by 2020, Oregon 25% by 2025. And I put this up here just to show you that New England's interest in advancing renewable resources is really sort of consistent with what's going on across the country.

This is a slide, and I appreciate ISO letting us use it, that shows the renewable portfolio standards across New England. You will - just kind of a visual of the goals by 2020. Just notably, Vermont is not on this slide and that's not because Vermont is not interested in developing resources, it's rather because they've set something that's more like a goal as opposed to a traditional RPS.

Here's another slide and this is from Sustainable Energy Advantage that gives you a snapshot of the share of demand by state in the year 2015 and the year 2020. This also, as I noted last time, Vermont wasn't on the slide. Vermont's kind of relative demand is in this slide.

This doesn't include some of the RPS's that are designed to maintain historical contribution of renewal energy or some of what's called the Class 2 resources in other states.

We're going to move on to talk about the New England governor's Renewable Energy Blueprint. I put the cover shots of two documents on this introductory slide because we really think about the blueprint as two pieces of work.

One is the governor's blueprint which is on the left which is sort of the policy piece. And then on the right, you'll see a technical analysis which was an economic study conducted at the governor's request by ISO New England.

Just a quick word about the blueprint's task to date. This started about a few years ago with a governor's resolution followed by expressing interest and looking at our renewable resources and their development, followed by communication with our federal leaders about an interest in working together sort of in a state and federal partnership to that end. Subsequently, through

NESCOE, the governors requested that ISO New England conduct a technical analysis.

ISO concluded that last year. It informed the governor's blueprint which was adopted in this past fall, and today we are working on some of the issues that were identified and specifically coordinated procurement. All the information related to this is at NESCOE.com.

I won't read this to you. I just wanted to give you a little bit of a snapshot of what the governor said to President Obama and congressional leaders about a little over a year ago about their interest in really changing the way we generate and use electricity that will, you know, in their minds being about associated economic, environmental and health benefits to the region.

So a word about what went on behind the governor's blueprint document. We asked ISO New England to look at the significant sources of renewable energy available to New England, and the ways to most effectively integrate them into the grid and the associated costs.

So ISO New England conducted a technical analysis that looks at 20 years in kind of one year in time to identify some transmission pathways and they were conceptual pathways, not at all projected pathways, or recommended pathways, but just an idea to give us some data.

It focused on some wind resources up to 12,000 megawatts and that was a combination of onshore and offshore and importantly we looked at incremental cases from 2000 to 8000 megawatts with the thought that there's no particular need for New England to say we must develop "X" amount by some date certain. So I think incremental cases were an important part of the blueprint.

I just want to underscore what the blueprint was not. It wasn't intended in any fashion to discount the contribution that other renewable and low-carbon resources can make to New England's energy mix. It also wasn't meant to signal any reduced interest in energy efficiency or demand reduction.

I think all the states have very strong policies and programs in those areas and those will carry forward. It also as I mentioned was not an effort to identify any particular resource location or any particular transmission pathway that should go forward.

In our view, competitive markets or competitive process should really identify those that are most able to serve customers and sort out what are developed, when and by whom.

Just a few of the study's findings, there are more in the blueprint documents themselves but these are just a few of the highlights. The study's a combination of the economic study and the governor's blueprint really identify that New England has a lot of untapped renewable resources more than 10,000 megawatts of on and offshore and wind power potential and those can be developed, as I mentioned, incrementally. If we develop them conservatively there's plenty to meet New England's needs.

The last bullet is important here and that is from our review and analysis it appears that development of renewables in and around the region would be possible with a less capital investment per transmission than would be needed to import an equivalent quantity of power from remote out-of-region resources on new sort of cross-country, high-voltage transmission lines.

And again as I mentioned at the outset it's about consumers, so the snapshot of what would it actually cost at the end of the day is critically important.

The other thing the blueprint did was we sat back and said what can the six New England states do with our current authority to help facilitate development of renewable resources? And one of the things we've identified is potential opportunities to conduct joint or coordinated competitive procurement.

I think all of the six states have a very common interest in their statutes in securing low-cost or cost-effective or cost-stabilizing power, so there's some opportunity there.

We've also identified an opportunity to coordinate citing reviews for interstate transmission facilities that sort of show themselves to be the best way to serve customers with renewable power.

I'm not going to read you all this. When we talk about the governor sort of adopting the blueprint I'm often asked what does that mean. Basically the governor's endorsed the concepts and the policy direction in the blueprint, and also importantly asked us to carry forward and look at potential ways to pursue joint or coordinated competitive procurement and get back to them within the year.

So that's work that kind of work is underway now at the states and we anticipate reporting back to the governor sometime this summer.

These are a few final thoughts on renewables very broadly and I won't read this but you know the picture for New England is really good. We've got natural resources, we have solid technical analysis, the states have cooperative

experience and are really inclined to work closely together. We have competitive markets and mechanisms in place here in New England and have work well. And we also have sort of a common national, common interest with our national leaders in increasing renewable power and reducing carbons.

In a couple if citing takeaways. Wind you know is simply important to meeting our policy objectives. It's one of the reasons it was the centerpiece of the blueprint. And ultimately whatever we seek to develop, it's going to require citing of new transmission facilities in New England and other energy infrastructure.

There's a common myth that New England doesn't cite well, and the reality is we do. We've cited I think on the order of four billion dollars worth of transmission in the last few years, and significant new supplies have been added to the system. So we have sort of we're looking at ways to carry that forward to wind.

The other important point is that citing is inherently local. That's really important to make sure the decision-makers are aware of and able to be responsive to local concerns.

So with that I appreciate the opportunity to talk a little bit today and I'm going to sit back and enjoy the main part of the program today and learn with all the participants.

So Thank you (Bob).

(Bob Grace): Thank you Heather for setting the table for us. I'm going to ask the coordinator here just to put the Q&A instructions back up at the on the screen for a moment before we start with Ben Hoen's talk at the bottom here, for the

question and answer period. Please click on the Q&A at the top of the LiveMeeting window. Type your name, location, question in the Q&A box and then click Ask.

We will take the questions as they come. Questions are for Ben Hoen on the property values topic. And at this point why don't we switch over to Ben's presentation while I introduce.

Ben Hoen is under contract to Lawrence Berkeley National Labs, to investigate individual and community responses to a number of different renewable energy resources, such as the research he'll be discussing today, as well as the separate analysis of the impact of solar energy systems on home-selling prices, as well as an investigation into public acceptance of households living near wind turbines.

He's often been asked to speak on the subject of wind energy and property values, has done so to municipal leaders, other real estate researchers and practitioners and stakeholders inside and outside of the wind development process.

He's a graduate of the Bard Center for Environment Policy at Bard College with a masters of science degree in environment policy where he focused on econometric and GIS modeling.

Previous to graduate school he worked in the paper recycling industry in Baltimore, and setup and ran his own business in Brooklyn, New York.

He holds bachelor degrees in finance and general Business from the University of Maryland. We welcome Ben and thank him for his participation

here, as well as Ben is a representative on our steering committee and helping us with the project overall.

Ben, it's all yours.

Ben Hoen: Thank you, (Bob). Thank you everyone for coming today. It's a pleasure to be here online to discuss this subject that's been my interest for a number of years now, having such a diverse group.

I want to note at the top that this presentation is in part made possible by funding through the U.S. Department of Energy's office, the Energy Efficiency and Renewable Energy, specifically their wind and hydro-power technologies program. It also was the funding for the research that I'll be discussing in part today.

Okay, so, the goal today is to review the literature on this subject of impacts on residential property values near wind turbines. And this includes the previous literature on wind energy and property values that existed prior to the Berkeley Lab study, as well as the Berkeley Lab study that was released last year that I'll be addressing today briefly.

And also the literature of other potentially analogous disamenities that is considerably more rich and therefore can serve as a frame into which the wind energy property values literature can fit.

Following that review, I will turn to where we go from there, given sort of a set of conclusions, and offer some suggestions on how to proceed.

So it's most likely not surprising to any of you that the environmental amenities and disamenities can impact property values and that this linkage

has been well-studied. Whether we're talking about a decrease in values for homes near highways or high voltage transmission lines, or an increase in values for homes near open space or on an oceans front, clearly the environment that surrounds a home is taking into account by the buyer and seller when establishing a value for a property.

Therefore it's not unreasonable to think that the same linkage is true for wind energy facilities. It's also important to note that the home for most people is the largest asset in their portfolio and therefore is the one that most people will go the furthest to protect. And I'll give a bit more context to that point later on in the presentation.

Finally, it also should be noted that prior to a wind facility's construction, impacts such as visual and auditory to individual properties are, at this point given what we have to work with, fairly difficult to quantify.

Now, all of this is to say that it is reasonable that aesthetic and property value concerns consistently rank high in the list of stakeholder concerns of those considering a wind energy facility in their area. Because the public is normally involved at some level in the citing and permitting processes of wind facilities, their concerns about property values often percolate to the top.

And finally, one last point to make before moving on is that property values are a proxy for the real and perceived balance between costs and benefits to the degree that they are equal, the cost and benefits of each home, the value of the underlying property, all else being equal, should not change. But when one outweighs the other, the values will likely move, assuming these costs and benefits are well-understood by the community of buyers and sellers.

All right now we've made an attempt to group the concern for wind energy and property values into three non-mutually-exclusive subgroups, those being area stigma, scenic vista stigma and nuisance stigma.

Area stigma is the concern that the rural area, which to some is an amenity in itself, will appear more developed, therefore losing its bucolic character, and thereby decreasing the desire for folks, especially retirees and second home owners to move there. These impacts, if they existed, would likely be felt throughout the region surrounding the turbines, out so many miles and for homes with and without a view of the turbines.

Scenic vista stigma, also called, maybe, the Cape Cod effect, encompasses the concern that the views of the turbines alone can affect property values, and that they are likely most pronounced for homes with dramatic views of the turbines.

Finally, nuisance stigma is essentially a catch-all character, category, which encompasses the myriad effect which occur in close proximity to wind turbines. Those that might include, but are not limited to, issues related to sound and shadow flicker and concerns about health and safety, just for those living close to the turbines, for instance inside of a one mile.

So each of these stigmas could impact property values and therefore set up testable hypotheses, those being, if the stigmas exist property values would be adversely impacted.

Now, turning to the previous literature, most of which preexisted the Berkeley Lab study, we find that the group is fairly thin, at least in comparison to other disamenity literature, which I'll discuss later in the presentation.

For example, there are only two studies which have been published in peer-reviewed journals on the subject of wind energy and property values. Now, that notwithstanding, existing literature is definitely worth investigating. It consists of studies using a variety of methods, with various levels of sophistication, and as is to be expected the results from which are diverse, largely unpersuasive given the limitations of their data, and often inconsistent methodology.

Because of this, comparisons between the studies are difficult because of their diverse nature. But that notwithstanding, some conclusions can be drawn from them when looking at them as a whole.

Specifically, many studies have predicted that property values will be negatively impacted by as much as 43%, in the case of one study. Therefore, prior to construction of the facility, there is an expectation for effects to exist. Though after construction, many experts have not experienced notable reductions in value when surveyed.

Similarly, when analyzing actual sales data, large impacts have also failed to materialize. That is, except for one study that looked at land sales, as mentioned there.

Finally, based on the results from a few studies and from surveys of real estate experts, it seems most likely that effects will exist in close proximity to a facility, if they do exist, and in the period after announcement yet prior to construction, when risks are difficult to quantify and homeowners, at that point, will be most likely to take a risk averse stance.

Okay, so those are the conclusions drawn from the previous literature, but it's important to note that the body of work has many limitations. Specifically,

many of the studies have relied on surveys rather than using actual sales data. Most studies have relied on simple statistics, using relatively small data sets, and not even reporting statistical significance, therefore making it difficult to determine if the results are meaningful.

Many studies have concentrated on this question of area stigma, ignoring the other two stigmas. And probably similarly, the studies have rarely included field visits to the actual homes that sold, and as I mentioned, only two studies have been published in peer-reviewed journals, which is of course a standard for empirical research.

Given that, and turning to the Berkeley Lab research, clearly there was a good deal to improve upon, and was in fact the impetus for the research project. Specifically a thorough literature review was conducted, a large amount of data was collected, each home was visited, multiple statistical models were used, mostly relying on something called a hedonic pricing model which I'll discuss in a little more detail in a few slides. Each of the three stigmas was tested for directly, and finally the work has culminated in a paper which was submitted for review in a leading real estate journal just a month ago.

So simply put, the goal of the project was to test if the views of and distance from a wind facility have a measureable effect on selling prices of nearby homes, and how these effects, if they do exist, might change over time.

Regarding the samples, data was collected from ten study areas in nine states, surrounding 24 wind facilities, totaling roughly 7500 transactions. And those transactions span the period prior to announcement of the wind facility to well after the facility was constructed and operating. And the red dot in this slide depicts where those study areas were and they are roughly representative of

where development had occurred and is occurring currently, as represented by the blue dots.

Now, it's important to note that despite the fact that we had 7500 total transactions a relatively small number of those actually are where we think impacts are most likely to exist, and that is, let's say, inside of one mile.

In fact, we have 125 transactions that exist inside of one mile. Now, this is the most that have been collected to date and gives us therefore something unique to say, but as you'll see from my final recommendations, clearly more work needs to be done in this area. But what I'm presenting today is effectively the most and best information that we have on the subject.

What is a hedonic pricing model? I will try not to bore you with this, but simply put it's a model designed to explore the differences in selling prices between homes that vary by certain characteristics.

This model is extremely useful and, for this reason, it has been and is being used by practitioners worldwide for over 40 years. There are literally thousands of examples of this application in the literature. As such, it's a particularly good model at dealing with the questions we try to answer in the Berkeley Lab research.

Now, one thing to note is that, as with any significance test, both the size of the estimated difference between for instance, two sets of homes, and the significance level of that estimate come hand in hand.

An example of this might be results from a poll that, for instance, discover that two groups differ by let's say, 3%. If the margin of error for that same poll is 5%, which is a common number, one cannot say with any confidence

that the discovered difference of 3% is worth taking note of. That same thing is true for some of the results I'll present today, and so I'll revisit this issue later.

Finally, it should be noted that although we relied on the hedonic model for much of the work, we also used other models to confirm results and to confirm that results were stable regardless of the approach.

Okay, so I'm going to drill down a little bit into the method specifically to this study to give you a sense of how the results were derived. As far as the individual stigmas, I'll start with scenic vista stigma, which remember was the question of whether view alone affects property values.

I mentioned earlier that each home in our sample was visited, and one of the reasons for doing this was the need to collect not only information on the degree to which the turbines could be seen, but as well the quality of the scenic vista.

The concern was that the two might be correlated and pull in two different directions, therefore creating bias in our measurements. These photos depict such a situation. On the left, it's a bucolic vista from a home that, all else being equal, would likely add a premium to the home as compared to homes without such a nice vista. And on the right is the same scenic vista, but with a view of turbines overlapping it.

Now it's our supposition that the turbines decrease values and so if the turbines decrease values by a smaller amount than the scenic vista increased the value, we might get a perverse result of an increase in value for this particular home, if scenic vista were not controlled for. Therefore, we had to control for scenic vista to reduce the potential bias.

And this was done by rating the quality of the scenic vista using a five-point qualitative rating system. These ratings range from poor to premium and were ascertained without taking into account the views of turbines if they were visible at all. These ratings took into account, for example, the distance of the scenic vista, how far people could see from their home, if it contained water the degree to which it invited exploration, the amounts of manmade structures in it, again regardless of turbines, and the angle at which these vistas were available. These were techniques derived from other studies looking at similar issues.

Similarly, for views of turbines, a four-point rating system was used to rate the quality of that view, ranging from minor to extreme. And of course there's the other option, which is no view of turbines. The rating system took into account not only the distance that the home was from the turbines, but more importantly, the number of turbines visible and the viewing angle of these turbines.

To test for the area and nuisance stigmas, we relied on distance, and therefore transactions were distributed into five distance bands based on the distance at the time of sale to the nearest turbine.

Two bands inside of one mile are where we expected to see a nuisance stigma, therefore it follows that outside of one mile, nuisance effects are not likely to exist based on our assumptions. But those homes - but for those homes, an area stigma might be present.

Now, it should be noted that many of these techniques, for example distance measurements and qualitative ratings of views, were used and have been used by those conducting the research of other disamenities such as high voltage

transmission lines and conventional power plants and roads. So therefore we had a lot of work that we were just simply hanging on the coattails of that had been done before us.

Okay, so I can finally dispatch with the preamble and turn to the results. Although the report has ten different models, and of course that means ten different sets of results, we don't have time today to explore all of them and therefore I'm going to just concentrate on some of the key findings of the research.

Of course, the full report is available for download and the link to that will be available on the last slide. So I told you we visited each home to quantify the quality of the scenic vista, and this figure describes the differences we found between homes with various scenic vistas. And that means the differences in sale price.

The reference category for this model and this set of results are homes transacted that had an average scenic vista, and our model estimates that a home with a premium scenic vista sold on average for 13% more than homes with an average scenic vista, all else being equal. And on the other hand, homes with a poor scenic vista sold on average for 21% less than homes with an average vista.

And I will add, although it's not shown in this figure, that these estimates are very stable regardless of the subset of data used to estimate the differences between homes with various scenic vistas.

For example, if one looks at homes that transacted prior to wind facility construction, just select a group of data, a similar scale is estimated. As well,

when the data were broken down along geographic delineations, we had similar results.

Now remember, these ratings were derived when not taking into account if the turbines were visible and the degree to which they were visible. These results tell us two things; folks clearly do care what can be seen from their home in general, and that number two, the differences between home values for this first aesthetic test, mainly scenic vista, are robust across the data set no matter how we slice and dice the data.

This gives us confidence when looking at the tests for the views of turbines, our second aesthetic test because the ratings for which were established using similar methods as those for scenic vista. And moreover we can have some confidence that the effects of views of turbines would also be relatively stable at the study area level, meaning at different geographic delineations if we actually had more data available. Of course that's an assumption we make, but based on the similarity of the two tests we think that that's probably reasonable.

Let's turn to the turbine - view of turbine results now. This figure displays the estimated differences between homes with different levels of views of turbines, as compared to those homes without views of turbines at all. The sample used for this set of estimates includes all transactions occurring after the wind facility was constructed. Therefore, every home at least had an opportunity for a view of turbines.

What is clearly shown here is that the view of turbines alone have only a minor impact on sale price and that none of these effects are statistically significant. Remember, that's the question of inside or outside the margin of error.

Therefore, as I mentioned earlier, could be just from pure chance. These results hold even for homes with more dramatic views of the turbines, such as moderate, substantial or extreme rated views. Taken together with the previous scenic vista slide, this tells us that although folks are sensitive to the environment in general surrounding their home, they seem to be not sensitive to the views of turbines. Or if they are sensitive, the values of those homes change only a small amount.

I'm turning now to area and nuisance stigmas. We concentrate on the distance parameters rather than the view parameters. In this figure we see the estimated differences in average selling prices for homes located inside of five miles, as compared to those outside of five miles; homes which we believe are reasonably likely to not have been impacted by the turbine's existence.

Again, this sample for these results are only transactions that occurred after the wind facility was constructed so all homes had some calculable distance to the nearest turbine. What we can see is that for homes outside of one mile, differences are relatively small and, not surprisingly, not significant. Therefore we posit that there is a lack of evidence of an area stigma. For the homes situated inside of a mile, we find more dramatic differences.

In our case, largely because of the small numbers of transactions inside of a mile, you'll see inside of 3000 feet and between 3000 feet and one mile we have 125 transactions. We cannot say, because of this, with much confidence that these differences inside of a mile are not because of pure chance, but despite that one must honestly look at them and wonder if the turbines are impacting selling prices.

That said, one thing we can be confident of is that if effects do exist, they are likely on average not to be of the magnitude that had been posited elsewhere in the grey literature in the 20-40% range.

Now this is not the end of the story; there is considerably more data at our disposal and possibly these data will elucidate more of what's happening near the turbines. The temporal aspects model, as depicted here, estimates the average differences in prices after adjusting for housing inflation. And the reference category in this model are those transactions occurring more than two years prior to the wind facility's announcement for homes that were located more than five miles from where the turbines were eventually located.

This group of transactions we believe is very likely to have not been affected by the development of the wind facilities. What would one expect to find if effects existed? Remember, we have adjusted for inflation are curves that fall away, after construction, to the right. Instead, for all distances outside of one mile we see relatively straight lines, indicating little to no measureable differences between home prices after the facilities announcement and eventual construction.

Though that is not what we find inside of a mile. That subset is depicted by the blue curve. We see a depression in values prior to the facility's announcement as compared to homes further away. This would indicate the differences in value preexisted the facility's announcement and eventual construction and then, more importantly, following the announcement and eventual construction sales prices, on average, climbed back to more normal levels.

Moreover, we find the differences in value we saw on the previous slide, in the base model, might not be indicative of a difference in value between

homes that are within a mile and those outside of five miles because of the turbines, but rather because of the results of a preexisting disparity.

Whichever the case, what we do not see again is a decrease in value after construction, as compared to the pre-announcement levels which would indicate a nuisance stigma.

Now I want to propose an alternative theory. The line indicating the announcement date as shown on this figure here might be more appropriately located to the left. The announcement date, for our purposes, was the date on which the wind tower project entered the public record, usually through a notice or permit application.

It is not unreasonable to believe though that well before that date, the public was aware of the development. Developers, for example, circulate through the community signing up land leases well before a project is announced.

Even more ostentatious would be the erection of a meteorological tower to collect wind data. Either of these might spur neighbors to talk to neighbors and potentially realtors and buyers, which therefore could influence prices.

Additionally there might be bias in the less than one mile curve, specifically at the end. The end, in this area and this area, excuse me, at the end of the blue curve.

The additional sensitivity analysis shows us that if there is bias at the end of the curve it's likely downward. These two points of data were represented by relatively smaller numbers of study areas and therefore had greater influence, or likelihood of being influenced.

Now, if both of these potential biases were corrected for it might be that a U-shaped curve would be a better fit, and this would indicate a period following the announcement of the facility when prices were deflated, but after which, in the post-construction epic they returned to more normal levels.

Again, though, whichever interpretation is used, and clearly the latter is more speculative, we are not seeing any consistent depression in values following the construction of the facility and therefore no evidence to support the claim of a nuisance stigma.

So, what conclusions can be drawn from our analysis and as far as the Berkeley Lab study? There is an absence of evidence of sale prices of homes - evidence that sale prices of homes without views of turbines and further than one mile from the facility are stigmatized with arrival of that facility.

Similarly there is an absence of evidence that sale prices of homes with a view of turbines are uniquely stigmatized, even if that view is dramatic. And finally, for nuisance stigma, there's an absence of evidence that prices of sales occurring after construction of the facility, in this sample, are uniquely affected. And there is some evidence that sales occurring prior to construction are affected adversely.

Now, it's important to note that an absence of evidence does not mean evidence of absence, but if effects do exist in this sample they are either too small or too infrequent to result in a statistically observable impact.

So, given that, let's turn to the other disamenity research and see if there are parallels that can be drawn. What we have here is a very condensed sampling of the enormous quantity of research that has investigated property value effects attributable to other disamenities.

There is no reason to believe that windmills are entirely unique and that effects found elsewhere would not be at least in part applicable to those of turbines. Now, there's too much here to discuss in detail, in fact, entire papers have been written doing just that, but there are a few takeaway points.

Look at the percentage change column. You see that regardless of what disamenity we are looking at and despite if we are just simply inside of a mile of the disamenity or adjacent to it, affects to not climb north of 20%. And of course, nowhere do we see an effect of the 40% magnitude posited elsewhere for wind energy facilities.

This is so despite the research has investigated the effects of a crematory, a super fund sites, contaminated ground water, industrial plants and such, each of which can be reasonable assumed to have an adverse affect on your health, much less just simply the use and enjoyment of your property.

Therefore the findings of the Berkeley Lab study and many of the other previous studies fit well within these levels. Now, it's unclear where they would fit best, but at least we can get a sense of scale.

Now, secondly, look at the distance limits for the effects on the far right side. In the case of the high voltage transmission line, where visibility is the key issue, effects fade outside of a few hundred feet. Similarly, a lead smelter, an industrial site, which of course have many other characteristics that would be considered disamenities, have not been found to adversely affect sales prices outside the two miles.

The turbines, it might be that effects fade quickly, as well, reinforcing both the appropriateness of looking near the turbines for effects but also the reasonableness of assuming that further away homes are likely not affected.

Finally, the third takeaway point as it related to noise, which is an important issue for some communities considering wind energy or having it installed in their area. Price differences attributable to road noise, which I thought was the best analogy, were estimated both from original research, which is the excuse me there, this study, or from a meta-analysis of research of 29 other studies.

And they found marginal effects near 2% for five decibel – dB - difference. The dBa difference between a quiet road and a busy road might be roughly ten dBa, and therefore price effects are estimated to be about 4% for those two sets of homes.

Now, I'm not a sound engineer so a lot of that is just based on what they have told us, but as you can see these are relatively small effects. Therefore, again, we find effects found in the Berkeley Lab research and elsewhere for nuisance stigmas to be well within the bounds estimated by other research.

So, where do we go from here given these largely synonymous findings? I want to repeat that these results do not imply that effects near turbines do not exist but rather that they are likely to be relatively small and/or infrequent, and occur after announcement and prior to construction, largely, and of course occur in close proximity.

So given this, are property values something stakeholders should be concerned about? Of course. Remember at the top I mentioned that homes are the largest asset in a resident's portfolio, that risks are difficult to quantify

prior to construction, and that nearby residents have a big effect on the outcome of citing and permitting processes in a lot of cases.

So I would contend that it is reasonable to assume that property value risks will persist unless they are measured, mitigated, and managed going forward. And what does that mean?

Let's start with measure. First, stakeholders need to continue to measure to better understand effects, to test the robustness of previous findings, and to explore nuances in effects. Specifically, we need to use a variety of techniques with similar data, we need to use similar techniques with a variety of data, and also test where possible for analogous effects such as time on the market or sales volumes near turbines.

Finally, results and research should be prepared in a form that is submitted to journals for publication. It simply raises the bar and puts the work in a different light for practitioners and stakeholders alike.

Other disamenities, such as high voltage transmission lines, have tons of research conducted about them and published in journals, and there's really not reason why the same cannot happen for wind turbines.

Now, to mitigate. There are ways that risks can be mitigated in the development process such as increased efforts to quantify risks for those living closest, which includes improving the models used to predict these effects.

Specifically, these mitigation strategies I suggest can include organizing visits to existing facilities, talking to neighbors, realtors and other knowledgeable folks there, improving models to accurately describe effects, maybe, for an

example, through video montages of what a facility will look like. And, four, getting them in front of the homeowners through open houses and other means.

All of this will help to more better describe what risks exist. Also, where appropriate strategies should include improving the predictive models themselves, such as those to predict noise effects upon which regulations are based.

This might include taking into account unique meteorological occurrences,. For instance, high wind shear, something that has been shown to increase sound annoyance.

Again, I'm a bit out of my area here, but we are clear that those regulations in some cases don't match perfectly with what is going on on the ground.

Finally, we need to modulate these techniques as knowledge and methods evolve.

Finally, manage. This category accepts that real or perceived risks cannot be measured or mitigated away entirely and that, for better or for worse, there is a potential cost, real or perceived, to nearby homeowners. Therefore, this slide describes possible techniques to balance those costs with benefits.

Now, it should be noted that when facilities do already bestow benefits on a community, usually in the form of some property tax or payment in lieu of tax, among other things. But these benefits are often applied across the entire community evenly. And, therefore, the folks nearest to the turbines might be deserving of some additional benefits or that the existing benefits can be

distributed slightly differently to take it into account this fact of where costs are born.

Therefore, one suggestion is to offer some combination of neighbor agreements or other incentives and/or property value guarantees in so far as they are economically workable and legally tenable for the stakeholders. I am not a lawyer, and I know that these things are a doozy to put together. But, it seems at least conceivable that they could be looked at, at least in combination or in some collection of possibilities between these various programs.

Additionally - therefore, one suggestion...Okay, excuse me. In addition, stakeholders should agree to conduct follow up studies to test if assumptions prior to construction are in fact met, realizing that cumulative impacts might exist. And that real or perceived risks might increase or decrease as more and better information becomes available.

So, in closing, hopefully, using these various tools and suggestions to measure, mitigate and manage the risks, when combined, will give stakeholders more reason to sit down on the same side of the table and provide greater consensus in the sighting and permeating process.

Thank you very much. If you have more information, want more information, there is the link there for the full report. Also, you are welcome to contact me directly via email or the phone. I look forward to answering some of the questions that we have today.

(Bob Grace): Thank you very much Ben. Very interesting presentation. A lot of questions raised I'm sure. We have a number of questions up on the question and answer checkbox already. And, as well, we have a few that have been post by number of the steering committee.

I'll start with some of the questions that have been posed and every once in a while I'll throw in from the steering committee as well.

Our first question is from a (Joe Aruda) of Alteris Renewables. How do we get a copy of this presentation and, also, does a wind turbine installed at a resort increase or decrease the value of the property from a sell value standpoint?

Ben Hoen: Okay. Well, this presentation, today, I guess, (Bob), will be available ultimately on our Web site.

(Bob Grace): Yes, I'll wrap up the session with a slide that will show where that information will be available.

Ben Hoen: Okay, so I think this question is getting at an important question that is asked often, which is, is there something unique about a group of properties that would make them more likely to have effects than maybe the average that we found across our dataset.

And, the short answer is, we don't really know. There are a lot, a wide variety of homes represented in our sample of the wide variety of prices. Some of which were the highest priced homes in the sample for a particular study area.

And, so, to some degree, we would see that effects would likely exist in our data because of those homes. Also, one take away point from the research is that there is no reason to assume that effects operate in different directions. Meaning, in one locale you might have a negative effect and in another locale you might have a positive effect.

So, that being the case, you would likely still find some measurable effect based on distance, for instance, if it did exist in larger magnitude elsewhere.

Now, that all being said, there are potentially some unique characteristics, maybe very high sensitivity to purchasing in an area. It might very well be that a particular area is entirely unique for a particular scenic vista and that that scenic vista is known to be highly valued.

This is something that we tried looking at by comparing homes that had a uniquely high scenic vista and also had views of turbines to other homes that had high scenic vistas that didn't have views of turbines.

We found very little there to support the claim that that exists. But, because we didn't uniquely look at it, we can't say for sure. I think one would look at those areas in a way similar to other areas that have a maybe historic view shed that would then be identified in an environmental assessment and may be some places to avoid.

But, in general, it looks like we are not going to see a dramatic difference, unless, as I said, of course, the particular area is unique in some way. So, that's a long answer to that question. I wish I had more to say in that area.

(Bob Grace): Okay. Let's go on to the next one from a (Steven Mahoney). I am in a municipal electric area in (unintelligible). Can I receive help with wind energy in my location?

I'm not sure if that is something that Ben can respond to. But, perhaps, (Steven), if you could put up maybe a little bit more specific question. I'm not sure if there is anything there.

Ben?

Ben Hoen: I'm not sure what exactly he is asking.

(Bob Grace): Okay. So, let's go on to the next from a (Ann Forschner), New York, New York.

If I am a developer and am attempting to seek public support for the development of a perspective wind farm, what are the best public relations techniques that I can utilize to help convince the members of communities to understand that the installation of wind turbines don't have a significant negative effect upon home prices?

Ben Hoen: Well, I mentioned some of them at the end. I mean, I think you take what research exists; both the research that exists around wind and energy property values and also about other disamenities. You get out early and talk to folks and provide examples of this research as well.

As I mentioned, visiting other communities is probably the best thing that can be done for a lot of reasons. One, you get to talk to the experts in areas where a existing wind facility is located. You can talk to realtors there and appraisers and assessors. You can also talk to the homeowner's themselves to see whether they like living near turbines or not.

I mean, I think these are the best ways to do it. Those are folks that are, of course, on the ground and sort of a combination between the two, really, I think supports the case that, you know, for what is really going on around wind facilities.

So, get out early, you know, organize opportunities for people to get information and visit other facilities. I guess that would be my best recommendation.

(Bob Grace): Right. Let's go on to the next one from (John McClain) in Massachusetts.

At a past presentation by a person from Hull, I was left with the impression that their experience with tourism and real estate values was very positive. Any comment on this?

Ben Hoen: Well, I can't remember the fellow's name from Hull that is the town manager, but he wrote a letter to me when I was doing my literature review, saying similar things. He does not believe that folks, that tourism has been affected there and that property values are affected.

But, you know, I can't say for sure. He seems easy to reach and if this is something you are very curious about, I'd say call him. Essentially, what he, I am to agree with what you say, and also that his opinion hasn't changed since he wrote that letter to me, his findings are similar to what I just presented today in that effects are relatively small, if they exist and they might be sporadic and might actually exist only in the post-announcement, pre-construction phase.

(Bob Grace): Thank you. Our next question is from (Michael McDonald) who has identified himself as CEO (Cleanshare) in California. To what extent can this wind study be applied to other renewable technologies, specifically telefarms are small scale residential wind?

Ben Hoen: All right, a very common question. I would be very nervous about applying the results from one to the other. As I said, from the other disamenity

research, you can't really figure out where wind turbines fit. You can get a sense of scale, but there are different animals.

Small winds might be louder than some wind turbines in some case, some large industrial turbine. The solar plants, you know, might have other characteristics that turbines don't have. I'm not sure what they would be, maybe reflective issues or taking up more contiguous land. Again, I'd be careful applying one to the other.

(Bob Grace): Okay. The next question is from (Cheryl Lewis) who identifies herself as a member of the public in New Hampshire. The question is, one of your hired appraisers for your study (Michael McCann) has publicly criticized your final report for a number of reasons. His data turned over to you reflected 40 home sales resulting in 25% reduced value in your Mendota Hill turbines, yet these were omitted.

There have also been much criticism of your analysis, in particular your data analysis methods. Given the criticism, why did you wait so long to have your report peer reviewed and what peer review is now undergoing?

Ben Hoen: Okay. I'm glad this came up. So there's a lot of questions here. I didn't get data from (Michael), I got data from the town assessor and I got all the data that they provided to me.

I understand (Michael) has some opinion on effects in his area, Mendota Hills. There are a number of people that have put forward results that are different than his. And, I'm waiting for some published report from (Michael) that one could look at.

He criticized our results and he is welcome to do so. I think the results stand pretty well on their own. As regard to other criticism of the analysis, in particular your data and analysis methods, I will put forward that we used very similar techniques as other practitioners have.

As I said, the literature is very wide and deep on this subject, it just hadn't been applied to wind turbines and we used techniques that have been vetted well in the literature.

And, I think practitioner's that are familiar with the literature will support that we used the techniques appropriately. Why do we wait so long to have the report peer reviewed? We did have it peer reviewed, it was through a process that the lab conducts through sending it out to as many stakeholder's as we could find and practitioner's in the area. They responded with comments about the report. Comments on how to improve it, what they thought was weaknesses, other things and we incorporated as many as possible of those into the final report.

The peer review process that we are undergoing now is different because the report is not submitted to the journal, a much smaller paper is submitted to the journal and it took us a while to re-write the report in a condensed form.

And, we also wanted to present it this year, which we did, at the American Society for Real Estate Research down in Florida. We were asked to do that and we since submitted it to a journal. So, we will see how it goes. I think that, hopefully, we will be accepted, but one has to see. Again, I would say the work stands on its own as good quality work.

(Bob Grace): Okay. Thank you. The next question is posed by (Ed Bloom) from Wenew, Wisconsin, in Madison, Wisconsin. When do opponents say that the study has

no value precisely because it has too many transactions from too many places to say anything about a particular location or, as the opponents say, an actual study can't tell you anything about the price of homes in Wisconsin and especially not in my home. How do we respond to these critics?

Ben Hoen: Right, so, this is this question. We had 125 transactions inside of a mile, they were spread out across multiple study areas. We controlled, for many different aspects of the study area, which are sort of the controlling characteristics.

So, when one says all else being equal, we didn't find a difference. What that means is that we are controlling for many of the differences that exist in those study areas. And, the report has a ten-page section on how many different models we tried to try to sort of upset our results and we couldn't find them. We couldn't find a way to do it, largely.

So, I think what can be said here is that it is reasonable, and the literature, of course, has many examples of pooling data is the term used, across a large geographic area. It's not the only way to do it, but it is one way to do it.

And, there are ways to address that pooling issue and still make your model stable. So, yes, we are not looking at home values in particular in Wisconsin or New York, but they are included in the sample. And, as I said at the top, it would be unlikely to expect effects to exist in one direction in one study area and in the other direction in the other study area, therefore wiping out in the average the effects.

I think the most likely scenario would be that they would be maybe stronger in one area and weaker in the other, but in the same direction. Therefore we would have found an effect, probably, but it might have been smaller and it would have been in one other area.

So, I think that's what you can say. The last piece of the puzzle is looking at that scenic vista test that I presented here, today. The question of whether scenic vista alone has an effect on home values. That we had a lot more data for. It was a very similar aesthetic test (of that for use of turbines) and those we were able, because we had more data, to split and slice and dice in many different ways. And, we found that the scale of those effects were very stable across the study area.

So, it would seem odd to me that those estimates are similar and stable across the various study areas and similar to that as pooled across the country and something different than that would be the case for wind turbines.

So that's how I address that, though I have to admit, one really needs to keep looking at this issue and see if something unique pops out in one of the study areas that hadn't been found before.

(Bob Grace): Great. The next question is from (John Miller) an engineer at CH2M Hill in Massachusetts.

The question is, why weren't your bands based on turbine height, for example, one time or five times the turbine height, rather than simply choosing a constant distance such as 3000 feet or one mile?

Ben Hoen: Well, it sounds like an interesting question. We had to pick something that was applicable across all study areas and we had many different turbine heights, so there would have been no way to have done that. I think that, you know, set backs are based on, of course, in some cases, turbine height, but often just a fixed distance, maybe 1000 feet or 1500 feet.

So, assuming that many of the homes, in fact none of our homes were inside of the band, the setback band. Meaning, none of them had turbines on them. We thought it would be reasonable to take the first grouping, which is between roughly 800 feet, which was the nearest home and up to 3000 to see if effects existed uniquely there.

Because I think that's where the stakeholder's believe that they are most likely to exist. That's where we believe they are most likely to exist. And, so, it was reasonable to group those homes together.

(Bob Grace): Great. At this point, I am going to fold in one of our questions from the Steering Committee, which is somewhat similar to the last one. Is there any evidence of a potential link between project size and property value impact?

Ben Hoen: Right. So, not in our analysis, it just wasn't something we could do. I mentioned that it might be the case that cumulative impacts exist. You know, for many homeowners they are on the perimeter of a wind facility and so they have sort of one direction to look at the turbines, but they could choose another direction if they wanted that wouldn't include turbines.

And, it might an entirely different animal if you had turbines on four sides of your home. I just don't know. We didn't have enough there. We did have some of those homes in our sample, but, they were just too small in number to be able to find anything unique about them.

It could very well be that as wind facilities grow and maybe homes get subsumed in various facilities that impacts might be different. But, as I had seen development occur in the study areas that we had in our sample, there weren't situations where that was occurring with great frequency.

But, yeah, those could be homes that would be uniquely impacted. I don't know the answer to that.

(Bob Grace): Okay. The next question comes from (Tom Stevens).

Were turbine or easement payment factored in? That is if a property is entitled to a \$10,000 payment per year, was that factored in the analysis?

Ben Hoen: Right. So, what we confirmed, I mean, many of these transactions occurred for wind facilities that were developed in the late '90's, early 2000, and I think the neighbor payments weren't very popular. We contacted as many of the developers as we could. We contacted the, of course, the local authorities we were in contact with a great deal, trying to find out if they existed, property value guarantees, that sort of thing, neighbor payments existed.

And, we did not find evidence of that. If we did find that, that would be definitely something that needs to be factored in. And, that's sort of this balance of cost and benefit. If there is a cost to a homeowner, let's say an impact because of less use and enjoyment of their home, but, on the other hand, on the other side of the balance sheet, there is a payment coming in, you would hope that the two could find a way to be balanced.

So, that's why it's recommended, at least as one of the tools for some of the homeowners that might be uniquely impacted. But, it was something that we feel pretty confident that didn't exist in our sample, and so it wasn't need to be factored in.

(Bob Grace): Great. At this point, we are nearing the end of our scheduled time. Ben has agreed, now that he has additional time, to keep going through questions. We

still have another 30 or more questions that have been posted here, so we would like to get to as many of them as possible.

Just before anybody wants to drop off the line, I want to focus for a moment on the wrap-up slide to highlight a couple of items. One that our next Webinar will be focused on understanding the impacts of wind turbine sound. Our expectation is that will be in early summer, the date is to be announced. We are still planning that one.

To be on the distribution list for the announcements, please sign up at the link indicated on your screen. That sign-up will allow you to receive both the new REWEEP Webinar invitations and the New England Wind Forum newsletter, another project that is funded by Department of Energy's Wind Powering Market Program.

Webinar materials will be posted by approximately May 14, that would be next Friday or sooner on the New England Wind Forum Web site. Here you can see, [www.windpoweringamerica.gov/newengland](http://www.windpoweringamerica.gov/newengland), is the home page there and there should be an indicator on the home page where to click to get information on the Webinar materials.

And, those posted materials will include the recorded Webinar, a transcript of the session as well as the Q and A, an annotated bibliography and list of references on the topic.

We will also list all the questions asked by the participants. And, over time, we will be happy to post other related resources and studies as identified over time.

So, having done that, we can leave this up on the screen for people. In the meantime, why don't we go back to the questions and we will take them as long as you have the time to answer them, if that's okay, Ben.

Ben Hoen: Yeah...

(Bob Grace): You have a hard stop to (unintelligible) and we will wrap up.

Ben Hoen: Yeah, I guess I'm not sure with what you are comfortable with. I'm sticking around. I'll be fine to stick around until, let's say, three.

(Bob Grace): Okay.

Ben Hoen: Half an hour from now.

(Bob Grace): We shouldn't be taking any longer than that.

The next question is from a (Lena Amanik), I hope I'm doing justice to that name, from (TretaTech) in Massachusetts.

And, the question is, what studies can be done on a project level considering results are low or infrequent overall?

Ben Hoen: I'm not sure I understand. Maybe the question is what, just taking the first part, what studies can be done on a project level. And, I guess maybe I would add because there is not going to be too many sales on a per project level.

I think the best tool for that is surveys. You can do surveys called willingness to pay surveys or willingness to accept. There are very sophisticated techniques that can be used to try to control for biases and there is techniques

to ascertain whether property values have been affected based on just polling the homeowner's.

As well, you can use sort of a standard appraisal technique, which would only require three comps for every one sale, three or five comps for every one sale and to look at the differences there between homes that sold near facilities and those that sold further away.

The other, I guess, final technique would be, if you are trying to look at a specific project, you would, maybe, try to find a project that is nearby that is analogist that maybe had been around for a little longer and might have more transactions. You could maybe group two facilities together again getting a little bit more statistical power. It's tough using some of the techniques we used to get that sort of margins of error that give you the opportunity to find effects if you don't have a lot of data. So, you have to use a little bit more simple techniques.

But, a survey would be great. One of the things that we know, we have a sense of, is we have a feel for whether property values were impacted, but not as much information as to why they were or were not impacted. And, so, surveys would be great to have out there.

(Bob Grace): Great. The next question is from (Mark Green). He did not indicate where he is from.

But the question is, in addition to real estate value, how are natural resources that support tourism being controlled or protected? In other words, view shed versus air quality or smog and haze? And, how is the integration of wind systems into properties being controlled to add value to the property? In other words, transferability?

Ben Hoen: That's right - I'm not sure I...So, let's say let's take the first part, how are natural resources that support tourism being controlled and protected? I'm guessing that's something that would be addressed through the environmental, whatever sort of environmental review, if I understand the question.

He said view shed versus air quality, so maybe having turbines increases the quality of the air but takes away from the view shed. I'm not sure you could argue that point very well. But - because power isn't generally localized. But, it's something maybe on a global scale or a national scale, that's something to be looked at. I don't know the answer to that.

And, then the second question, how is the integration of wind systems into properties being controlled, add value to the property. I'm thinking not transferability. I think he is asking, did we control for the fact that some turbines are on some of the properties that were sold and the answer to that question is no, none of the properties we had had turbines on them.

So, we don't have to address the issue of income and transferability of those properties. If that's what he was looking for.

(Bob Grace): Okay. Hopefully so. The next question is from (Stefan Lonburg) at Mass Energy in Massachusetts. Actually, this is a question I was thinking about myself. How well do you think your results might translate into more densely populated areas such as we have in this part of the country?

Ben Hoen: Right. So, I mean, there is something like 406 different wind facilities in the U.S. when we started our project. We whittled it down to ten. And, largely because those are the only wind facilities, or study areas, that had enough transactions near them.

And, so, the samples that we have is roughly I would say somewhat analogist to a densely populated area. Because, in fact, all of the study areas we had were relatively densely populated. Now, of course, where the turbines were situated is not densely populated in most cases.

So, we are looking at situations where a dense population bordered those. In some cases there were towns that were maybe a few hundred that were right near or in amongst the turbines. In some cases they were on the side of the wind facility.

You know, again, I was mentioning that there might be unique effects if turbines surrounded individual homes, but if they were bordering them on the side, I would say that our sample is actually fairly representative of that group. So, I would say it would translate pretty well.

Again, you know, we have not too much to work with here. We are trying to draw some conclusions from a relatively small number of studies. But, again, you know, if effects exist in some locals, they are likely to not exist at all or be going the other direction in other locals. So, we would find effects there in the same direction.

Again, it's that home that maybe is situated in amongst a whole bunch of turbines that might be unique that we can't really address.

(Bob Grace): All right. Let's go on to the next one from (Kathleen Whitley) from Applied Energy Group in New York. The question is, what property value studies, if any, exist for existing off-shore wind farms in other countries?

Ben Hoen: None as far as I know. That's the short answer. I wish there were and I hope to study it myself.

(Bob Grace): Barely a topic of interest locally, here?

Ben Hoen: Yeah, of course. I mean, I think the issue there we addressed to some degree, which is the view parameter, which is what I call the Cape Cod effect. You know, these facilities will not be heard. They probably won't be any shadow flicker or any other nuisance effects. So, really, we are talking about a scenic vista stigma. And, I think that we have done a really good job of measuring that in a very similar way as would be measured elsewhere.

Also testing for homes that have a high quality scenic vista. High valued scenic vista and see if they are uniquely affected and we are not seeing effects there. So, that's the best I think that we have at this point. I don't know of any other studies that look at that specifically.

(Bob Grace): Okay. Next question is from (Jose Locker) in Massachusetts. The question is, how does the study control for widespread economy wide real estate price trans? For instance, the recent drop in real estate values.

Ben Hoen: Okay. So, all the prices in the models, for every home, is adjusted to a local housing price index. That's an index that changes quarterly based on the local set of homes. So, that index is produced by Fanny Mae and Freddy Mac based on municipal statistical areas.

The individual community of the study area was often not in one of those municipal statistical areas, so we contacted the realtors and assessors in the local area and had them tell us which market, if there were maybe more than

one, was the most reflective of the market that they were in, what reflected their market the most.

And, then, we applied that index to the local prices that we had in our model. So, as prices went up, the prices were accounted for in that local community, and as prices went down, it was similarly located, it was similarly addressed. Our last sale date, I think, was sometime in early 2006, so we largely missed the bubble. But, it's an important question. And, again, something that you have to work really hard to pull out of your model entirely, but you just hope it's not correlated with your variables of interest.

And there is no reason to assume that across our entire data set, that across, you know, almost ten years, we would have a unique variable related to home supply or demand that would be correlated with wind turbines. At least we believe not to be that case.

(Bob Grace): Right. So, the next question is from a (John Soynanen), I think I'm pronouncing that correctly, from (Aolynen) Renewable Energy, operating across New England. And, the question is, on slide 25 it seems property in close proximity to wind farm locations are deflated long before development. Can you explain or clarify?

Ben Hoen: Right. So, I said, from slide 26, I guess, I don't have the presentation in front of me now, but they were not sure that what was represented - okay, great, thanks.

(Bob Grace): This one?

Ben Hoen: There we go. All right. So, we are not sure what is represented on the blue curve is in fact reality. We have a sample. We are looking at trying to figure

out if that sample, you know, we analyzed the sample, and, of course, in any study, you hope that your sample represents the population.

We talked to a lot of the local folks in the area that were well represented in the pre-announcement period and those estimates and tried to have them explain what might be going on, you know, based on our findings.

There is some plausible explanations, which is one community that dominates that area became very popular and there was a larger demand for homes that were in rural areas, sort of, (farmettes), and they thought possibly that that was not something that we were controlling for, just the (farmette) effect. And it could be that that was driving those homes uniquely compared to other homes in the community.

Secondly, there is a subdivision that is well represented in that group that is, and I should say it is the largest part of the effect, that had been adversely priced for well before the wind facilities were ever proposed or showed up in the scene. They are homes that were built back in the, after World War II. A very, very tight community.

And, it could be that those homes are that represented a large group, large part of that pre-announcement estimate there of minus 13 is drawing down the rest of the sample there. So, again, you know, we think through some tests of sensitivity by sort of running different subsets of the data that may be the real effect is actually higher for that end of the curve and that sort of dip shape, the u shape, is a more appropriate shape for that curve, so.

(Bob Grace): Okay. The next question is from a (Donna Coffin) at (UMane) Cooperative Extension. Her question is, have studies been done to measure the effect of mini wind turbines on home value or how might towns, I'm sorry, or how

towns might change property values as a result of installation of a mini wind turbine?

Ben Hoen: This is the question about small wind and individual turbines at homes, we don't really have a sense of this. It really hasn't been studied, as far as we can tell. Individual turbines, let's say, at, like the hall example, seems to not have effects that are noticeable base on local authorities' opinions and, I guess, their analyses.

So, I don't know if property values are changing because of the installation of what she is calling a mini wind turbine. I'm not sure if I have answered the question correctly, though.

(Bob Grace): Okay. I think the next question is more or less the same issue. (Steve Senkins) from Saint George, Maine, is asking have there been any studies that look at impacts of residential setting of small backyard turbines less than ten kilowatts, or if community turbines less than 100 kilowatts.

Ben Hoen: Right.

(Bob Grace): We are starting to get a lot of the 100 kilowatt scale turbines put up in New England.

Ben Hoen: I think, again, I think, you know, we are going to have a finding sales around those. You got to look at surveying, probably, and get a sense. I don't have too much to say there.

(Bob Grace): Okay. Let's go on to the next one. This is from (David Daylor) in Plymouth, Massachusetts. The study does not really cover New England home values. We have a proposed wind turbine farm, 490 feet tall each, less than 1500 feet

from a high end neighborhood. This study really does not apply in this case. I would like to see more studies within a half of mile of homes with extreme views and increased noise of seven to eight (dba).

Ben Hoen: Yeah, I mean, we are looking at average effects. If there unique homes that are uniquely affected, it could be that effect would be larger. I think maybe one would want to turn to the disamenity research, the other disamenity research to get a sense of likely scale. And, we are looking at, you know, I showed you some of the results of, here I'll put the slide up, of other disamenities.

I mean, super fund sites, ground work, contamination issues, waste transfer stations. I mean, we are still not seeing a kind of whole sale loss in value as would be maybe posited by this question. Or I'm not sure if that is what he is saying.

Now, you know, can anything be taken away from our study based on what his situation is? I would say that there were many homes, you know, roughly half of those inside of a mile that were inside of 3000 feet that had extreme views of the turbines, could likely hear them. I mean, they are inside of 3000 feet and they are not all sitting at 3000 feet, they are spread apart through that distance, up to 800 feet.

And, of course, the turbines in our study are industrial size. I can't remember what the average size was, maybe 78 meter at the hub. I can't be sure of that. But these are not small turbines either. These are not turbines from the 70's and 80's, these are large industrial wind facilities and large turbines.

Now, you know, he is right in that we don't have the newest turbines represented in our model and we don't have an enormous group of homes

inside a half mile that might be hearing them. But we have the largest amount that exists and we know, again, that the effects that we estimate are the average effects across that group of homes.

And that, even though we don't find them statistically significant, the effect, the measured effect, could very well be the true effect. And, so, we are just not seeing a whole sale loss in property values at that distance for homes based on our sample and I would say based on the previous literature and the disamenity literature.

So, I think it's, you know, I hear what he is saying and maybe his tone and I wish I could answer him specifically about his home. The only thing we can do is keep going back to the data, keep going back to other facilities, keep testing this and see what we find. And we just don't have evidence to support the claim that there is a whole sale loss in sale prices at that distance that he is talking about based on other research.

(Bob Grace): Okay. At this point, I am, the next question is from a (John Martin), who asked is there any chance who came to today's presentation as a podcast, and I believe that National Renewable Energy Lab will be converting these into a podcast. I'm going to just ask Sue to send me a chat message here to confirm that.

So, if it is available in a podcast we will indicate that on the Webinar Web page. It certainly would be a desirable feature.

I'm going to ask another question from the Steering Committee before we go back to the remaining questions from the other participants. This one is, is liquidity just important to study, even if a property sells for approximately the same amount with or without a nearby wind project, if it takes, for example,

four months longer to sell, isn't that important to know and what do we know about this?

Ben Hoen: Yeah, I think it's important to know. And, it should be coincident, I think, to some degree. You know, time is money and for people that might be sitting on a house for longer because of the existence of the wind facility, I think that's an important thing to recognize.

I think in reality what goes on for many of these homes, because nobody can deny that some people aren't, that don't share a belief that the wind facility - let's say, some people definitely find these wind facilities to be inappropriate and don't want to live near them.

And, of course, in every case of these transactions there was a buyer that existed that bought that home. And, so, they made a choice, at that point, to buy the home or not by the home. And, I think what might be happening, and this is a reasonable assumption, and there is some evidence in the little literature that we have that this exists in fact, just there is a few number of willing buyers that approach a home that maybe is near a wind facility.

And, they are what's called self-selecting buyers. They might be buyers that say, you know, to me it doesn't matter. Or they might, you know, we know from running into them in the field that some of them say I don't mind them at all.

So, there is a smaller pool of potential buyers and that will, of course, slow down the sale process. And, so, it's reasonable to think that homes will sit on the market a little longer, that there will be fewer buyers because of those two situations.

And, I think it's something that should be looked at more closely and it might not ultimately affect the sale price because it's only one buyer that makes the final deal. But, it might mean that people have to sit longer to sell their home.

(Bob Grace): Okay. Well, I think perhaps we have identified something that might be useful as follow-up research.

Ben Hoen: Yeah.

(Bob Grace): Just following up on a question earlier about the podcast. Yes, we have confirmed that this will be available as a podcast. So, good news there. The next question is from (Can Weemar) in Massachusetts and University of Michigan. The question was, what years were the study conducted and is there any discussion of rural zoning reform to ensure residential development does not occur in suitable high wind resource areas, that it may be class four or better?

Ben Hoen: What years, this is an easy one, the first one. The price of sales were collected between 1996 and 2006. Spanning a period to prior to wind facility development in all cases and the period after it was actually constructed.

Is there any discussion of rural zoning reform to ensure residential development does not occur in suitable high wind resource, you know, this is sort of like the renewable energy zones that are proposed in Texas and have been proposed elsewhere, where they sort of say, here's a great place, here's a great wind resource. We want to zone this for development. We are going to put transmission there and really encourage development in those areas.

And, you know, as Texas is an example, it's been so successful and I'm not exactly sure that all the work for those zones is complete, meaning all the

transmission has been put in place. In fact, I'm sure it's not. Anyway, the development process has been so successful that they have, in some cases, outstripped the demand for wind turbines under certain times during the day.

And, so, that is a good solution. Plus, if that can be done with a group of stakeholders involved, looking at, you know, all the parties involved, trying to find where those are best suited, because there is a lot more to take into account than just property values.

You have to look at migration patterns and protected areas and lots of other environmental issues. And, of course, just pragmatic issues dealing with the development itself, the proximity to transmission and all that. So, anyway, you can sort of get a group of stakeholder's together and have that process.

I think that's a great process. It's not the way it is happening now in the U.S. and in general, but it's ideal if it can happen that way and maybe over time it will happen more and more that way.

(Bob Grace): Great. Next question is from (Travis Bullard). It seems New England has unique views high scenic vistas, and issues that are different from some of the sample areas. Wind development tends towards ridgelines, hence increasing visibility, and the existence of second rural homes. Are the assumptions from other geographic locations reasonable to our specific geographic location?

And, I'm going to add a little related question here, Ben. The study was conducted before there was much in the way of wind turbines on the ground here in New England. That's no longer the case. We now have a data set to work with here. And, so, as you answer this, I would ask, is your methodology one that would be amenable to replicating in New England to try to answer this question?

Ben Hoen: Yeah, I think so. We try to look at that. As I said, we tested for, I mean, this is the way to do it. We test for a correlation or interaction between your scenic vista and your views of turbines variables.

So, you are looking for a unique effect for homes that have both a high - oh, I was just disconnected from the meeting, incidentally. So, if you weren't Bob, and you can still read me questions, I can't see them anymore.

(Bob Grace): Okay. I can still do that.

Ben Hoen: Okay. So, the homes that have uniquely high scenic vistas and also have uniquely or relatively high views of turbines should be uniquely affected. And we should see, in fact, a negatively sloping curve on that interaction and we did not see that. We found actually very, very little difference between those homes as a group.

Now, there wasn't tremendous amount of data to really look at this question, but it was something we thought it would pop out if it existed. To get back to the first question, which is, you know, is there something that we can do in New England now that we couldn't do before and the answer is yes. And the answer is yes all across the country.

I mean, we stopped looking at data after 2006. Now we have four years of data. We have a lot more wind facilities on the ground and we have a lot more opportunity to study. And there's a wind facility that's been in Vermont for a long time in Searsburg, and I think probably the fellow that was asking this question might probably do well to contact the folks in and around Searsburg and ask them, just ask the assessors, appraisers, realtors whether they see affects existing there because that I think is a pretty beautiful place too.

So, maybe there's something there and as much as we can come back at this question over and over again or at least one more time using other data the better we'll have a feeling for this with the situations.

(Bob Grace): All right. The next question is from (Adam Latchman) from the (Island) Energy Task Force in Vinalhaven, Maine. The questions for Ben. First of all, thank you for your insightful presentation Ben. I'd like to know if you could elaborate more on the impact of property values from neighboring wind turbine generation as it pertains to unique situations where land is scarce and highly desired, for instance an island, and does this change your overall findings?

I think you've more or less addressed that. An additional part of the question is also given the misinformation regarding the impact of wind power, how can we effectively get the right message out?

Ben Hoen: Yeah, I mean, we're signing into new Webinars. I mean, this is a great way to do it and especially that this will be available to download and this is just one piece of the puzzle but I think having this available for download indefinitely with all the questions and answers and the presentation will be very useful for folks, hopefully.

(Bob Grace): And, of course, it's our hope that we could have it as a living Web site and as there are additional studies available that we can augment the information available there.

The next question is from (Ann Blemis), American Planning Association, Chicago.

How common is a property valued guarantees such as the one used in (DeKalb) County?

Ben Hoen: I'm sorry, how come?

(Bob Grace): How common.

Ben Hoen: Oh, how common. Not very common. I was not able to find another one that had been applied at least from an ordinance standpoint meaning that it was common and known. I think that some of them have been applied at kind of a one-off basis to sway over particular homeowners but it's not been applied in that way elsewhere as I'm aware.

So, I'm not sure they're very common. Not being the lawyer, or the developer I don't know really why they should or should not be applied. I think that it involves sitting down and discussing it and working out an arrangement if that makes the most sense for a community.

But that is one way, as I mentioned, amongst others the potentially manager the risk because, of course, people are feeling like they could be losing value and knowing that they have some backstop would maybe give them a greater sense of (common development) going forward.

(Bob Grace): All right. Let's see, the next question seems to be a little bit more of a follow-up comment on one of your earlier responses. This is from a (John Coltenfause) who says it seems to me that this makes a lot of sense. I've talked with three assessors on or near Cape Cod. They do not adjust the value of homes as a result of the proximity to wind turbines and two of them specifically disagree with there being an effect.

So I expect that was a follow-up to your suggestion to talk to local assessors.

Ben Hoen: Okay.

(Bob Grace): So no question there. The next is from (John Weiss) of industrial economics in Cambridge Massachusetts. The question is, are you aware of any comparably credible studies currently underway or in development to (them) the impact of offshore wind turbines on property values in Europe and would you consider results from such a study to be transferable to US markets?

Ben Hoen: We addressed that and I would think that they probably would be transferable. There's no reason to think that the other disamenity research looks at property value affects around high voltage transmission lines and roads and what have you across the world. They're pretty similar. People care what they can see and feel from their house and so I don't think there would be any reason why they would be discounted. They just don't exist right now.

(Bob Grace): Okay. Again, we welcome people offering us up any studies that they're aware of. We're happy to provide information about that on the Webinar Web site as long as we've got the funding to continue doing that.

The next question is from a (John Quazi) and from (Shaw Quazi) Services in Manchester, Massachusetts. There is no data representing the impact on property values during construction or the typical duration of the construction process.

Why is this information not part of the study? It might be useful even as a reference point and will it be addressed in the future?

Ben Hoen: Right so we assumed that once construction started that all affects were unique, I mean similar, to those that would exist after construction was completed. We didn't splice the data down to that level of detail.

We thought that that affects, if they did exist, would be pretty similar for periods after construction as they would be during construction. I guess one could argue that maybe cranes and trucks driving around make a big deal, difference, and I think that's probably true but we didn't really look at that.

We didn't know enough to be able to do that actually. We know when construction began and we know roughly when it became online but we don't know kind of what frequency was happening during those two points.

So we'll have to deal with the facts if we found them uniquely there as far as explaining them.

(Bob Grace): Well, Ben, as you gave us till about 3:00 we have about two minutes left and we have about two questions left so I think we're going to hit the ground at about the right point.

Ben Hoen: Good.

(Bob Grace): The next question is from (Fred Piltzer) and the question is did you find any positive impacts and where there any differences in the vista impact between one wind turbine versus multiple wind turbines?

Ben Hoen: Right so I guess this is related to just the quality of the scenic vista. It doesn't relate to turbines. We use the term view of turbines to define, I think what he's asking, whether - answering the second question first which is is there a

difference in homes that can see many turbines versus those that can see only a few?

Those are captured in the view ratings. For instance, a minor view would often only have a view of one turbine and it would be pretty far away. On the other hand an extreme view of turbines would almost involve more than one and they would be very close.

And so we would have expected - we actually did expect that there would be a difference there and we just aren't finding it and I think that that's because largely there isn't a unique affect there that is overwhelming the home price.

And so the first question was whether positive effects, we treated - when we found models that had coefficients that where north of zero, meaning they were not negative, that they where probably, again, just because of pure chance, we don't think that we did a bad job of measuring things and so we should not find that sort of result and we didn't find effects that where large and positive when we had a decent size sample. They were also negative or very, very close to zero when positive.

So, no, we didn't find a positive effect. I will add that we did try to look for affects based on the school district that had turbines in there thinking maybe we could find something there. There's a tax implication that might exist where wind turbines are delivering a decent amount of income or revenue to a particular school district and that might translate into better quality schools and therefore lower taxes. But we didn't find anything there that's distinguishable. So...

(Bob Grace): Okay. Let's deal with the last remaining question which is from (William Veno) at the (Matanz) Vineyard Commission. Have you looked for similar

studies in other countries with longer histories with wind turbines? We understand that Denmark requires land owners be compensated if values decline indicating that they recognize a potential negative impact by turbines.

Ben Hoen: Right. Yeah, so we have the two studies that I actually cited are not from the US, (Sims) and (Dent), those are from UK. I don't know how long those one facilities were around. I am aware that there are other more stringent requirements out there, Denmark being one of them. They require that now there's sort of a fund put together by every developer to compensate folks and I understand in some cases applications have been made to do so.

If you don't know what happens on an individual house basis and I haven't been able to look at those individual situations where the applications have been made. But, again, the work that is looking at this kind of across many homes where you're really clear that picking up various affects have not found existence of that adverse impacts.

As I mentioned in my closing slides that sort of scenario where property values are guaranteed is a reasonable solution, maybe not workable, but is one of the options. And so maybe Denmark is ahead of us, again, on getting that in place.

I would think that that would do a good deal, if it was easy to apply it would do a good deal to smooth over concerns from the local community.

(Bob Grace): Great. Well, I think it's time for us to close, even though we're more than half an hour beyond our close time. We still have nearly 100 folks on the line. So I think that's a sign that this has been a valuable dialogue.

I'd like to thank Ben and Heather for their time and contributions to this Webinar and thank all of our participants for listening, for participating, for offering good questions.

I am leaving up here, on the screen, the information or where to find Webinar materials and we hope you will join us for future Webinars where we will attempt to get the best information we can out there on other critical wind issues and over time we hope to build a greater base of information.

We do plan to have a conference at a location and time to be determined but most likely next spring I think will be critical to identify needs for additional research and potentially even allow for some of that research to be done between now and then to help create a base of knowledge to make a decision.

So, thank you very much. At this point we will sign off.

Operator I guess you can pull the plug. Thank you.

Coordinator: Thank you. That concludes today's conference. All lines may disconnect.

Thank you for your participation.

END