IN RE : HERITAGE WIND PROJECT

PUBLIC INFORMATION MEETING

February 28, 2019

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HERITAGE WIND PROJECT COMMUNITY FORUM

Public Information Meeting

Location: Carl Bergerson Middle School
254 East Avenue
Albion, New York 14411

Date: February 28, 2019

Time: 7:30 p.m.

Reported By: MICHELLE MUNDT ROCHA
Alliance Court Reporting, Inc.
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Rochester, New York 14604

A P P E A R A N C E S

Moderator:
Rita Coleman-Graham

Apex Clean Energy Representatives:
Neil Habig
Ben Yazman
Greg Liberman
Marcel Mibus
Tracy Butler
Rob O'Neal
Jim Muscato

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HERITAGE WIND PROJECT

THURSDAY, FEBRUARY 28, 2019;

(Proceedings in the above-titled matter commencing at 7:30 p.m.)

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MS. COLEMAN-GRAHAM: Okay, I want to welcome everybody. And if you haven't already, come on in, take a seat. We've got lots of empty seats up front here.

Good evening, and thank you for attending tonight's public informational meeting regarding wind energy and the Heritage Wind Project proposed by Apex Clean Energy.

My name is Rita Graham. I'm an independent consultant from south of Pittsburgh, Pennsylvania; and I am the meeting moderator tonight. My role is to facilitate the meeting, and I'm going to be presenting your questions to the panelists over here for responses during the Q and A session.

Now, Apex Clean Energy comes here tonight with three main goals. Okay, the first goal is to present updated project information.

The second goal is to have technical experts over here provide information on wind energy projects; including their development, their

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construction, their operation and their decommissioning.

The third goal is to provide as many questions as needed to allow for a clear understanding of wind energy development and the Heritage Wind Project and then to provide answers and clarification to those questions.

Now, this meeting is not a regulatory required meeting. Apex chose to hold this meeting to better inform the community on wind energy development and to solicit and respond to community questions regarding wind energy.

In addition, Apex chose to videotape and transcribe the presentations and the Q and A session. That way the material can be readily available to maybe some of your neighbors who couldn't be here tonight or other interested communities. It will be as if they were here tonight getting the same information.

Now, let's take a look at the agenda, and we can go over the format for tonight. The agenda was on the back of this program. In a few minutes the panelists are going to briefly introduce themselves, and then your handouts include additional bio

information on each of the speakers.

Then we're going to move in to the information presentation part, which brings me to discussing these (indicating). You all should have gotten several 4x6 cards. If you didn't, raise your hand, and a couple of the runners will give them to you. These are your question cards.

As the panelists are speaking, I'm going to ask each of you to jot down your questions for that panelist on these cards. And I need you to write them clearly enough so that I can read them, because I'll present your questions to them during the Q and A session. Now, these need to be questions, not a declaration or a statement, because we want to engage the panel while we have them here.

After each speaker, I'm going to then ask you to pass your cards to the aisle ways. And we have two runners. You probably met them out front. They're back at the door. There's Kaitlyn and Amber, and they're going to collect those cards after each speaker. Then they're going to bring them up here and give them to the ladies at the table here, Carmen and Jessica.

And what they're going to do is they're

going to sort through those, and we put them in the boxes for the correct speaker. And in doing that, what I try to do is I try to group any questions that might be identical or very similar together. So you might see us fiddling around with them, because we're putting paper clips on them and grouping them together. I'm trying to be as efficient as I can to get as many questions asked and answered tonight. The most frequently asked questions, of course, will be asked first.

Now, if we run out of time before we run out of questions, Apex has agreed to post questions and answers on their website.

Now, as I mentioned, the video camera is going to be capturing all of this activity. So we need to do the question generation and that card collection without a lot of disruption. I ask that you please don't wave the cards around. Instead, in between the speakers I will prompt you to pass them to the aisle for collection. And if you run out of question cards, just raise your hand, and the girls will take that as an indication to come see you to give you some more cards.

Now, everyone's cooperation is going to

ensure that your neighbors or other interested communities are going to have both a good audio and a good video of tonight's proceeding, so that they can get as much information from it as you are here tonight.

Now, after the last speaker, what I'll do then is I will present the audience questions by reading your question cards to the panelists. What I'll do is I'll read two or three questions to each speaker -- I'm going to work my way down the table -- and then I'll come back around and do the same thing until about 9:40. And that's when we'll move into the next steps, so we can adjourn at 9:45.

Now, we did build in about ten minutes extra question time, because we realized we have a lot of panelists and a lot of information to share with you, figuring to give you a lot of time for questions and answers. The one thing is the school has asked that we be out of here, all of us, by 10. So that's one constraint we're working with.

Now, one last thing before we move into the panel session. I've found it very useful for meetings to have meeting ground rules, and that's what you see over here to my right on that white plaque. I

want to just go it over them real quickly.

The first one is listen without interruption. We have a lot to cover here tonight, and I want to give a sufficient amount of time to your questions getting answered by the panel. Disruptions are going to prevent me from asking your question or will prevent somebody else from hearing a response.

Second, again, we need to have the questions written on the cards. And boy, my eyes aren't what they used to be; so neatly, so that I can actually read them. And again, they need to be questions, not statements or declarations. We want to engage these gentlemen over there.

No banners or signs in the room. Thank you. I appreciate that. I do that for safety reasons and for visibility, so that everybody can see well.

And lastly, respect each other. You know, I realize that emotions may be high for some people here tonight; and, you know, that's understandable. We just need everybody to work together and to be courteous and respectful, so that everyone gets the maximum benefit from this meeting.

So with that, I'm going to ask you to please silence your cell phones and refrain from any

heckling or disruptions.

Oh, one other thing, just for the record, so you know. I'm sure you've seen the gentlemen. When I have large meetings like this, I always have security on-site. It helps if there are any disruptions; but more importantly, in this day and age, we know what can happen when there's a large group of people together. And I want everybody to feel safe. So I've never had to engage security; and I don't plan to have to tonight, as long as you work with me and don't break my record.

So now I'm going to ask the panelists to go through one at a time, to stand up, give their name, their topic and who they're with, starting with Neil.

MR. HABIG: Neil Habig, Apex Clean Energy.

MR. YAZMAN: Ben Yazman, Apex Clean Energy.

MR. LIBERMAN: Greg Liberman with Environmental Design & Research.

MR. MIBUS: Marcel Mibus, Apex Clean Energy.

MR. BUTLER: Tracy Butler with Apex Clean Energy.

MR. O'NEAL: Rob O'Neal from Epsilon Associates. I'm going to talk about sound.

MR. MUSCATO: Jim Muscato from the law firm of Young/Sommer, permitting counsel for Apex.

MS. COLEMAN-GRAHAM: Okay. Now, is it Neil or Ben that's starting off here? Ben, okay. As Ben's getting up here and getting ready to go, remember to get your index cards out and be ready to jot your questions down for Ben.

MR. YAZMAN: The Heritage Wind Project began in 2016 with a series of open houses, addresses to the Town of Barre and the county, the opening of our project office in Albion, and the first step in the project's path to an Article 10 permit with the filing of our Public Involvement Program or PIP.

I'll speak a little bit more about the project's status and Article 10 permitting in a few slides; but in case anybody here does not know what that is, I want to mention that it is a portion of New York State Public Service Law which creates the New York State Board on Electric Generation Siting and the Environment, also known as the Siting Board. And they issue certificates of environmental compatibility and public need, which authorize the construction and

operation of major electric-generating facilities.

It's basically the primary construction permit for any electric-generating plant being built in New York State that's greater than 25 megawatts in capacity. Whether that fuel is wind, solar, natural gas or biogas, if it's built out, it has to go through a review process called Article 10.

So as I was saying, the Heritage Wind Project began development in 2016. 2017 we initiated the first of two years of studies measuring bird habitation and migration in the area, which my colleague Greg will discuss shortly, and began working with landowners in the Town of Barre to sign leases.

Since we can only develop and ultimately build on land that is under agreement with the project, success in land leasing has been critical. That success has allowed us to design and share the facility layouts like the one you saw walking in today.

We published an initial preliminary layout with our Article 10 Preliminary Scoping Statement in March 2018, and we are sharing this preliminary layout now with the caveat that an updated facility layout will be published in our Article 10 application later

this year.

I'd like to talk a little bit now about how wind farms are designed with consideration to operational safety and community impact. Across the industry wind developers apply what I'll refers to as setbacks to establish distances from wind turbines to different features, such as roads and houses.

On the next few slides I'll walk you through an exercise showing you how some of those setbacks are applied. But this list here details what a few of them are as applied to this array, the one you saw outside.

So this shows the application of a couple spatial setbacks applied to a section of Barre just over two square miles. The shaded areas are removed from buildable area due to the setback requirement. You can see how one is placed on top of another with smaller setback to barns being eclipsed by the larger setback to homes.

In this slide we applied two setbacks that are based on the dimensions of turbines we ultimately choose on top of the other setbacks we just discussed. For setbacks to nonparticipating parcels or parcels that are not under lease we apply a setback of 1.5

times the tip height of the turbine we're modeling. The tip height, of course, is the height that the blade reaches at the tallest point in its rotation.

For a turbine with a 500 foot tip height we'd assume a setback of 750 feet; for a 600 hundred foot turbine we would use a setback of 900 feet and so on.

To all parcel boundaries, unless both parcels are owned by the same individual, we use a setback equal to the length of the turbine's blade to prevent a turbine from being sited on one parcel and having a blade hang over onto another. Even if both are participating.

So the important thing here is to understand that as we consider different turbine models, that consideration impacts the setbacks applied and some of these models' dimensions.

Again, we -- this slide shows identification of wetlands and streams, which are delineated as part of our site evaluations. These areas are similarly exempted from buildable area, and you can see that as they're added to the list of setbacks applied, buildable area is further reduced.

Then after applying all the setbacks, what

we're left with is a map of just buildable area. Some of you may remember that a preliminary buildable area scenario was published with our PIP. That buildable area scenario would be fed into an engineering software called an optimizer, which takes wind data and creates an optimized layout that best captures the wind resource, and that's how we arrive at an array.

So I just want to reiterate that this array is subject to change when we finalize our project plans and Article 10 application, but it is our most current map of turbine points. So I hope that is informative. You can view this layout again on the easel in the lobby. And as Rita said, this presentation will be posted on our website at the end of March along with the video and transcription.

Now I want to talk a little bit about the community benefits of the Heritage Wind Project. When this project advances to operation, it will bring with it substantial investment in the community. Obviously landowners who host facility components will benefit from lease payments directly; but taxing jurisdictions -- namely the Town of Barre, the Albion Central School District and Orleans County -- will also receive payments which they can use for a variety

of services for their constituents.

These community benefits payments can be packaged in a couple of different types of agreements. Typically they would include a payment in lieu of taxes, or a PILOT agreement, coordinated by the IDA or EDA and sometimes a host community agreement with a municipality that hosts a project, so in this case the Town of Barre.

Either way, the goal of these agreements is to lay out what the project would be paying each taxing jurisdiction for a set period of time, typically 15 to 30 years. And this would allow both project owners and the taxing jurisdiction alike to do financial planning.

We've compiled a list of community benefits paid by wind farms all over New York state. Here are just a few. But based on the history of PILOTs in the state, Apex would expect to pay around $7,500 per megawatt of the plant's capacity. So speaking conservatively, using the 158 megawatt array we shared tonight, we would estimate that Heritage would bring in over $1.1 million to the community each year.

That's a significant revenue stream, an

increase in funding for the town; and as I said before, that amount would be divided between taxing jurisdictions in these PILOT as community agreements which we're hoping to solidify in the coming months. That means that Heritage Wind can generate more than $30 million for these jurisdictions over the life of the project.

So Heritage is poised to submit its full Article 10 application this year. In collaboration with our colleagues at EDR, Epsilon Associates, Young/Sommer and other groups of subject matter experts around from New York.

The application is another Article 10 milestone, at which a batch of intervener funds will become available. Intervener funds have provided resources for the Town of Barre and citizens groups to participate in a review and evaluation of the project. Importantly the application will detail a final facility layout with collection lines, access roads, substation location and other components as well as details on turbine models under consideration.

While we have not selected a turbine model yet, I do want to discuss a little bit about what these considerations look like for project

stakeholders, because they have been changing over the past few years. In 2016 when this project started, the largest turbines on the market were those like the Vestas V136, which has a tip height of just under 500 feet.

In 2018 which approached the Town of Barre, first in January and then more formally in the summer, to communicate that we'd be considering newer turbines with tip heights up to 600 feet, because their output would mean that each turbine would have significantly greater collection capacity.

In the last year wind turbine technology has continued to advance. New turbine technologies will ensure that the project remains competitive, because it will make power generation by the project even cheaper, ultimately helping to reduce energy costs for New York energy consumers. We have the ability and the need to take advantage of newer turbines that are much more efficient, but which also decrease the number of turbines needed for the project.

In order to make these improvements, Heritage Wind must use modern turbines, which means turbines that are taller than the 500 and 600 foot

turbines that we considered in the past. Innovations in turbine technology have shifted the market, requiring that wind projects utilize them in order to remain competitive in the current energy market. In order for Heritage Wind to be built, it must use these newer taller turbines.

I ask you to consider the benefits of newer turbines. Whereas our layout released last year called for up to 47 turbines, with newer turbine models we're looking at approximately 33, which is a 30 percent reduction in the number of turbines themselves. Increases in turbine size also correspond directly to increases in capacity. And capacity being the basis of community benefits payments means that larger turbines, which are more efficient, pay more into the community.

Increasing turbine height also results in larger setbacks based on tip height, meaning that these larger turbines can produce more energy, and therefore increase community benefit payments, while still operating safely.

This year we've become aware of turbines like the Nordex N149, which has a tip height of approximately 655 feet and the Vestas V162 with a tip

height of approximately 677 feet. The N149 was used in the array that you see outside that we're representing today.

While we believe that fewer taller turbines will ultimately help this project address many of the requests of community members, we also recognize that this is a change from what's been previously proposed. But the benefits are numerous. And as the boards in the lobby show, it's difficult to gauge the difference between these and older shorter models with the naked eye. And these newer taller turbines are more reliable and less variable, capturing a better more consistent wind resource and out competing other wind resources on wholesale energy markets.

We'll continue to provide updates on our facility operations as we move forward, and we look forward to detailing a full facility layout in the Article 10 application.

That's all for me. I'm going to turn things over to my colleague Greg.

MS. COLEMAN-GRAHAM: Thank you, Ben.

And as Greg is coming to get set up, I want to remind you this is the time where you pass

your question cards to the aisle, and the two ladies will pick them up and bring them up to us so we can get ready for the Q and A session later.

MR. LIBERMAN: Good evening, everybody. My name is Greg Liberman. I'm a senior project manager with Environmental Design and Research. We are the lead Article 10 consultant working with Apex on this project. And I just want to leave this slide up for a quick second, just so the folks can get a sense of where we are on the process.

As Ben mentioned, the preliminary Public Involvement Program plan was filed some time ago and set in motion this Article 10 process that we're in right now. Looking ahead to an actual application filing later in the year 2019, where we are today is right in the middle phase here.

In other words, a Preliminary Scoping Statement has been filed. That was filed in the spring of 2018. The scoping statement outlines the methodologies, the amounts of studies that will be prepared, and really provides what I would consider a road map for what the application will look like as we kind of move through this process. So hopefully that kind of puts things into a little bit of context.

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And with respect to some of the studies that have been outlined in the Preliminary Scoping Statement, I'll talk with you today a little bit about some of the environmental studies and the wildlife studies that have been proposed, many of which are in the process of being performed now. Specifically we'll talk about some of the environmental studies that will support Exhibits 22 and 23.

The Article 10 application when it gets submitted will contain over 40 individual exhibits, many of which will have various support studies. Exhibit 22 focuses on terrestrial ecology in wetlands, where Exhibit 23 focuses on surface water resources.

So having said that, there are a range of studies that are being performed now via wildlife surveys, vernal pool surveys, wetland and stream delineations habitat analyses, invasive species surveys, etcetera, that will be used to help guide and inform the facility design which is currently underway. So for instance, siting of turbine locations and/or a construction road to get to that turbine can be sited in a manner that avoids, say, for instance, a wetland resource, because we're doing those studies at this point in time.

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With respect to some of the ongoing wildlife studies, there were a variety of plans outlined in the Preliminary Scoping Statement that were developed with the input from the New York State Department of Environmental Conservation; and many of those studies have been initiated. In fact, they were completed between the fall of 2016 and the end of 2018.

Specific studies included small and large bird use studies, eagle use, fall migratory raptor surveys, winter raptor surveys, spring migratory raptor surveys and breeding bird survey. And in fact, in the Preliminary Scoping Statement that was issued in the spring of 2018, the winter grassland studies, the breeding bird studies and the spring migratory studies were included in that Preliminary Scoping Statement for public review.

Other studies which are ongoing -- for instance, the eagle use surveys are ongoing. The data was collected in calendar years 2017 through 2018. The data is still being processed now and will actually be used to assess potential impact as the final layout's defined, and what will be prepared is called an Avian Risk Assessment Report.

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The Avian Risk Assessment Report will assess impacts as specified in the Preliminary Scoping Statement, including an assessment of collision and mortality and a cumulative impact assessment for eagles out to I believe it was 100 miles. That information will then inform what's called a Net Conservation Benefit Plan. That plan will be included in the Article 10 application and will outline any mitigation measures needed for any potential impacts that may arise from the design.

One thing that is unique to the Article 10 process is there's a lot of opportunity for public interaction and a lot of opportunity for agency correspondence. So, for instance, through the review of the Preliminary Scoping Statement, vernal pools were identified as a resource that should be evaluated and studied in this application.

And I'd like to note that typical projects that get reviewed by the New York State DEC under their wetland regulation, which is Article 24, or stream regulation, which is their Article 15, typically don't regulate vernal pools. So this is a little bit of an additional level of environmental analysis.

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So for folks that may not know, a vernal pool is a type of wetland condition in the landscape that's typically characterized as a shallow depression that retains water during the early spring, early part of the growing season, and that will dry out in the summer. And that affords them a little bit of a unique quality in that they support the various type of wildlife habitat, because they are a unique feature.

So a vernal pool assessment was performed within the facility site of the Heritage Wind Project. That was performed in the early growing season of 2018. And essentially those have been identified and can be incorporated into the design process so that impacts to vernal pools can be avoided.

A major component of this -- of the environmental analysis for this and really any project in Upstate New York focuses an wetland and stream delineations. These were initiated in the late growing season, late summer, 2018 for this project. They'll be completed in the spring of 2019. We're obviously not out there today. These have to be done during growing season, so that we can identify the available plant species and comply with the Army Corps

of Engineers and New York State DEC delineation methodologies.

And what's important to note here is wetland delineations are being performed out to a distance of 500 feet from areas of potential ground disturbance. So in other words, where an access road may be proposed or a turbine facility may be proposed, any area of potential ground disturbance we're looking out 500 feet from that area on both sides. So that's essentially -- in certain areas it's a 1,000-foot-wide swath of wetland and streams that are being delineated. But there's a positive to that in that we can have that information now, so that design decisions can be made to avoid those wetlands.

Another thing to note that's unique to Article 10 is when the wetland delineation and stream report, which will be appended to the Article 10 application, will also include what's called a functions and values assessment. It will look at each individual wetland and identify what the major functions are of that wetland; so that when we go ahead and assess the impacts, we're actually able to assess the functional impacts and then provide appropriate levels of mitigation if needed.

Another aspect of the Article 10 process is called a habitat fragmentation analysis. And essentially this is a GIS exercise that looks at the proposal development, the proposed limits of work, and looks at direct impacts to grasslands and forested area. In addition, it will also look at indirect impacts which may result as a result of the proposed project.

Our wetland crews that have been out there doing the vernal pool assessment and doing the wetland assessment will also be out there to do what's called an invasive species baseline survey. For those of you that may not know, an invasive species is a plant species that is typically not native to an area. It can be pretty aggressive. It can be -- you know, you see phragmites in a lot of different places on roadside ditches.

So we go out and map these areas, and we use what we call a density code to identify areas of sparse, patchy, dense or monocultures. I would consider this to be a monoculture. That data is then fed into what's called an invasive species control plan.

Essentially the control plan outlines

various best management practices that are approved by New York State DEC for controlling the spread of these invasive species during constriction. So the Article 10 application will include the baseline survey, and it will include the invasive species control plan to make sure that the spread of invasive species does not occur.

And the last component that I want to touch upon simply is that the Article 10 application will include an inventory of all plant and wildlife species observed on the site during our studies; it will include a list of species which may utilize various cover types, forest, grassland, etcetera, within the site; and it will also outline a list of species based on public available information, say, from the DEC.

So that concludes the environmental portion of my talk, but I did want to indicate one last thing. Environmental Design and Research is also working on what's called Exhibit 24, which is a visual impact assessment. As part of that, a visual impact analysis report will be prepared and included with the application. The first step in preparing a visual impact assessment is soliciting input from you folks

and from the local community.

So in accordance with the Article 10 regulations, we're in the process now of sending out a mailer to various municipal planning agencies, various cultural institutions locally, state agencies to solicit input on potentially visually sensitive resources. State parks, town parks, areas where people gather, areas that we think may have a potential concern.

And in addition to soliciting the information from municipal planning representatives and various state agencies, there's going to be some information made available at Apex's main office here in Albion. There will be a set of maps with some information based on sensitive sites that have been gathered from publicly available data sets, but really the missing piece is information from the local community about things that we may have missed.

So there will be an information card and a map set available during Apex's business hours at the office in Albion where you can go and make your comments known and say, you know what, I think you need to take into account this place or this place. And that will help us kind of pull all of that

information in to have a pretty robust set of information as we move forward on the visual impact assessment.

Thank you.

MS. COLEMAN-GRAHAM: Thank you, Greg.

Same thing with the cards. Please pass them to the aisles. And if you need some more cards for the next speakers, raise your hand, and the girls will give you some additional cards.

Okay. So now it is Marcel.

MR. MIBUS: Good evening. My name is Marcel Mibus, and I'm an energy analyst at Apex Clean Energy.

So before getting into some specifics, I just want to give you a context of what I do and how it is incorporated with what some of the other speakers talked about. So I do some site design and figure out where turbines are placed.

And that is based in part of what Ben said where you have physical setbacks where we create certain distances from roads, homes. Then there is the environmental setbacks, and then there's two other aspects about siting that come with the turbines more specifically. And one of them is sound, which Rob

will talk about; and the other is shadow flicker, which is what I will discuss. So those are the additional aspects of siting with the physical setbacks, plus the meteorological data to try to design the best and effective project for this area.

So shadow flicker occurs from the sun being perpendicular to the spinning blades. And the good thing is we know very well how to model it and site accordingly.

So modern wind turbines have a rotational per minute up to somewhere around 12 to 13 RPM; and that is a variable speed, obviously, as it moves with the wind. And the amount of shadow flicker diminishes rapidly with distance. Roughly 10 rotor diameter from the turbine is academically what has been determined as the maximum shadow flicker distance.

So math. So there's really three parameters that I kind of want to highlight. You understand that there's a structure, the turbine with the tip, and then there's the sun behind it. And then that's basically how we determine the distance of where the shadow flicker is. So really the question is to understand this, we need to understand where the sun is and how does it relate to the turbine.

So geometry of the sun. So basically there's three important angles that we need to take into account. And I'm just highlighting this. The equation is marginally not important. We walk through -- there's three angles that come out of this. It's how the earth is rotating around the sun, the latitude of where we are on earth, and then the time of day. And from that information, we actually know very explicitly where the sun is for the area. Now, that is the first step in determining, obviously, where can shadows be.

So this is just a rough idea of a model at some location of a turbine, and then it has the shadow flicker wings highlighted in different colors in minutes. So we can walk through, and you go from the pink, and it's pretty long; and that's where you get the most small amount of minutes. And that's because there's -- many times of year you have small segments of minutes that really accumulate into these giant areas. And then as you get closer to the turbine, obviously you get more shadow flicker.

So it's really a time problem. Now, so this is a simulation of -- you see the dot in the upper left corner there of that pink area; and then at

the bottom you have the time of day, the year, the months on the bottom axis, and then your time of day in the vertical axis.

So those brown things show -- the brown filled-in part simulates when shadow flicker could occur from this turbine in that orientation. And this assumes clearly that it happens every day and you have basically a glass house from that angle. So it doesn't take into account if the turbine is looking in your direction or if there's clouds or if they're at low wind speed, shut down. So it has just this evening sunset version.

And then conversely you have the same in the opposite case where this would only be possible in the small segment of time at sunrise in the summer if it were located on the other side. So it's a very time-specific -- time-of-year-specific obstacle.

So again, this is some of the basic aspects. It doesn't take into account the orientation to your house, if you have walls facing that orientation, if you have tree cover of that orientation. And then the turbine has to be in that wind direction to create a shadow in that direction. And then at very low angles the sun is very diffuse.

So if you think of a sunset on the horizon, you get an orange glow. It's not a pointed feature.

So the question, then, is how do we site for shadow flicker to ensure that we minimize it on homes. So in the model like we cut out areas for physical setbacks, we limit areas for turbines to be placed for shadow flicker. So if you see here, this black area basically is a cutout where we say that if this is the amount of minutes where shadow flicker were to occur on this residence, that would not be in compliance. So anything within that black area a turbine couldn't be sited.

And if you can see the shape, it's vertical compared to the actual wings where you had the majority coming down towards the residence in that one. So based on this, and then in conjunction with the sound modeling, we site the turbines. And with the physical setbacks.

So I hope that gives you some context about the thought process of how we site our turbines and the impacts that we study accordingly.

MS. COLEMAN-GRAHAM: Thank you, Marcel.

And as we have Tracy coming up, again, same deal. Pass your cards to the aisles, if you

would. The ladies will pick them up. And raise your hand if you need more cards.

MR. BUTLER: Hi there. I'm Tracy Butler. I'm the director of civil engineering for Apex Clean Energy. I'm going to chat about engineering and construction of the wind farm.

So this first slide is kind of busy, but basically I want to start with what a wind turbine is and how a wind farm kind of comes together physically; and then we'll go into how we actually physically do that.

So if you look over here on the right, there's a diagram here of a wind turbine, and the principle is pretty sensible, just like an old windmill from hundreds of years ago. The wind blows through these blades, or rotor blades we call them. They spin, and there's a generator here within the cell that creates electricity. And that's the basic principle.

Obviously there's some complexities to it; but the turbine itself, there again, is several components. Blades, the cell and the rotor and generator, and then a tower. And the towers are actually multiple segments as well. So for the

turbines that we're contemplating here that tower may be three, four or even five tubular stacked up pieces. So that's the turbine itself.

And as was mentioned, we're contemplating up to 33 turbines here. So how does that work? Well, they get sited, as was discussed, based on setbacks and wind resource. And then once they're sited and it's time to go into construction, they're built. And they're connected via a series of underground cables. And that's kind of depicted here.

So the cables take the power from the generator in the turbine, and that's at a generation, voltage, it depends on the model, but it gets bumped up to 34.5 kilovolts. And that runs through -- and it's called median voltage, and that runs through all the cables. And those cables collect it and bring it to a central substation, which is indicated over there.

Now, the substation has a transformer there where it ups the voltage from 34.5 to 115 kilovolts in this case, and that's the voltage of the transmission grid in the area. So the power, there again, from the generators, down the towers, through the collection system, around to the substation where

it gets up voltage; and then it gets plugged onto the existing transmission grid.

Here in this project the transmission line runs through the project, so there really isn't a need to build any additional transmission line except for a little piece to connect our substation to the line. So that's that.

Also, too, here I just kind of glazed over what these guys are standing on; but down here at the bottom they're standing on a large concrete foundation. This foundation could be approximately 70 feet in diameter at the base, which is all the way underground here about 11 feet deep. And it's tapered up so that near the surface there's a pedestal. And the pedestal is approximately 18 feet in diameter, and that's what pops up out of the surface.

So at the ground you would see about 6 inches high and 18 feet in diameter a concrete pedestal that the turbine would then bolt onto. There would be a series of bolts in a ring buried -- embedded in the foundation, and that's what the turbine bolts onto. That supports the turbine.

So that's how it's laid out, but how do we build it? In some regards it's a large construction

project to get these large turbines in. For reference, some of the models that were discussed have rotors where just one blade is over 200 feet long. So that's quite a project to get that blade into the site.

To do that, we need to build access roads to where we want to build turbines, and we need to look at whether the existing public roads need to be improved and have turn radian increased or what not to get them so...

But the first step really in the construction process is the mobilization to the site. So crews come in, create a laydown yard where they would do their field offices and store some components and some materials; and that's kind of the central hub with all the construction activity. Once that's up and running, then it's really the access roads get started.

So as was mentioned, there's a setback from existing roads to where the turbine can be. So all the turbines are out in fields, so we need to build a road to get out there. The components are large, and some of them are quite heavy. The cell can way up to a hundred tons. So it's substantial. And

these access roads are designed to accommodate that construction traffic.

After construction, there will be a 16-foot-wide road maybe 6 or 8 inches deep of stone; but during construction they'll be much wider. They'll be 40 feet wide. But the majority of that will be the compacted shoulders on the edges of this road. So gravel road down the middle, compacted shoulder, so we can get the bigger trucks through, the cranes and all that. After construction, those compacted edges will be de-compacted so that the crops and such can grow right up to the road.

I should also note, too, that there is at the end of the road a little gravel beauty ring that goes around the turbine. That's usually 10 to 20 feet across so that the pickup trucks during operations can pull up, turn around. And farming just goes right back up to there. So you can really just work the land right up to that beauty ring. So that's the access roads to get to the turbines and get them built.

Also, you know, as those roads are getting built -- it's not really shown here, but the excavation to put in those foundations is going to be

happening as well.

Then at the same time the collection cable is going to be installed. And it may be hard to see from there, but it's basically a piece of equipment about the size of a bulldozer. It's a trencher, and it runs along and has a trenching saw that digs a trench that's approximately a foot wide, maybe 18 inches wide. And while it's doing that, it's placing the collection cable into the trench.

And the power -- the collection cable that carries the power, it's three cables that carry the power, it's a ground cable and a fiber optic cable; and they're all going in the trench at the same time. So that installation, it's pretty smooth.

I should note, too, that in agricultural fields the topsoil is usually pushed to one side first before the trencher comes through. Then the trencher comes through, spits the underlying soils to the other side, the cable goes in, those underlying soils get put back in and topsoil on top. So they stay separated.

I should also note, too, that if there's drain tile in the field that is at a depth where this would hit it, fragments would come up here in the

trench, immediately gets tracked with a GPS coordinate, and then repair crews come fix that. And that would be under the warranty of the contract and the lease for, I think, several years to make sure those drain tiles are repaired properly.

So while that's going on -- I'm kind of jumping around here -- the substation is also going to be in progress. As I said, that's central to the project and will be located along the existing transmission lines. So here there's various circuit breakers that are built, a transformer gets brought in and brings the voltage up, the transmission voltage. So that's something similar to what you've seen around locally with a substation.

Then the turbines themselves, I mentioned that there are various components, the rotors, the towers and such. And that process is once the foundation is laid and cured, the bottom two tower sections, the base and the bottom mid, they get set by crane, bolted in. And then a larger crane, which you see there, the top-out crane, will come in and stack the rest of the tower up and bring the cell that goes on top of that, which is where the generator is at, and then attach the rotor.

In this case most likely the rotor would be built in the air. So one blade you could lift it up and then the next blade and the next blade. So that's generally the construction.

Once the turbines are up and there's power back fed to the facility, the generators will be commissioned. So teams of commissioners will be running through the turbines, going through a pretty extensive checklist to make sure everything's up and running perfectly, all the safety functions are going and it's operating.

Now, I don't have a slide for the next thing I want to talk about, but decommissioning. So at the end of the useful life of the farm, which is -- you know, depending on the farm, could be 30 years or 25 years, there's decommissioning. And Article 10 process actually requires us to come up with a decommissioning plan and a financial security to pay for that decommissioning.

And the decommissioning is basically this slide in reverse. Crews come in and start to take the turbines down, the substation will get dismantled, roads get reclaimed. So the stone gets taken out, everything gets decompacted and turned back into

whatever the use was, a farm or pasture or what not.

I believe here in these leases the depth of removal of the foundation is 4 feet. So anything 4 feet and above will get jackhammered out. The cable as well, if that's above that, that would come out. If it's below that limit, it can stay in the ground. But that's basically the way the decommissioning works. So the intent is that after that happens, you can't really tell it was there, for all practical purposes.

That's got me covered.

MS. COLEMAN-GRAHAM: Okay, Tracy. Thank you.

Again, same thing with the cards. Pass them to the aisles, if you would. Ask for more cards if you need them. And Rob O'Neal is up next.

MR. O'NEAL: Thank you, Rita.

Again, my name is Rob O'Neal, from Epsilon Associates. And I've been doing community sound studies for about 30 years now, and the last 15 years or so I've worked on approximately 150 different wind turbine wind farm projects doing sound studies. So I've seen quite a few of these. Tonight I'm going to touch on -- I've only got about 15, 20 minutes, but

I'm going to touch on five basic topics related to sound.

The first one is a quick sound 101 primer. Second is talking about how you measure existing sound. Third topic is predicting future sound from the wind farm. Fourth topic I'm going to touch on is a question that comes up a lot, and it's low frequency and infrasound. And finally talk briefly about criteria or design goals for the wind farm project.

So sound 101. Two sound sources of equal measure, and sound is measured in decibels. What we hear are A-weighted decibels, and I'll talk about that in a minute.

So two sound sources of equal measure add up to be 3 decibels higher, because sound is logarithmic. So our cricket at 30 decibels and fan at 30 decibels together would be 33 decibels, not 60 decibels. So it's logarithmic math.

Likewise, two sources of sound where one is 10 decibels or more higher than the other -- so in this example that same cricket at 30 but an air conditioner at 40, the two of those together would really be 40 decibels -- the louder source dominates. It's not 70 decibels.

So if you remember your old stereo system from back in the day, you might have had a graphic equalizer in it, which allowed you to control the different frequencies. And that's what sound is; it's made up of different frequencies. You've got that low base, middle frequencies, high frequencies.

This graph here on the bottom it shows you those frequencies starting on the left here in the infrasound region down around 4 hertz. Infrasound goes up to 20 hertz, low frequency is 20 to 200, and then middle and high frequencies are 200 hertz and above. And then the Y axis is sound levels in decibels for each frequency band.

And this graph here is an audibility graph. In other words, the point of this graph is that we don't hear infrasound. The amount of energy you need to hear it is too high. You have to have over 100 decibels in those low, low frequencies for us to hear it. And really you don't have those things typically out there in nature or in our world, unless you're standing on the tarmac with a jet engine running, which we shouldn't be.

This last graph here I'm going to show you on sound is how the A-weighting frequency works. So

A-weighting is the standard convention used in the acoustics world to represent how a human ear responds to sound. And again, it's sort of the inverse to what I just showed you in the previous graph in that we hear the middle frequencies really well. So there's no correction to that.

So 1,000 hertz we hear very well. These low, low frequencies in the infrasound region over here we don't hear well at all. So there's a huge, huge correction that's applied there. They don't contribute essentially anything to the A-weighted sound levels. But A-weighting is what we hear and how we hear. So that's the standard that we use in wind turbine sound studies and most any sound study.

Second topic, measuring sound. As part of the Article 10 process, the state requires two seasons of existing sound level measurements here in the community, one during summer, one during winter. Those have actually been completed now. I'll show you some information on that in a minute.

These are just a couple of examples of the equipment we use. We have a lot of sound level meters, which is the upper right-hand photograph there in the protective cases. We also measure the

concurrent wind speed. Because the wind itself is a very important factor in terms of generating sound.

As you know from this past week if you were outside during some of those windy days, that's pretty much all you heard was the wind whistling past you. So as part of our studies, the lower left-hand photograph shows a picture of one of our meteorological towers that we measure the wind speed with wound studies.

All this equipment that we use is compliant with American National Standards, ANSI standards; and we also use ANSI standards to analyze the sound level data that goes into the Article 10 application.

So this graph here has a lot of information. Graphs like this will be part of the application when it's turned in later this year that you'll be able to really study. This graph represents about 15 days of existing condition measurements here in the project area. We had eight different sound level meters spread out amongst the community in different spots.

This particular graph is the wintertime measurement, so it goes from late February -- so about

a year ago today -- into mid-March. And what you see in the top series of lines are the eight locations with their sound levels overlaid on each other. And as you can see, there's a lot of similarity, which is what we'd expect in a large agricultural community.

And the point of that is to show the variability. Remember, again, there's no wind turbines around here. But the sound today when the wind is absolutely still during the nighttime hours could be as low as maybe 16, 17 decibels. But a lot of the time it is up here, 50, 60, approaching 70 decibels.

What's plotted on the bottom here in gray is the wind speed data from that meteorological tower that I showed you in the previous photograph. So that's ground level wind speed and the scale for that on the far right-hand side. And there's usually a very strong correlation -- you see it here, too -- when the wind speeds are high, such as this data right here or this data over here, sound levels high. Not surprising.

But there's also a lot of other things influencing sound today in town, whether it's the wind, it's traffic, it's planes, it's insect noise,

plane noise. A variety of mechanical equipment on the farms and so forth all contribute to the variety of sound levels here, which can vary by at least 50 decibels over course of a day at the same location.

The third topic I was going to touch on is predicting sound. So in other words, once Ben and Marcel have completed the layout of where they think the turbines are going to go, we then take that information along with a lot of other information, which I listed up here, and we put that into our sound model.

There's a very rigorous standard called the ANSI -- sorry, the ISO 9613-2 standard for propagation of sound. That's what's used to take sound from all the different wind turbines as well as the substation and propagate that out, or calculate that out, to every home in the community in the study area.

There's a lot of other information that goes into the sound modeling. Any terrain -- it's pretty gentle terrain here, but any terrain data goes into the model, the heights of the wind turbines are put into the model, the meteorology -- worst-case meteorological conditions go into the model; and all

the distances are calculated using the software.

The fourth item right here is one I want to touch on for a minute, maximum sound level from each wind turbine. So depending which manufacturer is used for the project, we'll get a technical specification sheet from that manufacturer, whether it's General Electric or Vestas or Nordex. Any of the big manufacturers have very detailed sound data they've taken of these types of wind turbines.

And the sound data is going to vary as a function of wind speed. So at very low wind speeds the sound levels are very low. And they gradually go up and up until it reaches maximum wind speed, at which point even if the wind speed increases, the sound levels from the turbines will not increase. They plateau. The blades will start to feather, and the sound will not increase after that.

So that maximum sound level that the turbines can generate from whatever wind speed that is is what goes into the model, and that's what we use to calculate those potential worst-case sound levels that could occur at any one of the homes in the community.

I don't expect you to read this graph from the audience, but this type of map will be in the

application. This is a map from another project that's in the public record, the 8 Point Wind Project in Steuben County in the Southern Tier. We'll use a similar map for the Heritage Wind Project.

There's a lot of information on here, where the turbines are, where the homes are, and then the calculated sound levels. And each one of these has a very detailed inset where you can go and see your home if you're in the project area in a lot more detail. That's what this map here shows. It's one of these inset maps. And again, don't worry about seeing all the detail tonight, but this is the type of information that will be included as part of the Article 10 application. The home, sound levels, etcetera.

I was explaining before about sound levels vary as a function of wind speed. What this graph here shows you is representative. It's not from the Heritage site, but it's another site in New York State. So I expect it to be not dissimilar to a site here.

But this is one year's worth of hub height wind speed data. So it's hourly data. So in a year -- there's 8,760 hours in a year, so there's

8,760 hourly wind speeds plotted on this graph from January 1st to December 31st. And the speed is over here on the Y axis going from zero. And it's in meters per second, which is the way things are done in the wind industry. It's a holdover from Europe.

But the cut-in wind speed for most turbines is around 3 meters per second, which is about 7 miles per hour. So below 7 miles per hour the turbines won't spin. They won't turn; therefore, there's no sound from the wind turbines. And as you can see from this graph here, that would be all these hours down approximately here. So the turbines won't be turning, so there will be no sound. So that's certainly sometime in the year.

And then the maximum sound is usually around 9 or 10 meters per second up here, where you get that sort of maximum sound; and everything below that is going to be something in between. So again, the point is the sound levels from a wind turbine over the course of a year are going to vary. It's not going to be the sort of worst-case sound level for the entire year.

This next graph is going to illustrate that for you. This is taking a similar type of annual

data set. This is, again, one year's worth from January 1st on the left here to December 31st on the right. It's hourly sound levels this time. And as you can see, these are sound levels here from zero. Those are all those hours during the year where the wind is below cut-in speed, so those are all hours where the wind farm is not making any sound.

As soon as the blades start turning, then the sound level will jump up from anywhere from 15 to as high as 40. 40 would be those times of that worst-case wind speed I was talking about before.

So again, the take-away from this is that sound levels will vary, you know, during the course of the year. They're not always going to be at that worst case, which is kind of what we stress in the application; but the message is that it's not always at that level. As you can see from this, it's very frequently a lot lower than that.

A question I get a lot of times on the modeling predictions is "Are they any good?" "Why should I believe you guys?" And that's a fair question, and the answer is they're accurate. We've learned enough over time now, we've put in conservative model assumptions, and they're accurate.

We've done a lot of post-construction testing. There's over 50,000 wind turbines operating today in the United States, and a lot of them have been tested; they've been measured for sound. And what we find is that if we can measure those worst-case conditions where we reach that maximum speed at the hub, it's not too windy at the ground. So the wind's -- the turbine's being drowned out, that we find the actual sound levels are often a couple decibels less than we actually predicted.

These next two slides are just covers from a couple of technical reports that I've worked on which back that up. This is a technical conference paper that I would where I did the modeling. I did the post-construction compliance measurements. We found out that the actual measured sound levels after the fact were 1 to 3 decibels lower than what we had estimated pre-construction.

And this is the cover of another report, a commissioned study by the State of Massachusetts where our firm was involved, and we studied a lot of different things. And that was also one of the conclusions we came to preparing models versus measuring data.

Fourth topic is low-frequency infrasound. You may have heard about it, you may not have. People talk about it, or they may not understand it. Wind turbines generate low-frequency infrasound. If you remember that graph I showed you early tonight where it's just part of the spectrum, and it's just part of any mechanical device. There's low-frequency and infrasound sound in the auditorium here tonight that we're all experiencing right now. It's in our homes, it's every day. And wind turbines generate it, too. They're no different.

There's several ANSI standards that I list up here. Those will be looked at as part of Article 10, because there are some general guidelines and criteria that are in there to ensure that the sound levels from low frequency are not so high they're going to cause things to vibrate and rattle. That's a question that comes up. So we'll be looking at that and making sure they comply with those limits.

We were commissioned several years ago to do a research study on low frequency and infrasound. This is a cover of that study where the results were peer reviewed, and the conclusion was yes, there is low frequency and infrasound. We measured that at

1,000 and 1,500 feet from turbines at a number of homes, and all the levels were below those criteria that I showed you earlier.

This is a graph showing three different actual sound level measurements. The lower one here in red is an area with no wind turbines and light winds. This is the area of infrasound right here to the left of the dotted line, as you can see this infrasound. The blue line is also an area with no wind turbines, but a moderate wind, now 6 to 8 miles per hour. Again, plenty of infrasound. And finally, the top graph is an area -- it's not here in New York State, but it's an area that does have wind turbines under very high winds, 12 meters per second. It's about 25 miles per hour. And once again, you've of course got some infrasound that's a little bit higher, but it's downgraded by the wind itself. That's what's generating that large part of the infrasound.

Last infrasound slide here is one I took of my own air-conditioner. Again, the infrasound is down here to the left of the solid line. That's anywhere from 40 to 50 decibels at those various frequencies. Typical air-conditioner that you might have in your house. This is the audibility line, this

slanted line here. Again, it's inaudible in the infrasound. Once you get to low frequency, it goes to the right of that. That just means it becomes audible. Not that I recognize it as low frequency, it just means I can hear my air-conditioner. That's all that means.

Final slide is just touching briefly on noise design goals or criteria for projects here. The sleep disturbance at the outside of a home is 45 decibels; and that's going to be the design goal for this project at every home, 45 decibels or less. As I mentioned, the low frequency and infrasound have ANSI guidelines. Those will be used to enforce and inform design goals to keep them below those limits that cause any vibration or rattle or disturbance from low frequency and from.

And finally -- I didn't really touch on this -- a tonal noise. It really isn't an issue from wind turbines. Substations, perhaps, can be a source of tonal sound. Those will be looked at as well and will not be allowed to generate any tonal sound. Tonal is that sort of pure tone, any hum or whining you might recognize as sort of a distinct tone you might hear.

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So those types of criteria will be part of the project and part of the criteria that we design to meet those criteria.

So with that, Rita, I believe that concludes my slides.

MS. COLEMAN-GRAHAM: Thank you.

Again, if you would pass your cards to the center aisles, we'll go ahead and pick them up and add them to our growing pile here.

What I'm going to do now is do the questions for the panelists reading from your question cards. Okay. The first ones are for probably Neil.

If the Heritage Wind Project were to be sold and Apex not hired to manage the facility, how does Apex ensure that environmental compliance is met?

MR. HABIG: Well, the permit -- and Jim can comment on this as well. The Article 10 results in a certificate of public good, and it has a number of conditions that are in effect for the duration of the operation of the project. So whether it be Apex operating the project or another operator of the project, they would still be bound by the same conditions and requirements.

Jim, did you have anything else on that?

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MR. MUSCATO: I'm afraid to. I just wanted to add. So a certificate is required to be transferred if it's sold to another entity, and that transfer has to be approved by the siting board, and the new owner would have to agree to all of the conditions in the certificate before the transfer is approved.

MS. COLEMAN-GRAHAM: Thank you. There were several versions of that question, so I've read that one.

Again Neil. Why aren't forums such as the one you're holding here tonight done prior to getting landowners signed up, so that the entire town is aware of your presence and your intentions? Why is it a big secret?

MR. HABIG: Well, I wouldn't characterize it as a big secret. We had some open houses; we invited landowners; we spoke with public officials. A lot of what we hoped and shared tonight is a culmination of quite a bit of work in laying out the project and determining where turbines may be, where landowners have chosen to participate and so forth.

So very early in the stage -- again, we didn't keep it as a secret. We went to the Town

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officials as well as talked to the landowners, did not try to keep it a secret. But we -- at that stage we did not know what landowners were interested in participating and didn't have much configuration -- or any configuration details at all.

MS. COLEMAN-GRAHAM: Is this project being proposed in a manner that meets or exceeds in a beneficial manner all current Town of Barre ordinances?

MR. HABIG: In particular the tip height, I believe the Town of Barre wind ordinance was established in 2009 or 2007 -- several years ago -- at which time the 500-foot height restriction was adequate to cover any expected turbine height at that time. Subsequently over time, turbines have gotten taller, rotor blades have gotten longer; so the tip height has increased.

So it is not -- what we're proposing does not conform to the 500 feet as well. And Ben can speak to this. There's some property line setbacks as well as a few sound specification details. For example, there was a lack of specificity in the units associated with the level. Those are more corrections as opposed to changes. But I'll let Ben clarify.

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MR. YAZMAN: There's a number of setback provisions that we've discussed with the Town of Barre in a proposal to amend their Zoning Ordinance, and I would propose that we just detail those in response to this question on our website responses.

MS. COLEMAN-GRAHAM: Last question for Neil for this round.

How many times has Apex Clean Energy walked away from a proposed site when they discovered that there would be significant environmental impacts.

MR. HABIG: Well, I don't have a specific answer to that. When you say "walked away," that seems to imply that you were somewhat committed to that site. But one of the early stage steps in evaluating a project is a fatal flaw.

So before a project actually even becomes a project, there's quite a bit of analysis that goes into it. We have a 50-or-60-slide deck that looks at all these different things, including wildlife issues. So we would work with a firm like EDR as well as our own internal permitting experts or environmental experts to look at some of the sensitive habitats that we know. Some of those are not appearing until studies are done, but I'd have to check with folks

internally to see what the answer to that is as far as numbers.

MS. COLEMAN-GRAHAM: Okay. Let's move on to Ben.

Ben, how far do the wind turbines have to be from the airport?

MR. YAZMAN: Well, ultimately that will be a determination that the FAA makes. The turbines sited on this map are no closer than 2 and a half nautical miles to the airport.

MS. COLEMAN-GRAHAM: What was that number again?

MR. YAZMAN: 2.5 nautical miles.

MS. COLEMAN-GRAHAM: Thank you. I'm not sure if this one should be you or not, Ben, but we'll give it a try.

What are the readings of the current three meteorological towers in the town?

MR. YAZMAN: We don't publish comprehensive wind data from those meteorological towers. We do submit reports on their functionality to the town, but I can say that they confirm that the Town of Barre has what the IIEC has classified as a class 3 wind speed.

MS. COLEMAN-GRAHAM: I have four that are very similar, so I'm going to try to group it as one question here. It deals with the proposed jobs in the local area. The questions are getting at what is the number of permanent jobs that could be expected for this area and what type of wages.

MR. YAZMAN: We would expect up to eight high-paying technical jobs to be permanently attached to the project.

MS. COLEMAN-GRAHAM: And those would be full-time jobs?

MR. YAZMAN: Full-time jobs, yeah.

MS. COLEMAN-GRAHAM: Okay. How many years will the proposed jobs by the developer for the local community exist?

MR. YAZMAN: I would expect they would exist for the life of the project. As an example, I'm thinking about a wind turbine technician. It's a high-paying skilled labor job that would be required throughout the life of the project.

MS. COLEMAN-GRAHAM: This deals more to the economic benefits.

What percentage tax decrease do you anticipate for Barre residents? And then it goes on

schools, the county, so forth.

MR. YAZMAN: That's really going to be up to the taxing jurisdictions and their leadership to determine what to do with the money that comes from the project. But we can, you know, estimate what we would be paying into a community benefits pool, which as I said before we assume to be about $7,500 per rated megawatt of the plant.

MS. COLEMAN-GRAHAM: Okay. And last one for you.

What is the value of this proposed project? It might be Neil.

MR. HABIG: Something over $200 million. It depends specifically on the final turbine chosen and final configuration, but it would be in excess of $200 million of project cost.

MS. COLEMAN-GRAHAM: Okay. Moving on to Greg.

Who determines the value of the wetland?

MR. LIBERMAN: The methodology that's been documented in the Preliminary Scoping Statement and agreed to by the New York State DEC is called the United States Army Corps of Engineers Highway Methodology. It's a methodology established by the

Federal government to essentially come up with a standardized approach on how to assess functions and values, because it can be subjective.

So through the process of developing the scoping statement, there's been agreement to use the highway methodology, and that's been consistent with several other Article 10 projects as well.

MS. COLEMAN-GRAHAM: When was the species inventory started?

MR. LIBERMAN: Species inventory was initiated in 2016 with some of the initial wildlife studies and is continuing through all facets of fieldwork, whether it's through wetland delineations, vernal pool assessment or upcoming wetland delineations that will occur in 2019.

MS. COLEMAN-GRAHAM: Okay. You may have just touched on this.

Other than birds and bats, what other environmental studies are being done?

MR. LIBERMAN: Great question. There will be several in support of Exhibit 22 and 23. The biggest is probably the wetland stream delineation report. There will be an invasive species control plan, the invasive species baseline survey. There

will be habitat fragmentation analysis, net conservation benefit plan per species, an avian risk assessment. There will be a vernal pool assessment.

There will be scope, prevention and counter control measures, a water quality report along with a stone water pollution prevention plan.

And I'm -- there may be others, and I'm happy to kind of provide in writing maybe a response of what was outlined in the Preliminary Scoping Statement in terms of all the supporting studies, just because of the volume of 40 exhibits with probably upwards of 60 appendices. But those are the big ones.

MS. COLEMAN-GRAHAM: Okay. One more. Why is there only one vernal pool study in the spring of 2018? Why not this spring as well? Shouldn't these studies be done for at least two years?

MR. LIBERMAN: Good question. So the methodology used for the vernal pool study was based on -- New York State does not have a vernal pool identification standard. Several other states do. So there was a collection -- a review of various other states, Pennsylvania and Massachusetts, that were used as the guideline for that. And it doesn't -- it has

to have a two-step component. And I apologize for not being explicit in the discussion.

And it's not so much about the year as much as it's about looking at it in the early spring and then going back in the summer to make sure that the vernal pool is in fact dried up. And that work has occurred. And as part of the delineation work that will happen in early 2019, we'll be double-checking the vernal pool assessment performed in 2018. But as far as the standards that exist, it's not a two-year standard.

MS. COLEMAN-GRAHAM: Okay. Let's move on and give some to Marcel.

So is shadow flicker just minutes a day certain times of the year?

MR. MIBUS: I mean, it depends greatly on how you look at the geometry of where a home is to where the turbine is. Generally, especially with the distance that the turbines are from homes here, they are largely just in the minutes per day. And then that obviously just depends on the time of year.

MS. COLEMAN-GRAHAM: Okay. This one -- how many hours for participating parties or leaseholders -- I think they're getting at -- what's

the standard there?

MR. MIBUS: I believe we fall back to our internal Apex standard, which is 40 hours per year.

MS. COLEMAN-GRAHAM: What was the number again?

MR. MIBUS: It's 40 hours per year per the internal company standard.

MS. COLEMAN-GRAHAM: Okay. Shadow flicker. You say distance matters. So say that a cloud goes in front of the sun. Would seem to make a shadow on the ground. But you say it doesn't? I think they want clarification as to that.

MR. MIBUS: I think I was referring that the shadow flicker from the turbine is blocked by clouds. But if it's cloudy, you'll have sunshine behind the turbine to have the flickering.

MS. COLEMAN-GRAHAM: Has shadow flicker study been conducted to help site the turbines?

MR. MIBUS: That is normally done once the layout is finalized, and it is then done through an independent group to confirm that we are meeting the regulations.

MS. COLEMAN-GRAHAM: Okay. This one's a little longer.

On a flat area how far will shadow flicker transmit during sunrise and sunset with the potential of maximum sunlight?

MR. MIBUS: Well, I think I would have to -- for any specific numbers I would have to actually look at it and then report the numbers back specifically. But there is an aspect of the near horizon diffuse light that limits the maximum number. But for very specifics I'd have to report back in to the website.

MS. COLEMAN-GRAHAM: Okay. There was a second part to this one.

If a tower is situated beyond the limits, what happens?

MR. MIBUS: So there's two potential. We either work on siting the turbine or -- to adjust for that, or we curtail the turbine at very specific time periods to limit the shadow flicker during the expected windows.

MS. COLEMAN-GRAHAM: Okay. And last question for you. And I'm sure I'm not going to pronounce this correctly. You can tell I'm neutral and not in the wind industry.

Iberdrola told our town in 2008 that there

wasn't enough wind in Barre to make it successful and consequently pulled out. So what's changed in 11 years?

MR. HABIG: The turbine blades have gotten quite a bit longer, and so the minimal threshold wind speed for viable wind projects has gone down over the last 12 years.

MS. COLEMAN-GRAHAM: Okay. Let's move on to Tracy.

Will multiple sites be under construction simultaneously?

MR. BUTLER: Yes. Yeah, absolutely. So, you know, there's typically a plan of installation that would have the roads coming in and then the foundations behind that and then the turbines coming behind that. And that would work its way across the project such that the cranes could just move in one direction and don't have to backtrack.

But yeah, you'd have several foundations being poured at once and several turbines being erected at once.

MS. COLEMAN-GRAHAM: This next one has been asked in a couple different ways by people, so I'm going to pick this cards.

Will the collection cables in wooded areas -- will they be tracked by the shortest distance or parallel to an access road?

I think they're getting at minimizing the disturbance to a wooded area.

MR. BUTLER: Sure. So that's where some of the wetlands information that Greg was talking about comes into play. Because there are some forests wetlands here where we do need to go under them in the shortest way possible with a bore or bore around them. We've got to look at each one specifically to see if it makes sense to try to find a way to go around or bore underneath.

MR. LIBERMAN: And I would even add to that that it is a bit of an iterative process. In other words, there's been a lot of discussions with some of the preliminary layout information and some of the preliminary environmental information to avoid to the extent practicable. And then that information gets documented, and it will be provided in the Exhibit 9 of the Article 10 application. All of these measures to avoid impacts siting these facilities in ways that will maximize the avoidance of minimization will all be documented in the application, but it's

definitely an iterative back-and-forth process.

MS. COLEMAN-GRAHAM: Tracy, are the nacelles rotational, or will they be in a fixed position.

MR. BUTLER: That's a good question that we didn't touch on. So the nacelle has anemometers on top and wind direction wind veins on top. So the nacelle will rotate to line up to face the wind. And also, you know, the blades themselves, they rotate as well.

So when it's non-operating, the blades can be feathered back so they're not catching the wind; and then as the wind speed comes up, they can engage, start to rotate. And then as we reach high wind speeds where it needs to cut out, the blades can feather again.

But exactly, yeah, the nacelle can rotate, spin all the way around.

MS. COLEMAN-GRAHAM: Last one for you this round.

If the proposed project is approved, to whose satisfaction are the roads repaired after construction?

MR. BUTLER: That would be also a good

question to bring Ben in on. Because there is a road-use agreement that would have to be agreed to through the town, and usually that agreement then is required to do a pre-construction survey of the roads and then a post-construction survey of the roads to make sure they've been repaired per the road-use agreement.

MR. YAZMAN: I'd just add that the standards of that road-use agreement would be to leave roads in same or better condition as we found them, essentially.

MS. COLEMAN-GRAHAM: Okay. Let's move on to Rob.

Rob, how was the 45-decibel setback used previously determined?

MR. O'NEAL: I'm not sure I understand the question.

MS. COLEMAN-GRAHAM: I think they're looking at what's the basis of 45 as the number.

MR. O'NEAL: Okay. So the 45 has been used as a guideline to prevent sleep disturbance that's exterior to a home. That's been used as a number to -- 45 or less, so there will not be sleep disturbance at night.

MS. COLEMAN-GRAHAM: For measuring sound are you using averages or immediate sound levels?

MR. O'NEAL: So the instrumentation is constantly recording and sampling. Obviously it's going to record a lot of different statistics, and for the baseline condition we're reporting it in terms of ten-minute increments. So those ten-minute periods will have equivalent sound level average or an LEQ average.

It's not an average, however. What it is it's the energy average which is dominated by the highest possible sounds over that ten-minute period.

MS. COLEMAN-GRAHAM: If we don't hear it, can it still injure our hearing? Can it impact our health?

MR. O'NEAL: So I assume the question is referring perhaps to infrasound and low-frequency sound, because that would be the only thing I think that people might be thinking of. So the audible frequencies, there's no issue there. And the many, many peer-reviewed studies that have come out on health from studied wind turbines have shown there is no medical impact from wind turbines, from operating wind turbines, whether it's from infrasound or

anything else.

MS. COLEMAN-GRAHAM: Okay. And last one for you this round.

Does your sound decibel graph show duration of sound? And then there's an "and" after that one, but I'll stop there for that one.

MR. O'NEAL: So probably the way to answer that is the data that I showed tonight in the slide from the project site, those are ten-minute points, if you will. So that's a summation of every ten minutes over a two-week period.

MS. COLEMAN-GRAHAM: Are wind turbine sounds consistent, or does it change similar to a current day here?

MR. O'NEAL: So the variation I showed tonight that occurs today, you'll never see that from a wind turbine. In other words, you'll never go from 16 decibels to 65 decibels from a wind turbine.

When a turbine is operating and that's the dominant source of sound, you'll have a much narrower range of sound from that turbine generally anywhere from -- depending how far away you are from it, anywhere from 25 up to perhaps 45 decibels. But it will be -- once it's operating and it's operating and

it's the only source, it's not being up and down, up and down, but background, it could be steady.

MS. COLEMAN-GRAHAM: Okay. Let's move on to Jim.

What is the projected timeline for the Article 10 process?

MR. MUSCATO: Well, from the date that we file the application, the siting board has to render a decision on the application within 12 months.

MS. COLEMAN-GRAHAM: Who takes legal responsibility if a new company is not complying with the signed agreement?

MR. MUSCATO: So if that means with respect to the certificate, the permit conditions, then in that instance the siting board has the Department of Public Service staff who can enforce the conditions in the certificate. And so therefore, DPS staff, a state agency, would enforce the certificate conditions.

MS. COLEMAN-GRAHAM: Okay. I'm trying to decide an order here.

Does the Article 10 process have any requirement that the developer or project remain active for a minimum amount of operational time?

MR. MUSCATO: No, Article 10 does not have a minimum in terms of at what point an inoperable unit would have to be decommissioned or anything like that.

That's going to be subject to the individual decommissioning plan that's going to be submitted as part of the Article 10 application that I think Tracy mentioned earlier. That plan is likely to have time frames for inoperability and at what point the turbines would be considered to be decommissioned.

MS. COLEMAN-GRAHAM: Does the Article 10 process have any requirement for studies to be performed after a project has been approved? And if so, who regulates that process?

MR. MUSCATO: So there's a number of studies that would be performed after the project is operational. One that I can think of off the top of my head would be a post-construction noise study that Rob mentioned earlier. And the enforcement of that and the review of that and approval of the compliance filing associated with the post-construction noise plan is going to be the Department of Public Service staff. Again, the state agency regulating Article 10.

MS. COLEMAN-GRAHAM: Okay. The next question is for me, since we're about to go back

around.

The question is when you are organizing the questions that are to be answered, are you removing any questions to definitely not be answered this evening; and then will all questions including this one be answered online in March.

Okay. Any of the questions that we have here you can see -- and that's why we're doing it up here in the clear boxes -- you can see we're trying to figure out who's the best person on the panel to answer that. So they are all going in the boxes. And some are more conducive to fairly short kind of answers that we can have here.

So if we see something that has multiple questions in it where it wants recording of a lot of factual information to back it up, then that one doesn't come to the surface to be asked one on one with the time constraints that we have.

But they're all in the boxes, and they all remain -- all questions are going to have answers, and the remaining ones we don't get to today will be included on the website of the project that's in the program that you have by March 28th. So we are addressing all questions either tonight or online.

Okay. Now we're coming back around to Neil.

Since nonparticipants have no choice in whether turbines are erected in our community, are you giving the residents a written guarantee that our assessments won't plummet once the turbines are erected?

MR. HABIG: There have been a number of studies showing that property values are not negatively affected. There's been some studies that show -- indicate otherwise, but the vast majority of studies show that there is no negative impact on property values in proximity to turbines. And not just by number of studies, but by number of homes or transactions considered.

So the data suggesting that there is no negative correlation vastly outweighs any indication that there would be a negative impact. But it's been studied extensively.

MS. COLEMAN-GRAHAM: Okay. There's, like, a segue question to this one.

Should the proposed project be approved and a property owner is unable to sell their property for an appraised value that was given just prior to

approval, will Apex or its successors purchase that property from the owner for that appraised value?

MR. HABIG: We don't have any program like that; but again, there are 25 operating wind farms in the state that have been well accepted in communities, and the evidence doesn't support that that is an issue.

MS. COLEMAN-GRAHAM: If Apex sells to another energy company, do new contracts have to be drawn up, or are the previous ones transferred to the new company?

MR. HABIG: No, they're assignable under the terms of the contract. So they would be assigned to the new owner of the company. And the project company itself could be sold; and therefore, the agreement would still be with the same party.

MS. COLEMAN-GRAHAM: Okay. Having developed multiple projects in New England and New York that are now in operation -- and that's taken from the form handouts -- how many projects exactly are multiple projects that are operational now in New England and New York? I think they're looking for numbers.

MR. HABIG: A project that I've been

involved in, there's two in New York, one in Vermont and one in Massachusetts.

MS. COLEMAN-GRAHAM: Okay. Tip height. How do current models compare to Orangeville? I don't know if that was one of the examples in Ben's slides.

MR. YAZMAN: I'm not sure which turbine model they're using in Orangeville. Anybody?

MS. COLEMAN-GRAHAM: Okay. So that will be something --

MR. YAZMAN: We'll have to look at that.

MS. COLEMAN-GRAHAM: -- addressed in the written comments. I'm going to put that back in here. Last one here, Neil or Ben.

Can a turbine cause health issues such as headaches, heart attacks or miscarriages?

MR. HABIG: As Rob said, there's been numerous studies -- peer-reviewed studies done that indicate there's no correlation to health impacts. Turbine -- there's no correlation with turbines and health impacts.

MS. COLEMAN-GRAHAM: Okay. Let's move on to Ben here. This is a two-parter, so I'll give you the first part.

What are five separate ways the community

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benefits?

MR. YAZMAN: The primary community benefits that I discussed earlier are payments to the taxing jurisdictions and then secondly payment to landowners who are the economic drivers of the community. I would leave it at those two as our primary community benefits.

MS. COLEMAN-GRAHAM: How exactly are these -- I'm sorry. How exactly are all the windmills connected to the grid? That was on the same card. It might be a Tracy question.

MR. YAZMAN: Yeah, I think Tracy did talk a little bit about that. I'll answer it quickly.

Turbines are connected one to the other by underground transmission back to a central project substation, and then that substation is connected to existing grid infrastructure.

MS. COLEMAN-GRAHAM: Worldwide scientists say unless you cut our carbon use, we will be beyond the ability to make a difference in ten years. When is the earliest your project will be online?

MR. YAZMAN: The earliest we'd expect to be online is 2021.

MS. COLEMAN-GRAHAM: Okay. How can Apex

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reassure residents that their TV, radio and cell phone service won't be interrupted or ruined by the industrial wind turbines?

MR. YAZMAN: Greg may have more to add here, but that would be the subject of part of our Article 10 application, evaluation of impact to those facilities.

MR. LIBERMAN: Exhibit 26 of the Article 10 application will be an assessment of the project on potential communication systems, AM/FM, microwave, cellular, etcetera. And there are -- those studies are currently in process. That will be summarized in the application, and there will be mechanisms for addressing complaint resolution should this come up. So that topic will be discussed in detail in Exhibit 26 of the application.

MS. COLEMAN-GRAHAM: There's multiple questions here. Is there a building in Western New York as tall as your tallest tower? I think they mean turbine.

MR. YAZMAN: I'm not aware of any buildings in Western New York that are 655 feet tall.

MS. COLEMAN-GRAHAM: Have you ever applied for variances to the setback restrictions?

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MR. YAZMAN: No.

MS. COLEMAN-GRAHAM: Are lessees permitted to publicly oppose any variance applications? Are lessees permitted to publicly oppose any variance applications?

MR. MUSCATO: I would say theoretically if a variance application was submitted just by a legal standard, typically the landowner would indicate its support for that variance application. It's usually a requirement of the local code.

MS. COLEMAN-GRAHAM: Now we're moving to Greg.

Are turbines -- no. I'm sorry. As turbines are being built, how much habitat/trees would be cut down?

MR. LIBERMAN: We don't know the answer to that as of yet. In the Preliminary Scoping Statement there is a table that indicates by project component how large a potential work area would be. The area around each turbine, I believe, for the PSS was 250 foot area of land disturbance. So there's the potential for forest impact, potential for grassland impact. That will be fully borne out in the application once the final layout is determined.

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MS. COLEMAN-GRAHAM: Why is the mailer not being sent to every resident of Barre for visual impacts? Why make the busy working residents come to you?

MR. LIBERMAN: Understood. The Article 10 regulations are pretty clear in terms of how the consultation and whom should be consulted for visual impacts, and it states municipal planning representatives and various state agencies.

And I think there was some logic in that in that we -- I apologize for the quick sidebar here, but there's other studies that will result in direct mailers to community residents, one of which will be a private well survey.

And what we've seen is the response rate is not very good for that information. So by sending it directly to municipal planning representatives -- in this case town planners, town historians, town executives -- the idea is that we're casting a pretty wide net with a shorter group of people to provide us information. And then by providing the opportunity for daily interaction at the Apex office is a way to help solicit that information. We feel we'll get better information back, more meaningful information

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back through that mechanism.

MS. COLEMAN-GRAHAM: Okay. This deals with the wetlands and stream delineations. They were initiated during the growing season of 2018 to be completed this spring. How is less than a year an effective time frame to gather necessary data?

MR. LIBERMAN: It moves pretty quick. Again, we're talking about a 500-foot corridor along the project components. And we go out in groups of two for safety reasons, and we're able to piggy-back. And the wetland delineation effort from a ground study standpoint can be done fairly quickly, so it doesn't take an entire year to do that level of study.

So the work that was done in the fall growing season of 2018, roughly 20 to 30 percent of the facility site, and the remaining balance will be completed this spring.

MS. COLEMAN-GRAHAM: What are the current requirements in New York State for wind developers to monitor and report bird and bat fatalities?

MR. LIBERMAN: That will be borne out through this process. In other words, I don't know that there's -- there will be an environmental monitoring program outlined in the net conservation

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benefit plan and the avian risk assessment that will be reviewed by and agreed upon by the DEC, and their input will be directly put into it. So that on a project-by-project basis the specifics for post-construction monitoring can be vetted and agreed upon.

MR. MUSCATO: I would add, too, the state has guidelines for post-construction monitoring, and those guidelines would be a condition of the certificate.

MS. COLEMAN-GRAHAM: During the migration seasons, Canadian snow geese, bats and many smaller species of birds fly over a huge area here. Shouldn't these species be protected? And what happens to migration patterns? We look forward to seeing this migration every year.

MR. LIBERMAN: Great question. With respect to migration, there's been several studies already performed that were included in the Preliminary Scoping Statement. Those will be assessed in relation to the proposed layout, and potential impacts will be described in Exhibit 22.

With respect to bat species, they're -- we've been in discussion with the DEC, and there is an

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assumed present aspect to the bats where we're looking at adaptive management and various curtailment regimes to avoid impact to bats. So that information will be provided in Exhibit 22.

MS. COLEMAN-GRAHAM: The next two questions deal with some information that Dave Phillips had supplied at a recent meeting.

At the environmental presentation that Dave Phillips did on January 16, 2019, he mentioned that bird deaths around industrial wind turbines have been significantly higher than projected. What steps have been taken to identify the bat population in the Town of Barre and protect this population?

MR. LIBERMAN: I apologize. Is it referring to bats?

MS. COLEMAN-GRAHAM: Yes.

MR. LIBERMAN: So with respect to protecting the bat species for this project, there will be an adaptive management plan worked through the Article 10 process and in agreement with the New York State DEC. And there are several steps that can be implemented over the operations of the project to limit impacts to bat species.

A primary component would be, say,

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curtailment, which means that certain wind speeds at certain times of the year the turbines would not spin, thus avoiding impacts. So through ongoing discussions with the DEC and looking at various adaptive management regimens, impacts can be avoided or minimized.

MS. COLEMAN-GRAHAM: Another one about Dave's talk. He shared at a previous environmental open house that birds adapt and avoid an area with industrial wind turbines.

Would that mean that the entire project area would be considered a loss of habitat for that species? And please explain. And that dealt with birds.

MR. LIBERMAN: That's a -- so I think that's something I would want to look into, just because I'm not familiar with what Dave was alluding to at that conversation. So I think that's for March 28th.

MS. COLEMAN-GRAHAM: Okay. Thank you. Moving on to Marcel.

If the date and time of possible flicker can be identified using your computer system, will you make the residents aware of those potential times, so

that they can plan accordingly?

MR. MIBUS: I believe in the Article 10 application we filed the shadow flicker report that the time that the turbines are on the residences is reported.

MS. COLEMAN-GRAHAM: Is recorded?

MR. MIBUS: Reported.

MR. HABIG: Yeah, the study looks -- every day of the year it will tell you on March 22nd that flicker has the potential of occurring. Of course, the wind direction has to be correct, and it has to be a sunny day. But it will say the start time and the end time, and it will be a calendar that will show every day that it has the potential to occur.

MS. COLEMAN-GRAHAM: Okay. Marcel. You mentioned that modern turbines have XYZ, but Ben just spoke that the turbines now being proposed are the newest brand-new model.

Would this increase the distance of shadow flicker? With a bigger model, what new issues does shadow flicker pose?

MR. MIBUS: Well, I mean, shadow flicker is geometry. So directly the taller turbine would have a longer shadow. So it would require us to site

more conservatively.

MS. COLEMAN-GRAHAM: Why is the shadow flicker setback just for residents and not for the property owners and not the property? I think, if I get it right, the nonparticipating property owner was the value you had on your slide.

MR. YAZMAN: Shadow flicker has to be measured at a receptor. So that's why homes are used rather than, say, in the middle of a cornfield where nobody would be to experience shadow flicker.

MS. COLEMAN-GRAHAM: And then it goes on to ask the nonparticipating property owner should have rights to use their entire property and not be impacted by shadow flicker. Wasn't in the form of a question, but could you address the impact of shadow flicker on...

MR. BUTLER: Yeah, I can speak to that a little bit. So the shadow flicker is more apparent when it's coming through a window, because the concept is a window would have light coming through it, and it would get blocked out by the shadow.

So in the case where you're in a field or an open place, that's not really -- I mean, you certainly can see the shadow coming, but you don't

perceive the whole of your window being blocked out. So if there was something that had a window or -- that would be a receptor that we would be modeling.

MS. COLEMAN-GRAHAM: This deals with wind speeds. There are three different questions here, each a little different.

What is the maximum wind speed for the turbines that you're proposing?

MR. MIBUS: The maximum wind speed is roughly, depending on the turbine model, somewhere around 22 to 24 meters per second, which is about 2.2 times for miles per hour, so 55.

MS. COLEMAN-GRAHAM: So what was the last number?

MR. MIBUS: 55 miles per hour, roughly.

MS. COLEMAN-GRAHAM: What would the minimum wind speed be needed for the turbines that you're proposing?

MR. MIBUS: So the cut-in for all these turbines is at 3 meters per second, which would be 6.6 miles per hour.

MS. COLEMAN-GRAHAM: And I think you just answered the first part of this one. For the proposed turbines, at what wind speeds will the turbines be

started?

MR. MIBUS: Same answer.

MS. COLEMAN-GRAHAM: And what is the rated rotational speed in miles per hour?

MR. BUTLER: Well, I think Marcel said it was 12 to 13 rotations per minute; and based on the rotor length, the speed of the tip is 180 miles an hour or so.

MS. COLEMAN-GRAHAM: That was the next question.

MR. BUTLER: Is that the next question? Okay.

MR. HABIG: I think the larger newer turbines it's actually lower than that. But we can get a specific answer.

MS. COLEMAN-GRAHAM: Okay. Now we're on to Tracy. Decommissioning questions.

With the tower taking up such little usable farmland, how much is each lessee paid per tower? The decommissioning is the third part of this one.

MR. BUTLER: Yeah, I'd have to look to Ben or Neil for that.

MR. YAZMAN: Leases provide for a minimum

payment of $5,000 per rated megawatt. So again, increases in turbine technology mean increases in capacity mean increases in payment. That's a minimum payment.

Leases also include a clause discussing revenue share, which would be a payment -- a percentage of the revenue made off the project assuming it's above that minimum.

MS. COLEMAN-GRAHAM: This is probably back to Tracy. What is the setback requirements for substations?

MR. BUTLER: So the substation, I don't know -- maybe I should actually look down here to see if there's -- if that would fall within Article 10 requirements, or is there something special about the substation specifically? Because really there wouldn't be a traditional wind turbine setback for that other than our internal setback, which would be 1.1 times the tip height.

MR. MUSCATO: Typically there's a standard in the local law that would be applied to any type of structure. So I don't know what it is in the Town of Barre, but usually there's a local setback that would apply.

MS. COLEMAN-GRAHAM: Decommissioning. If you were to go bankrupt, do you know of any bankrupt companies that do not remove the towers?

MR. BUTLER: Well, decommissioning in the Article 10 process requires a financial security to do that decommissioning. So regardless of the status of the project company, that security could be pulled, and the plant could be decommissioned.

MS. COLEMAN-GRAHAM: Have you or any of your company taken any down?

MR. BUTLER: No, we haven't.

MS. COLEMAN-GRAHAM: And why not?

MR. BUTLER: They're young and new. The first wind farm that we built was in 2012. So, you know, the life-span of these farms is 25 to 30 years.

MS. COLEMAN-GRAHAM: If Apex or Heritage ceases to operate in the town, what is the required procedure for dismantling the towers? And what is the requirement if either company goes bankrupt?

MR. BUTLER: There again, it's that financial security that's -- that we have to put out there to cover that.

And then the procedure would be, as I mentioned, basically just the reverse of construction

and bringing the tower down piece by piece, pulling out the top four feet of the foundations and reclaiming the roads.

MS. COLEMAN-GRAHAM: And who would be responsible to do that in the case of something like that happening?

MR. BUTLER: So with that financial security, I suppose it's the town that pulls it. Or is it the state that holds it?

MR. MUSCATO: It would likely -- it would depend on each of the proceedings, but it's likely that the financial security would be for the benefit of the towns. That's how it's been done in the previously permitted project in the state, and that's likely the procedure that would be had here as well.

So the towns would have access to the financial security. There would be a decommissioning agreement which would outline the steps that the town would take to access that money, and that's -- the financial security would be for or on behalf of the towns -- or town.

MS. COLEMAN-GRAHAM: I'm not real sure which of you this part of the question would go to.

Can Apex or Heritage sell the project or

lease the project without the permission of the Town of Barre?

MR. MUSCATO: I think this is a repeat of the question earlier. Again, if there was a transfer of the certificate from the project company to another entity, that transfer would require the approval of the state siting board.

MS. COLEMAN-GRAHAM: There's a couple more decommissioning ones, and I'm just going to pull out what is different. The first one wants to know if the money that's set aside for decommissioning -- is there a percentage increase each year?

MR. BUTLER: That's a good question. So depending on the way the decommissioning plan is written, sometimes they are recalculated every five years or some increment to readjust the estimate. So the estimate -- clearly it's predicting the future, but it's often certified by a professional engineer who does, you know, a calculation of these exact things using commodity data and existing data with an escalation. It's often times adjusted as the project goes on.

MS. COLEMAN-GRAHAM: What is the average amount of time that wind turbines are functional

during the year?

MR. BUTLER: I guess you can say when it's windy. The NCFs for projects of this nature are in the 30s. But that's really not the duration, so...

MR. MIBUS: NCF is more related to the energy per turbine.

MR. HABIG: Typically from a speed distribution, how often would it be below cut-in speed?

MR. MIBUS: I think we model turbine availability at roughly 96.1 percent.

MR. HABIG: That would be the availability, but how frequently -- how many hours per year would be below cut-in speed?

MR. MIBUS: I'd have to look at it more specifically.

MR. HABIG: We can get a specific answer on that.

MS. COLEMAN-GRAHAM: Last one for this round, Tracy.

Would the 4-foot decommissioning -- I think this is the depth -- still remain with the larger scale turbines, or would it be increased?

MR. BUTLER: That would stay the same. So

with the larger turbines there's nothing really that changes in regards to the depth. The foundation design -- you know, I mentioned this would probably be 10 to 11 feet deep -- that would probably be the case for whether the turbine was larger or smaller.

If a larger turbine requires a larger foundation, it's usually increased in diameter or in the thickness of that base part to add more mass and concrete. But it's not really deeper. So there's nothing to take out that would be different.

MS. COLEMAN-GRAHAM: Okay. Moving on to Rob.

In regards to the hourly sound level annual sound modeling, what percentage of the year? In regards to the hourly sound level annual sound modeling, what percentage of the year? Well, let me read the rest of it, and it may gel.

As a resident, the variability in sound is frustrating, as this is what will wake us up at night or be disturbing when we're trying to reside and to enjoy.

So I think they're getting at the -- sounds like it's that fluctuation, that variability, asking whether or not your hourly sound levels -- or

the modeling accounts for that, I guess.

MR. O'NEAL: Let me see if I can try to answer that.

MS. COLEMAN-GRAHAM: Sorry.

MR. O'NEAL: That's okay. The modeling calculation that's presented -- the idea is to calculate what the loudest sound level would be during the course of a day or night. So we look at the highest wind speed and use that to calculate the expected sound levels.

Obviously if the wind drops during the course of the night, then the sounds levels will go down to a lower sound level; but the maximum highest sound level is based on the highest wind speed.

MS. COLEMAN-GRAHAM: Why is the goal of sleep 45 decibels, higher than the recommendations by WHO?

MR. O'NEAL: So keep in mind that's the exterior sound level. That is a WHO recommendation. That's a short-term recommendation, the 45. WHO also has an annual nighttime recommendation of 40, but that's for every hour of the night during the course of a year.

So again, that's an annual number. So

that takes into account all the different wind speeds over the course of a night in a year. So that's not the same as the 45 short-term.

MS. COLEMAN-GRAHAM: Where were your sound-measuring devices located in our community?

MR. O'NEAL: So the specifics of all that will be in the application. I don't have the exact addresses with me here tonight, but the details of that will be as part of the application.

MS. COLEMAN-GRAHAM: And that's the Article 10 application?

MR. O'NEAL: That's right.

MS. COLEMAN-GRAHAM: How long have you studied various wind speeds? With the bigger turbine increase, how would your data for wind account for over 600-foot height change?

MR. O'NEAL: So in a sense, that part is not as important to what I'm trying to calculate. In other words, I assume that the wind speed that generates that sound is achievable any time during the year.

So we're modeling for that 45 decibels based on the hub height wind speed. Whether it's at 500 feet, 600 feet or 650 feet, we assume that that

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wind speed is achievable.

MS. COLEMAN-GRAHAM: Rob, as an expert on sound associated with turbines, if you lived in a rural area like Barre, New York, at what distance -- that's my three-minute warning alarm deliberately set.

If you lived in a rural area like Barre, New York, at what distance would you be comfortable living and sleeping from one of the over 680-foot proposed turbines.

MR. O'NEAL: I mean, this is going to be set up so that whatever the distance is -- and to achieve that sound level or less will be at a different distance. There's not one distance where it's going to depend on the turbine configuration.

So sound is really based on the sound level and less on the distance away. I mean, they are related, certainly. Sound level and distance are totally related, but it's not just one number. It's not just, say, 1,500 feet away. It's going to be at that sound level or less, and then you can get a good night's sleep.

MS. COLEMAN-GRAHAM: Last one on sound, and then I've got a couple for Jim.

For sound level prediction process, are

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business locations or other sensitive receptors other than homes used?

MR. O'NEAL: That's a great question. So yes, the project team is in the process right now of identifying all the sensitive receptors in the area. I don't know if Greg wants to add anything to that, but that inventory will be part of the application.

MR. LIBERMAN: Correct. The sensitive receptors right now are in the process of being formatted in accordance with the New York State Office of Real Property tax and classification codes as agreed to through the PSS stipulation process. And that will include all parcels within the one mile of the potential turbines, and it will based on the actual tax classification code.

MS. COLEMAN-GRAHAM: Okay. The last three are for you, Jim, and we'll have gone through the table three times.

When do you anticipate to submit an application for this project?

MR. MUSCATO: I think Ben said earlier this year.

MS. COLEMAN-GRAHAM: According to the Article 10 process, what information, if any, are you

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required to share with the community?

MR. MUSCATO: Oh, well, in terms of sharing information with the community, the Article 10 application in full will be available both at the local document repository, the town offices. It will also be available publicly online on either-or both the Heritage website as well as on the Department of Public Services website.

All of that information will be included as part of notices that are submitted and precede the filing of the application. There will also be newspaper notifications when the application is filed. There will be notifications to the municipal officials when the application is filed.

So there will be advance notice, and the application will be available for individuals in the town to view.

MS. COLEMAN-GRAHAM: Last one for you here is other than the minimum 25 megawatt project to go through the Article 10 process, does the Article 10 process have any requirements for the amount of electricity that's produced by a project?

MR. MUSCATO: Article 10 is part of the evaluation of interconnection and electric system

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modeling for a facility. It will look at certain production numbers. But in terms of requirements, the requirement for proceeding to Article 10 is that the nameplate capacity of the facility is 25 megawatts or more.

MS. COLEMAN-GRAHAM: All right. That ends the time that we have.

MR. HABIG: One clarification. I think the question before was when do we intend to submit the application. Jim, you may have misheard it. But assuming that was the question, the answer would be sometime May or June of this year.

MS. COLEMAN-GRAHAM: Okay. As you can see, there are still questions in the boxes that haven't been asked. And like I said, all questions are going to be asked. So these remaining questions, along with the video of tonight's informational meeting, will be posted on the project website by March 28th. And your program has the actual address for the website if you need that.

Couple quick next steps here. A reminder, as Greg mentioned earlier, there will be some environmental maps that are going to be available soon at the local Heritage office, so please feel free to

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stop in, look at them and comment on them. Apex Heritage office in Albion is open Tuesdays and Thursdays from 9 a.m. to 5 p.m. And you're also welcome to stop in with any questions or feedback that you have there.

Another thing. If you didn't get this flier, see somebody to get it. As noted in this flier that was on the table, Neil James, the Vice President of operations for Apex, will be in the office on March 12th at 7 p.m. He's going to be discussing safety at operating sites, and all are welcome to attend.

Now, with that, I want to thank you all for your participation and for your questions and your cooperation and good penmanship. I was able to read these. So the meeting is adjourned now. So please drive safely, and good night.

(TIME: 9:43 p.m.)

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C E R T I F I C A T I O N

STATE OF NEW YORK:
COUNTY OF MONROE:

I, MICHELLE M. ROCHA, do hereby certify that I reported in machine shorthand the above-styled cause; and that the foregoing pages were produced by computer-aided transcription (CAT) under my personal supervision and constitute a true and accurate record of the testimony in this proceeding;

I further certify that I am not an attorney or counsel of any parties, nor a relative or employee of any attorney or counsel connected with the action, nor financially interested in the action;

WITNESS my hand in the City of Rochester, County of Monroe, State of New York.

MICHELLE M. ROCHA
Freelance Court Reporter and
Notary Public No. 01R05038965
in and for Monroe County, New York