SMALL WIND TURBINE CERTIFICATION AND TRAINING

March 1, 2012

Coordinator: Welcome and thank you for standing by. At this time all participants are in a listen only mode. During the question and answer session please press star 1 on your touchtone phone.

Today's conference is being recorded. If you have any objections you may disconnect at this time. Now I will turn the meeting over to Miss Karin Sinclair. Ma'am you may begin.

Karin Sinclair: All right thank you. I'd like to welcome everybody on this webinar to the Bi-monthly ASES Wind Division Webinar.

Today's topic is going to be an Introduction to Small Wind Certification. And our presenter will be Tony Jimenez, who's a Senior Mechanical Engineer at NREL. His activities include leading the Small Wind Turbine Regional Test Center project here at NREL. And he also works at wind project analysis work on behalf of the Federal Energy Management Program.

Past work includes the development of wind farm financial analysis and small wind project analysis tools, wind project economic impact analysis and co-authoring two hybrid system application guidelines - or guidebooks I should say.

He's an - also an Engineer Officer with the Army Reserve and spent a year deployed in Iraq working on reconstruction projects with the U.S. Army Corps of Engineers. So I'm going to turn this over to Tony. And thank you for joining us.

Tony Jimenez: All right thank you Karin. And I want to thank the ASES - I guess it's now the ASES Wind Division rather than the ASES Small Wind Division for sponsoring this webinar.

And this is - so I can give the overview, I'm going to start with a background on why we have small wind turbine certification, talk about who the roles involved, who the players are in certification. Then I'll talk about the four specific tests the field tests that are done, and finally a little bit on the Regional Test Center Project being done at NREL.

Background; basically certification was developed to resolve - help consumers make apples to apples comparison between wind turbines. There's a lot to know when selecting a wind turbine, a lot of research to be done, and it was very difficult for the run of the mill consumer to have and to get enough background knowledge to adequately assess the different turbines that are out there.

With the growth in the market over the last decade, the market has become more prominent and there's been a lot of new entrants into the market. And you know, some of the new turbines coming in are very good, and some are not so good. And it's very hard for a consumer just entering the market to know that, to tell the difference.

Another group that this is helping is the state incentive program managers who are, you know, there's pots of money available to incentivize the sale and the purchase of small wind turbines, and they've generally either had to allow just about any turbine to be eligible for these funds or to be restrictive.

And if they're restrictive, there hasn't been a really good objective measure to say that, "This turbine qualifies and this one doesn't." so it appears very

arbitrary and there's been a lot of complaints either way. So they'd like to - the state managers would really like to get out of the business of making that determination.

So the answer to those is certification. And prior to 2010 there was a lot of issues with small wind turbine certification in the United States. The testing part was time consuming and expensive.

There was a lack of U.S. based small wind turbine certification testing, been basically limited to testing here at the wind site under the independent testing program, basically subsidized by DOE, so the federal government was subsidizing these tests. In the long-term that's not a really good sustainable strategy from a program point of view.

There's a lack of U.S. based certification agent, so there was a lack of anybody who could take those test results, apply them - or compare them to a given standard and say, "Yes, this turbine meets the standard," or, "No it doesn't."

And finally, there's no real market pressure for certification testing. You know, people would bring a turbine to market, it would sell, and there was no real reason for them to go through this process, there was no legal mandate.

There still is not; the consumers didn't want it, it was hard to do and no one really wanted to have you do it anyway. The small turbine manufacturers typically are not well capitalized so they had lots better things to do with their time, their effort and their money.

Recently a lot of that has changed beginning in basically the middle of the last decade of the OTS, DOE, NREL and some states got together, and along with

the small wind turbine industry to create a small wind turbine certification infrastructure.

And basically the purpose of that was to increase the number of certified turbine models in the U.S. market with the ultimate objective really of maintaining and gaining consumer confidence in small wind turbine technology.

It doesn't take too many, you know, spectacular failures or things of that nature to really give the industry a black eye. And so the industry really wants to make sure that, you know, consumers have an easy way of selecting among, you know, reasonably good turbine models.

So in December of 2009, the American Wind Energy Association, AWEA, released the AWEA Small Wind Turbine Performance and Safety Standard -- and that's AWEA Standard 9.1 - 2009 -- basically based on existing IEC standards. But those basically gave something - the U.S. market something to work towards.

In 2010 the Small Wind Certification Council and InterTech, both North American Certification bodies for small wind turbines, began accepting applications for certification to the AWEA standard. So basically in 2010 all the pieces came together and also several organizations, about a dozen or so, began to offer small wind turbine field testing services to the small wind turbine market.

So everything came together in 2010 and now there's lot of turbines going through the process, and actually have a couple of certified turbines in existence now with many more in the pipeline.

So with that background, I'll talk about the roles in certification and what it's about. The goal is to accurately characterize the turbine and choose those words very carefully. It's really not to say that a given turbine is good or bad, but to characterize it.

So the good analogy is the EPA mileage sticker on a car. It doesn't say, "This car gets good mileage or gets poor mileage," it just you know, gives you the miles per gallon and it's up to the consumer to decide whether that meets their needs or not. So it's basically a third-party characterization of the turbine.

It provides consumers with objective information about small wind turbine performance. It'll actually have a power rating and an energy - an annual energy production rating under the same conditions so the consumers can compare those between different turbines.

For the state incentive programs, the same data gives an objective measure of determining turbine eligibility. They can say, "We will only - only turbines that are certified are eligible." And a lot of states are moving in that direction.

I would expect in another two to three years, most state incentive programs will mandate that turbines be certified to receive state money. And it does set a sort of a minimum safety level, you know that's again, it's not going to say the turbine is safe or unsafe, but it'll meet at least some basic safety criteria.

What are the eligible turbines? Well basically it has to have a rotor swept area of up to 200 square meters, and both, horizontal or vertical axis it doesn't matter. If you're looking at turbine power rating, that's about 50 to 60 kilowatts as far as rated power.

And it generates electricity for use while grid interconnected or for battery charging. So if it doesn't generate electricity, it's not covered by the standard. So for example the mechanical water pumper would not be covered by this standard.

These are the players -- this slide gives an overview of the players -- and the products that move between them. You have your standards development body, that's IRC or AWEA, you know, for the U.S. market, develop a set of standards. Those go out to the world.

You have your certification body; this is the one that takes the test results and the design data and gives thumbs up or thumbs down on a particular turbine model.

You have your testing entity that actually does the field testing. And usually they're in good communication with each other during the testing process. That's best that they both be brought on board at the same time.

And you have the turbine manufacturer that has the turbine to be tested.

So if you look here; they'll give a turbine to be tested to testing entity; the testing entity will feed the test results back to the manufacturer; the manufacturer will feed the test results and the design data to the certification body; and assuming the certification body grants certification, it will then issue a certificate to the manufacturer. So that's kind of how things flow.

The standards development body, the ones that the people care about in the U.S., the IEC and AWEA, basically determine how the terms will be evaluated. So they will bring in all the possible stakeholders to help develop the standard. So it's kind of a circular thing.

The standards are widely accepted because they're widely accepted. But they try to get as many stakeholders involved as possible so that, you know, there's kind of wide agreement that these are a reasonable set of standards. And these standards will tell how the, you know, how the testing is done, how the design review is done, what the criteria is, and that - all that sort of stuff.

The standards that are mainly in use in the U.S. are the IEC standards. And there's basically three specific standards that apply to small wind turbine testing, and they're all the 6.1 400 series, so there's 6 400-2 Design of Small Wind Turbines, 61 400-12-1 Power Performance, and 61 400-11 Acoustic Noise. And that really forms the basis for the AWEA standard.

If you look at the AWEA standard, it mostly references these IEC standards. And turbines can be certified to either standard or both, depending on the market strategy of the manufacturer.

You look at the other entities you have the turbine manufacturer that will provide a turbine of the model to be certified. You have your testing entity, so this is the field test site. They will do the testing mandated by the test standard.

And depending on the standard, the testing entity can be an accredited lab, an un-accredited lab, or the turbine manufacturer. AWEA actually will be - the AWEA standard actually allows the turbine manufacturers to do their own certification testing. As far as I know, not many have done that, usually they have a third-party do the field testing.

And finally you have your certification body or also called the certification agent that will conduct the design review. It will evaluate the testing results, and also evaluate the testing entity.

If the test entity is an accredited lab, it's already being heavily scrutinized they're not going to look at them too heavily. If it's an un-accredited lab, they will need to be looked at a little more closely.

And if the turbine manufacturer's doing the testing, that certification body is going to be all over them, you know, making sure they're doing an honest test. So it really depends on kind of the level of the testing entity that determines how much scrutiny they get from the certification body.

And then finally, the certification body will grant or withhold certification depending on the results of the field testing and the design review.

All right, well now I'm going to talk about the certification tests themselves. There's four tests that are done and they're called; the duration test, the power performance test, the safety and function test, and the acoustic test. And for the most part they're done concurrently.

So the relevant document for the duration test is IEC 61 400-2, the second edition, and the AWEA standard. And the purpose of this test is basically to see if the turbine holds together. So it's kind of a reliability test. You know, basically, will it hold together, you know, is it still in good shape at the end of the test rather than at the beginning.

So what's involved in this test is basically the test site will do an inspection. It'll look for any corrosion, cracks, deformations and whatnot before the testing begins. We'll then put up the tests, put up the turbine. It'll run for

typically 6 to 12 months, then there'll be a posttest inspection to see if there's any new corrosion, cracks or whatnot.

So again, the basic purpose of this test is to see whether the turbine holds together. So kind of an implicit standard the turbine has to meet and it has to survive this testing process. And we've had some at the wind site that have not survived the testing process.

So we're looking for reliable operation during the testing period. We need to have at least six months of operation, and/or - and you need at least 2500 hours of power production under winds of any velocity. So if it takes more than six months to get those 2500 hours, you've got to run longer.

You need at least 25 - 250 hours of power production in winds of moderate wind speed, that's 1.2 times the average and above, and you need 25 hours of power production in winds of 1.8 times the average and above. And that's all the IEC standard.

And finally the AWEA standard -- and I screwed up this slide a little bit -- mandates all of the above, plus it wants - it mandates you need at least 25 hours of power at above - at 15 meters per second or higher.

What is the average? What do we mean by that? Basically the manufacturer can decide what turbine class that its turbine model is, I through IV, it can also be special.

And basically Class I turbine is meant for a very high wind speed. So it's going to have a smaller rotor diameter, the Bc easier withstand high winds. And as you go down the categories, the turbines get less Bc, the rotors get

bigger because they need to have bigger rotors to still have decent energy production.

And so your V average for a Class I machine is 10 meters per second. So to get those 25 operating hours you're going to need 25 hours of - at 18 meters and above, 18 meters per second and above of wind. Whereas Class IV, the V average is only 6 meters per second and so you need less wind - you need a less of a wind speed to fill those higher bins. So that's that.

Reliable operation; again, basically the only kind of Pass or Fail criteria is to be an operational time fraction of at least 90%, and I'll explain that next slide, no major failure of the turbine or components of the turbine system. So if you have a major failure, and that's a little bit of a squishy definition, you basically need to start over.

No significant wear, corrosion or damage to the turbine components. This is why it's important to do that pretest inspection so that if there's any, you know, dents or corrosion or something that looks like damage that occurs before the test starts, you know, as long as there's no additional wear, corrosion or damage at the end, you're still good to go, and no significant degradation of produced power.

What that means is you actually take a power curve, you take the data say the first two months, back out a power curve, and then you want to look at - you want to back out a power curve using the data for say for the last month or two and product a power curve and they should be roughly the same. So you - shouldn't be any significant degradation in energy production as time goes by.

So the duration test is the one that takes the longest, and the other tests can be done concurrent. And again, minimum of six months, and depending on the

wind speed and the wind resource of the test site, you know, it could go a year or more. But basically ideally, you want to choose a test site that you can knock this out within a year.

Operational time fraction, this is the definition. All time is categorized in one of actually four classes;

TT is the total time period under consideration;

TU is the time during which the turbine status is unknown. So an example of this would be your gas conks out and you just don't know what's going on at all;

TE is time that is excluded from the analysis, and this is basically something that's not the turbine's fault. An example would be if you have a test site with multiple turbines and you need to turn a turbine off so you can do a sound test on another turbine, that would be an example of TE;

And finally, TN is the time during which a turbine is non-operational, either because it's broken or because it needs to be shut down to do manufacturer mandated, you know, regular scheduled O&M. And that - crunch the numbers, and it needs to be 90% or higher.

And there's some - there are usually some discussions on categorizing time. So it can be a bit of a tense discussion between the test site and the manufacturer, especially if it's very close to that 90% mark.

The next test I'm going to talk about is power performance. The relevant document is IEC 61 400-12-1 Annex H, and again, the AWEA Small Wind Turbine Performance and Safety Standard.

This test is the most prescriptive test. The objective for the standard is basically to provide a basis for comparing different wind turbines, to minimize the uncertainty in the tests, and improve repeatability between sites. So you should get the same results, pretty close, whether you're testing in Scotland or Kansas or New York or California. The idea is to - is this should be repeatable between test sites.

The objective of the test; well one, it's required for certification, but it's really to provide an independent check on the manufacturer's claimed turbine performance. So the, you know, the turbine manufacturer will claim all sorts of things. This provides third-party verification that, "Yes you know, the energy production is what the manufacturer says it would be," or maybe not.

But the - it will provide the basis for a sticker. It will be on turbines sold at least in the U.S. The turbines can - and consumers can compare the stickers to see what the - what their expected energy production would be.

And so the results of the power performance test are the output of the turbine versus wind speed, so basically a third-party derived power curve, overall efficiency, and an estimate of the annual energy production of the turbine under standard conditions. And that's basically going to be assuming an average wind speed of 5 meters per second, assuming a Rayleigh distribution. And so consumers can make a good apples to apples comparison of their expected energy production.

This is the test sort of setup that's mandated by the power performance standard. It's - the duration uses the same thing. The power performance is the most prescriptive, so with - this is what it's used, and the data's used for a lot of different things.

But you, basically you have your wind turbine, and then you have your met tower. And the met tower has to be two to four rotor diameters away from the turbine. It has to be roughly the same height of the turbine, within plus or minus 2.5%.

There has to be an anemometer at that height and then you have a couple of secondary anemometers. You have also a direction vein, pressure sensor and a temperature sensor as well. So there's a lot of different - a lot of equipment that needs to be posted on that met tower.

Also the met tower should be typically downwind or to the side of the turbine, compared to the prevailing wind direction, because if it's directly behind, that data cannot be used for power performance purposes. So you want to, you know, take a look at where your prevailing winds are as a test site, to properly position your turbine and your met tower.

Next test I'm going to talk about is safety and function. Talked about in IEC 61 400-2 you'd also need - there are some other IEC or some other sections that talk about wind turbine safety. And you know, again the AWEA small wind turbine performance and safety standard.

The objective is not really to say this - that a turbine is safe or unsafe, but rather that whatever safety features the manufacturer says the turbine has actually are there.

And these are, you know, personnel safety, but also you know, kind of turbine protection as well. You know, "Does it furl when it's supposed to furl, you know, if the voltage goes to high on something, does the turbine shut down like it's supposed to?" Those sorts of things.

An example, and this test gives a little more reign for the creativity of the test sites. An example would be if there's some sort of voltage set point and the turbine's supposed to shut down if the voltage goes above the set point. Those are all pretty easy to go into the controller, you know, move that set point down, see if the turbine turn, you know, shuts down like it's supposed to and call it good.

You know, some other features, you know, may take a little more creativity to test and some may not be able to be tested at all. There's a tension here between testing the safety features. But not disabling them so much that the turbine actually - there's danger the turbine could fail or be damaged. So there's usually a lot of discussion back and forth between the test site and the manufacturer on exactly what they will do for the safety function test.

The last one is the acoustic. Relevant document is IEC 61 400-11, and again the AWEA standard. This is probably the - from the point of view of most small wind folks, the geekiest of the tests. It's purpose is determine the turbine's noise emission characteristics. This test is mandatory under the AWEA standard.

And the thinking there is that, you know, the noise is a big consideration in the market. The consumers are concerned about how noisy or quiet a turbine is. And so they determined that if, you know, for the U.S. market this was something that needed to be checked out. If you're not testing the AWEA standard, this may or may not be required depending on the certification body being used. So that's kind of the background on that.

And this is the one I can describe least well. It's just - I just don't know a whole lot about it. This is the definition of the test - or of the result. It's

basically you'll get a sound level in decibels that will only be exceed 5% of the time, if you read about this. And you'll assume an average wind speed of 5 meters per second in a Rayleigh distribution. And this is at a location 60 meters from the rotor center.

And this is the test setup. Basically the meter or the transducer, the sound transducer is set up downwind of the turbine. Interestingly enough it's setup at hub-height plus half the rotor diameter.

You take some sound measurements when the turbine is off, so you get a sort of a background noise, and then you the turbine - you flip the turbine on and you get some data at a variety of wind speeds. And you get it over - data a variety of wind speeds, and then you crunch it per the standard.

And you get kind of an overall sound pressure level, what's called a 1/3 octave spectra, and I have no idea really what that means except that I think it has something to do with basically the sound level at various frequencies. But that's basically the noise test. And you can see the standard for more details.

Going to talk a little bit, if we have the time, about our RTC project to basically, you know, help this process along. And so the purpose of this was basically to help the testing sites get up and running, and to share the expertise that the independent test team is at here at the wind site has developed over the years, and share that with the wider small wind turbine testing community.

So basically did an RFP, selected four partners, dubbed them Regional Test Centers. And basically what we're doing is we're subsidizing the initial round of tests at each one of these sites and providing technical assistance while they do these tests. And these RTCs were selected via competitive solicitation.

The scope is basically we're - we - we're parting - we've partnered with four - or we are partnering with four RTCs and we're supporting the testing of a total of eight turbines at each site.

And these are the site, we're partnering with InterTech. They have a test site in New York, Kansas State University - actually a consortium of Kansas State University and Colby Community College in Colby, Kansas, the Alternative Energy Institute at West Texas A&M at Canyon, Texas outside of Amarillo, and Windward Engineering in Spanish Fork, Utah. So we have a good distribution across the country.

And the interesting thing about these is the tests that NREL is subsidizing will actually be made public in much more detail than is typical so that people can see the results of this testing and know what goes into a test report.

Kind of an overview, DOE and NREL are kind of doing overall project management. We're providing funds and technical assistance. The RTCs basically setup the test sites and conduct the testing. The small wind turbine manufacturer provides a turbine to be tested.

And then the certifying body, which is not - will provide or deny certification based on those results. And our contract is - or NREL's subcontract is strictly with the RTCs, but small wind turbine manufacturer and the certification body are extremely interested parties in this process.

Now for just a recap of what I've talked about in the last 1/2 hour or so, I'll give a background of small wind turbine certification and why the industry made the effort to develop the certification infrastructure. I gave an overview of the various roles of the manufacturer, the standards body, the certification agent and the testing entity.

I talked about the four tests involved; the duration test, the power performance, safety and function, and acoustic, and then talked a little bit about the NREL, the DOE NREL regional test center project. And that concludes my presentation.

I guess I will say that, "This webinar will be posted within a week or so. And we're going to have a couple, at least two or three follow-on webinars that will be available for download prior to the International Small Wind Association of Testers conference in New York scheduled for late April." And more - we'll get more information out on the webinars and the conference will be coming out shortly. It'll be held in Ithaca, New York.

So if you have a really deep interest in small wind turbine testing, that'd be a good event to test - or to attend. And the webinars are basically to help anybody who's kind of new to the field to get up to speed before they arrive at the conference.

So with that, are there any questions?

Coordinator: To ask a question over the telephone please press star 1. And that is star 1 to ask your question. Currently there are no questions from the phone.

Once again to ask a question please press star 1. One moment for the first question. You have a question in the queue. Your line is open if you had your question.

(Heather): Can you hear me?

Tony Jimenez: Yes.

(Heather): Hi Tony, this is (Heather). So...

Tony Jimenez: (Heather).

(Heather): ...I was hoping you could talk a little bit more about why the process is taking more time than originally anticipated in terms of getting kind of a critical number of turbine models certified?

You know, I think there's maybe four that have been certified in the U.S. and 10 or 12 over in the U.K. And you know, just some of the delays that are encountered with testing, and you know, why the - often the testing has to be restarted, that kind of thing.

Tony Jimenez: Okay. I can speak specifically mostly to my experience in managing the RTC subcontracts. There is a lot of pressure on manufacturers to go to certification testing prematurely. That's kind of my personal opinion.

The certification test is really the model that's going to be sold and so if there's any significant or even insignificant changes to the turbine model, than it has to be reviewed by the certification agent. And that's kind of a gray area that probably will be resolved as the specific cases come up.

What I've seen is that turbines are - start certification testing, they break or something happens, they get redesigned and they've got to basically start over. And that's happened on a couple of turbines on - within the RTC project.

And I can only - you know, I can imagine that the same thing is happening, in you know, the non-RTC turbines as well, is that the test site is being used as a beta tester when really the - ideally the turbine would be well designed and

ready to go when certification starts, but that just doesn't happen that way very often.

The testing itself can take a long time. It runs a minimum of six months. And that's just the testing pieces, so the turbine has to be installed, it has to be - well it has to be inspected, it has be installed, it has to be commissioned. Then the data acquisition system has to be commissioned - has to be installed and commissioned. And so there's just a lot of delay in getting that part started.

And then there's the contract between the turbine manufacturer, the certification agent and the test site, and so all that takes time to get those agreements in place and all that started. So just - it just takes a long time, you know, even longer than I expected.

Does that address your question (Heather)?

(Heather): Yes. I think you know, your comment about premature - or the pressure to start it and I guess I'm wondering what you think about, it's kind of a chicken and egg, if there isn't kind of market pressure for starting the certification, maybe some of those problems are never found.

So you know, I understand the point that you don't want to start the actual, you know, test cycle until you're ready. But you know, how do they find out the problems before they start testing?

Tony Jimenez: They need to do their own testing beforehand. And some of these - at least a couple of the RTCs we contracted with have been heavily involved in prototype testing for a number of years. So you can - there's people - there's entities that manufacturers can go to to help in the - help with their turbine development.

(Heather): Okay. So that's your recommendation is, "Before you do your actual certification testing, you should be doing other kinds of pretesting?"

Tony Jimenez: Yes.

(Heather): Okay.

Tony Jimenez: Yes.

(Heather): Okay.

Tony Jimenez: Okay?

(Heather): Yes and then I understand that all different kinds of delays have happened with, you know, sensors being hit by lightning, and you know, for one thing or another, something drags out with the data analysis.

So you know, yes it definitely it seems like it's not happening as quickly as we would like, but we do say that, you know, this calendar year we're going to see quite a few more come through?

Tony Jimenez: I would agree. I would agree.

(Heather): So from - so your testing through this whole process?

Tony Jimenez: Yes. Yes, I think so.

(Heather): Great.

Karen Sinclair: Well I think too - and this is Karen Sinclair. One thing we actually saw recently was we had a turbine that went through the whole certification testing, or IEC testing here at the wind site, and then the manufacturer decided they wanted to revise a major component of the turbine. And then they - but they sent that turbine for certification, the data from the testing that had been done for certification.

However, what they wanted to certify was really a radically different turbine. And it was hard to - hard for them to understand that, "No, they had to start the whole process over again," because the turbine that they wanted to get certified was not the turbine that had been tested.

And so I think that's a real disconnect in some people's minds about what the purpose of certification is versus development of a product.

(Heather): Okay. interesting.

Tony Jimenez: I would agree. Well said Karen.

(Heather): Also Tony, you touched on this, but the differences between MCS certification and getting certified to the AWEA standard, would you say that's pretty important for a turbine from the U.S. to complete the AWEA process even if they've already done the MCS process?

Tony Jimenez: Yes and the certification bodies have gotten - have talked about that. So the MCS is the British test standard, it is also based on IEC. And usually you can either - a lot of times the certification agent can take the data from MCS and still certify the turbine, or there might just have to be a little bit of design review, or some sort of abbreviated test.

So they're - they are trying to make sure that a manufacturer doesn't have to go through the whole process again. I mean, they just have to do the parts that weren't - that aren't covered by the standard that they're coming from.

(Heather): Is the labeling and the public rating piece of it different or? I've had trouble trying to track down some of the ratings on the MCS turbines, so I'm just wondering if those are publicly available like the AWEA ratings are?

Tony Jimenez: I do not know. I honestly don't know.

(Heather): Yes well...

Tony Jimenez: I would assume there would be some sort of minimum public information available under whatever scheme, you know, is being used.

(Heather): Right, right. Great. Hopefully we'll see more of those MCS turbines going through the AWEA standard process too.

Tony Jimenez: Yes.

Karen Sinclair: I would say - this is Karen again. I would say that the SWCC is evaluating turbines that have gone through the MCS certification and issuing conditional temporary certification until the process has been completed. But the whole idea of reciprocity of - is something that's been discussed for quite some time.

Because for example the Bergey 10 kW turbine was not tested, I don't believe it was fully tested in the U.S. under the AWEA standards. But got its SWCC certification through reciprocity with the MCS certification. I might be wrong on that but I think that might be how it works.

So there's a couple of turbines in the queue right now that are - have been issued conditional temporary certification as the SWCC does a full evaluation of the testing that was done to allow them to get certified under the MCS. Does that make sense?

Tony Jimenez: Yes.

Karen Sinclair: So it's a temporary based on other - another entity's certification. And the expectation is that the certification will eventually be issued under the SWCC. And the labeling is supposed to be a standard issuance. There's an IEA body that was developing the labeling for all turbines.

Tony Jimenez: Yes, that is correct.

Karen Sinclair: So if you go to the SWCC Web site you'll see that there's quite a few turbines that are in the queue for certification and they're in various stages.

They might only be in the initial stages of testing at either an RTC, at NREL or one of the other entities that are doing testing, or they could have already been tested somewhere and SWCC is working through the process of evaluating, either that site or the data and reports submitted on behalf of that manufacturer.

So I agree that we will probably see quite a few in FY - in 2012, be certified.

Coordinator: Once again, to ask a question please press star 1. Once again that is star 1 to ask a question, one moment for the next question. Our next question comes from (Jamie). Your line is open.

(Jamie): Hi, I just - I asked this question online as well, but, "Are there other testing agencies other than the SWCC that would certify turbines?"

Tony Jimenez: The ones in the U.S. that I know of are SWCC - the certification bodies are SWCC, which was specifically setup under the AWEA standard, and then the AWEA standard allowed for any nationally recognized testing lab to also become a certification body.

And so InterTech, which is a nationally recognized testing lab, decided to take that opportunity and they set themselves up as a certification body as well for the AWEA standard.

(Jamie): So are there any InterTech certified small wind turbines out at this point, are there...

Tony Jimenez: Not that I know of.

(Jamie): Okay, thank you.

Coordinator: Our next question is from (Heather). Your line is open.

(Heather): Was that me again?

Coordinator: Ma'am your line is open.

(Heather): Okay, thank you. So Tony and Karen, I guess the turbine I was trying to ask about as an example, when you were talking about the labeling and the standardized.

So the Gaia turbine for example is certified in the U.K. by MCS, but I haven't been able to find, you know, apples to apples comparisons of their rated capacity, annual rate - annual energy, just to compare it to the Skystream and the Bergey, from a consumer's point of view. And do you have any suggestions on that - where to find that kind of information?

Tony Jimenez: No I don't.

Karen Sinclair: So what my thinking is the application for Gaia is pending under SWCC. But once the Gaia is certified under the SWCC then it'll have the consistent labeling, I believe.

Tony Jimenez: Yes that makes sense to me.

(Heather): Well yes, I mean some of those turbine models have been on that pending list for, you know, almost two years now so.

Karen Sinclair: Right, and that's why I was saying that there's a range of - and so SWCC has actually revised their Web site so that you can see the status of them. Some are - before it used to just say, "Application pending," or something like that.

Now you know whether they are just under test, whether they're under contract, you know, to be tested, or whether you know, basically what the status is of the - within the process.

So I agree that in the beginning it was a little confusing because you didn't know whether they had simply signed a contract to be tested at, for example, an RTC and that has happened. And they weren't even installed yet.

They simply signed a contract to be working with the SWCC because when you're beginning your testing process, you really want to work with the SWCC to make sure that you're doing everything you need to do so that you don't get 18 months down the road and find out you didn't do something properly. That wouldn't be in your best interest.

So I agree. And I think perhaps maybe if you're really interested in a particular turbine manufacturer, maybe you can contact them directly.

(Heather): Yes I tried doing that and I didn't get a response. But okay, thank you.

Karen Sinclair: Well maybe - send me an email and we'll try to contact them directly for you.

(Heather): Okay, great. Thank you.

Coordinator: You have one more question in the queue, the name was not recorded. If you still have a question your line is open. Please check your mute button. Still have a question, your line is open. Please check your mute button.

(Trudy): Hello?

Tony Jimenez: Hello.

(Trudy): Hey Tony this is (Trudy).

Tony Jimenez: Hey (Trudy).

(Trudy): Sorry it's taken me a little while to get in on this call. So a couple of points; do you want to talk a little bit about the First International SWAT meeting? I know you mentioned it, but do you want to elaborate a little bit?

Tony Jimenez: I guess all I can say, "Is this is kind of a follow-on meeting to a series of meetings that have been held since 2008 now."

(Trudy): Yes.

Tony Jimenez: And the initial ones at the NWTC, last year it was held at West Texas A&M hosted it, this year it's being hosted by InterTech. So we're trying to reduce the NREL presence at it and really, you know, make it the test - make it a tester's conference more than an NREL event.

((Crosstalk))

(Trudy): Yes, I would just add that this was an idea formed by the international energy agency Task 27. You can see their information on ieawind.org. And the idea was to have a uniform labeling practice across the world for small turbines.

And this group also developed something called a recommended practice. And recommended practices are not requirements per se, but they give guidance on what labels should look like.

So I know that in Australia and in Sweden they're beginning to use this international label and there will be eventually a group that holds that label and holds the back information for it. So in the long run, there will be a process that would answer (Heather)'s question for example, about the Gaia even though there may not be an answer today.

And the other thing is that this first international Small Wind Association of Testers called SWAT meeting, really is going to have a stronger international presence than ever before. And this meeting is in Ithaca, New York. It is being

hosted by InterTech in that area. And if you look at their Web site you should be able to find a link to it. And Karen and Tony, maybe we can help get that link out to people.

Karen Sinclair: Sure, we can put that in our upcoming newsletter.

(Trudy): Yes. And I think I have some other comments for Tony, I'll take those offline with you, and sorry for the delay in my technology challenging world now.

Tony Jimenez: Thanks (Trudy).

Coordinator: Once again to ask a question please press star 1. Our next question comes from (Chris Durf). Your line is open.

(Chris Durf): Hi, can you hear me?

Tony Jimenez: Yes.

(Chris Durf): Hi, I have a question. You mentioned that you didn't think - and maybe I misunderstood you, but that you didn't think InterTech had certified any turbines. But I understood that the Jacobs 20 kW model had been certified or was in the process of being certified by InterTech. Do you know about that?

Tony Jimenez: It's in the process of being certified by InterTech.

(Chris Durf): In the process, okay.

Tony Jimenez: That's actually one of the ones they're testing under our subcontract. So it's - so yes, there are some - they have some in the pipeline but I don't think any - as far as I know they haven't actually certified anything yet.

(Chris Durf): Okay and do you know what the...

Tony Jimenez: They (unintelligible) the process.

(Chris Durf): Do you know what the time expectation is for that?

Tony Jimenez: Let's see, maybe sometime this year.

(Chris Durf): Okay. Should I contact them directly? I - the reason I'm concerned is that's one of the ones that has been installed most frequently here in Oregon, so we would be concerned if that were not certified pretty soon.

Tony Jimenez: Yes, feel free to contact them.

(Chris Durf): Okay. Okay, will do. Thank you.

Tony Jimenez: You bet. Yes I'm kind of limited in what I'm allowed to say, but you know, they can say whatever they want, you know, about what they're doing. But you know, they can you know, they can - whatever they feel comfortable putting out there they can put out there.

(Chris Durf): Okay, thank you.

Coordinator: Once again to ask a question at this time please press star 1. One moment please. Once again that is star 1 to ask your questions.

Karen Sinclair: So while we're waiting for the next question, it's just come to my attention that in fact InterTech has issued certifications for - it's an Irish manufacturer called C&F Green Energy, a...

Tony Jimenez: Okay.

Karen Sinclair: ...15 kW and a 20 kW turbine. But they - these turbines were certified to the British standard and listed with the MCS. So in fact they weren't tested and - it sounds like they weren't tested and received certification through testing at InterTech, but rather InterTech took the results just like SWCC is doing for some other turbines that are coming in through the MCS program.

And I'm going to defer to (Trudy) and see if she knows anything more about this. Maybe not.

Anyway, there's a little bit of confusion, but I think in the very near-term we're going to see a lot of turbines being certified through a number of different entities. And once I think this - SWCC gets more comfortable with working with the MCS certification, that a number of turbines will move quicker onto our - into our certified world, so to speak.

Well, let me just say that we had scheduled this webinar to only go an hour and that we were going to follow-up this webinar with a wind - ASES Wind Division business meeting. And I would like to recommend that anybody that's on this call who may not have gotten that email, because I think there's some new people on the call today, please send me an email and I will send you the call in information.

And if there aren't any more questions, I think we need to wrap this up. So I'll defer to the operator for one more request of questions.

Coordinator: Once again to ask a question please press star 1. One moment please. (Trudy), your line is open.

(Trudy): Thank you. So you're absolutely right in that InterTech does have some first certifications. And you can find that on their Web site. And it is an Irish company. I don't know how much testing InterTech did or if they contracted that out.

One thing that's a little different, the British have the British Wind Energy Association Standard, which is very like the American Wind Energy Association Standard except for how it - the acoustics are reported. So you collect the same data, but you report the acoustics differently. So those entities that get for example British U.K. credential through MCS have a different way of reporting output for acoustics.

The other difference is in the U.K. they're on a 50 hertz grid. And that 50 hertz grid will have a slightly different power performance than what we would have here on our 60 hertz grid so often power performance gets meant over or redone. And that test is relatively short and then it's only 180 hours - or excuse me, 60 hours, 180 is something else.

So the InterTech guys may have had some test data from this Irish company and they have done some power performance testing and done some acoustic analysis to line up the results and get it to confirm to the AWEA standard if it was originally done under the BAWEA standard. And I hope that wasn't too confusing.

Karen Sinclair: Okay so this is Karen again. I think we should wrap this up. Let me just say, "I want to thank everybody who joined the call. We had a really good discussion. I want to thank Tony for giving us a great presentation, getting the dialogue started."

We do do bimonthly webinars and our next scheduled one is May 3. And we're going to have a presentation by the Interstate Turbine Advisory Council on what their program is. So stay tuned for that, I'll try to get information out with a little more lead time. And I think maybe the operator has something to tell us about the recording of this, I'm not sure.

Coordinator: No Ma'am, I don't have anything to say.

Karen Sinclair: Okay great, then let me just wrap this up and say, "Thanks again and we look forward to your participation on the next calls."

Coordinator: Thank you for your participation, you may disconnect at this time.

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