

## **OFFSHORE WIND DEVELOPMENT AND INDUSTRY UPDATE WEBINAR**

**October 19, 2011**

Coordinator: Welcome and thank you for standing by. At this time all participants are in a listen-only mode until the question-and-answer session. If you would like to ask a question at that time, please press star 1 on your touch tone phone and please clearly record your name when prompted.

Today's conference is being recorded. If you have any objections, you may disconnect at this time.

Now I'd like to go ahead and turn the call over to your host for today, Mr. Charles Newcomb, NREL Wind Powering America. Sir, your line is open.

Charles Newcomb: Thanks (Jose). Good day everyone. It's nice to see today's attendance and we're excited about today's conversation. We're going to be talking offshore wind energy, and where we are today, and who are the players.

We've got two speakers today. So we've got Chris Hart who's at the Department of Energy and Darryl François with the Office of Energy and Bureau of Offshore Energy Management.

A couple of details before we go. I know we're kind of rushing through this phase. Usually we're a little more calm, but we had some technical issues that put us a little behind schedule so we're moving quickly. Sorry about that.

But first of all I want to again welcome Jonathan Bartlett. Jonathan Bartlett is our new - Michele DesAutels leading our charge for Wind Powering America. We're also fortunate to have not truly lost Michele because as many of you know Michele knew leading our charge for Wind Powering America.

We're also fortunate to not have truly lost Michele because as many of you know Michele moved on to (bowmer) or to (Boehm) directly and so she brings with her into (Boehm) all of her expertise and experience with market transformation, (berry) reduction. So we're very, very happy to not be losing Michele.

Just a quick high level on offshore energy to kind of create the stage and talk a little bit about what we're going to be today. Offshore has been around for a while now coming up on over a decade over in Europe.

We have yet to build anything in this country and the Department of Energy and the Department of Interior both have identified the offshore wind market as a potentially substantial contributor to the wind energy portfolio. And in that regard have invested a tremendous amount of time, energy, and money this year to moving this conversation forward.

They've identified a few key market challenges like the cost of offshore energy, the technical challenges in terms of O&M infrastructure installation cables, and etcetera, and also the lack of direct experience in the United States. To that regard have teed up a lot of funds to move this forward quickly.

So without further ado I wanted to introduce Chris Hart who leads the offshore charge at the Department of Energy headquarters. And Chris comes to us through the naval architecture ocean and marine engineering field. First getting this undergraduate at US Naval Academy and then impressively in a mere 44 months also getting a Master's in engineering, an MBA, and a Ph.D. Do not know how the man sleeps.

And if that weren't enough, he's also has a bronze star for valor for his tours overseas which we're very thankful for.

So Chris without further ado, we'd like to turn it over to you. Are you ready?

Christopher Hart: I am, thanks Charles. I just want to make sure that I've got control of the slides. That's the only thing.

Charles Newcomb: Okay. Try clicking on up/down button and confirm for yourself over in the bottom left.

Christopher Hart: Yes. Yes, I don't have - let's see here. Something's happening. Still don't have control of the slides. I can...

Charles Newcomb: Oh. It'll show up. You actually seem to be logged in three times so we're trying to figure out which one you are. Which one is your evil twin. Keep trying.

Woman: Chris, I can advance your slides for you if you just want to let me know when to go next.

Christopher Hart: Okay that sounds good. Appreciate the kind introduction. Obviously there's a lot more going on behind the scenes here at DOE. We've got a strong team of intelligent, committed, passionate folks we put together here both contractors and federal employees and it's our pleasure to have the fortune of working on this particular effort.

So what I'm going to talk today about is summarize our most recent effort here at DOE as was mentioned in the introduction. The offshore wind energy activities at DOE have been ongoing for some time most notably NREL had

been working and carrying the torch for offshore wind over the past, you know, five years even up to ten years and it wasn't until last year that that effort really coalesced into a DOE level initiative. So I'm going to talk a little about that.

I'm going to talk a little bit about the awards that we made 47 awards. Six of them were announced on June 28 and then 41 more on September 8. I'm going to talk a little bit about that and then share about some of our thoughts for future activities and ways that we can drive towards that scenario that we've put forth in the national offshore wind strategy of 53,000 megawatts of deployed in 2030, but just a quick introduction. We can go the next slide, please.

We are working very closely with DOI as was mentioned in the intro with Bureau of Ocean Energy Management and also the broader Department of Interior and we're very excited about those activities.

As you may or may not know, they were co-authors on the offshore wind strategy that was released in February and we continue to work very closely with interior.

We consider that our work - the 47 projects that I mentioned is absolutely integral to securing the renewable energy future in the US and all the benefits that we're all aware of with offshore wind are absolutely key there so. Next slide, please.

As I mentioned quickly, this program was started on June of last year. We built upon a lot of work that had been ongoing at the labs NREL and (Bea) Pacific Northwest National Labs. Some work at some of the other labs as well

on a lesser scale, but when we put together this initiative and actually got it off the ground we were able to build on a lot of that foundational work.

Some of the things that we did, we knew that there needed to be a unified federal message on offshore wind and a national strategy so we worked to build upon that previous work that was published in large scale offshore wind documents in September.

We also held seminars around the country. One in Boston, one in Cleveland, and one in Washington, DC where we tried to get input from many different stakeholders. I imagine that several of the people on this call were also participants in those seminars that we held.

The national offshore wind strategy is a culmination of really just a lot of work, a lot of coordination between the 16 different federal agencies that have “equities” in offshore wind and we were proud to release that. Secretaries (Chu) and Fellows made the announcement on February 7.

We also work fairly extensively in ensuring that the international level lessons are learned here in the US and that there’s a forum for collaboration there. We’re working with Germany, France, the EU in general.

Most notably here we held an event in March called the Rising Tide, you know, under the idea that a rising tide lifts all boats. We invited three UK experts here to the US and we exchanged information and introduced them to the growing industry here in the US. There is some excellent conclusions from that meeting and we’re taking several of them into action.

We’re also working with our neighbors to the North in finalizing and improving a fast forward for a ultra (Wnlzing) and improving a fast forward

for Ultra Wind in the Great some excellent conclusions from that meeting and we'll be boating in the Great Lakes. We obviously - I'm going to talk a little bit more in depth about the (FOAs) and how excited we are about the (FOAs). But that process as most of you know is fairly long.

Those three (FOAs) funding opportunity announcements - three of them were announced along with the national offshore wind strategy and in September we made the final set of awards as I mentioned and actually held a very exciting kickoff meeting 2-1/2 hours prior to the (AWIA) offshore event up in Baltimore last week and then had another panel. So things are moving along very well and we're excited to get some of the results and also to continue sharing those results with the broader public. Next slide, please.

One of the things that the national off wind strategy did many things, but one of them was to establish again from a broad perspective taking into consideration all of the different federal agencies it was agreed that DOE was the right organization to lead the offshore wind effort again creating an industry here. A sustainable, responsible offshore wind industry and really our role as national leader comes in three forms. Just one of those forms is the supporting innovative partnerships through funding mechanisms that I mentioned.

But there's two other ways in which we can exercise our role as our national leader and that's really informing decision makers and stakeholders and, you know, inform similar to this and also last week in Baltimore but also in making sure that the national and international experts are able to exchange information and avoid any potential rework. Next slide, please.

This is direct right out of the national offshore wind strategy. Two scenarios here - 54,000 megawatts at a cost of energy of 7 cents kilowatt hour in 2030

and 10,000 megawatts; an interim target there of 10,000 megawatts (unintelligible) kilowatt hour by 2020.

We see two critical objectives to meeting those scenarios. Obviously reducing the cost of energy. It's too high now and we envision a future when offshore wind energy exists without subsidies. In order to get there we need to focus our efforts on reducing the cost of energy but also working closely with Department of Interior, (Boehm), and our other federal and state, regional partners in order to promote responsible deployment.

And this is an area where DOE doesn't necessarily take the lead, but we again work very closely with those who are responsible for those developing - the regulations, etcetera, for responsible deployment.

Really three areas that we're focusing on we call them focus areas for our strategy in order to achieve those two critical objectives, one is demonstrating next generation technology, another is removing market barriers, and the third is developing innovative technologies.

You may notice the three funding opportunities that I covered early briefly. Both fall into the or all three of them fall in the last two categories there - removing market barriers and developing innovative technologies. So I'll get more in depth into those here in the next slide. Next slide, please.

So one of the funding opportunity announcements here is the next generation deep water platform designs and this is actually where we've got several activities that we've got ongoing here. Total level of funding is \$15.5 million. You can see that the wind wave, hybrid (floating) platform, we've got the University of Maine work falls underneath this activity. We've also got

significant activities that we're funding in modeling and additional data analysis support for this particular level of funding. Next slide, please.

Another area that we're working is removing market barriers. This is the one of the (FOAs) that I mentioned. There are seven subtopics here. Those subtopics range everywhere from just a better understanding of what it's going to take to create the market here in the US to environmental studies.

In fact our largest award is in the environment category and it's doing a more in depth analysis of birds and avian migration specifically in the wind energy areas and along the Atlantic seaboard. And then there's several other studies there as well.

We're also looking at the complete life cycle, the complete system for an offshore wind installation and that really starts with the manufacturing of the system and the different elements of the supply chain and goes all the way through installation operations or maintenance and eventually to the actual hardware itself.

And so what you see here is several pieces there that are going to add up to a better understanding of where those costs can be taken out of the entire system. So manufacturing, supply chain, transmission, optimized infrastructure and operations, and maintenance is included there also.

We've got a couple of additional areas we're interested in as research characterization. This is one area that we're working on here with this (FOA) in order to address resource characterization design conditions.

We've got several other activities that we're currently engaged in that aren't represented here in this (FOA) discussion. One is something that we're very

excited about. Just about a week and a half ago we launched our partners - the Grand Valley State University launched the third every buoy that has a remote sensing capability integrated with that buoy. It's a (lidar) buoy and it will be - it actually is currently in the Lake Michigan taking wind resource measurements in Lake Michigan.

And I mentioned this is the third buoy ever built by this particular company and this is only the second time it's been deployed in open water. And the first time it's ever been deployed for actual real world research applications so we're very excited about that.

There's also some things that we have ongoing - a reference facility for offshore for Noble Energy. That's a way that we're trying to look at existing infrastructure and building on that infrastructure in order to better understand resource characterization, etcetera. So a lot going on there. We've got some awards we're very excited about in this particular (FOA) along those lines as well.

The last one there is just really to better understand the spectrum of electronic equipment from radar to sonar to other impacts that there will be some studies that will be executed there as well. Next slide, please.

This does a good job of getting more into the details of what I said and really trying to show how these activities do help us better understand the entire spectrum of again the offshore wind system from the market all the way through to specific questions like electronic equipment and the marine environment radar and sonar, etcetera. Next slide, please.

This is another one of the funding opportunities that we announced again. This one as well as the previous -- the removing market barriers funding opportunity announced -- and we announced both of those on September 8.

This one's a little bit more - there's only three subtopics, but really these three subtopics we feel like will be able to hit a lot of the key challenges facing lowering the levelized cost of energy. And this particular (FOA) actually compliments a third (FOA) that we had released and made the announcements on June 28. That's the next generation drive train (FOA) and we're in that (FOA) where we're funding six new drive trains. Some very interesting potential opportunities there as well.

But for this particular (FOA), we recognize the drive train has a huge impact on cost but we tried to look at some other ways to improve costs as well. Here and you'll see the first one there looking at design tools and modeling capabilities. That's something that once we have the robust high fidelity models and tools that's going to allow us and really the industry more appropriately to optimize these systems in order to reduce the cost of energy through modeling.

You don't actually have to go out and, you know, build as many actual physical scale models and you can get some cost improvements from desktop studies. That's the end goal there again trying to improve the existing suite of modeling capabilities.

The second one there ties into actually the first (FOA) that I talked about -- the removing market barriers -- there was a discussion there of manufacturing, supply chain, installation operations or maintenance. And we really think that the games there will be coupled with games across again the entire system and

that's actually where the largest percentage of cost reductions are going to come from. There will be impacts from certain components like drive trains.

And in the third line item here you see innovative component development. In particular there we're focusing on rotors and control systems and we will recognize there will be cost improvements from looking at those different components. But we also see a tremendous opportunity for systems and that's what the second topic area is covering there. We've got seven systems that are looking at least a 25% reduction in the cost of energy there. So it should be some really exciting possibilities. Next slide.

Again taking a look at a graphic that helps illustrate how these particular (FOA) subtopics and the work that's going to be executed within them take a look at each one of these barriers for technology development. Next slide, please.

There's a lot to be excited about here when you look at the 47 awards. These particular awards here show 41 of those projects. Again there were six in the announcement that was made on June 28. But this shows a geographical distribution of the awardees. Blue being for technology development and red being for the removing market barriers.

One of the things that's great is there is 41 awardees, \$43 million from 20 different states and you can see that there's a substantial investment in several of these states and in several of the regions. And this goes along with the idea that our national offshore wind strategy, our offshore wind initiative at DOE is absolutely national in scope.

We recognize that there are benefits, you know, strengths and weaknesses in each one of these regions. And now as a few weeks ago all of the regions - the

West Coast, Gulf of Mexico, Great Lakes, Northeast, Mid-Atlantic, and Southeast all are looking at offshore wind and the message is there as we go and engage in these regions for them to understand their specific strengths and to play to those strengths to ensure that as the coming offshore wind industry arrives they're able to capitalize on its benefits. Next slide, please.

What we're really trying to do, we've got a lot of projects even, you know, more than the 41. We've got 160 different organizations we need to take into consideration - primaries, secondaries, etcetera, but what we're trying to do is have a national mobilization of resources. Get some great minds, some very smart people, some quality organizations engaged here and really accelerate the industry.

These investments in research and development we want to be efficient and we've already spent some time, you know, one of the key focus I think that we focused on in that in that event before (AWIA) was to identify synergies and make the connections between some of these projects where there's a natural overlap. And we want to identify those opportunities and we're really enjoying watching the process and engaging in the process of executing those opportunities so. Next slide, please.

I'll just close again by mentioning we're trying to plant the seeds here. We're trying to facilitate the identification and execution of those synergies. There's several regions within the country now that are getting funding from DOE, going to be answering some of these hard questions, working on some of these challenges. And we're looking forward to continuing to help move that process forward.

There's a ton to be learned from Europe and we recognize that and we're trying to make sure that those lessons can be learned in the most sufficient

way possible and as a lot of us know the message what really resonates now from a personal and, you know, from a professional standpoint even from a political standpoint it's economic revitalization. We know that this needs to be done and so we really focused a lot of our effort there.

This 54,000 megawatts, 54 gigawatts by 2030, it's a scenario that we put forth. All of our analysis current points toward the fact that that certainly has a strong potential and we're digging into that number (in) that date of more deeply now. And we're just really looking forward to having the influx of additional data and additional conclusions that can help value to that number and add fidelity to that number. And we think it provides an excellent aspirational target or a goal to shoot for so again a lot of exciting things happening.

A lot of good stuff happening at Department of Interior and a lot at all of these organizations and so it's great to be able to report that the work has begun and we look forward to sharing updates on the progress of these projects as time progresses.

So thank you very much. I think - I'm not sure if we're going to setup for Q&A now or maybe later on, but looking forward to the opportunity to answer any questions.

Charles Newcomb: Chris, thank you very much for that enlightening presentation. And with regards to questions thanks for that segway. We'll be answering questions on the other side of Darryl's presentation so we make sure that Darryl has time to get through his slides.

And if we don't have time to get through all of the questions, we'll be sure to send around emails to the folks that have logged in on the web at least because we'll have those emails readily handy.

Next up we've got Darryl François. He's with the Bureau of Offshore Energy Management that Chris mentioned and again the Bureau of Offshore Energy Management is that group that takes care of the regulatory framework around offshore wind.

Darryl is the Chief of the Projects and Coordination and he does manage this regulatory framework for the deployment of renewables on the outer continental shelf. They work in the policy guidance and management oversight (unintelligible) process - the coordination of the inner governmental information gathering an evaluation and dissemination, etcetera.

So he's heavy into this. The team over at (Boehm) is spinning up quickly. It's fascinating to watch a group come up to speed so quickly on a new technology.

Prior to -- Chris has been with the DOI for almost 30 years which is a pretty impressive -- sorry Darryl, Darryl has been with DOI for a very long time. It's a nice long career and I think that's a really important facet a lot of people overlook because as you now federal agencies are replete with regulations. And knowing how to move through those regulations, how to work with a coalition around those regulations is no small task. And so when you're trying to move things through quickly from the start, etcetera, it's critical to have people at the helm who know the systems well.

So with that in mind and without further ado, Darryl.

Darryl François: Thanks (Chris) for that introduction - that generous introduction. I appreciate it. I'm going to move as quickly as I possibly can through a whole host of slides and just give you an overview of the regulatory structure that we have as well as what we're trying to do to stand up our offshore wind infrastructure on the offshore.

So I'm just going to keep running through these regulatory framework, how we operate, phases of the program, and a key element of our interaction and development is working with stakeholders through an inner governmental process and also through a public information process that we try to manage.

We are a new organization. I'm going to skip through some of these things, but we sit right with a direct line to the Director of Bureau of Ocean Energy Management.

Many of you know that the regulations Energy Policy Act of 2005 specifically authorized the Department of Interior to regulate renewable energy development offshore in the United States. So I'm going to run through this here.

The types of renewable energy activities. You hear mostly about wind, but there are proposals out there in the testing phase for producing energy from waves and ocean currents and also the other issue that we have is transmission.

So we have a lot of activity associated with that. We continually have folks come up to us and say, "Don't forget us" in terms of the ocean current and wave development - the issues as well.

But it is mostly about wind right now. Our regulatory framework starts with coordination. We have a leasing (unintelligible). It's either the outline of our regulations. I'm going to skip through that, but that's generally the framework where you step through from Step 1 all the way down to operations and then eventually at some point in time decommission it.

Our office has been split up over the last several years. Very quickly we have to not only deal with actually doing the nuts and bolts work of working with stakeholders to get renewable energy products up and running, leasing, and so on but we also have a significant environmental review responsibility. And we're also developing a whole regulatory framework at the same time. So it has three major elements of work going on.

We have to collaborate with a number of federal agencies all throughout the federal government and it's too numerous to mention right here. We have vigorous studies programs looking at all the aspects of what it takes to develop wind energy in the offshore environment.

And just to note that in July 2011 we held an Atlantic Wind Energy Workshop to identify data gaps in the offshore environment and the final report on that should be coming out by the end of the year. And we hope that this will be one of many to come.

We also have a technology assessment and research program where we're looking at not only the environmental aspects of development, but also the technical aspects as well. And how once we stand up a leasing and regulatory process and we move to actual development, how do we regulate worker safety and make sure that things are done in a way that does not end up harming either human life or the environment.

As I said we have a number of agreements with federal agencies. We're working through them very quickly. We're partnering with Noah specifically on another issue which is the development of a multi-purpose marine (cadasser). The Web site address is at the bottom of the page.

But this is a key element in our planning process and in reaching out to the wider federal agency family as well as the public to demonstrate and share the environmental information and other multiple and research use information that we have on the OCS. And I encourage folks to go to the marine (cadasser) and explore that. There are a host of user tools that are very friendly to use.

One of the key elements that we have that helps us achieve our aim in our inner governmental task forces. We have task forces setup in several states along the East Coast and are currently setting up one in Hawaii as well and we have one operating in Oregon.

Here is a forum where state government agencies and local government agencies can sit down around the table with other federal agencies involved in regulating and examining the impacts and potential development scenarios offshore and working out what the resource use conflicts are so that we can get to a least conflict area - there is not going to be a no conflict area, but a lease conflict area in an area where we've identified what measures that we're going to take to mitigate whatever conflicts that are there. It's a key element in our regulatory scheme.

So if you were to look at the OCS right now most of the activity going on is in the planning and analysis phase we're moving towards leasing. There is of course (Cape Wind) and Martha's offshore in Massachusetts which is the only commercial operation licensed at least right now. So there are site assessment

activities going on there and hopefully in the next few years we'll see commercial development associated with that as the first of many to come.

I'm going to skip through a couple of these because this planning and analysis stages is very lengthy and try to get to some of what our task force activities are.

These slides I'm told will be available for future viewing and we can get confirmation on that later.

One of the key things to point out is as we move through the leasing process, one of the things that's (smart) from the (start) did is to put into effect sort of a phase approach to development where we would move to a - once we have a lease and issue a commercial - a lease for commercial development, there is a period within that lease term where the developer will be able to go out and do site assessment and site characterization data before they come in with the construction and operation plan. That will allow for information to be gathered and for the developer to have access to the site to make a long-term plan.

So this is where we are with our task forces. We have task forces established for Maine, Massachusetts, Rhode Island, New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina, Oregon, and Hawaii with one to come soon I think in Florida and South Carolina. So there's planning activity all along the Atlantic Coast.

In Maine we started with task force meetings in September and November 2010. We don't have any planning notices issued as of yet, but we are working with the new governor's administration to get that task force back up

and running. And I think we are on target for another task force meeting by the end of this year.

In Massachusetts we've had considerable discussions, six task force meetings. Just this past Monday we had our last meeting just before we moved to issuing what we call a call for information and nomination this fall which is in our terminology a call is where we have really established that we believe there will be significant competitive interest by a number of developers in that area and is the first step in moving towards having a lease sale.

Also I just mentioned the (Cape Wind) energy project which is - excuse me - 133.6 megawatts of wind turbine generators in the 46 square miles of the Nantucket Sound. There's considerable activity going on around that development as well.

Rhode Island, this is one of the complicating factors that you find when you're working with states adjacent to one another. Rhode Island, we had started task force meetings and since Massachusetts already was up and running, they clearly expressed an interest in an area offshore where they said they had a mutual interest. And so we have joined those two states together in an area of mutual interest that we're calling Offshore Rhode Island and Massachusetts.

We issued a call for that area and the common period closed on October 3. We are currently in the process of analyzing the nominations by developers that came in there as well as the additional information. And we will be taking steps in the near future to look at the environmental analysis needed to move forward with leasing in that area as well.

New York, we had another task force meeting in November 2010. The latest development is that about three weeks ago the New York Power

Administration and the partnership with Long Island Power Administration and Consolidated Edison came forward with a unsolicited request for a commercial wind lease about 30 nautical miles South of Long Island. We are in the process of gearing that task force up to look at that proposal and map a path forward on that one.

New Jersey, Delaware, Maryland, and Virginia, I'll lump them together really quickly. We are just in the final stages of analysis of moving forward on an environmental assessment on wind energy areas offshore all of those states and hopefully that will help facilitate the leasing process in New Jersey, Maryland, and Virginia in 2012 as well as a non-competitive lease negotiation offshore the State of Delaware.

This slide here shows the environment assessment where the areas that are being considered offshore in those four states for wind development.

New Jersey and Delaware, there have been interim leases where -- this was before the regulations were finally in place -- and there has been (unintelligible) characterization activities going on around those leases for the last couple of years now.

As these slides also note that there have been express interest by developers in Maryland and we're looking forward to issuing a call in the fall for Virginia as well.

North Carolina, moving south. We just had a task force meeting about two weeks and we've identified three areas offshore North Carolina that we will be moving towards a call. We also identified two other areas where we are going to be going out with an information notice.

This is one area that demonstrates the complexity of dealing with developing a wind energy industry offshore. There's significant National Park Service issues with national seashores at Cape Lookout and Cape (Patteris) that we have to analyze what the potential effects could be in terms of the enjoyment of visitors to those seashores and working with the National Park Service to see what is acceptable to them in terms of development offshore.

And we're also working very extensively with the Coast Guard analyzing (vessel) traffic and synthesizing data from state and other agencies to see how we can work to develop areas offshore that don't end up conflicting with marine (vessel) traffic going up and down the Atlantic Coast.

This has prompted the Coast Guard to move forward with an Atlantic Coast coast access route study which they are trying to attempt to define to better define what the (vessel) traffic patterns are up and down the Atlantic and not just in and out of the major ports there.

Georgia and Florida, our activities are not progressing as fast. They're a little bit on a slower track, but we do have Southern Company which has applied for a lease install in (Mid) Tower offshore (unintelligible) (Allen) in Georgia looking at what the wind resources are offshore that's safe. And Florida Atlantic is where we have Florida Atlantic University is moving forward with looking at ocean current resources in that area.

I'm going to skip over Oregon and Hawaii because those are really in the very beginning stages of development and there hasn't been much activity except some initial discussions and looking at what the data resources there are out there.

The major project on transmission is the Atlantic Wind connection and we hope to have a request to competitive interest concerning the Atlantic Wind connection which is - that slide says 800 miles, but it's really a 680 mile right of way in five phases that will stretch from Virginia to offshore New York.

These are the key stakeholder issues that we have found out there and we are working hard with our federal agencies and state partners to make sure that we address as many of those as possible in working towards a lease conflict areas.

And I know I rushed through that very quickly, but I just wanted to make sure we had at least a few minutes for Q&A. And I will stop there and turn it back over to (Chris) Newcomb.

Charles Newcomb: Darryl that was an impressive movement to the slides and I think you actually did a terrific job of capturing the sense of each one. So that's fun to watch. Thank you very much for moving through that so quickly.

And we do have a few questions out there. This is from (Simon) and for Chris. Chris, are you still with us?

Christopher Hart: I sure am, yes.

Charles Newcomb: Great. So there's a question about whether or the timing for looking at Florida, Alabama, and Mississippi with regards to wind assessments because they weren't included in the NREL offshore wind assessment. Do you know if those assessments are planned? And if so what the timing for those assessments might be?

Christopher Hart: I don't have that information with me right now. I know it's something that we've looked at closely to - it's obviously an area that's interesting and so we

plan on continuing that analysis. I just don't have the completion dates with me right now. But yes, we're aware of the oversight and are looking forward to filling in that gap soon.

Charles Newcomb: Okay. And I think that's a good message because it lets people now that it's on our radar. Thank you for that.

Another question for your Chris is, "There's a big difference between US offshore and European offshore mostly because they don't seem to see very many hurricanes over in Europe. Can you speak for a moment about the unique technical challenges that that might pose, and how we're handling that, and what kind of research is being done with regard to that?"

Christopher Hart: Sure. The hurricane issue is obviously one of a host of technical differences between the US and the European offshore wind, you know, industries and then the technical challenge that you face. I'm not going to go into all the differences but, you know, another one would be the freshwater deployment in the Great Lakes and the scale that could be envisioned there and the potential that that presents. And we're obviously looking there as well.

As far as the hurricane issue goes, there's actually one of the topic area too in the technology development funding opportunity announcement -- the systems one that I mentioned -- one of the awards is specifically looking at a hurricane resilient design. And there's a lot of really interesting things that are being proposed with that particular project.

Notably they've got a - in the beginning public abstract that was published with that application there, they discussed a 10 megawatt turbine down wind design -- a three bladed down wind design -- 180 meter rotor. That turbine would be installed on a twisted jacket type of foundation.

When you talk about twisted foundation you obviously immediately think of Keystone Engineering which is a US engineering firm based in the Gulf of Mexico that has been successful in getting international funding for moving that particular design forward.

Then there's some other interesting controls and both active and passive controls for the design of the rotor itself that would help move that idea of a hurricane resilient design forward.

Another interesting piece that's going to be looked at there is what sort of a cost impact taking into consideration hurricane resiliency have on the design and can there be some other improvements when you look at the system as a whole that can offset those added costs. So we're excited about that project. There's some other things that are being done with regard to resource characterization and better modeling events so there's a substantial effort trying to identify that or answer the question about that particular challenge itself.

Charles Newcomb: Chris that's a great answer. Thank you very much. Going to your 54 gigawatt figure that you had discussed briefly. Can you speak a little bit to the kind of the background behind where that figure comes from? And then as importantly or maybe even more importantly just to provide context, can you speak to what percentage of the onshore load does that 54 gigawatts represent? Is it a tiny amount or is it most of it? I think people will have a hard time kind of imaging that without that information.

Christopher Hart: Sure. So the number comes from the report that was a DOE report that was published in 2008 and the name of the report is Twenty Percent Wind by

2030. I think probably a lot of people are familiar with that particular document itself.

So what that document envisions and tries to analyze is the idea of 20% wind penetration and the number for 20% as put forth in that report is 300 gigawatts. So that includes 54 gigawatts of offshore wind. So that gives you an idea of the, you know, 20% is from wind in general and that's 300 gigawatts and then you can do the math and see what 54 gigawatts is. But that's where it comes from, 2008 20% by 2030 report.

And what I was kind of hinting at in the final slide there was that, you know, we put forth 54 gigawatts recognizing that the analysis that got us there -- the 20% analysis -- is arguably dated especially when you consider the pace at which the onshore and the US onshore and globally the offshore wind industry is progressing.

And we think that that 54 gigawatt number while supported by analysis, we'd like to dig in deeper there and I think there's a lot of other people out there that would like to dig in deeper into that number as well. And so we look forward to using the data and the conclusions that come from some of these analyses to help us add confidence to that number and potentially explore other deployment scenarios as well.

Charles Newcomb: Thanks Chris. How about - can you shed a little light on or do you have the figures handy that describe what 54 gigawatt represents? Is that a big piece of the Eastern seaboard and electrical load or is it a smaller piece? Have you seen those numbers?

Christopher Hart: Well one clarification there in the question. That's in national numbers so it doesn't estimate that, you know, 54 gigawatts will be deployed on the East

Coast. In fact I would go so far as to say that we feel that in order to get to that scenario 54 gigawatts, it has to be deployed in other regions besides just the East Coast because we don't see necessarily that the East Coast is going to be able to provide that, you know, that number. But if 300 gigawatts is 20% and, you know, 54 gigawatts is 1/6 of 300 gigawatts then, you know, it's roughly say 3%, 3-1/2% of the load.

Charles Newcomb: Great. Thank you very much. Thanks for that clarification and I think that's a really important distinction. And I think the other distinction to make is that (Boehm) is offshore federal waters and (Boehm) won't be speaking much to the Great Lakes that you just sort of referenced there.

Can you provide any comments on when the demonstrate project (FOA) might be released and what steps need to be taken before that can be released?

Christopher Hart: Yes and so what we've said very publicly now in many different forums myself, I mean even Secretary (Chu) in a public hearing and now Assistant Secretary Henry Kelly at the offshore event what we have recognized and stated in public is that we still stand by the value of these three focus areas that we identified in the national offshore wind strategy. That is technology, development, market barriers, and advance technology administration projects are all crucial to reaching the scenarios that we put forth.

So we're 100% behind demonstrating technology and in fact we're so far behind it that we've got a - we're ready to go. We're ready to release a solicitation, but the challenge facing us there is actually a political one and therefore we are trying to address that political challenge using the appropriate channels.

So bottom line, we're going to get that demonstration project (unintelligible) out as soon as we possibly can. And we just think it's very important and we look forward to - and the other interesting thing is that there, you know, since we've been talking about demonstration projects I think that a lot of other people in the industry recognize the value thereof there have been some pretty impressive consortia that are forming around the country.

And again they're regionally based and we're talking about, you know, power purchasing organizations, research organizations, original equipment manufacturers, marine installations, operations and maintenance folks. There's some great teams that are developing and we just really look forward to seeing what these consortia -- these world class consortia -- put forth once we release the solicitation.

So a very, very positive outlook on the potential success of that piece of our initiative and are really looking forward to releasing that (FOA).

Charles Newcomb: Thank you. Darryl another question out there is can you speak for a moment. When powering America - excuse me - just to remind us all is really the deployment arm of the Department of Energy. It's how the technology is draped over the market and how that interface is managed effectively to effectively increase the permeability of the markets.

So that takes a lot of stakeholder engagement, it takes a lot of policy analysis, it takes a lot of market analysis, and economic development impact analysis, jobs analysis. It takes a lot of hand holding and hand shaking between developers and utilities and having honest true good information out there is vital that.

So in that context knowing what wind powering America and the deployment arm of the Department of Energy is about can you speak a little bit about sort of where's that bright line between the Department of Energy and that market acceptance and barrier reduction space and (Boehm)'s regulatory side? And how (Boehm) anticipates or would look to sort of hand shaking effectively with the Department of Energy? Can you provide a little bit of insight on that?

Darryl François: I'm not sure that I could really illustrate, you know, be too illustrative of how that works. You know, our mandate is that to provide access to the OSC for (data kind of on the shelf) for renewable energy development resources.

And so one of the things that we have to do is to, you know, setup a regulatory process that provides, you know, fair access to the development community as well as in coordination with states and to try to go along with the wishes of the public stakeholders that's out there as well as the other federal agencies that have regulatory responsibilities for different resources on the OSC.

We share as much information as possible with DOE on what we see as coming down the pipe and what we hear about the issues because we have an ongoing conversation with federal agencies with regulatory responsibilities on the environmental front, with state governments looking at what their potential needs are and wishes as well as the development community in terms of what they see as either barriers to access or ways to improve access.

And so we share that information as much as possible with DOE looking at the larger perspective of how do you build an industry to allow DOE the flexibility to respond where it feels it's most appropriate given the fact that we have a limited resource space, you know, in our current, you know, budgetary situation.

So it's not we don't have a sort of formal one to one process on that front, but I think we have a very collaborative relationship. I'm not sure that really got to where you wanted to go, but it kind of describes how we work.

Charles Newcomb: That's helpful. Thanks very much Darryl. Chris another question.

Apparently this is an attendee at the offshore conference in Baltimore last week and there was some concern that there is a lot of priority being put on long-term technologies such as floating platforms, deep water, technology. And maybe we need to put emphasis or more emphasis on near term technology approaches to getting steel in the water.

Can you provide a brief perspective on the Department of Energy is balancing the goals of getting steel in the water now along with knowing that it takes a lot of long-term investment to get the more complicated strategies moving so that they're where they need to be when we need to deploy them?

Christopher Hart: Yes. First of all I love that question. Unfortunately I wasn't at the final panel there with the developers, but I really, really like that question because what does it do.

I think it establishes that we're - largely we're all saying the same thing. And, you know, some people took issue with the way it was presented in that forum rather than, you know, in another way. But I don't have, you know, as much of an issue with that. I think what it does is again we all know that we need to get steel in the water. We're ready - (unintelligible)'s ready to support getting advanced technology demonstrated. Again this goes to the topic - one of our favorite topics as we think about what a sustainable responsible offshore wind industry means in the United States.

Now one of our favorite ways to think about it is this concept of first yes. First you have to get some projects in the water, but you also have to keep an eye to something that I think we're trying to bring more into the center of the discussion which is this best technology. So yes we want to get technology in the water. Yes we're ready to support, you know, advanced technology that's ready for deployment, that's ready for demonstration now and we're completely on board.

However our hands are tied to a certain extent and we look forward to the opportunity to supporting just exactly that demonstration of technology that's ready for putting deal in the water now. But will ultimately lead us closer towards that idea of the best sustainable responsible industry here in the US.

Charles Newcomb: Fantastic. Okay. Right before we move on to our closing can you look into your crystal Chris real quickly and somebody had a question of, "Well how many turbines really does it take to get to a gig?" And I think the fundamental question on that is, "Well how big are these machines going to get?" And that's kind of a fun question because we've never been right as far as I can tell in predicting how big equipment is going to get. But it would be fun to hear your perspective on what do you think?

Christopher Hart: Well so the first all 5 megawatt farm in the world completed construction I think it was a month ago - maybe a month and a half ago, the Orman farm in the UK. That's 35 megawatt machines installed on jacket foundations. Excellent project.

I met the original project developers. They're now the leads for the (Baryonic) Group which is looking at 3000 megawatts in Texas. Obviously (unintelligible) bought the rights to that project and completed the

development. But a very, very interesting project and a lot to be emulated there. Obviously there's several 10 megawatt turbines.

I think by the time - and we recently announced we're supporting GE in exploring a truly revolutionary design that could lead to up to a 15 megawatt design. You know, there's people looking at 20 megawatt design out there. By the time we get to 2030 -- that 54,000 megawatt -- I think you're going to be talking about the 7 to 10 megawatt range as the norm at that point. So, you know, we can do the math there, you know, on how many of these turbines it's going to take.

But with several 6 megawatt not several maybe 2 megawatt prototype 3 designs spinning globally, you know (unintelligible) this is obviously moving towards their 164 meter diameter 7 megawatt machine and there's a couple of these 10 megawatt machines that are progressing. So I think that's very much doable. Then we'd be talking in the high, you know, close to 10 megawatt machines for the 20/30 deployment timeframe.

Charles Newcomb: You know, that's an interesting segway into a conversation that we had had when we were thinking about webinars going forward and how we tend to stay fairly high level in most of our webinars. But how it would be fun to have a few slides in there where we dig into the technology at a high granular level or whatever - at a very deep level. And I think that would be one of the exciting for a lot of participants to or attendees to see is what does a 10 megawatt machine look like. That'll be fun.

Well thank you both Chris and Darryl for your time today and your expert presentations. We absolutely appreciate your contribution to our ongoing webinar series.

Looking forward, we've got in the next three months - we only have two webinars because we're going to give you all a break. We considered putting up, you know, a video of a fireplace and Christmas music but we thought that that might not go over all that well. So in November we've got the wildlife interactions especially (germane) given, the recent guidelines and moving back and forth in that arena. So it'll be a very interesting I'm sure for folks to understand where all that has landed.

In January we're going to be talking about market acceptance and how to manage that effectively and some case studies, some lessons learned. So to that regard as is our typical fashion, we tend to go a few minutes late. We're considering making the 75 minute webinar a de facto element so that we don't feel bad and we don't crush our presenters who have so much to present.

But again thank you all very much for joining us today. We had terrific attendance. It was fun to watch. Thank you for the questions and Chris and Darryl again if we could applaud you, you would hear a lot of little tiny hands clapping away. So thank you very much.

Darryl François: My pleasure being here.

Christopher Hart: Thanks Charles.

END