

CAREERS IN WIND ENERGY

May 16, 2012

Coordinator: Welcome and thank you for standing by. At this time all participants are in a listen-only mode.

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

I would like to turn the call over to Mr. Charles Newcomb with Wind Powering America. Sir you may begin.

Charles Newcomb: Thank you and welcome everyone to this month's installment of Wind Powering America, the Department of Energy and the National Renewable Energy Laboratory's Wind Powering America Webinar series.

This month's installment is in careers in wind energy and we have three speakers with us today.

Before we introduce the speakers I want to really quickly go over how the program will work and how to ask questions -- that sort of stuff.

So the first thing is you'll notice at the top of your screen there's four, I guess five different effectively pull down menus in the old way of thinking about things and the first one being content. I don't know if - they don't get that, so maybe it's four.

So the third one across would be Q&A. That's the important way that you - the only way that you can interact with or presenters today. And I encourage folks to experiment with that a little bit.

In the Q&A section you're able to ask a question. I will read through those and paraphrase them for our speakers and pass the information along to them and manage the Q&A portion of the Webinar itself.

Questions will be handled at the end of the third presentation so we make sure we have plenty of time to make it through all the presentations.

But there's also a little section in the top right corner. We rarely use it but if you feel like playing feel free. It's the feedback section. And here you can kind of say I can't hear you or you're going to fast or I don't understand.

Since is only a color it doesn't give us nearly as much information as if you ask us a question.

So feel free to use the Q&A section as well to communicate those sorts of specific things. We're more likely to understand what you're saying then.

So our first presentation among the three is going to be Derek Johnson. Again thinking about the three presentations and jobs in the wind the space there's a lot of ways to get into wind energy.

There's unofficial ways where you know somebody or you see a solicitation out there and you just go for it.

And then there's more of a formal track where you actually go and get some training whether it be at the community college level, the college or university level or the graduate level.

And thinking about the sort of official path and how folks are addressing that challenge because we know we are going to need many tens of thousands of new workers in the wind space over the next couple of decades as we increase our penetration of wind on the grid.

We do have these three speakers. The first speaker is going to be Derek Johnson with the Redstone Community College.

It's a local college here just down the street from the National Wind Technology Center which is kind of fun to have someone that close.

Now my second speaker is going to be Andy Swift out of Texas Tech. And it's interesting on our team here at the National Technology Center with Wind Powering America we even have Jason Fields who is a graduate of that program.

And Jonathan Miles is our third speaker out of James Madison University. And Jonathan is also - we'll talk about his bio later but also one of those folks that came out of UMASS and Jim Manwell's program where Ian Baring-Gould, those of you know who Ian also came out of that and so they are contemporaries.

So those three institutions will be talking today about how each of the institutions thinks about the concept of training folks up, what some of the challenges are, what some of the opportunities are, how they do it?

So with that I introduce you to Derek Johnson. Derek has been in the electrical technical space for a number of years, five of those in the wind space.

And he has experience with the Nordex and GE machines specifically and has taken his training courses in converter certification and commissioning, et cetera.

And so it was interesting to see someone come out of the industry and then take a leadership role at a community college in developing the curricula and getting folks in.

So with that I give you Derek Johnson. Derek are you ready?

Derek Johnson: Yes. How is everyone doing?

Charles Newcomb: They won't respond to that. Actually quick everybody answer. Sorry Derek, go ahead.

Derek Johnson: All right. I'll be talking a little bit about the college, a little bit of history and where we're going here in the future and where we started and how many graduates we have so far and what's our success rate.

Redstone College located in Broomfield, Colorado, founded in 1965. It's been around for over 45 years now.

We have quite a few program. We have the FAA Certificate Program, the Advanced Electronics program for Avionics, and the Ace Fact program.

And a new program though was added, the Wind Energy Technology program first started August of 2010.

Our Wind Technology program we have three graduating classes so far. We have a class that graduated...

Charles Newcomb: This is Charles. Do you mind advancing your slides? We're falling behind you. Please? Thank you.

Derek Johnson: All right let me get locked in. Okay sorry about that. So we have three graduating class so far since our program started.

October is our first graduating class. We have 19 graduates. January was our third class with 28 graduates and March 2012 was our third graduating class with 30 graduates.

Here at Redstone College we stress hands on. We have a lot of equipment that we use to do our training.

We have live volt equipment that we use in our lab and we have a lot of faculty experience from the field.

We have approximately about eight instructors on board that actually help to teach our courses.

We do strive on our career placement. We help a lot of our students find jobs once they're finished with the program and also tuition free alumni retraining which means that if we change anything as far as the program you can come back and take free training.

Next detail about the program, it's a 15 month program. We have six - we do six hours per day in our classes. Our program is comprised of 12 classes which is approximately six terms.

Our first four classes we do primarily our electronics program, we do DC, AC, solid state and digital.

Once the students finish electronics they move on to the wind classes. We have eight wind classes from Wind 101 to 108.

We do Red Cross, OSHA, client safety. And we do a lot of hands on training on our Vestas V27 turbine. It's a 225 kilowatt turbine that we have in our lab.

Okay in addition we have hydraulic systems that we use. We have motors, PLC stations. And also fiber optics.

Moving onto the next slide basically the program focuses primarily on a lot of the electronics.

What I notice from the CO is there's a lot of troubleshooting on electronics but we do focus a lot on the electronic equipment, okay?

Basic concept that the students learn, we have dial indicators, shaft hog training which teaches our graduates how to align generators and gearboxes.

Okay safety is one of our big thing that we focus on here to make sure that our safety protocol is been carried out. We stress lot - LOTO, high voltage safety and just make sure that all students adherent to a proper PPE and all our safety protocols.

High torque certification, we do high torque and ten hour OSHA and our 30 hour OSHA program.

Next some of the companies that come to the college, and we have Siemens, Sky Climber, SOS Staffing, Vestas, RES Americas, enXco.

And we just had a small company they came to visit our campus, Ethos Distributed Energy that came out. And they just hired one of our graduates here. And we're told that he's working out really well in the field, okay?

Our wind technology program graduates, not only does our wind technology program we graduate wind technology technicians but we also have companies from oil and gas that comes in and they look at our graduates.

Some of the things that they look at is our Foundational Electronics program that we have. And we do have companies from the oil and gas that actually hire some of our wind technicians, companies such as MI SWACO, Schlumberger, Wireless Construction Service, IAC Direct, and Rocky Mountain Geothermal.

Since our graduates have been in the field such a short time we have a lot of success stories. Okay for example for our March graduation we have March graduate that's now in the field. He's one of our top techs that's actually in the field doing heavy troubleshooting and is pretty reliable for coming out of the college the short time with the knowledge that he has.

Company rely on him to do a lot of troubleshooting and also train some of the new techs.

In October 2011 we got graduates. We had a graduate that had an experience out in the field that had a situation where there was a vibration on the centrifuge and had different colleagues look at it.

And one of our graduate actually used the knowledge that he gained from the college and actually was able to step up and actually fix the problem.

Some of the feedback that we get from some of the companies, some of the employers are often tentative to create relationship with new schools since many schools give degrees with no extensive focus training taking place.

Redstone is different. Company managers include officials from Siemens and Clipper have visited the campus and observed the students in the lab working and spoke with the faculty members about the curriculum. All have left the campus impressed.

Just a couple months ago we had one of the training managers from (Susan Long) came out and said that our training was in line with what they - they're training in the field so very impressed with what we're doing here at the campus.

The Redstone Wind Program will continue to improve and train students in the latest technology and safety.

And if there's any questions you can contact me at my email. And also you can visit the Web site redstone.edu for any more information.

Charles Newcomb: And if you also have questions please feel free to click on your Q&A button at the top of your screen and we can try to get them answered for you today.

Derek thank you for that overview and I think it's not unusual to hear these kinds of accolades from hiring folks in the field and when they've taken people out of these Windsmith training courses.

Our next speaker is Jonathan - or sorry Andy Swift out of Texas Tech. Andy's been central to our industry for a long time.

And it's always fun to have somebody who has such deep history and connectiveness with the industry speaking for us.

So, you know, Andy has been at Texas Tech for quite a while. He's one of the professors in the civil engineering and environmental engineering area over there.

Andy was also I think one of the - for me one of the great ways of determining whether - how somebody is viewed in the industry is that Andy was on our peer review panel for years for the wind program.

So with that (Andy) with your 30 years of experience we hand it over to you now.

Andy Swift: Okay thank you very much, always appreciate all those nice words and hello to everyone. Also thanks to Wind powering America for hosting this and inviting me to speak. I appreciate it.

So let me go through. Charles you'll keep me straight here if - I assume it's all moving and working okay, is that correct?

Charles Newcomb: It's looking good.

Andy Swift: Okay. So our program here -- and I'll give you the timeline a little bit later -- actually started with our - originally with a PhD program that was put in place in 2007 with some NSF support.

But the current institute where we're focused on workforce and education really began with this grant from the Texas Workforce Commission.

And I know that on the list here there's several folks from Texas who are tuned in. And I want to thank them for, you know, helping us get things going.

But it was that Workforce Commission Grant and really a mandate to partner with Texas State Technical College in Sweetwater.

They have the two year Wind Tech Program. It's been very, very successful. And our goal was to focus on putting together a university level program first for the region of course since it was Texas Workforce Commission but then eventually to expand to have hopefully a national significance.

One of the first things that when we started this program people ask is they said well, you know, we know you need engineers to build wind turbines. You know, what other jobs are there in this industry?

And anyone who's been following the numbers know that we're up in the order of 75,000 to 85,000 jobs right now in the industry.

And most of those jobs really are not engineering. And so Wind and Industry Advisory Board made up of folks from the Wind Coalition here in Texas.

And one of their first mandates to us was don't do an engineering only program. And I start here by listing some of the engineering jobs but I'm going to carry on with some of the non-engineering jobs and kind of give you that talent.

So you've probably been looking at this list already and you can see and some of them are a little bit unusual. For example let me see if I can get the laser pointer to operate here.

We have a site - I'm not quite having success here. And we practiced this yesterday, right? Okay...

Charles Newcomb: And we gave you a certificate too.

Andy Swift: Yes that's right. Okay over on that second column you can see site operation managers and really site suitability engineer near the top.

So some of these are very, very specific to the wind industry, others are just general engineering jobs.

When we have folks that come to us and say, you know, I really want to design wind turbines we recommend first they get the engineering degree, get the credentials so that you can, you know, be certified in the state that you're working. And then go ahead and get a minor or certificate in wind energy.

Now I'll point out one of the keys in developing this science and technology based but not engineering program it ensures that that minor is available.

And we found that as we looked around our programs if you end up with a very small kind of a boutique program somewhere a lot of times all the courses that the students want to take aren't offered.

And by having this more general focus we're able to ensure that in fact the courses are offered so that the engineering major can, you know, have the courses available to do the minor, okay?

All right moving on then to where the bulk of the jobs are in this industry and we don't claim this to be any kind of a complete list but it gives you some idea okay of the breadth of training that people need in this.

It's truly a multidisciplinary degree. It's a multidisciplinary field going all the way from business and finance.

We just talked about the engineering side. But often to some of these other areas that some of which are wind specific such as wind power forecasting and others that are more general but really need specialists in the wind industry.

And I put two slides up here covering some of these other areas. And we actually offer in our 40 credit hour courses that cover a lot of these, for example we have law and regulatory issues, modeling design, grid integration, a course in social impacts which is important.

And we decided to address some of the technical issues such as mathematics and physics by having wind orientated classes focused on these.

So the students have to have of course their core requirements in a university level math and physics. But then what they need in wind we actually give them a specialized program.

Okay our timeline as I mentioned really started with a PhD. It's the only degree like it in the nation. That would not have been in place without some funding from National Science Foundation and their multi-disciplinary IGERT program.

And we've got about 20 students continuously enrolled in that. We've had probably about 25 graduates. Many are out working in the wind industry today with the PhD.

We - when we got the Workforce Commissioning Grant we then moved on to a graduate certificate in wind energy building on some of the course work.

But again we offered both a technical and a managerial track. And that's five courses at the graduate level.

Everything is offered by distance. You can do it either face to face or by distance.

Then last year we get approved by the Board of Regents, we believe the first Bachelor of Science in wind energy in the nation.

Again this is a science and technology degree but it is not a wind energy degree. And of course there is that minor again, the second bullet down so that people who want to major in engineering or in business and finance but get the minor in wind these courses are available on a continuing basis for them to take and we also have an undergraduate certificate.

We have about 70 students enrolled in right now in the Bachelor of Science in wind energy. And I'll give you some enrollment numbers afterwards.

We don't yet have a Master of Science kind of filling that gap. We have the graduate certificates. That's under consideration.

And we're not sure that may be an engineering degree and it may not. We may keep it as multidisciplinary. Those discussions are going on. But it took essentially seven years to grow the program to where we are today.

You can see the growth. It's been phenomenal. Even I am just stunned by how quickly this program has grown.

The green bars are the graduate program. The blue are the undergraduates. This does not include their PhD program which is about 20 students continuously enrolled in that program.

About a 1/3, between 1/3 and 40% are by distanced in these program enrollments. And these are non-majors. I mentioned we have 70 majors. These are wind energy courses that have students enrolled so one student in a wind energy course would be one enrollment.

And you can see this last spring we topped 470 course enrollments and it's grown very, very rapidly. And we're having trouble keeping up with instructors and support systems to handle this kind of growth.

So let me summarize here. Obviously as Charles said we're going to need a lot of folks both at the wing tech level and at the University level in order to achieve our national goals in wind energy as a nation.

The 20% goal, the numbers out of that report are about 300,000 additional jobs in order to support the 300 gigawatts of development if we reach 20 - the 2030 goal.

We brought together some folks and estimated that about 35,000 of those jobs, you know, it's about 12% or so would benefit from a university education.

Compared to 300,000 that's not a big number but if you look at the number of programs in this country, you know, UMASS has had an excellent program for a number of years. It's focused on engineering, put out some great folks.

But, you know, we're so far from that 35,000 number that we have a long way to go. And certainly it's going to take a number of universities to step up and really fill those numbers if in fact these projections are correct.

I gave you Web site there for more information and be happy to answer your questions when we get to the Q&A. Thank you.

Charles Newcomb: Andy, thank you very much. And as is not unusual we're getting some questions coming in about whether folks will be able to get these slides somehow, get handouts. And the answer is yes you will be able to get them.

You'll need to check in with our Web site in about a week. It seems to take about that long for us to post everything. And the transcript will be up there as will all the handouts.

So it's always a lot of information that kind of flies by so fear not. Don't scribble to hard because you'll be able to download these things at your leisure in about a week.

So thank you very much Andy. And now we've got Jonathan Miles with the Department of Integrated Science and Technology at JMU.

John is - directs the Virginia Center for Wind Energy at JMU. And his group there has been running the anemometer Loan Program there.

The University also has one of our wind application centers as part of our Wind for Schools constellation of universities.

And Jonathan as I mentioned comes out of UMASS in his distant past getting more and more distant with every day as we all grow older.

But with that Jonathan is one of those fantastic forces out there. And it's great fun to see his graduates finding their places in the wind industry. So with that Jonathan it's all yours.

Jonathan Miles: Thank you Charles. I appreciate that. It was very kind of you. And I want to thank you and (Sue) and (Diane) and the rest of the folks out there in Colorado for the invitation and for hosting this. It's a real pleasure to share our story.

I think I preface just with an observation now having listened to the other two talks from Derek and Andy that we came at this a little bit differently.

We - I would say almost inadvertently we backed into wind as a driver within the curriculum and at the university to a point now where I think it's fair to say that we're viewed by the university as having an important contribution to make and one that is consistent with the overall mission at JMU to address and to try to apply principles of sustainable development and so on.

And so let me just proceed from here. Can you hear me okay Charles?

Charles Newcomb: We can hear you just great. Thank you very much.

Jonathan Miles: Sure. And I'll start off as well by just a quick explanation or description of our program.

So I've been with the Department of Integrative Science and Technology for 16 years.

In 1998 I was approached by some students who had indicated an interest in taking on wind in some respect as the driver for their senior projects.

We have a compulsory three - six credit hour three semester senior project senior capstone experience.

And as you rightly noted I come from UMASS and in fact got to know Ian very well at that time. But I was involved in very different research within the Department of Mechanical Engineering there so most of my early influences I can attribute to Ian.

And when I was approached by the students I thought well that might be an area that could be interesting to pursue as well and at that time trying to find my footing as a junior faculty member.

So lo and behold we spent a year or two working with some students and that coincided with Wind Powering America developing and offering some seed funding. And the rest is history so to speak.

I offer this slide because I do want to elicit some differences between us and what you heard from Andy and Derek.

And that is we have an inherently inter- disciplinary but technical undergraduate program here. And I highlighted in red some of the areas that I think sort of favor our involvement in wind in the sense that as probably everybody on the call understands wind is inherently interdisciplinary.

So we tend to attract students who aren't interested in only engineering principles or only modeling or one thing or another.

They really do, you know, very sincerely want to understand the technical and social and the economic and the business aspects.

And wind has a little bit for everybody. I heard Andy, you know, mentioned that I think you were and encouraged not to think only in terms of engineering but more broadly than that. And we really had no choice.

I'm an engineer by training and I have colleagues who are. But we are strongly encouraged to work sort of beyond those boundaries and it's worked very well for us.

Let me go forward here. So our Virginia Center for Wind Energy at JMU is now for all intents and purposes an official university center and it's recognized statewide as well.

Some note that we serve is sort of an ad hoc extension service for the State Energy Office who has for years along with DOE and Wind Powering America been a very generous supporter of what we do here and has allowed us to grow.

As Charles noted we serve as the WAC for Wind for Schools here in Virginia. And we provide a suite of resources that support teaching, training, provide opportunities for interns and program development within the center here.

And I mentioned in my fourth bullet we serve as a feeder to industry. One thing we've been able to do here is bring on some of our very recent somewhat

green graduates at the undergraduate level just coming out of the program and give them an opportunity for a couple of years to get to know the industry in maybe more protected confines, a place where they can learn a lot from the folks who work here professionally and full-time but yet gain experience and then go on into industry.

So at this point we are considered a resource for the university. And we're interacting with probably on the order of at this point 60 to 80 undergraduates a year through capstones, through courses and through some of the other activities that we have going on here.

The Wind Application Center here at JMU supports among other things, the development of undergraduate courses.

We're now formulating with collaborations from other departments including geographic sciences, that's the GS acronym, our engineering program and our business college, a minor that according to our prescription if this takes hold would be a minor that would serve not just hour or one or two disciplines or majors but several.

We have been supporting as I mentioned since 1998 undergraduate projects, senior capstones and that continues unabated.

And recently my colleague (Remy Lauritsen) or I'm sorry Remy Pangel taught a course called Global Sustainability at the University of Virginia.

And that gave her an opportunity to start to reach in and gauge students, undergraduate students at another state university just down the road from us.

So every year we have anywhere from four to half a dozen or more undergraduate theses. I have three graduate dissertations that I'm advising right now.

And as I'll mention in a moment we are just on the verge of opening for operation what we define as our small wind training and testing facility that will serve the university and other universities in the state as well as our two year and K-12 institutions and will help us advance workforce development here in the state.

And last we are working with EWEA very closely. And we help them to pilot our student chapter this past year.

Two years ago, a shameless plug here, we are on the 20th to the 22 of June going to host our fourth Statewide Wind Energy Symposium.

Two years ago when we did this we had our Lieutenant Governor, Bill Bolling on hand. And he announced an \$800,000 grant to the university that was intended to help us design, develop and ultimately construct this small wind training and testing facility.

That was very consistent with the president, our university president's commitment to advancing sustainable practices not just at the curriculum level but really across the entire institution here.

Going on here I just include a couple of images that demonstrate a suite of instrumentation that the facility includes.

So we have 120 foot room tower supporting a Bergey XL. And in addition to that we'll have a - an adjacent space where not only will we have that fixed the

tower but we'll have the ability to install and uninstall tilt up towers as well that will be primarily Sky Stream units.

So the intention here as I mentioned is going to be to serve all the different educational needs that we have here at the university and in the region.

And then finally I've mentioned this already that with the support from the state actually originating with the AERA program and with an additional 1/4 million dollars support from JMU we were able to execute this.

What you're looking at is our East Campus Science and Technology and Engineering Library and in front of that the tower, the turbine, and just at the bottom of that the building that houses all of the mechanical elements that support all that.

Moving along here I just want to outline some of the courses that we have either already stood up, namely those in the first - in yes, I'm sorry the first and the second bullets.

So we are - we've developed and we're offering at the freshman level what we envision would be the first of the six courses in the minor that's in development.

The second one is a course taught to our interdisciplinary liberal study students and that's a fancy way of saying education students.

This course was taught primarily by Remy this past semester with support from myself and some of the other staff at the center.

And then we're in - we're having a conversation now between JMU, Dabney Lancaster Community College in (Masina) in Technical Center which is a high school level institution here in Rockingham County that would really be a partnership between the three institutions.

The course would be taught predominantly by teaching staff at the community college but would be overseen by myself and Remy. And JMU would offer college credits.

So it'd be ideal for students at Mass Tech who either want to go on to Dabney Lancaster or come to JMU and give them the opportunity to earn some university credit in advance.

Also I want to outline another effort that is not quite as closely connected to our suite of undergraduate or predominantly undergraduate activities but one that I think is important to mention nonetheless.

We've - we launched three years ago a graduate/international program. We refer to this as sustainable environmental resources management.

It's modeled loosely after our undergraduate curriculum but it is graduate level courses covering technical areas, legal and policy areas and all that wrapped around the core of five case study courses.

And one of those is exclusively an energy course. And the other for the focus on marine and coastal resources water, ag and food, and air and waste. Each touch on the connections to energy as well.

And the energy course and the connections to that course are mostly focused on sustainable energy and energy technologies and practices and so on.

So we have a real opportunity there for the graduate level students to examine what we teach at the undergraduate level at a higher level and within the international context as well.

And we have each year a cohort of on the order of 16 to 18 students hailing from the US and countries, other countries as well and at least two or three who focus their graduate dissertations on wind power.

So let me just finish up here by describing what might be a different set of paths than what you'd see coming out of the other programs that you heard about.

These are the types of jobs that our graduates mostly coming out of the undergraduate program have been successful in landing.

And while you're looking that over I'll just mention some of the companies that these graduates are now working with. And they would include DNV Global Energy Concepts in Seattle, Community Energy in Pennsylvania, Iberdrola.

We have a couple students working with EWEA. One has been there for about ten years now. And (Exico) in California, Horizon Wind, Apex Wind, a couple who have stayed with us here at the center and gone on to the Virginia Tech's Advanced Research Institute, General Electric in South Carolina, AWS now Truepower, RES in Texas, (Solea) Wind in Massachusetts, Los Alamos National Labs.

And finally we've had a couple students go on and work at ENREL although not necessarily within wind.

And I'll finish there. And again thank you all very much for the opportunity.

Charles Newcomb: Jonathan, thank you very much. It's always fun to see where your graduates end up. And it is remarkable to see how many in the field which is really nice.

So moving into the question and answer section, I guess the first question is going to be for Derek. Derek I'm thinking about the folks that enroll in your program and where do they come from?

Are these people who are trying to transition from an HVAC perspective into a bigger machine or are they people who tied rebar on a wind turbine foundation and thought wow I would like to actually get on the machine? How do I do that?

What do they look like? What's your typical applicant and from how far away are they coming?

Derek Johnson: We have a variety of different type of wind technician that comes to the college, different age group from 19 all the way to we have a couple guys that's in their 50s.

There's guys from the Midwest, guys from the military, a lot of vets that actually want to continue their career in this field. And, you know, seeing the growth in the field is part of it so all over the US.

Charles Newcomb: Very good. Let's see Andy, on one of your slides you sort of showed that out of the hundreds of thousands of jobs that are going to be needed in the

field a fraction of those are going to require some engineering or technical training at the university level.

And we're going to need a bunch of universities to kind (step) up and fit that need, meet that need.

Where are the other what, you know, are there - can you just spend a moment sort of describing what those other jobs are thinking about the national skills assessment efforts and things like that and where we're anticipating to see a lot of growth?

Andy Swift: Yes Charles I'm sorry but I'm not quite sure let's - actually I'm not quite sure of your question there.

It's a 300,000 number which is the total direct and indirect jobs in the industry.

We came up with about after estimating, about 10% to 12% of those requiring university training. Is your question what about the other...

Charles Newcomb: That's right.

Andy Swift: ...that difference?

Charles Newcomb: Yes.

Andy Swift: Yes okay. Well most of those folks are going to be probably in construction. And whatever training it would take to be in construction, you know, some of those folks do have university degrees but, you know, a lot of them are coming out of tech schools in the construction area.

A lot of them will be manufacturing jobs where folks are, you know, manufacturers and their - they have to be making wind equipment but they're in manufacturing and they would be trained in some manufacturing program.

Some would be SCADA people and they'd be trained in a SCADA program as a tech for example. So does that answer?

Charles Newcomb: That does answer. Jonathan this is a fun question that came through. You know, how come there's no wind down in the Gulf states installations?

And I think we know the answer to that to be well the resource could be better. And we're manufacturing machines today that are actually making that resource economical.

But thinking a little bit about as we expand into that space into the Gulf states and into the southeast where historically we haven't seen the same level of investments that we have in the upper Midwest for example or in Texas do you think that there's going to be - well what's that's transition going to look like from an educational standpoint in those areas? Do you have any insights into that?

Jonathan Miles: Yes Charles so is the question more along the lines of would there be opportunities or greater opportunities or universities or to your schools...

Charles Newcomb: Exactly.

Jonathan Miles: ...in the Southeast?

Yes I think we're already seeing that. You know, very notably this the activity with drive train that's been supported by DOE in South Carolina.

So, you know, despite the fact that the resource may be more modest in the Southeast on land and of course there's interest in Gulf Coast offshore development as well I think every indication, you know, dating back to the 20% by 2030 report would suggest that even if the contributions in terms of install capacity are not as grand in the Southeast as in other parts of the country there are significant opportunities in terms of manufacturing.

Labor costs are lower. You know, so the hope would be that overall contribution to the wind industry could be balanced in other ways besides just install capacity.

Charles Newcomb: Excellent. Andy here's a fun question for you. And I'd actually like to ask this both of Andy and Derek. But Andy do you mind answering first?

There's an individual online who's a recent graduate of the University of Michigan Department of Naval Architecture and Marine Engineering.

And they're in - currently involved in commercial vessel design. But you'd think that that person may have a play in the offshore wind space perhaps?

And what would their next steps be to a bit of retooling perhaps on the engineering side to be useful in the offshore space?

Andy Swift: Yes good question. My quick answer is absolutely. I mean as this industry tries to go offshore folks with those kinds of skills are - and background I think are going to be prime.

So then the question is as it is for a lot of folks out there how do you, you know, pick up the wind specific knowledge?

And, you know, I think there's a number of, you know, professional development courses. We offer some and they're all available online.

If you wanted to, you know, invest in a certificate or get a Masters in the area then you could, you know, I mean, you know, Jim Manwell's program, a lot of that's online. And they do both onshore and offshore.

Our graduate certificate for the technical side is available online and that's five courses.

And it's a significant investment to do that. But that's how I think you'd pick up the knowledge, skills, nomenclature, you know, kind of how this industry works information.

Charles Newcomb: Thanks Andy. Derek thinking about online courses and thinking about folks that are currently employed in this space and they want to transition over, do institutions such as yourselves offer any sort of distance learning opportunities?

Derek Johnson: Currently we were not. We just started a year ago so one of the things we're focusing on right now is to basically to master our dayshift.

And we're looking at possibly two years out, three years out before we can transition into online courses. So we want to master the program first and then branch off into night classes or online classes.

Charles Newcomb: Excellent. John I'm thinking about in ASHE specific, you know, the what is it, the society for or the sustainability...

Jonathan Miles: Association for Sustainability and Higher Ed.

Charles Newcomb: Thank you. I'm thinking of that as a national conversation amongst institutions that are interested in increasing the level of sustainability for their campuses and their operations.

And there's a question here on - from one of the attendees who's asking if there's similar conversations at the university and college level for college and universities that are involved in wind curricula. And if so how do they get involved so that they can learn from others?

Jonathan Miles: Hey well thanks for the opportunity for another shameless plug here.

One opportunity clearly is the - to participate for those who are going to be attending wind power to come to the Tuesday meeting of the Education Working Group.

I know there are a lot of attendees on here and I don't want to take too much time with that but maybe I can work with you and (Sue) to get the word out to folks as far as the location, the timing of that meeting.

That's a group that I've been involved with for a period of time, Andy as well and a lot of others.

And the one intention of that group that now falls under the auspices of the Workforce Committee within EWEA is to provide opportunities for folks who are involved with and interested in wind curriculum development to come

together periodically and share their stories and address some of the issues whether, you know, those are opportunities or challenges together.

Charles Newcomb: Great answer. Thank you.

All right so Andy there's a lot of people, I think a lot of technical people and very qualified.

There's an example here of a PhD physicist astrophysicist. There's a lot of those kinds of people that are gainfully employed but really curious about the renewables revolution.

They want to be part of the sustainable solution for nation's energy sources. And but they don't really know as a well-trained academic or even somebody in research how to transition over.

And I think you speak to that a little bit with your distance learning capabilities or opportunities. But what you do about somebody who's pretty far down an academic track? What do they do then?

Andy Swift: Yes I think if they're, you know, willing to invest in, you know, taking some courses I mean I think that's the way that you go unless you go right out and look for a job in the industry which you can do but online I think and I'm looking forward to as John talked about the EWEA Education Committee and more and more of the schools as they pick these up putting things online so that folks can sign up and take it online.

I mean that's been fantastic for us. I've got people in Afghanistan, in the Air Force, you know, taking wind energy classes, getting ready for when they get out.

I've got a guy from Bell helicopter who's in Italy wants to transition over. And so it's a way to do it without having to drop your work and go to school because it's just available online.

I think that's the answer but again it's going to take a number of universities to get involved in this and provide these offerings.

Charles Newcomb: Excellent. So Andy can I ask you another question? So we're seeing some big uncertainty in the market. And it's not just a financial crunch that we happen to be in but also the potential expiration of the PTC.

And we're seeing tremendous layoffs in the development space. And I think there is one large group last fall that let thousands of people go.

Do you see this as a kind of bough wake effect affecting your enrollment or as you mentioned there's such a - supply or demand is outstripping supply anyway.

You mentioned several times now that we need a bunch of universities to step up. Are - do you have plenty of applicants or you seeing that your numbers are actually getting weaker?

Andy Swift: Yes good question. And we'll have a better sense I think as we go into next fall because, you know, there - it's an energy industry.

Energy industries are typically historically up and down industries. You know, with wind it's PTC. With oil and gas it's price and volatility and EPA.

I mean so it's and up and down industry. So we'll have a better sense next fall but the interest of students coming in especially at the freshman, sophomore level to take the intro classes is still very, very high at this time.

How that will translate into people going into upper division actually declaring a major as opposed to a minor and things I think we'll have to wait and see.

Charles Newcomb: Jonathan do you have any follow-up comments on that? Are you seeing a similar thing or did we lose Jonathan? We might've lost Jonathan.

Jonathan Miles: Charles I'm sorry I'm back on. I had to step away for a moment.

Charles Newcomb: Okay no worries. Did you hear the question?

Jonathan Miles: I did not. Go ahead though.

Charles Newcomb: So the question is is we have a bit of uncertainty and I think Andy put it nicely in terms of the sort of boom and bust or up and down cycle that we see in energy anyway.

Are you seeing any now that we're, you know, a few years into the trouble spot and we're seeing, you know, the looming PTC question mark getting larger and larger are you seeing any ripple effects in your enrollment?

Jonathan Miles: No I would say not in the enrollment. You know, quite frankly I think at the undergraduate level the students' perception-wise are they're more focused on their interests, their local and immediate interests in terms of what they're going to study.

And, you know, I'm confident to counsel them to the extent that this is an industry that has gone through its ups and downs, is going to go through its ups and downs.

But over the long haul it's likely going to provide them as steady an opportunity as just about any other sector in the, you know, within the energy domain.

I'd say more at the graduate level we're addressing some of these issues on a more regular basis.

Maybe the sensitivity is there but my perception has been that if a student is really, you know, reaches a point where they've decided this is an area where they want to kick off their career I think even the notion that the industry may be in a down - a bit of a downturn doesn't tend to dissuade them from pursuing that.

Charles Newcomb: Thanks. You know, I think another alarming statistic is the amount of power engineers that are going to be retiring in the next decade and that there's going to be an enormous chasm and that despite the fact that our power systems are - have a higher degree of automation and maybe we can get by with fewer people many in the power industry anticipate that this is going to be a problem for us in the next five to ten years.

Andy do you - have you - can you provide any comments on that at all?

Andy Swift: Yes you make a good point. And it's a bit of an engineering focus. You know, as microcomputer stuff came along the power system programs all just kind of withered away at the universities.

And now we've got this demographic shift. And so a lot of universities are having to crank back up, Texas Tech being one of many across the country their power system program. And that's going to be needed.

I think a program that can provide some people with technical expertise in the grid integration of power system may help fill some of that.

But of course you've got to have the certified degree folks in order to actually seal drawings and do substation detailed design and these kind of things.

So yes it's an area. And I know that UWIG is focused on that and has had a number of workshops.

Charles Newcomb: UWIG being the Utility Wind Industry Group at uwig.org?

Jonathan Miles: Yes and they've changed their name. They're no longer UWIG...

Charles Newcomb: Oh that's right.

Jonathan Miles: ...they're what, Variable Resource...

Charles Newcomb: That's right.

Jonathan Miles: ...Industry...

((Crosstalk))

Charles Newcomb: I've got to get used to that. But we - but I promise to get used to it shortly.

Jonathan Miles: Okay.

Charles Newcomb: Okay so here's another fun one. There's an individual online who has been operating in this space for a time at the programmatic level.

And the question is this is someone with a liberal arts degree who's very interested in getting into renewables. And Jonathan I think this question is for you.

But there's a lot of other opportunities that don't require the technical degree and, you know, Andy was nice enough to sort of describe how if you're a technical person here's how you take your distance learning courses and you can get a certificate and how somebody at Iberdrola or some - or Horizon will happily hire you to help them on the technical side.

What would you say about somebody who is maybe a community liaison for a wind developer? How would somebody tool up for that to be able to transition over into that side, space within a development company?

Jonathan Miles: That is a good question. I don't know if I have the best answer to that but I'll offer what insight I can.

You know, one thing I've heard from the folks in industry who are involved in hiring, in fact one thing that really stands out still kind of a principle that sticks with me from a conversation I had from a blade manufacturer several years ago and at the time and he wasn't yet acquainted with our students in our program but I think he saw the merit in it.

Because what he shared with me is that generally he hired two kinds of graduates, an engineer or an English major.

And in either case, you know, the English major of course to participate in technical writing or any of the other number of things that an English major would be equipped to do or qualified to do.

But in either case his expectation is that he'd bring somebody in who had the appropriate degree and I guess, you know, general background but had his expectation that had zero or very little knowledge of wind in the wind industry.

What I'm getting at is this. I think that regardless of a background whether it's English engineering, something in-between, law, business and so on one of the things that someone can do who has valuable experience and I would not hesitate to say that almost any experience is valuable and can be applied in the wind industry, get involved, participate, get connected.

We encourage our students even if they're those who come around midway through their senior year don't have an opportunity to take a course, don't have an opportunity to engage in a project, well by golly we will help you if you're really that motivated and determined, help you find a way to get to a wind power conference and spend a couple days connecting and visiting folks in the industry.

Volunteer, come to exhibits that we do et cetera, et cetera. And, you know, somebody's willing to do the legwork and get themselves involved then I think there's always opportunity.

I think those who hire respond very well to people who can demonstrate a sincere motivation to find a role for themselves in the industry.

Charles Newcomb: That's a fantastic answer. So much of it is initiative, right?

Jonathan Miles: Exactly, yes.

Charles Newcomb: And then...

Jonathan Miles: And you know I'd say - I listed the kinds of jobs that our students have gone off and get and I missed one. I left one out. And maybe it's the most important one. And that is entrepreneur.

We have - and I missed a company too, Sustainable Energy Developments. And this was a company that just celebrated its 10th anniversary. They're based in - up in Rochester.

Charles I know you and some others know these guys who came through our program a long time ago, went off to work with established companies in wind.

And then they all jettisoned their day jobs and set up shop literally in their garage. And now they're doing very well in the space that they've carved out for themselves or regionally with small wind and small projects.

And these are guys who were, you know, not the best, necessarily the highest scores in my class when I encountered them. But my goodness I knew going out the door these guys had drive and motivation and they're some of the most successful graduates I've seen now and did it because they really believed in the field and wanted to work in it.

Charles Newcomb: And they are absolutely thought leaders in this space. There's no question about it.

Andy Swift: Yes Charles this is Andy. Can I add something else?

Charles Newcomb: Of course.

Andy Swift: Yes I think it's important as we move forward though and I think John would agree with this and Derek too but, you know, our three institutions and others across the country are trying to put in place a little more formal programs.

You can't, you know, replace enthusiasm and drive. On the other hand if we're really going to grow to 20% wind power in this country I think all of us who have programs started to realize that, you know, oh I've got a lot of enthusiasm but I have no idea how to do this 100 megawatt project development.

Or sure go down the hall and ask Bill. He did one last week and he'll get you started.

If we're going to be a serious industry and grow to where we hope to grow to we just need formal programs in addition to very energetic folks. And I'm happy for other people to jump in on that if they want.

Charles Newcomb: Andy I would echo that reasonably strongly because when you see people who are enthusiastic but who are missing some pieces it - damage can happen because they can get a project sort of teetering. And it ends up not going right. And when it doesn't go right it can create almost more trouble for those that try to follow later on.

So to a degree that would sort of speak to that there's in addition to your formal training there's apprenticeships if you will.

So working in a company and getting the lay of the land and understanding how the development process works, understanding all the pieces before you go out and try to do it on your own is really, really important. Because it's it looks easy sometimes to folks and there's the case studies out there but flailing is not what our industry needs. So there's definitely a place for traditional structured education, educational programs.

And I think that many would agree that if you can get into a company and work your way up and then jettison like the folks that SED did, once they understood a process really well and figured hey we can make a better mousetrap we know how to make a mousetrap, then that's a very good result.

All right well I want to thank the speakers very much for their generous contribution to today's effort.

And I want to draw your attention to our upcoming Webinars. Again these Webinars happen on the third Wednesday so they're fairly predictable. I don't think we've missed one in a while which is nice.

On June 20 since it's always helpful to have a fresh set of success stories and kind of know the back story behind those success stories. So it's not just a case study but you've heard from the people who actually put the project together and you can ask clarifying questions.

We've got that coming up on the 20th where we'll have a few exemplary projects that may have some fun details because there's always another way to do approach the - both the technical and the institutional and social problems or challenges around wind.

So that will be a good interest. It so is good to put a few more arrows in the quiver with success stories.

On - in July we're going to provide an update for community and distributed wind. I know we had some voices and among them was Kevin Shulte with SED back in March.

But it's been a while since we sort of saw how community wind projects may differ from the development side from to traditional wind projects, traditionally financed and developed wind projects with a large developer.

And there are some unique elements to that which are worth discussing at greater detail in July.

And again it's been a while since we've kind of heard how things are happening with the small wind space. What are their specific challenges, how are they overcoming them, how's the investment tax credit working out for them, where do they think they're going?

And then finally in August 15 we're going to revisit because I - it's an evolving space. Things move very quickly. New things come up in the space of social acceptance.

And so please look forward to that. That will round out our summer. And before we close I want to thank again the Department of Energy for its support and sponsorship of this effort.

Without their support and sponsorship none of this would be happening. And we would all be kind of making this up as we go. So thanks again to the Department of Energy.

And we look forward to having all of you attend the upcoming Webinars. If you have any questions there's a few contacts for you.

Jonathan Bartlett is our lead in Washington. And those of you know that Jonathan - those of you that do know Jonathan he's incredibly helpful and supportive. It's great.

And then both Ian and myself are on that list as well. So thank you very much. And again in about a week's time this Webinar should be posted up and memorialized on the Web site. And you'll be able to download the presentation at that point if you haven't been madly collecting screen grabs as you go. That's always an option.

All right, thanks folks and have a safe end of your week and weekend.

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