Room 205 Session II
Jane Disney, MDI Biological Lab
Increasing access to wind energy education in schools, and in installing wind turbines at schools, i.e., "Wind for Schools"

I'm from the MDI biological lab, on MDI in Bar Harbor, Maine. And we do a lot of work with teachers and schools and having kids come out with us and actually I do eel grass restoration and so the big conversation for all of us this summer-I have some teacher workshops and teacher internship opportunities-is around marine habitats and climate change. So we are actually trying to work alternate energy and climate change all into eel grass habitat restoration. There's so many infinite ways to link the work that scientists are doing with what teachers are teaching and what kids are ready to learn. It's amazing, the links. So now I have teachers interested in workshops and working with us who aren't biology teachers, but are physics teachers and physical science teachers and math teachers. You know, that's pretty cool. I had nothing to do with this so I'm going to turn this over to Sue Jones.

Sue Jones:
"Thanks for being here guys. I have two hats, I work in industry but I also work in essentially creating a non-profit called Windependents. My specialty, what I really do is what's called community wind. Locally owned wind turbines. Whether it's a small project that's a school size or farm size or whether it's a commercial scale project. We have over a hundred and fifty megawatts of locally owned wind turbine projects in the pipeline in Maine right now. That's about half of what we've installed right now, but which is owned currently it's pretty much by out of state companies where the profit go out of state and the landowners don't get as much of a benefit. I work on a number of different target audiences but one is schools, and so what I bring to the table is seven years of experience working at the national, state, and local level to educate and inform about wind; how it works, why it's good, what are the benefits, but my passion really is about community wind. This year in 2012, I've partnered with GP COG which is the Greater Portland Council of Governments. One of the things that we are actually releasing in September is a guidebook for municipalities to install their own wind turbines. A little known fact in Maine is that Massachusetts, of all places, has six times more installed capacity owned by municipalities than what we have right now. They have about 42 megawatts of municipal owned projects. We have probably actually about three megawatts, if you count biowind in there too it's more like six. So, we're on a learning curve. The concept of local ownership has been embraced in Maine. Many of the projects you won't hear about probably for another two, three years because of some of the opposition that has arisen many project developers and even towns and municipalities are really keeping things on the hush just because of opposition issues and not having the resources to really address it. So what I wanted to talk about today, and what I'm really looking for is feedback and potentially your ideas in how Windependents and the industry in Maine can help you with creating some sort of program, and I actually have a handout. The front page is the training and I hope you guys will all look by. On the back side is Wind for Schools. And Wind for Schools is a program that was created by the national renewable energy lab. It's in 12 states right now, we actually applied for a grant a couple years ago. There are no wind for schools programs, formal programs, under the DOE on the east coast, other than I think North Carolina right now. But Maine, Massachusetts, Vermont, all these states that have some very good community outreach programs were not awarded, and so these concentrated out west, Kansas, Colorado, and so on. Consequently,

we have not had the benefit of federal support to launching this program and unfortunately that puts us at a little bit of a disadvantage because that program has not only educated the teachers and you all in the basics and the curriculum, and the principals, but the students have been somewhat deprived. The opportunity has not been there. No more funding for the program. I'll be in DC next week lobbying for the funding, but I don't expect that any of us will be successful with the DOE of course because of all of the cuts that we have. But none the less, this is a model that we can replicate in Maine. And on the back you can see there's at least a couple of different providers of curriculum some of which is free that you can download right off the web and you can bring curriculums even as young as kindergarten and first grade and second grade, you can bring the curriculums to your classrooms. Now we do the training just to take it to the gold level, you not only will have a full week of training and advice and counseling and camaraderie but you'll also have a toolkit. You'll actually be making your own turbine, much like they did in the wind blade challenge, you'll be able to bring that back to your students and then know how to undo it redo it and take what you made over the summer back to your students. I can't speak highly enough about Kidwind, these guys have taught over 7000 classes, these guys are really laid back, they're nice they are funny and of course it's going to be held up in Bar Harbor, which is a pretty nice place to spend a week this summer. So what I would love is a discussion today about how industry and the nonprofit community in Maine can help you and support you in doing more or starting…Really what we're trying to do is create a more diverse group and elevate the level of education around wind energy. My own interest is really getting wind turbines installed in schools so that you have a teaching tool whether it be for physics, math, all the STEM related areas. But there's many different creative ways in which wind turbines principles are being taught surrounding biology and other areas. And Kidwind takes a very broad brush. They talk about what a plant impacts. They want you to think about wind turbines even beyond STEM. I did want to just let you know of the schools that I know of that are already doing some things in Maine at various levels; Jay High School, Portland Middle School, all of the Windblade Challenge schools of course are doing the windblade challenge. Over 70 schools are doing it, some with multiple teams which is amazing. Pittsfield, Oxford Hills has a sky stream, Camden High has this amazing northern power system, 100 coming in, it's being built right now, there's going to be a big ceremony in two weeks. Thorndike has sort of gone through the discussions, the community meetings, and I don't think it's really going anywhere, but at least that was definitely something that they went through the process and I think they've gotten stalled. There's a big project happening at Presque Isle which has yet to be announced…Obviously you know Northern Maine Community College has a whole training program, there's a waiting list every semester so far and it's been a very successful program. KVCC has a burgee right outside of their building. I wouldn't say that's the best site for it, but whatever. We're learning. And of course you've got University of Maine, Unity has done a lot with wind power, especially on the siting and the wind assessment side of things. And UMPI of course has a 660. It's a beautiful machine if you've ever seen it, it's right there on campus serving about 20% of the campus needs for electricity. And I just want you to note some of the dates on the horizon so that if you're thinking of becoming involved here's different places to learn more about it. Of course the windblade challenge is happening the end of April, the last week of April I believe. Wind senators training in Bar Harbor is the last week in July. AWEA, the American Wind Energy Association, is having a regional meeting in Portland, Maine. A day and a half. It'll cover everything from on shore off shore transmission, community wind. The dates are probably terrible for you. It's the fourth and fifth of September, maybe your first or second day back at school, but I just want to give you a heads up that without having a conference here by folks here like myself, I

have put on conferences, that's the best time. It's going to be a great conference. It's a regional conference. There'll probably be 3 or 4 hundred people there. Another thing, a project that's dear to my heart, that I'm totally integrally involved in, is right around that time September/October we're going to be releasing, we meaning Windependents, community energy partners, and Greater Portland Council of Governments, we're going to be releasing a guide book for municipalities, essentially a how-to, how to put in your own wind project. Much along the lines of creating some competition between Maine and Massachusetts. We've got some great examples in Massachusetts of putting in wind turbines. There's 70 communities in Massachusetts that are testing wind data, have put in their own projects. Situate just announced yesterday. Lynn, Saugus, all of the Cape, Falmouth's been kind of a bad example because of some of the opposition issues. Cape Wind of course. Hull Massachusetts has three projects they put in. The first one right next to their school, the second one on their land fill, and the third is going to be an offshore project right on their town beach. So Massachusetts is just full of these wonderful examples that we hope to replicate in Maine and there's lots of good information. So with that, I just wanted to sort of give that to you as a preface. And there's lots going on in Maine. A lot is sort of under the radar screen but I want to open up the floor and I want to listen and I want to hear how can industry and the nonprofit community help you achieve your goals with wind."

Audience member 1: What I really need is time. Cause I decided to try wind this year in tech-ed and that curriculum is downloadable, it's free, I just don't have time to look through it. I mean I do a little bit at a time and then I got a nice small grant from meek and was able to buy some of the hubs from key wind before the kids were making their own, they weren't really coming out that well so that was really nice.

Sue: what specifically, I mean time is one of those things, how…would it be helpful if someone came in and helped teach the unit or something like that?

Audience member 1: Or maybe like a session somewhere about, I don't think I can come up with $1500 for a meek but just sessions over keys of the curriculum or…

Sue: could it be done by a webinar maybe?

Audience member 1: Maybe, but I would probably take a nap instead…you know I'd probably go somewhere and pay attention

Sue: if you got a scholarship would you attend, be more interested?

Audience member 1: Maybe, some other curricular development, I kind of like to have fun sometimes…it sounds great you know, but I just don't want to book up my summer…I guess that's just it I think there are a lot of resources it's just a matter of finding time to focus on it.

Audience member 2: Yeah, and I'll just say for me, and I work out of schools, but I do a lot in schools also. I'm interested. Professional development, and I talk with teachers, well tell me why I should do it, you know other than philosophically we support that. You know economically tell me why should? What is the information I need to know. I need a crash course I need a one day here are the things you need to know, here are the activities that can bring you up to, what are the hands

on things that I can catch those teachers or the principal or the superintendent as I'm walking through school systems what are the pieces that will catch their attention? What is the need they'll solve and how does it connect with kids and standards. For me now can you do that in a day I don't know but that would be my wish list.

Sue: so if we did like a summit or if we did a one day workshop, bang bang bang,

Audience member 2: With a hands on piece that you can take to the school that will start the process.

Sue: And tell me more about that. What information do you need to get to yes?

Audience member 2: See I am not sure, that's why I need someone…I work in science I work a little in the STEM process but I work on experiential learning with kids so you know I come from science I come from agriculture. I come from a whole host of places in terms of curriculum. I don't know if everyone here is science gurus or STEM gurus or math gurus, but for the teachers I talk with and we talk about what about this and many of them don't have and I'm talking elementary, they don't have the background I don't have anything that I can take to the upper level that'll say this is the reason why…

Sue: a fact sheet or something or talking points

Audience member 2: but with hands on how does it match the standards of curriculum, how do I integrate that into what I'm already doing so it can be something else not an add on and then how do I move forward with that in an engagement process

Audience member 3: and I have to say that in the last session we talked about research institutions and what they could do to help teachers integrate rather than add on to what they're doing so I think that is a common theme that's probably happening no matter what issue we're talking about. In terms of real world engagement how does it get integrated and not added on to what teachers are already doing (17:30)

Audience member 4: I was just going to say, hearing some of the comments and hearing your suggestion about a one day workshop. I think that would be great where you build a wind turbine and build blades. You'll experience that whole thing, you'll test it, you'll see what the output is. Something like that would be beneficial for people that are thinking about incorporating this in their curriculum if they possibly can but the thing is sitting there and listening to somebody, turning around and doing it you know that's a different curriculum right there. And I think people would enjoy that.

Audience member 5: what I've found with the hubs is it takes so much less time that building their hub. So now what used to take a few days it took one day or two days. I mean I need to work more stuff in it from the curriculum like the math and science but I just haven't had time to learn it.

Audience member 6: I have to say, and I've seen this is schools, there's a lot of trial and error stuff I see going on around turbines, but when I heard, oh there's so much math and so much physics

I'm like I've never really seen teachers integrate that stuff. It's been more like a free for all, here's all this stuff you could build it out of kids tape stuff together, they try to make it work, it doesn't work, they try and tape it together again, you know. But at the end I don't know that a lot of math and science got integrated in those classroom activities, and so seeing the actual math lessons or the physics

Sue: something that's done after a turbine's installed

Member 6: or no, but even when they build the little models in the classroom I think it's a lot of trial and error and not a lot of math and science. That's just my perspective having walked into classrooms where this is going on.

Audience member 7: Well some of it is the experience of process depending on what framework you're coming from. You want them to test and trial, and then the comment is, ok if you're doing this and you're successful here's what the formula is, here's how you look at how do you build so that there's a relevancy that goes with that.

Member 6: Yeah before during or after, yeah. And I'd be curious about the wind turbine that went up at Pembetick, I'm not really sure how the students are using it now that it's up. So I actually thought that their curriculum was more fundraising around getting it up. They had a lot of fundraising but you know it all seemed like a lot of extra work on top of the curriculum for the teacher. She did a lot of the fundraising around it too. So how do you get funding for these projects.

Audience member 7: Is this website the website that I go to to try to figure out scholarship money? Is it the learnkidwindorg?

Sue: yes Joe Rand. Joe won't have the latest information on where we are with getting Maine money

Audience member 7: So I could write to him?

Sue: Or just call him he's great. What is on the website is they probably have ten scholarships available right now. But some are earmarked for the Minnesota utility person, like XL. There's two scholarships every year to them. So not all of it you'll be able to be eligible for but Paul Williamson and I are actively trying to raise money right now from the industry

Audience member 7: And my second thing that might help people is that there is a credit. A lot of people need certification credit. So it's a seven day class, you could probably get six credits for your five years that would probably take care of it.

Sue: so how do we get it accredited, what's the process?

Audience member 7: you probably have to go in front of the people in charge of the education department

Sue: one of the things kidwind has done is they suggested hiring a standards person in Maine to

help conform it I guess, which is a little different I think than what you're talking about, but I'm pretty sure they have done some types of….ok so just contact Anita. Does that take a long time?

Audience member 7: I can do CU and that's different than accreditation, but I can do that in a 48 hour period of time.

Sue: and how many do you need a year.

Audience member 7: over five years you need 90.

Sue: and is that equivalent to 90 hours? Question for you all, with the conference coming up. Conferences are a great place to interact and there's still time where we could potentially do something at night if there was interest. What's the likelihood, would you be interested in something like that if we could pull some of this stuff together? Get funding together. I don't know if it's even do-able but. The fourth and fifth of September is that even do-able? I just needed to confirm that.

Audience: you could definitely throw that out for like mid-November…October's a better time

Sue:Ok…AWEA wouldn't do it for it's sections because it's a money maker for them. But we could do that. Paul and I could do something like that.

Audience: There's lots of online web conferencing that could handle like 200 people that could just dial in.

Sue: one of the folks who will be at the conference is Larry Flowers who is one of my mentors and he helped start the national wind for schools program. And there's a chance he may be able to come back in the fall again a second time. He's been to Maine like four times and presented on wind for schools. But he would be a great person to present to you guys about starting programs, encouraging programs, finding funding and resources.

Audience: the wind is very good for physics. There's your core, you've got to deal with magnetism, you've got to deal with electricity AC/DC converting, it's a perfect place for a teaching thing and then monitoring and constantly watching because the wind doesn't blow all the time. And so when it does, what are we getting, what do we do with it. I mean there are things that you can do, cause that's what you were talking about, what can I do with it. There are lots of…there are just little things, you can monitor it 24 hours a day, but that's data collection, and then you take that data and then you extrapolate over certain times and see what we can do with it, you know like spreadsheets and that sort of thing. So there's a lot of creativity that can come out of it if you understand what you've got.

Sue: right. What if you didn't have your own wind turbine? In Massachusetts there's a couple of schools that have real time data collection. You can go online and you can check exactly what that wind turbine is doing at any time. I think Camden is going to have this as well. How can we create a system where you all can get trained in how to access that data? So that maybe you could do some comparative studies with this school verses that school on a given day.

Audience: yeah, the kids now adays are using their telephones, small aps

Sue: yeah you can plug right in

Audience: it would be a readout of what's happening at the wind turbine in Medford, another school that is producing

Sue: schools out west are connected. And one of the things in Maine I've thought about is funding. We've had some anemometers that are up. Not in terribly windy areas I will admit. But none the less they capture data and many of them are still up I believe. But if the general public at large had access to this information, there's a lot of learning opportunity that could happen in that sphere just by knowing that it's available. It's public. From the developers you won't get their windbag for obvious reasons because it's totally confidential. But where the public funds have gone towards data collection at public sites we should be thinking of ways in which we can make it

Audience: there's a couple companies, you're talking about anemometers, there're weather stations, and they're not real expensive they're in the 3-4 hundred dollar range that are monitoring not only the wind but then you get your pressures, and so now we're talking about a different science than physics though it is also physics, so now you can expand out into different parts of you know how is that going to effect our growing season for a greenhouse or what

Sue: and now we're seeing climate change is impacting our winds big time, so Northern Maine is one place where we're seeing decreased winds as an example whereas in the Midwest it's increasing. The gps is another thing, for you know chaching. There's whole examples of how curriculums have been developed for siting. You know how do you pick the right sites? It's not rocket science ,it's where the wind is.

Audience: just the height, just raising and lowering it, that's a whole semester of just raising and lowering, let's find the peak thing…I mean there can be a lot of fun things to do once the students understand what they're doing.

Sue: there's one other thought I wanted to pose, and that is, in Maine we have a policy called net energy billing. Is anyone familiar with that? Windependents did a workshop on this in January we had a hundred five people it was not here for teachers but it was here for engineers, folks who are actually designing putting in projects, mostly you know half megawatt and below because that's where the policy threshold is at 660. So what it is, is it allows ten electricity meters to be aggregated to take power from wind project or a solar project and type of energy project. The result of which is it helps to finance projects through a shared ownership model or shared off taker model. Why is this important to schools? Because ten of those entities could be schools, each putting in a little bit of funding, you know I know the idea of doing one project by yourself can be pretty daunting but if you have ten schools together sharing the costs and the risks and sharing information, sharing the process, that might be a way in which to get a larger project in the ground. The larger projects tend to have a better payback they're much more efficient, they generate much more power per dollar, so it's a way in which you could potentially partner together and share resources. I wanted to make you aware of that. The other thing is schools don't have, the particular

areas don't have to be contiguous or even adjacent. What this means is…where are you from? Sydney, and I'm from Freeport and you're from Falmouth, and where are you from? York. We're all in CMP territory. Because we're within that particular territory, these four accounts, our electricity meters could be aggregated and could support a wind turbine or solar or whatever

Audience: So it's not like they're actually sharing the electricity coming out of that turbine

Sue: Exactly, it's all done on paperwork. And say none of us are in a windy area, I'm not in a windy area, but we partner with a farmer out in western Maine who just had a bad year that has a hilltop or a good wind site,he could be our fifth partner. And so we don't have to be connected. And so I want to plant this seed for you because I want you to be thinking of these synergies, not only getting turbines into your schools but who the partners could be. It could be a town library, town hall, town school, it could be a farmer in Western Maine with an island. As long as it's within a T&D territory, which means CMP, Bangor Hydro, Maine Public service, within each of those territories, up to ten accounts can be combined. And so it can create some additional types of learning opportunities that I think could be kind of interesting. There was a notion of urban/rural that came out of one of the workshops and I thought, oh net energy billing take that. It's all done by billing, it's done by paperwork.

Audience: but that opens the door for one school who's doing this and other school who's doing this to say hey we're doing the same wind why don't we

Sue: exactly, and partnerships, and sharing the work and the resources and experiences

Audience: you don't have the time to learn but somebody else is already building it, so why don't we just share some of that information

Sue: one school could take on siting, another school could take on financing, another school could take on community outreach and each could be a sub project. It makes for an interesting set of synergies and collaborations

Audience: and that's what everybody is shooting for, to open up and the opportunities not just in wind but solar any of the green or whatever you want to call them, energy efficiencies all fall into this cradle of collaboration that we should take advantage of. Just little stuff for teaching. Putting out a little black box with some hose running through it and generating heated water and so the students can see it isn't new technology but it is new to them, I mean it's been around and you watch it heating the old we used to have they were cigarette lighters when cigarettes were fashionable that you would bring camping with you and you just put your cigarette in and point it at the sun and it lit. now the old magnifying glass that we did when we were kids, just what you can get out of solar energy is just amazing and great teaching tools.

First speaker: So the big question is how does this conversation inform what it looks like when we do STEM teaching and writing and what we were talking about at the end seems to be such a great model. Clearly when schools collaborate it's going well and when industry collaborate with schools there's more potential, more possibility, and take some of the burden off the teacher who doesn't have time. Any other thoughts on how this conversation informs what it looks like when

we're doing this teaching and learning well?

Audience: Could I go back to the turbines for just a second? Because how it becomes STEM related is that it's not just building wind blades and pointing it towards the fan and seeing if you light up the meter or not. It's learning about different gearing systems and how that increases the output of blade design, angle of the blades, so you really have to get in depth if you're going to do something like this with kids and they love it. Tilting the blades at a certain angle makes a difference, what are they? Measure amount. So then you're incorporating all that so I just wanted to throw that out.

Speaker 1: There is room in here for real deep content as well as process

Audience: And do two sets of blades don't just do one

Speaker 1: So you always have a comparative

Audience: I for the first year this year wanted to do something with turbines and teach 8th grade. We built our own out of wood and what we did was we used fans. We did it where they had the turbine and their job was to run all six simple machines off of it, so it was the gearing, the linkage all that. There was a lot of trial and error. The first time I'd done it so it was mostly trial and error with the kids but afterwards I had them figure out the mechanical damage of the levers and we had pulley systems. Next year hopefully I'll do a lot better, but there is a tremendous amount there, but it wasn't with electricity. And I went to home depot and I bought plywood which I cut up for bases for them and two by fours I got screw drivers and drills and stuff so it was a lot of hands on stuff it was amazing kids who had never had a tool in their had before what they learned from that and what I learned. It's like holy cow, you've never used a screw drivers before, pick up that screw driver and do that. So that was amazing. I liked it because a lot of them used like a linkage or belt system and learned a tremendous amount that way without even the electrical part of it, which I'd like to get to, but it was still future thinking of using the wind, harness it basically

Audience: If you don't have the little LED meter that they have through kidwind then get that, I'd like to see the lights light up, and when they light it up like a Christmas tree they think that's absolutely wonderful. They don't like the meter they like the LED lights.

Wiring your own generating, getting the wire and wrapping it and seeing how with a little magnet beside it and see what they can produce.

Speaker 1: So I think even in the last session we'd already kind of touched on all these topics by the time we got to the end. We talked about what partnerships that support students look like, there's your organization and then there's other organizations but then there's the power companies and each other, any other partnerships we didn't explore in here?

Audience: there's a place up in Augusta called ACAR and they have their own wind turbine and they did it as a family business and they expect that in 7 years that they won't pay an electricity bill ever again and that it'll be paid off. It's right on state street or whatever that street is between Hollowell and Augusta. Right beside healy tire. His name is Al and he's happy to talk to anyone.

Speaker 1: and so given our different roles what specific steps can we take that will support STEM?

Audience: taking it at the first level and really making sure that you're addressing the technology piece and the math piece and the engineering piece

Speaker 1: Right that next level that sometimes is hard to get at and that's where I think a place where there could be support as well from the department of engineering at the University of Maine and institutions as well.

Audience: And the big push is for females in engineering right now. So if you can spark and interest and get girls interested at that level that's what they're looking for.

You might be able to find government money. We've done higher education. We've gotten lots of grants just to bring in women or minorities. Either one just to do projects, and raising from one to three is big time. The Dept of energy I'm sure has got something on their website that if you dig through I'm sure you could find money for that.

Sue: we have a grant pending right now that would provide scholarship to a woman teacher for the full week wind senators course. So I'll find out from the Maine women's fund next month whether we get funded or not but we're really trying to push that. I did two years in mechanical engineering, hated it and became an environmental lawyer. So I personally understand why it's so challenging as a woman in the engineering field and that's exactly why I put in that application. If you know anyone at the Maine women's fund, put in a plug for the Windependents GP Cog application.

This was a great discussion. You guys are awesome. You have a lot of great ideas and now we know there's a few more resources.