

Offshore Wind Working Group

Wednesday, November 29, 2017

9:00 a.m.

Public Service Commission Hearing Room

861 Silver Lake Blvd.

Dover, DE 19904

Meeting Minutes

Members present:

Bruce Burcat, Chair
Senator David McBride
Representative Ronald Gray
Representative Trey Paradee
Robert Howatt, Public Service Commission Staff
Drew Slater, Public Advocate
Mario Giovannini, Delmarva Power and Light
Mark Nielson, Delaware Electrical Cooperative
Dr. Jeremy Firestone, University of Delaware
Jeffery Gordon, American Birding Association
Guy Marcozzi, Duffield Associates
James Maravelias, Delaware State AFL-CIO
Brenna Goggin, Delaware Nature Society
Collin O'Mara, National Wildlife Federation
Brenna Goggin, Delaware Nature Society

Members absent:

Jeff Bullock, Secretary of State
Patrick McCullar, Delaware Municipal Electric Corporation (DEMEC)
Senator Harris McDowell
Shawn Garvin, DNREC
Albert Shields, Governor's Policy Director

Designees present:

Doug Denison, designee for Secretary Jeff Bullock
Scott Lynch, designee for DEMEC
Jordan Seemans, Legislative Assistant, Office of the Governor
AJ Dillione, Legislative Assistant for Senator McDowell

Staff to the Working Group:

Thomas Noyes, DNREC Division of Energy & Climate

Consultant:

Max Chang, Synapse Energy Economics

Bruce Burcat started the meeting at 9:13 a.m.

Administrative Matters

The Working Group reviewed the meeting minutes from November 15, 2017. Drew Slater requested an amendment to the draft minutes, which he agreed to provide in writing.

The first public comment workshop was held on Monday, November 27th in Middletown, DE. During this meeting, Deepwater Wind and US Wind gave brief presentations, but it was noted that the working group has not contracted with either group. The goal of their presentations was to provide information about offshore wind in Delaware.

The next public comment workshop will be held on Tuesday, December 5 at 6:00 pm at the Lewes Public Library (111 Adams Avenue, Lewes, DE). Please note that a calendar invite was sent out by someone not in state government stating a wrong location for the public meeting. To ensure that the public has the correct location and time for the meeting, a press advisory will be sent out to confirm the correct dates. The working group and DNREC are looking into this incident to determine if it was simply a glitch, or if it was done with a malicious purpose. Please disregard any event invitations from non-working group members.

Mr. Noyes said that everything presented at the public workshop will be posted on the working group website (www.de.gov/offshorewind). A stenographer was present at the meeting and the transcript will be posted on the website as well.

Discussion of Offshore Wind Analysis

Mr. Noyes gave a presentation to the group on the price effects of offshore wind to ratepayers. The analysis of rate impacts used public data: DPL integrated Resource Plan (IRP), Maryland PSC Order 88192, Levitan report on Maryland OSW, and EIA sales for Delaware’s three utilities. The analysis used simplifying assumptions of no change in DPL’s 2016 RPS projections and no change in REPSA.

A hypothetical wind project was used for this analysis, based on what would happen if Delaware bought the Skipjack project in 2020 and the Maryland net OREC prices are based on the Levitan report (Levelized: \$76.79; Net OREC: \$85.28). Based on these assumptions, the following chart was developed:

Delaware Offshore Wind Customer Impact

Input	Value	Source	Formula Notes
MD OREC levelized (2012\$) (\$/MWh)	\$131.93	MD PSC Order 88192	[a]
Year One OREC (2016\$) \$/MWh	\$145.26	Levitan March 27th Update Table 44	[b]
Year One Net OREC (2016\$) \$/MWh	\$85.28	Levitan March 27th Update Table 44	[c]
DPL Exposed Load average (22/23 and 23/24) (GWh)	6,471	DPL 2016 IRP Table 8	[d]
Project Size (MW)	32	Input	[e]
Capacity Factor	43.3%	Levitan Report ES-28	[f]
Monthly Consumption(kWh)	1,000	Input	[g]

Calculations	Value	Calculation Notes	Formula Notes
Gross OREC Impact to Net OREC Impact	58.7%	[c]/[b]	[h]
Annual Production (MWh)	121,379	[e]x[f]x8760	[i]
Annual Gross OREC Cost (2016\$)	\$17,631,450	[b]x[i]	[j]
Net OREC Cost (2016\$)	\$10,351,164	[c]x[i]	[k]
Gross Impact on Residential Rates Year One (2016\$/MWh)	\$2.72	[j]/([d]*1000)	[l]
Net Impact on Residential Rates Year One (2016\$/MWh)	\$1.60	[k]/([d]*1000)	[m]
Rate impact year one per \$1MM spent	0.15	[l]/([j]/10^6)	[n]
Gross Monthly Bill Impact for Year One OREC	\$2.72	[l]x[g]/1000	[o]
Net Monthly Bill Impact for Year One OREC (2016\$)	\$1.60	[m]x[g]/1000	[p]
Annual Gross Bill Multiplier per million Year One OREC	0.15	[o]/([j]/10^6)	[q]
Annual Net Bill Multiplier per million Year One OREC	0.15	[p]/([k]/10^6)	[r]

Sources

- MD PSC Order 88192
- Levitan March 27th Update Tables for MD PSC (ML 214210)
- DPL 2016 IRP

Dr. Firestone noted that this table is for the first year impacts. He recommended looking at levelized costs as well and suggested the working group should use numbers from the EIA report, which would provide the best numbers for residential usage. Tom Noyes noted that a cost calculator was developed for this purpose. Mr. Noyes will circulate this calculator to the working group.

Drew Slater requested that if the working group decides to use levelized costs that the group looks past the first year. He would like to see actual costs for five to ten years in the future. Tom Noyes stated that for the purpose of the report to the Governor, if there are different ways to look at this, both of these numbers (levelized vs. actual), will be included in the report. Jordan Seemens asked if there is a way to capture industrial prices as well.

Mr. Slater suggested capping the industrial amount at 75,000 MW and also mentioned that the working group had not talked about any of the Maryland assumptions yet. Mr. Noyes commented that fully capturing all of the permutations in the Maryland Law might be more work than the working group has time for right now. However, the group can look at rate categories. Secretary Garvin stated that although the working group is focused right now on putting out a report, this is just the beginning of the discussion of the potential for offshore wind energy in Delaware.

Mr. Slater reiterated that the working group should talk about whether there is a cap for industrial numbers. Secretary Garvin suggested that the working group talk about the principles of a cap, but that crunching numbers would be unnecessary at this time.

Mr. Noyes presented calculations of Delmarva bill impacts from a hypothetical offshore wind farm:

Project Size	Gross Monthly Rate Impact	Net Monthly Rate Impact	Gross Monthly Bill Impact	Net Monthly Bill Impact
(MW)	\$/MWh	\$/MWh	\$	\$
8	\$0.68	\$0.40	\$0.68	\$0.40
16	\$1.36	\$0.80	\$1.36	\$0.80
32	\$2.72	\$1.60	\$2.72	\$1.60
64	\$5.45	\$3.20	\$5.45	\$3.20
128	\$10.90	\$6.40	\$10.90	\$6.40

Assuming monthly usage of 1000 kWh

Mr. Noyes presented a slide showing the overall costs for all utilities:

Project Size	Cost to DPL	Cost to DEMEC	Cost to DEC
(MW)	\$ millions	\$ millions	\$ millions
8	\$2.59	\$0.79	\$0.55
16	\$5.18	\$1.58	\$1.09
32	\$10.35	\$3.17	\$2.18
64	\$20.70	\$6.34	\$4.37
128	\$41.40	\$12.68	\$8.74

Mr. Noyes said that these calculations took the net OREC price from the Skipjack project and applied these assumptions to Delaware.

Dr. Firestone noted that recommendations would have to be enacted through legislation. The working group is not intending, or able to, make any near term commitments for a price or specific path, but

Delaware should not avoid taking any action because of potential “what –ifs”. Drew Slater commented that there are a lot of additional costs and a lot of additional uncertainties. The working group has to look at costs that Delaware will accrue before then.

Mr. Marcozzi asked what is the delta cost compared to other renewables. It was noted that the net OREC number is a premium number compared to other renewables.

Mr. Noyes asked Mr. Slater to write up a paragraph with what is happening in Maryland. Mr. Slater stated that he has a chart that has all of the costs that will come into effect even before offshore wind goes into effect.

Discussion of Environmental Issues

Mr. Noyes started off this discussion by showing a table of projected avoided emissions. These numbers are from a report that PJM publishes annually showing the NO_x, SO_x, and CO₂. Average emissions show the most conservative number, so the working group members and DNREC Staff have been using them in calculations and analysis for the working group’s work.

Avoided emissions from a 200 MW wind farm	Units	CO ₂	SO ₂	NO _x
Annual				
PJM average	Tons	373,667	497	283
Buonocore, et al.	Tons	455,000	1,495	618
Lifetime (20 years)				
PJM average	Tons	7,473,331	9,944	5,650
Howatt (Levitan)	Tons	9,900,000	118	13,686

There is a University of Delaware and Synapse report that was referred to briefly a few weeks ago that modeled a wind farm and its impact on emissions in Maryland. Those numbers are higher and assumed a 200 MW project. This project was collaboration: Synapse modeled the PJM grid and integrated the amounts of offshore wind slowly into the grid over several years. It should be noted that this model was for all of PJM, and not specifically for air flowing into Delaware. Synapse will provide the assumptions used in this report to the working group.

Mr. Seemans asked if the air emissions numbers can be quantified in a more accessible way. For example, communicating emissions reductions in terms of how many cars would be taken off the road, how many coal plants would be shut down, etc.

Mr. Howatt asked if the PJM average include nuclear energy. Mr. Noyes said that yes, it does include nuclear energy.

Mr. Burcat noted that a few weeks ago, when Bob Howatt presented on costs, that his number was higher than the PJM average. Bob Howatt responded saying that the Levitan report studied a PJM mix

with coal. His presentation used numbers that showed gas being displaced. Tom Noyes mentioned that we will need to clarify that in the report.

Mr. Slater stated that the Levitan report was made for the Maryland PSC, and said that there is some discussion in the report that offshore wind could potentially provide more emissions in Delaware. According to the report, offshore wind will displace onshore wind west of Delaware (source: Levitan report, p. 92 and p. 160). Therefore, more coal will be used in states west of Delaware causing more emissions to enter Delaware due to air currents entering Delaware from the west. Mr. Slater provided this excerpt from the Levitan report for inclusion in the minutes:

We found that carbon emissions in Maryland would decrease as in-state power plants operate less frequently due to the US Wind *and Skipjack* Project(s) as shown in Table 28 *and* Table 47. Since the US Wind *and Skipjack* project would be interconnected to the DPL zone, power plants in other EMAAC states, i.e. Delaware, Pennsylvania, and New Jersey will also operate less frequently.

The market response that will displace 372 *and* 186 MW of planned onshore wind resources in western and central PJM will cause carbon emissions to increase in western and central PJM due to increased coal generation. Since coal generation is more than twice as carbon-intensive as gas-fired generation, the decrease in gas-fired emissions in MAAC region is outweighed by the increase in coal emissions in western PJM, and overall emissions in PJM would increase due to the US Wind *and Skipjack* Project(s).

Source: "Evaluation and Comparison of US Wind and Skipjack Proposed Offshore Wind Project Applications, Revised Public Version, prepared for the Maryland Public Service Commission. Original – December 11, 2016, Revised – March 17, 2017."

Mr. Burcat said that is critical information that should be in the report, but it should be noted in the report that there are other counterpoints and assumptions that have positive impact.

Mr. Noyes said that the working group has been trying to figure out how to get all of this information into the report. He said staff will put the Levitan report along with the numbers presented during this meeting. There is a PJM renewable integration study that says overall emissions will be reduced by more renewable integration into the system. Mr. Noyes said we are not going to try and debate these two points, but instead we will post both studies up on the website.

Mr. Burcat said that this report is a means to get to the next stage in determining if offshore wind development is right for Delaware. We want to put all the information that we have considered in the report so that the Governor can make a final policy decision.

Mr. O'Mara asked when the Levitan report was finalized. Mr. Slater responded that the report was finalized on March 17, 2017. Collin O'Mara asked how that report reconciles with the number of plant retirements coming up. Mr. Slater said that the report says that coal would be replaced by natural gas. Mr. O'Mara discussed offshore wind environmental impacts in Delaware. He said there are some animals that would be affected by an offshore wind farm off the coast of Delaware including: the North Atlantic right whale, sea turtles (which will move further North as ocean temperature get warmer), and sea birds (loons, scoters, gannets, etc.). Sea turtles are coming up further North as ocean temperatures get warmer. However, the further the project is from the shore, the less conflict there will be with

wildlife. It should also be noted that a lot of migration patterns of these potentially affected birds are seasonal and could be planned for with the developers to minimize impacts.

Mr. O'Mara explained that any offshore wind project in Delaware should try and minimize wildlife impacts. In Rhode Island, there have been agreements to have a construction schedule that would prevent impacts on northern right whales. The data is getting better and better on how to minimize impacts, and potential impacts are not a reason to take no action, but provide options and things to consider. Animals are smart; therefore they are not going to swim right into a turbine. However, there are concerns regarding effects from sonic studies during the development phases and impacts to wildlife during installation of the turbines. Mr. O'Mara said that his group can provide maps on habitat areas and information on migration times for the potentially affected wildlife.

Mr. O'Mara cautioned that when considering the impacts from offshore wind compared to other types of energy resources, we should do an apples to apples comparison. The working group has to look at how mammals are affected from use of coal and natural gas (extraction, production, etc.) energy resources. One-third of all wildlife species are at risk for extinction within the next century and we have to help prevent this from occurring by fixing our energy system.

Mr. O'Mara said offshore wind has the potential to actually increase fish populations. When turbines are installed, they can act as artificial reefs. In Rhode Island, some of the best fishing areas are located near the Block Island turbines.

Ms. Goggin mentioned that mitigation and avoidance should be taken into account to avoid wildlife impacts. There is not currently a lot of scientific data in the United States on migratory impacts. Jeremy Firestone stated that he hopes that the working group is proactive and not just doing studies before these projects go in, but after they are installed as well. This will allow for Delaware to learn for future offshore wind projects.

Mr. Marcozzi asked if there is there a net environmental impact. Mr. O'Mara commented that there is less of an impact compared to other sources. When a project is built offshore, there are fewer species that could be collided with.

Mr. Nielson asked if the National Wildlife Federation participated in Maryland discussions. Mr. O'Mara noted that we need rigorous transparent data collection and have to be mindful about doing it the right way. He also said that there are opportunities to look at the interconnection potential for offshore wind. For example, developing strong dunes is important to wildlife, and these could be potentially impacted from transmission lines.

Key Decisions Facing the Working Group

In regards to how large of a project we should explore, Secretary Garvin said that the bookends for the group to consider are a large purchase where legislation created and doing nothing at all. Based on all the questions that the working group has discussed, there is still a whole list of issues that will need to be discussed before we can get to any decision. One option is to identify all the options available to the Governor in the report. The group should get answers to some of the math questions that were asked and have a discussion on November 11th as to what options should be recommended to the Governor. Drew Slater said that the public comments were good at the first public comment workshop on November 27th. He went on to say that the public does not know what they are commenting on because details have not been provided anything to comment on by the Working Group prior to the meetings.

He proposed asking the Governor for more time for the final report and to present the options considered by the group to the public and get their comments after they have been provided the opportunity to review the group's work.

Secretary Garvin responded saying that the working group has discussed having a public comment on a draft report that will be sent to the Governor on December 15. Drew Slater stated that his concern is that a draft report may be interpreted as a final report and he is very concerned about a public comment section in the report since there is nothing for the public to comment on.

Ms. Goggin asked what the report to the Governor is going to look like. There are a lot of unanswered questions and there are too many unknowns. We should reframe the report to focus on the questions that we have and recommending how the governor goes forward to collect that data. For example, we talked about the potential for port development, but have not had a representative from the ports come to speak about their needs and experiences.

Mr. Seemans said the Governor is at least expecting a progress report so he can see the sort of recommendations being considered. Mr. Seemans said as a reminder, under the Executive Order the working group is active until the end of legislative session.

Mr. Slater stated that he would be okay with calling what is presented to the Governor on December 15th a progress report, but not calling it a draft report.

Dr. Firestone noted that there has not been a real attempt to educate the public on energy choices. The working group should hold engagement sessions in January to have a back and forth to allow for us to have a discussion with the public. This will allow the public listened to and fully engaged in the process.

Mr. Slater stated that he was concerned because there is still new data and associated unanswered questions being presented at every working group meeting. He said he is hesitant to move forward when there are still so many variables that are unknown. One gentleman at the public comment workshop stated he did not know what to comment on because there were still so many questions. Collin O'Mara said one way to accomplish this is to present a series of options in the report. Don't put a thumb on the scale, just layout the options to the Governor's office. The working group has ballpark impact numbers and has two decision options to consider: does Delaware jump on the opportunity presented by the Maryland project or do we build our own projects?

Mr. Marcozzi said that he also liked the progress report idea. Perhaps the group can frame this as "we know that this will cost more and it is not driven by the need for more energy but we know it is a nice thing to do and it might have environmental and economic and health benefits that would be good." Then, we can focus the public debate on those items. He believes that's where the working group will get meaningful comments.

Dr. Firestone stated that the costs are not entirely known because we do not know if the cost of fossil fuels will go up in the future.

Mr. Seemans said that the Governor selected the working group to advise him. Everyone selected is the brightest in their fields.

Mr. Slater said that Deepwater Wind and US Wind have gone forward and said that we need to build an offshore wind project quick and fast. Drew proposed that Delaware should see what Maryland does

before we move forward. Why not learn from them? By the time that New Jersey does offshore wind, perhaps Delaware could ride on their coattails. He would be very reluctant to move forward quickly on the Maryland project, and said that Delaware has been burned three times before by moving too quickly. Jeremy Firestone commented that with that logic, Delaware should not have started SRECs until this year when prices went down. That implies that Delaware should not do anything and make progress. All citizens have an obligation. If all we want to do is wait, than all we have done is waste our time for the last few years.

Mr. Burcat said that our progress report should represent both of those positions and say that the group still needs to address those issues. These are things that we want to get more public comment on. Mark Nielson said that he does not think that the working group will ever have consensus on one recommendation. Bruce Burcat said that perhaps the working group will have a vote, but still comment on what others in the group think.

Mr. Howatt said that there are three possible scenarios: 1) sit back, see what happens, and look at other renewables 2) Go with a 50 MW plant and add on to what other states do, meaning that Delaware will learn something, but won't make any progress 3) Go with a 200 MW plan, where Delaware will get some attention, and maybe convince the developers to pay to upgrade the Delaware City Port. No matter which of these you pick, there are a series of questions behind each option. I think those are three options that need to go to the governor. Bruce Burcat added that perhaps under each option, the report can include the pros and cons of each scenario.

Mr. Slater stated that the working group has talked about the supply chain. If the companies wouldn't look at Delaware for a supply chain if there is only a 50 MW project, then that's a reflection on the company for not looking at lowest cost. We don't have a lot of manufacturing, but we do have the University of Delaware and Delaware Tech and technical high schools that could train future employees. Companies are going to look at lowest costs, not the number of MW available.

Secretary Garvin suggested that the working group put together a list of the questions that still need to be answered. Jordan Seemens suggested that the group give the Governor a menu of options with the pros and cons of each. He reminded everyone in the working group that they have a reason for being here, and can use those skills to help the working group.

Representative Paradee said that he is not convinced about the environmental benefits of an offshore wind project for Delaware and is concerned about job losses. There should be a study on how many jobs could be lost or gained. He is not convinced that there is any benefit to the people who live in his district. The working group should not talk about moving forward unless there can be some demonstrable benefits to our constituents. There needs to be a cost-benefit analysis done. Representative Paradee said he could not support putting forward legislation without a solid cost-benefit analysis that can be taken to constituents. As someone who might be in a position to vote for something, we need to see that there is a benefit to Delawareans. Secretary Garvin reiterated that the Governor had the same questions and the working group is here to answer them.

Representative Paradee said that the working group should be exploring the potential to invest in other renewable energy technologies. Bruce Burcat said that if the working group went the route of including a suite of options in the report, this should be one of them.

Representative Grey said that one thing that has not been brought up is the view. It would be helpful at the public hearing to show the images of what the turbines will look like. He keeps hearing about the

costs. Unless the environmental gains are high, he doesn't see what the benefit is. Secretary Garvin said that one of the reasons we had the developers at the public meetings was to show the viewshed impacts of the Maryland projects. Jeremy Firestone said that the University of Delaware has a lot of visuals that they would be happy to provide. Tom Noyes said that view shed pictures will go up on the webpage this week.

Dr. Firestone also stated as a follow-up to Representative Paradee's comments, why did Delaware have SRECs? The costs when they were first developed were very high.

Mr. Howatt said that we understood the issue about the viewshed, and it is a concern. Maryland is moving ahead with their projects and the viewshed will be what it's going to be. Representative Grey said that he thinks Delaware should have been more vocal about the viewshed impacts in Delaware from the Maryland project.

Mr. O'Mara said that the cost of the status quo is not free. Living through hurricanes, 50 MW is not going to have an impact to prevent climate change. One option to look at is Delaware redirecting some funds from other projects towards these projects. Mr. O'Mara would rather have costs for renewables go into Delaware and not out of state. As a state that is going to be disproportionately affected by climate change, if Delaware does not lead by example, we are going to fail our citizens. Mr. O'Mara stated he is concerned about climate change impacts, and Delaware has to lead because the federal government is not leading.

Representative Paradee said that wherever REC dollars go, if it leads to a better environment and costs for Delawareans, it shouldn't matter if it is in Delaware or Western Pennsylvania. If Delaware cannot demonstrate the benefits of an offshore wind project, what is the problem if RECs funds go to another state that is doing renewable energy? Collin O'Mara said that if energy goes out of state, Delawareans have less control. Delaware should have gotten more generation in-state years ago to reduce costs. Delaware could be the nexus for the industry. Bruce Burcat said that these two positions will be reflected in the report

Secretary Garvin noted that Delaware was an extremely active voice in Maryland regarding offshore wind energy, but Delaware did not have any leverage. There was nothing in that project that Delaware controls, yet it is happening off our shores. Drew Slater noted that Delaware will get some benefits from Maryland's project. We do help climate change and get benefits, even if we do nothing in Delaware.

Schedule and Agenda Going Forward

The next working group meeting is scheduled for December 11, 1:00 p.m. to 4:00 p.m. in the Public Service Commission Hearing Room. The next public comment workshop is Tuesday, December 5 at 6:00 p.m. at the Lewes Public Library (111 Adams Avenue, Lewes).

The working group is going to start fleshing out the report itself. Most of the report will be the information and questions that the group has looked at and discussed. The working group and DNREC Staff are going to do as much analysis as possible before the next meeting.

Mr. Slater asked for the working group to have all of the information to be discussed at the meeting circulated at least 24 hours in advance.

Public Comment

Jay Fuess offered two comments: First, one of the things that you're missing on your questions is "do we do this project?" Second, what is the path forward?

Mr. Burcat responded saying there will be an interim report. And we will have a report that addresses public comments and our group's recommendations. It will be more specific. I think one of the options is a wait and see if there are benefits and then potentially look forward in the future.

David Stevenson (CRI) said he would like to build on what Representative Paradee said. The first question is do you even do this project at all. If you tack on to the Maryland project, you're still going to have costs. SRECs and on shore RECs are much lower than offshore. 2) If you build more solar, you're going to have the same impacts. He said there are environmental impacts for birds. He also said even a 200 MW project wouldn't benefit Delaware in terms of economic development. 3) He suggested that the Working Group look at annual costs instead of monthly costs.

Alan Rodgers of the Chemistry Industry of Delaware said he hasn't heard anything about the impacts on the energy system from the Maryland project. Delaware stands to benefit more from the projects than Maryland does because all of that has to go north up the peninsula. He said he'd like to see more about what that project does, even if we do nothing.

Bill Murray said he hasn't heard anything from the point of investors; If he were going to invest in a large industrial port, one of the things I would ask is "how much wind are you building," if you said you were sitting and waiting on it, we would not invest. He said that eventually we will have wind power off the coast of the Atlantic. The question is whether or not Delaware would benefit from the wind power, due to the location. Delaware has the ideal spot because we have the options of our transportation system. We own the Delmarva Peninsula, we have the railroad line, there are a lot of geographical areas available to us. New Jersey could offer more money, but Delaware can say that we have cost savings due to our strategic location. We have a good option, and it comes down to if we decide to go forward with not doing anything, then investors will say that we're not going to invest there.

The meeting was adjourned at 12:00 noon.