U.S. House of Representatives
Committee on Natural Resources
Subcommittee on Energy and Mineral Resources
Subcommittee on Energy and Environment

H.R. 3068 - Building a 21st Century American Offshore Wind Workforce

Testimony of Lisa C. Linowes

June 11, 2019

1. Please state you name and a brief summary of your background.

My name is Lisa Linowes. Since 2005, I've served as executive director and spokesperson for the WindAction Group. In that role I research and report on the wind energy market and the policies that drive its growth. I also advise public and private entities on siting issues relative to wind energy development. I am a senior fellow at the Texas Public Policy Foundation and inaugural member of the Institute for Energy Research (IER) Advisory Council. A more complete biography is included at the end of this testimony. The findings and opinions I present here are entirely my own and should not be construed as representing any official position of the above cited organizations.

2. Briefly summarize your testimony.

My testimony examines the aim of H.R. 3068 relative to the current US wind energy market, both onshore and offshore, along with actions already taken by states pursuing offshore wind opportunities. I looked at the question of federal government involvement from several perspectives: 1) current availability of training and certification programs, 2) available public funding for offshore training, and 3) the barriers to offshore wind development that might impede a greater roll-out of turbines. I also looked at the effect of the wind production tax credit expiring and the possible impact of its expiration on existing wind jobs. Based on my review, I do not recommend support for H.R.3068.

3. Please provide information regarding offshore wind development today.

Offshore wind is generally presented as a new, largely unexplored industry for the United States, but one that is expected to drive significant economic opportunity for US coastal states, particularly for the first state to claim a large facility. Numerous attempts have been made in the US to see offshore wind deployed off our coasts including the Great Lakes, but only one project is operational.[1] Different reasons are given for projects not following through, including public opposition, environmental concerns, and

[1] The controversial Cape Wind project (468 MW), proposed nearly 20 years ago, would have had a starting contract price of $207.33 per megawatt hour (MWh) rising to $330/MWh in its 15th year, costing Massachusetts ratepayers billions in above-market energy costs if built. In 2012 and again in 2018, New Jersey was urged to reject the 30 MW Nautilus wind project (previously referred to as Fishermen's Energy) over cost. The Long Island Power Authority tabled several attempts at building wind turbines off Jones Beach on Long Island, and in Delaware, NRG's Bluewater Wind terminated its power purchase agreement with Delmarva Power citing lack of financing and growing public opposition to expensive renewable energy. The one operating facility in the US, Block Island Wind (30 MW) sited in state waters off the coast of Block Island, was initially stopped by the RI PUC after the Commission ruled its costly contract did not meet the statutory mandate of "commercially reasonable." But the stall was temporary. The General Assembly, with pressure from the governor, passed a last-minute bill that redefined the standard applicable only to the project and the PUC was forced to reverse itself. This small project will cost every Rhode Island ratepayer approximately $1,000 over the 20-year life of the contract, not counting the multimillion dollar underwater cable constructed from Block Island to the mainland, also in rate base.

siting constraints but the one universal impediment to development has been cost. State RPS policies typically do not ensure sufficient financial incentives for these pricey projects to get built.

In recent years, there's been a renewed push for offshore wind driven, in part, by public frustration with onshore projects. Community opposition to land-based turbines that now reach 600-feet tall and high-profile fights over expansive (and expensive) transmission needed to deliver the energy long distances to load centers have slowed onshore development in many states, especially along the east coast.

In order for offshore wind to move forward, public-private partnerships are needed.

In the last 5-6 years, several states passed laws aimed at overcoming the economic barriers to offshore wind.[2] In each case, the respective legislatures acted on the hope that their state would be the first to see a large facility in waters off their coast, and as first, be crowned the offshore wind hub for the other states.

Table 1 lists information for seven offshore wind proposals that received some level of state approval. Block Island Wind is also shown as the only operating facility.

4. What about the job opportunities and the need for training?

With no large-scale (>50 MW) offshore wind projects in operation in the US today, job count projections are typically modeled using NREL's Jobs and Economic Development Impacts (JEDI) or similar economic input-output analysis models (IMPLAN). JEDI models purport to calculate state or local economic impacts resulting from building a potential wind energy facility, however, JEDI only looks at the positive impacts of a project and assumes that money spent is always beneficial. As such, these models often inflate new job creation by looking at gross amounts, rather than net outcomes. For example, jobs that might transfer from onshore wind to offshore are treated as new job creation when, in fact, no new jobs are created. JEDI-like models do not consider potential job losses owing to higher costs imposed by a project (ex: higher electricity prices) nor can the model assess greater job creation if monies were allocated differently.

---

[2] Massachusetts' *Energy Diversity Act* (Chapter 188 of the Acts of 2016) directs the Electric Distribution Companies (EDCs) to "jointly and competitively solicit proposals for 1,600 megawatts (MW) of offshore wind energy generation through multiple solicitations conducted with the Department of Energy Resources (DOER) and to subsequently enter into cost-effective long-term contracts for such."
https://malegislature.gov/Reports/8121/SD2453_OSW%20StudyFinal_report..pdf

Connecticut enacted a law requiring the solicitation of up to 2000 MW from offshore wind facilities. Maryland passed its *Offshore Wind Energy Act of 2013* creating an OREC subsidy capped at $190/mWh and other impact caps for residential and nonresidential customer's electricity rates. Each of these legislative actions are offshore wind specific and mandate actions independent of already existing renewable energy mandates.

Table 1

Project Name	State	Total MW	# of Turbines	Project Cost (M$)	$/kw	Contract Cost ($/mwh) Levelized
Vineyard Wind	MA	800	100	2,000	2,500	$89
Block Island Wind (existing)	RI	30	5	290	9,667	$244 - $470
Skipjack	MD	120	15	720	6,000	134
US Wind Maryland	MD	248	62	1,375	5,544	$177
Dominion	VA	12	2	300	25,000	n/a
South Fork Wind Farm	NY	130	15	1,128	8,677	$220
Revolution Wind CT	CT	200	25	500	2,500	tba
Revolution Wind RI	RI	400	50	1,000	2,500	98
		1,940	274			

As long as these limitations are understood, JEDI-like models can be useful tools in assessing general economic opportunity. However, caution is advised should the output be used for more specific plans, as in this case for determining potential training requirements. For example, US Wind's 248 MW project proposed off the coast of Maryland touts full-time equivalent (FTE) jobs of 6,650 jobs over its 26 year life (development, construction, and operations). Impressive, yes, but upon closer review we see that indirect and induced job counts are included. When removed the direct count drops to a more realistic 28 direct jobs per year. During the 4-year construction period, 232 direct jobs are anticipated.[3]

Table 2 shows the number of direct jobs per MW during the operational period for US Wind and three other proposed offshore projects that are furthest along in development. The numbers are generally consistent.[4]

[3] http://www.levitan.com/wp-content/uploads/2018/05/Levitan-Associates-Inc.-Evaluation-and-Comparison.-Revised-Public-Version.-Case-No.-9431.-ML-214140.pdf

[4] The US Wind numbers cited here are consistent with the figures provided by the developer's consultant. Levitan later increased the job numbers claiming "… the US Wind Project should have about twice the economic benefits compared to Skipjack during the development and construction periods due to it being about twice the size. Levitan's recommended changes added nearly 4x the O&M jobs required of other projects.

Table 2

Project Name	State	MW Installed	Direct Jobs: O&M
Vineyard Wind[5]	MA	800	80 (0.1 jobs/MW)
Revolution Wind[6]	RI	400	50 (0.125 jobs/MW)
US Wind	MD	248	28 (0.46 jobs/MW)
Skipjack	MD	120	24.2 (0.20 jobs/MW)

5. The US has nearly 100,000 MW of wind operating today. Is there an opportunity for these jobs to transfer into the offshore arena?

Yes. The offshore wind market includes the construction of wind turbines and other infrastructure relating to underwater transmission cables, water-based tower foundations, and landside/port upgrades for the manufacture, assembly and staging of the turbines. As such, it will require job skills found in both the onshore wind and offshore oil and gas markets. Job transfers from these two markets are certain to happen if the offshore wind market is realized. This is particularly true for existing onshore wind jobs after the federal wind production tax credit (PTC) expires this year.

The PTC, first adopted in 1992, is widely touted as the primary incentive behind wind energy development in the United States.[7]

With passage of the Protecting Americans from Tax Hikes Act of 2015 (PATH), and the PTC phase-down there's been a notable uptick in wind project starts in order to secure the full PTC benefit. By the end of 2016, the number of safe-harbored turbines was around 35,000 MW with the majority expected to be in service before the end of 2020, thus eligible for full PTC treatment. Proponents insist that technology advances have reached a point where growth will continue without public funding. This may be true in areas with excellent winds and buyers willing to commit long-term to purchasing the energy, but even the Department of Energy's latest report suggests an uncertain future without the PTC.[8]

Given the enormity of the PTC's value relative to project costs, developers will have to find a way to recoup the loss of the PTC, either through amendments to state RPS policies, adoption of other renewable

[5] http://publicpolicycenter.org/wp/wp-content/uploads/2018/03/VW-800-MW-Jobs-Report.pdf

[6] https://www.pressherald.com/2018/05/31/wind-farm-will-create-800-jobs-rhode-island-firm-says/

[7] Sherlock, Molly F. 2012. "Impact of Tax Policies on the Commercial Application of Renewable Energy." *House Committee on Science, Space, and Technology*, April 19.

[8] https://www.energy.gov/eere/wind/downloads/2017-wind-technologies-market-report

energy programs (federal or state), or by employing more conventional project finance strategies, which will significantly raise the price of their project output thereby lessening buyer interest.

After 2020, we are likely to see more industry consolidation, fewer job opportunities, and a shrinking of project activity. According to the Bureau of Labor Statistics (BLS), onshore wind technician jobs reached 5,580 in May 2018.[9] Workers trained in the construction and maintenance of wind turbines will transfer to the offshore market. If the offshore wind market continues to grow, we are also likely to see the existing manufacturing sector for onshore wind retool as needed to meet the demand for the larger capacity offshore turbines.

6. Does the federal PTC also benefit the offshore wind market?

Yes. Wind energy developers have the option of making an irrevocable election to receive a 30% investment tax credit in lieu of the PTC. For offshore, this is the more likely scenario given the high capital cost to construct projects. Under the phase-down, the ITC benefit is similarly reduced however, the percentage reductions are applied to the value of the ITC. Table 3 shows how the subsidy is reduced in each year of the phase down.

Table 3

Year	PTC value	ITC in lieu of PTC value
2016	2.4¢/kWh	30% of project costs
2017	1.92¢/kWh (80% of full value)	24% (80% of 30%)
2018	1.44¢/kWh (60% of full value)	18% (60% of 30%
2019	0.96¢/kWh (40% of full value)	12% (40% of 30%)
2020 and after	0¢/kWh	0%

All of the projects listed in Table 1 above expect to benefit from the ITC. In most cases, the announced phase-out of the ITC was a factor in prompting the states to act.

[9] https://www.bls.gov/oes/current/oes499081.htm

7. Describe the effectiveness of the PTC/ITC relative to creating wind energy jobs.

As mentioned, the wind PTC has been the main incentive behind wind energy development in the United States.[10] By the end of 2018, 96,487 megawatts (MW) of wind was operating in the United States, a 40-fold increase from 1999 and representing 6.6% of US electric power consumption.[11]

The American Wind Energy Association (AWEA), which is the primary source for wind-related employment statistics in the US, reported that at the end of 2017 there were 105,500 jobs spanning all areas including construction/development/transportation, manufacturing/supply chain, and operations and maintenance. Validating this figure independent of AWEA is not possible but typically includes direct, indirect, and induced jobs. Nonetheless, there is no question the industry has grown under the PTC.

8. What about training programs?

With the growth in wind jobs, the private market has responded to the need for skilled labor. The federal government currently lists 195 training programs[12] for the wind industry nationwide. Not all programs apply to turbine technician training, but many do, including certification programs. Where offshore wind may have unique technical requirements compared to onshore (i.e. underwater foundations), turbine maintenance should be very similar. Offshore oil and gas programs like those offered at Nicholls State University in Louisiana are also apt to respond should the demand be realized.

The Joint Committee of Taxation estimates that the wind PTC/ITC will cost taxpayers nearly $5 billion each year through to 2022.[13] There is no reason to tax the public an additional $125 million for offshore wind training when there is clear evidence the market is responding on its own. As long as projects are built, workers will be needed and training will follow.

9. It will take time for training facilities to respond. Wouldn't passage of H.R. 3068 spur offshore-specific programs?

The states actively seeking offshore project development have been proactive in ensuring the skills are available to meet the need. Through the combined efforts of the offshore developers and the governments of Massachusetts, Rhode Island, and Maryland, developer money has been allocated specifically for

[10] The 2009 stimulus program created the Section 1603 cash grant program in effect from 2009 to 2012. During this period, 21,633 MW of wind energy were developed under the program costing $13 billion.

[11] https://www.eia.gov/totalenergy/data/monthly/pdf/sec2_13.pdf

[12] https://windexchange.energy.gov/training-programs

[13] https://www.jct.gov/publications.html?id=5148&func=startdown

offshore wind training. Table 4 summarizes the commitments in place in these states. In addition, New York State has established a $15 million fund to develop offshore wind training and certification programs. New York and Massachusetts each developed detail plans identifying the types and number of jobs needed to support the offshore wind market and the skills required.

Table 4

Project Name	State	Workforce Funding	Comments
Vineyard Wind	MA	$2,000,000	Over $720,000 in grants have already been distributed to Bristol Community College, Cape Cod Community College, Massachusetts Maritime Academy, UMass Amherst, Adult Continuing Education- Martha's Vineyard, and Pile Drivers and Divers Local 56 trade union.[14] Bristol Community College's offshore wind program and others are already available.[15]
Skipjack[16]	MD	$6,000,000	As a condition of approval, money is to be contributed to the Maryland Offshore Wind Business Dev. Fund.
US Wind Maryland	MD	$6,000,000	As a condition of approval, money is to be contributed to the Maryland Offshore Wind Business Dev. Fund.
Revolution Wind RI	RI	$4,500,000	$3 million for higher education higher education around offshore wind programs; 1.5 million to support development of offshore wind supply chain and workforce. [17] A similar grant opportunity is likely to be announced after the Revolution CT project is further along.
New York[18]	NY	$15,000,000	Governor Cuomo announced a $15 million commitment to train the local workforce needed to build offshore wind and develop port infrastructure.

[14] https://www.southcoasttoday.com/news/20190510/bcc-receives-200k-for-offshore-wind-training

[15] http://bristolcc.smartcatalogiq.com/en/2017-2018/Catalog/Programs-of-Study-alphabetically/Engineering-Technology/Offshore-Wind-Power-Technology

[16] https://www.psc.state.md.us/wp-content/uploads/PSC-Awards-ORECs-to-US-Wind-Skipjack.pdf

[17] https://www.offshorewind.biz/2019/04/23/revolution-wind-team-sets-aside-usd-4-5-million-rhode-island-offshore-wind/

[18] https://www.governor.ny.gov/news/governor-cuomo-releases-first-nation-offshore-wind-master-plan-guide-new-yorks-development

10. Since taxpayers at large benefit from these offshore facilities in the form of cleaner generation, isn't it appropriate they cover part of the training cost?

No. States where the most offshore activity is happening, proactively committed their ratepayers to paying higher electricity costs. Economic forecasts prepared for the projects suggest the higher costs will be offset by other benefits, but there are no guarantees. When Rhode Island's Public Utilities Commission approved the Revolution Wind contract last month, each Commissioner publicly admitted to the risks. Commissioner Abigail Anthony stated it this way:

> *If the price of certificates representing the environmental benefits of renewable energy fails to increase as projected, then the contract could cost consumers in the long run. Additionally, much of the savings are expected to come on windy winter days when the wind farm is expected to displace more expensive oil generators or natural gas-burning plants that may charge a premium. If those savings are lower, the net benefits may be too. It's clearly not a sure bet that the economic benefits will exceed the costs. I think the commission and ratepayers should be clear-eyed about the economic risks."*

Commissioner Anthony's comments would apply to any of the projects in the offshore pipeline. Approvals of these projects were not conducted in a vacuum. Ratepayers in the respective states had the right and opportunity participate in the process and to let their thoughts be known. It would not be appropriate to ask taxpayers at-large to foot the bill for choices made by individual states where they had no say in the decision.

11. Are there any other reasons to vote no on H.R. 3068?

Yes. As mentioned earlier, there is tremendous pressure to build out the offshore wind market while federal subsidies are still available. Several states have approved above-market energy funding in the form of ORECs or long-term contracts in the hope that the development will deliver on jobs and cleaner energy mandates. Despite the intensity surrounding these projects, it is still not clear the offshore market will be realized. I've identified several barriers to development that I recommend be examined honestly and directly in order to avoid conflicts before and after projects are built. In this regard, the federal government would play an essential role in addressing conflicts. In 2017, BOEM completed its programmatic EIS for the full Outer Continental Shelf. Issuing additional programmatic EISs that focus on particular areas would help bring attention to local and regional concerns.[19]

[19] http://www.columbiaenvironmentallaw.org/avoiding-the-doldrums-evaluating-the-need-for-change-in-the-offshore-wind-permitting-process/

a) It is not clear whether opening the US offshore wind market will encourage European and Asian turbine makers to relocate in the US. At a February 2, 2016 briefing before the Maryland Senate Finance Committee[20] on offshore wind, Mark Rice of Maritime Applied Physics Corporation advised that manufacturing will not arrive in Maryland or North America until there are at least 6,000 MW of projects greenlit. If onshore wind development slows, we might see existing manufacturing facilities retool to the extent they can to address the larger capacity turbines.

b) Several studies have found that residents of, and visitors to, coastal areas will accept offshore wind, provided the turbines are not visible. NY Governor Cuomo has stated that his offshore wind plan will keep turbines at least 20-miles away so they won't be seen. Mayor Rick Meehan of Ocean City has asserted that "First and foremost, the Town of Ocean City supports *green, unseen energy*." He went on to say "[d]espite claims of dangling hundreds of thousands of dollars of community investments, the town has not received any firm offers of a benefits package, nor have we requested or agreed to accept this type of information."[21]

c) The US commercial fishing industry has repeatedly argued that offshore wind turbines will negatively impact the livelihood of its members. This concern is echoed by fishermen in Germany who are forced to work around the turbines and are not allowed within 500 meters of the towers for safety reasons. They see developers as having "invaded and blocked their fishing grounds."[22]

d) Conflicts with the US military's mission are serious and may prohibit offshore development. A map developed jointly by the Navy and Air Force, and subject to public comment shows the bulk of offshore areas leased to developers in red meaning 'Wind Exclusion.' Leased areas off MA/RI/NY carry site-specific stipulations which could impede full operation of the turbines.[23] The military has expressed a willingness to work with developers, but ultimately enabling wind development in red areas could impair the most advanced radar and defense systems in the world.

---

[20] http://mgahouse.maryland.gov/mga/play/274b6433-31c1-4c37-944a-add5e04ad1a7/?catalog/03e481c7-8a42-4438-a7da-93ff74bdaa4c

[21] https://mdcoastdispatch.com/2018/06/14/sparring-over-offshore-wind-farm-distance-continues-mayor-says-our-view-is-not-for-sale-in-response-to-developers-benefits-package/

[22] https://www.handelsblatt.com/today/companies/winds-of-change-the-boom-and-bust-of-germanys-offshore-wind-farms/23582948.html?ticket=ST-2072839-Rsn1fALg6jz3ulgxd5lC-ap6

[23] https://navysustainability.dodlive.mil/files/2018/10/ATLWindAssessement_20180920.jpg

Some have argued that offshore oil and gas rigs have similar impacts on coastal military operations but the comparison is without merit.

Off-shore turbines produce Electromagnetic Interference (EMI) unlike oil and gas, and present impacts to radar facilities, both air traffic and air defense, similar to shore based turbines. Off-shore turbines produce low frequency under water noise which is difficult to predict and measure but has obvious impacts on US classified and unclassified subsurface systems, both operationally and in testing. Oil and gas do not produce this. Finally, off-shore wind turbines generally require 10's of square miles of pylons that can stand twice the size of oil and gas rigs, which is an issue for low altitude flying.

Unlike offshore wind turbines, oil and gas production platforms can be put any place and can drill and produce from as far away as six miles and reach up to 24 wells in different directions. Technology is also available to drill on the ocean floor with an offset production platform situated miles away so you don't have to be over the actual oil and gas reservoir to produce it.
Large expenditures of government time and funds have been allocated in pursuit of technical mitigations to address wind turbines impacts on military assets, but so far the results are controversial. Proper siting of the towers, while politically cumbersome, is the only tried and true form of mitigation.