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Critique of PA Consulting Group Delaware Offshore Wind Benefits Report

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The state of Delaware is negotiating through a Term Sheet[1] with US Wind to permit offshore wind power cables to come ashore at Delaware Seashore State Park just south of the Indian River Inlet Bridge. Power cables would then be laid underwater through the inland bays to Millsboro to connect to a substation near the Millsboro Indian River power generating plant. The offshore wind projects receive large subsidies added to Maryland electric bills to ensure needed financing to construct the projects in federal waters. US Wind has promised economic development payments to Maryland, and promised to hire construction, operations, and maintenance workers in Maryland.

An analysis[2] comparing the benefits and costs to Delaware of allowing offshore wind power cables to come ashore was conducted by the PA Consulting Group. This document evaluates the accuracy of claims in that Benefit Cost Analysis (BCA).

The PA Consulting Group study makes these benefit claims:

- US Wind will pay the state parks division $350,000 a year in lease payments, increasing 3% a year, for total payments of $9.4 million over twenty years.
- US Wind will provide $40 million over twenty years to the state government for use in various community benefit programs with $20 million provided in the first 5 years.
- US Wind will provide up to 150,000 Renewable Energy Credits (RECs) a year for twenty years to Delaware electric utilities at no charge to offset the purchase of RECs from other sources. RECs are produced for each megawatt-hour of power generated by the Marwin, and Momentum Wind projects. The free RECs will only be provided from any excess over the number promised to Maryland. PA Consulting estimated the RECs will be worth $76 million to Delaware electricity customers.
- PA consulting also estimated Delaware electricity customers will see $253 million in lower electric bills over twenty years. Using the Aurora modeling program they estimated power and capacity value reductions on ratepayer bills of up to $186 (or $9/year); $1,609 (or $77/year); and $162,936 (or $7,759/year) for the average residential, commercial, and industrial customer in Delaware. The savings equal about one half of one percent of annual electric bills[3].
- The projects will lower carbon dioxide and air pollution emissions.

Emissions reductions

The two offshore wind projects were approved in two different Maryland Public Service Commission dockets using two different consultants[4]. Both consultants stated the offshore wind projects would simply replace onshore wind projects that would have been needed to meet Maryland renewable energy requirements. The second consultant went on to calculate emission savings would actually be higher for the onshore wind projects as there would be less transmission energy losses as the onshore wind projects are closer to electricity demand centers.

Lease fees to Delaware State Parks, and community payments

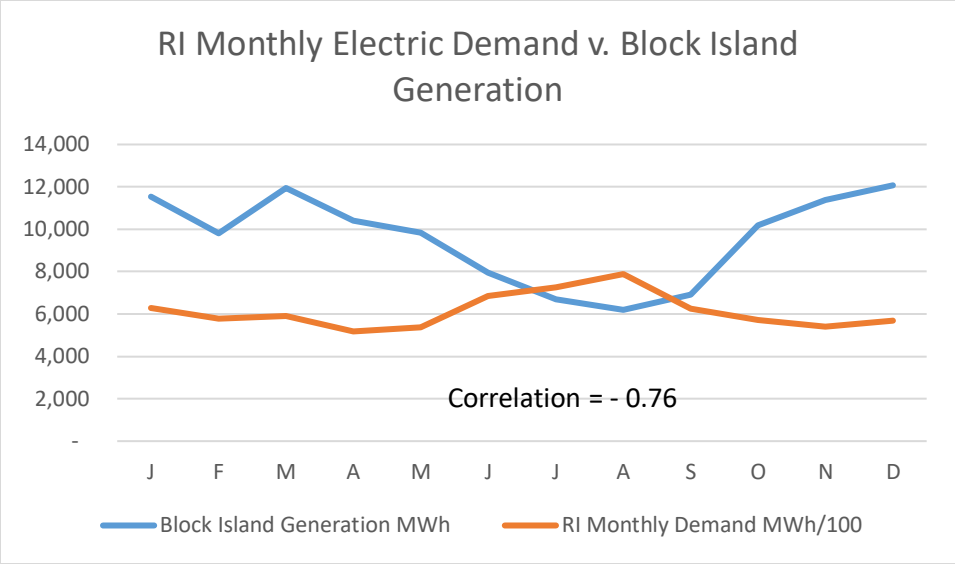
To compare benefit and cost items over time results are compared as Net Present Values (NPV) based on a future value discount rate[5]. The typical discount rate used for projects lasting longer than five years is 7%. By reverse calculations we determined PA Consulting used a 3% discount rate. The $9.4 million in nominal lease payments over twenty years has a $3.7 million NPV at 7%, and $4.6 million at 3%. The NPV of the $40 million community benefits package is $9.4 million at a 7% discount rate, and $11.4 million at 3%. As shown below these are the only guaranteed payments in the Term Sheet being negotiated between the state and US Wind with NPV of about $13 million.

Free RECs

The NPV of the free RECs is $26.7 million at a 7% discount rate, $32.4 million at 3%. PA Consulting used a 44% capacity factor for annual offshore wind generation. That level of generation has been demonstrated by five turbines off Block Island, RI, and two turbines off the Virginia coast. US Wind estimated a 44% capacity factor for the larger Momentum Wind project, and 42% for the Marwin project in its guarantees to the Maryland PSC.

If the Marwin project has a 44% capacity factor there may be 43,500 extra RECs (8760 hours X 248 MW capacity X 0.02). However, neither project is likely to generate power 44% of the time. Our regional grid manager, PJM, in its "Effective load carrying capability report"[6] estimates offshore wind capacity at 37%. In addition, the graph below shows the four year average monthly generation of power at the Block Island offshore wind project. The most power is generated during the spring and fall when power demand is at its lowest. As more offshore wind projects are built the electric grid will simply not be able to accept all the power produced in the spring and fall forcing generation curtailment.

The 2020 Connecticut Integrated Resource Plan[7] shows curtailment reaching as high as 10% to 20% of generation in figure 5.3 as more projects are built. Also, a report from Europe, "Gone With the Wind? Wind Farm-Induced Wakes and Regulatory Gaps"[8], shows the impact of the wake effect of wind turbines on downwind turbines in the same project can reduce power output by up to 5% to 10%, and one large project can decrease power at a downwind project by up to 20%. Quite simply, it is unlikely there will be any excess RECs to give to Delaware.



Savings from lower power and capacity costs

The NPV from estimated $253 million savings from lower electricity and capacity cost is $134 million with a 7% discount factor, and $188 million with 3%. So, for example, the $9/year savings on residential electric bills falls to $6/year with a 7% discount rate. More importantly, PA Consultants modeling showed only a 0.5% savings, but the error bar in the modeling could be as high as 2.5% meaning the cost savings is not statistically significant and should be reported as such. The Aurora program sums the results from many runs. The more runs the smaller the error bar. PA Consultants did not state which run setting they chose.

PA Consultants also failed to include any estimate of the cost to run inefficient backup generation often needed to deal with drops in power production by intermittent source such as offshore wind. It is likely those costs could wipe out the projected savings. US EIA Detailed State Data[9] shows onshore wind development moved to 2% a year growth in share of power demand in Texas in 2016 from 1% after investing $7 billion in taxpayer money to expand transmission lines to the windy Texas panhandle. Between 2016 and 2022 wind's share of power produced in Texas rose from about 11% to over 25%. However, power prices jumped 22.4% in Texas compared to 21.6% nationally suggesting added wind power may have increased, not decreased prices. There are so many pricing variables it is difficult to discern any single cause. The PA Consultant statement offshore wind will save power cost is not credible.

The cost of lost tourism

PA Consultants only describe potential benefits. Potential costs include lost commercial fishing, increased vessel collisions, and poorly studied environmental impacts. The most likely cost may come from lost tourism and lower property values. The US Bureau of Ocean Energy Management (BOEM) reports Environmental Impact Statements (EIS) showing potential negative visual impacts[10]. In multiple EIS documents BOEM reports ocean views will change

from pristine to developed with views dominated by turbines. BOEM used a University of Delaware survey[11] of beach goers to calculate potential lost tourism because of the daytime visual blight of turbines on ocean views. The survey showed visualizations of 579' tall turbines and asked whether people would return to the beach with turbines present. The closer the turbines were to the beach the more people responded they would not return. Since US Wind plans to use turbines between 938' and 1050' tall the survey results shown in figure 7 need to be adjusted for the greater visibility which suggest a net 24% of visitors may not return.

A similar survey of recent renters in the Outer Banks[12] showed 38% would not return based on daytime views, but 54% wouldn't return based on nighttime views of blinking lights. The UD study showed nighttime visualizations but didn't report the results. US Wind is often quoted as planning to use an Aircraft Detection Lighting System that would only turn lights on when aircraft are detected by radar. However, US Wind added a clause the system would only be used if it was commercially feasible[13], which it is not as the system has been rarely used. Without a solid US Wind commitment we should assume the system will not be used.

A 2021 Delaware tourism report[14] shows $2.7 billion in tourist spending at the beach, so a 24% loss equals $640 million in lost tourism, sixteen times the PA Consultants benefit estimate. That could mean over 5,000 lost jobs, $200 million in lost wages, and over $65 million in lost taxes according to the tourism report. The UD study also stated property values would fall, but no dollar values were given. A new University of Connecticut study[15] shows when onshore wind turbines are highly visible property values fall 11% the first year after construction, A Zillow search of recent home sales in our beach towns averaged over $1 million, so lost property values could exceed $100,000 per home.

The NPV of the lease payment and community benefit fund totals $13 million over twenty years. Just 1% lost tourism costs twice that amount in just the first year. These are Maryland approved projects that are a very big losing proposition for Delaware. Our state government should not be supporting these projects by issuing permits to bring power ashore in Delaware.

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