Local Community Acceptance of an in-View Offshore Wind Power Demonstration Project

Public Opinion of Fishermen’s Energy, Atlantic City, NJ, USA

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**Introduction and Background**

Development of the wind resource for electricity will reduce many social and environmental problems caused by conventional means of power production. Although New Jersey cannot solve climate change or associated issues with traditional power production alone, as it possesses exceptional offshore wind resources, it has the ability to take significant action and to lead by example. Concentrated near the major city load centers, offshore wind resources can generate electricity where the onshore wind resource is limited.

Wind energy projects have received much attention from the media and communities where projects are proposed or built. Land-based projects have faced opposition for a variety of reasons, such as effects on cultural landscapes and wildlife and noise disamenity (Pasqualetti, 2004; Warren et al, 2005). The public may have a variety of reasons for supporting or opposing wind energy projects, but it is evident that opposition to wind development can be instrumental in whether or not and the speed with which a project moves ahead toward completion. Indeed, the extent of wind energy development is much more an issue of social, regulatory and policy considerations than it is of technological ones.

Building upon its prior research, the University of Delaware undertook a survey of residents in the greater Atlantic City area (and in coastal Delaware) on three unique areas of wind energy research: existing land-based wind energy projects sited near the coast, proposed near-shore (within 3 miles) offshore wind demonstration projects, and the proposed subsea transmission cables that bring offshore electricity to land. In this report, we focus on public opinion regarding the small-scale offshore wind demonstration project that Fishermen’s Energy has proposed to build 2.8 miles off the coast of Atlantic City. At the time of the survey, the Fishermen’s Energy project had obtained federal and state permits, had been one of seven projects awarded an initial $4 million demonstration project grant from the United States Department of Energy (DOE) and thus in the running for an additional $46 million in federal funds, and was in the middle of a months-long state regulatory proceeding before the New Jersey Board of Public Utilities (BPU) focused on its costs and benefits to New Jersey electric ratepayers (this was the crux of the question before the BPU in its consideration of whether to approve the price structure and grant the project offshore renewable energy credits (ORECs)). In March 2014, well after the survey had been completed, the BPU rejected the project by a vote 4-0.

We conducted semi-structured interviews in 2012 and a mail survey in 2013 to examine public opinion in and around Atlantic City. The target population for the survey included full-time and part-time residents of this area. Both homeowners and residential renters were included in the survey. Atlantic City, along with much of the New Jersey coastline, is developed with residential homes and businesses. The city relies on coastal tourism, activities at casinos as well as beach and boardwalk recreation. A 7.5-MW land-based wind project is situated at the Atlantic County Utilities Authority (ACUA) sewerage waste facility in Atlantic City, visible from some areas of downtown and some
hotel and gaming facilities. Lastly, Atlantic Grid Development seeks to build a submerged offshore transmission backbone that would connect offshore wind facilities to the onshore grid, as well as transporting land-based electricity, along the New Jersey coastline. This project, the New Jersey Energy Link, a portion of the Atlantic Wind Connection, initially was planned to cover much of the mid-Atlantic seaboard, which included making landfall in Delaware.

New Jersey is a net importer of electricity, with approximately one-third of its consumption being supplied by out-of-state generators. Considering only in-state generation, slightly more than 50% of is from nuclear power, with natural gas being the other large contributor at more than 40% (EIA, 2014a). New Jersey’s residential electricity rates averaged 15.26 cents/kWh in January 2014, slightly more than 3.5 cents/kWh above the national average (EIA, 2014b).

Survey Design and Implementation

The first project component was to conduct semi-structured interviews serving two objectives: to assess general knowledge to help design a comprehensive mail survey and to aid understanding the general knowledge base and underlying perceptions. Semi-structured interviews make use of open-ended questions, employing an interview guide that is followed in each interview (Bernard, 2002). Locations to target respondents were pre-selected to focus on areas where residents of all demographics are expected to congregate, such as public parks, beaches, and community buildings. Selection of interviewees was opportunistic, and aimed to gather a broad cross-section of the community rather than a random sample or a specific sub-population (e.g., members of a local NGO). Interviews lasted between 15-40 minutes.

The second component was a mail survey, to enable a full assessment of the research questions with the ability to conduct comprehensive statistical analysis to report findings. Survey questions were designed using baseline information from the semi-structured interviews, as well as theory, intuition and past studies. Prior to mailing, a pre-test was conducted locally for general comprehension, question design, and length. Following the pre-test, a pilot study was conducted at a Delaware Department of Motor Vehicles office, to ensure the questions were understandable, used consistent language and logic, and were unbiased, and that the survey was of an appropriate length. The DMV location was chosen to provide a good cross-section of the population.

In addition to wind and energy-related content, the survey instrument also collected demographic data such as age, sex, level of income, employment, education, and geographic location. This data allows re-weighting to address concerns of non-response bias (e.g., we have found a lower response rate among women as compared to men) and to facilitate statistical analysis (see e.g., Firestone and Kempton, 2007).

To assist the respondents’ ability to answer survey questions, the survey was supplemented with visual aids that depict the proposed near shore wind facility in question. The visual aids included a series of three images each from greater Atlantic City at locations specifically chosen that receive a
high volume of visitation and with an unobstructed view of the project in question. The purpose was to provide not only a straight-on view from the shore directly adjacent to the project, but angular views as well from beach communities up to five miles to the north and south. The photo simulations were produced by an internationally recognized expert in wind turbine photomontages, Macro Works, using actual photographs of the locations and a digital terrain model to most accurately depict what will be seen by the naked eye. The specific characteristics of the most likely turbine to be deployed at site—the XEMC Darwin 5MW wind turbine was included in the simulations to provide the most accurate depiction of the project. In order for a visual depiction of a wind turbine to accurately reflect how it will look from a given point, that depiction must be held a specified distance from the eyes of the person viewing it (the distance depends as well on the size of the image). To account for this fact, the contractor designed a graphical representation of how far respondents should hold the photo-simulation from their face, and we provided accompanying written instructions.

**Figure 1: Visual Depiction of the Fishermen’s Energy Project from Atlantic City, NJ.**

*Image: MacroWorks, 2013.*

We sampled individuals from three distinct locales within the coastal study area (strata): surrounding the Atlantic City turbines, greater Atlantic City’s coastal seaboard, and “inland” greater Atlantic City. The locales were demarcated first by census tract, and further by block group based on proximity to the coast or existing coastal turbines. Coastal residents are defined as those living directly adjacent to the ocean, ‘inland’ residents are those residing in a census block group beyond the coast up to approximately 6 miles from the coast, and surrounding turbine communities include those living within the immediate proximity of the ACUA turbines who are expected to see turbines on a regular basis. A total of 241 surveys were returned, coded, entered into a database, quality control checked, and analyzed statistically. After accounting for undeliverable mail, this represents a response rate of 24%. We tested for non-response bias by examining the difference in support for the project between early respondents (responded to the first mailing) and late respondents (responded after the second packet was mailed out) (the intuition is that non-responders are more likely to be like late responders). Our test did not reveal a non-response bias and differences in level of support is not statistically significant.
Results

After asking some questions about the local land-based wind project and some general questions about offshore wind power, we briefly described the planned Fishermen’s Energy project as a “small demonstration project” being planned by the “private developer,” Fishermen’s Energy, that would be comprised of “5 wind turbines and one scientific buoy” that would be about three miles off of the Atlantic City Boardwalk. We then asked if respondents had heard of the Fishermen’s Energy project, and 34% percent indicated that they had. Respondents were next asked to specifically refer to the photos, and respond if they support or oppose the project, or hadn’t yet made up their mind. We find that 59% of greater Atlantic City residents support the project, and only 16% are opposed, with a quarter of respondents not having yet made up their mind (Table 1). Respondents who had previously heard of the planned project are significantly more likely to support the project than people who have not heard of the project ($p<0.05$, Chi$^2$).

Those who hadn’t formed an opinion were then prompted to respond to the question “which way are you leaning?” More than four times as many lean toward support than toward opposition, so that when those leaning toward support/opposition are combined with those firmly supportive/opposed, we find the Fishermen’s Energy project is supported by 77% of local residents, compared to only 20% opposed, and with 3% remaining undecided. The difference between supporters and opponents is significant at the 1% level (typically anything below 5%, is considered to be statistically significant).

Table 1: Support for or Opposition to the Fishermen’s Energy Demonstration Project

<table>
<thead>
<tr>
<th></th>
<th>Atlantic City, New Jersey (%)</th>
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</thead>
<tbody>
<tr>
<td>Support</td>
<td>59</td>
</tr>
<tr>
<td>Opposition</td>
<td>16</td>
</tr>
<tr>
<td>Unsure</td>
<td>25</td>
</tr>
<tr>
<td>Support + Leaning</td>
<td>77</td>
</tr>
<tr>
<td>Oppose + Leaning</td>
<td>20</td>
</tr>
</tbody>
</table>

To examine the differences in support and opposition among groups of residents, we combined support and leaning towards support, and opposition and leaning towards opposition into a single variable. From this point forward, reporting of support or opposition includes leaners, unless otherwise noted. What factors can help describe the differences among residents?

Demographic variables that make up the survey population provide some insight into describing support and opposition. Women in New Jersey are less supportive than men (66% compared to 88%, not statistically different). The average age of supporters is not statistically different than the average...
age of opponents, although, the average age of supporters is 53 and opponents’ average age is 39. Primary homeowners are just as likely to support the project as second-home owners. People that are self-employed are significantly more likely to oppose the project (48%), compared with those who work for wages (4%). Retirees and working age residents do not register statistically different levels of support. As well, similar percentages of college educated and non-college educated residents support the project, 72% and 79%, respectively, not a statistically significant difference. Importantly, views about the project are not politically partisan, with almost equal percentages of Obama voters (70%) and Romney voters (71%) supporting the project. However, more complex statistical analysis (not described in this report), where the effects of all these demographic variables are analyzed together and hence controlled indicates that factors including age, voting preferences, and level of education are important when determining the likelihood that local residents support or oppose the project.

People who can see the ocean, and likely will have a view of the project, are more likely to oppose the project (28%) than residents who cannot see the ocean (13%) and more generally supporters live farther from the ocean (1.2 miles away) than opponents (0.46 miles away).

We asked respondents what the believed the effect of offshore wind power would be on items such as price, tourism, marine wildlife, recreational fishing, and job creation. Respondents were then asked to self-report the top “three issues you consider to be the most important, regardless of whether mentioned above, ranked in order of importance #1, #2, and #3” in their decision to support or oppose the Fishermen’s Energy project. The written answers were coded into categories, by grouping like items together. We did not know whether the item listed was considered to be a positive or negative issue given the wording of the question, so we separate the top reasons listed by supporters (factors leading towards support) and the top three reasons listed by opponents (factors leading to opposition). We list “top choice” percentages by support and opposition (ordered by percentage listing a factor as the top reason for support) and the “weighted top 3 choice” percentages (where each of the top 3 choices is weighted by 1/3 so that the percentages add up to 100%). For example, if 6% listed user conflicts as their top reason for opposition and another 58.86% and 0.25% respectively listed it as their second and third reason for opposition, we multiplied each by 1/3, and then summed to 21.8%, and then rounded to 22% (Table 2).

When looking at the top three factors, opponents appear to congregate around a few key issues, where supporters have a wide variety of reasons for supporting the project. The factor with the widest resonance for both supporters and opponents is the same—wildlife and the environment. Supporters may view ‘big-picture’ benefits resulting from reduced emissions and associated environmental harms from traditional energy generation, whereas opponents may be concerned about the acute effects on local wildlife. Interestingly, cost of electricity is an important issue, but only for supporters. Because offshore wind is not inexpensive, particularly at the scale of the Fishermen’s Energy project, it is possible that respondents believe that the project will lead to large-scale implementation in the future which will ultimately lead to lower electricity rates. Alternatively, they may simply be mistaken about the cost of offshore wind (see further discussion at end based on additional statistical analyses) or they may correctly recognize that the costs of a small project like
Fishermen’s Energy when spread over all New Jersey households is likely to be quite meager.\textsuperscript{1} General costs rank as another important issue for supporters and opponents. The general costs category includes responses including: cost, project costs, maintenance and maintenance costs, costs to taxpayers, cost effectiveness, government subsidies, and efficiency. Finally, jobs ranks highly for supporters. Since this project is relatively small, project supporters may see the project of a harbinger of New Jersey’s plans for large-scale commercial offshore wind projects and for the construction and supply chain jobs such large-scale development is likely to engender. For opponents, location/siting concerns resonate, with aesthetics being a highly ranked category as is user conflicts (fishing, boating) and tourism.

Table 2: Top Factors Leading Towards Support for or Opposition to the Demonstration Project

<table>
<thead>
<tr>
<th></th>
<th>Supporters</th>
<th>Opponents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Top Choice (%)</td>
<td>Top Three (wt %)</td>
</tr>
<tr>
<td>Wildlife/Environment</td>
<td>26 (19)</td>
<td>59 (24)</td>
</tr>
<tr>
<td>Cost of electricity</td>
<td>18 (19)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Cost, general</td>
<td>13 (5)</td>
<td>9 (7)</td>
</tr>
<tr>
<td>Jobs</td>
<td>11 (14)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Clean Energy</td>
<td>9 (8)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Energy Independence</td>
<td>9 (5)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Storms</td>
<td>4 (1)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Aesthetics</td>
<td>2 (3)</td>
<td>22 (14)</td>
</tr>
<tr>
<td>User Conflicts</td>
<td>2 (2)</td>
<td>6 (6)</td>
</tr>
<tr>
<td>Air Quality</td>
<td>1 (5)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Research &amp; Technology</td>
<td>1 (2)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Tourism</td>
<td>0 (0)</td>
<td>23 (23)</td>
</tr>
<tr>
<td>Electricity stability</td>
<td>0 (1)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>MISC.</td>
<td>4 (11)</td>
<td>2 (2)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>101</strong></td>
</tr>
</tbody>
</table>

* Totals over/under 100% due to rounding error

After identifying the key issues that people consider when choosing to support or oppose the Fishermen’s Energy project, we presented a list of six benefits and six drawbacks of the project. The

\textsuperscript{1} Although not part of the survey, using census data along with the residential electric rate data cited above in conjunction with the proposed Fishermen’s Energy power price, we estimate the monthly increase in household electricity bills to be between 9\textcent/month and 22\textcent/month. There is a dispute between Fishermen’s Energy and the NJ BPU on whether the price that should have been evaluated is $199.17/MWh or $263/MWh, which results in the two calculations.
benefits included: small increase in electricity bills, visible from shore, accessible to researchers, lead
to large-scale industry with great greenhouse gas emission reductions, local job creation, and testing
and validation of new technologies. The drawbacks were listed as: higher cost per unit of energy
produced than commercial-scale projects, visible from shore, disturbance of habitat and human uses
of ocean, negligible greenhouse gas reduction due to small scale, unlikely to create manufacturing
jobs, and potential for taxpayer assistance. Upon reading the list, respondents were asked if, based
on the received information, they were more or less supportive or whether it had no effect on their
opinion. In other words, the question sought information on how a respondent’s intensity of opinion
changed, if at all, rather than if it caused them to switch from support to opposition or vice versa.

Results indicate that opponents found the drawbacks to be more compelling than the benefits, with
very few opponents becoming more supportive. Perhaps the drawbacks are more compelling than
the benefits, with the benefits not being persuasive enough to encourage people to oppose the project
less than they previously had. Another possibility is that respondents were already knowledgeable
and had already factored in a variety of information before forming an opinion. But we also see that
opponents are more likely to become less supportive than supporters are to become more supportive.
Supporters were less willing to change their intensity of support in either direction than opponents.
This may indicate that supporters have formed a stronger position irrespective of the benefits and
drawbacks listed. Ultimately, by providing information, respondents seem to be moving more
towards the extremes (supporters become more supportive, opponents become more opposed) rather
than moving towards the middle, where they might consider moving from support to opposition, or
opposition to support.

### Table 3: Change of Opinion

<table>
<thead>
<tr>
<th></th>
<th>Firm Supporters (%)</th>
<th>Leaning Supporters (%)</th>
<th>Firm Opponents (%)</th>
<th>Leaning Opponents (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>More Supportive</td>
<td>36</td>
<td>18</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Less Supportive</td>
<td>2</td>
<td>3</td>
<td>60</td>
<td>51</td>
</tr>
<tr>
<td>No Change</td>
<td>62</td>
<td>79</td>
<td>39</td>
<td>48</td>
</tr>
</tbody>
</table>

For those whose intensity of opinion changed, we asked a follow-up question “which benefit or
drawback was most important in your change of opinion for this project?” Respondents were offered
a checklist of the previously listed 6 benefits and drawbacks. However, because the percentage of
individuals who supported the project but became less supportive is small (between 2-3% of firm and
leaning supporters) as are the percentage of individuals who opposed the project but became more
supportive (between 1-2%), the conclusions we can draw are limited. We do nevertheless observe
that both supporters and opponents become less supportive upon learning that there will be some adverse effects to wildlife and other ocean users, with 44% of supporters and 76% of opponents indicating this as the primary reason for decreased support. Additionally, although we listed a “slight increase” in electricity bill as a benefit, 17% of supporters hold even a slight increase in electricity prices in negative light.

Earlier, 80 individuals\textsuperscript{2} listed electricity price as one of their top three reasons for support. Of those, five individuals now express concern over a “slight increase” in electricity rates (as noted above, we had listed this as a benefit). This suggests that the vast majority of supporters who are motivated by electricity price to support the Fishermen’s Energy project already appreciated, or when faced with “new” information remained unconcerned, that the project would result in a slight increase in electricity rates. In other words, it suggests that respondents either believe that the Fishermen’s Energy project has substantial merit even if it will raise electricity bills slightly or, as suggested earlier, believe that the project will ultimately lead to lower electricity rates as the offshore wind power industry matures.

\footnotesize{\textsuperscript{2} Note that, here, unlike prior analyses, the reference is to the un-weighted number of respondents.}
References


