

**Summary of Public Opinion Surveys (2006-2015):
Development of wind power off of Delaware's coast
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Executive Summary

In a series of surveys of public opinion since 2006, Delawareans overwhelmingly supported offshore wind power development, with percentages approaching 90%. This was true as well for Delawareans who live along the coast. In addition, support among those with an ocean/project view approached 70%. This contrasts with public opinion in the state being split more generally (e.g., 2016 Presidential election). Importantly, offshore wind power opinion remained high (and even increased) after the Bluewater Wind Power Purchase Agreement (PPA) was approved—a PPA that was more expensive on a per-kWh-basis than the recently accepted bids by Maryland (Deepwater Wind/Skipjack and US Wind).

1. Background. In 2008, four state agencies and the General Assembly approved a PPA between Bluewater Wind and Delmarva after an unprecedented show of citizen support for offshore wind. According to a master's thesis by Jacki Piero, during the proceedings, 429 individuals submitted unique comments supporting offshore wind power compared to 77 who submitted unique comments opposing offshore wind power. Additionally, approximately 2000 individuals submitted form or solicited letters in support of offshore wind power.

What did the regulators and legislators approve? They approved a 25-year, 200 MW PPA that included separate prices for energy, capacity and RECs, and an annual escalator. The all-in blended price was \$120.92/MWh in 2007\$. Taking this forward, with the 2.5% escalator, the price would have been \$179.51/MWh in 2023\$, which is higher than the \$2023 OREC price for Skipjack approved by Maryland. Assuming a 2015 start for Bluewater, the Bluewater PPA would have been \$70MWh more than Skipjack in 2040 given the OREC price escalates by only 1% a year. Moreover, Bluewater Wind PPA was a 25-year contract, which all other things being equal, would result in a lower per-MWh price than a 20-year contract—the length of the OREC. Finally, Bluewater Wind was awarded an additional 2.5 RECs for each MWh generated that it could then sell on the market.

2. Public Opinion Surveying. There have been four surveys of Delaware residents' public opinions regarding offshore wind power: 2006, 2009, 2013 and 2015, the first of which was undertaken before Bluewater Wind's bid on the request for proposals. The surveys are described and the results summarized in Table 1. Trends can be seen in Figure 1. Each survey was accompanied by photomontages that depicted how the wind projects were expected to look and instructions on how to view them so that they would provide a realistic representation. The survey respondents were drawn from random samples and the results weighted by strata (area) and demographic characteristics such as age, sex, and education, to reflect the population as a whole.

The surveys found consistent high levels of support among Delaware residents, with statewide support varying from 78% to 89%, with a trend toward higher levels of support over time. While support was slightly less in census tracts that border the ocean, it shows even more dramatic increases over time from 65% in the 2006 to 77% in 2009 to 83% in 2013 to 86% in 2015. Support was high even among those with an ocean/project view—55% in 2006, 68% in 2009, 89% in 2013, and 74% in 2015. Interestingly, the public opinion data were not affected in any substantial way by distance of the proposed or hypothetical project from shore. In sum, while public support was high at the time the Bluewater project was being considered, it was higher in the year after its approval, and was even higher in 2013 and 2015.

Interestingly, residents also expressed a willingness to pay premiums to move the turbines further from shore, although after about 6 to 9 miles the public was not willing to pay additional amounts (The Bluewater Wind project was to be sited about 13 miles from the coast). Finally, tourism effects are likely small and may even be positive. For a hypothetical project at 14 miles from shore, 94% of out-of-state tourists indicated that they would continue going to the same beach and another 4% to another Delaware beach while 66% were somewhat or very likely to take at least one curiosity trip to a different or new beach to see the wind turbines and 44% were somewhat or very likely to take a boat tour.

Table 1. Summary of Delaware offshore wind power survey results

Survey Year	Peer Reviewed	Viewed Images	Survey Size	Survey Description	Pertinent Findings
2006	Yes	Yes	935	Random sample of Delaware residents regarding hypothetical project located six miles from shore with coastal residents oversampled	<p>Support</p> <ol style="list-style-type: none"> 1. 78% statewide 2. 65% border the ocean 3. 55% if ocean view <p>Distance from shore</p> <ol style="list-style-type: none"> 1. Willing to pay more for offshore wind power if turbines further from shore, although little benefit beyond 6-9 miles. 2. Prefer offshore wind over natural gas or coal expansion somewhere in Delaware if turbines greater than 1 mile from the beach
2007	Yes	Yes	1076	Random sample of out-of-state tourists on Delaware beaches and boardwalks	<ol style="list-style-type: none"> 1. 86% says offshore wind power should be allowed or encouraged; another 6% tolerated and only 3% prohibited 2. At 14 miles offshore, 94% would go to the same beach, 4% would go to a different Delaware beach. 3. 66% somewhat or very likely to visit different beach at least once to see offshore wind project 4. 44% somewhat or very likely to take a boat tour
2009	Yes	Yes	595	Random sample of Delaware residents regarding Bluewater Wind project (13 miles from shore), with coastal residents over-surveyed to increase size	<p>Support</p> <ol style="list-style-type: none"> 1. 80% statewide 2. 77% border the ocean 3. 68% project view <p>Change in likelihood of support among undecided if project was the first of 300 similar projects</p> <ol style="list-style-type: none"> 1. 57% more supportive; 9% less supportive
2013	Yes	Yes	458	Random sample of coastal Delaware residents regarding 6 turbine (30-35MW) project, 3 miles from shore	<p>Support</p> <ol style="list-style-type: none"> 1. 90% coastal support 2. 83% border the ocean 3. 89% ocean view
2015	Not yet submitted for publication	Yes	337	Random sample of Delaware residents regarding 300 MW project in MD Wind Energy Area, 11 miles from the coast, with coastal oversampling	<p>Support</p> <ol style="list-style-type: none"> 1. 89% statewide 2. 86% border the ocean 3. 74% project view

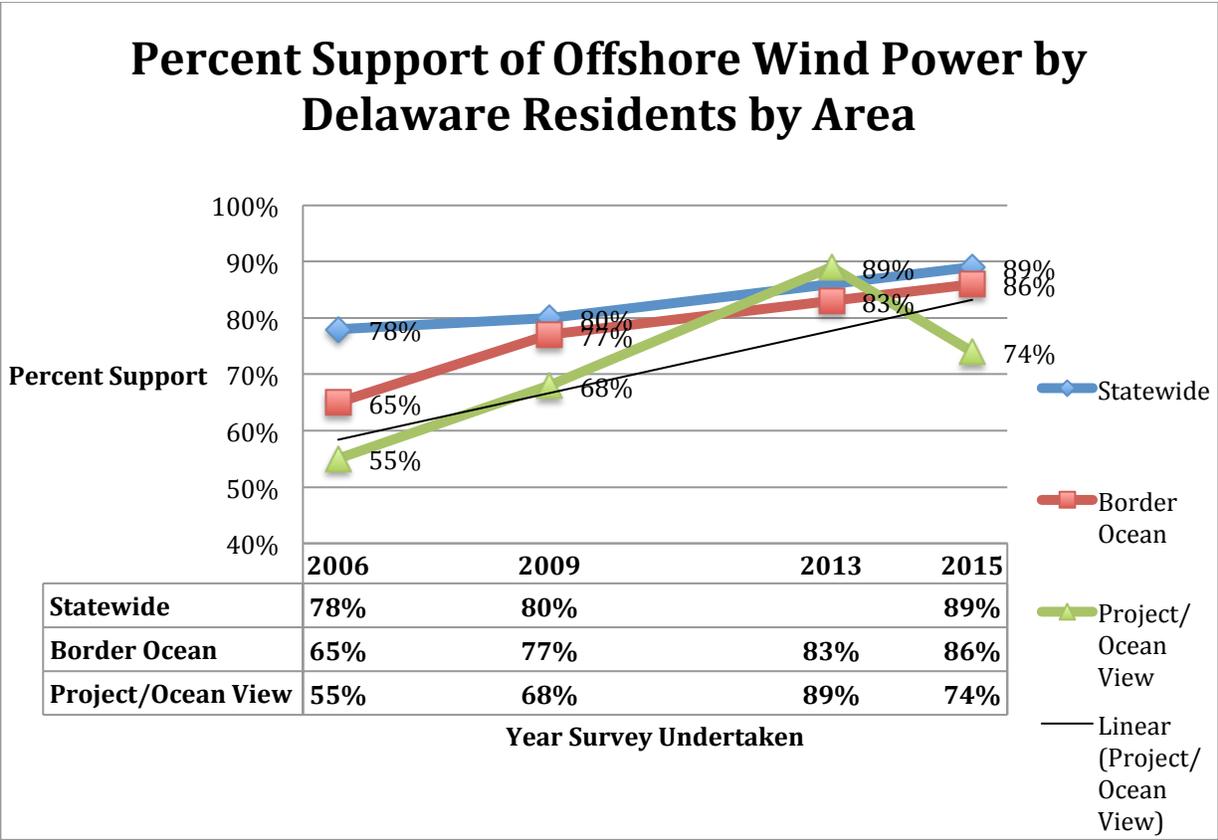


Figure 1. Percent support of offshore wind power among Delaware residents over time: Statewide; in census tracts/block groups that border the ocean; and who have an ocean/project view

3. Other surveys of note. Two other US studies are also noteworthy. First, a longitudinal study of public opinion of residents proximate to the United States’ first and only operating offshore wind project found high public support (83-88%) (Project A below). Second, a national study found residents who live proximate to US land-based wind power projects would rather live near their local project than (a) a coal, natural gas or nuclear facility (by approximately 20:1) and (b) a commercial-scale solar project (by more than 4:1) (Project B below). The wind power project(s) characteristics, the research characteristics, and pertinent results are summarized next.

A. Block Island Offshore Wind Project

- Project Characteristics
 - Only operating offshore wind project in the United States
 - Located 16 miles to the mainland Rhode Island coast; 3 miles to Block Island
 - 30 MW total (five, 6MW General Electric wind turbines)
 - PPA between National Grid and the developer
 - Price: 24.4 cents/kWh in year 1, increasing at 3.5%/year for 20 years
 - Price in year 20 is over 48 cents/kWh.
 - Does not include cost of transmission between Block Island and mainland Rhode Island
- Research Characteristics
 - 420 Block Island and coastal Rhode Island respondents to a longitudinal study
 - First survey in 2016 prior to wind turbine installation
 - Second survey in 2017 after project commissioning/operation commenced
 - Publication Status: Manuscript undergoing peer review
- Pertinent Results

Table 2. Level of support for Block Island Offshore Wind Power Project

	Pre-installation	After operation commenced
Block Island, Rhode Island	82.9%	82.6%
Mainland (coastal) Rhode Island	88.1%	87.6%

B. National land-based wind survey

- Project Characteristics
 - US project with one or more wind turbines (a) with a nameplate capacity of at least 1.5MW; (b) that is at least 364 feet high and (c) installed through 2014
 - These projects cumulatively represent 50GW of installed capacity
- Research Characteristics
 - Study led by US DOE Lawrence Berkeley National Lab
 - Jeremy Firestone served as a consultant
 - Sample: People living within 5 miles of a “qualifying” US wind power project
 - Survey undertaken in 2016
 - 1705 individuals completed the survey
 - Status: Manuscript submitted for peer review. Re-submitted after only very minor modifications requested
- Pertinent Results

Table 3. Among residents who had moved into their home prior to project construction, do they prefer living near their local project or living near a coal, natural gas, nuclear or commercial-scale wind facility (no preference omitted)

Other Project	Prefer local wind power project	Prefer Other
Coal	91%	4%
Natural Gas	89%	4%
Nuclear	84%	6%
Commercial-scale solar	52%	14%

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