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Faring well in offshore wind power siting? Trust, engagement and process fairness in the United States

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ABSTRACT

Although visual effects may be the most defining characteristic of a wind project, implementing fair, transparent and just decision-making processes may be a significant determining factor in success. To shed light on this question, we undertook a study of perceptions of mainland coastal and island residents proximate to the Block Island project—the first offshore wind project in the United States. The study included a longitudinal survey of residents prior to and after turbine installation, and semi-structured interviews with residents and key stakeholders. We assessed the extent to which respondents were engaged in the planning process, opinions of transparency and fairness, and degree to which the planning process affected their opinion. Although interviewees who held a negative view of state government indicated that it did not cause them to oppose the project, trust in state government was the primary driver of perceptions of process fairness, which in turn was the primary driver of project support. We also found individuals to withhold final judgment of the process until the final outcome—project operation. Finally, fair process was seen as having benefits distinct from its effect on the outcome—that is, local residents valued the process itself.

1. Introduction

The development of renewable energy resources has become a major part of many states' energy and environmental policies, contributing to global climate mitigation efforts and goals. One of the renewable energy industries with the greatest potential is wind. The United States (U.S.) Department of Energy [1,2], in its *Wind Vision*, reports that onshore wind power "has become an established, reliable contributor to the nation's electricity supply." Indeed, in 2017, wind power provided approximately 39% of all electricity generation from renewable energy, including hydropower, meeting 6.6% of U.S. electricity demand [2]. The increase in installed capacity has been one factor in helping to reduce the unsubsidized levelized cost of new land-based wind power, which declined by 70% from 2009 to 2019 [3]. The success of the onshore wind energy industry in the U.S. has provided valuable momentum and helped pave the way for the offshore wind industry to excel on the national platform.

As population density in coastal areas continues to increase [4], there is an opportunity to utilize an energy source close to these areas of high energy demand. The U.S. offshore wind resource is substantial near these coastal areas [5], with approximately 20 gigawatts (GW) planned along the east coast. However, one major roadblock to the development of proposed offshore wind projects has been public perception and opposition to specific proposed offshore wind projects [6–8]. Gaining an appreciation of values, expectations, and public perception of a proposed energy project is thus critical for understanding potential public acceptance and support [9,10].

Wind power siting involves an analysis of the technology itself, as well as the proposed location, the developer, and the siting procedures employed [11]. In the social acceptance literature, much of the focus has been on distributional aspects of siting [7], with less attention on the focus of this article—procedural justice [12,13].

Some of the most important characteristics that affect public perception of a planning process include how fair, transparent, and trustworthy the process and the project developer are perceived to have been [14,15]. Indeed, broader studies of trust in organizational contexts

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reveal that people are more likely to feel fairly treated when they are allowed to present their suggestions about what should be done and participate in the resolution of a decision [16]. Yet, importantly, people may only value their opportunity to speak to authorities if they trust the authorities that are considering their opinions [16,17].

Processes used to reach outcomes are important not only in their own right, but because the public believes fair procedures are likely to produce fair outcomes [18]. As a result, how well stakeholder expectations for engagement processes are met may influence not only trust, but also acceptance of project outcomes [19]. Creating an environment where people perceive they have been afforded an opportunity to affect a proposed project outcome can go a long way toward generating project support [20]. This 'fair process effect,' suggests that where a decision-making process is perceived as fair, it can result in public acceptance of an outcome, even if the outcome does not fully satisfy all, or address all concerns [10,21,22]. Not only can fair processes lead to institutional trust [23], but as Grimes [24] notes, trust in institutions can shape perceptions of public processes.

Indeed, without public trust or a perception of process fairness, a project may be more likely to be confronted with public controversy compared to one with more deliberate and meaningful community engagement [12,25]. Moreover, conditional supporters of a wind power project may become opponents if they perceive the process to be unfair or the developer to be untrustworthy [26].

Further, Dwyer and Bidwell [19] highlight that the perceived fairness of a process is but one part of what they refer to as a "Chain of Trust." Their research builds upon Eltham, Harrison and Allen's [27] theory that public acceptance is rooted in institutional and societal factors, especially trust. Specifically, the "Chain of Trust" details how stakeholder trust must be first cultivated by process leaders, as only then will the information they provide be considered trustworthy. Similarly, trust in the process is necessary to trust the outcome. If the chain holds, then there is a greater chance of support for the outcome. However, if trust is lost (e.g., through perceived unfairness) at any point, the chain breaks, increasing the likelihood of opposition to the outcome.

As studies of facility siting across various countries have made clear, social distrust can be a fatal source of conflict and ultimately political stalemate [28,29]. Despite well-intentioned efforts by planners and decision makers, social trust, once lost, is extremely difficult to recover and often cannot be gained within the timeframes that decisions require [30]. Some societies (including the U.S.) have undergone a basic loss of trust in science and in major institutions [31]. If conditions of low social trust prevail, they pose major challenges to decision-making.

Building on this body of literature, the present research explores public perceptions of process fairness of and support for the first offshore wind project in the United States—the Block Island Offshore Wind Project (BIOWP)—which has been operational since December 2016. It is a five-turbine, 30-MW wind project located over 27 kms (km) off the coast of Rhode Island (RI), but only 5 km off the coast of Block Island (BI), a small tourism-dependent island community. The planning, installation, and operation of the first offshore wind project in the U.S. presents an opportunity to answer Devine-Wright's [32] call to utilize a specific conceptual foundation within a specific landscape context to understand public perceptions. The history and planning processes in specific contextual landscapes previously studied [33] are structurally different from those presented by the BIOWP, and so, it is important to explore how the process for the BIOWP—being largely developer- and state-led and initiated—may have affected perceptions of trust, transparency, and fairness. Here we do so using mixed methods: survey research and semi-structured interviews.

Random probability samples properly weighted have strength in that they generate results that are representative of populations studied. Yet, surveys, particularly those that have primarily closed-ended questions, are limiting in that they force respondents to fit their knowledge, experiences, and feelings into categories created by the researcher. In contrast, interviews allow participants to express their understanding in their own terms [34]. Yet, few have framed qualitative data, systematically collected, within the literature on process fairness [35,36]. An exception is Dwyer and Bidwell [19], who undertook semi-structured interviews with process leaders and engaged members of the public during the time period when the BIOWP offshore wind turbine foundations were being installed. The use of mixed methods—quantitative survey and qualitative interview methodologies—can provide a more comprehensive understanding of a complex phenomenon such as process fairness, combining the strengths of each method [37,38].

This research considers three main questions: 1) how does a mainland coastal and an island community perceive the fairness of the BIOWP planning process, 2) how are perceptions of the planning process affected by involvement in the process, and 3) how do perceptions of the fairness of the planning process affect support of or opposition to the project?

1.1. Planning process overview

The planning process for the BIOWP included input from and engagement among developers, government officials, members of the scientific community, and the general public, and was made up of four distinct stages: spatial planning (Ocean Special Area Management Plan (OSAMP)); the siting of the turbines; siting of the transmission lines; and the Power Purchase Agreement (PPA). Although the 20-year PPA was initially rejected by the RI Public Utilities Commission (PUC) as commercially unreasonable, RI's state legislature redefined "commercially reasonable," after which the PUC approved a slightly modified PPA in 2010.

The OSAMP provided the public with an opportunity to attend public meetings (over one hundred were held) and submit comments (over two thousand were received) on the draft plan [39,40]. As part of the development of the OSAMP, a Renewable Energy Zone (REZ) was designated off of Block Island based on oceanographic, geologic, and resource-use data collected from/by research scientists and stakeholders. The REZ identified a development area which would result in the least potential impact to the ecosystem and resource-use. Deepwater Wind, a private developer headquartered in Providence, RI (since purchased by Danish energy company, Ørsted), heeded the OSAMP and proposed to site the BIOWP within the REZ. Public engagement continued: Deepwater Wind employed a community member to serve as a liaison and agreed to reimburse the Town of New Shoreham (the governmental unit on Block Island) for costs associated with the town hiring consultants to advance the town's interests [35]. Deepwater also altered final turbine placement based on feedback from local fishermen [41].

After turbine siting, planning turned toward siting two transmission lines: one that would connect the turbines to a substation on BI, and a second between BI and mainland RI, allowing electricity to be sent to or from the mainland as needed (previously, BI was isolated from the electric grid and dependent on diesel generation). Originally, Deepwater Wind proposed that the cable would make landfall at the Narragansett Town Beach. While the public was under the impression that these cables would be completely buried underground, it was soon discovered that this was not the case [42]. Deepwater changed its plan to make landfall at the Narragansett Town Beach in favor of another Narragansett beach—Scarborough State Beach—ultimately burying the cables underground [43]. This new location was strategic in that it allowed Deepwater to bypass local government and negotiate with a more supportive state government [44]. BI also secured a commitment to include a fiber optic cable with the electric cable from the mainland [35]. Fig. 1 is a map of the project and area.

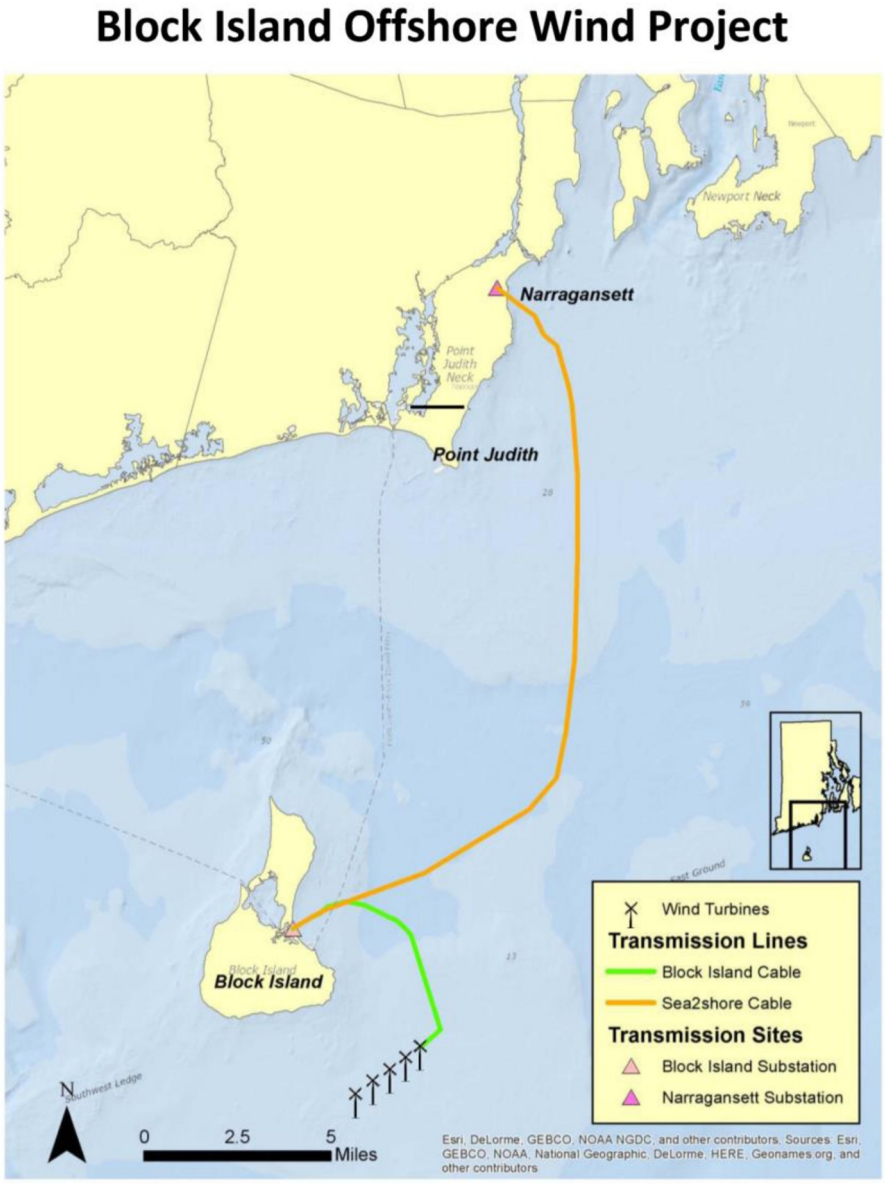

Fig. 1. Block Island Offshore wind power project (turbines and transmission cables). From [53]. Reproduced with permission.

2. Methods

This research is part of a larger, random longitudinal (probability) mail and internet survey studying perceptions of the BIOWP conducted through a collaboration between the University of Delaware and the University of Rhode Island. The first survey was undertaken in 2016, immediately prior to turbine installation (but after foundation installation, henceforth referred to as "before construction") and the second survey between January and May 2017, following project commissioning (referred to as "after construction").[1] The sampling frame was stratified by location: households on BI and those living in census areas bordering the RI mainland coast (border ocean) and those just inland (near ocean), which are together referred to as coastal residents. These strata were created and sampled because they represent the RI residents who are most likely to have been engaged during the public processes and be affected by the project (e.g., aesthetics and place, construction, and recreational activities, etc.). All homes were sampled on BI, and a stratified random probability sample of coastal residents was drawn by Survey Sampling International (SSI).

Respondents were contacted by mail and had the option to complete either an internet or mail survey; 672 individuals responded to the first survey for an effective response rate of 33%. The 672 individuals were prompted to take a follow-up survey to be completed by whichever mode (mail or online) the first survey was completed; 420 individuals responded, for an attrition rate of 37.5%, resulting in an overall effective response rate of 21%. No attrition bias was found between the first and second surveys based on process fairness metrics. Descriptive statistics are weighted on geographic strata, age, gender, and education to reflect the population. All descriptive statistical survey results are reported based on the 420 respondents who responded to both the first and second surveys after accounting for question nonresponse.

Perceptions of process fairness were further revealed during twenty-seven semi-structured interviews (the interviewees will hereinafter be referred to as the "participants"). The semi-structured interviews were used to explore the results of the surveys and delve deeper to discover the underlying reasoning behind stated perceptions [45–47]. These interviews focused on perceptions of fairness of process regarding the

[1] A third survey (not analyzed here) was undertaken a year later in 2018.

Table 1
Support of and opposition to the project by location. We group those individuals who lean toward support of or opposition to the project with supporters or opponents, respectively. BI survey (n = 112); Coastal RI survey (n = 308); Interview (n = 27).

		1st Survey	2nd Survey	Interview
BI	Support/Leaning Support	82.2%	82.6%	78%
	Oppose/Leaning Oppose	17.8%	17.4%	22%
Coastal RI	Support/Leaning Support	87.3%	86.7%	100%
	Oppose/Leaning Oppose	12.7%	13.3%	0%

BIOWP. Interviews were undertaken by one of the co-authors who was also involved with all facets of the second survey.

The first method for sampling for the interviews was to purposively select from those who responded to the surveys based on their anticipated richness and relevance of information in order to reach saturation, discerned by the results of the survey [48,49]. Some of the factors used for purposive sampling included age, gender, island versus mainland coastal, extent of participation in the planning process, and support of (or opposition to) the BIOWP. The second sampling method included identifying key stakeholders. Three individuals fell into both categories, one was a key stakeholder who was not a resident of the survey population and 23 were selected solely purposively. The interviews of twenty-seven participants were conducted in-person or over the phone and audio recorded with participant consent (all consented) between November 2017 and January 2018. In-person interviews were conducted in local public libraries or other common spaces. Seventeen had their primary residence on BI, nine coastal RI, and one in Massachusetts. Participants are identified with a "C" for coastal residents or "B" for Block Island residents; an "S" for supporter or "O" for opponent; and an identification number. Thus, the first coastal supporter would be identified as CS1.

Interview transcripts were coded using qualitative coding software MAXQDA with a directed, *a priori* approach where key concepts and themes from the relevant literature were identified and used as initial coding categories to enable an understanding of the extent to which the data supports existing theory [34,50]. The three major themes were separated into engagement in the planning process, trust in the state and developer, and effect of perceptions on project support. In order to compare the qualitative interview data and the quantitative survey data, the survey data were analyzed separately, and final insights result from the comparison or triangulation of the analysis of these qualitative and quantitative datasets [34].

Based on the results of descriptive data analysis and the interview data, we limited regression analysis to Block Island. We used a two-stage model of process fairness/support. We ran weighted and unweighted linear and ordered logistic regressions of process fairness in stage one, from which we generated predicted probability process variables for use in the second stage support/opposition model. The process fairness dependent variable is a composite of perceived fairness of the OSAMP and perceived fairness of the turbine planning/siting process (Cronbach's alpha = 0.81, for unweighted data). Because the deliberation over and decision on the location of transmission landing primarily affected only one coastal community—Narragansett—perceived fairness of the transmission process was not included in the composite dependent variable. Stage one independent variables were drawn from survey questions and include measures discussed in the literature including having a say in the planning processes, trust of state authorities and developer transparency. The variables are described in more detail immediately prior to the regression results for reasons of practicality.

We ultimately employed a linear regression model for the first stage given the large number of categories (nine) in the dependent variable, each of which would have required us to generate a predicted probability if ordered logit was used in the first stage. As the weighted first stage model had a slightly higher R^2 than the unweighted model, and because we prefer a weighted model for stage two (discussed next), we used weighted linear regression to generate predicted probabilities. We do, however, present both first stage models given other differences.

For the second stage, we ran weighted and unweighted linear and ordered logistic models of support. Given that the second stage weighted ordered logistic model performed similarly to both an unweighted ordered logistic model and a weighted linear model (the unweighted linear model performed differently), we employ weighted ordered logistic regression for stage two. Independent variables in the second stage include perceived process fairness, a measure of distributive justice (whether the respondent was directly affected by the project) along with perceptions of the project's appearance and fit with the landscape.

Only those respondents who answered each question that was the basis for a variable in both the first and second stage models were included in the regression analysis so that effects can be attributed to variables alone rather than to the addition or subtraction of respondents. Those who lacked knowledge of the extent to which the OSAMP process was fair or unfair or the extent to which the turbine planning processes was fair or unfair were also not included in the regression, being that the stage one dependent variable was a composite of answers ranking the fairness of those processes. For each statistical model we present coefficients, p values and measures of effect size (omega-squared (ω^2), for linear regression and odds ratios for ordered logistic models).

3. Results

3.1. Descriptive statistics and interview data

3.1.1. Support and opposition

Table 1 facilitates comparison between interviewees and survey respondents on the question of project support. Support and opposition on Block Island effectively remained constant between the two surveys (approximately 82%). The Block Island interviewees were slightly less likely (78%) to support the project and include two individuals who had earlier been opposed. In coastal RI, the level of support was high (87%) among survey respondents and also effectively unchanged between the surveys. All coastal RI interviewees supported the project, including one individual who had earlier sat in opposition.

3.1.2. Involvement in the process

Respondents in the first survey were provided a list of actions and asked to identify which actions they took during the planning process (Table 2). The majority of Block Islanders took at least one form of action (59.5%) compared to only 15.5% of coastal residents. About half of Block Islanders attended a meeting (50.7%) and almost a quarter

Table 2
Actions and involvement in the planning process. Ordered from highest to lowest percentage of Block Islanders.

	Block Island (n = 111)	Coastal RI (n = 306)
Took one or more specified actions	59.5%	15.5%
Attended meeting	50.7%	10.4%
Spoke at meeting	24.1%	2.6%
Wrote or spoke to a government official	23.3%	2.9%
Other	14.7%	1.4%
Wrote a Letter to the Editor	4.6%	0.0%
Contributed to webpage	3.0%	3.2%
Put up sign	0.5%	2.4%

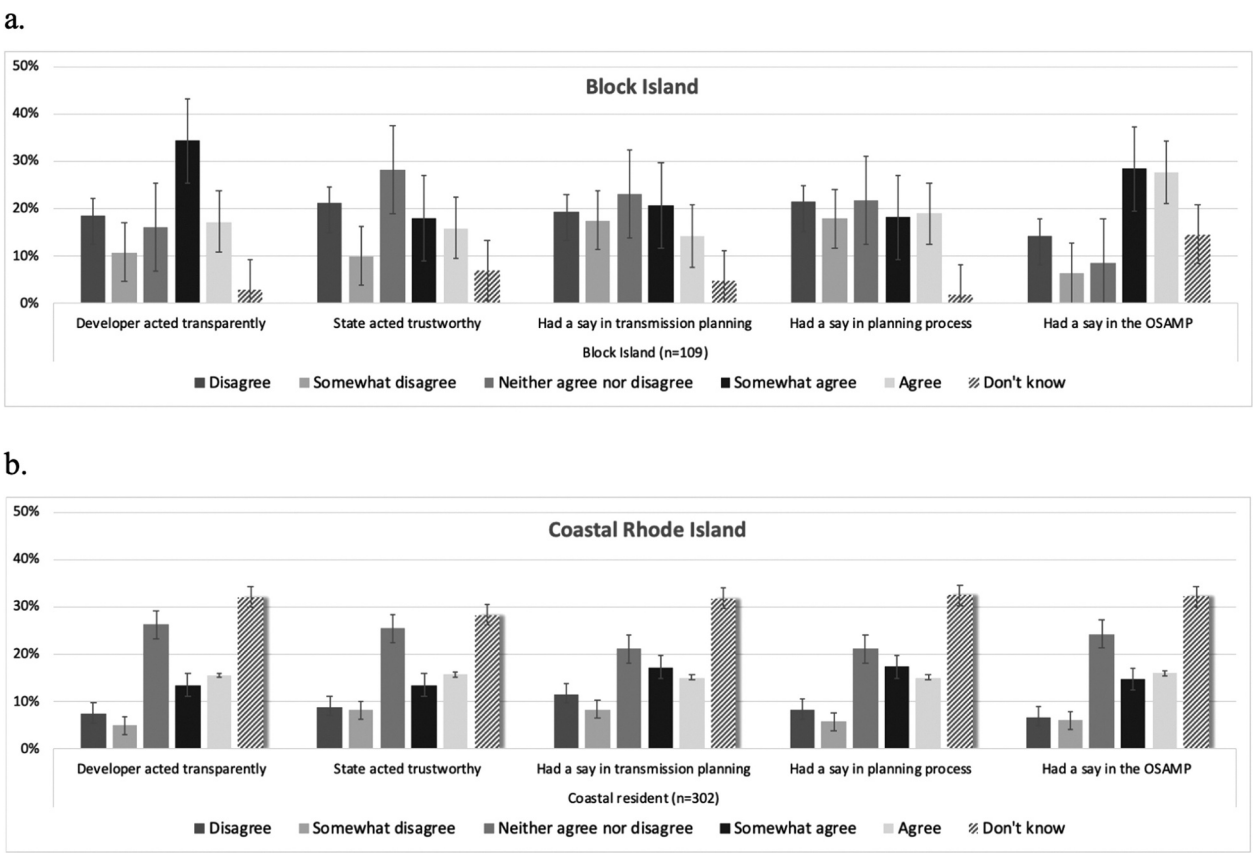

Fig. 2. Perceptions of the community having had a say in the planning processes and the openness, trustworthiness, or transparency of the state and developer. a, Block Island residents. b, Coastal Rhode Island residents. Error bars represent 95% confidence intervals (negative values omitted).

spoke out at a meeting (24.1%). Of Block Islanders who took one or more actions, 36.7% took only one, 55.6% took two or three and 7.7% took four or more.

In the first survey, respondents also were asked to what extent they agreed or disagreed with five statements: community members had a say in the (1) development of the OSAMP, (2) the planning process of the offshore wind turbines, and (3) the transmission planning process; (4) the state acted in an open and trustworthy manner; and (5) the project developer acted openly and transparently (Fig. 2). For each statement, a respondent could choose among five options from disagree to agree or "I don't know." Most BI residents were engaged, with the vast majority having an opinion on the community engagement, trustworthiness, and transparency metrics. Just over half of Block Islanders (51.5%) responded that they agreed or somewhat agreed that the developer acted openly and transparently, while 56.1% felt that the community members had a say in the development of the OSAMP. In contrast, almost a third of coastal RI resident answered "I don't know" to all prompts, highlighting how much less they were engaged in the process, and perhaps reflecting that they perceived a lower stake in the outcome.

Throughout the interviews, participants discussed their involvement, or lack thereof, in the planning process for the BIOWP. Greater percentages of interviewees from Block Island (88% versus 60%) and Coastal Rhode Island (56% versus 16%) participated in the planning process than residents as a whole. Participants who had not been involved in the planning process were asked why. While participants noted that they were too busy and did not have time to invest, more interestingly, they mentioned that they felt not qualified to participate and that others more directly affected were representing their concerns and sharing information, making getting involved and participating themselves unnecessary. Some implied that mainland residents had less stake than those on BI, and thus did not need to actively engage.

> "It really wasn't of concern to me, I thought the overall benefit to the island would be positive…Being on mainland all my life, I didn't give it a lot of personal study, I just knew it was happening."
>
> Participant CS4

> "All in all I think we [mainland RI] had a small voice in it. I think Block Island and people are going to be affected a bit more had more voice."
>
> Participant CS1

A similar sentiment was expressed by Block Islanders.

> "It's Block Island Wind Farm. It's not Rhode Island. It's not New England's wind farm. It's Block Island Wind Farm."
>
> Participant BS7

Block Islanders' more substantial role in the planning process and greater voice in affecting the project was perceived as fair by coastal residents due to Block Island's proximity to the project and anticipated effects on Block Islanders.

Yet, many Block Islanders, including those who supported the project, did not feel their community had a large voice in the project, noting BI's small year-round population (approximately 1000 residents) as a reason for why the first offshore wind project in the country was sited there; community members felt the location were purposefully chosen so that the project would be met with little community opposition or pushback and be easily completed.

> "You have to use a small place like this because you're not going to get away with it anywhere else. There's a reason why Block Island was the first one."
>
> Participant BS7

Those who had been involved in the planning process discussed

Table 3
Beliefs regarding fairness of processes before and after turbine construction among those individuals who answered a given process-fairness question in both the first and second surveys. Proportion are weighted. Means are based on 1–5, from "very unfair" to "very fair." The *t*-test uses weighted means; the Wilcoxon signed rank test uses unweighted means.

Process	Location	Survey relative to turbine installation	Very unfair	Somewhat unfair	Neutral	Somewhat fair	Very fair	Mean		*t*-test	Wilcoxon Signed Rank test
								Weighted	Un-weighted	P value	P value
OSAMP	Block Island	Before	7.0%	19.9%	17.1%	28.0%	27.9%	3.50	3.47	0.002	0.000
		After	1.4%	12.4%	21.5%	10.5%	54.1%	4.04	4.09		
	Coastal RI	Before	9.1%	15.1%	31.0%	32.0%	12.8%	3.24	3.20	0.031	0.000
		After	8.8%	5.9%	29.6%	13.7%	41.9%	3.74	3.81		
State permitting of turbines	Block Island	Before	26.3%	6.5%	25.5%	20.9%	20.8%	3.03	2.96	0.003	0.000
		After	11.2%	15.5%	15.9%	13.7%	43.7%	3.63	3.42		
	Coastal RI	Before	8.8%	14.3%	31.2%	31.2%	14.5%	3.28	3.18	0.085	0.000
		After	15.5%	5.9%	19.1%	18.2%	41.3%	3.64	3.72		
State siting of transmission lines	Block Island	Before	10.2%	18.9%	24.0%	25.2%	21.8%	3.29	3.34	0.056	0.000
		After	4.5%	15.9%	28.4%	6.2%	45.0%	3.71	3.88		
	Coastal RI	Before	12.3%	8.7%	28.0%	37.6%	13.5%	3.31	3.22	0.013	0.000
		After	6.9%	2.6%	28.1%	26.2%	36.2%	3.82	3.79		

appreciation for and positive attitudes toward the process, but they did not necessarily feel that their involvement affected the planning process in any way. Getting as much of the community involved as possible was admittedly difficult, yet crucially important, for cultivating a better process and more acceptable situation, as reported by both Block Island project supporters and opponents.

> "…the Town Council or whoever it is, the governing force of that community, has to really do grassroots type information and try to involve as many people as possible. You really have to. … It's hard to get people involved…a lot of people just didn't become involved. It's a very crucial thing for our community. I think a lot of time has to be spent in trying to engage with the public. That's very hard to do. I [would] be the first to admit that. I think that helps the project a lot."
>
> Participant BO9

> "I know I've complained about multiple meetings, but in the long run, it made for a better process and brought the community along to a much more of an acceptable situation."
>
> Participant BS14

3.1.3. Perceptions of process fairness

Respondents were asked in both surveys whether they "believed" the following planning processes were fair: the OSAMP, state permitting for the wind turbines, and the siting of the transmission lines (Table 3). In the first survey, before installation of the turbines, 32.8% of Block Islanders found the state permitting of the turbines to be somewhat (6.5%) or very unfair (26.3%), while 29.1% found the transmission siting to be somewhat or very unfair. Coastal residents display similar perceptions, although they were less polarized than Block Islanders.

After construction, all processes saw an increase in "very fair" responses, and the difference in the process means before and after turbine construction were generally statistically significant ($p < .05$).[2] Interestingly, very unfair perceptions of the turbine permitting process decreased from 26.3% to 11.2% on Block Island while increasing from 8.8% to 15.5% among coastal residents.

3.1.4. Perceived effect of planning process fairness on support and opposition

In the first survey, respondents were also asked if they had a change in opinion regarding the BIOWP as a result of the planning process (Table 4). More than half of Block Islanders (52.1%) and three-quarters (75.3%) of coastal residents responded that their opinion of the project was unchanged as a result of the planning process. About a third of Block Islanders (32.8%) and a fifth of coastal residents (20.1%) said that their opinion of the project was made more positive as a result of the planning process compared to 15.0% and 4.6%, respectively, more negative. While the majority of respondents did not change their opinion due to the planning process, those whose opinions were changed were more likely to become more positive. However, the percentage of Block Islanders who reported being much more negative due to the planning process was roughly the same as the percentage who were much more positive.

Table 4
Change in opinion regarding the project due to the planning process.

	Block Island (n = 110)	Coastal RI (n = 297)
Much more positive	12.2%	9.3%
Somewhat more positive	20.7%	10.9%
Unchanged	52.1%	75.3%
Somewhat more negative	3.7%	2.9%
Much more negative	11.3%	1.7%

While interviewees did not believe that community involvement had an effect on the project outcome, they did express the importance of community representation, having community concerns aired and questions answered, and receiving project updates at meetings.

> "There was enough meetings and people got a chance to say their piece but I don't think that really affected the project at all."
>
> Participant BO9

3.1.5. Trust

In the follow-up survey, respondents were asked to indicate the extent to which the openness and fairness of the state turbine siting and permitting processes, openness and fairness of the federal processes, trust of the state government, and trust of the developer (Table 5) affected their decision to support or oppose the project. For Block Islanders, the mean of those who identified trust in the developer (3.55 on a Likert scale of 1–5) as affecting their decision to support or oppose the BIOWP was significantly greater than those who identified trust of the state government ($p = .009$) or openness and fairness of the federal process ($p = .04$); it also was greater than the mean of openness and fairness of the state turbine siting and permitting process (3.14), but the difference was not statistically significant ($p = .15$). For coastal residents, none of the four metrics stood out from the others, with means

[2] We include t test of weighted means and a Wilcoxon signed rank test of unweighted means (we were not able to run this test in STATA using weighted means).

Table 5
Effect of process metrics on decision to support or oppose the project.

		Not at all (1)	Slightly (2)	Somewhat (3)	Moderately (4)	Very much (5)	Mean (1–5)
Block Island (*n* = =97)	Openness and fairness of the state siting and permitting processes	21.3%	13.6%	24.3%	11.5%	29.3%	3.14
	Openness and fairness the federal process	24.5%	8.4%	23.3%	24.1%	19.7%	3.06
	Trust of state government	25.5%	14.0%	22.6%	18.4%	19.5%	2.93
	Trust of the developer	16.8%	11.9%	10.5%	20.9%	40.0%	3.55
Coastal RI (*n* = =272)	Openness and fairness of the state siting and permitting processes	18.6%	7.4%	32.1%	20.0%	21.9%	3.19
	Openness and fairness of the federal process	18.4%	7.8%	28.8%	25.3%	19.7%	3.20
	Trust of state government	13.1%	10.0%	31.9%	21.5%	23.4%	3.32
	Trust of the developer	14.6%	6.7%	36.8%	20.8%	21.0%1	3.27

ranging from 3.19 to 3.32. Interestingly, the decision-effect of trust in state government had the lowest mean of the four measures on BI (2.93) and the highest mean in coastal RI (3.32).

3.1.6. Involvement in the planning process

During the semi-structured interviews, participants spoke both positively and negatively about the developer and the extent to which the developer had an effect on their decision to support or oppose the BIOWP. Participants reported that the most positive aspect was the community liaison that the developer hired about halfway through the planning process to facilitate communication between the developer and community. A Block Island resident for about thirty years at the time of hire, the liaison was recognized as a community member and therefore garnered the trust of much of the community in this new role. He had previously served on the Town Council and on several boards and commissions and was a volunteer firefighter. He also came to the position with experience in design and construction. As the liaison, he had an office on Block Island, open to anyone to schedule a meeting to discuss or ask questions regarding the BIOWP. He was mentioned frequently throughout the interviews, especially among Block Islanders, and while not all participants had formally taken advantage of his services, they mentioned that he could be found stopping to talk about the project in the grocery store or elsewhere around town, emphasizing the liaison's role not only as the community's connection to the developer, but also simply as a community member.

> "…the hiring of a local personage who was knowledgeable and respected in the community, and intelligent enough to understand everything was really critical. [He] has a good reputation on the island and is very knowledgeable so I thought that was critical."
>
> Participant BS2

> "I know that there are people who that made all the difference to them, having that community liaison."
>
> Participant BS7

In this way, similar to Firestone et al. [12], we see that the extent of participation is somewhat less important for overall perceptions of fair process than perception of the openness of the developer. While it's plausible that this liaison could have been perceived as someone handpicked and influenced by the developer, as seen in Dwyer and Bidwell [19], no one mentioned this during our interviews, consistent with findings of Klain et al. [35]. One participant suggested making a third-party point person available to the public to provide general project information for future projects. Various other community liaison models for public engagement have been utilized at offshore wind projects in the United Kingdom, illustrating how the liaison model can be molded in a way that is most useful to the community and the proposed offshore wind project [51].

Besides the hiring of the community liaison, the developer was favorably viewed by some due to its perceived commitment to stakeholder engagement. Participants discussed the developer holding meetings and taking the time to answer all questions that were asked, but this was also sometimes perceived as a negative. As shown in the quotes below, some questioned the intentions of the developer and the real motives behind its fervent engagement: as a business trying to develop the project and make a profit, was it engaging the public so steadfastly to ensure a fair and engaged process for the benefit of the community, or as self-protection to try and prevent community opposition?

> "I think they were as transparent as I could expect. [laughs] They are a business company and they are in to make money and they give a return to their investors. From my viewpoint…I say they did a really, really excellent job."
>
> Participant BS5

> "This is their first project, so it's financed by a hedge fund, I have some issues with that. I think that their profits for this are going to be a lot more than they need it to be to make this a viable project."
>
> Participant BO9

> "That's my only skeptical thought on the project like that. Somebody is making money somewhere, got to, is it a worthy investment for the general population or is it only benefiting the people who invested in it?"
>
> Participant CS4

Early in the planning process the developer was not always able to answer all questions that were asked by the community (e.g., "How many turbines will be installed?"). This was interpreted by some as the developer withholding information (also identified as an issue by Klain, et al. [35]) or not being prepared for those meetings with the necessary information:

> "I don't feel like they were totally forthcoming. I don't know if I would say Deepwater Wind was not totally forthcoming when they were dealing with residents of Block Island maybe."
>
> Participant BS7

> "People got frustrated and feel like they weren't being transparent when they wouldn't answer a question. My observation was, if they wouldn't answer a question it's because they actually didn't have the answer. Like early on, 'how many wind turbines?' 'Well, five to eight.' 'Does that mean you're really planning ten?' They were sometimes very reticent to answer a question with 'this is what we think.' They always wanted to know the answer. I understand that but sometimes you can do a little bit better, you seem more open if you say, 'Well, we don't know for sure but we think we're going to get it down to five wind turbines.' I know why they don't want to do that because if it turns out to be six somebody is going to say, 'You said it was going to be five.' I think some people felt they weren't transparent on some items, but I think in all cases there were answers to questions they either didn't know or they didn't have control over the answer."
>
> Participant BS4

While holding these informational meetings from the beginning of

Table 6
Descriptions of regression variables and their weighted means of respondents in the regression models along with an indication from which survey the data was collected.

Variable	Variable Description	Mean (SE) (n = =78)	Survey
Dependent Variables			
Fairness	9-category composite of two 5-category variables: (a) fairness of the planning process for the OSAMP and (b) fairness of the planning process for state permitting of the offshore wind turbines. Each 5-category variable ("1" if very unfair, "2" somewhat unfair, "3" if neutral, "4" if somewhat fair, "5" if very fair, and don't know is excluded). The composite thus ranges from 2 to 10, with a midpoint of 6	6.38 (0.32)	2
Support	5-category variable ("5" if respondent supports the BIOWP; "4" if leans toward support, "3" if doesn't indicate direction leaning, "2" if leans toward opposition, "1" if opposes)	4.17 (0.22)	2
Stage One Independent Variables			
Process Metrics			
OSAMP Say	5-category variable ("1" if disagree, "2" if somewhat disagree, "3" if "neither agree nor disagree" or "don't know", "4" if somewhat agree, "5" if "agree") (1–5) responding to the statement "Community members had a say in the development of the Ocean Special Area Management Plan (SAMP)"	3.62 (0.23)	1
Turbine planning say	5-category variable as above; statement was "Community members had a say in the planning process of the offshore wind turbines"	2.99 (0.20)	1
State trust	5-category variable as above; statement was "The state acted in an open and trustworthy manner"	2.95 (0.18)	1
Developer transparency	5-category variable as above; statement was "The offshore wind project developer acted openly and transparently"	3.22 (0.21)	1
Took action	"1" if at least one action taken related to BIOWP planning; "0" if no action taken	0.595 (0.08)	1
Demographic Variables			
Age	Age in years	54.8 (3.6)	2
College	"1" if received a Bachelor's, Graduate, or Professional degree; "0" if otherwise	.558 (0.08)	1 + +2
Gender	"1" if male; "0" if female	0.472 (0.08)	2
Retired	"1" if retired; "0" not retired	0.217 (0.06)	1
Stage Two Independent Variables			
Process Metrics			
Predicted process fairness	Predicted process fairness (9-category variable)	6.38 (0.29)	NA
Objectively Measured			
Own	"1" if own home; "0" if rent	0.803 (0.07)	1
See	"1" if the turbines can be seen from primary or secondary residence; "0" if can't see	0.188 (0.06)	2
Fish	"1" if engage in ocean fishing from a boat; "0" if do not	0.440 (0.09)	1
Subjective			
Fishing importance	4-category variable ("1" if either do not engage in ocean boat fishing or if do engage, it is not important to you, "2" if engage and somewhat important, "3" if engage and moderately important, "4" if engage and very important)	2.03 (0.20)	1
Directly affect	5-category variable (disagree to agree, with middle category neither agree nor disagree) on whether "the project would affect me directly" (1–5)	4.51 (0.12)	1
Turbine appearance	"1" if like the way the wind turbines look; "0" if don't like the look	0.83 (0.06)	2
Turbine fit	5-category variable ("1" disagree that turbines fit well with the landscape/seascape during daylight hours, "2" if somewhat disagree, "3" if neither agree nor disagree, "4" if somewhat agree, "5" if agree)	3.54 (0.22)	2

the planning process was generally valued by the community, some felt that information provided by the developer was not completely neutral and could have biased the community toward supporting the project:

> "My problem is, if you feed only a certain amount of information that allows the listener to come to a conclusion that you want them to come to, it's not open and fair."
>
> Participant BO9

Participant BO9's sentiment highlights the expectation and value of the public being given information and coming to their own conclusions, a finding supported by Dwyer and Bidwell [19].

Participants also discussed how positive perceptions and trust in the developer produced an increase in project support, even resulting in some who had originally opposed the project to support it, a finding that is similar to that of Dwyer and Bidwell [19].

> "…[the developer,] they're the ones that kind of sold me. I think I was against it until I actually saw them, what they were doing, how they were presenting themselves and the people that they had involved."
>
> Participant BS13

The state processes and trust in the state government also generated both positive and negative perceptions among interview participants. Those who held positive views of the state processes mentioned the clear initiative to start this project and to see it through to completion in a timely matter, although these positive perceptions did not seem to have any effect on increasing support for the project. On the negative side, state politics was referred to in the interviews as "crooked," "fishy," "horrendous" (hereinafter, we use the term "corrupt") and failed state projects were cited to show the state's inefficiency, underscoring participants' positive impression of the swift progress of this project from inception to completion. However, many participants continued to be fixated on their perception of the state as corrupt and held more negative views of the state's participation in the planning process. Both supporters and opponents of the project felt that it was a "done deal," meaning that "strings were pulled," and that the project had been agreed upon somewhere in the state government and it was going to happen no matter what. Participants shared that they felt no amount of community outcry or opposition would prevent the project from happening due to questionable workings at the state level.

> "I don't think it was all above board…It needs to be a lot more transparent than this process was. I believe it was something that Governor Carcieri was really pushing then changed rules to make this project look more viable. I think that was a big mistake."
>
> Participant BO9

However, similar to participants' negative perceptions of the developer, these negative perceptions did not generate lasting opposition to the project. A number of those who did cite corrupt state actions in their original opposition to the project changed to supporting the project once it was being developed or installed, highlighting the feeling of the inability to make changes to the project and acknowledging its benefits (e.g., elimination of the diesel generators). Meanwhile, those who originally supported the project continued to support it, even when

acknowledging a negative perception of state government:

> "There are deals and people are wheeling a dealing to get what they want to get…
>
> I thought that was probably what kept me from being supportive… Once it was a done deal and they were up, what are you going to do, it's already done. We're going to live with them. Since then I see what the benefit is. I think I've been supportive since. I flipped from being against it to accepting and now in favor."
>
> Participant BS13

> "…it was a done deal. The Wind Farm was going to happen. Nothing was going to get in the way. Overall, I'm glad it happened."
>
> Participant BS6

Corruption is what many had come to expect from their state government, so these workings did not necessarily come as a surprise and were not going to change their support.

3.2. Multivariate statistical analysis

To gain additional insight, multivariate statistical analysis was undertaken. In light of the interviews suggesting that coastal residents were disengaged and the high percentages who did not know the answer to the questions we posed about process fairness, we model Block Islanders only. A two-stage model of (1) process fairness and (2) support was run. Variable definitions and means are found in Table 6.

The dependent variable in the first stage is a nine-category composite of perceptions of fairness of the OSAMP and siting processes. The second stage uses a five-category variable measuring project support, where 1 = opposed, 2 = leaning opposed, 3 = not leaning, 4 = leaning support and 5 = support.

Independent variables in stage one include process metrics: openness and transparency of the developer, openness and trustworthiness of the state, and whether the community was perceived to have had a say in the OSAMP process and in the turbine planning/siting process. We also include the process metric whether a respondent took any of the specified actions (e.g., attended a meeting) during the planning process. Demographic variables—age, education, gender and retirement status—also are included as they may be correlated with the dependent variable; as well, in the unweighted model, they account for differential rates of response among demographic groups.

Independent variables in stage two include the predicted process fairness variable generated in stage one. The next set of variables include items that can be objectively measured: home ownership (as those with a potentially greater stake in the community and investment in their residence may differ from renters in their perceptions of the extent of engagement they consider fair and appropriate), whether you can see the turbines from your residence, and whether you engage in commercial or recreational fishing. The last set of variables account for subjective impressions of a respondent: whether the project would directly affect you, whether recreational fishing is important to you, and whether you like the appearance of the wind turbines and think they fit the landscape during daylight hours.

Table 7 sets forth the weighted and unweighted fairness regressions for Block Island. The models have relatively high R^2 ($> = 0.769$), although in the weighed model, the only variable that is statistically significant ($p = .000$) is that the state acted in an open and trustworthy manner. Its effect size ($\omega^2 = 0.201$), also sets it apart from the other variables. In the unweighted model, the variable measuring developer openness and transparency is also significant ($p = .01$), although the effect size of state trustworthiness is 2.3 times as great. Ratings of community members having had a say in the OSAMP or in the turbine planning processes were not significant and they had small effect sizes. Whether one took an action regarding the BIOWP (e.g., attended a meeting) also was not significant.

Turning to project support and opposition among Block Islanders, only two variables were significant, predicted perceptions of the fairness of the process leading to the project and perceptions of how well the turbines fit the land/seascape (Table 8). The odds of support effectively double (OR = 2.039) when the perception of process fairness (mean = 6.38, ranging from 2.53 to 10.02) increases by one, and the odds of support of those with the highest predicted perceptions of process fairness are 15.5 times as great as those with mean perceptions and slightly more than 200 times as great as those with the lowest predicted process-fairness perception values. These compare to the odds of support among those who agree that the wind turbines fit the landscape being 15.2 times as great as the odds of support among those who disagree.

4. Discussion and conclusion

As states continue to increase their renewable energy resources as part of their energy and environmental policies, and as the price of offshore wind energy continues to drop, offshore wind power will become increasingly attractive for development. This research has added importance because the BIOWP is the first of its kind in the U.S., with approximately 20 gigawatts of offshore wind power planned off the U.S. east coast.

The survey results indicate that public perception of process fairness is an important factor in support of the BIOWP. It had a much greater effect on project support than 1) whether the BIOWP would affect an individual directly or 2) perceptions of the appearance or fit of the project with the land/seascape. Our results differ from those of Firestone et al. [12] in regard to developer transparency. They found developer openness and transparency to be the most important factor determining whether someone had a positive or negative attitude toward their local project in a nationwide study of the public perceptions of U.S. land-based wind. In contrast, the results here were mixed regarding the significance of developer transparency, depending on the model. This may be because we controlled for trust in state government, while they did not.

As revealed in the interviews, trust of state government decision-making regarding the BIOWP was fraught given perceptions of the manner in which the state had acted in the past. Although some interviewees who held a negative view of state government indicated that it did not cause them to oppose the project, trust in state government was the primary driver of perceptions of process fairness (based on omega squared values), which in turn was the primary driver of project support (as quantified in odds ratios). Trust in government in the State of Rhode Island thus seems to be more a positive driver than a lack of trust is a negative one.

Moreover, interviews showed that while positive perceptions of the fairness of the planning process and trust in the developer worked to increase project support, negative perceptions regarding the developer had little effect on increasing opposition to the project. Interestingly, a fair process was seen as having benefits distinct from its effect on the outcome. In other words, local residents valued not only the outcome—offshore wind turbines—but the process that led to that outcome [10,52]. Although interviewees' perceptions of state government and politics suggest a loss in social trust in government in general, and they considered the project to have been a "done deal," and not "above board" (recall project success was greatly eased through a state work around of local opposition to transmission and facilitation of approval of the power purchase agreement by amending the legal standard under which the project was reviewed), many continued to support the project, perhaps due to its symbolism as progress toward a clean energy future [53].

The findings are generally consistent with the literature [54,55], yet they also suggest that individuals may withhold their trust in or final judgment of the process until the final outcome (including community

Table 7
Block Island Process Fairness Linear Regression.

Model	Weighted			Unweighted		
N	78			78		
P value (F test)	0.000			0.000		
R^2	0.779			0.769		
Model ω^2	0.748			0.736		
	Coefficient	**P value**	**ω^2**	**Coefficient**	**P value**	**ω^2**
OSAMP say	0.160	0.379	0.000	0.193	0.249	0.005
Turbine planning say	0.258	0.323	0.012	0.258	0.163	0.014
State trust	0.866	0.000	0.201	0.708	0.000	0.182
Developer transparency	0.299	0.154	0.037	0.395	0.010	0.079
Took action	0.727	0.097	0.051	0.410	0.287	0.002
Age	0.008	0.492	−0.008	0.010	0.478	−0.007
College	−0.242	0.469	−0.006	−0.245	0.466	−0.007
Gender	−0.112	0.720	−0.012	0.014	0.966	−0.014
Retired	0.113	0.836	−0.014	0.504	0.230	0.007
Constant	0.765	0.485		0.787	0.396	

Table 8
Block island weighted ordered logistic model of project support/opposition.

n	78		
Prob > chi^2	0.001		
Log pseudolikelihood	−0.871		
Pseudo R^2	0.314		
	Coefficient	**P value**	**Odds Ratio**
Predicted process fairness	0.712	0.026	2.039
Own	1.381	0.208	3.979
See	0.745	0.464	2.107
Fish	2.001	0.325	7.394
Fishing importance	−0.649	0.323	0.522
Directly affect	−0.335	0.404	0.715
Turbine appearance	0.102	0.938	1.108
Turbine fit	0.681	0.038	1.976
Constant	2.937		
Constant_2	3.281		
Constant_3	3.483		
Constant_4	4.987		

benefits), as shown in Table 3. In fact, one benefit of the BIOWP marketed to BI residents during the planning process was a high-speed internet cable connection to the mainland. There appears to have been confusion on what the developer promised: an internet cable making landfall on the Island or internet accessibility in each Island household and business. Although the internet cables made landfall on the Island, and thus in one sense the island is "connected", the developer did not extend internet connections to individual households and businesses. Although not a focus of the interviews, unprompted, several interviewees brought up the internet cable, feeling that this was a false promise. Due to disappointment in this outcome, some residents questioned their trust in the developer and other project actors. We find then that trust in project actors is not fixed or constant even after the planning process is complete, but instead, can be continually revised with the passage of time and new information and outcomes.

The results of the semi-structured interviews and of the survey reinforce each other, with the interviews providing additional insight into the previously-stated perceptions. Interviewees who held negative perceptions of the planning process, but who nevertheless supported the project, expressed that having a generally positive attitude toward the BIOWP was often more important in their decision than their negative perceptions of the process. Therefore, advocates of offshore wind energy may want to target and further engage those who are undecided or opposed to a proposed project, yet generally in support of wind energy, as those individuals may be more likely to change their opinion of the project based on state and developer perceptions and perceptions of process fairness. Hiring a local community member to be a liaison from the beginning of the process to communicate with the public would be a start. Understanding preconceived notions and the Chain of Trust is also important for cultivating trust throughout the entire process [19].

The BIOWP is however unique in several respects. The project is sited about twenty-seven km from mainland Rhode Island, but only 5 km from Block Island, therefore having a greater effect on the Block Island community. This proximity to Block Island and the naming of the project after Block Island may have limited coastal residents' sense of ownership of the project. Less knowledge about the project, lack of participation in the planning process, and more neutral perceptions of fairness may all be due to coastal residents' deference to Block Island, or the idea that this project belongs (more) to Block Island than themselves. This finding suggests that in addition to the manner in which a decision-making process is structured, who is engaged and participates underlies process fairness [56]. In contrast, offshore wind projects in the future will rarely exhibit a similar geography. Although studying the perceptions and drivers of support on the mainland may be most useful for thinking about subsequent offshore wind projects, it is likely that the relationship examined here may have been greatly affected by Block Island's proximity to the turbines. Unique project benefits to Block Island residents (e.g., cable connection to the mainland, elimination of diesel generators, very high existing electricity rates) also may not be considerations for future projects, and so these results should be evaluated for relevancy when considering and studying future projects.

Yet, for planned offshore wind projects that will serve Massachusetts, Long Island, Connecticut, and Rhode Island in the waters off of Rhode Island and Massachusetts, the findings here on process fairness and project support will likely have relevance. Indeed, one such project is a 400 MW offshore wind project to be built by the same developer—Deepwater Wind/Ørsted—in the nearby Rhode Island/Massachusetts Wind Energy Area. Moreover, given that the project studied here is very much a "community" project in terms of its size and focus of benefits to Block Island, it also may have lessons for an energy future that is at least in part decentralized and a product of local self-governance and self-reliance.

Finally, rather than considering wind power project siting as fundamentally a technical question that demands only the minimal extent of public input that the law requires, it would be prudent and enlightened for developers and policymakers to treat siting as a public question that also requires technical input [57]. Indeed, moving forward, state government, offshore wind developers, and other key actors should, as suggested elsewhere [58,59], prioritize creating community

engagement plans built specifically for the local community, ensuring transparency of the planning process, and providing a standard for community expectations early in the process.

Declaration of Competing Interest

Funds for this research were provided by First State Marine Wind, LLC, (FSMW), a private corporation that owns and operates a 2 MW wind turbine adjacent to the University of Delaware's (UD) Lewes campus and by the UD-DEMEC Graduate Fellowship. FSMW, which is majority controlled by UD, uses its revenues to further wind energy research. The Graduate Fellowship, which is primarily fund by the sale of Renewable Energy Credits (RECs) associated with the production of power by the wind turbine, is administered by UD. Neither FSMW nor the Graduate Fellowship had any involvement in the study design; collection, analysis or interpretation of the data; in writing of the manuscript; or the decision to submit the article for publication. The lead author has held various roles related to the wind turbine since its commissioning in 2010 and has been a Director of FSMW since 2016. He was not involved in the decision to allocate either FSMW or graduate fellowship funds to the project.

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