



Figure 1. The Block Island Wind Project off the coast of Block Island, Rhode Island, US. Photo courtesy Evan Krape

Social Perceptions of Offshore Wind Energy through the Lens of Acceptance and Justice

Shannon Howley,* Department of Marine Affairs, University of Rhode Island, shannon_howley@uri.edu
Emma Korein,* School of Marine Science & Policy, University of Delaware

Abstract

The offshore wind industry is rapidly expanding across the globe as countries aim to meet ambitious renewable energy targets and provide renewable energy to coastal population hubs. Offshore wind represents not only a transformation of energy markets but also ocean spaces with which individuals and communities have economic, personal, and cultural ties. Social science research can help understand the complexity of this human-technology interaction by exploring individuals' perceptions of offshore wind projects and their effect on sociocultural systems. In this article, we review two theories that examine the social dimensions of offshore wind: social acceptance and energy justice. We then conduct a literature review of offshore wind research using these social acceptance and energy justice frameworks, with a focus on three groups of affected communities (coastal residents, tourists and recreationists, and commercial and recreational fishers) and compensation measures. We finish with a discussion of what the current literature reveals about the complex and diverse responses people have to offshore wind development in their community and the implications for future research.

Keywords

offshore wind, social acceptance, energy justice, social perceptions

*Both authors contributed equally to this article.

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Introduction

Wind energy is widely regarded as an important strategy for climate change mitigation.¹ While onshore wind infrastructure has a longer history as a power generation source, offshore wind (OSW) is becoming an important renewable energy resource and its development is rapidly expanding across the globe.² The global OSW capacity in 2023 reached 75.2 gigawatts (GW).³ This represents a 24 percent increase since 2022, and forecasts predict that annual additions of offshore wind power will likely triple by 2028.⁴ Asia is the global leader in OSW development (over 40 GW of installed capacity),⁵ followed by Europe (34 GW).⁶ The US has the only operational OSW market outside of Asia-Pacific and Europe, with 174 MW of OSW online as of March 2024.⁷

Policymakers and experts have often focused on renewable energy as a technological or economic problem, but researchers have increasingly recognized the need to consider social, political, and cultural dimensions.⁸ As OSW power expands globally, there is a pressing need to examine the social considerations that come with the development of ocean environments, which hold personal, economic, and cultural importance to communities. Research has identified both concerns (e.g., visual impacts, displacement of fishers) and supportive sentiments (e.g., economic benefits, climate change mitigation) toward offshore wind development, reflecting on differences in individual values, priorities, and socioeconomic factors.⁹ Social science research elucidates the dynamic, nuanced relationship between people, places, and emerging technologies. Two prominent bodies of social science research that have taken shape and evolved within the offshore literature are social acceptance and energy justice.

Social acceptance research examines the factors affecting support and opposition to energy projects. Social opposition to renewable energy is considered

a significant barrier to industry growth.¹⁰ Understanding factors that affect community perceptions of wind development can inform effective public engagement practices.¹¹ However, as the field of social acceptance research has evolved, scholars identified the need to more critically examine the role of social justice and power relations in shaping community perceptions of energy development.¹²

More recently, these concepts have been explored through the framework of energy justice, which examines the fairness and equity of energy systems.¹³ Social acceptance and energy justice are distinct yet interconnected; for example, energy projects perceived as fair may be more accepted by community members.¹⁴ However, there are tensions within scholars' motivations for studying social acceptance and energy justice.¹⁵ On the one hand, instrumental perspectives view acceptance and justice as a means to secure project approval and address environmental problems like climate change.¹⁶ Some of these perspectives frame opposition to renewable energy as deviant and something to be overcome.¹⁷ On the other hand, intrinsic motivations view fairness and justice as normative goals; these perspectives seek to achieve a just system and acknowledge how energy systems contribute to injustices.¹⁸ These varying social acceptance and energy justice agendas have implications for policy and future directions of research.¹⁹ Thus, it is critical to examine how these frameworks have been applied to energy development studies.

Scholars have emphasized the importance of applying energy justice and social acceptance theory to policy and practice, with some specifically emphasizing the need to consider these principles early in energy development processes.²⁰ Offshore wind is uniquely positioned to apply these critical social science theories to its decision-making while the industry is relatively young. For this to occur, it is important to document the literature that has used social acceptance and energy justice frameworks to examine community perceptions of offshore wind energy development.

While there is a robust body of theoretical literature discussing the various frameworks and developments within social acceptance and energy justice scholarship, few articles, to our knowledge, have reviewed how these separate but interrelated frameworks have been applied to empirical research on offshore wind.

Prior literature reviews have used social acceptance and energy justice frameworks to review the literature on wind energy in general (e.g., Baxter et al., 2020²¹ and Ellis and Ferraro, 2016²²), but not specifically on offshore wind. Compared with onshore wind energy, there are differences in the ways in which communities engage with and respond to offshore wind energy.²³ Wiersma and Devine-Wright²⁴ have highlighted unique considerations regarding viewsheds, symbolism, and attachment to coastal and ocean spaces, as well as the different stakeholders and decision-makers specific to the marine spatial context. Literature reviews have been conducted in the context of offshore wind public engagement (e.g., Wiersma and Devine-Wright, 2014²⁵) and offshore wind acceptance and justice in specific sectors and geographies of interest (e.g., Haggett et al., 2020,²⁶ fishing communities in the US and UK). Our review, therefore, adds to the existing scholarship by both integrating acceptance and justice frameworks and focusing on multiple communities and issues pertinent to offshore wind energy on a global scale. This review is timely, given unprecedented expectations for the global growth of the offshore wind industry and a recent surge of literature examining energy justice perspectives in offshore wind.

The goal of this paper is to review empirical studies using social acceptance and energy justice frameworks to understand the factors influencing community perceptions and impacts of offshore wind. In the remaining sections of this article, we first present an overview of social acceptance and energy justice, followed by a review of the offshore wind literature using these frameworks. We organize our offshore wind review into the following

sections: affected communities (coastal residents, tourists and recreationists, and commercial and recreational fishers) and compensation measures.

Theoretical Frameworks

Social Acceptance

Social acceptance research has been very influential in explaining social actors' dynamic positions and actions regarding renewable energy technologies, including wind, solar, hydroelectric, geothermal, and biomass. Acceptance is generally understood as the degree to which a phenomenon is taken up, liked or disliked, supported or resisted, or tolerated by social actors.²⁷ Wüstenhagen et al.²⁸ defined three dimensions of social acceptance: sociopolitical acceptance, community acceptance, and market acceptance. Sociopolitical acceptance is broad and reflects the support of technology by the public, stakeholders, and policymakers.²⁹ Market acceptance describes the market adoption or innovation of the technology. Community acceptance is the acceptance of siting decisions and energy projects by local residents and stakeholders.

The framework from Wüstenhagen and colleagues is a valuable boundary object for researchers to foster dialogue and collaboration on social acceptance issues.³⁰ The framework also helps researchers conceptualize the various actors and institutions involved in social acceptance, including the public, stakeholders, policymakers, and financial actors or institutions. Wolsink described the social acceptance framework as a "bundle of decision-making" on issues concerning the uptake of energy systems across multiple layers (community, market, and sociopolitical).³¹ Acceptance of the energy transition across the three layers includes innovation, production, distribution, policy, coproduction, and public opinion.

Most studies on social acceptance have focused on the community acceptance dimension.³² Research studying community acceptance has aimed to understand the "social gap," described by Bell et al.³³ as the gap between high public support for wind

energy in national opinion surveys and the low success rates for wind energy planning. Bell and colleagues also described the “individual gap” as an individual having a generally positive attitude toward wind energy but opposing a specific project.³⁴ Early research explained individual and local opposition to energy projects as NIMBYism (Not In My Back Yard)—the assumption that communities only oppose projects in their areas due to selfishness or ignorance.³⁵ However, newer research has critically examined factors explaining opposition to renewable energy technologies, and scholars have largely dismissed NIMBY explanations for their simplistic and pejorative understanding of project opposition.³⁶

Moreover, Bell and colleagues described two alternative explanations for NIMBYism or self-interest: (1) qualified supporters (or opposers) and (2) democratic deficit.³⁷ First, qualified support is the idea that individuals only support projects if they meet specific criteria, such as the beauty of their favorite landscape not being affected. Second, the democratic deficit is the idea that the permitting process does not reflect the majority’s will but reflects those who oppose wind projects; this is grounded on the idea that public criticism is more likely to happen in decision-making processes than public support.³⁸ Bell et al.³⁹ revised this framework in 2013 to provide an additional explanatory variable: place protection, which reflects that people may support or oppose projects due to the particular value they attribute to places.

Newer waves of social acceptance research have been critical in elucidating social acceptance’s complex, fluctuating, and often context-dependent nature.⁴⁰ Research on the community acceptance dimension has found multiple variables associated with individual responses to energy technology, including temporal, spatial, and power dynamics.⁴¹ For instance, time was found to be an important variable, as attitudes are not static. Wolsink⁴² in 2007 introduced the concept of the U-shaped curve for energy proj-

ect development; namely, an individual’s support is high before a project, declines when projects are announced, and rebounds after completion. Other studies of offshore wind in the US⁴³ and Belgium⁴⁴ have supported these U-shaped curve findings. The history of a place’s energy development and the spatial location of a project can also influence acceptance.⁴⁵ Ellis et al.⁴⁶ in 2023 also called for more attention to how power dynamics influence social acceptance, since extant literature has rarely addressed these dynamics. Resource ownership and market dominance can affect the relationship between the public and energy development, and different stakeholders exert various forms of power.⁴⁷

It is essential to note the criticisms of the social acceptance framework. An influential critique from Aitken⁴⁸ illuminates the risk of focusing on *acceptance*. Literature that presumes opposition is deviant could ignore the full context of wind energy and its legitimate concerns.⁴⁹ Likewise, Batel⁵⁰ suggested that researchers should include other responses like tolerance or indifference. In a paper revisiting the understanding of “acceptance” in 2018, Wolsink⁵¹ clarified that acceptance refers to all nuanced positions and actions—“taking initiatives, early adoption, support, resistance, opposition, apathy, tolerance, uncertainty, and indifference.”

Nevertheless, social acceptance is a critical departure point for scholars studying the development of energy technologies; studying social acceptance is important to understanding how projects affect people and reflect the voices of interested groups.⁵² Social acceptance research has grown, and newer waves of research are helping to understand responses to energy technologies considering their dynamic nature across time and space, as well as their variability based on power or scale dynamics. While sociopolitical and market acceptance are integral components of the social acceptance framework, we focus largely on community acceptance to examine how offshore wind

research theorizes individuals' relationships to the technology, including support, opposition, and perceptions of its benefits and risks.

Energy Justice

The emerging field of energy justice interrogates the fairness, equity, and justice of renewable energy decision-making and implementation.⁵³ This scholarship provides a pathway for evaluating existing injustices within energy systems and identifying processes for their remediation.⁵⁴ Sovacool and Dworkin⁵⁵ outlined the multifaceted utility of energy justice as a conceptual tool that integrates philosophical and ethical principles into energy systems, an analytic tool that guides how researchers frame energy problems, and a decision-making tool with applications to energy policy, business, and consumerism.

Energy justice was first defined conceptually within the academic literature in 2013 using three tenets: distributional, recognition, and procedural justice.⁵⁶ Distributional justice focuses on whether the benefits and burdens of energy projects are distributed fairly and equitably.⁵⁷ This tenet calls researchers to examine what is being distributed, between which entities the distribution is occurring, and what method is used to determine distribution.⁵⁸ Recognition justice examines which members of society have been represented, marginalized, ignored, or unfairly treated regarding energy developments.⁵⁹ This tenet emphasizes the rights of members of society to be treated with respect and dignity while acknowledging the diverse perspectives and cultural values of different social groups.⁶⁰ Procedural justice examines how decision-makers engage communities, with emphasis on the nondiscriminatory inclusion of communities and individuals in decision-making processes.⁶¹ Jenkins et al.⁶² emphasize that access to participation in energy decisions encompasses multiple facets of community engagement, including "local knowledge mobilization, greater information disclosure, and better institutional representa-

tion." These three tenets of justice have roots in civil rights movements and require an understanding of the historical marginalization of communities in energy systems and pathways to reconciliation.⁶³

While this three-tenet model has been dominant in shaping energy justice discourse, scholars have used other frameworks to conceptualize energy justice. Sovacool et al.⁶⁴ identified ten energy justice principles: availability, affordability, due process, transparency and accountability, sustainability, intragenerational equity, intergenerational equity, responsibility, resistance, and intersectionality. Hefron⁶⁵ argued that energy justice should move from a three-tenet framework (distributional, recognition, and procedural) to a five-principle framework that also includes restorative justice (addressing harms from energy projects and preventing foreseeable impacts) and cosmopolitan justice (consideration of cross-regional and cross-border impacts of energy systems).⁶⁶ Other scholars have taken a different approach to expanding upon the three-tenet framework; Lee and Byrne⁶⁷ explored the underlying issues within technological, economic, and political structures and ideologies that enable systematic recognition, distributional, and procedural injustices. Dutta et al.⁶⁸ established a framework that intersects tenets of energy justice (distributional, recognition, procedural, cosmopolitan), principles of responsible research and innovation (adaptiveness, inclusion, reflexivity, and anticipation), and levels of technological readiness (i.e., the maturity of the technology in development).

Scholars have additionally turned to other theoretical bodies of literature to enhance and diversify energy justice schools of thought. Castro-Diaz et al.⁶⁹ emphasized that participatory research frameworks can help contextualize energy justice theory within grounded practices that have real-world applications. Wolsink⁷⁰ incorporates principles of distributional and procedural justice within the social acceptance framework as an integral aspect of community perspectives regarding siting, infrastructure, and coproduction decisions.

Scholars have also offered various perspectives on the integration of energy justice and just transition frameworks, the latter of which investigate the justice and equity considerations related to the shift from fossil fuels to renewable energy.⁷¹ A number of authors have emphasized the need to expand energy justice ways of thinking using philosophical and ethical principles outside of traditional Western schools of thought,⁷² as well as perspectives from postcolonial, feminist, Indigenous, and anti-racist theories of justice.⁷³

These different energy justice frameworks and schools of thought offer distinct yet sometimes overlapping and complementary conceptualizations of energy justice, with implications for interdisciplinary research and policy.⁷⁴ While advancements in theoretical conceptualizations of energy justice are emerging and diversifying, procedural and distributional justice, and, to a lesser extent, recognition and restorative justice, remain the most frequently referenced and applied theoretical approaches used to discuss energy justice within the literature.⁷⁵

Based on our literature review to follow, this pattern is consistent with the offshore wind energy justice literature, and thus procedural, recognition, and distributional justice are the predominant frameworks we use throughout our OSW literature review. Nevertheless, having an overall understanding of the diverse mechanisms by which energy justice can be explored provides important context for assessing themes found within the offshore wind empirical literature and identifying future research directions. The following sections of this paper explore what the social acceptance and energy justice literature has revealed about how affected communities perceive offshore wind energy.

Methodology

This paper examines theoretical frameworks and their applications to offshore wind using a narrative literature review approach, whereby author “exposure, expertise, and experience” (the “3Es”)⁷⁶

were used to identify and describe key ideas and themes within the literature.⁷⁷ While this overall approach is non-systematic, relevant papers not already identified through the 3Es were examined through a deliberate two-phase process. For phase one, scientific article search engines (Google Scholar, Web of Science, ProQuest) were used to identify articles on social acceptance, energy justice, and offshore wind energy. Initial word searches encompassed combinations of words, including “social acceptance,” “energy justice,” “offshore wind,” “human dimensions,” “social dimensions,” and “public perceptions.” Articles cited within the literature were used to find additional relevant studies.

Based on the peer-reviewed literature from this initial search, the scope of topics on which to structure this review were identified: affected communities (coastal residents, tourists and recreationists, commercial and recreational fishers) and compensation measures. These topics were selected because they represent community groups and management approaches that are uniquely pertinent to offshore wind and have a high relevance within current offshore wind social science discourse. Jenkins et al.⁷⁸ describe energy justice using a “what, who, how” framework; distributional justice focuses on *what* the concerns are, recognition justice focuses on *who* they affect, and procedural justice examines *how* decision-making processes are conducted and the identification of strategies for remediation. With this framework in mind, we structure the sections of this literature review around affected communities (i.e., the “who”), and within each section we examine the particular concerns, issues, and procedural conduct relevant to this particular group (i.e., the “what” and the “how”). We also dedicate a section to compensation measures, particularly focused on the distribution of benefits to affected communities as a way of compensating for offshore wind development burdens. We chose this topic not only because it is a prominent discourse within the social acceptance

and energy justice offshore wind literature, but also because it represents a policy tool that is currently being used by offshore wind practitioners, with implications for multiple facets of energy justice. It is important to note that this literature review is not intended to cover a comprehensive list of all affected communities and compensation strategies, but rather a review of selected topics that are important for understanding social acceptance and energy justice. We acknowledge and, in some cases, discuss key additional stakeholder groups and government bodies (e.g., Tribal governments and citizens, local governments of coastal towns, energy industry workers, nongovernmental organizations, etc.); however, dedicated sections for these groups are beyond the scope of this review.

Upon choosing review topics, a second phase of scientific database searches was conducted with a more targeted combination of words, including “offshore wind,” “social acceptance,” “energy justice,” “commercial fishing / fisheries,” “recreational fishing / fisheries,” “coastal communities,” “residents,” “viewshed,” “place attachment,” “culture,” “tourism,” “recreation,” “compensation,” “community benefit agreements,” and more. Citations within identified papers were again used to find additional references, and multiple search engines were used to increase the chance of finding relevant papers. Peer-reviewed papers were selected for inclusion if they discussed community perceptions of offshore wind energy from the lens of social acceptance and/or energy justice on the selected topics. Articles from any global location were selected for inclusion, although we note that many of the articles found were regional to the US and Europe. While the focus of our review is offshore wind energy, in some cases, studies focusing on onshore wind energy or marine renewable energy (a term for any renewable energy technology sited in the marine environment, including but not limited to offshore wind) were included when highly relevant or when unique insights could be drawn.

Affected Communities

Coastal Residents

For this study, we define coastal residents as individuals who inhabit a town or region adjacent to the coast where OSW is sited or planned. Social acceptance literature has highlighted how perceived economic impacts from OSW affect project support or opposition in coastal areas. Research from Chile, France, Guernsey, the US, and Taiwan found that positive economic impacts associated with OSW, such as job creation, energy security and autonomy, and infrastructure development, are contributing factors to project support.⁷⁹ Conversely, studies from Northern Ireland and the US have found that some opponents fear negative economic consequences, such as local job displacement and lower property prices.⁸⁰ Opposition can also be driven by the perceived utility of clean energy investments; a study in Northern Ireland found that some opponents view OSW as a waste of financial resources, expressing skepticism that it will help solve the climate crisis.⁸¹

In addition to financial metrics, OSW perspectives can be shaped by coastal residents’ complex sociocultural relationships with the ocean and coast. Research has shown that beliefs about the ocean can affect social acceptance.⁸² For example, Bidwell⁸³ found that in Block Island in the US, consumptive beliefs (e.g., the ocean is a resource for food, commerce, and energy) were associated with higher OSW project support, while ecological-cultural beliefs (e.g., the ocean is a place for wildlife, exploration, and culture) were associated with decreased support.

Related to ocean beliefs is the concept of place attachment, which describes the emotional and symbolic bonds that people have with specific places or landscapes.⁸⁴ Research has shown that place attachment can influence support or opposition to OSW development.⁸⁵ The direction of this relationship, however, can vary. For example, survey respondents in the US who agreed that the ocean is part of their identity had increased sup-

port for OSW in Delaware, but decreased support in Atlantic City, New Jersey.⁸⁶ OSW projects themselves can also hold symbolic meaning. Research in the US has linked OSW support with the perception that wind turbines are a sign of progress toward clean energy.⁸⁷ In contrast, some assign negative symbolism to OSW, such as the loss of a pristine ocean view or a detriment to the character of a town.⁸⁸ Place attachment can also influence actions toward engagement; surveys in North and South Carolina in the US revealed that for individuals opposed to OSW development, increased place attachment was associated with increased intention to take action, such as signing petitions or attending meetings.⁸⁹

Viewsheds and visual aesthetics are also important factors in community acceptance of OSW.⁹⁰ Aesthetic preferences relate not only to the turbines themselves but also to their overall visualization within the landscape.⁹¹ Research in France identified impacts on coastal landscapes as a critical driver of OSW opposition.⁹² Beliefs about landscape fit can vary across communities; Russell et al.⁹³ found that in Rhode Island in the US, more Block Island residents agreed OSW turbines fit well with the landscape than mainland coastal residents. In some cases, perceptions of viewsheds reflect a cultural identity with unobstructed or un-industrialized ocean views.⁹⁴ Studies in the US and Germany found that residents perceived OSW as a threat to the intangible values they associate with views of the sea.⁹⁵ Viewsheds can also hold value for Indigenous Tribes, such as the Mashpee Wampanoag Tribe and Wampanoag Tribe of Gay Head, for which bodies of water and ocean views hold spiritual, cultural, and religious significance.⁹⁶

In addition to viewsheds, underwater historic and cultural resources are important considerations for OSW development.⁹⁷ Off the coast of Massachusetts in the US, Indigenous Tribes expressed concerns that the proposed Cape Wind project could disturb archaeological sites and underwater burial grounds that hold spiritual, cultural, and

historical significance.⁹⁸ Tribes of the Coos, Lower Umpqua, and Siuslaw Indians passed a resolution opposing OSW off the coast of Oregon in the US due to impacts on cultural viewsheds and resources.⁹⁹ Marine ecosystems and wildlife can also hold significant cultural importance. Members of the Shinnecock Indian Nation have expressed concerns over OSW impacts to marine wildlife for which they have a spiritual connection, such as whales.¹⁰⁰ Studies in the US, Chile, South Korea, and New Zealand have also found that potential impacts to marine ecosystems, wildlife, and biodiversity are a salient concern of coastal communities and can be a key driver of project acceptance.¹⁰¹

Justice-focused research has highlighted how community perceptions are shaped not only by these economic and sociocultural perspectives, but also by the mechanisms by which OSW is governed and manifested. On the West Coast of the US, Tribes of the Coos, Lower Umpqua, and Siuslaw Indians expressed that the US government has not adequately listened to their concerns or provided sufficient information about the impacts of wind energy development.¹⁰² Energy justice requires the recognition and inclusion of historically marginalized groups, and yet scholars have highlighted that current government processes are not adequately addressing the concerns of Indigenous peoples.¹⁰³ Researchers in Canada have advocated for governance approaches that allow First Nation control and ownership of renewable energy projects with designs that reflect long-term community values.¹⁰⁴

Procedural justice concerns have been salient throughout the OSW literature. Research in France found that OSW opponents felt the engagement process was unjust because it prioritized the interests of industry over those of the public and dismissed the concerns and preferences of local residents.¹⁰⁵ In another example, a study in Rhode Island in the US found that resident perceptions of fairness in the OSW development process were the primary driver of project support.¹⁰⁶ This study also found that residents valued a fair process in

and of itself, distinct from its effect on project outcomes.¹⁰⁷ Research in the US has found that trust in decision-makers is a key driver of perceptions of a fair process; trust can be garnered through practices such as early engagement, integrating stakeholder feedback into decisions, and the use of local community liaisons to facilitate public communication.¹⁰⁸ A study in Northern Ireland found that some offshore wind opponents expressed mistrust in developers, viewing them as profit-motivated entities with agendas that differ from public interests.¹⁰⁹

Studies in South Korea and the US found that transparency of decision-making processes can significantly affect resident acceptance of OSW projects.¹¹⁰ A case study in Brazil identified procedural and recognition injustices related to information asymmetries, power asymmetries, and disrespect of local people, as “elite” offshore wind decision-makers ridiculed coastal communities at public meetings and failed to provide understandable information about project development.¹¹¹

Further research elucidates best practices for OSW participatory engagement. Research in the US found that quality public engagement processes should include a mutual exchange of knowledge and values among decision-makers and local communities.¹¹² A study in South Korea found that the ability to participate in the siting process and access to sufficient information to make judgments about OSW were among the most important considerations for residents.¹¹³ Skjølsvold et al.¹¹⁴ discussed the importance of incorporating energy justice principles into the OSW participatory process in the North Sea, such as including diverse knowledge sources, early and continuous engagement, transparency about decision-making mechanisms, public influence, and including marginalized populations.

Principles of distributional justice also help further elucidate how coastal residents react to offshore wind development. Costs placed on consumers can further social inequities by exacerbating burdens placed on those who cannot afford

to pay or to be flexible with their electricity consumption.¹¹⁵ Distributional justice can also manifest itself in the relationship between who owns an offshore wind project and who stands to benefit from it. A study in the northeast US found that communities prefer that electricity produced by OSW off their state is also used within their own state, and that regional rivalries led to regionalist attitudes that further affected the perceived fairness of how benefits are distributed.¹¹⁶ Similarly, a study in Norway found that participants were more concerned with maintaining national ownership and use of OSW projects than they were with the siting of projects onshore versus nearshore or offshore.¹¹⁷ A further discussion of studies that examine the relationship between community benefits and distributional justice can be found in the “Compensation Measures” section of this article.

Overall, many coastal communities hold personal and cultural beliefs associated with ocean spaces, which can affect their perception of OSW development. Understanding the interaction between OSW and local communities’ sense of place requires governance structures that allow for public participation in project planning,¹¹⁸ which can allow diverse cultural values to be considered in project decision-making and the distribution of outcomes.

Tourists and Recreationists

The impacts of OSW not only apply to coastal residents but also to seasonal visitors and those who recreate near OSW developments. OSW projects are commonly sited in areas with sizable seasonal tourist populations and other marine recreationists. Coastal and marine recreation constitute diverse users and activities, including angling, boating, sightseeing, surfing, beach use, and charter excursions.¹¹⁹ Tourism and recreation activities also comprise a significant portion of many coastal and small-island economies.¹²⁰

The potential impacts of offshore wind on tourism and recreation may affect perceptions

of offshore wind projects. Additionally, potential impacts raise questions about justice, particularly distributional justice, and how project costs or benefits are allocated among tourists and recreationists.

Tourists

Social acceptance literature examines how perceived impacts on tourism affect attitudes toward offshore wind and tourist behaviors. Offshore wind research has yielded mixed results about tourist perceptions and impacts on the tourism industry: some studies report adverse effects of OSW on tourists, while others find neutral or positive impacts. Moreover, OSW support or opposition can affect tourist behaviors, such as choice of beach, business, or vacation home.

Negative tourist perceptions of offshore wind projects are primarily associated with effects on viewshed and the natural landscape.¹²¹ In a review article on offshore wind research on tourism and recreation, Machado and Andrés identified visual deterioration as one of the main reasons for opposition; visitors may be attached to the seascape and concerned about the turbines' effect on aesthetics.¹²² Studies have found that many beachgoers perceive the landscape as "pristine" and disapprove of obstructions or industrial uses of the ocean.¹²³ Additionally, negative visual effects can stem from perceptions that turbines do not fit within the natural characteristics of the landscape.¹²⁴

Many of the studies reporting adverse effects have investigated tourist behaviors. Voltaire et al.¹²⁵ found that individuals visiting Catalonia, Spain, were more likely to visit beaches without OSW. Likewise, Lutzeyer et al.¹²⁶ found that visitors may not rent or re-rent properties within the OSW viewshed on the North Carolina coast in the US. Other studies have focused on how residents perceive impacts to tourism; a study in Delaware, US found that more residents believed an offshore wind project would harm tourism than improve it.¹²⁷

Nevertheless, another body of research has found positive or neutral responses from tourists

to OSW projects and suggests that tourists are not deterred from visiting areas with offshore turbines.¹²⁸ Research suggests that OSW can improve tourism by attracting visitors and elevating recreational experiences.¹²⁹ Some people are interested in visiting an area with wind turbines due to curiosity, interest in the technology, or an appreciation for its aesthetic.¹³⁰ OSW can also provide opportunities for coastal businesses to expand their services, such as tours or excursions to see the turbines.¹³¹

While many studies have examined proposed projects or used photo simulations, the Block Island Wind Project (BIWP), the first offshore wind project in the US off the coast of Rhode Island, was a helpful case study for examining tourist preferences and activities related to an installed project. Smythe et al.¹³² found, in a study of the BIWP, that viewshed effects worried tourism and recreational professionals, yet most people had neutral or positive opinions about the actual viewshed impacts. Bidwell¹³³ found that visitors had positive attitudes toward the BIWP, which became more positive as the project progressed from construction to operation. In a US study comparing Block Island rentals to other New England tourist destinations, Carr-Harris and Lang¹³⁴ found that areas with offshore wind projects had increased Airbnb reservations and occupancy rates during peak season.

While some research focuses on the binary variables of support or opposition and visit or avoid, other research illuminates the nuances in tourists' perceptions and relationships to OSW. Tourists' opinions and experiences are neither simplistic nor monolithic.¹³⁵ In a study in the US, Bidwell¹³⁶ found that values, such as altruistic or traditional values, can influence tourists' perceptions. Similarly, a study on OSW projects in South Korea showed that individuals' environmental attitudes, including biospheric or anthropocentric attitudes, affected beachgoing behaviors.¹³⁷ Additionally, research has found that individuals actively assess OSW projects' positive and negative impacts,¹³⁸ and tourists' perceived benefits of



Figure 2. The Block Island Wind Project off the coast of Block Island, Rhode Island, US. A view from the water. Photo courtesy Rafeed Hussain

OSW can significantly affect their behaviors.¹³⁹ A study on Block Island found that if individuals support OSW turbines and perceive environmental or socioeconomic benefits from the project, their tourist behaviors will not be adversely affected.¹⁴⁰

Another consideration for social acceptance is the individual's experience with coastal areas; the frequency of beach use or type can influence tourists' OSW interactions.¹⁴¹ For instance, Ladenburg¹⁴² found that, in Denmark, those who visited seasonally (winter and summer) had different perceptions than those who visited less frequently, as seasonal visitors perceived the landscape as "pristine" and did not support the "industrial" uses of the sea. Previous experience may also have an important role; Westerberg¹⁴³ found that Northern European visitors to projects in the Mediterranean Sea had more experience with offshore wind and were less likely to be concerned about the installation of projects than those from Southern Europe. Similarly, Ladenburg¹⁴⁴ in 2009 found that, in Denmark, individuals with experience from projects farther from the coast had more positive percep-

tions of visual effects than those who had experience with projects closer to the coast.¹⁴⁵

Moreover, the effects of OSW on tourism can be a distributional justice issue, as they can affect how communities experience benefits and burdens from project development. Many offshore wind and tourism studies have not explicitly reflected upon the energy justice dimensions of offshore wind, although these studies have illuminated important considerations of distributional justice by identifying how the industry affects the residents, visitors, and the economy.

Nevertheless, Nie et al.¹⁴⁶ examined the relationship between OSW tourism and energy justice in the Beibu Gulf and found that positive tourist experiences from offshore wind projects could compensate for losses associated with the project. Nie et al. also contended that distributional justice can be improved through space allocation and adequate distance from shore. Although they did not discuss distributional justice, Westerberg¹⁴⁷ similarly found that reductions in tourist revenue in the French Mediterranean were offset by attraction to wind projects.

Further investigations into the relationship between OSW, tourism, and energy justice are warranted. The deterrent or attractant effects of offshore wind projects can implicate coastal economies and residents. Empirical evidence about the deterrent or attractant effect of OSW is still emerging, and even with the potential benefits that OSW can bring to coastal tourism, it would be too early to claim there is no negative impact. However, extant social acceptance literature has exemplified a challenge for energy justice, as there are two broadly contrasting groups of tourists: those who view offshore wind as an amenity and those who perceive it as a disamenity.¹⁴⁸ One challenge for energy justice is determining how to balance the preferences of different groups and consider the tradeoffs from either gaining or losing tourism due to offshore wind development.

Ultimately, the nascency of OSW as an industry underlies another consideration: the future relationship between tourism and OSW may change with the construction of more projects globally. As Smythe et al.¹⁴⁹ note, the effect of the BIWP on tourism may have benefited from its novelty as the first project in the US. Additionally, positive tourist experiences could be contextual due to a region's unique landscape and tourism industry.¹⁵⁰ Research also suggests avenues for coastal communities to overcome deterrent effects, including moving the turbines further from shore to mitigate visual effects and supporting attractions for visitors who are interested in the projects.¹⁵¹ For instance, Parsons et al.¹⁵² found that the closer an offshore wind project was sited to shore on the East Coast of the US, the larger the negative effects on beach use. Hence, planning for offshore wind must carefully consider the distance the projects are sited from shore.

Recreationists

Tourism research is intertwined with recreation, as many tourists participate in coastal recreational activities. Coastal recreationists are key stakehold-

ers in the OSW siting process as they will have physical and situational interactions with the projects. However, much of the research on coastal recreation and OSW has focused on recreational fishing or beachgoing. Other types of recreation, including boating, charter excursions, diving, or surfing, have received less attention.

The perceived effects of OSW projects on recreation may affect social acceptance. Ferguson et al.¹⁵³ found that in the US, perceived impacts from OSW on recreation on Lake Erie were a major predictor of overall support for OSW projects. This study also reported that the more a recreationist believed they would be positively affected by the OSW project, the more likely they were to support it. Some of the positive benefits reported were that OSW is a unique recreation attraction, provides an opportunity for informative boat tours, and allows anglers to target OSW structures. Similarly, Brownlee et al.¹⁵⁴ found that marine recreationists' support for OSW development was higher than the general population in Massachusetts, US. Other research on OSW and recreational fishing has found that OSW can positively influence anglers' perceptions of catches near turbines.¹⁵⁵ Recreational fishing will be discussed in greater detail in the Recreational Fishing section below.

Pro-environmental attitudes or values can also affect recreationists' perceptions of OSW, as increased pro-environmental attitudes have been found to bolster support for OSW.¹⁵⁶ However, recreationists' perceptions may depend on the landscape characteristics, perceived "fit" of the turbines, and their symbolic attachments to places where OSW is located.¹⁵⁷

While the studies we reviewed did not directly analyze recreation through an energy justice framework, this research underscores how the allocation of benefits and harms has justice implications. Similar to offshore wind and tourism research, extant research has reported both adverse and positive effects of OSW on recreation experiences. OSW could negatively affect beachgoing behav-

iors by deterring or altering beach trips.¹⁵⁸ Other concerns include OSW affecting recreation activities on the open ocean by altering access to the sea, blocking sailing routes, or restricting space for activities like diving or windsurfing.¹⁵⁹ In a study in the US, Dalton et al.¹⁶⁰ found that OSW affected boating and that boaters' activities could shift due to OSW development as some reported a reluctance to get close to turbines.

However, other research has reported limited impacts from OSW on recreational activities, including Landry et al.¹⁶¹ who found that OSW did not significantly affect recreational beachgoing in North Carolina, US. Ferguson et al.¹⁶² investigated the perceptions of US water-based recreationists near a proposed OSW project on Lake Erie; they found that recreationists believed OSW could positively affect recreation by providing additional opportunities for tours or fishing. Likewise, Ferguson et al.¹⁶³ surveyed recreationists on the New Hampshire US coast and found that OSW would not alter recreation activities or behaviors, including charter fishing and boat tours, sailing, and beach activities. Trandafir et al.¹⁶⁴ found that when people saw the BIWP turbines on a trip, they showed a positive willingness to pay for fishing and boating.

Moreover, OSW can have both positive (e.g., additional experiences) and negative (e.g., spatial conflicts) impacts on coastal and marine recreationists, affecting the fairness and justice of the project and influencing the acceptance of OSW development. When examining the impacts of offshore wind on coastal and marine recreation, researchers and policymakers should consider the diversity of recreation activities. While much research has considered the experience of beachgoers, further research should examine the perceptions of and impacts on other recreationists, such as sailors and surfers.

Commercial and Recreational Fishers

As ocean users with historical, cultural, and economic significance in many regions around the world, fishers are an important stakeholder group in OSW development. Research has helped shed light on some of the plausible effects that OSW can have on the fishing industry. One consideration is spatial conflict; the presence of turbines and related construction and operations activities may exclude or displace fishers from transit or fishing grounds.¹⁶⁵ Fishers can be legally restricted from an area with an OSW project, or they may choose not to fish there due to concerns of safety, liability, or the loss or movement of fishing gear.¹⁶⁶ OSW development can also have ecological and physiological impacts on the species that fishers harvest due to factors such as the artificial reef effect (when turbine structures attract certain marine fauna and flora), electromagnetic fields, altered water currents and wind wakes, and noise pollution.¹⁶⁷

These spatial and ecological impacts to the fishing industry may be negative (e.g., reduced fishing grounds for trawling) or positive (e.g., increased abundance and size of target species due to temporary closures).¹⁶⁸ While ecological studies on OSW and fishing ecosystems will help elucidate impacts on fisheries, social acceptance and energy justice research is critical for understanding the social dimensions of this issue. As commercial and recreational fishers represent distinct groups with different stakes, motivations, and impacts from OSW, we review them separately.

Commercial Fishers

Commercial fishers in many regions of the world have been vocal opponents to OSW development.¹⁶⁹ Fishers have protested OSW development in the Netherlands¹⁷⁰ and Taiwan.¹⁷¹ In the US, various fishing companies and members of the commercial fishing industry have sued federal agencies for their approval of the Vineyard Wind OSW project.¹⁷²

Research in Taiwan has identified that the perception of OSW impacts on fishing activities, economic gains or losses, and marine ecosystems can affect fishers' social acceptance of offshore wind.¹⁷³ A study in South Korea found that the degree to which damage to fisheries is considered in OSW siting decisions can also affect fishers' acceptance of OSW projects.¹⁷⁴ However, fisheries are not homogeneous; fleets vary physically, economically, and socially, which can lead to differential responses to OSW development.¹⁷⁵ Studies in Ireland, Scotland, and the US have found that attitudes toward marine renewable energy projects, including OSW, can vary across geographic locations and among individual fishers.¹⁷⁶ For example, a study that surveyed commercial fishers in western Scotland found that fishers operating from mainland ports were more likely to have negative attitudes toward renewable energy developments than those operating from island ports.¹⁷⁷ The target species and fishing method can also affect perceptions of impacts; research in the UK found that crab and lobster fishers may benefit from using turbines as artificial reef structures, while trawlers often fear displacement from fishing sites.¹⁷⁸

Commercial fishers' acceptance of OSW development can be tied not only to economic factors (e.g., dependence on fishing as a source of income) but also to social and cultural factors, including attachment or historic connections with a specific fishing area or practice.¹⁷⁹ For example, Tribes of the Coos, Lower Umpqua, and Siuslaw Indians have expressed opposition toward OSW development off the Oregon coast in part due to its disruption to fishing resources that hold cultural significance.¹⁸⁰ However, some fishers are hopeful about the possibility of coexistence between offshore wind and fishing. A survey of commercial fishers in Ireland found that 70 percent of respondents believed fishing and marine renewable industries can coexist.¹⁸¹ Similarly, research in Scotland and Germany found that fishers were proactive toward implementing multiuse management options that accommodate

both offshore wind and fisheries.¹⁸² However, the same study found that there was little interest from OSW companies to pursue multiuse plans unless they added clear value to the project and did not pose risks to development.

Research has found that various management strategies can make progress toward addressing conflict between fishers and OSW, including the colocation of projects and fisheries, compensation for fishers negatively impacted by OSW projects, intentional hiring practices to facilitate employment transitions for fishers, and the participation of fishers in OSW decision-making.¹⁸³ However, the successful implementation of such policies requires careful consideration of diverse fishers' perspectives, strategies for just decision-making, and an understanding of the complexity of potential outcomes.

Principles of recognition and procedural justice highlight the importance of the inclusion of communities in project decision-making.¹⁸⁴ Consultation is often used as a strategy for including fishers in decision-making, however consultation processes can often fall short of achieving justice. For example, fishers in South Korea have expressed frustration over being ignored or not having their interests recognized through OSW consultations.¹⁸⁵ Studies in the UK and the Netherlands found that consultation that is unidirectional or insufficient (e.g., too short or infrequent) can leave fishers feeling alienated or frustrated by the process.¹⁸⁶ Fishers in the UK and Ireland perceived inclusionary processes to be merely "box-checking" exercises, and some fishers felt that the input they provided did not have a meaningful influence on outcomes.¹⁸⁷ This idea reflects some fishers' concerns about uneven power dynamics, where political support for renewable energy drives projects forward regardless of issues raised by fishing communities.¹⁸⁸ Research in the UK and Ireland has also found that engagement should begin early in the development process and that building trust between fishers and developers takes time.¹⁸⁹ A

study in Taiwan additionally emphasized the need for developers to treat fishers with respect and have an understanding of their fishing practices and native knowledge.¹⁹⁰

Trust can also be a barrier to productive collaboration; for example, commercial fishers in the UK and Ireland have described feeling mistrust for “outside” groups, such as developers or developer-appointed fishing liaisons.¹⁹¹ A study in the Northeast US revealed that, while OSW developers are viewed as central to communication and coordination, they are not widely viewed as trustworthy or credible.¹⁹² Similarly, a study in South Korea found that fishers perceived private offshore wind developers as deceitful, describing them as “tricking” fishers, leading to a breakdown in trust.¹⁹³ This study emphasized that principles of restorative justice can help explain community mistrust in novel OSW developments based on histories of past injustices from exploitative energy developers.¹⁹⁴ A study in the UK found that mistrust can also be felt by the developer, sometimes resulting in contradictory claims from either side (e.g., where fishers perceived just compensation, developers perceived exaggerated or fraudulent claims).¹⁹⁵

Perceptions of the distributional effects of offshore wind on fishing are diverse. Studies have found that fishers may perceive benefits to OSW, including habitat creation, improvements to harbor infrastructure, compensatory payments, and alternative employment opportunities.¹⁹⁶ In a survey of fishers in Ireland, Reilly et al.¹⁹⁷ found that 57 percent of participants would be interested in alternative employment and training courses for marine renewable energy jobs. However, studies in the UK, Ireland, South Korea, and Brazil have found some fishers perceive negative impacts from OSW, including displacement from or lack of access to traditional fishing grounds, loss of income, loss or damage to fishing gear, and harm to marine ecosystems and biodiversity.¹⁹⁸ Hooper et al.¹⁹⁹ found that the colocation of fishing activity and OSW

projects in the UK may require clear communication of legal and insurance protocols to address concerns around safety, liability, and compensation for gear damage. In general, transparency, clear communication, and keeping fishers informed about OSW developments are important for just marine governance.²⁰⁰

Recreational Fishers

Although more research has focused on commercial fishers, recreational fishers (i.e., those who fish for leisure or sport rather than as a profession) are also a key stakeholder group in OSW development projects. Research in the US and UK has found that many recreational fishers believe wind turbines create habitat for fish, which attracts species targeted by recreational fishers.²⁰¹ In some cases, experience magnifies this perception; a survey of anglers on the East Coast of the US found that experience fishing at the BIWP was associated with more positive beliefs toward OSW impacts on catch.²⁰² However, outcomes from a survey in the UK were more mixed, with only 33 percent of respondents who had fished at or near wind developments reporting improved catch, while 36 percent reported declined catch and 24 percent reported no change.²⁰³

Several studies found that many recreational fishers view the BIWP as a unique destination or landmark, which led to more recreational fishing activity in this area.²⁰⁴ However, this may not be a universal phenomenon: a survey in the UK found that anglers reported being unlikely to change their fishing behavior as a result of OSW development.²⁰⁵ Furthermore, a study in the US found that the excitement of OSW as a novel destination may fade over time, and overcrowding of anglers and charter boats can be a drawback.²⁰⁶ Practical and safety considerations are also relevant to recreational fishers’ acceptance of offshore wind. Research in the UK and US identified that projects that are close to shore or that are located within fishers’ typical travel routes may be more accessi-

ble to recreational fishers.²⁰⁷ However, recreational fishers in both the US and UK have expressed concerns that fishing grounds near OSW developments may be restricted in the future.²⁰⁸

The physical appearance of wind turbines is another factor that affects recreational fishers' experience, though multiple studies in the US found mixed perceptions as to whether turbines had a positive or negative aesthetic.²⁰⁹ Similarly, research in the US has found mixed perceptions of the symbolism of OSW, with some recreational fishers admiring the progress of clean energy and others mourning the loss of natural beauty and unobstructed ocean views.²¹⁰ In a survey in the UK, Hooper et al.²¹¹ found that many anglers agree OSW is needed to address climate change, although some respondents expressed a preference for other forms of low-carbon energy generation.

Although elements of energy justice were not typically at the forefront of research on recreational fishers and OSW, a survey of anglers in the UK did reveal that only 12 percent of respondents believe OSW developers can be trusted to listen to communities, and answers to open-ended questions revealed a need for more communication and information about OSW projects.²¹² These findings reveal the importance of information dissemination and bidirectional community engagement between decision-makers and recreational fishers. Further research should empirically explore recreational fishers' perceptions of energy justice within OSW processes and outcomes to inform governance approaches with this particular stakeholder group.

Compensation Measures

Compensation measures and community benefits are integral elements of offshore wind energy development and can affect community perceptions of the technology and relationships with decision-makers and energy developers. The makeup, provision, distribution, and oversight of benefits can significantly affect the projects' out-

comes and may represent forms of energy justice or injustice. Our review considers compensation measures as they are a core policy instrument used in offshore wind energy development that negotiates the relationships between developers, decision-makers, and affected and geographically proximate communities.

OSW developers can provide compensation, mitigation, and benefits to individuals or communities affected by development.²¹³ Compensation can be administered through various mechanisms but are often referred to as "community benefit arrangements" or "compensation schemes."²¹⁴ These schemes may include monetary benefits, like direct payments, as well as nonmonetary benefits, such as infrastructure, educational opportunities, or workforce training. The schemes can also be administered directly by the developer or indirectly through a community organization or local government.²¹⁵

A number of different types of benefit schemes exist, some with different nomenclature to distinguish between the purpose or parties executing the agreement. One common approach has been "community benefits agreements" (CBAs)—legal contracts "setting forth a range of community benefits regarding a development project, and result[ing] from substantial community involvement."²¹⁶ The first US federally recognized CBA for OSW was negotiated for the Vineyard Wind 1 project, which included monetary funds given to the community and investments in job training.²¹⁷ Other types of benefit schemes include Project Labor Agreements, collective bargaining agreements; Good Neighbor Agreements, where developers recognize and define their roles in the community; and Host Community Agreements, agreements between the developer and the town or community located near parts of the OSW project and its infrastructure.²¹⁸ Financial benefits could also include co-ownership or co-investment. In Denmark, 20 percent of wind farm ownership is required to be offered to local

communities and adjacent municipalities.²¹⁹ Additionally, there are Tribal Benefit Agreements; the first in the US was established between Vineyard Offshore and the Mashpee Wampanoag Tribe,²²⁰ who agreed to a lasting collaboration and established a fund to support scholarships, wastewater projects, language reclamation, and workforce training. Moreover, the benefits and their composition may also be up to the developers' discretion or mandated by governments; for instance, the Highland Council in Scotland developed a policy through which offshore renewable energy developers pay £5,000 per installed megawatt and the Council provides the structure for receiving, managing, and distributing community benefits.²²¹ For the remainder of this article, we will use the term "community benefits" as a broad all-encompassing term to refer to the various types of benefit arrangements adopted by energy developers.

Community benefits have received attention in social acceptance research. One of the motivations cited for administering community benefits in the renewable energy literature is to secure social acceptance.²²² Other motivations for benefit provisions are legal or regulatory requirements, supporting environmental justice, or compensating for losses.²²³

Emerging research about offshore wind has exemplified the potential effects of community benefits on social acceptance. Central to the research findings that community benefits improve social acceptance is the assumption that financial benefits are perceived as "positive add-ons."²²⁴ Walker et al.²²⁵ found that community benefits increased the local acceptability of an offshore wind project in Exmouth, UK, by improving perceptions of the project's favorability on an individual and collective level. Windemer²²⁶ found that economic benefits outweighed the significance of visual impacts for the acceptance of wind development in England. In the US, Klain et al.²²⁷ found that local stakeholders and government offices attributed the

success of the BIWP to the distribution of community benefits.

In contrast, some research has found that community benefits have been perceived as a "bribe" or trying to "buy" support.²²⁸ In the UK, a study on renewable energy technologies, including offshore wind, found that residents distrust project developers or government officials.²²⁹ In a study of offshore wind in the UK, Walker et al.²³⁰ found that perceptions of bribery can undermine support gained for a wind project through benefit schemes. Cowell et al.²³¹ conducted a discourse analysis in Wales and illuminated that people may accept unwanted outcomes, but that does not necessarily suggest people have become indifferent to wind energy projects, even with the provision of benefits.¹⁶⁴ Additionally, in an analysis of three onshore wind energy projects in Denmark, Jørgensen et al.²³² suggest that compensation may not always address wind energy project-related concerns or perceived losses.

The distinctions between whether benefits are perceived as a "bribe" or as a positive add-on can depend on the schemes' institutions, delivery, and motivations.²³³ Some studies have found community perceptions of OSW benefits are mixed,²³⁴ which reveals the need to examine nuances in differential community opinions. For instance, a study in Germany found that benefits can increase acceptance of OSW but not for everybody equally, as opponents of wind projects were not swayed by benefits.²³⁵

Other scholars contend that institutionalizing community benefits reduces perceptions of bribery. According to a study in Scotland from Aitken,²³⁶ making community benefits a policy requirement creates the perception that developers are fulfilling a mandate, not trying to buy out the community's opinions. However, Walker, Russel, and Kurz²³⁷ cautioned that it is essential to consider how institutionalizing community benefits could foster perceptions of government bribery. In a study of



Figure 3. The Nysted Wind Project off the coast of Denmark. Photo courtesy Jeremy Firestone

the Kitty Hawk lease in North Carolina in the US, Tyler et al.²³⁸ found that key informants were skeptical of the state administering benefits and preferred a trusted local organization. Ultimately, the region's characteristics can influence perceptions of benefit schemes; Tyler et al.²³⁹ noted that the rural characteristics of the region could have influenced the residents' perceptions of the government. Additionally, early community involvement has been mentioned as one mechanism to mitigate skepticism about wind project developers and their projects.²⁴⁰

Research examining social acceptance underlies how community benefits are intertwined with perceptions of trust in developers, perceived fairness, and perceptions of project benefits to communities.²⁴¹ Community benefits also relate to multiple dimensions of justice, as the design and outcome of the benefits scheme can affect a project's contribution to energy or environmental (in)justice.²⁴² Cowell et al.²⁴³ explicate how three tenets of justice are involved in developing community benefits: it concerns those who receive the benefits (distributional justice), it involves decision-making pro-

cesses (procedural justice), and it concerns whose interests are valued or considered (recognition justice). In interviews with offshore wind practitioners in Wales, Cowell et al.²⁴⁴ found that the conventional, instrumental view of community benefits—to increase acceptance—was only one explanation of the result or purpose of administering benefits, as community benefits could serve environmental justice or provide reparation for impacts. The authors also highlighted the importance of considering justice issues when designing benefits. Similarly, Rudolph et al.²⁴⁵ examined case studies in the UK, US, Denmark, Germany, and the Netherlands of offshore renewables and emphasized how community benefits provide a way to improve distributional justice by addressing the inequitable distribution of burdens and benefits. In addition, these authors contend that benefits are an opportunity to improve procedural justice through community participation.

Moreover, studies in the US and across Europe have found that one pathway to distributional justice is the provision of tailored community benefits negotiated through a collaborative process.²⁴⁶

However, Rudolph et al.²⁴⁷ reflect that the outcomes of the benefits depend on how they are conceptualized. Benefits or compensation may not always support energy justice. For instance, Walker et al.²⁴⁸ found that communicating community benefits did not increase perceptions of procedural justice in England. Jørgensen et al.²⁴⁹ found that some Danish citizens perceived OSW compensation schemes as unequal due to concerns about unfair distribution and access. They also found that monetary benefits were not perceived as commensurate with the nonmonetary losses associated with wind projects. This reflects the recommendations from Rudolph et al.²⁵⁰ that benefits should be locally tailored to the site and project characteristics.

There is limited OSW research examining the local perceptions of community benefits or compensation schemes and preferences related to their design. However, recent research on OSW suggests that communities have preferences for the configuration and administration of community benefit schemes.²⁵¹ For example, Tyler et al.²⁵² found that many informants in North Carolina, US supported a community fund that supports economic, social, or environmental investment in the region. Additionally, a study in Chile that found both compensation programs to individuals (reduction in electricity bills) and communities (construction of a community-oriented facility) increased the social acceptability of marine energy projects.²⁵³ In a survey about onshore wind in Canada, Walker and Baxter²⁵⁴ found that community ownership was the preferred form of economic benefit.

Many extant studies about community benefits examine onshore wind or other renewable energy technologies; however, emerging global research underscores how community benefits have mixed effects on acceptance and energy justice.²⁵⁵ Nonetheless, compensation scholarship suggests that the relationship between benefits, acceptance, and justice depends on its design and administration as well as the history and dynamic of the communities where it is implemented.

Conclusions

This review aims to elucidate the development and application of social acceptance and energy justice frameworks to offshore wind energy. This research highlights how offshore wind alters human relationships with marine and coastal places. Understanding the social aspects of OSW is essential to acknowledging how it affects coastal communities and to ensuring just and sustainable transitions from fossil fuel energy to OSW energy.

Our review analyzed two core aspects of the development of OSW energy: (1) affected communities and (2) compensation measures. We chose to examine these aspects due to the importance of understanding and recognizing diverse community needs and values when planning for offshore wind projects.²⁵⁶ Understanding the perceptions and impacts on communities is also essential when designing or administering compensation strategies, which have been identified by developers as an important management strategy to respond to public concerns.²⁵⁷

In our review of affected communities, we analyzed three groups: (1) coastal residents, (2) tourists and recreationists, and (3) commercial and recreational fishers. In many instances, the research regarding different affected communities overlapped. Fishers, coastal residents, and tourists have personal and cultural attachments to ocean spaces. Additionally, the research we reviewed exemplified how people's opinions do not always fit the dichotomy of support versus opposition. People's perceptions of OSW projects are affected by conditional or contextual factors; values, preexisting beliefs about the ocean, landscape fit, cultural heritage, project processes, and the distribution of benefits and burdens have all been found to affect perceptions of OSW.²⁵⁸

Furthermore, there are many interactions between social acceptance and energy justice theory. One is that the perceived distribution of benefits and burdens can influence people's perspectives.²⁵⁹ Other research suggests procedural justice could be associated with perceptions of projects

and their outcomes.²⁶⁰ However, there can be tensions between some applications of social acceptance and energy justice, as community acceptance research and practices that aim to advance support or acceptance of technologies may not attend to the injustices of OSW and ignore marginalized perspectives. While improving justice outcomes may increase social acceptance, scholars and practitioners should be careful not to rely on instrumental frameworks that cast opposition as deviant.²⁶¹ Additionally, there are many instances highlighted in our review where people have divergent visions of desirable offshore wind planning (e.g., place fit of turbines), and a challenge for energy justice and social acceptance scholars will be to attend to diverse, competing perspectives.

Moreover, our review reflects how the social aspects of OSW research have many uncertainties.²⁶² Tourism, recreation, and community benefit or compensation research have mixed findings about how people perceive and are impacted by OSW projects. These mixed findings exemplify people's complex, nuanced opinions about OSW technology, and they also underscore the importance of aligning OSW projects and compensation with identified community needs and values.

Nevertheless, people's nuanced relationship with OSW demonstrates the importance of local approaches to OSW governance. Our review suggests that OSW policy should not be a one-size-fits-all approach and should attend to the community's relationships with energy developers and their state and local governments. Additionally, coastal residents, fishers, tourists, and marine recreationists are not monolithic groups. Marine stakeholders have various characteristics that shape their relationship with OSW; for example, fishers have varied fleets and fishing practices. Residents, tourists, and recreationists have different relationships with seascapes and the uses of the coast. OSW can have localized effects depending on policy approaches and geographic location. A coastal

community's perceptions of its state or local governments may influence the perceived benefits or burdens of the projects.²⁶³

As OSW expands, empirical social science is needed to further develop the existing scholarship on this nascent industry. It is critical to consider people's physical encounters with OSW projects, especially acknowledging the cumulative effects of multiple, more extensive projects. Multiple or cross-comparison case studies could be conducted to understand these projects further.

Future research should examine the tensions and interactions between social acceptance and energy justice approaches in studying OSW. Further integrating insights from acceptance and justice scholarship could help to develop a holistic conceptual framework for understanding perceptions of OSW. For example, using social acceptance frameworks that integrate tenets of energy justice, such as that of Wolsink,²⁶⁴ can result in a more nuanced understanding of community perspectives of OSW decision-making and outcomes. As Krupnik et al.²⁶⁵ suggest, energy justice provides a helpful way of conceptualizing impacts at different scales without relying on reductionist dichotomies of "good" and "bad." Research that has examined offshore wind through an energy justice lens has largely focused on procedural, distributional, and, to a lesser extent, recognition and restorative justice tenets. Future offshore wind studies should consider alternative, multidisciplinary, and non-Western-centered frameworks to diversify perspectives.²⁶⁶

Our analysis should be understood in light of its limitations; we recognize that our analysis was not a systematic review of all offshore wind social acceptance or energy justice literature. Our review was not intended to be exhaustive, and some relevant articles may have been omitted. However, our review of social acceptance and energy justice research explores and helps elucidate the complex, intersecting, or diverging aspects of their applica-

tion to offshore wind. Our findings highlight key themes in OSW research and provide insights for future research into OSW social acceptance and energy justice.

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