



Original research article

Will communities “open-up” to offshore wind? Lessons learned from New England islands in the United States



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ABSTRACT

National-scale polls demonstrate high levels of public support for developing renewable energy while local opposition has led to delays and cancellations of renewable energy projects around the world. What makes for robust public engagement processes to reject or site renewable energy projects? A literature review reveals numerous considerations, with complexity that impedes their application by practitioners. In this study, we conducted interviews and document analysis to assess the extent to which design principles from the analytic-deliberative process literature arose during public engagement on three New England islands adjacent to proposed offshore wind farms. In our study sites—amongst the array of criteria in the literature—good public engagement boiled down to two key themes: enabling bidirectional deliberative learning and providing community benefit. Decision processes perceived as effective occurred when (1) participants, including experts and local stakeholders, learned from each other while reconciling technical expertise with citizen values; and (2) outcomes included the provision of collaboratively negotiated community benefits. Our findings highlight that community benefits are not the same as benefits to groups of individuals. Attending to these key themes may improve the quality of interactions among communities, government authorities and developers when deciding if and where to site renewable energy infrastructure.

1. Introduction

The scientific consensus regarding the urgency of climate change mitigation has coalesced [1] while ideological and economic debates about appropriate actions and energy policies have become increasingly polarized [2–5]. Achieving the IPCC’s goal of 1.5 °C or less of warming entails a transformation of various modes of production and consumption, including massive changes in U.S. energy infrastructure [6]. Transitioning to low carbon sources of electricity largely depends on the extent to which people act at various scales to obstruct (e.g., file lawsuits), accommodate or champion low-carbon energy technology.

Switching to greater reliance on renewable energy can diversify sources of energy, reduce carbon dioxide emissions, reduce air pollution and meet growing demands for electricity [7]. As renewable energy infrastructure scales up, it is becoming increasingly common in and near where people live. Siting this infrastructure has often been controversial, resulting in project delays and cancellations [8,9]. Bell et al. [10] identified a ‘social gap’ when it comes to understanding why national opinion polls reveal high levels of public support for the development of renewable energy while specific applications for its

development have low success rates. Proposed explanations for this ‘social gap’ include the following: (1) *self-interested NIMBY-ism* (not in my backyard), defined as “an attitude motivated by concern for the ‘common good’ and behaviour motivated by ‘self-interest’” [10]; (2) *democratic deficit* in that a small, unrepresentative number of opponents dominate the decision processes; (3) *qualified support* in that national surveys may report high levels of public support, but this support may in reality be based on certain conditions being met (e.g., related to noise, size, number of turbines, environmental protection, community engagement, fairness of decision process, and fair allocation of economic benefits); and (4) *place protectors*, who perceive higher place value in a specific location without the renewable energy development (e.g., rejecting a development due to its impact on local biodiversity or the historic qualities of a particular landscape), but may accept the development in another location [11]. If renewable energy targets are to be achieved, this “social gap” must be bridged to mitigate, accommodate or otherwise work through concerns of local communities to particular renewable energy projects [10,12].

Social science can elucidate why and how renewable energy controversies might be ameliorated via robust public engagement

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strategies, including those that seek to clarify both concerns and possible outcomes or alternatives. Public participation in decision-making has the potential to enhance the quality of decision outcomes while improving the capacity of those involved to meaningfully engage in policy processes [13]. Scholars of risk, technology and social dimensions of renewable energy recommend shifting governance away from reliance on primarily technocratic evaluations of risks and benefits. Instead, scholars have called for methods that ‘open-up’ the capacity for people with diverse perspectives to participate in analytic deliberative processes to determine what constitutes appropriate development of a technology [14]. Analytic-deliberative methods are approaches to public engagement in decision-making that involve assessment and dialogue to reconcile technical as well as expert knowledge with citizen values [15]. Such methods can result in increased trust among those involved and acceptability of outcomes [16,17]. “Opening up” decision-making processes entails recognition and accounting for the numerous factors driving the development and deployment of technology, including “individual creativity, collective ingenuity, economic priorities, cultural values, institutional interests, stakeholder negotiation, and the exercise of power” [14]. And yet, when done poorly (i.e., closing down decision making), deliberative processes can ‘close’ down both discussion of new technologies and so too the possibility of innovations (e.g., offshore wind farms) and potential paradigm shifts (e.g., a move from large corporate-owned to distributed community-owned energy systems) [14].

We focused our research attention on contributing to the growing literatures on community-scale analysis of public opinion, participatory processes and community benefits related to wind energy [18–23]. Our research is a response to Smardon and Palmer’s [24] call for additional evaluation of processes to facilitate interactive dialogue about renewable energy landscapes. We explore what constitutes meaningful citizen participation for siting offshore wind in the northeast U.S., using three case studies as impetus for a possible streamlining of theory about analytic deliberative processes that is especially relevant for practice and applied research. Within this context, we give special attention to the provision of community benefits, distinguishing specifically between community and aggregate individual perspectives.

By community benefits, we mean additional and distinct funds or investments that the developer provides to communities, often near project sites [25,26]. Benefits associated with the generation of renewable electricity, such as carbon dioxide reduction, are diffuse and tend to accrue at a global scale while several environmental, economic and landscape impacts are concentrated and local. Providing community benefits above and beyond tax revenues can play an important role in managing renewable energy scale-related distributional conflicts [27,28].

We conducted research on the experiences of three New England islands to explore deliberative processes, community benefits and logics of acceptability or unacceptability of offshore wind farms. Our goal was to parse how public engagement has occurred and the types of engagement practices that built or eroded support for wind farms. We used normative theory on key components of analytic-deliberative processes to explain characteristics of community engagement that worked well versus those that resulted in relatively higher levels of frustration among various parties. Our research identifies similarities, differences and gaps between this normative theory and our three island community contexts to identify characteristics of community engagement that may minimize frustration and increase satisfaction with decision processes and outcomes among local stakeholders.

1.1. Theorizing public engagement processes

A normative theory of public participation in decision-making has sought to conceptualize and identify principles for reaching legitimate outcomes (Fig. 1) [29,30]. Concepts of *ideal speech situations* and *communicative competence* are central to this theory. An *ideal speech*

situation involves the aspirational goal of reaching a rational consensus wherein communication follows implied rules, no coercive or non-rational pressures exist and assertions made are based on reason and evidence only [17,31]. *Communicative competence* is “the ability to use language...to create understanding and agreement... This requires people enter into a discourse [i.e., discussion or deliberation exercises] with an attitude oriented toward reaching understanding. People must be committed to reflecting on their personal beliefs, values, preferences, and interests, they must be open to alternative definitions of reality, and they must listen to other people’s arguments with an open mind” [33, p. 44]. Competence also means that the people involved in the deliberation are able to assimilate information to reach an adequate understanding of the issue and appropriate procedures are in place to choose the relevant knowledge to inform the process. Principles of fairness are linked to competence to the extent that legitimate outcomes depend not just on competence, but fairness as concerns equality of inclusion in the decision process, procedural fairness throughout the deliberation, and mutual respect among all involved. Lastly, fairness is transgressed when (1) the role of power is ignored or is not neutralized; and/or (2) when political institutions make the deliberative process an end-creating activity, rather than the means for generating an outcome. These obstacles can block the achievement of legitimate outcomes (Fig. 1).

Abelson et al. [29] expand and operationalize this normative theory into pragmatic principles for evaluating public participation in decision-making with more explicit recognition of the role of power in deliberative processes (e.g., the availability and use of particular information can be a source of power). This highly cited review, with over 795 citations on Google scholar as of 2017, documents how no simple formula exists for designing an optimal public engagement process, but four key topics require attention: (1) representation; (2) procedural rules; (3) information employed in the process and (4) the outcomes including decisions resulting from the process.

Representation refers to determining who fairly represents the “public” in a decision-process. This can be challenging because fair and legitimate processes that provide meaningful opportunities for learning and recognition of diverse perspectives tend to be time-intensive and relatively exclusive processes that can only involve a small number of people. Further complicating fair representation is that citizens are more likely to get involved if they fear losing something they value [29]. Situations can arise when a majority of people support or feel neutral towards a proposal, but they choose not to get involved with the decision process [33]. Concerns about representation are prominent in the literature on energy justice, in which *recognition-based justice* calls for greater consideration for segments of society who tend to be ignored or misrepresented [34].

Abelson et al. [29] documents how procedural rules can help manage this potential self-selection of who gets involved. They also identify the importance of being upfront and transparent about the timing and extent of public engagement as well as responsiveness on the part of an authority who compiles and responds to public input. These considerations are part of *procedural justice*, a line of research that looks into the extent to which processes are fair, local knowledge is mobilized and information is disclosed [34].

Providing ample time for those involved to examine, discuss and challenge the information presented in the process is important, as is maintaining mutual respect and concern for others throughout the deliberation. Choices about information are crucial, specifically what information is selected then how it is presented and interpreted.

Finally, not just the process leading to the decision, but also the outcome (the decision) needs to be associated with legitimacy (the general perception that the decision is an appropriate use of power by a legally constituted authority) and accountability [29] (responsibility is assumed for the decision, including an obligation to report, explain and be answerable to the resulting consequences). This last point touches upon distributional justice, which focuses on outcomes related to

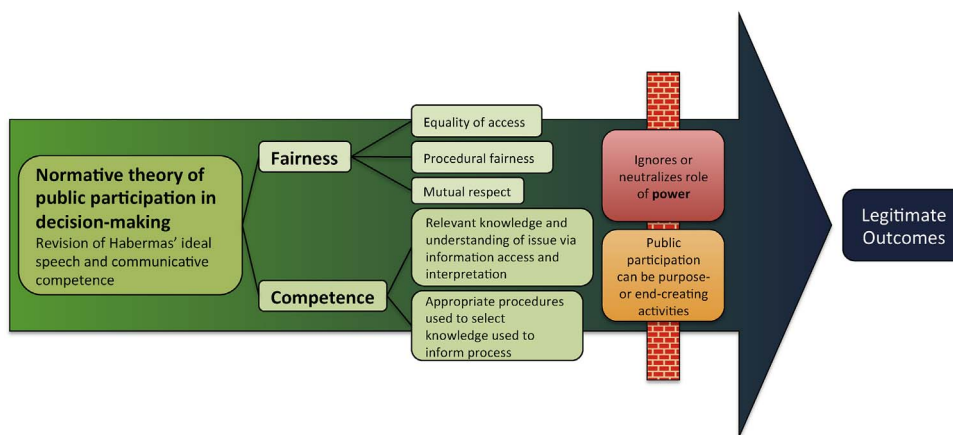


Fig. 1. Normative theory of public participation in decision-making, adapted from Abelson et al. [23]. The meta-principles of fairness and competence are necessary [30,31] but arguably not sufficient to reach legitimate outcomes [32]. Neglecting the role of power and participation as an end unto itself rather than a means to an outcome can be barriers to reaching legitimate outcomes [29].

unequal allocations of costs and benefits and/or responsibilities [34].

Abelson et al. [29] identified these key components of public participation in analytic deliberative processes based on experiences in the health sector. Numerous other studies uphold them in the design of deliberative processes related to sustainability issues [35–41], though some emphasize a smaller set of these theoretical principles. For example, Demski et al. [28] conducted an analytic-deliberative workshop to better understand public values when it comes to system-wide energy transitions with explicit attention paid to representation, procedural rules and information used in the process. We identify and characterize components of three decision processes associated with offshore wind project proposals, then relate our findings from our qualitative analysis to the evaluation components from Abelson et al. [29].

Our investigation of community engagement processes that worked well and those that could be improved focuses on three New England islands at the forefront of offshore wind debates due to their locations near proposed wind farm sites as well as economic and cultural connections to adjacent ocean spaces (e.g., reliance on fishing, sense of place reinforced by aesthetic views). Due to their proximity to the first offshore wind projects in North America, New England island residents are likely to be among the first positively and/or negatively impacted by this technology.

Three questions drove this work and were also relevant to our community partner, the non-profit Island Institute. This organization has advocated for meaningful public engagement during decision-making processes, including those involving island communities and offshore wind. Using various media, business and community-based strategies, Island Institute has engaged local stakeholders, developers, scientists, engineers, state and federal agency decision-makers and others to learn from each other and consider the trade-offs involved in various development proposals. The Community Energy program staff at Island Institute has worked with New England coastal and island communities on energy issues since 2008. Our aim with this project was to co-produce knowledge relevant to the communities with which Island Institute works and academic audiences.

Given the public engagement already occurring in New England on developing offshore wind: (1) What worked well regarding the process of community engagement and its outcomes near proposed offshore wind farms near three New England islands? (2) What were the major challenges with community engagement in these contexts? (3) What insights on community engagement likely apply elsewhere as renewable energy infrastructure proposals become more common? How this industry and other low carbon energy technologies unfold has implications for the rate at which carbon dioxide emissions from electricity production are reduced and the timing and extent to which we address

climate change.

2. Methods

Our three research questions informed how we collected qualitative data from interviews and relevant documents (e.g., meeting minutes, newspapers, magazines and online news articles), iteratively reviewed and coded the data, compared and contrasted the experiences on three islands, identified common themes, and then related these themes to a theoretical framework, specifically Abelson et al.'s [23] key components of public participation in deliberation. We identified ways in which our findings resonate with and differ from these components in the analytic-deliberative literature.

2.1. Context of study: collaboration with community-based organization

Our project was based on a collaboration between academic social scientists and staff of a non-profit community development organization, Island Institute. We selected three islands based on Island Institute's long-term engagement with community members, government authorities and wind farm developers involved in the consideration of offshore wind close to these islands (see Fig. 2). The company Deepwater Wind completed the *Block Island* Wind Farm in 2016. The Vineyard Power Cooperative officially partnered with Offshore MW, a European wind farm company, in January of 2015. Together, they obtained a lease from the Bureau of Ocean Energy Management (BOEM) to develop their project in federal waters 12 miles south of *Martha's Vineyard*. As of early 2017, The University of Maine and their corporate partners' proposal for testing floating turbines near *Monhegan Island* may receive a DOE grant (\$40 million) to deploy and study a full scale prototype, but organized community opposition has emerged and no final decision has been reached yet [42,43].

2.2. Data collection and analysis

Island Institute staff conducted unstructured, key informant interviews to collect impressions, opinions and experiences of people closely involved with community engagement in our study sites. These included interviews with town council members, community leaders, government agency employees, leaders of an electricity cooperative and wind farm developers. A total of 35 key informant interviews were conducted including 12 people involved in the *Block Island* wind farm, 6 involved in the *Martha's Vineyard* proposal, 12 involved with the proposal near *Monhegan* and 5 from government agencies (BOEM, NREL, and DOE). Island Institute staff conducted the interviews because they already had trust and rapport with the interviewees. Interviews

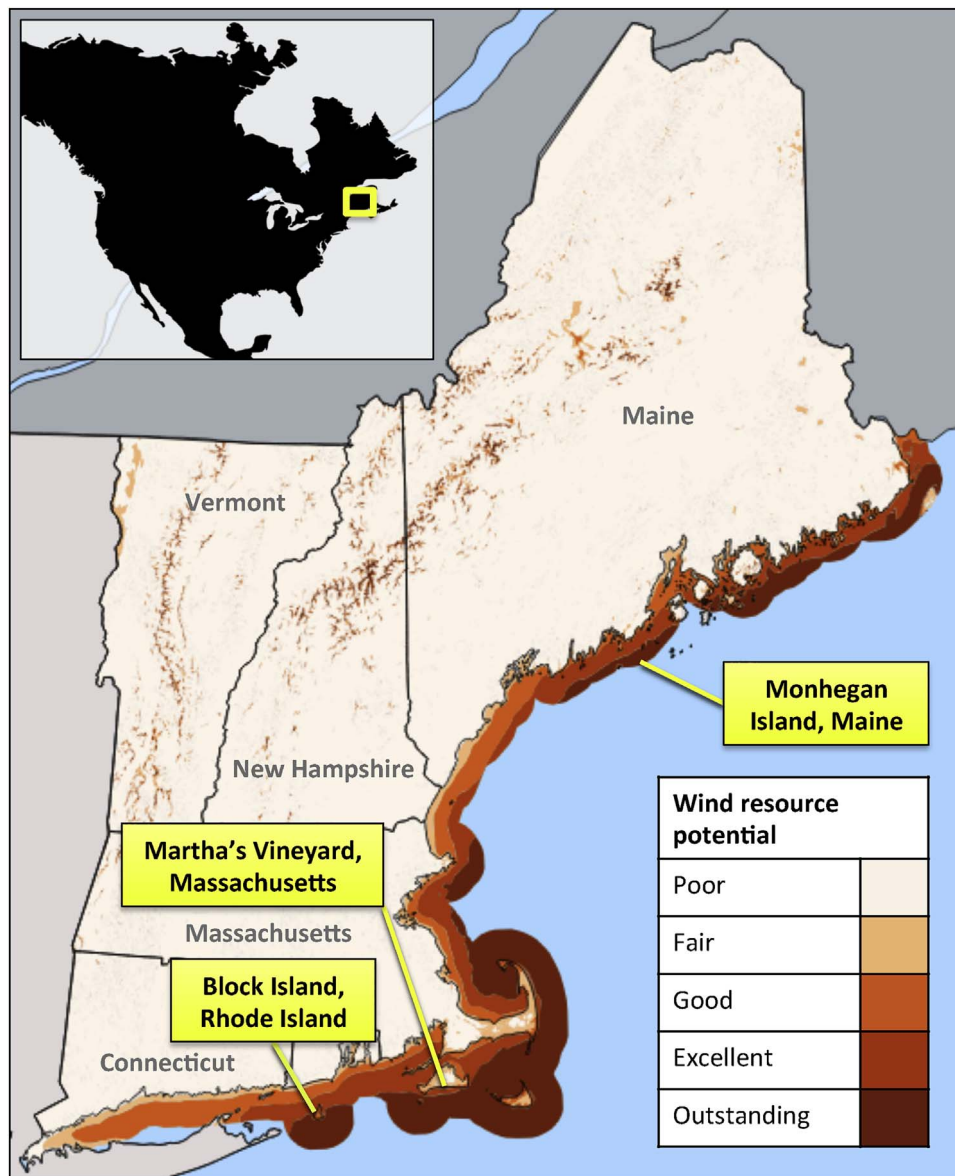


Fig. 2. Map of focal islands. Wind data and categorization from National Renewable Energy Laboratory (NREL) [44].

varied in length from half hour phone calls to multi day conversations during site visits, workshops and meetings. Staff shared the interview results, including direct quotations and notes, with an academic researcher, who was hosted in their office for 2.5 months to collect data via informal interviews as well as analyze Island Institute documents and online materials. The team also made site visits to the islands to tour existing energy facilities and meet community members involved with energy decisions.

The non-profit staff who conducted the interviews may have introduced bias, but Island Institute works to support engagement processes acceptable to local residents rather than advocating for specific outcomes. The academic research collaborator triangulated perceptions obtained from interviews with information from various documents, including relevant newspaper articles, reports, meeting minutes and information from websites pertinent to offshore wind and community engagement initiatives. These initiatives were sorted into two categories, namely those that participants associated with legitimacy and positive affect, and those associated with expressions of frustration or other negative affect. The academic researcher coded the interview notes and other documents based on qualities regarding stakeholder satisfaction or lack thereof, discussed initial themes with

Island Institute partners and refined the themes based on their discussions. Finally, these themes characterizing engagement processes more associated with positive affect and those more associated with negative affect were compared and contrasted with analytic-deliberative literature on key components of public participation in deliberation.

3. Results and discussion

Participants tended to be more satisfied with engagement processes that involved bi-directional and accessible deliberative learning and the provision of custom-tailored community benefits. Block Island and Martha's Vineyard had community engagement processes that Island Institute staff and those involved in the processes perceived as contributing towards enabling the projects to proceed. Monhegan Island was challenged with a compressed timeline and other initial challenges in building community support. Our interviews and document analysis led us to identify two overarching themes associated with perceptions of legitimate outcomes: accessible, deliberative learning opportunities and community benefits. We then suggested ways to adapt and augment key components of public participation in delibera-

Table 1

Key differences between New England island study sites and mainland communities relevant to engagement on energy issues. The population and economy characteristics apply to many small towns while energy costs on islands tend to be higher than on the mainland.

Characteristic	Description	Consequences
Year-round Population	Small compared to adjacent mainland communities [45] <ul style="list-style-type: none"> ● Block Island: 1051 ● Martha's Vineyard: 16,535 ● Monhegan: 69 	Few technical experts Local leadership positions are often part time or volunteer positions
Economy	Strong dependence on fishing and tourism Highly seasonal	Relatively vulnerable due to low economic diversification Year-round residents are likely more available to participate in engagement efforts during low season while seasonal residents and visitors are more likely to engage during the summer
Energy Costs	Can be higher than mainland, e.g., residential electric rates on Monhegan Island are ~\$0.70 per kWh and ~\$0.15 on the mainland	Strong interest in alternatives that could reduce energy costs, particularly on islands without a grid connection

tion to siting renewable energy infrastructure to better incorporate community benefits.

3.1. Focal island communities and wind farm engagement experiences

Our island communities differ from those connected by bridges or on the mainland largely based of their relative isolation. We summarize basic characteristics of our three island communities in Table 1.

Below, we provide a brief overview of engagement processes relevant to the islands we studied.

3.1.1. Block Island: America's first offshore wind farm

The first offshore wind farm in North America, a 30-MW, five-turbine wind farm three miles off the coast of Block Island, began generating electricity in 2016. In 2010, a formal state-level marine spatial planning process resulted in the Rhode Island Ocean Special Area Management Plan, referred to as SAMP [46], which was disseminated before the wind farm was proposed. This meant that information about state waters was already readily available and accessible and had been discussed with key stakeholders [46], including the town council of New Shoreham on Block Island, which actively followed and contributed to the SAMP process.

The developer and the town council discussed the town's need for additional technical capacity to make the proposed project more understandable to residents. The town selected and hired consultants to represent their interests after the developer, Deepwater Wind, agreed to reimburse the town for the expense of these consultants [47]. Also, Deepwater Wind hired a liaison who had grown up on the island and was well respected by the local community to facilitate community involvement and hold informational meetings. A Block Island local government official said:

The community [of Block Island] benefited greatly from the sharing of information via the Ocean SAMP process, and by Deepwater Wind's commitment to putting in place a trusted liaison as conduit for information... By employing [the liaison] and locating his office on Block Island, Deepwater Wind was able to provide up-to-the minute information and build relationships of trust. This was critical to success... By negotiating with the developer a number of key community benefit items, the Town of New Shoreham became a partner, albeit small, in the project, not just a passive venue to be utilized, exploited... We became educated, conversant, increasingly confident, and responsible citizens as we faced each phase of the process.

Questions about perceived objectivity (or lack thereof) did not arise in relation to these hires based on our interviews and document analysis. These consultants served the function of a bridging organization between the developers and the island community members. The consultants translated pertinent technical details and locally relevant

information to the town council. They shared information with the broader community, fielded questions at community meetings, listened to community concerns and translated these concerns into comments during the formal regulatory processes. The expertise of the consultants provided the town council with greater confidence that community concerns would be better integrated into the wind farm planning processes.

Local stakeholders, government officials and Island Institute staff were convinced that locally-relevant community benefits played an important role in the success of this project, as demonstrated in the previous quotation. The Block Island wind farm development was done in conjunction with connecting the island to the mainland electricity grid for the first time. The town negotiated to have fiber optic strands included in the underwater electricity cable bundle that now connects Block Island to the mainland grid. Residents and business owners report benefiting from this high speed internet. Deepwater Wind and New Shoreham also developed a formal Community Benefit Agreement (CBA) in which the wind farm company pays for improvements to town infrastructure where the cable comes ashore. Further, the project is expected to generate 300 jobs during the construction phase, including opportunities for local mariners and fishermen [48].

Block Island no longer needs to transport and burn approximately one million gallons of diesel fuel per year to power the island's generators [49]. The island will rely primarily on electricity generated from the wind farm, they will sell excess electricity on particularly windy days and draw from the mainland utility when the wind farm is not operating. The existing diesel system will remain on the island in case of cable failure. There has been some discussion that this system be used occasionally if requested by mainland utilities, in which case they would export some power back onto the cable during heavy load conditions.

3.1.2. Martha's Vineyard: moving forward with a cooperative approach

Vineyard Power grew out of Martha's Vineyard's Island Plan, a sustainability strategy that the Martha's Vineyard Commission completed based on input from thousands of island residents in 2009 to "create the future we want rather than settle for the future we get" [50]. This plan included a recommendation to create a community-owned renewable energy cooperative so islanders could have more autonomy over their energy production and better ensure community benefits associated with renewable energy development. In 2009, Vineyard Power began recruiting members. People joined for social reasons (e.g., inclusion in the decision making processes in an island-owned, action-oriented group to create a more sustainable energy future for their community) and financial rewards (e.g., ownership and control of local renewable energy projects and stabilized electricity prices once a large-scale renewable energy project is developed) [51]. The cooperative's community benefits are embedded in the cooperative's mission: "to

produce electricity from local, renewable resources while advocating for and keeping the benefits within our island community” [52].

Vineyard Power staff explained how they learned from the controversy over the nearby Cape Wind project and consequently worked to integrate benefits, including partial ownership, to island residents. The cooperative also engaged community members in the wind farm decision process. It hired a consultant who used the industry standard windPRO tool to generate interactive visualizations and administer a visual impact survey in 2010. The survey of co-op members and island residents found that island to turbine distances of 6–7 miles were acceptable to a majority. Staff at the energy cooperative described how the wind map viewer provided accessible information about visual, ecological and human use impacts based on various proposed sites, including data collected from local sources such as island fishermen. The cooperative also hosted a series of community meetings to share wind farm visualizations and solicit feedback [53].

In January 2015, BOEM auctioned the rights to lease offshore wind in areas in federal waters south of Martha’s Vineyard. The wind farm developer, Offshore MW, received a 10% discount on their bid price because they had executed a Community Benefit Agreement (CBA) with Vineyard Power. The CBA outlined opportunities to investigate local benefits to the island including job creation, an operations and maintenance facility, and local equity ownership in the project [54].

3.1.3. Monhegan: confronting deep water and community challenges

The tumultuous path of offshore wind in Maine provides insights regarding mutual learning, timing and accessibility of information. In 2009, Maine set ambitious goals to become a national leader in ocean energy [55] and created opportunities for the development of marine renewable energy demonstration projects [56]. Discussions of offshore wind had implications for the island of Monhegan, a remote community of less than 70 year-round residents 12 miles out to sea with some of the highest energy costs in the nation [57]. In state waters, Maine took initial steps to engage stakeholders in its strategy to expedite the development of the industry by designating three research and demonstration test sites within state waters. State government staff and collaborators hosted a series of public meetings and small and informal discussions along the Maine coast. They incorporated scientific data and local knowledge into their assessment process by making mutual learning accessible, e.g., traveling to Monhegan where they asked fishermen to rank their fishing activity effort around the island in order to identify a site of least impact for wind turbines.

Efforts to site offshore wind in nearby federal waters underscored the importance of timing and availability of information. The Maine Public Utilities Commission (PUC) began a 16-month process during which they solicited and reviewed bids for and public comments on a long-term power purchase agreement. This extended period of time provided an opportunity to engage stakeholders prior to the announcement of a developer and the location of a site. During this time, the Island Institute worked as a bridging organization to facilitate mutual learning through the Offshore Wind Energy Information Exchange, an outreach and education initiative to inform and engage coastal and marine stakeholders, developers, and decision-makers on the potential for offshore wind energy development in the Gulf of Maine. The initiative included deliberative learning experiences, such as exchange trips to fishing communities as well as a wind farm, the human use mapping project *Mapping Working Waters* [58], information sessions at the annual Fishermen’s Forum in Maine [58], and readily available and understandable fact sheets [47]. Island Institute staff reported that these efforts provided coastal stakeholders and industry representatives with a baseline understanding of community priorities as well as the offshore wind industry, while creating an opportunity for stakeholders to meet each other informally and build relationships.

Maine PUC later announced its selection of an unsolicited proposal from Statoil – a multinational corporation specializing in offshore energy infrastructure – for testing floating turbine technology in federal

waters in the state’s Midcoast region. According to Island Institute staff, marine users and other stakeholders in the area had already participated in education and information exchange opportunities, which prepared them to more proactively and constructively engage in discussions with the developer and decision-makers [59].

The University of Maine entered a federal funding competition with a new scope of activities at the Monhegan test site. Subsequently, the Maine Legislature directed the PUC to reopen the bidding process so that the University of Maine could submit a proposal on an accelerated timeline, and Statoil withdrew its proposal for a project in federal waters. While these developments had statewide implications, this impacted Monhegan by significantly limiting the timeframe in which the community could learn about the change in scope from small-scale portable to large-scale, semi-permanent turbines. The PUC opportunity, which prompted many islanders to learn of the change in project scale, was announced during the summer—the island’s busiest time of year.

The accelerated timeline and need for information strained relations between the island community and Maine Aqua Ventus (MAV), the University-led consortium developing the larger project, but both parties, according to Island Institute staff, quickly committed to improve communications. They clarified points of contact and expectations for communications so that MAV could be certain that project updates were shared widely. Island leaders created the Monhegan Energy Task Force (METF) to prioritize information that the community needed and facilitate discussion of community benefits associated with the proposed offshore wind project. METF and MAV engaged in weekly phone calls to enhance the flow of information and worked to develop an expectations document to ensure timely project communications. During this time, both parties looked to Block Island for examples of how information was shared and community benefits arranged. MAV also began to host semi-regular open house sessions on the island during which residents and visitors could have more extended discussions about aspects of the project. Island Institute staff report that the developer and community have laid a more solid foundation upon which future communication can take place. In 2016, however, MAV became eligible to receive federal funding (\$40 mil) to deploy full-size platforms with 6 MW turbines 2.5 miles from the island while a local opposition group emerged, Protect Monhegan [60]. This group contributed to the submission of a state bill to prohibit wind energy test sites within 10 miles of Monhegan’s lobster conservation area, which would make the proposed project economically unfeasible [61].

3.2. Bi-directional deliberative learning and community benefits as key to good engagement

Based on our assessments of offshore wind-related community engagement on Block Island, Martha’s Vineyard and Monhegan Island, our qualitative analysis suggests that many of the myriad considerations for good analytic deliberative processes and outcomes boil down to two key, integrative themes: ensure bidirectional deliberative learning and custom-tailored community benefits. These two overarching themes emerged from our iterative coding process in which interview notes, attitudes and opinions of various parties involved, engagement materials, meeting minutes and newspaper articles were reviewed, categorized and discussed. Table 2 characterizes the two overarching themes of bi-directional learning and community benefits. We discerned four dimensions within the bi-directional learning theme: readily available and appropriate information, trusted messenger, collaboration with bridging organizations and timing of engagement. Reading vertically from the left hand side of the table, it is evident from Table 2 that these common themes and associated dimensions played out in various ways across sites.

3.2.1. Defining bi-directional deliberative learning

Based on our interviews and document analysis, bi-directional deliberative learning opportunities improved stakeholder engagement

Table 2
Summary of good practices and challenges related to community engagement in three proposed offshore wind farm sites, see site descriptions.

		Sites		
		Block Island, RI	Martha's Vineyard, MA	Monhegan Island, ME
Bi-directional Learning	<p>Readily available & appropriate information</p> <p>Trusted messenger</p> <p>Collaboration with bridging organization</p> <p>Timing of engagement: Iterative and multi-year</p>	<p>-Town hired consultants to listen, translate and represent community interests</p> <p>-Developer reimbursed town for consultants</p> <p>-Developer prioritized outreach to community (Island Institute [47])</p> <p>-Developer hired local liaison to lead outreach</p> <p>-Consultants helped to bridge town and developer</p> <p>-Project preceded by RI Ocean Special Area Management Plan (SAMP) process, which was funded and supported by federal, state and private entities (Nutters and Pinto da Silva [46])</p> <p>-Engagement with fishing industry continued after SAMP completed</p> <p>-Community meetings from 2009 to 2012 to create and adopt comprehensive energy plan for Block Island (IEC [86])</p> <p>-SAMP process made information about state waters readily available before OSW farm was considered (Nutters and Pinto da Silva [46])</p> <p>-Having participated in SAMP process, offshore wind was not a new topic to local leaders when project was proposed</p>	<p>-Vineyard Power Cooperative hosted interactive offshore wind map viewer to inform participants about environmental, human use and visual impacts</p> <p>-Cooperative founders and members are island residents</p> <p>-Partnership between local cooperative and developer provides a bridge to the community</p> <p>-Process to create Martha's Vineyard Island Plan and energy coop entailed substantial learning and sharing of information and values</p> <p>-Coop used online wind map viewer to solicit resident preferences for farm location</p> <p>-Formal community engagement from 2006 to 2010 to create comprehensive, proactive Island Plan on various sustainability issues</p> <p>-Recruited energy coop members over multiple years starting in 2009</p>	<p>-Island Institute developed peer-reviewed fact sheets to address the questions raised during community meetings (Island Institute [78])</p> <p>-Leaders in Monhegan Energy Task Force assumed role of messengers, albeit late in process</p> <p>-Island Institute served as bridging organization between developer and communities</p> <p>-Information Exchange site visits enabled diverse stakeholders to meet repeatedly and exchange information and experiences</p> <p>-Mapping Working Waters project engaged fishermen to share local knowledge and provided opportunity for them to learn about wind farms (Island Institute [58])</p> <p>-University of Maine collected information on turbines' proximity to fishing areas, created and shared visualizations, and conducted tourism impacts study</p> <p>-Timing of engagement around state waters test site activities created challenges from which the community organized Monhegan Energy Task Force emerged</p> <p>-Presentations about OSW in both winter and summer to reach year-round and seasonal residents</p>
Provision of Community Benefits	<p>Deliberation to determine community benefits with flexible models for custom tailored benefits</p>	<p>-Provides mainland grid connection – Reduction in electricity rates</p> <p>-Ends need to import 1 mill gallons of diesel annually (Economist [49])</p> <p>-Fiber optic strands in cable bundle provided to increase internet speed</p> <p>-On-island infrastructure improvements</p> <p>-Local jobs provided: mariners and fishermen hired to provide security during construction</p>	<p>-Embedded in Vineyard Power Cooperative's mission and organizational structure</p> <p>-Coop members steer siting decision (VPCOMW [54])</p> <p>-Community Benefit Agreement enabled developer to get discount on lease of ocean space</p>	<p>-Island fishermen were hired to assist with environmental monitoring and site assessment</p> <p>-Preliminary discussions have included possibility of mainland grid connection, reduced electricity rates, improved broadband internet</p> <p>-More engagement is needed to more precisely identify locally appropriate community benefits</p>

in offshore wind project consideration and site development. We use the term *bi-directional* in reference to mutual learning among developers, government authorities and local community members. *Deliberative learning* is the exchange of both knowledge and values in a group setting, which is important for developing trust, mutual respect and reaching more satisfying outcomes among those engaged in decision-making processes [37]. Interviewees emphasized the importance of the developers learning about local knowledge, values and priorities. Staff at organizations involved commented on the need to build a shared vocabulary (e.g., megawatt, microgrid) when considering future energy scenarios on each island.

State-level marine planning processes before public engagement related to wind farms were more substantial in Massachusetts and Rhode Island than in Maine. This additional deliberative learning within comprehensive planning initiatives may have contributed to improving the quality of community engagement on Martha's Vineyard and Block Island, where offshore wind is a small part of a larger ocean-planning framework.

Island Institute staff explained their motivation for their Working Waters participatory mapping exercise as collating different types of knowledge with the goal of sharing facts and values to help address an often unequal power dynamic between project proponents “from away” and local communities. Based on our analysis and relevant literature, wind farm proponents tend to benefit from community engagement strategies in which they learn from the relevant experiences and knowledge of people who could be directly impacted if the proposed development moves forward [62][see 62].

From our qualitative analysis, we characterized four linked components that we categorize under bi-directional deliberative learning: readily available and accessible information, employment of a trusted messenger/communicator, collaboration with bridging organizations and timing as related to iterative learning opportunities over multi-year time frames. These topics arose in interviews and documents as being crucial to the quality of community engagement.

3.2.2. Readily available and accessible information

Island Institute staff and local government officials in our study sites—echoing the academic literature [10]—emphasized how people in adjacent communities needed easy access to information in order to have informed opinions about the proposed wind farms. On the three islands we studied, this information included background on wind farm technology, specifics of a proposed project and how this development could impact individuals and their communities. Island Institute staff and government authorities recognized how skill is needed to translate technical scientific and engineering facts into language that helped lay people learn without being alienated. They stressed the importance of using language accessible to public audiences (e.g., translate megawatts generated into how many average households' electricity needs will be met in a year, explain what a cable to the mainland means for island residents, explain a power offtake agreement). Island Institute responded to community concerns about a lack of accessible information by creating wind farm fact sheets available in paper form and online [47]. Wind farm information in our study sites was published in locally popular newsletters, posted on bulletin boards, paper copies were provided in public places and information was posted online.

Island Institute staff compiled local knowledge in their Mapping Working Waters project [58] because they recognized local knowledge and values need to be translated for wind farm project proponents, marine spatial planners and others working at regional and larger scales to better understand the salience, credibility and legitimacy of local perspectives. This type of local knowledge translation, such as fishermen's expertise on suitable routes to lay the cable [62] and the location of prime fishing areas to be avoided, is also documented in academic literature as helping to reach legitimate decision outcomes [37,63]. The accessibility of information provided during these decision processes was critical given that new information can influence opinions,

especially when there are high levels of uncertainty related to a proposed project [13] and in situations with widespread misconceptions [10,64].

3.2.3. Trusted messenger

Our interview data showed that Block Island wind farm developers recognized the importance of hiring a trusted liaison from the local community to help facilitate the community engagement process. Communication between community members and project proponents was an issue on Monhegan Island, for various reasons including the compressed time frame to submit a federal grant proposal and, potentially, because the developer had no local, Monhegan-based staff. Consequently, more effort has been invested in relationship building, particularly between the developer and a community energy group, the Monhegan Energy Task Force as the developer prepares to apply for additional funding.

Our interpretation of the central role of trusted communicators aligns with numerous studies that have documented how the messenger may matter more than the information delivered [65–67]. Studies have shown that if a technology and its costs and benefits are not appropriately translated or people distrust the source of the information, stakeholders may feel alienated or disengage from the decision process and potentially become entrenched in their opinion regardless of new information that arises [65]. Information alone has a limited influence on opinions [2]. People tend to “endorse whichever position reinforces their connection to others with whom they share important commitments” [65]. Arguably more important than technical information, the social context in which information is shared and the person presenting it—the messenger—can exert substantial influence on attitudes, opinions and behavior [65,66]. This encompasses the personalities, communication styles and values of people sharing information and facilitating community meetings and dialogues.

3.2.4. Bridging organizations

Island Institute as a bridging organization spearheaded participatory mapping of fishing effort to inform marine spatial planning [58]. Part of the rationale for this project was to shift local stakeholders from playing the role of recipients of information to producers of information that developers and government officials could understand, respect and use. Tobias [68] documents how boundary organizations can help provide such potentially empowering experiences for local stakeholders.

The experiences of people involved in our offshore wind farm study sites reinforce the critical role that bridging (also called boundary) organizations can play in supporting community engagement. Echoing Cash et al., boundary organizations assisted in the co-production and sharing of knowledge for decision-making in our study sites. Boundary or bridging organizations can be defined with the following characteristics [69]:

- Accountability to both sides of a boundary, e.g., local communities and project proponents
- Use of “boundary objects,” somewhat malleable objects that maintain their integrity when various communities use them in different ways [70], e.g., maps, reports, and forecasts
- Participation across the boundary involving
 - Convening
 - Translation
 - Coordination of complementary expertise
 - Mediation

Island Institute, SeaPlan, Gulf of Maine Research Institute and NOAA's Sea Grant program are examples of bridging organizations that played important roles in relation to the island communities that we studied. Interviewees characterized them as more objective third parties (i.e., more objective than the developers). These organizations

helped run community engagement and public outreach processes related to marine spatial planning and offshore wind farm siting, but did not push for specific outcomes. On Block Island and Martha's Vineyard, our interviews and document analysis showed that project proponents and local government retained organizations and people with excellent communication and facilitation skills who the community already trusted. It is likely that part of the success of using these relatively neutral people who served as communication bridges is that stakeholders are more likely to be open to learning new information if the values of the messenger and/or bridging organization resonate with them [65].

3.2.5. *Timing: substantial iterative public engagement before site selection*

Iteration emerged as a requisite characteristic of the community engagement processes characterized by minimal participant frustration. These iterative learning opportunities unfolded over multiple years. They involved joint fact-finding, such as Rhode Island's Special Area Management Plan process, and values clarification, such as the prioritization of sustainability issues and potential solutions in the Martha's Vineyard Island Plan.

Timing was problematic on Monhegan Island where a resident leading opposition to the test site described the rapid change from small to large-scale turbines as an unfair "bait-and-switch," lacking in time and opportunity to account for local concerns [43].

From our interviews, we surmise that in all three sites, developers were often reluctant to share uncertain details, such as the specific location of a site, before they were confirmed. During an early stage of the project, developers on Monhegan Island tended to share only incomplete information when they engaged in community meetings, which frustrated local stakeholders, some of whom perceived the developer as being dishonest by withholding information. The uncertainty of the impacts also frustrated stakeholders.

The frustration that select interviewees expressed suggests that some public mistrust, skepticism and opposition to the Monhegan renewable energy proposals may have been (or could be) reduced with more frequent, meaningful and timely opportunities for locals to voice their concerns in decision-making [10,37]. Literature on planning processes and environmental management stresses the importance of engaging communities early and often [13,37] yet, as our island examples show, this can be challenging due to uncertainties inherent in early stages of project development. It became apparent from our research that wind farm developers often spend years collecting the requisite information to comply with regulatory requirements and determine optimal sites.

Upstream research engagement can help navigate uncertainties associated with a new technology and the impacts it may have. Scholars are beginning to study upstream deliberation regarding offshore renewable energy [21,71]. When conducting upstream research, scientists, government authorities, bridging organizations and/or developers can discuss a new technology with citizen groups before any choices are made regarding if and where the technology may be used. Upstream research can help scientists and developers to "open innovation processes at an early stage to listen, respond and value public knowledge and concerns related to risks and ethical dilemmas" [72]. This type of research can help answer people's questions, including "Why this technology? Why not another? Who needs it? Who is controlling it? Who benefits from it? Can they be trusted? What will it mean for me and my family? What are the outcomes that this technology seeks to generate? Could we get there in another, more sustainable and cost-effective way?" [72].

We recommend that when state, tribal and federal agencies initiate ocean planning, they also facilitate upstream research as pertains to potential new uses of ocean space that may not yet be pressing issues. Ocean planning involves coordinating regional planning for current and future ocean industry, conservation and recreation. Before areas are designated for specific ocean uses, such as offshore renewable energy

development, ocean planning initiatives have provided opportunities for data collection, dialogue on various uses and values and sharing of information. More of this kind of early engagement could help stakeholders learn about technologies and how they could be managed without triggering place-protective opposition. Such opposition can stem from perceived threats to specific places that may be important to people's sense of identity and to which they may have other strong attachments [13].

In addition to being included in ocean planning processes, BOEM also has the potential to facilitate upstream research as the agency interacts with state, tribal and local governments through task force meetings on specific offshore resource issues. This helps in providing transparency regarding issues at different levels of government and provides opportunities for stakeholders to learn and ask questions about areas of federal waters or specific projects. BOEM has the authority to collect and share data on and then define boundaries of offshore ocean areas that are available via leases to wind farm developers [73]. Through BOEM's task force meetings, information is directed to the specific set of stakeholders that an offshore renewable energy project may affect. This type of early engagement with stakeholders is critical in any ocean development project.

Our interviewees emphasized how early engagement dispelled community member's fears of finding out too late to become meaningfully involved in decision processes on Martha's Vineyard and Block Island. On Martha's Vineyard, the steps of the process and the timeline for making various decisions related to island sustainability in general and later offshore wind enabled stakeholders to understand how and when to engage in the process. Boundary organizations, developers, and government agency staff recognized time and resource challenges around iterative and potentially multi-year stakeholder involvement in decision processes. Our analysis showed that building trust among proponents, the selected 'messengers' and communities takes time as does allowing for new information and questions to arise. Based on the literature and our qualitative analysis, timely deliberation on identifying and procuring community benefits can also build trust.

3.3. *Provision of community benefits*

Island Institute staff, community leaders and local government officials thought that explicit inclusion of community benefits was key to successful engagement processes on Block Island and Martha's Vineyard. Engagement efforts in Monhegan did not include substantial discussion on this topic prior to 2016.

Whereas the term 'community benefits' has been used broadly, the experiences of those engaged with our study sites suggest a need for a more nuanced theorization of this term. That is, whereas the term itself could be viewed from a utilitarian perspective as simply providing net benefit to the majority, our study sites demonstrate that such a narrowly utilitarian approach does not sufficiently capture strongly held community concerns of fairness. Whereas one might think that a community benefits from a project if the majority receives a net benefit, and the community-scale aggregate is a net benefit, our data suggest that these are not sufficient criteria. Individuals expressed concern that specifically impacted groups may require compensation, i.e., some island leaders and boundary organization staff expressed how compensation should be considered for fishermen who would lose fishing grounds. These individuals were not among those who would be most directly impacted by an offshore wind farm. Accordingly, we seek to make explicit that broadly acceptable community benefits are benefits to individuals and groups *as seems fair and appropriate from a community perspective*.

This qualifier adds a broader relational perspective that integrates not only consequences but also principles and notions of fairness at scales coarser than an individual. From this perspective, individuals may oppose a project even if they might personally gain from it (e.g., a local barge operator may get numerous contracts from an offshore wind

project), if they seem unfair at a community level, accounting for the existing and historic relationships and the prevailing values of a place (e.g., the wind farm siting process may not be sensitive to the preferences of local lobstermen).

Community benefits can help balance the provision of private and public benefits associated with an offshore wind farm [26,74]. Some perceive offshore wind development as privatizing the ocean, which, historically, has been a public space for fishing, recreating and other activities [19,75,76]. The federal management agency overseeing the development of offshore wind, BOEM, has public good-oriented goals, but they use market-based tools to achieve these (e.g., auctions involving private developers). Part of BOEM's mission is to "promote energy independence, environmental protection and economic development" via delineating and auctioning areas of the ocean for different purposes, including offshore wind farms [77]. We suspect that BOEM's general public good-oriented goals are less salient to residents of communities adjacent to wind farm sites compared to local concerns, such as displacement of fishermen from fishing grounds, but we did not measure this [78]. In order to shift perception of benefit from the large scale and general to the local and specific, developers may provide community benefits for various reasons, such as to help earn the public's trust and create a sense of fairness associated with the project [26,79,80]. However, as noted in European case studies, the formation and provision of community benefits can erode or build trust and perceptions of fairness [79]. Community benefits literature and our research demonstrate how establishing trust and perceptions of fairness rest on both the process of coming up with appropriate benefits as well as the models and mechanisms used to deliver the benefits.

3.3.1. Deliberation to determine community benefits

Relevant literature and our island-focused research point to the importance of collaboration among developers, communities and government agencies to identify and provide community benefits rather than only respond to government mandates about benefits [26,79]. Community benefits are required by law in some contexts and voluntary in others. For example, land-based wind developers in Maine must pay host communities according to the number of installed turbines [81] but offshore wind developers are not required by law to provide community benefits in the UK [79].

Our research confirms the findings of Rudolph et al. [74] in that early discussions among government authorities, developers and communities are needed to arrive at acceptable definitions and understandings of communities, benefits, impacts and how they relate to each other (see Fig. 3). We have thus far used the term community in reference to residents of particular islands, but communities can be based on location (e.g., a town), interests (e.g. recreational boaters), groups who are adversely impacted (e.g., commercial fishermen), organizations (e.g., an energy cooperative) and/or other shared characteristics. Benefits can be understood as sharing economic gains associated with tapping into a public natural resource (i.e., wind), recognition of hosts (e.g., developer seeks to be a *good neighbor*, communities receive benefits for hosting substation infrastructure), increasing local support (e.g., community groups or energy cooperatives who receive benefits commit to supporting wind farm), accounting for impact (e.g., recognition of local negative impacts), compensation for agreed upon and specific losses (e.g., funds to improve habitat for birds at high risk of collision with turbines). Impacts can be perceived as positive (e.g., provision of jobs and carbon neutral electricity) and/or negative (e.g., bird mortalities, decreased visual amenities). Rudolph et al. [26] developed a framework to achieve the legitimate provision of community benefits via a set of interactions among communities, benefits and impacts [26]. Community engagement processes on two of the islands we studied had substantial community support (Martha's Vineyard and Block Island) and covered the topics in this framework when they developed community benefits. Interviews documented that wind farm developers for the Monhegan project have come to recognize

the role of community benefits in the other islands' development processes and are working towards discussion about what such benefits could be for Monhegan.

3.3.2. Flexible models for custom tailored benefits

Community benefits took different forms in our three study sites. They can be integrated into various stages of a project, such as the planning, permitting, mitigation, operational and decommissioning stages. We add to Rudolph et al.'s [26] overview of common offshore wind community benefit models and mechanisms:

- Community funds (most common)
- Other and pre-existing funds
- Community ownership
- Equal distribution of revenues
- Direct investment and project funding (e.g., paying for infrastructure improvements)
- Jobs, apprenticeships and studentships
- Educational programs
- Electricity discounts
- Community benefit agreements
- Indirect benefits from the supply chain
- Indirect benefits via tourist facilities

It may be instructive for communities, government authorities and developers to look to Europe when considering appropriate community benefits. In Denmark and regions of Germany, community benefits are often based on cooperative models in which members own the business and all profits after taxes are given back to members [82]. In the UK, energy developers annually pay into a fund proportional to the megawatts (MW) of installed capacity for community organizations to spend on local initiatives [80]. For more detailed descriptions of different types of community benefits, see Rudolph et al. [26].

Community benefits have the potential to enhance or degrade relationships between developers, government authorities and local communities; they can be perceived as broadly beneficial or a bribe that displaces civic duty [25,83]. Co-creating community benefits so they are perceived as fair and appropriate from a community perspective may reduce the perception among stakeholders of benefits as bribes. Establishing locally-appropriate community benefits involves clearly identifying their scale, role and purpose in order to reduce this potential negative perception [80]. This process can also improve clarity and diminish uncertainty about what will be provided so developers can discuss them earlier in the planning stages. Rudolph et al. [26] recommend that developers and authorities negotiate with communities about various benefit models during early stages of wind farm planning, ideally before submitting planning applications.

3.4. Relevance to components of public participation in deliberation

We conducted our qualitative analysis before reviewing principles for public participation in deliberation. Many of the concepts that emerged from our analysis of engagement processes reinforce principles from Abelson et al. [23]. The principles from Abelson et al. [23] that arose more than once in our qualitative analysis are outlined in blue in Fig. 4. We augment these principles with consideration of community benefits in deliberative processes that may result in an imposition of one party's interests on a community (e.g., wind farm developers interests imposing on adjacent community member's interests). It is likely that Abelson et al. [23] did not attend to community benefits because the topic of their review was health policy and the presumed community benefit was improved health. Explicit attention to community benefits, as depicted in orange boxes in Fig. 4, could apply broadly to community engagement with various types of infrastructure and technology, not just to a developer building a wind farm.

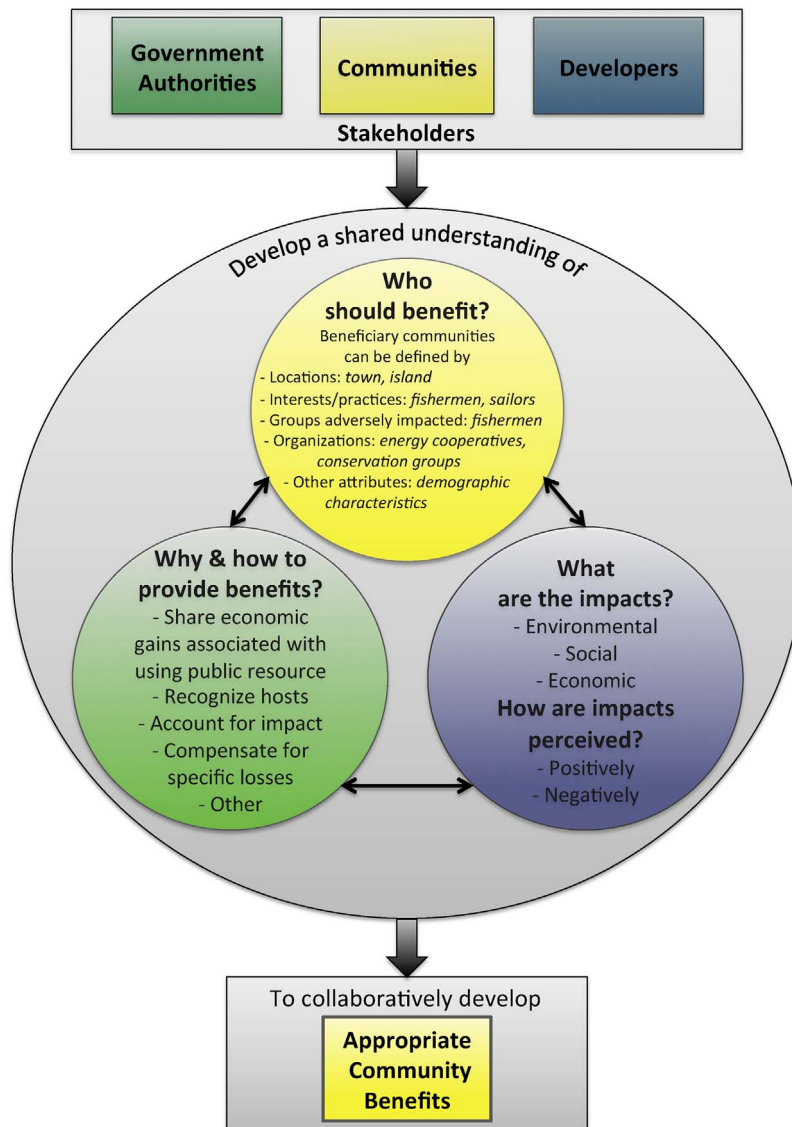


Fig. 3. A robust approach to developing community benefits. This requires reaching a common understanding of impacts, communities, fair and appropriate benefits, and their interactions among developers, communities and government authorities. Italics denote examples. Adapted from Rudolph et al. [74].

3.5. Policy recommendation to formalize community engagement and benefits

We recommend formalizing (1) community engagement related to offshore wind within government institutions, including BOEM, such as an established set of best practices and a framework for the engagement; and (2) processes to identify and deliver acceptable community benefits associated with offshore wind involving local communities, government agencies and developers. Such formalization could help clarify expectations among those involved as technologies and sites are considered.

4. Conclusion

Proposals for renewable energy infrastructure are poised to rapidly proliferate, particularly if countries follow through with carbon reduction commitments. The ways in which humanity approaches, manages and responds to inevitable controversy over these technologies impacts the pace and efficacy of addressing climate change and transitioning to low carbon energy sources [8]. Based on results from the islands we studied and literature synthesis, we see the critical importance of developers and decision makers engaging local communities to address

concerns about project impacts and benefits to achieve acceptable decision outcomes. Communities may legitimately reject particular renewable energy technologies.

Furthermore, we augment established principles for public participation in deliberation that focus on *process* with an explicit inclusion of a particular *outcome*. Specifically, if the project is considered worthy of moving forward, we recommend *outcomes* of community benefits deemed fair and appropriate by communities that incorporates viewpoints from government authorities and developers.

Deliberative analytical decision processes involving extensive stakeholder engagement can be resource and time intensive, but this initial investment can result in lower long-term costs with potentially fewer delays, it may reduce the risk of litigation costs [84,85] and we suggest it may result in better long-term relationships among those involved. Based on what we learned from the experiences of Block Island, Martha’s Vineyard and Monhegan Island, building a foundation of both knowledge and trust is crucial for the success of an offshore wind farm and likely other renewable energy technologies. Making deliberative learning accessible and providing clear community benefits can help ensure that (1) the decision-making processes around these projects are inclusive, effective and perceived as fair; (2) local, scientific and political knowledge is considered; and (3) projects that are considered

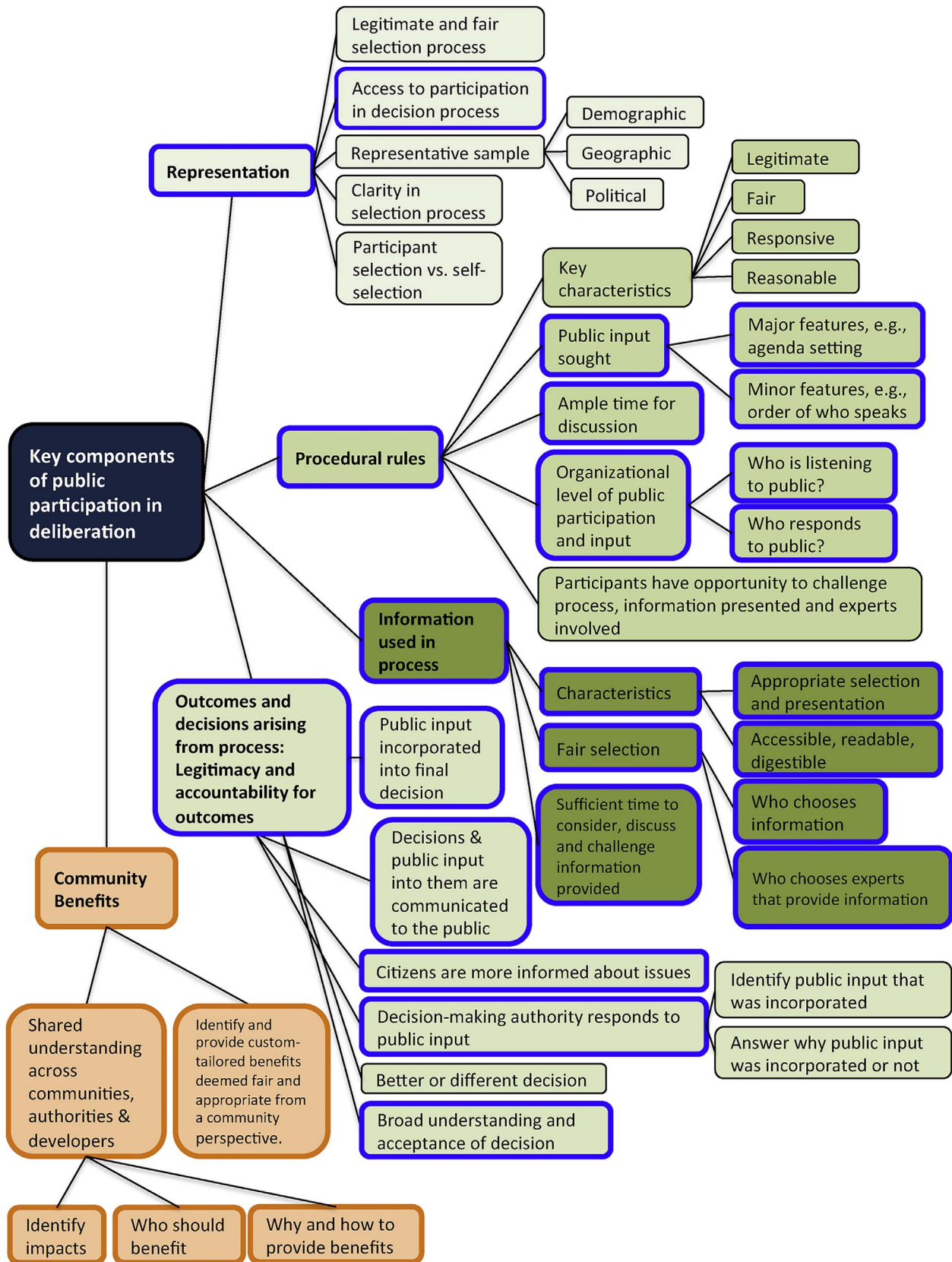


Fig. 4. Design and evaluation principles for public participation processes with community benefit outcomes. Blue outlines denote topics from Abelson et al. [23] that arose in multiple interviews and our document analysis despite how we did not provide specific prompts for these topics. Orange denotes attributes of community benefits that were perceived as crucial to the success of the wind farm decision processes that we studied. We recognize the importance of topics in black outlines from Abelson et al. [23], even though they were not common topics in our interviews or document analysis. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

appropriate after an analytic-deliberative process are properly sited.

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