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# Advancing community-engaged research for offshore wind on the West Coast

November 2024

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## Abstract

The Biden Administration has called for 30 GW of offshore wind (OSW) to be implemented by 2030 and 15 GW of floating OSW by 2035. Because floating OSW is a novel technology for the West Coast, the United States, and the world, there is limited information about the implications of floating OSW for coastal communities. Floating OSW faces a complex regulatory landscape and a wide set of interested parties that stand to gain or lose based on the development process and outcomes. Key agencies are often siloed in their mission space, with little attention or resources for innovation in planning. Furthermore, many communities along the West Coast of the U.S. have experienced the boom-and-bust cycles of large, extractive industries that use coastal resources to benefit consumers in other locations, while leaving behind few long-lasting benefits at the local level. These siloes in government and civic society, and the lack of trust born out of past failures, make it difficult for communities, government agencies, scientists, and industry to plan for OSW based on community values and concerns. There is a need to develop energy projects that more equitably distribute benefits while safeguarding the ocean ecosystems upon which coastal populations depend.

Meeting these challenges requires innovative approaches that scale place-based, community-engaged research, a relatively new capability at the Pacific Northwest National Laboratory (PNNL). To bring together and advance PNNL's expertise in community-engaged research and OSW and to lay the foundation to address these challenges going forward, we tackled two research questions: 1) What are the key elements of a scalable, community-engaged approach to OSW that are relevant for the West Coast? and 2) Who are the communities along the West Coast that are most likely to be interested in or affected by OSW?

To answer these questions, we conducted a literature review, internal workshops, expert interviews, and an inventory of communities along the West Coast. Our research has led to a draft framework for advancing community-engaged research for floating OSW on the West Coast and an inventory of more than 400 communities engaging in the OSW planning process and their primary areas of focus. We have developed two manuscripts for journal submission to communicate our results and secured further support from the U.S. Department of Energy (DOE) for social science research on relationships between floating offshore wind and communities. Through this work, we are advancing the understanding of West Coast community values and concerns with OSW, building PNNL capabilities to develop innovative and scalable approaches and tools for effective public engagement in OSW development, and laying the foundation for meaningful collaboration and more community-centered planning and permitting.

## Acknowledgments

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## Acronyms and Abbreviations

<b>BOEM</b>	Bureau of Ocean Energy Management
<b>DOE</b>	Department of Energy
<b>OSW</b>	Offshore wind
<b>PNNL</b>	Pacific Northwest National Laboratory
<b>WETO</b>	Wind Energy Technologies Office

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## 1.0 Introduction

The magnitude and pace of global climate change demands the rapid implementation of ambitious clean energy targets. Offshore wind (OSW) shows great promise in the United States, with significant resources available off both the East and West Coasts. The Biden-Harris Administration has called for 30 GW of OSW to be implemented by 2030 and 15 GW of floating OSW by 2035 to realize the country's decarbonization targets, create high-quality clean energy jobs, and position the U.S. as a global leader in OSW (The White House 2022).

Floating OSW, best suited for the depth of the ocean on the West Coast, has the potential to reduce carbon emissions, decrease pollution, increase energy resilience, reduce unemployment, and provide other socioeconomic benefits. However, it may also affect the coastal and marine ecosystems that West Coast communities rely upon for their livelihoods, sources of sustenance, cultural and religious practices, and sense of place. Furthermore, OSW development could strain existing social and economic systems, as well as local services, with the influx of new workers and conflicts among multiple ocean users. Recognizing this challenge, stipulations in the first leases held on the West Coast in California in 2023 required industry to engage with Tribal Nations, ocean users, and local communities that may be affected by the lease agreements. However, such stipulations have not been sufficient to quell concerns about the OSW planning process or outcomes in Oregon. In fact, in September 2024, the Bureau of Ocean Energy Management (BOEM) postponed the Oregon leasing auction due to a lack of interested commercial bidders (Bureau of Ocean Energy Management 2024).

Because floating OSW is new to the West Coast, there is an urgent need to address gaps in our understanding of relationships between floating offshore wind and coastal communities. Floating OSW faces a complex regulatory landscape and a wide set of stakeholders and industries that stand to gain or lose based on the process and outcomes. Furthermore, many communities along the West Coast have experienced the boom-and-bust cycles of large, extractive industries that use coastal resources to benefit consumers in other locations, while leaving behind few long-lasting benefits at the local level. This context makes it difficult for communities, agencies, scientists, and industry to work together to weigh the costs and benefits of various options, efficiently assess risk, and act (Susskind and Kim 2022; Aidun et al. 2022).

To address these challenges, new approaches are needed to foster trust among key entities and scale place-based, participatory processes for OSW development (Dwyer and Bidwell 2019; Firestone et al. 2018; Arkema and Ruckelshaus 2017). Here we aim to improve planning for OSW based on community values and concerns and support the development of projects that provide equitable distribution of benefits while safeguarding ocean ecosystems. This project combines the Pacific Northwest National Laboratory (PNNL)'s existing expertise in OSW technology and environmental effects with its growing expertise in community-engaged research to develop a framework for centering communities in OSW development. Ultimately, our work aims to support the



strategic goals of the U.S. for reduced carbon emissions, increased energy security, and place-based community-driven development through OSW along the West Coast.

## 2.0 Approach

This project takes a two-part, complementary research approach. The approach includes the development of a scalable framework for community-engaged research in OSW and an inventory of communities engaging in floating offshore wind development on the U.S. West Coast (Fig. 1). These components were conducted in parallel so that we could use the review and expert elicitation to inform attributes in the inventory and the “real world” data from the inventory to improve and ground the framework.

### *Framework for Scaling Community Engagement in OSW*

A key socio-technical challenge in renewable energy design, siting, and deployment is how to collaborate with communities and other end-users to advance new technologies to meet not only large-scale decarbonization goals, but also the needs, values, and place-based concerns of communities. Achieving these objectives requires robust stakeholder and community engagement, multidisciplinary integration of tools and frameworks, and innovative methods to better understand public attitudes and avoid common barriers to community-based development of renewable energy. To center communities more explicitly in floating offshore wind development on the West Coast, we developed a framework based on literature review, expert elicitation, and collaborative working sessions. We used the framework to help inform recommendations to Governor Inslee about a more inclusive process for OSW in Washington State and we are currently drafting a manuscript on the framework for publication.

### *Inventory of West Coast Communities*

We also developed an inventory of West Coast communities, both geographic and thematic, and the attributes that may influence their relationship with floating OSW. Our work entailed an iterative process to identify and document communities that have been engaged in floating OSW planning on the West Coast. In particular, we leveraged public comments from California and Oregon, BOEM engagement reports, and public comments on unsolicited leases in Washington as sources for identifying and documenting communities. We also collected information about each community’s specific areas of interest from community websites. These data provide a baseline for understanding which geographic and thematic communities may be affected by OSW development, as well as factors that may influence their perception of, and their relationship with, OSW. This work is also serving as a pilot analysis for further research on floating OSW and communities supported by DOE’s Wind Energy Technology Office (WETO).

In the following section, we provide a more detailed description of the methodology we used to develop the framework for advancing community-engaged research for offshore wind and the community inventory. We discuss how the community data collection, literature review, expert interviews, and workshops helped to inform the framework and community inventory. These activities also helped to build PNNL capabilities to foster more community-engaged research for floating OSW (Fig. 1).

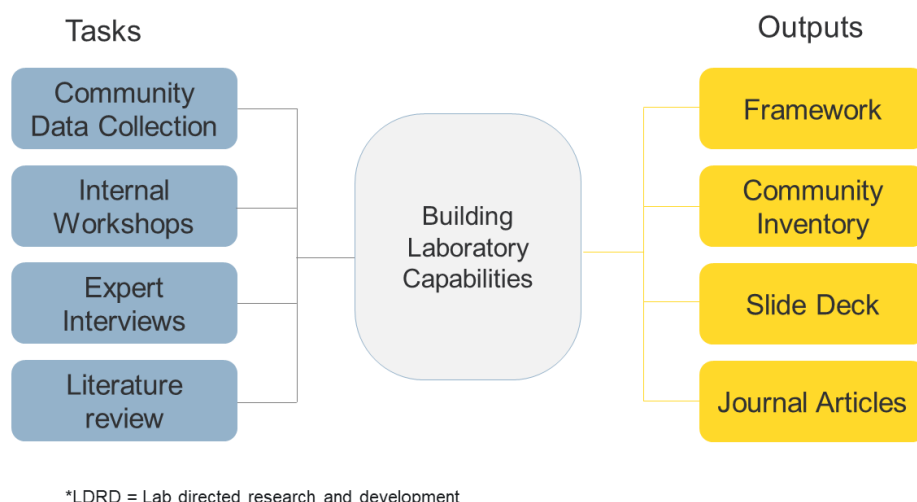


Figure 1. Approach to advancing community-engaged research for offshore wind on the West Coast.

## Methodology

Our methodology consisted of three main steps: 1) Literature Review, 2) Community Inventory, and 3) Expert Elicitation and Collaborative Workshops.

### *Literature Review*

In prior research, a vast body of academic literature on public participation and engagement methods has been utilized in diverse contexts. Rather than conducting a comprehensive review of this extensive body of literature, we implemented targeted keyword searches and critical analyses of relevant papers to conceptualize connections between OSW development, engagement processes and outcomes, and community decision-making. We considered literature from diverse decision contexts such as natural resource management, community-driven development of other energy systems, collaborative governance and sustainable development planning (Gregory and Keeney 2017; Emerson, Nabatchi, and Balogh 2012; Posner, McKenzie, and Ricketts 2016; Clark et al. 2016; Wolsink 2013). We explored creative models for community-based decision-making through a review of the literature and case studies to consider how such models might factor into the OSW energy development process. We documented our findings from the literature review in a spreadsheet that tracked several key variables from each paper (Fig. 2).





Research	Engagement	Governance	Communities
<ul style="list-style-type: none"> <li>• Methods</li> <li>• Geography</li> <li>• Authors</li> <li>• Time frame</li> <li>• Objectives</li> </ul> 	<ul style="list-style-type: none"> <li>• Spectrum of public participation</li> <li>• Who was engaged</li> <li>• Methods</li> <li>• Time frames</li> <li>• Outcomes</li> </ul> 	<ul style="list-style-type: none"> <li>• Stage of development</li> <li>• Regulatory process</li> <li>• Decision-making</li> <li>• Policies and laws</li> <li>• Frameworks</li> <li>• Barriers to entry</li> <li>• Leverage points</li> </ul> 	<ul style="list-style-type: none"> <li>• Sense of place</li> <li>• Attitudes</li> <li>• Values</li> <li>• Motivations</li> <li>• Interests</li> <li>• Acceptance</li> <li>• Opposition</li> </ul> 

Figure 2. Key variables for literature review

### Community data collection

To create the Community Inventory, we generated a list of communities currently engaging in floating offshore wind development on the West Coast. We generated this list using public comments on the leasing processes in Oregon and California, BOEM outreach reports, and public comments on unsolicited leases in Washington. We asked two questions about these communities: 1) what type of communities are currently engaging in floating offshore wind and 2) how is each community is engaging (Fig. 3). We answered the first question by classifying the communities according to their sector (public, private, civic, Tribal Nation), the spatial scale or geography that the community operates in (local, state, national), and their central theme, which we elicited from their website. To answer the second question, we classified formal engagement as being conducted through public comment while any other forms of engagement (i.e., attendance at BOEM outreach events) were classified as informal. While these data provide baseline information about communities, their interests, and their engagement in floating OSW, they will not be sufficient to understand community perceptions of OSW. Additionally, this inventory does not provide insight into communities that may be interested in or affected by offshore wind but are not being engaged by BOEM or not able to engage formally through public comment.

432+ communities\* currently engaging with BOEM and/or OSW developers on West Coast

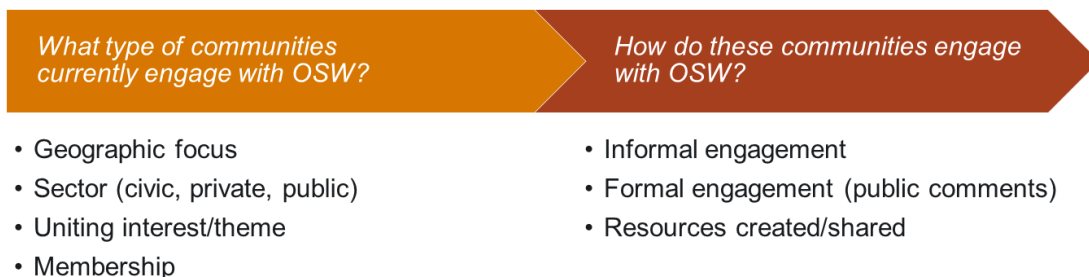


Figure 3. Community data collection

\*Community was defined broadly to include a group of people organizing around a shared interest, affiliation, or geography (e.g., municipalities, organizations, state offices).

### *Expert Elicitation and Collaborative Workshops*

To better understand community perceptions of floating offshore wind and the engagement process on the West Coast, we conducted semi-structured interviews with relevant experts (e.g., local/regional planners, regulators, community organizations, researchers, etc.). We conducted 25 interviews across California, Oregon, Washington, and with national organizations. Each interview was one hour in length and focused on the three questions in the figure below (Fig. 4).

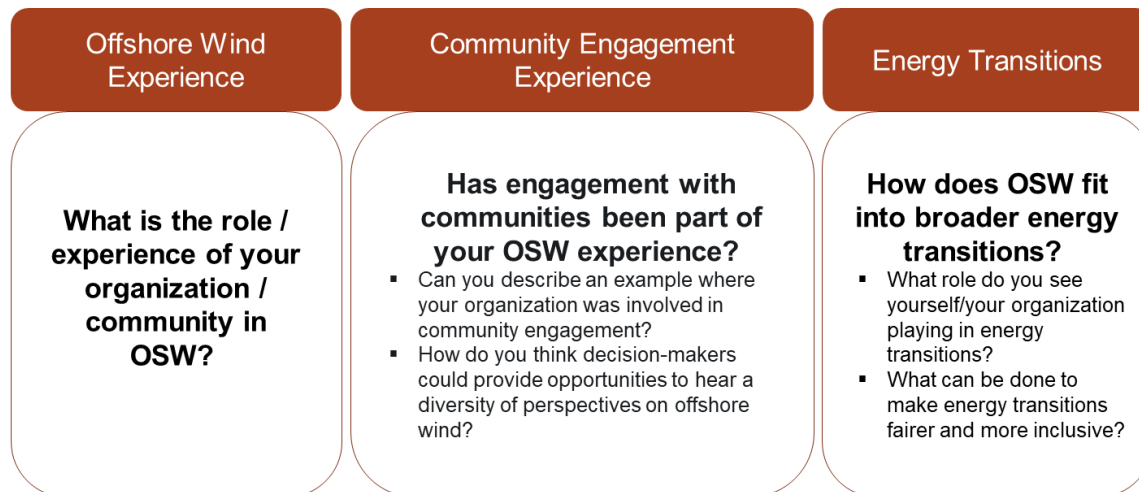


Figure 4. Expert interview questions

In addition to expert elicitation, we conducted two collaborative workshops during this project. First, we brought together core team members, advisors, and subject matter experts from across PNNL virtually for a two-hour workshop. The goal of the first workshop was to host several presentations that would set the stage for this project including topics like learning from the East Coast OSW process, learning from land-based wind community engagement, permitting/leasing process on the West Coast; and breakout groups to discuss community engagement resources, experiences, and experts to interview. Toward the end of the project, we hosted a second, in-person working group with a subset of the participants in the first workshop. The goal of this second workshop was to provide an overview of the project results to date and to elicit participant feedback on the themes we analyzed from the expert interviews and key elements in the framework for community-engaged research, as well as to discuss PNNL's role, as a national laboratory, in West Coast OSW planning and development.

### 3.0 Outcomes

The overarching goals of this LDRD are to advance understanding of West Coast community values and concerns with OSW, build PNNL capabilities to develop innovative and scalable approaches and tools for effective public engagement in OSW development, and lay the foundation for meaningful collaboration, future funding, and options for development of OSW that aim to achieve community visions and values as well as large-scale decarbonization goals. During this project, we produced several near-term outputs that help to support achieving the broader outcomes of the project. These outputs include internal and external presentations and manuscripts for submission to peer-review journals. These outputs helped us realize our broader outcomes of building capacity, producing a framework for centering communities in OSW, and generating an inventory of communities that may be interested in or affected by offshore wind. In the final section of this report, we provide a list of these outputs.

#### Outputs:

##### *Presentations - internal*

- LDRD team, Virtual workshop, May 2023
- LDRD team, In-person workshop, August 2023
- LDRD team, Lunch and Learn, December 2023
- Katie Arkema, Chris Henderson, Kevin Duffy, Mark Severy, LDRD final presentation, January 2024

##### *Presentations - external*

- Henderson, C. D., Arkema, K. Reimagining Engagement Frameworks for Community Empowerment in Offshore Wind Planning. *American Fisheries Society Annual Meeting*, Honolulu, HI. September 18, 2024.
- Nelson, L.K., Arkema, K., Gunn, C., Boos, E., Daly, M., and Shereda, A. Fishing community typologies: characterizing people and places to inform offshore wind development. American Fisheries Society Conference, Honolulu, HI, September 18, 2024.
- Arkema, K., Henderson, C. D., Duffy, K., Severy, M. Advancing community-engaged research for offshore wind on the West Coast. *Presentation to Gridworks*, April 3, 2024.
- Arkema, K. Tackling climate change with a two-pronged approach: Renewable energy and nature-based solutions in coastal communities. Natural Capital Symposium, Stanford University. Stanford, CA, June 2024.

- Arkema, K. Invited Panelist for “An Overview of the State of the Science” discussion at the West Coast Ocean Alliance (WCOA) Offshore Wind Energy Summit: In Support of Strong Partnerships and Sound Science. Sacramento, CA, April 2024.
- Arkema, K. Natural capital approaches for integrating community benefits of ocean ecosystems into offshore wind. Northwest Offshore Wind (NOW) Conference. Portland, OR February 2024.

#### *Papers*

- Arkema, K., M. Severy, J. Haxel, K. Duffy, C. Henderson, M. Freeman, D. Rose, C. Rumble, L. Nelson. Community-based participatory research to shape equitable outcomes for floating offshore wind on the West Coast of the United States. Target journal: *Nature Sustainability*.
- Henderson, C. D., Duffy, K. P., Arkema, K., Severy, M., et al., *In prep*. Reimagining governance and policy frameworks for community engagement in offshore wind. Target journals: *Marine Policy*, *Energy Policy*, *Energy Research & Social Science*.

#### **Conclusion:**

Through the research conducted under this LDRD, we have advanced PNNL’s understanding of the challenges and opportunities facing OSW on the West Coast and developed the key elements of a scalable, community-engaged approach for OSW. Our inventory of communities provides information about who may be interested in and affected by OSW and has already been used to strengthen community engagement in several DOE projects. Advancements in our capabilities and knowledge are laying the foundation for further research to support federal agencies, regional and local planning groups, and other stakeholders and communities engaging in OSW on the West Coast.



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