Berkeley Law | Center for Law, Energy, & the Environment

ENVISIONING *Offshore Wind* FOR CALIFORNIA

What the Future Could Look Like and How to Get There

JUNE 2021
Policy Report

CLIMATE & ENERGY
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JUNE 2021 | POLICY REPORT

ENVISIONING OFFSHORE WIND FOR CALIFORNIA

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ABOUT THIS REPORT

This policy report is the result of research completed by research staff within the Center for Law, Energy & the Environment (CLEE) and informed by discussions convened in late 2020 and early 2021. It was supported by a grant that the Natural Resources Defense Council received from the Gordon & Betty Moore Foundation.

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CLEE channels the expertise and creativity of the Berkeley Law community into pragmatic policy solutions to environmental and energy challenges. CLEE works with government, business and the nonprofit sector to help solve urgent problems requiring innovative, often interdisciplinary approaches. Drawing on the combined expertise of faculty, staff, and students across the University of California, Berkeley, CLEE strives to translate empirical findings into smart public policy solutions to better environmental and energy governance systems.

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Between October 2020 and February 2021, the Center for Law, Energy, and the Environment at UC Berkeley School of Law (CLEE) hosted two virtual convenings with offshore wind representatives and stakeholders, ranging from advocacy groups to industry participants to state and federal agency officials. The goal was two-fold: to initiate dialogue about some of the challenges and opportunities associated with developing California offshore wind (OSW), and to gather input to inform both immediate and longer-term actions. The discussions informed the key concepts and planning recommendations presented here.

This report identifies potential opportunities, challenges, and core principles related to California OSW development, and is intended to provide an overview for those new to the field. It also presents several recommendations including some shared during the convenings to help the state be a leading example for smart, equitable planning.

With adequate information and inclusive, proactive planning, California has an opportunity to not only maximize benefits and minimize potential harms from the nascent floating OSW industry but also to set a gold standard for OSW development domestically and beyond.

INTRODUCTION

Offshore wind (OSW) energy is not a new concept, but it is gaining new levels of attention as the world finds itself in need of carbon-free energy sources. Europe is the clear global leader in OSW, with over 22,000 MW of installed capacity and three decades of experience.[1] In the United States, OSW has long been thought of as an Atlantic coast endeavor, where the coastal waters are shallow enough for well-established fixed-bottom platforms. However, California's coast has 112 gigawatts (GW) of technical OSW potential, equivalent to nearly 1.5 times total statewide annual electricity consumption.[2] Most of this potential generation is in deep water – for example, current proposals target closer to 1,000 to 1,300 meter depths – thus requiring newer floating turbine technology rather than the fixed-bottom structures used when the water depth is less than 60 meters.[3] As floating turbines are beginning to be deployed in places like Scotland, Portugal, and Maine, the prospect of floating OSW development in waters offshore California has transitioned from a vague idea to a tangible prospect. Further, as California confronts the challenge of meeting its goal to source 100 percent of its energy from renewables by 2045, California's interest in OSW is becoming more focused, driving a need for conversation around this technology and the opportunities and challenges it poses. On May 25, 2021, the Biden Administration and the State of California jointly announced their intent to advance offshore wind in two locations along California's coast—a 399 square mile area located offshore of Morro Bay and an area offshore of Humboldt—with lease auctions expected in 2022.[4]

At present, two OSW projects are operating along the U.S. East Coast—Rhode Island's 30 megawatt (MW) Block Island Wind Farm and the 12 MW Coastal Virginia Offshore Wind project, which began operation in 2016 and 2020, respectively.[5] The U.S. Department of the Interior's Bureau of Ocean Energy Management (BOEM)—the federal agency responsible for regulating offshore wind leasing and operations—has issued 16 other leases to developers across eight East Coast states, but has yet to issue any West Coast leases.[6] In California, Trident Wind submitted an unsolicited lease request to BOEM in 2016.[7] This triggered BOEM's offshore wind planning process, and in August 2018 BOEM issued a call for information and nominations for the area that Trident Wind had expressed interest in offshore of Morro Bay. The following month, the Redwood Coast Energy Authority submitted an unsolicited lease request for an area offshore of Humboldt. In October 2018, BOEM issued a second call for information and nominations for three Call Areas adjacent to Morro Bay, Humboldt, and Diablo Canyon (see Figure 1).[8] The identification of Call Areas does not mean that BOEM will necessarily award developer leases in any of those areas, nor does it indicate that the areas will be leased in their entirety (i.e., a portion of a Call Area may be leased). BOEM solicited public comments to determine interest in the Call Area designations and received 14 nominations of interest from developers.[9] As of May 2021, BOEM has not conducted a lease sale offshore California, although it is expected to do so in 2022.[10]

FLOATING TURBINES

California's deep waters cannot support the fixed-bottom structures used on the East Coast, so floating wind turbines and infrastructure must be used. Although floating wind turbines are a relatively new technology, Norway hosted the first floating demonstration turbine in 2009, followed shortly by other European countries and Japan in the early 2010s.[11] In 2017, Scotland unveiled the world's first commercial floating OSW project, and Europe has several other floating OSW projects in its pipeline for the early 2020s, including an 8.4 MW floating turbine that began operation in 2020 off of Portugal's coast.[12] In the U.S., Maine is leading the floating OSW charge with a 10-12 MW demonstration project on track to finish construction by 2023, and plans for a floating turbine research array announced in 2020.[13]

This report builds from stakeholder feedback derived from two convenings, and does not reflect a comprehensive review of stakeholders or existing laws and activities. There are two phases of OSW development occuring: the first phase consists of the existing Call Area designations, as depicted in Figure 1, while the second phase includes any and all future potential OSW sites. When discussing siting, the recommendations contained herein are focused on that second phase, looking towards the possibilty of future Call Area designations along California's coast. When considering overarching elements, such as the need for adaptive management mechanisms, the recommendations apply to all (i.e., both phases) of potential OSW development.

With proper engagement and input from those whose activities will be impacted or affected and other interested stakeholders, California has a unique window of opportunity to determine how OSW development will unfold. The state's reputation for renewable energy innovation and climate leadership, combined with its extensive coastline and the magnitude of its energy needs, make it a prime candidate for OSW development. California can achieve multiple goals in its pursuit of OSW, ranging from mitigating climate change to electrifying rural communities. However, as with any new technology or large infrastructure project, OSW also poses sizeable risks to existing industries, ecosystems, and communities that depend on the ocean for their livelihoods, culture, and identities. Just as California leads in renewable energy development, the state also leads the United States on marine ecosystem protections and must continue to expand its natural resource management partnership with Tribal governments. Decision-makers and affected parties must identify clear objectives before they can effectively site, design, and govern California's OSW industry.

California would benefit from a comprehensive OSW vision. The ongoing federal leasing process in California is was initiated by unsolicited applications from developers, rather than a vision for what the industry would or should look like. Without an overarching vision and strategy, California may lose the opportunity to maximize positive, equitable impacts from the nascent industry and to minimize negative impacts on the ocean and those dependent on it. While the federal government through BOEM manages OSW leasing on the Outer Continental Shelf, the state government can and should demonstrate leadership by ensuring that the benefits of OSW outweigh the costs (monetary and otherwise) and that any planning and development process—including the siting of transmission infrastructure that would cross California's subsea and onshore lands—is inclusive, adaptive, and holistically addresses both offshore and onshore considerations.

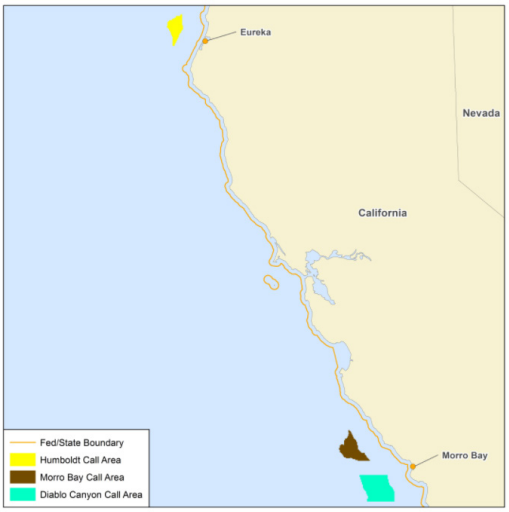


Figure 1. California OSW Call Areas. Bureau of Ocean Energy Management.[14]

I. OPPORTUNITIES & VISIONS FOR CALIFORNIA OFFSHORE WIND

The OSW development process should embody environmental, social, and economic sustainability principles and empower local communities while working to deliver renewable energy. Participants' vision for OSW centered on four main opportunities: climate change, energy, local communities, and state leadership. Although not all aspects can be maximized, OSW development should seek to achieve as many beneficial outcomes as possible while minimizing adverse impacts.

CLIMATE CHANGE

OSW generation can assist in decarbonizing California's energy portfolio to meet carbon-free electricity and emissions reduction goals.

In 2018, Senate Bill 100 (SB 100) set a state target of 100 percent carbon-free electricity by 2045 and 60 percent of electricity generation from eligible renewable sources by 2030.[15] While California is making progress towards the SB 100 target, the March 2021 SB 100 Joint Agency Report notes that California will need an additional 145 GW of new clean energy capacity (renewables and storage) by 2045.[16] Meeting this decarbonization goal will require as much as a six-fold increase in renewable energy capacity over the next 25 years, an expansion at unprecedented scale and speed.[17]

Scaling up existing carbon-free technologies cannot, alone, achieve this goal; meeting the state's GHG reduction goals for 2030, mid-century, and beyond will likely require adoption of new technologies.[18] A 2016 study by the National Renewable Energy Laboratory concluded that OSW "could potentially be deployed at a scale large enough to significantly contribute to California's electricity demand for low carbon energy."[19] The recent SB 100 report includes 10 GW of OSW by 2045 in both its core and expanded load coverage scenarios; in the scenarios where OSW and/or additional out-of-state wind were projected as not available, the lever had to increase on solar, geothermal, and/or storage.[20]

A monumental shift towards renewable energy will require a multifaceted approach, relying on a buildout of utility-scale as well as distributed energy generation, increased storage capacity, and demand side management. A clean energy transition is critical to combatting climate change. But achieving California's climate goals will likely cause some environmental and economic

impact in other industries, and it is important to quantify, characterize, and proactively work to minimize those impacts.

ENERGY

OSW has been called a "once in a generation" clean energy opportunity.[21] *OSW can improve grid resilience by adding diversity to the state's energy resource mix, augmenting supply during critical demand windows, and providing a back-up resource when others are not available.*

The California Independent System Operator (CAISO) must balance energy demand with energy supply throughout the day and across seasons. CAISO and partners throughout the western United States use the Energy Imbalance Market to dispatch available energy to demand locations at the lowest cost.[22] Offshore winds peak in the late afternoon and early evening, while onshore wind peaks at night and solar generation occurs during the day.[23] This timing means that OSW can complement California's existing onshore wind and solar generating capacity, boosting grid stability and smoothing out the production curve (i.e., mitigating the "duck curve" of current renewables generation). OSW produced and consumed locally can also provide geographic diversity to the resource mix, potentially reducing the need to build expensive transmission lines to connect population and load centers to renewable generation farther away in California.

Additionally, OSW can offset the need for renewable energy imported from other states, such as the proposed importing of renewable energy from New Mexico or Wyoming.[24] This may also avoid so-called leakage issues, where drawing renewable energy from out-of-state facilities leads to greater reliance on fossil fuel generation for the supplying state.[25] At present, it is envisioned that OSW will have to be transmitted via subsea cables from Humboldt to San Francisco and from Morro Bay to Los Angeles or Long Beach. The impacts of these lengthy transmission lines on energy costs, the offshore and onshore environments, and communities need to be understood and accounted for in decision making.

STATE LEADERSHIP

California has a unique opportunity to shape floating OSW development along the U.S. West Coast and Hawai'i and set a leading example for jurisdictions considering floating OSW proposals.

California has earned international recognition for its ambitious climate change leadership, often charting a path for new technologies, policies, and collaborations, and setting an example for other states and nations. But California is not yet a leader in OSW development.

The California State Lands Commission (SLC) is evaluating applications for two small-scale OSW projects in California state waters, both of which are located offshore of Vandenberg Air Force Base in Santa Barbara County.[26] SLC has not decided if it will issue leases yet, as of early 2021.

OSW has supplied power in parts of Europe for the past three decades, and Europe and Asia are increasing their investment in the industry. Within the United States, East Coast states are far ahead of California in terms of OSW investment, goals, and deployment. Rhode Island is home to the first OSW turbines in the country, and Virginia completed the first OSW project in federal waters in 2020. Projects are underway in states including New York, Massachusetts, and Maryland, and, unlike in California, these states have legislative and regulatory frameworks to catalyze OSW development. Nevertheless, California can demonstrate leadership, especially with regard to floating OSW, through several pathways:

- Develop an approach to ensure the full planning and decision-making process—from the setting of high-level goals, to the identification of priority areas to the siting and evaluation of individual projects, to the possible design of an in-state supply chain—engages a diverse set of stakeholders and interested parties, uses the best available information, and is inclusive, holistic, and transparent

- Consider OSW in conjunction with not only state renewable energy targets but also other state objectives, such as how OSW can support California's environmental justice, just transition, and overarching economic and social development goals (see next section on "Communities")

- Help establish a regional direction for OSW, including coordinating with other Pacific states (e.g., through the West Coast Ocean Alliance, and expanding to Hawai'i) and establishing a framework to share information and resources across jurisdictions, while demonstrating the regional viability of floating turbine technology

Furthermore, California must lead in partnership with Tribal governments. Tribes are sovereign nations, not stakeholders, and must be included as decisionmakers and partners from the outset of government planning processes.

- Involve Tribal governments in government-to-government consultations throughout the OSW planning process, including, but not limited to, consultation about actions directly affecting Tribal interests, cultural and environmental resources in areas of present and historical importance, guarantees for rural electrification and other benefits from project-impacted areas, and sovereignty.[27]

COMMUNITIES

Developing OSW can reduce air pollution, improve electricity access, and stimulate local economic development.

Local communities and those situated farther inland can derive several benefits from OSW development. For example, renewable energy like OSW can offset generation from fossil fuel facilities, decreasing local air pollution and improving public health outcomes in fenceline communities. For California to maximize

this potential, OSW must be considered as part of a broader suite of grid decarbonization policies.

Potential community benefits. It is vital to center local communities in the OSW development process, starting from the initial statewide vision through a specific project's operational life. OSW development should uphold environmental justice principles, especially in low-income communities or communities of color, where the development of polluting generation has often been prioritized over community health. It is important to note that centering local needs in the decision-making process requires engaging communities and environmental justice representatives in the entire planning process, not just regarding decisions about specific projects. For example, they should be engaged in the parts of the planning process that focus on setting statewide goals, prioritizing regions for development, and establishing cross-agency principles. Then at the project level, developers, planners, and government representatives should work with communities and ensure that project decisions align with the community's values, character, and priorities and, to the maximum extent possible, actively support other community goals as well.

Energy access and reliability. Transmission infrastructure upgrades associated with OSW development can improve connectivity in rural areas and areas historically underserved by infrastructure development. Tribal lands in particular have disproportionately low access to electricity infrastructure, resulting in reduced economic opportunity and increased air pollution due to reliance on diesel generators.[28] For example, many living in the Yurok Reservation, located near North Coast offshore areas identified as having high wind resource potential, lack basic access to energy infrastructure.[29] OSW-related transmission upgrades in the North Coast should prioritize these communities if they are asked to bear the costs of OSW development, so that advancement of the state's clean energy needs is associated with equitable expansion of access to electricity.

Improving local energy independence and reliability also can make communities more resilient to fluctuations in energy supply, thus supporting climate adaptation goals. Local participation in management decisions allows communities to ensure that OSW meets their unique needs and priorities. For example, community choice aggregators can enter into agreements with offshore wind developers to secure clean energy for their community.[30]

Communities can play an active role in project development, including through local ownership. In Denmark, 8,500 members of the Middelgrunden Wind Turbine Cooperative are co-owners of a 40 MW OSW farm, installed in 2001. Ownership and cost responsibility is split 50:50 between the cooperative and the utility.[31] Cooperative members include individuals, unions, foundations, and other local organizations. Each initial share was offered at 570 euro (2003). Loan offers were available to shareholders to allow more people to invest. 10,000 residents pre-subscribed for shares, demonstrating local interest in the model.

The cooperative model improved community acceptance at an early phase of the planning process and ultimately allowed the project to proceed. The local community was empowered to make crucial decisions and solve conflicts during development.

JOBS

If California's industries and labor can adapt to meet OSW supply chain gaps, the state could see job creation and economic activity across multiple sectors.

Increasing jobs. As a brand-new industry in the state, OSW also can drive job creation in sectors such as manufacturing, construction trades, logistics, and electrical engineering, revitalizing local economies and providing jobs with living wages. An NREL study estimates that installation of 10 GW of OSW in California by 2050 could support 1,320 full-time equivalent (FTE) construction phase jobs in the first year of project construction, rising to 4,260 FTE jobs in the year 2030 and approximately 14,890 in the year 2045.[32] On the operations and maintenance side, this level of OSW development could support 1,720 jobs in the year 2045.[33] An analysis by the American Jobs Project found that 5 GW of California OSW by 2045 would yield 2,900 FTE jobs in 2025, 4,100 FTE jobs in 2035, and 5,300 FTE jobs in 2045, under a status quo policy scenario.[34] If an OSW supply chain is established in California over the coming years, more of these jobs will be realized; however, if the in-state supply chain does not develop to meet the demand for OSW, significant quantities of labor and materials will be located out-of-state and imported, thus reducing the number of jobs added within California.

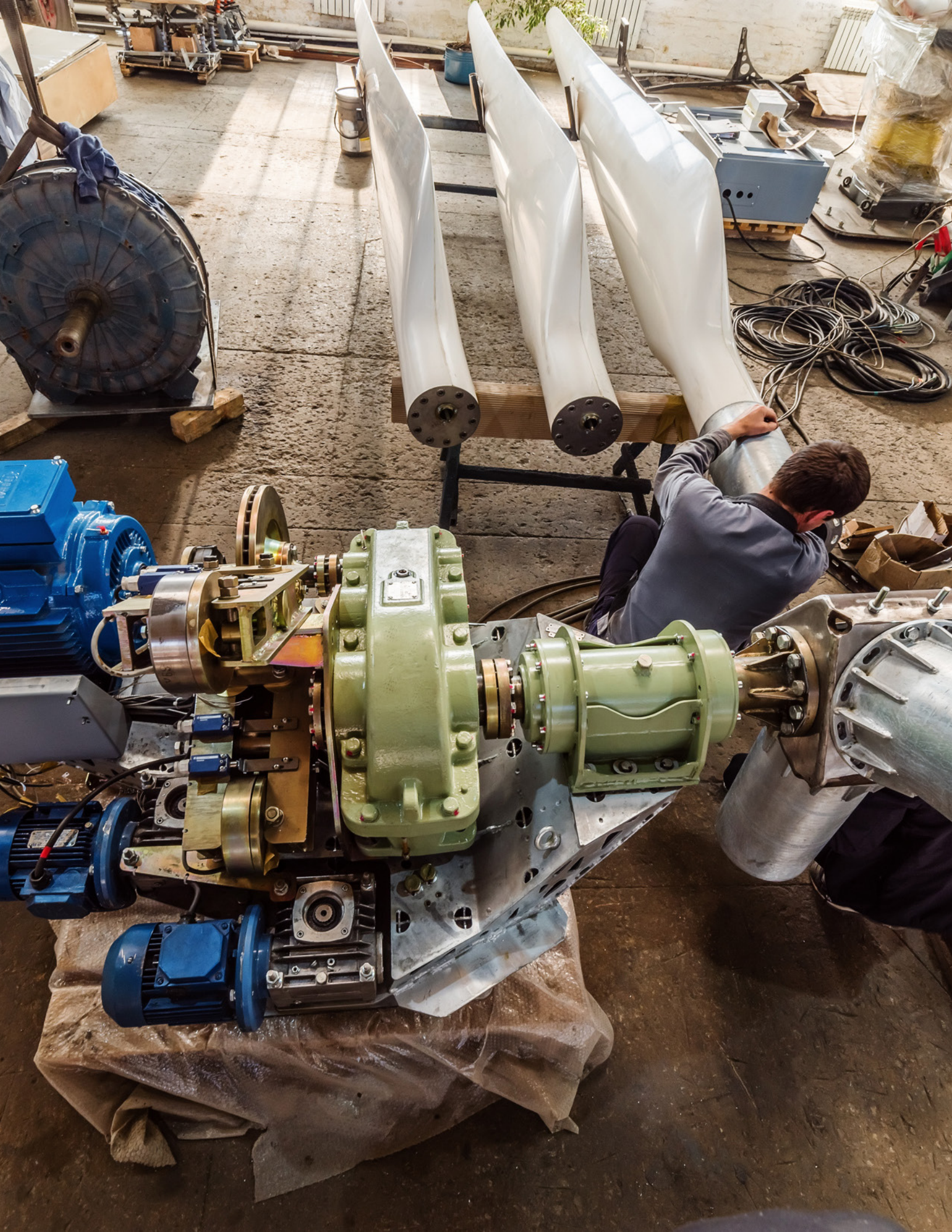
Estimates of annual jobs under 5GW & 10GW development scenarios

PHASE	TIMING	AMERICAN JOBS PROJECT (5 GW) [2025, 2035, 2045]	NREL ESTIMATES (10 GW) [2020, 2030, 2045]
Construction	2020-25	2,900	1,320
Operations			50
Construction	2030-35	4,100	4,260
Operations			380
Construction	2040-45	5,300	14,890
Operations			1,720

Just transition and first hire. OSW decisions should incorporate the principles of a just transition for workers and communities, aligned with the California Governor's Office of Planning and Research's definition of a just transition: "a sustainable and equitable economic transition to carbon-neutrality that builds a robust clean economy in which all

Californians prosper."[35] There is an opportunity for OSW to offer workforce development, training, and jobs to displaced workers in the energy sector and beyond, including the nearly 1,500 employees expected to be displaced by the Diablo Canyon facility's closure.[36] In Morro Bay, Castle Wind agreed to deliver benefits that minimize negative impacts on the local fishing industry and committed to "hiring qualified local residents [and] establishing internships and trainee programs at local schools and universities during construction and operation of the wind farm," among other initiatives aimed at ensuring positive and equitable outcomes associated with the project.[37] Similar community benefit agreements will be crucial to keep benefits within local communities. Additionally, labor unions should be included in all aspects of policymaking, and "high road" economic development should be prioritized, including project labor agreements and apprenticeship programs with targeted hiring in disadvantaged communities.

Communities may wish to update and revitalize port and harbor areas through the OSW process. Massachusetts funded the construction of the New Bedford Marine Commerce Terminal. The project intended to attract the OSW industry to the state and create local jobs. The terminal was specifically designed to accommodate OSW installation and staging, and OSW developers leased the terminal full time through 2027, agreeing to pay over $32.5 million between 2023-2027.[38]



II. CHALLENGES, CONCERNS, AND INFORMATION NEEDS

Californians must address several challenges and concerns before a vision of OSW aligning with broader values and goals can become a reality. These challenges include: siting future projects; understanding the physical impacts of OSW; addressing concerns about people, inclusion, and engagement; describing economic considerations; outlining information needs; and considering goal setting and timeline. Without explicitly addressing and planning for these challenges, California OSW may develop in a manner that leaves potential benefits on the table while failing to minimize potential adverse impacts. (In addition to the considerations described below, Appendix I contains a list of questions for further consideration in the planning process.)

SITING

Deciding where to locate OSW raises several competing questions and concerns. Where can generation connect to the grid most quickly and efficiently? Where can OSW be constructed most rapidly? Where is the best wind resource? Where is there minimal impact on the marine environment? Where is there minimal conflict with existing uses, including fishing, navigation, military, and cultural resources? Answering these questions requires direct engagement with existing users, and conducting research and collaboration.

In 2016, BOEM initiated the BOEM/California Intergovernmental Renewable Energy Task Force, a collaboration between state, local, Tribal, and federal governments to discuss opportunities and share information.[39] The Task Force, along with broader federal and state collaborators, has completed a wide range of planning activities to date, leading to the May 2021 announcement to advance leasing in select locations.

As part of the Task Force's efforts, the Conservation Biology Institute (CBI) developed the California Offshore Wind Energy Gateway, a mapping and analysis tool, funded in part by BOEM and the California Energy Commission (CEC). The Gateway contains California-specific information in more than 650 datasets relevant to OSW, including animal habitat maps, fishery data, industrial use maps, Department of Defense (DOD) use maps, and vessel transit counts, among many others.[40] CBI and Point Blue (a conservation science organization) are engaged in mapping efforts to identify data gaps, where more information is needed, and what areas might maximize energy production and involve relatively low potential environmental and human use impacts.

The initial developer submissions to BOEM catalyzed OSW conversation in California. In the subsequent years, BOEM and state agencies conducted 79 outreach meetings between February 2017 and September 2018, including 12 meetings with California tribes and 67 meetings with elected officials, commercial fishing community, mariners, academics, environmental groups, and the public.[41] These meetings were informational and generally followed the format of BOEM and CEC presenting on OSW, followed by time alloted for public comments at the end of the meeting. CEC has conducted analyses and maintained an open docket for ongoing submissions, and BOEM received numerous comments after it announced the identification of three Call Areas in late 2018.[42] Separately, developers have conducted outreach and in some cases have developed binding agreements to support local priorites.

Although there have been substantial efforts to include interested parties in the decisionmaking process, some stakeholders call for enhanced engagement for future OSW decisions, including outreach to a broader range of participants, engagement throughout the planning process not just at decision points, and better understanding of how their input affects decisionmaking. Suggestions include undertaking a participatory siting process for identifying future OSW development areas beyond the current Call Areas. On the interagency coordination side, it is important to note that DOD has objected to OSW development in large swaths of the Central Coast area, citing potential conflicts with military operations, especially within the Point Mugu Sea Range.

In October 2020, the U.S. Department of Energy deployed OSW research buoys off Humboldt County and Morro Bay. The buoys, which are the first released along the West Coast, will spend 12 months gathering meteorological and ocean data critical to OSW decision making. In Spring 2021, the buoys are expected to start collecting data on bird and bat activity in proposed OSW areas.[44] One of the buoys stopped collecting data in December 2020 due to power issues.[45]

PHYSICAL IMPACTS

An OSW project is no small undertaking—numerous factors must be considered, such as location, size, transmission from sea to shore, and environmental and habitat impacts.

Project Scale: A project's scale influences its physical and economic impacts. A smaller project could help to provide insight into some potential impacts before advancing to a larger project. However, a small project might not be of commercial interest without government support. Nonetheless, some states and developers have selected this option: a 30 MW project is operating in Rhode Island, a 12 MW project is operating in Virginia, and a 10-12 MW floating turbine project is in development in Maine. The State Lands Commission is evaluating two potential pilot projects located in state waters (within 3 nautical miles from shore) near Vandenberg Air Force Base.[43] In general, these projects could enable faster collection of information about impacts, as they could be permitted more quickly. But it is unclear how comparable the data gathered would be to projects located further offshore in deeper waters.

Having larger projects from the start will employ more workers and create more clean energy for Californians. Yet, larger projects will have

a more significant ecological and environmental footprint in terms of the ocean area reserved for turbines, greater impacts on existing uses, and greater risk for high-magnitude unintended consequences if undertaken without sufficient empirical data.

Transmission: The Central Coast has greater available transmission capacity than the North Coast. At present, OSW offshore Humboldt County is severely limited by the County's 70 MW of transmission capacity.[46] A Schatz Energy Research Center report analyzed several North Coast transmission scenarios and estimated that 48 MW of transmission upgrades would cost $540 million, while 1,836 MW of upgrades would cost between $1.7 and $3.0 billion.[47] The Central Coast's retiring generation—including the 2014 closure of the Morro Bay Power Plant and the expected closure of the Diablo Canyon nuclear plant in 2025—makes available approximately 3,200 MW of transmission capacity, which could accommodate OSW generation without the major expansions and upgrades required in the North Coast.[48] More facilities are slated to retire in the next few years, opening even more transmission capacity for OSW. Transmission costs and potential benefits need to be carefully studied and understood.

Environment/Ecology: Questions remain about floating OSW's impacts on the marine environment, including the many species that live in and migrate through the ecologically rich waters and areas offshore California's coast. OSW projects and experiences along the Atlantic Coast and in Europe may provide useful information, but additional California-specific information gathering will be essential. More research will be required to gather data to understand the potential effects of floating turbine arrays on marine mammals, fisheries, seabirds, bats, plant species, turtles, benthic habitats, upwelling, and the ecology of the areas in and around the wind farms (including impacts on the food-web) and to organize that data accessibly to decisionmakers and the public. Several efforts are already underway.

Pathways of impacts include increased maritime traffic, noise pollution (both above the sea surface and below), direct interactions with turbines and other necessary infrastructure like cables, entanglement in lines and cables (including secondary and tertiary entanglement such as when marine debris like fishing gear gets caught in lines and then entangles marine life), altering migratory patterns, and exposure to electromagnetic fields from transmission cables.[49] Research can inform near-term siting and planning decisions and longer-term, ongoing monitoring during project construction and operation to facilitate adaptive management decisions. Additionally, there is concern that monitoring technology used in land-based wind facilities is not yet transferrable to floating offshore applications. Research and development efforts paired with communication about the capacities and limitations of existing technologies will be crucial.

Onshore resources may also face consequences from OSW development. For example, transmission lines delivering power may cross through sensitive onshore habitats. Viewing the Pacific Ocean from shore is also a resource of immense cultural and economic value, and an essential and invaluable part of many Tribal cultural practices. Views of the ocean also draw tourists to

the state, generating substantial economic benefits for California's workers and communities.

Decisions should incorporate traditional ecological knowledges (TEK), which Tribes and other coastal communities have amassed over many generations of interaction with marine and land environments. Decisions should also incorporate the fishing industry's knowledge and experience. Together, qualitative and quantitative knowledge shared by Tribes and coastal communities and gathered through studies can provide a more robust picture of environmental impacts.

PEOPLE, INCLUSION, AND ENGAGEMENT

It is vital that any OSW planning process center on the inclusion of people, ideas, and goals (such as energy, jobs, equity, and conservation).

There is an opportunity for greater coordination among local, state, Tribal, and federal agencies, and among government, communities, researchers, labor unions, and non-profit organizations in future OSW decisionmaking. BOEM's Task Force and state agency outreach, while crucially important, could be augmented with more frequent communication and cross-cutting, interactive stakeholder engagement. Some stakeholders have voiced concern that conversations are happening in silos; others are concerned about irregular engagement; and others desire more opportunities to share information.

The current order of planning actions makes it more difficult to incorporate stakeholder input from the outset, which means that incorporating input requires additional resources and initiative on the part of federal and state agencies. There are several stages that require in-depth assessment, including developer-led information gathering efforts, but these assessments tend to be at a project-scale rather than a landscape scale. For example, an Environmental Impact Statement (EIS) and other reports are prepared once a lease is executed and the specific project is already envisioned, while an ideal process would have engaged diverse perspectives from the start. However, given that a first round of call areas have already been identified in California, there are parallel questions about how to proceed most effectively from here on, and also how to improve the process for the future.

One suggestion for improved communication moving forward is to establish a forum open to non-governmental entitites that regularly brings together OSW stakeholders for open discussion. Existing conversation space tends to be limited to certain agencies and stakeholders already engaged in OSW issues, as opposed to a broader spectrum of affected users and potentially interested parties. It would be in the state's interest to establish an ongoing discussion forum because broader inclusion of voices early on increases the likelihood of maximally beneficial planning and can preempt conflicts that would stall projects later in the planning process. The forum could pull people together for discussion of key issues between points of decision. Having a regular forum would reduce barriers to participation for those entities and individuals who do not have capacity to engage in every meeting, but may wish

to engage occasionally to be kept in the loop, such as community members outside of the current call areas radius.

A regular forum could help facilitate many of the possibilities contemplated in this report, including a participatory siting/mapping process; discussions of research and information needs; sharing of new information and best practices; and more. This forum could be managed by a state entity or a third party, rather than BOEM, to allow the conversation to be broader than the scope of what must be considered according to BOEM's regulatory process. It would not replace targeted engagement and information gathering processes, but rather provide a valuable additional component to support relationship and trust building between governmental and nongovernmental entities and individuals. More specialized forums may be needed for other considerations such as mitigating potential impacts or considering compensation to fishermen, exploration of localized public ownership structures, etc.; and it is important to note that consultation with Tribes would also be conducted separately, as appropriate for government-to-government activities. A range of stakeholder engagement examples and options are included in Appendix II.

Key principles:

- **Quality of Engagement**: To achieve community benefits as outlined in the vision section, policymakers must emphasize meaningful and timely community engagement, planning, and conversation about how to prioritize community needs. These conversations should include environmental justice and economic empowerment, as well as other community concerns.

- **Two-Way Engagement**: Communication and outreach must be a two-way street—the burden of finding ways to contribute and share information must fall not only on communities but also on developers and regulators. Government agencies should not only provide information but also listen to stakeholders and gather information from them. For example, during an outreach meeting, meeting coordinators should allot time for discussion rather than a short public comment period at the end of the meeting.

- **Timing and Scale of Engagement**: Communication should not occur only when there is a specific decision point; instead, there should be regular outreach to keep parties informed between major decisions. Commercial-scale OSW development will occur over the coming years and decades, so it will be crucial to keep parties focused and motivated throughout the lengthy process. Outreach and coordination are vital but can be daunting in a state the size of California and over the OSW timelines. It will take sustained effort to keep all parties updated with current technical and procedural information, so that they are equipped to engage during points of decision making.

ECONOMIC CHALLENGES

Industries like commercial fishing and others who rely on the Pacific Ocean for their livelihoods must be included in decision making.

While OSW offers opportunities to industries like construction and manufacturing, other industries will face adverse impacts if the planning process is not conducted in an inclusive manner that minimizes harm.

The commercial and recreational fishing industries, for example, must be included in OSW conversations and can provide crucial information on the location of fish stocks, catch data, and fishing vessel routes. California's commercial and recreational fishing industries support approximately 142,000 jobs and generate roughly $25 billion in annual sales.[50] Fishing also holds intangible value, as it connects with many local cultures. Commercial fishing, recreational fishing, and Tribal or subsistence fishing each face separate concerns and potential impacts. In some cases, treaties guarantee fishing rights to Tribes. Some fishing groups have called for additional research about possible ecological, environmental, social, and economic impacts, and a clearer analysis of the tradeoffs between these impacts (e.g., carbon emissions versus reduced fish catch). It is also important to understand potential regional impacts beyond California. Impacts on cultural or subsistence fishing must also be considered, as high-level data collection efforts may not capture the effects on small fishing operations.

Coastal tourism would feel the impacts of changes to the fishing industry, as fishing generates tourism revenue directly and indirectly. There is also some concern that visibility of turbines from shore could affect coastal tourism. BOEM developed visual simulations for each California Call Area at different times of day.[51] While visible on the horizon, the turbines do not dominate the viewscape; however, different people will have different levels of tolerance for disruptions to the viewscape. Turbines' impact—positive or negative—on recreation and tourism will depend on a combination of different factors. For example, research conducted along the Atlantic coast suggests that some tourists will reduce their trips to coastal areas with OSW projects (with greater distances from shore associated with less impact on trips), while other tourists would increase their trips to coastal areas with OSW, drawn by interest in the project.[52]

INFORMATION NEEDS

The outcome of California's OSW development hinges on timely, robust, and accurate information, gathered through a phased, incremental approach to enable learning over time. It is important to consider what level of uncertainty is acceptable to move forward.

The Offshore Wind Gateway Data Basin tool has over 650 data sets relevant to floating offshore wind development. Research conducted by other states and countries may, in some cases, apply to California's needs, inform a predictive model for California's research efforts, or at least could help articulate and

prioritize where California-specific efforts are needed to account for the state's unique marine environment. New York provides a helpful model. The state began creating its Offshore Wind Master Plan in 2016. The plan includes 24 completed studies intended to inform the state's OSW development, including a shipping and navigation study, a fish and fisheries study, a cultural resources study, and a benthic survey study, among many others.[53]

California could gather additional information on the following topics: navigation, shipping, and security impacts; fishing industry impacts; impacts to cultural and Tribal resources; community and economic impacts, including more comprehensive cost estimates and greater understanding of environmental justice impacts; and environmental and ecological impacts, including the impacts of future climate change on the information used in decision making. However, many of these impacts will be unknown until there are offshore wind developments, which puts the current emphasis on developing systems, protocols, and processes for collecting future data in a shareable way.

Research efforts require adequate funding—for example, funding limitations rather than technology limitations were identified as the central barriers preventing better remote sensing data availability. Government agencies and developers can signal their commitment to responsible OSW development by committing funding to studies that fill these and other information gaps.

It is important to note the value of clearly incorporating and sharing information about tradeoffs in the studies conducted. For example, climate change will have detrimental impacts on the ocean ecosystem, potentially devastating fisheries and marine biodiversity. While human energy needs inevitably have impacts on the environment, it is incumbent upon decisionmakers to achieve the best possible balance between meeting energy needs and avoiding catastrophic impacts of climate change while minimizing the immediate effects on species, habitats, and ocean users. Thus, while developing OSW will generate inevitable impacts, not developing OSW (or renewable energy generation elsewhere) could also create impacts. In addition to mandatory analyses already required under NEPA/CEQA, government leadership and developers should ensure proper analyses are completed that make such tradeoffs explicit and transparent, both to inform decisionmaking and to address stakeholders' concerns.

While it is critical to gather as much information as feasible, it will never be possible to have complete information. Decision makers should work with stakeholders to minimize conflicts and negative impacts and determine what level of uncertainty is acceptable to move forward and what adaptive management systems can be instituted to ensure nimble response to unforeseen challenges. It is vital to balance long-term information gathering with the need for urgent action on climate change, especially given the state statutory requirements to transition to carbon-free energy sources.

In February 2021, Assembly Bill 525 (AB 525) was introduced in the state legislature. AB 525 would require the California Energy Commission to "develop a strategic plan to achieve a goal of at least 10,000 megawatts of offshore wind energy developments installed off the California coast by 2040, with an interim target of 3,000 megawatts installed by 2030."[54] The plan would need to include "specified information relating to identification of sea space, economic and workforce development, transmission planning, and permitting."[55] The bill is under consideration by the legislature, so no specific targets or requirements have been codified yet.

GOAL SETTING AND PROJECT TIMELINE

Goal setting is viewed as an immediate necessity by some stakeholders and a premature action by others.

Establishing numeric targets or timeframes for OSW deployment is somewhat of a "chicken-and-egg" problem. Without clear goals early in the planning process, it will be more difficult to provide certainty to investors and developers that California is serious about OSW, inhibiting support for key planning processes like funding for additional research to address certain concerns. Further, given the scale of the transmission infrastructure that would be needed to support a commercial scale offshore wind industry, California is unlikely to make such investments without assurances of commercial scale development.

Legislation currently before the California legislature (AB 525, Chiu) has forefronted debate over the utility versus dangers of setting a numeric target before making higher-level decisions about approach. There is concern that unrealistic goals could have unintended negative consequences. For example, if supply chain industries ramp up training and hiring to meet an ambitious MW target, but the state falls short of its stated goal, many laborers could find themselves without work. But without an ambitious target, it will be difficult to attract supply chain development. Similarly, future development depends on significant cost declines, but costs only come down with technology proof of concept and industry experience, which is contingent upon getting initial projects in the water. And renewable energy is inherently beneficial to the environment, but there are concerns about committing to large-scale development without safeguards in the event of unforeseen adverse impacts.

In sum, there is tension between deploying OSW at a pace responsive to the urgency of climate change—and likely needed in order to meet California's and the nation's climate and clean energy targets—versus adopting an incremental approach that provides ample time for research, learning, and adaptation. Whether or not California sets a statewide target, California OSW development during this decade will advance the federal target of 30 GW by 2030 set by the Biden Administration in March 2021.[56]

Stakeholders' differing perspectives on these goals require decisionmakers to weigh several tradeoffs and balance priorities for which there are no easy allocations of value. Establishing state principles and objectives would help with comparisons between and decisions about these tradeoffs.

III. CORE PRINCIPLES AND RECOMMENDATIONS

This section provides core principles and example actions within the following categories:

1. California should expand coordination and communication related to OSW planning
2. California should pursue a forward-reaching vision and strategy that sets the framework for a gold-standard OSW planning process
3. The state should coordinate OSW-related research to maximize efficiency and integrity
4. California should establish robust adaptive management mechanisms for OSW
5. OSW conversations and decision-making processes must emphasize inclusion, Tribal consultation, and community engagement

CALIFORNIA SHOULD EXPAND COORDINATION AND COMMUNICATION RELATED TO OSW PLANNING

The state should designate a central entity to coordinate communication, share information, and maximize inclusion and engagement across agencies and interested parties. CEC is the state lead working in partnership with BOEM on leasing in federal waters and on energy policy across the board, while the State Lands Commission leads planning in state waters. The Ocean Protection Council convenes an interagency California Marine Renewable Energy Working Group to address regulatory uncertainties and state information needs related to marine renewable energy, among other things.[57] Another designee could complement CEC's leadership by adding a centralized communication and coordination function to support inclusion of the wide variety of potentially implicated considerations, such as other ocean uses and resources, economic and social development goals, and beyond. This role could be given to an existing state agency, department, or interagency working group, or a new entity could be created. For example, some convening participants suggested designating a non-regulatory point person within either the Governor's Office of Planning and Research or the California Natural Resources Agency, such as within the Ocean Protection Council. The essential element is that the entity maintain neutrality and act as a conduit for centralized and coordinated communication to all parties. A key function would be leading the creation of cross-cutting principles for offshore wind development that include energy, climate, environmental justice, just transition, economic development, and other elements.

Key factors may include:

- Appoint an existing or new neutral entity to complement and support ongoing state leadership by helping coordinate communication and gather and distribute information to both governmental and nongovernmental parties (e.g., the Governor's Office of Planning and Research, the Ocean Protection Council, or a newly formed entity)

- Commit research and development funding to assess and address the information needs mentioned in this report and the recommendations in the California Energy Commission's *Research and Development Opportunities for Offshore Wind Energy in California* report[58]

- Work with Oregon and Washington (through the West Coast Ocean Alliance) and possibly Hawai'i to share resources and information (e.g., consider modeling an MOU after the multi-state OSW agreement reached by North Carolina, Virginia, and Maryland)[59]

It is paramount that the process employed for each action, from determining an overall strategy and vision to identifying specific requirements, should be inclusive to as wide a range of government and nongovernmental actors as permissible and relevant.

Key leads and stakeholders should include, but not be limited to:

Government:

- [Newly designated point person, agency, or group responsible for coordinating OSW communication]
- Bureau of Ocean Energy Management
- California Coastal Commission
- California Department of Fish & Wildlife
- California Energy Commission
- California Independent System Operator
- California Ocean Protection Council
- California Public Utilities Commission
- California State Lands Commission
- Governor's Office of Planning & Research
- Local governments
- Tribal governments
- U.S. Coast Guard

Nongovernmental:

- Community and environmental justice organizations
- Developers
- Existing ocean users (e.g., commercial or recreational fishing)
- NGOs
- Researchers
- Trade associations
- Labor unions
- Utilities and other electric service providers

CALIFORNIA SHOULD PURSUE A FORWARD-REACHING VISION AND STRATEGY THAT SETS THE FRAMEWORK FOR A GOLD-STANDARD OSW PLANNING PROCESS

Development should be guided by an overarching vision for OSW's future in California, informed by meaningful stakeholder engagement, that can help the state set a leading standard for maximizing across-the-board benefits and minimizing adverse impacts.[60] While BOEM is responsible for making specific leasing decisions for OSW in federal waters, the state can develop a more holistic vision to inform the federal processes and to guide the state-led ones. The strategy associated with the vision could include overarching goals for siting and transmission such as prioritizing transmission to electrify rural areas and underserved Tribal communities and siting in areas that minimize conflicts with other ocean uses and resources. It should also include goals beyond energy, such as economic opportunity and job retraining for displaced workers, state and national food security, state and local energy security, environmental justice, and public health benefits such as reduced air pollution. An important component of this is a process for making visible the tradeoffs that will inevitably need to be made to move decisionmaking forward.

In developing an overall state vision, key factors may include:

Setting Goals & Establishing Principles

- Articulate clear principles for OSW's future in California, which should be informed by stakeholder engagement, government-to-government consultation, and the best available information
- Incorporate goals broader than renewable energy capacity into OSW planning, including energy equity, just transition, and grid resilience, among others
- Identify, in consultation with local communities, Tribal governments, and stakeholders, specific objectives for verifiable, concrete local benefits such as job training, electrification, and any potential costs
- Consider, as has been discussed through consideration of AB 525 (and done by the East Coast States), whether and when it is appropriate for the state to set goals for installed capacity for offshore wind

Siting & Infrastructure Planning

- Establish an inclusive and transparent least-conflict mapping process to aid identification of areas with high resource value and low stakeholder conflict
- Build on existing efforts to incorporate OSW planning into statewide transmission projections and determine where transmission infrastructure upgrades or expansions are required
- Prioritize a determination of port infrastructure needs and create a planning and funding strategy for addressing them

Economic and Workforce

- Identify local costs and gains that would be caused by OSW, such as economic disruption, job losses or gains, loss or development of working waterfronts
- Develop a plan to invest in workforce development and infrastructure upgrades that position California to benefit from economic opportunities throughout the supply chain
- Assess feasibility and desirability of establishing or requiring in-state supply chain components, such as turbine manufacturing, which is unlikely to gain traction until many projects are confirmed

THE STATE SHOULD COORDINATE RESEARCH TO MAXIMIZE EFFICIENCY AND INTEGRITY

Research efforts should be coordinated to reduce costs, delays, and overlap. There should be thorough identification and prioritization of outstanding research questions, including assessing which questions might be answered by studies completed in other regions versus those that must account for conditions unique to California.

Key factors may include:

- Working from ongoing efforts by CBI and Point Blue, analyze existing data to determine what questions can be resolved through existing research, including data available on the California Offshore Wind Energy Gateway

- Work with the State and Federal Agencies, ocean users (including fishermen and tribes), and other stakeholders and interested parties to prioritize ongoing monitoring and data gathering to advance siting conversations

- Prioritize outstanding research questions to help guide research funding coming from public and non-public sources, and help coordinate the myriad academic, nonprofit, research, and other institutions that conduct primary research to avoid overlap and maximize complementarity

- Incorporate both quantitative and qualitative scientific study and local and traditional ecological knowledge into research strategies

- Create a centralized forum for streamlining the information collection efforts of multiple groups, especially research and data gathering efforts, so that work is not duplicated and limited funding is used as efficiently as possible

CALIFORNIA SHOULD ESTABLISH ROBUST ADAPTIVE MANAGEMENT MECHANISMS FOR OSW

Establishing adaptive management principles can help California determine when and how to proceed with insufficient information and uncertainty. Deciding which conditions would trigger an intervention can inform in advance the appropriate response to an unexpected issue as a project proceeds. Public engagement is integral in shaping adaptive management criteria, and publicly accessible data can help inform adaptive management decisions. Adaptive management criteria should also seek, be informed by, and incorporate TEK and knowledge from other ocean users (e.g., fishermen).

Key factors may include:

- Establish adaptive management criteria that are informed by public input and TEK and incorporate a variety of goals
- Ensure that the adaptive management framework is robust and comprehensive, including detailed monitoring requirements, and revisit the framework periodically to reevaluate tradeoffs to ensure alignment with goals
- Specify triggers, thresholds, and concrete adaptive actions that shall be taken to alleviate impacts if thresholds are surpassed (e.g., seasonal or time of day curtailments)
- Create and implement monitoring and mitigation plans as development occurs

OSW CONVERSATIONS AND DECISION-MAKING PROCESSES MUST EMPHASIZE INCLUSION, TRIBAL CONSULTATION, AND COMMUNITY ENGAGEMENT

OSW planning must be inclusive—both of people and of issues. OSW decisions should incorporate the principles of environmental justice, TEK, and a just transition for workers. Emphasis should be placed on quality rather than quantity of efforts. For example, more meetings do not necessarily indicate better stakeholder engagement; instead, holding the right meetings and ensuring the meetings are valuable and accessible to all involved is a measure of quality engagement. That being said, stakeholders have emphasized the importance of regularity. Accessibility considerations include, but are not limited to, the availability of childcare at meetings, the languages in which meeting advertisements and materials are available, the location and timing of meetings, and the availability of reliable internet access for virtual meetings.

Key factors may include:

- Ensure that the centralized coordination and communication entity (see section on expanding coordination and communication) is aware of the full scope of stakeholders, building off of prior stakeholder mapping efforts completed by CEC and others, and develop a mechanism for new participants to add themselves
- Commit to communication and conversation even when no specific decision is pending by establishing a regular forum for general stakeholder conversations and information-sharing, possibly engaging a neutral third-party to serve as a bridging organization (see Appendix II for more information about bridging organizations)
- Enhance the accessibility of public meetings, including by distributing multi-lingual communication materials or offering meetings at different times of day
- Clarify, e.g., through a written or web-based guide, which federal, Tribal, state, and local agencies are responsible for what activities so that interested parties and people know what processes to engage in for what purposes
- Consider the role of localized public ownership, co-management structures, or other mechanisms to foster local control of the project (see prior note about Denmark's Middelgrunden Cooperative as an example)
- Facilitate dedicated Tribal engagement and partnership in a manner that recognizes and respects Tribal sovereignty
- Understand which Tribes may be affected by OSW and ensure that government-to-government consultation aligns with expectations established between Tribes and federal and state agencies, as well as additional guidance such as the West Coast Ocean Tribal Caucus's *Guidance and Responsibilities for Effective Tribal Consultation, Communication, and Engagement: A Guide for Agencies Working with West Coast Tribes on Ocean & Coastal Issues*[61]

California is at an important crossroads. OSW planning that is intentional, transparent, and inclusive can lead to the future that most convening participants envisioned—a future where OSW provides carbon-free energy, grid stability, rural electricity access, progress on environmental justice, cleaner air, and high-quality jobs throughout the in-state supply chain, while protecting the marine environment and the communities that depend on it. We have an opportunity to set an example for the world. But we could fall short if we don't proactively augment the current framework and set a vision to reach toward. This report outlined some of the key opportunities and challenges associated with OSW and laid out some steps for what California can do next.

APPENDIX I. QUESTIONS FOR FURTHER CONSIDERATION

Stakeholders have identified a range of questions related to offshore wind that require additional research, conversation, and input. State leadership will be crucial to ensuring that these questions are resolved and aligned with OSW efforts. While not an exhaustive list, the questions below cover some pressing issues with regard to timeline, scale, data and research, outreach and engagement, and transmission.

QUESTIONS OF TIMELINE:

How long could the planning and leasing process take for different scales of projects, including those currently under consideration by BOEM and other future projects? What are the key variables affecting the timeline?

When can California realistically expect OSW to become operational at a small scale, such as less than 50 MW? At a commercial scale, such as greater than 250 MW?

How can OSW development move quickly without sacrificing the quality of the outcome, in terms of energy, environmental, social, and economic goals? What is the balance between moving swiftly, maintaining integrity of the process, and managing costs?

QUESTIONS OF SCALE:

What project scale—in terms of both the project's physical footprint and generating capacity—would best meet California's needs in the short term? In the long term?

Where can California build to scale quickly to advance climate goals?

Would the development process for a pilot project be shorter than for a commercial-scale project?

QUESTIONS OF DATA AND RESEARCH:

How can research efforts be aligned?

How can California leverage information already collected, such as the data available in Data Basin? How can California best incorporate traditional ecological knowledge and knowledge of industry experts (e.g., fishing industry)?

QUESTIONS ABOUT OUTREACH AND ENGAGEMENT:

How can outreach and engagement reach the right groups? Who needs to be included in these conversations?

How can decision-makers best incorporate stakeholders' perspectives throughout the process?

What are the existing barriers to open communication, and how can these be resolved?

What resources are needed to have a thorough planning process? Who should lead that process?

QUESTIONS ABOUT TRANSMISSION:

Can available Central Coast transmission capacity be reserved for OSW? If so, how?

How much new transmission infrastructure should be constructed to offload generation from North Coast OSW? Where should this transmission be constructed?

What options are available for adequate transmission capacity with the lowest possible costs? For example, is some transmission available that would require affordable upgrades rather than entirely new construction?

APPENDIX II. EXAMPLES OF GENERAL OSW STAKEHOLDER ENGAGEMENT STRATEGIES

This appendix includes a list of stakeholder outreach principles sourced from OSW planning processes around the world. Inclusion of these principles does not imply that California has or has not taken the action; and not all of these strategies may be necessary or appropriate in California. The goal of this table is to build from OSW knowledge elsewhere and serve as a menu of options for future planning.

Timing

PRINCIPLE	RATIONALE	IMPLEMENTATION	EXAMPLES
Outreach should occur before proposing projects.	This reduces opposition because local stakeholders are less likely to feel threatened and are likely to have a more informed reaction.	Decision makers, developers, and researchers should engage in conversation with citizen groups about new technology before deciding if and where that technology may be used.[62]	Block Island, RI: created and disseminated a Special Area Management Plan (SAMP) before the project was proposed.[63] Martha's Vineyard, MA: established a community-owned renewable energy cooperative and began recruiting members years before proposing project site.[64] New York State: Developed a master plan with stakeholder input for all offshore wind development statewide before proposing any projects.[65]
Public should have "meaningful and timely" opportunities to voice their concerns.	This reduces public mistrust, skepticism, and opposition to proposals.[66]	There is a trend towards developing strategic plans for offshore wind for the totality of a coastal state in collaboration with stakeholders before making siting proposals.	Block Island, RI: the local town council actively followed and contributed to the SAMP. Local leaders were familiar with offshore wind when the project was proposed.[67]
Ocean planning should be utilized before project proposals.	This could reduce opposition stemming from perceived threats to places of strong cultural attachment that may be important to local identity.[68]	Leaders should coordinate regional planning that spans multiple present and future uses, from industry to recreation. Before specific areas are designated for different uses, ocean planning initiatives have offered data gathering opportunities, conversation about uses, and forums to exchange information and share values.[69]	Martha's Vineyard, MA: formal community engagement from 2006 to 2010 to create a comprehensive, proactive Island Plan on various sustainability issues.[70]

Mutual Learning

Shared information should anticipate stakeholder concerns.	Developers are often hesitant to disclose their plans before proposing a project, but this may frustrate stakeholders and give the impression that the developer is withholding information.	Members of local community need information about wind farm technology in general, project specifics, and how the project will affect them.[71]	Ireland: utility/developer provides the public with "plain English summaries" of their proposals.[72] United Kingdom: sponsors site visits to existing wind farms to relevant stakeholders.[73]

Mutual Learning (cont.)

PRINCIPLE	RATIONALE	IMPLEMENTATION	EXAMPLES
Information should be easily accessible to stakeholders.	Information needs to be accessible and understandable by all stakeholders.	Publish in locally popular newsletters, post on bulletin boards, and logical online sources.[74]	Martha's Vineyard, MA: hosted an interactive offshore wind map viewer with information about visual, ecological, and human use impacts based on various proposed sites.[75] Monhegan Island, ME: gave presentations on offshore wind in both winter and summer to reach both year-round and seasonal residents.[76] Moray Firth, Scotland: provide local media with frequent press releases to disseminate information and advertise opportunities for public involvement.[77]
Developers should exchange both knowledge and values with stakeholders in a group setting.	This is important for developing trust, mutual respect, and reaching more satisfying outcomes among those engaged in decision making processes.[78]	Convey shared values, because people tend to "endorse whichever position reinforces their connection to others with whom they share important commitments.[79] Proponents should acknowledge and address potential power and economic imbalances between local community members and well-financed project proponents.[80]	
Planners should recognize the "validity and significance of symbolic and affective dimensions" of the coastline.[81]	Stakeholders may feel an emotional attachment to certain sections of the coastline that may not be obvious when conducting a general cost-benefit analysis.	For example, a fisherman's "identity and sense of heritage" may be linked to using a particular area of the ocean. This is especially common in Maine, where lobstering territory is often exclusive and passed down through generations.[82]	Monhegan Island, ME: Agency staff met with local fishermen at their local fish house and asked for siting recommendations.[83]
Messengers should be chosen carefully.	If people do not trust the source, they may feel alienated or disengaged. Stakeholders could become "entrenched" in their opinion regardless of new information that arises.[84]	Messengers should appear neutral and sensitive to stakeholder concerns. The most common neutral messenger is a developer- or agency-appointed liaison to maintain relations between a stakeholder group and the developer.	Block Island, RI: the town hired independent consultants to represent community interests. Developer reimbursed the town for costs of consultants.[85] Developer also hired local liaison to lead outreach.[86] Moray Firth, Scotland: appointed a Fisheries Liaison Officer to consult with the fishing industry.[87]

Mutual Learning (cont.)

PRINCIPLE	RATIONALE	IMPLEMENTATION	EXAMPLES
Local stakeholders should play an informative role in the planning process.	Shifting local stakeholders from playing the role of recipients of information to producers of information that developers and government officials can understand, respect, and use can be empowering.[88]	Ask stakeholders to help identify other potentially relevant stakeholders.[89]	Martha's Vineyard, MA: the interactive offshore wind map viewer was used to solicit location preferences from local community. The website also included data from local sources, such as island fishermen.[90] Monhegan Island, ME: Fishermen were asked share information about fishing activity locations to identify a site of least impact. New York Master Plan: held seven public information meetings statewide, and solicited public comments both online and through the mail.[91] New Jersey Strategic Plan: Local fishermen will provide ecological monitoring data near offshore wind sites.[92]
Bridging organizations should serve as a neutral third party in negotiations.	Bridging organizations help translate facts and values, create opportunities for the co-production and sharing of knowledge, and build credibility in the planning process with local communities.[93]	Characteristics of a bridging organization: Accountability to both sides of the project; Use of "boundary objects," e.g., maps, reports, and forecasts, co-produced by stakeholders; Participation across the boundary (convening, translation, coordination, mediation) The bridging organization should not push for a specific outcome, nor do they stand to benefit from a particular outcome.[94]	Block Island, RI: Consultants translated technical details for town council; held community meetings; listened to community concerns; translated concerns into comments during formal regulatory process.[95] Martha's Vineyard, MA: co-op partnered with developer to provide a bridge to community.[96] New York Master Plan: sets up technical working groups that include relevant agencies, unions, and community members. The initial groups cover (1) Jobs and Supply Chain; (2) Commercial and Recreational Fishing; (3) Maritime Activities; and (4) Environmental Issues.[97] New Jersey Strategic Plan: formed an Environmental Resources Working Group with environmental groups, relevant agencies, fishermen, local businesses, developers, and community leaders to consult on the Strategic Plan.[98]

Provide Community Benefits[99]

PRINCIPLE

Developers should collaborate with communities and government agencies to identify and provide community benefits before submitting planning applications.

RATIONALE

This helps to earn the public's trust and create a sense of fairness associated with the project.[100]

It's important to collaborate with the local community to decide on benefits so the benefits are not perceived as "bribes for consent."[101]

IMPLEMENTATION

Developers often choose to go above and beyond government-mandated benefits to tailor the benefits to the needs of the local community.

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.[102]

Other common benefit models: Community funds (most common); Community ownership; Equal distribution of revenues; Direct investment and project funding (e.g., infrastructure); Jobs and apprenticeships; Electricity programs; Community Benefit Agreements[103]

EXAMPLES

Denmark: community benefits are based on cooperative models in which members own the business and all profits after taxes are given back to members.[104]

United Kingdom: energy developers annually pay into a fund proportional to the megawatts of installed capacity for community organizations to spend on local initiatives.[105]

Block Island, RI: agreed to install fiber optic strands along transmission line for faster internet; signed a Community Benefit Agreement through which developer would pay for improvements to town infrastructure where the cable came ashore; mariners and fishermen hired to provide security during construction.[106]

New York Master Plan: created a $20M Offshore Wind Training Institute and a $3M Community and Workforce Benefits Fund.[107]

New Jersey Strategic Plan: provide funding to support retraining (including fisheries workers), and to retool fishing vessels to provide various offshore wind workflow components.[108]

Massachusetts: signed financial compensation agreements with fishing stakeholders to address the potential loss of revenue and fishing opportunity within offshore wind farms.[109]

Taiwan: developers signed a memorandum of understanding with fisherman and agreed to pay remedial compensation for loss of fishing territory before construction of the wind farm.[110]

APPENDIX III. U.S. OFFSHORE WIND ENERGY DEVELOPMENT TIMELINE

The timeline below highlights the yearly development of offshore wind energy in the U.S. and California. The timeframe covered in this timeline is from 2005 to May 2021.

2005

The Energy Policy Act of 2005 is enacted by the U.S. congress as an amendment to the 1953 Outer Continental Shelf Lands Act (OCLSA). OCLSA facilitated the federal government's leasing of its offshore mineral resources and energy resources.

The Energy Policy Act granted BOEM lead management authority for marine renewable energy projects on federal offshore lands. BOEM received jurisdiction and regulatory responsibility for leases, easements, and rights-of-way for activities in the outer continental shelf.

BOEM's renewable energy program occurs in four distinct phases: (1) planning and analysis, (2) lease issuance, (3) site assessment, and (4) construction and operations.

2009

The Renewable Energy Program (30 CFR 585) established BOEM's offshore wind energy governance structure and agency obligations.

Rhode Island updated its RPS program and required that the state's utility, National Grid, enter long-term contracts with a 10-MW offshore wind demonstration project at Block Island and a second 150-MW utility scale offshore wind project.[111]

Rhode Island grants Deepwater Wind permits to begin construction of first U.S. offshore wind farm. The project is projected to cost $1 billion to construct and supply 15% of the energy used by the state of Rhode Island.[112]

2010

Massachusetts received BOEM lease for a 468-MW Cape Wind project offshore Martha's Vineyard, the first federal offshore wind commercial lease in the U.S. [113]

Virginia established the Virginia Offshore Wind Development Authority. The agency is tasked with coordinating and supporting the development of the offshore wind energy industry, supporting project developers and equipment vendors.[114]

The Department of Energy (DOE) instructs the National Renewable Energy Laboratory to complete the first the first U.S. offshore wind energy resource assessment.[115]

2011

DOE and U.S. Department of the Interior (DOI) present a national offshore wind strategy plan, a detailed report to enhance the development of offshore wind and to accelerate the commercialization of offshore wind.[116]

DOE releases the Funding Opportunity Announcement, resulting in 12 research projects that aimed to advance the characterization of wind resources and other data critical to wind plant feasibility assessment, siting, and facility design.[117]

To accelerate the development of offshore wind, DOE initiated the Offshore Wind Strategic Initiative and launched more than $250 million in public/private research and development funding grants and cooperative agreements.[118]

2012

The U.S. becomes the operating agent for Working Together to Resolve Environmental Effects of Wind Energy (WREN), established by the International Energy Agency's Wind Committee to address environmental issues associated with commercial development of land-based and offshore wind energy projects.[119]

2013

Maryland established the Offshore Wind Energy Act which permits wind project developers to receive financial support for their projects in the form of Offshore Wind Renewable Energy Credits (ORECs). The Act also amended the state's RPS to include offshore wind projects within 10-30 miles off the Maryland coast.[120]

University of Maine builds the first grid-connected offshore wind turbine in the U.S.[121]

2014

U.S. Wind, an offshore wind developer, executed two commercial leases for wind projects with BOEM (BOEM and U.S. Wind later merged these leases into a single agreement). The project is set to install up to 187 turbines offshore Maryland.[122]

2015

By the end of 2015, DOI had awarded 11 commercial leases for offshore wind development that could support 14.6 GW of capacity in areas already vetted for preliminary siting conflicts through extensive intergovernmental and stakeholder coordination.[123]

DOE released *Wind Vision: A New Era for Wind Power in the United States*, a landmark report evaluating future pathways for the U.S. wind industry and analyzing, for the first time, the full benefits and costs of a future in which wind delivers 35% of U.S. electricity by 2050.[124]

2016

BOEM and the California Energy Commission (CEC) establish the BOEM-California Intergovernmental Renewable Energy Task Force to explore offshore wind as a potential source of renewable energy. The task force is a partnership of tribal governments, state, local, and federal agencies. [125]

California and DOI sign an MOU to explore the development of renewable energy, including onshore and offshore wind.[126]

BOEM receives Trident Wind's unsolicited lease request for a 650 MW capacity wind farm off the California coast by Morro Bay. The proposal is for 100 offshore floating turbines. BOEM issues a Federal Register Notice on "Potential Commercial Lease for Wind Power on the Outer Continental Shelf (OCS) Offshore California - Request for Interest (RFI).[127]

Rhode Island's Block Island Wind Farm begins commercial operation and becomes the first commercial offshore wind energy facility in the U.S. The Block Island Wind Farm is a 30 MW project with five turbines.[128]

2017

Massachusetts utilities and Massachusetts Department of Energy Resources (DOER) conducted a solicitation process for long-term contracts for up to 800 MW of offshore wind proposals.[129]

In North Carolina, Avangrid Renewables entered into a lease with BOEM in 2017 for offshore wind development in the Kitty Hawk wind resource area. Avangrid evaluated options for up to 1,500 MW of offshore wind. BOEM extended the preliminary term for Avangrid's lease until November 1, 2019.[130]

Maryland finalized the country's first large-scale OSW solicitation of offshore wind and awarded ORECs to U.S. Wind and Deepwater Wind. These projects will generate 389 MW of energy off the coast of Maryland.[131]

New York committed to developing 2,400 MW of offshore wind by 2030. [132]

UC Berkeley Labor Research Center releases report describing the inter-agency cooperation required to get offshore wind in California a feasible prospect. Report says that offshore wind is essential to California's renewable energy strategy with regards to wind balancing and economic feasibility of the renewable transition.[133]

The BOEM-California Intergovernmental Renewable Energy Task Force launches the California Offshore Wind Energy Gateway, which contains over 600 data sets.[134]

The U.S. Navy issued its first maritime use restrictions, evaluating the combability of offshore wind with current and proposed military activities off California's coast.[135]

California and Scotland signed an MOU on climate change, which considered how the two governments could share data and expertise on offshore wind development. In 2018, the CEC established an MOU with Denmark.[136]

2018

The U.S. House Committee on Natural Resources unanimously passed the Offshore Wind for Territories Act, which authorizes offshore wind development for American Samoa, Guam, the Northern Mariana Island, Puerto Rico, and the U.S. Virgin Islands.[137]

By September 2018, BOEM had made more than 1.18 million acres of submerged federal land on the Outer Continental Shelf (OCS) available for potential wind power development, which has generated over $16.4 million in federal revenue through competitive auctions for offshore leases.[138]

DOI announced the completion of the eighth and highest grossing competitive lease sale for renewable energy in the OCS. The lease sales offered approximately 390,000 acres offshore Massachusetts for potential wind energy development and winning bids from three companies totaled approximately $405 million. The leased areas could support approximately 4.1 GW of commercial wind generation.[139]

Connecticut's Department of Energy & Environmental Protection conducted an RFP process soliciting renewable energy projects, including up to 825,000 MW annually. Under the RFP process, Ørsted negotiated a PPA with the state's utilities, Eversource and United Illuminating. The Connecticut Public Utilities Regulatory Authority approved the 20-year PPA.[140]

New York Public Service Commission (PSC) issued an order creating a framework for procuring offshore wind energy. The framework follows on New York State Offshore Wind Master Plan. The PSC decided to add offshore wind generation to the overall Clean Energy Standard and adopted the ultimate goal of 2,400 MW by 2030, with 800 MW for the initial procurement. It later expanded that goal to 9,000 MW of installed offshore wind capacity by 2035.[141]

In Virginia, BVG Associates published a report outlining a roadmap for Virginia to develop an offshore wind supply chain.[142]

New Jersey passed legislation to raise its offshore wind target from 1,100 MW to 3,500 MW by 2030.[143]

Rhode Island selected 400 MW from the Revolution Wind project through a competitive procurement. National Grid and Ørsted signed a contract for the project at a real levelized price of $74/MWh.[144]

DOE granted the New York Energy Research and Development Authority an $18.5 million grant to lead the National Offshore Wind Research and Development Consortium.[145]

In California, the U.S. Navy issued its second maritime use restrictions, which further restrict offshore wind activities along the central and southern coasts.[146]

The Redwood Coast Energy Authority and its partners submit an unsolicited lease request for a 100-150 MW wind farm off the coast of Eureka, California.[147]

BOEM publishes a Call for Information and Nominations (Call) as the next step in a competitive planning and leasing process for offshore wind deployment in California.[148]

The City of Morro Bay approved a Community Benefits Agreement with Castle Wind (Trident Winds

and EnBW North America), requiring the developer to allocate $250,000 for the rights to the grid connection at the Morro Bay substation and to support regional workforce development.[149]

Governor Brown blocked the construction of new oil and gas pipelines, preventing offshore drilling in federal waters along California's coast.[150]

2019

Connecticut enacted a law requiring the state to procure 2,000 MW of offshore wind by 2030 and selected Vineyard Wind's 804 MW Park City project as the winner of a large-scale solicitation.[151]

Maine's Governor directed the PUC to approve a contract for the 12 MW New England Aqua Ventus floating demonstration project and announced a new Maine Offshore Wind Initiative.[152]

Maryland passed an offshore wind mandate for an additional 1,200 MW by 2030.[153]

Massachusetts updated its 2016 law and passed legislation expanding authorization for utilities to procure an additional 1,600 MW by 2035.[154] The state also issued its second offshore wind RFP and selected the 804 MW Mayflower Wind project as the winning bid.[155]

New Jersey's Governor updated the state's 2018 offshore wind target from 3,500 MW by 2030 to 7,500 MW by 2035. [156] The state also granted the first OREC award to Ørsted's 1,100 MW Ocean Wind project.[157]

New York Governor Cuomo increased the state's target of offshore wind from 2,400 MW by 2030 to 9,000 MW by 2035.[158] The state also awarded its first offshore wind solicitation to Ørsted & Eversource's 880 MW Sunrise Wind project and Equinor's 816 MW Empire Wind project. Both projects signed 25-year OREC contracts with the state.[159]

Virginia's Governor issued an Executive Order calling for 2,500 MW of offshore wind by 2026. Virginia set a legislative target of 5,200 MW by 2034 for utility Dominion Energy. Dominion Energy announced plans for a 2,640 MW offshore project by 2026.[160]

A branch of the DOE focused on innovation and technology (ARPA-E) announced $28 million in funding for research projects related to offshore wind turbine technologies.[161]

In August 2019, U.S. Congressman Salud Carbajal (CA-24) and representatives from DOD, BOEM, NOAA, the California Energy Commission, and elected officials initiated a series of meetings to negotiate a mutual agreement on OSW locations near the Morro Bay Call Area.[162] Two areas were identified as potentially compatible for both OSW development goals and naval operations, and the group posed these areas for comment and input from stakeholders.[163]

2020

New Jersey and New York opened their second offshore wind solicitation, seeking up to 2,400 and 2,500 MW of offshore wind, respectively.[164]

In Virginia, Dominion Energy and Ørsted finished construction of the 12 MW Coastal Virginia Offshore Wind Project, the first project in federal waters.[165]

CEC released Notice of Availability "Outreach on Additional Considerations for Offshore Wind Energy off the Central Coast of California." The deadline for written comments for offshore wind energy opportunities off the Central Coast of California was extended from July 31, 2020 to September 30, 2020.[166]

BOEM established a series of webinars focused on BOEM-funded scientific research offshore California, Oregon, and Washington that will inform decisions about the planning, leasing, and development of ocean renewable energy in those areas.[167]

CEC released "Notice of Workshop to Take Comment on Additional Considerations for Offshore Wind Energy off the Central Coast of California." The offshore working group presented public comment on the description of offshore wind energy locations off the Central Coast of California.[168]

BOEM and Schatz Energy Research Center released a report titled, "Northern California Offshore Wind Generation and Load Compatibility Assessment with Emphasis on Electricity Grid Constraints, Mitigation Measures and Associated Costs." The report highlights

challenges and opportunities for offshore wind in Northern California.[169]

DOE and BOEM deployed two research buoys into California's water. One buoy is stationed approximately 625 meters off of Humboldt County. The second buoy is about 1,000 meters off of Morro Bay. The buoys will gather wind measurements for 12 months.[170]

As of October 2020, Congressman Carbajal reconvened negotiations with DOD, and the Navy has expressed willingness to find mutually aggregable areas.[171]

2021

In February, Assembly Members David Chiu (D – 17th District), Laura Friedman (D – 43rd District), and Jordan Cunningham (R – 35th District) introduced Assembly Bill 525. The bill would require state agencies to develop a strategic plan to achieve 10,000 MW of OSW by 2040.[172]

On March 29, 2021, the Biden Administration announced a suite of OSW goals and priorities, including a 30 GW by 2030 target, a commitment to high-quality job creation, identification of new leasing areas and acceleration of the permitting process for select Atlantic projects, a robust domestic supply chain, and renewed research and development efforts.[173]

On May 25, Governor Newsom announced an agreement with federal partners including the Department of the Interior, White House, and Department of Defense to open up the West Coast for OSW development, including 399 square miles northwest of Morro Bay and a separate area off the North Coast.[174]

ENDNOTES

1 Wind Europe. *Offshore Wind in Europe: Key Trends and Statistics 2019*, (February 2020), available at https://windeurope.org/wp-content/uploads/files/about-wind/statistics/WindEurope-Annual-Offshore-Statistics-2019.pdf.

2 Walter Musial, Philipp Beiter, Suzanne Tegen, and Aaron Smith, *Potential Offshore Wind Energy Areas in California: An Assessment of Locations, Technologies, and Costs,* National Renewable Energy Laboratory and Bureau of Ocean Energy Management, (December 2016), available at https://www.boem.gov/sites/default/files/environmental-stewardship/Environmental-Studies/Pacific-Region/Studies/BOEM-2016-074.pdf.

3 *Id.*

4 See Office of Governor Gavin Newsom, "California Announces Historic Agreement with Federal Partners to Advance Offshore Wind Development," May 25, 2021, https://www.gov.ca.gov/2021/05/25/california-announces-historic-agreement-with-federal-partners-to-advance-offshore-wind-development

5 Rhode Island Coastal Resources Management Council, "Deepwater Wind Block Island" (webpage), available at http://www.crmc.ri.gov/windenergy/dwblockisland.html; Windpower Engineering and Development, "12-MW Coastal Virginia Offshore Wind farm ready for commercial service," (October 14, 2020), available at https://www.windpowerengineering.com/coastal-virginia-offshore-wind-farm-ready-for-commercial-service/.

6 U.S. Department of the Interior, Bureau of Ocean Energy Management, "State Activities" (webpage), available at https://www.boem.gov/renewable-energy/state-activities.

7 U.S. Department of the Interior, Bureau of Ocean Energy Management, "California Activities" (webpage), available at https://www.boem.gov/california.

8 "Commercial Leasing for Wind Power Development on the Outer Continental Shelf (OCS) Offshore California—Call for Information and Nominations (Call)." Federal Register 83:203 (October 19, 2018) p. 5309. Available at https://www.boem.gov/sites/default/files/regulations/Federal-Register-Notices/2018/83-FR-53096.pdf

9 Bureau of Ocean Energy Management – Pacific Region. *Commercial Leasing for Wind Power on the Outer Continental Shelf (OCS) Offshore California – Call for Information and Nominations Docket No. BOEM-2018-0045,* (April 2, 2019), available at https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/CA/CA-Call-Nominations-for-website-2019-05012019-%282%29.pdf; Bureau of Ocean Energy Management, "California Offshore Wind Energy Planning Process," (December 13, 2018), available at https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/CA/SLO-Public-Meeting_12132018-FINAL-%281%29.pdf.

10 U.S. Department of the Interior, Bureau of Ocean Energy Management, "California Activities" (webpage), available at https://www.boem.gov/california; U.S. Department of the Interior, Bureau of Ocean Energy Management, "A Message from BOEM's Acting Director: The Path Forward for Offshore Wind Leasing on the Outer Continental Shelf," (June 11, 2019), available at https://www.boem.gov/newsroom/notes-stakeholders/message-boems-acting-director-path-forward-offshore-wind-leasing-outer; U.S. Department of the Interior, Bureau of Ocean Energy Management, "Press Release: Biden-Harris Administration Advances Offshore Wind in the Pacific," May 25, 2021, https://www.doi.gov/pressreleases/biden-harris-administration-advances-offshore-wind-pacific.

11 International Renewable Energy Agency, Floating Foundations: A Game Changer for Offshore Wind Power, (2016), p.5, available at https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2016/IRENA_Offshore_Wind_Floating_Foundations_2016.pdf.

12 John Parnell, "World's Largest Floating Wind Turbine Begins Generating Power," Green Tech Media (January 2, 2020), available at https://www.greentechmedia.com/articles/read/worlds-largest-floating-wind-turbine-connected.

13 The University of Maine, "Diamond Offshore Wind, RWE Renewables join the University of Maine to lead development of Maine floating offshore wind demonstration project," UMaine News (August 5, 2020), available at https://umaine.edu/news/blog/2020/08/05/diamond-offshore-wind-rwe-renewables-join-the-university-of-maine-to-lead-development-of-maine-floating-offshore-wind-demonstration-project/; Office of Governor Janet T. Mills, State of Maine, "Governor Mills Announces Intent to Expand Research and Development of Floating Offshore Wind in Maine," (November 20, 2020), available at https://www.maine.gov/governor/mills/news/governor-mills-announces-intent-expand-research-and-development-floating-offshore-wind-maine.

14 U.S. Department of the Interior, Bureau of Ocean Energy Management. "California Activities," (webpage), available at https://www.boem.gov/california.

15 Senate Bill 100 (De León, Chapter 312, Statutes of 2018).

16 California Energy Commission, California Public Utilities Commision, and California Air Resources Board, 2021 SB 100 Joint Agency Report - Achieving 100 Percent Clean Electricity in California: An Initial Assessment, (March 2021), available at https://www.energy.ca.gov/sb100#anchor_report.

17 *See, e.g.,* California Energy Commission (CEC), *Deep Decarbonization in a High Renewables Future* (June 2018), available at Deep_Decarbonization_in_a_High_Renewables_Future_CEC-500-2018-012-1.pdf (ethree.com); California Public Utilities Commission Decision 20-03-028, Rulemaking 16-02-007, p. 26, (March 26, 2020), available at https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M331/K772/331772681.PDF; Energy and Environmental Economics (E3), *The Economic Value of OSW Power in California*, (August 2019), available at https://www.ethree.com/wp-content/uploads/2019/09/2019-08-08_E3-CastleWind-OffshoreWindValueReport_compressed.pdf.

18 *See, e.g.*, California Energy Commission (CEC), *Deep Decarbonization in a High Renewables Future,* (2018), available at Deep_Decarbonization_in_a_High_Renewables_Future_CEC-500-2018-012-1.pdf (ethree.com).

19 Walter Musial et al., *Potential Offshore Wind Energy Areas in California,* supra, p. xi, available at https://www.boem.gov/sites/default/files/environmental-stewardship/Environmental-Studies/Pacific-Region/Studies/BOEM-2016-074.pdf.

20 See CEC, CPUC & CARB, *2021 SB 100 Joint Agency Report: Achieving 100 Percent Clean Electricity in California: An Initial Assessment*, CEC-200-2021-001 (March 2021), pp. 75-76, available at https://www.energy.ca.gov/sb100#anchor_report.

21 State of New Jersey – Office of Governor Phil Murphy, "Governor Murphy Announces Plan to Develop the New Jersey Wind Port: First Purpose-Built Offshore Wind Port in the U.S.," (June 16, 2020), available at https://www.nj.gov/governor/news/news/562020/20200616a.shtml.

22 California ISO (CAISO), "Managing an Evolving Grid: Transitioning to a low carbon future," (2018), available at http://www.caiso.com/Documents/ManagingAnEvolvingGrid-FastFact.pdf; See CAISO, "What the duck curve tells us about managing a green grid," (2016), available at https://www.caiso.com/Documents/FlexibleResourcesHelpRenewables_FastFacts.pdf.

23 Walter Musial et al., *Potential Offshore Wind Energy Areas in California*, supra, pp. 28-29; See also Robert Collier, *High Road for Deep Water: Policy Options for a California Offshore Wind Industry*, University of California, Berkeley, Center for Labor Research and Education, (November 2017), pp. 12-13, available at https://laborcenter.berkeley.edu/pdf/2017/High-Road-for-Deep-Water.pdf.

24 Energy + Environmental Economics, Inc., *The Economic Value of Offshore Wind Power in California,* supra, p. 19.

25 Meredith Fowlie and Danny Cullenward, *Report on Emissions Leakage and Resource Shuffling,* Independent Emissions Market Advisory Committee, (September 10, 2018), pp. 7-8, available at https://calepa.ca.gov/wp-content/uploads/sites/6/2018/09/6e.-IEMAC_Meeting_Materials_9-21-18__Fowlie_and_Cullenward_Report_on_Emissions_Leakage.pdf.

26 California State Lands Commission, "Offshore Wind Applications in State Waters," (November 20, 2020), available at https://www.slc.ca.gov/renewable-energy/offshore-wind-applications/.

27 West Coast Ocean Tribal Caucus, *Guidance and Responsibilities for Effective Tribal Consultation, Communication, and Engagement: A Guide for Agencies Working with West Coast Tribes on Ocean & Coastal Issues,* (July 2020), available at https://static1.squarespace.com/static/5bc79df3a9ab953d587032ca/t/5f0cdc876f40e375a323305af/1594678422449/WestCoastTribalEngagmentGuidance_July2020.pdf.

28 Catherine J.K. Sandoval, Energy Access is Energy Justice: The Yurok Tribe's Trailblazing Work to Close the Native American Reservation Electricity Gap, (2018), pp. 6-8, available at https://1x937u16qcra1vnejt2hj4jl-wpengine.netdna-ssl.com/wp-content/uploads/Energy-Access-is-Energy-Justice-by-Professor-Catherine-Sandoval-2018.pdf.

29 *Id.*

30 Paul Ciampoli, "Calif. CCA signs MOU for supplies from 1,000-MW offshore wind farm," *American Public Power Association,* (August 20, 2019), available at https://www.publicpower.org/periodical/article/calif-cca-signs-mou-supplies-1000-mw-offshore-wind-farm.

31 Copenhagen Environment and Energy Office, "The Middelgrunden Offshore Wind Farm," (March 2003), available at https://base.socioeco.org/docs/a118_doc1.pdf.

32 Bethany Speer, David Keyser, and Suzanne Tegen, *Floating Offshore Wind in California: Gross Potential for Jobs and Economic Impacts from Two Future Scenarios*, National Renewable Energy Laboratory and Bureau of Ocean Energy Management, (April 2016), pp. 16-17, available at https://www.nrel.gov/docs/fy16osti/65352.pdf.

33 *Id.*

34 American Jobs Project, *The California Offshore Wind Project: A Vision for Industry Growth,* (February 2019), p. 28, available at http://americanjobsproject.us/wp/wp-content/uploads/2019/02/The-California-Offshore-Wind-Project.pdf.

35 California Governor's Office of Planning and Research, "Just Transition," (webpage), available at https://opr.ca.gov/economic-development/.

36 American Jobs Project, *The California Offshore Wind Project,* supra. p. 17.

37 Castle Wind, "City Approves Exclusive Community Benefits Agreement with Castle Wind to Pursue Mutual Benefits of Offshore Wind Project," (November 30, 2018), available at http://castlewind.com/city-approves-castle-wind-offshore-project/.

38 Massachusetts Executive Office of Energy and Environmental Affairs, "Baker-Polito Administration Announces Agreements with Vineyard Wind and Mayflower Wind for New Bedford Marine Commerce Terminal," (August 20, 2020), available at https://www.mass.gov/news/baker-polito-administration-announces-agreements-with-vineyard-wind-and-mayflower-wind-for-new. See also Port of New Bedford, "Offshore Wind" (webpage), available at https://portofnewbedford.org/offshore-wind/.

39 California Offshore Wind Energy Gateway. "BOEM/California Intergovernmental Renewable Energy Task Force" (webpage), available at https://caoffshorewind.databasin.org/pages/about-ca-renewable-energy-task-force.

40 Conservation Biology Institute. "California Offshore Wind Energy Gateway - Data Basin" (webpage), accessed January 15, 2021, available at https://caoffshorewind.databasin.org/.

41 Bureau of Ocean Energy Management, *Outreach Summary Report: California Offshore Wind Energy Planning,* (September 2018), available at https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/CA/Outreach-Summary-Report-September-2018.pdf.

42 Bureau of Ocean Energy Management, *Commercial Leasing for Wind Power Development on the Outer Continental Shelf (OCS) Offshore California – Call for Information and Nominations (Call). Docket No. BOEM-2018-004,* (October 2018), available at https://www.federalregister.gov/documents/2018/10/19/2018-22879/commercial-leasing-for-wind-power-development-on-the-outer-continental-shelf-ocs-offshore.

43 California State Lands Commission, "Offshore Wind Applications in State Waters," (January 2021), available at https://www.slc.ca.gov/renewable-energy/offshore-wind-applications/.

44 Mary Ann Showalter, "Offshore Wind Research Buoys Float into California's Waters," Pacific Northwest National Laboratory (October 9, 2020), available at https://www.pnnl.gov/news-media/offshore-wind-research-buoys-float-californias-waters.

45 See U.S. Department of Energy, Atmosphere to Electrons, "California- Wind Sentinel (120), Humboldt, Raw Data," (webpage), available at https://a2e.energy.gov/data/buoy/buoy.z05.00.

46 Christina Ortega et al., *Resource and Load Compatibility Assessment of Wind Energy Offshore of Humboldt County, California*, Energies 2020 13(21), 5707 (2020), available at https://doi.org/10.3390/en13215707.

47 Mark Severy & Arne Jacobson, *Interconnection Constraints and Pathways,* In M. Severy, Z. Alva, G. Chapman, M. Cheli, T. Garcia, C. Ortega, N. Salas, A. Younes, J. Zoellick, & A. Jacobson (Eds.) *California North Coast Offshore Wind Studies*. Humboldt, CA: Schatz Energy Research Center, (2020), p. 9, available at schatzcenter.org/pubs/2020-OSW-R8.pdf.

48 Garrett Hering, "US military squeezes wind energy development off California's Central Coast," *S&P Global Market Intelligence,* (March 13, 2020), available at https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/us-military-squeezes-wind-energy-development-off-california-s-central-coast-57492026.

49 Andrea Copping et al., "Floating Offshore Wind Platforms and Whale Encounter," Pacific Northwest National Laboratory and Bureau of Ocean Energy Management, Environmental Interactions of Marine Renewables (EIMR) Conference, Orkney, UK, (April 2018), available at https://tethys.pnnl.gov/sites/default/files/publications/029_Whale%20Encounter%20EIMR%20Copping%20and%20Grear.pdf; Hayley Farr et al., *Potential environmental effects of deepwater floating offshore wind energy facilities*, Ocean & Coastal Management 207, 105611 (2021), available at https://doi.org/10.1016/j.ocecoaman.2021.105611.

50 National Oceanic and Atmospheric Administration (NOAA), "Fisheries Economics of the United States, 2016," (2016), available at https://www.fisheries.noaa.gov/content/fisheries-economics-united-states-2016.

51 Bureau of Ocean Energy Management, "California Visual Simulation" (webpage), available at https://www.boem.gov/renewable-energy/state-activities/california-visual-simulation.

52 George Parsons and Jeremy Firestone. *Atlantic Offshore Wind Energy Development: Values and Implications for Recreation and Tourism.* University of Delaware and BOEM, (March 2018), available at https://espis.boem.gov/final%20reports/5662.pdf.

53 New York State Energy Research and Development Authority (NYSERDA), *New York State Offshore Wind Master Plan: Charting a Course to 2,400 Megawatts of Offshore Wind Energy*, (2018), available at https://www.nyserda.ny.gov/All-Programs/Programs/Offshore-Wind/About-Offshore-Wind/Master-Plan.

54 Assembly Bill 525 (Chiu), 2021-2022 Reg. Sess., available at https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB525.

55 *Id.*

56 White House Briefing Room, "Fact Sheet: Biden Administration Jumpstarts Offshore Wind Energy Project to Create Jobs," March 29, 2021, available at https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/29/fact-sheet-biden-administration-jumpstarts-offshore-wind-energy-projects-to-create-jobs/.

57 California Ocean Protection Council, "California Marine Renewable Energy Working Group," https://www.opc.ca.gov/2010/05/offshore-wave-energy-development.

58 California Energy Commission – Energy Research and Development Division, "Research and Development Opportunities for Offshore Wind Energy in California," (August 2020), available at https://ww2.energy.ca.gov/2020publications/CEC-500-2020-053/CEC-500-2020-053.pdf.

59 "Memorandum of Understanding Among Maryland, North Carolina, and Virginia to Create the Southeast and Mid-Atlantic Regional Transformative Partnership for Offshore Wind Energy Resources (SMART-POWER)," (October 29, 2020), available at Microsoft Word - SMART POWER MOU_FINAL.docx (virginia.gov); West Coast Ocean Alliance, "West Coast Ocean Partners," (webpage), available at https://westcoastoceanalliance.org/members#:~:text=The%20West%20Coast%20Ocean%20Alliance%20brings%20together%20state,,on%20specific%20coastal%20areas%20of%20the%20West%20Coast.

60 The December 2020 $900 billion COVID-19 relief package increased and extended the federal Investment Tax Credit (ITC) for OSW, allowing projects that start construction by 2025 to receive a credit equivalent to up to 30 percent of investment costs. Tradeoff analyses and financing plans should consider the available tax credits.

61 For more information about Tribal consultation guidance, see West Coast Ocean Tribal Caucus, *Guidance and Responsibilities for Effective Tribal Consultation, Communication, and Engagement: A Guide for Agencies Working with West Coast Tribes on Ocean & Coastal Issues,* (July 2020), available at https://static1.squarespace.com/static/5bc79df3a9ab953d587032ca/t/5f0cdc876f40e375a323305af/1594678422449/WestCoastTribalEngagmentGuidance_July2020.pdf

62 Sarah Klain et al., Island Institute, "Engaging Communities in Offshore Wind: Studies and Lessons Learned from New England Islands,"(December 2015), p. 17. available at https://islandedgrid.org/wp-content/uploads/2017/04/Engaging-CommunitiesOffshoreWind_2015_web.pdf.

63 The co-op was formed to give the local community "more autonomy and better ensure community benefits associated with renewable energy development projects ... people joined for social benefits such as 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 like ownership and control of local projects and stabilized electricity prices ...." Sarah Klain et al., Island Institute, "Engaging Communities in Offshore Wind: Studies and Lessons Learned from New England Islands," (December 2015), p. 30.

64 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 16.

65 New York State Energy Research and Development Authority (NYSERDA), *New York State Offshore Wind Master Plan*, supra.

66 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 16.

67 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 28.

68 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 17.

69 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 17.

70 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 26.

71 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 14.

72 EirGrid Group, *Stakeholder Engagement Plan* 2019, (2019), p. 3, available at https://www.eirgridgroup.com/site-files/library/EirGrid/Stakeholder-Engagement-Plan-2019.pdf

73 Vilma Del Rosario and Kar Han Goh, *Community Stakeholder Management in Wind Energy Development Projects: A planning approach*, (2007), p. 68, available at https://www.semanticscholar.org/paper/Community-Stakeholder-Management-in-Wind-Energy-%3A-A-Rosario-Goh/03ddcb6123dd99623f34518f71e38271fc3c16c4.

74 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 14.

75 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 30.

76 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 26.

77 Craig Milroy, *Environmental Statement: Technical Appendix 1.4 B – Stakeholder Engagement Strategy; Telford, Stevenson, MacColl Wind Farms and Associated Transmission Infrastructure Environmental Statement*, (2010), p. 12, available at http://marine.gov.scot/datafiles/lot/morl/Environmental_statement/Volumes%208%20to%2011%20-%20Technical%20Appendices/Volume%208%20-%20The%20Project%20Technical%20Appendices/Appendix%201.4%20B%20-%20Stakeholder%20Engagement%20Strategy.pdf.

78 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 15.

79 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 15.

80 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 15.

81 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 15.

82 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 15.

83 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 32

84 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 15.

85 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 28.

86 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 26.

87 Craig Milroy, *Environmental Statement*, supra, p. 14.

88 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 16.

89 The University of Rhode Island, "Offshore Renewable Energy: The Stakeholder Process" (webpage), available at https://web.uri.edu/offshore-renewable-energy/planning-and-policy/stakeholder-process/.

90 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 30.

91 New York State Energy Research and Development Authority (NYSERDA), *New York State Offshore Wind Master Plan*, supra.

92 New Jersey Board of Public Utilities et al., *New Jersey Offshore Wind Strategic Plan*, (2020), p. 50, available at https://www.nj.gov/bpu/pdf/Final_NJ_OWSP_9-9-20.pdf.

93 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 16.

94 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 16.

95 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 20.

96 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 26.

97 New York State Energy Research and Development Authority (NYSERDA), *New York State Offshore Wind Master Plan*, supra.

98 New Jersey Board of Public Utilities et al., *New Jersey Offshore Wind Strategic Plan*, supra, p. 27; *see also* Habitat Working Group on Offshore Wind Energy, Massachusetts Office of Coastal Zone Management https://www.mass.gov/service-details/habitat-working-group-on-offshore-wind-energy ("The Habitat Working Group on Offshore Wind Energy is comprised of scientists and technical experts from environmental organizations, academia, and state and federal agencies.").

99 Community benefits are "additional and distinct funds or investments that the developer provides to communities, often near project sites." These benefits help balance the dispersion of private and public benefits associated with the project, since the benefits are distributed widely and the burdens are disproportionately allocated to the local community. Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 19.

100 "Benefits can be understood as sharing economic gains associated with tapping into a public natural resource, 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 projects), compensation for agreed upon and specific losses (e.g., funds to improve habitats for birds at high risk of collision with turbines)." Sarah Klain et al., *Engaging Communities in Offshore Wind*, p. 20.

101 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 13.

102 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 20.

103 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 22.

104 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 22.

105 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 22.

106 Sarah Klain et al., *Engaging Communities in Offshore Wind*, supra, p. 29.

107 Andy Su, *Establishing Floating Offshore Wind Development in Oregon: Lessons from East Coast State Policy Tools Promoting Offshore Wind*, UCLA J. ENVTL. L. & POL'Y 38, 222 (2020).

108 New Jersey Board of Public Utilities et al., *New Jersey Offshore Wind Strategic Plan*, supra, p. 60.

109 Stephen A. Bortone and Shinya Otake, Modern Fisheries Engineering: Realizing a Healthy and Sustainable Marine

Ecosystem, (2020), P.9.

110 Ying Zhang et al., *Offshore Wind Farm in Marine Spatial Planning and the Stakeholders Engagement: Opportunities and Challenges for Taiwan*, Ocean & Costal Mgmt. J. 149, 69 (2017), available at https://doi.org/10.1016/j.ocecoaman.2017.09.014.

111 K&L Gates. SNC Lavalin, and Atkins, *Offshore Wind Handbook Version 2*, (October 2019), available at https://www.atkinsglobal.com/~/media/Files/A/Atkins-Corporate/offshore_wind_us_brochure_2019.pdf.

112 "Rhode Island Chooses Deepwater Wind to Build Off-Shore Wind Farm," (September 30, 2008), Renewable Energy World, available at http://www.localcleanenergy.org/news/sustainable-energy/2008-10-06.

113 K&L Gates. SNC Lavalin, and Atkins, *Offshore Wind Handbook,* supra.

114 *Id*.

115 Marc Schwartz et al., *Assessment of Offshore Wind Energy Resources for the United States,* Technical Report NREL/TP-500-45889, National Renewable Energy Laboratory, (June 2010), available at https://www.nrel.gov/docs/fy10osti/45889.pdf.

116 U.S Department of the Interior Bureau of Ocean Energy Management Wind and Hydropower Technologies Program, A *National Offshore Wind Strategy: Creating an Offshore Wind Energy Industry in the United States*. Washington, D.C.: U.S. Dept. of Energy, Office of Energy Efficiency and Renewable Energy, EERE Information Center (February 2011), available at https://www1.eere.energy.gov/wind/pdfs/national_offshore_wind_strategy.pdf.

117 U.S. Department of Energy and U.S. Department of the Interior, *National Offshore Wind Strategy: Facilitating the Development of the Offshore Wind Industry in the United States*. (Sept. 2016), available at https://www.energy.gov/sites/prod/files/2016/09/f33/National-Offshore-Wind-Strategy-report-09082016.pdf.

118 *Id*.

119 The United States leads this effort with support from the Pacific Northwest National Laboratory, National Renewable Energy Laboratory, and the U.S. Department of Energy's Wind Energy Technologies Office. https://tethys.pnnl.gov/about-wren.

120 Maryland Offshore Wind Energy Act of 2013, General Assembly of Maryland. http://mgaleg.maryland.gov/mgawebsite/legislation/details/hb0226?ys=2013rs

121 U.S. Department of Energy – Wind Energy Technologies Office, "First U.S. Grid-Connected Offshore Wind Turbine Installed Off the Coast of Maine," (October 2013), available at https://www.energy.gov/eere/wind/articles/first-us-grid-connected-offshore-wind-turbine-installed-coast-maine#:~:text=When%20the%20turbine%20was%20turned,wind%20turbine%20in%20the%20Americas.

122 U.S. Wind, "Maryland" (webpage), available at http://www.uswindinc.com/maryland-offshore-wind-project/.

123 U.S. Department of Energy and U.S. Department of the Interior, *National Offshore Wind Strategy*, supra.

124 U.S. Department of Energy (DOE). *Wind Vision: A New Era for Wind Power in the United States*. DOE/GO-102015-4557. DOE Office of Energy Efficiency and Renewable Energy. Washington, D.C. (US), (2015), available at https://www.energy.gov/sites/prod/files/WindVision_Report_final.pdf.

125 California Energy Commission, "Offshore Renewable Energy" (webpage), available at https://www.energy.ca.gov/programs-and-topics/topics/renewable-energy/offshore-renewable-energy.

126 U.S. Department of the Interior Bureau of Ocean Energy Management and The State of California, "Memorandum of Understanding Between The Department of the Interior and The State of California on Renewable Energy,"(2016), available at https://www.boem.gov/sites/default/files/documents//MOU%20DOI-State%20of%20California%20Renewable%20Energy%202016-12-12.pdf.

127 Bureau of Ocean Energy Management, "BOEM Initiates Review of Proposal for Wind Energy Development Project Offshore California," (March 2016), available at https://www.boem.gov/newsroom/press-releases/boem-initiates-review-proposal-wind-energy-development-project-offshore.

128 American Clean Power, *U.S. Offshore Wind Industry Status Update*. (September 2020), available at https://cleanpower.org/resources/u-s-offshore-wind-industry-status-update/.

129 K&L Gates. SNC Lavalin, and Atkins, *Offshore Wind Handbook,* supra.

130 *Id*.

131 American Clean Power, *U.S. Offshore Wind Industry*, supra.

132 *Id*.

133 Robert Collier, *High Road for Deep Water*, supra.

134 American Jobs Project, *The California Offshore Wind Project*, supra.

135 *Id*.

136 *Id*.

137 Michelle Froese, "U.S. House Committee Passes the Offshore Wind for Territories Act," Windpower Engineering

& Development, (September 7, 2018), available at https://www.windpowerengineering.com/u-s-house-committee-passes-the-offshore-wind-for-territories-act/.

138 K&L Gates. SNC Lavalin, and Atkins, *Offshore Wind Handbook,* supra.

139 *Id*. The three companies were Equinor Wind US, Mayflower Wind Energy, and Vineyard Wind.

140 *Id*.

141 *Id*.

142 BVG Associates, *The Virginia Advantage: The Roadmap for the Offshore Wind Supply Chain in Virginia*, (December 2018), available at https://static1.squarespace.com/static/5b3cf461d274cb109aa488d8/t/5c23e225562fa7be221fe841/1545855531929/BVGA-20802-Report-r2-final-20181227.pdf.

143 American Clean Power, *U.S. Offshore Wind Industry*, supra.

144 *Id*.

145 U.S. Department of Energy, "Secretary of Energy Rick Perry Announces $18.5 Million for Offshore Wind Research," (December 2017), available at https://www.energy.gov/articles/secretary-energy-rick-perry-announces-185-million-offshore-wind-research.

146 American Jobs Project, *The California Offshore Wind Project*, supra.

147 *Id*.

148 *Id*.

149 *Id*.

150 Office of Governor Edmund G. Brown Jr., "Governor Brown Signs Bill to Block Trump Administration's Offshore Oil Drilling Expansion," (September 2018), available at https://www.ca.gov/archive/gov39/2018/09/08/trump-offshore-oil-drilling-expansion/index.html.

151 American Clean Power, *U.S. Offshore Wind Industry*, supra.

152 *Id*.

153 *Id*.

154 *Id*.

155 *Id*.

156 *Id*.

157 *Id*.

158 *Id*.

159 *Id*.

160 *Id*.

161 Justin Gerdes, "ARPA-E Commits $28 Million to Develop Advanced Floating Offshore Wind Turbines," GreenTechMedia,(February 25, 2019), available at https://www.greentechmedia.com/articles/read/arpa-e-commits-28-million-to-develop-advanced-floating-offshore-wind-turbin#:~:text=The%20U.S.%20Department%20of%20Energy's,for%20floating%20offshore%20wind%20turbines.

162 California Energy Commission, "Updated Notice of Availability of Outreach on Additional considerations for Offshore Wind Energy off the Central Coast of CA," (July 24, 2020), available at https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/UPDATED-NOA-Outreach-on-Additional-Considerations_0.pdf.

163 *Id*.

164 American Clean Power, *U.S. Offshore Wind Industry*, supra.

165 *Id*.

166 California Energy Commission, *Notice of Availability UPDATED Notice of Availability of Outreach on Additional Considerations for Offshore Wind Energy off the Central Coast of CA*, (July 2020), available at https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/UPDATED-NOA-Outreach-on-Additional-Considerations_0.pdf.

167 Bureau of Ocean Energy Management, "West Coast Renewable Energy Science Exchange" (webpage), available at https://www.boem.gov/west-coast-renewable-energy-science-exchange.

168 California Energy Commission, *Notice of Workshop to Take Comment on Additional Considerations for Offshore Wind Energy off the Central Coast of California*, (June 2020), available at https://www.boem.gov/sites/default/files/documents/regions/pacific-ocs-region/environmental-science/CEC%20Notice%20of%20Workshop.pdf.

169 BOEM and Schatz Energy Research Center, *Northern California Offshore Wind Generation and Load Compatibility Assessment with Emphasis on Electricity Grid Constraints, Mitigation Measures and Associated Costs*, (September 2020), available at https://www.boem.gov/sites/default/files/documents/regions/pacific-ocs-region/environmental-science/BOEM-2020-045.pdf.

170 Mary Ann Showalter, "Offshore Wind Research Buoys Float into California's Waters," Pacific Northwest National Laboratory, (October 9, 2020), available at https://www.pnnl.gov/news-media/offshore-wind-research-buoys-float-cali-

fornias-waters.

171 Office of U.S. Congressman Salud Carbajal, "Carbajal Reconvenes Offshore Wind Working Group, Secures Commitment from Navy," (October 1, 2020), available at https://carbajal.house.gov/news/documentsingle.aspx?DocumentID=754.

172 Assembly Bill 525 (Chiu), 2021-2022 Reg. Sess., available at https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB525.

173 White House, "Fact Sheet: Bide Administration Jumpstarts Offshore Wind, *supra* note 56.

174 See Office of Governor Gavin Newsom, "California Announces Historic Agreement with Federal Partners to Advance Offshore Wind Development," May 25, 2021, https://www.gov.ca.gov/2021/05/25/california-announces-historic-agreement-with-federal-partners-to-advance-offshore-wind-development

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