



MEMORANDUM

April 21, 2023

TO: MEMBERS, PORT COMMISSION
Hon. Kimberly Brandon, President
Hon. Willie Adams, Vice President
Hon. Gail Gilman
Hon. Steven Lee
Hon. Ed Harrington

FROM: Elaine Forbes
Executive Director

SUBJECT: Informational update to the Port Commission on staff's efforts and paths to support State of California Assembly Bill 525 to develop a strategic plan for offshore wind energy deployment off the California coast in federal waters.

DIRECTOR'S RECOMMENDATION: Information Only – No Action Required

EXECUTIVE SUMMARY

In September 2021, Governor Newsom signed California State Assembly Bill 525 (AB 525) into law, requiring the California Energy Commission (CEC) to develop a strategic plan for offshore wind energy developments to be installed off the California coast in federal waters. Under AB 525, the CEC is required to submit the strategic plan to the California Natural Resources Agency and State Legislature by June 30, 2023.

Seaports (or ports) and waterfront facilities are essential for the development of a new offshore wind industry in California and will also be an important driver of potential economic benefits, including jobs and economic growth opportunities. Initially, California ports may not be able to handle all the required activities to support industry development. However, they have the potential to serve as strategic hubs to support a workforce that can assemble, fabricate, install, and operate and maintain offshore wind turbines and related components.

THIS PRINT COVERS CALENDAR ITEM NO. 9A

This staff report summarizes the activities that Port staff has undertaken to position the Port to participate in the realization of the vision set forth in AB 525, in addition to seeking feedback from the Commission on staff's proposed paths to continue supporting the planning for development of offshore wind energy in conjunction with Federal and State agencies and Port stakeholders.

BACKGROUND

On September 23, 2021, Governor Gavin Newsom signed into law Assembly Bill 525 which took effect January 1, 2022. AB 525, which was sponsored by former Assemblymember (and current San Francisco City Attorney) David Chiu, requires the California Energy Commission (CEC), in coordination with federal, state, and local agencies and a wide variety of stakeholders, to develop a strategic plan for offshore wind energy deployment off the California coast in federal waters. The CEC must submit the strategic plan to the California Natural Resources Agency (CNRA) and the Legislature by no later than June 30, 2023.

The strategic plan will address several issues, including:

- Identification of suitable sea space for wind energy areas in federal waters sufficient to accommodate the offshore wind planning goals for 2030 (2-5 GW) and 2045 (25 GW)
- Economic and workforce development
- A plan to improve waterfront facilities that could support a range of floating offshore wind energy development activities
- Transmission planning, to include an assessment, in consultation with the California Public Utilities Commission (PUC) and Independent System Operator, of the transmission investments and upgrades necessary to support the offshore wind planning goals for 2030 and 2045
- Permitting, to include the permitting roadmap discussed separately below; and
- Information on potential impacts on coastal resources, fisheries, Native American and Indigenous peoples, and national defense, as well as strategies for addressing those potential impacts

As part of the AB 525 study, the California State Lands Commission will identify port space and the necessary investments to improve waterfront facilities for the offshore wind industry. Based on preliminary conversations with state and federal agencies, offshore wind industry representatives, and California port authorities the Port of San Francisco is well positioned to play a supporting role in the deployment of the offshore wind industry in California.

The legislative findings for AB 525 recognize the potential for development of offshore wind energy at scale to advance California's progress toward its renewable energy and climate mandates and provide substantial economic and environmental benefits to the state and nation. They further state that offshore wind energy presents an opportunity for

California to attract investment capital and provide economic and workforce development benefits to communities. This can occur through the development and preservation of a skilled and trained workforce, the creation of long-term jobs, and support the development of an offshore wind energy supply chain.

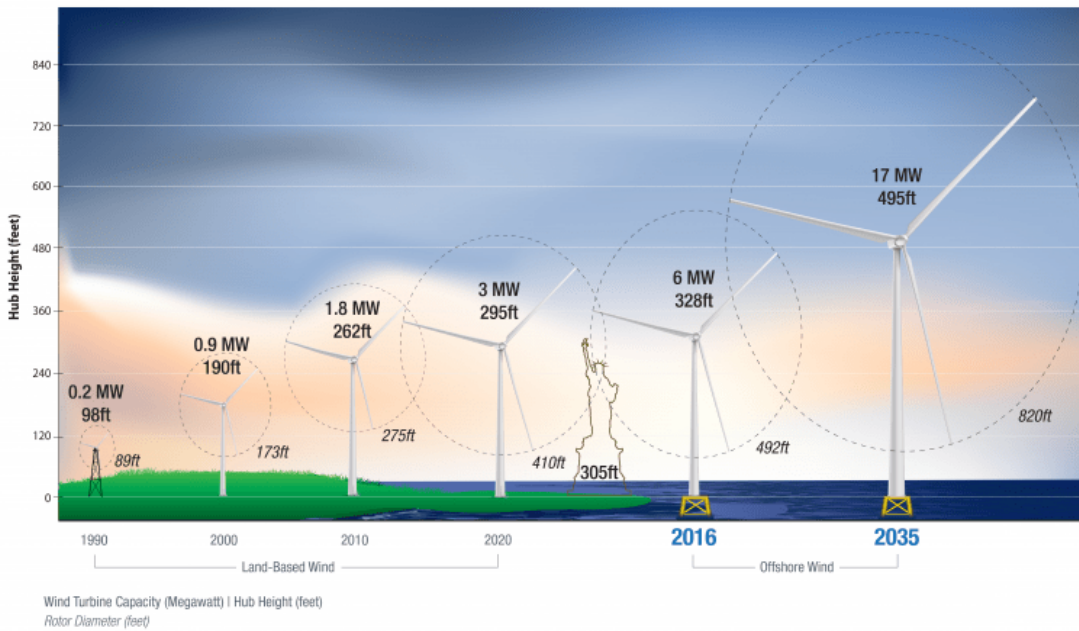
PROVEN SOURCE OF CLEAN ENERGY PRODUCTION

Offshore wind has been identified as an abundant domestic source of clean energy production for the United States because offshore winds tend to be strong, fast, and uniform. Floating and fixed-bottom technologies have been deployed internationally, and there are 50,500 MW of installed capacity of fixed-bottom projects globally, including a pipeline of additional projects under development on the U.S. East Coast, as well as 123 MW of installed capacity of floating projects globally. However, specific technologies depend on site-specific conditions and characteristics such as water depth, wind speeds, and seabed geology.

MAJOR TECHNICAL CHALLENGES

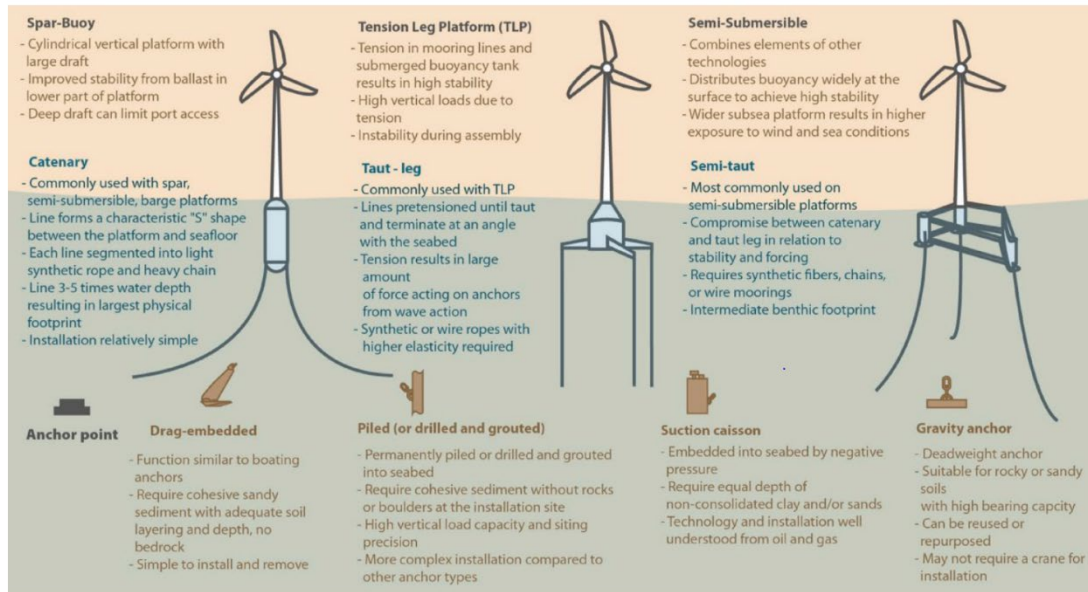
Whether floating or fixed-bottom, offshore technologies use wind turbines that essentially operate in the same way as onshore wind technologies. Offshore wind turbines and related components are larger than those used for onshore wind energy generation, and current market data indicate they are expected to continue increasing in size. For example, offshore wind turbine hub height averaged 330 feet with a capacity of 6 MW in 2016 and is expected to grow to nearly 500 feet with a capacity of 15 MW or more by 2035, as seen in **Figure 1**.

Figure 1 - Illustration of turbine heights and blades lengths over time



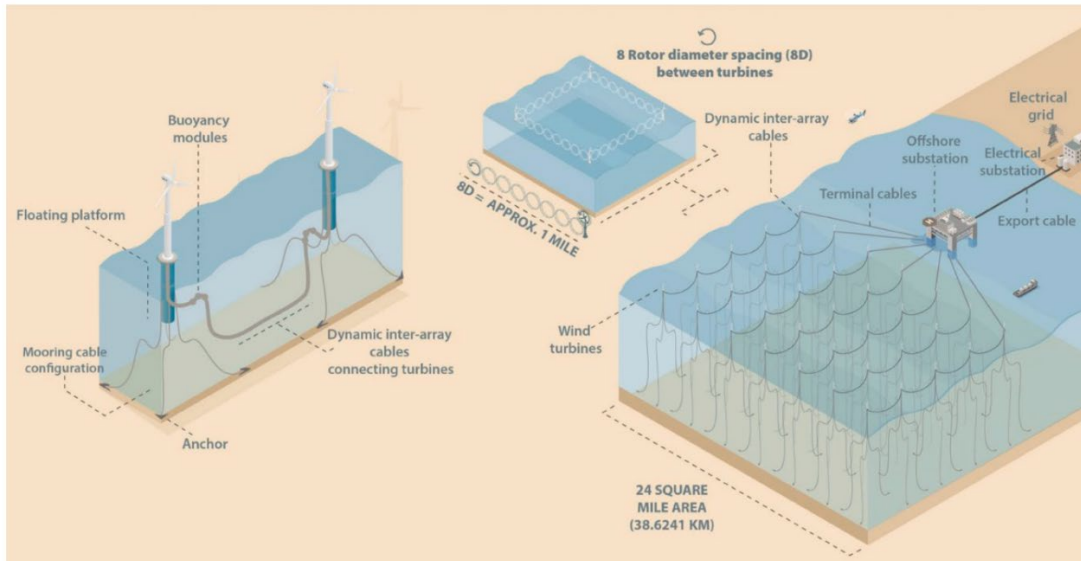
In addition to turbines, floating offshore wind developments will likely include midwater-suspended electrical cables linking the turbines, mooring cables, and anchors attaching the turbines to the seafloor, with an electrical cable to transport the energy from the turbines to a substation, either onshore or offshore. There is also variability among floating offshore wind technologies with regard to some of the examples of currently known platform design, mooring, and anchor configurations being pursued in deep ocean waters, as seen in **Figure 2**.

Figure 2: Diagram of Mooring, Anchoring, and Floating Foundations



The schematic shown in **Figure 3** is an example of a floating offshore wind project, though no floating offshore wind projects have been developed at the scale shown in **Figure 3**. While the global floating offshore wind market is still in early stages of development, the technology is projected to advance quickly, with some estimates that the global floating offshore wind energy installed capacity could grow to more than 40 GW by 2036.

Figure 3: Schematic of an Example Full-Scale Floating Wind Energy Development



CALIFORNIA'S BLUEPRINT FOR OFFSHORE WIND ENERGY DEVELOPMENT

In January 2022, AB 525 became effective, setting the analytical framework for offshore wind energy development off the California coast in federal waters and tasking the CEC to move swiftly to develop a strategic plan for offshore wind development:

- **Development of Strategic Plans**
 - Identification of seas space
 - Economic and workforce development and identification of port space and infrastructure
 - Transmission planning
 - Permitting Roadmap
 - Potential impacts on coastal resources, fisheries, Native American and Indigenous peoples, national defense, and strategies for addressing those potential impacts
- **Regarding port infrastructure, the strategic plan must:**
 - Emphasize and prioritize near-term actions, particularly related to port retrofits and investments and the workforce, to accommodate the probable immediate need for jobs and economic development.
 - Strive for compatibility with other harbor tenants and ocean users to ensure that the local benefits related to offshore wind energy construction complement other local industries when considering development.
 - Emphasize and prioritize actions that will improve port infrastructure to support land-based work for the local workforce.

To construct floating offshore wind turbines, turbine components will need to be fabricated, assembled, and transported from onshore ports to the offshore wind call areas. Existing port infrastructure on the West Coast is not adequate to support these activities, and significant investment is required to develop potential offshore wind port sites. Since passage of AB 525, Port staff have participated in numerous meetings with state and federal representatives, offshore wind industry experts, and California port authorities to monitor and track developments related to industry roll out.

Due to height limits imposed by the Bay and Golden Gate Bridges, the Port will not serve as a staging and integration site where floating turbine systems are assembled and towed to offshore wind call areas. The Ports of Humboldt and Long Beach will likely perform this role given their available maritime terminal acreage and proximity to wind call areas in Humboldt and Morro Bay. However, the Port of San Francisco has been identified as a potential manufacturing and fabrication site for components within the offshore wind supply chain. Possible roles for the Port include floating platform construction, mooring point fabrication, nacelle component development, and workforce training.

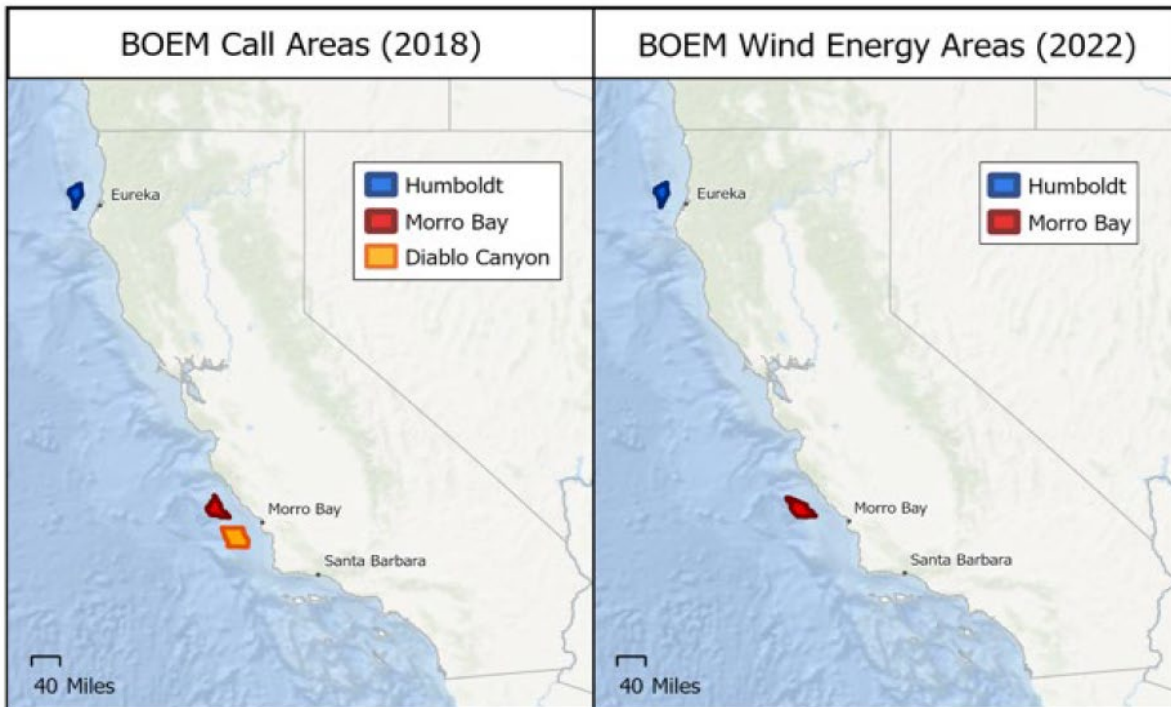
FEDERAL BUREAU OF OCEAN ENERGY MANAGEMENT (BOEM)

At the national level, planning for offshore wind energy development on the Outer Continental Shelf (OCS) began taking shape starting in 2009 when the U.S. Department of the Interior (DOI) developed regulations for renewable energy development in the OCS. BOEM's authority extends from 3 nautical miles (nm) offshore ending at 200 nm offshore.

In March 2021, President Joseph Biden announced a national goal to deploy 30,000 MW (30 GW) of offshore wind capacity by 2030 to create a pathway to 110,000 MW (110 GW) of offshore wind capacity by 2050. As of June 2021, there were 42 MW of installed offshore wind operating capacity in the United States. Since 2013, BOEM has conducted nine competitive lease sales in the United States — all on the East Coast. On the West Coast, BOEM designated two call areas in 2018 off the coast of California in federal waters, are the Humboldt on the North Coast and the Morro Bay and Diablo Canyon call areas, off the Central Coast.

On May 26, 2022, the DOI announced proposed auction details and lease terms for offshore wind energy development in the Morro Bay and Humboldt WEAs, with a goal of holding a lease sale auction in fall of 2022. The map in **Figure 4** depicts the call areas as well as the WEAs.

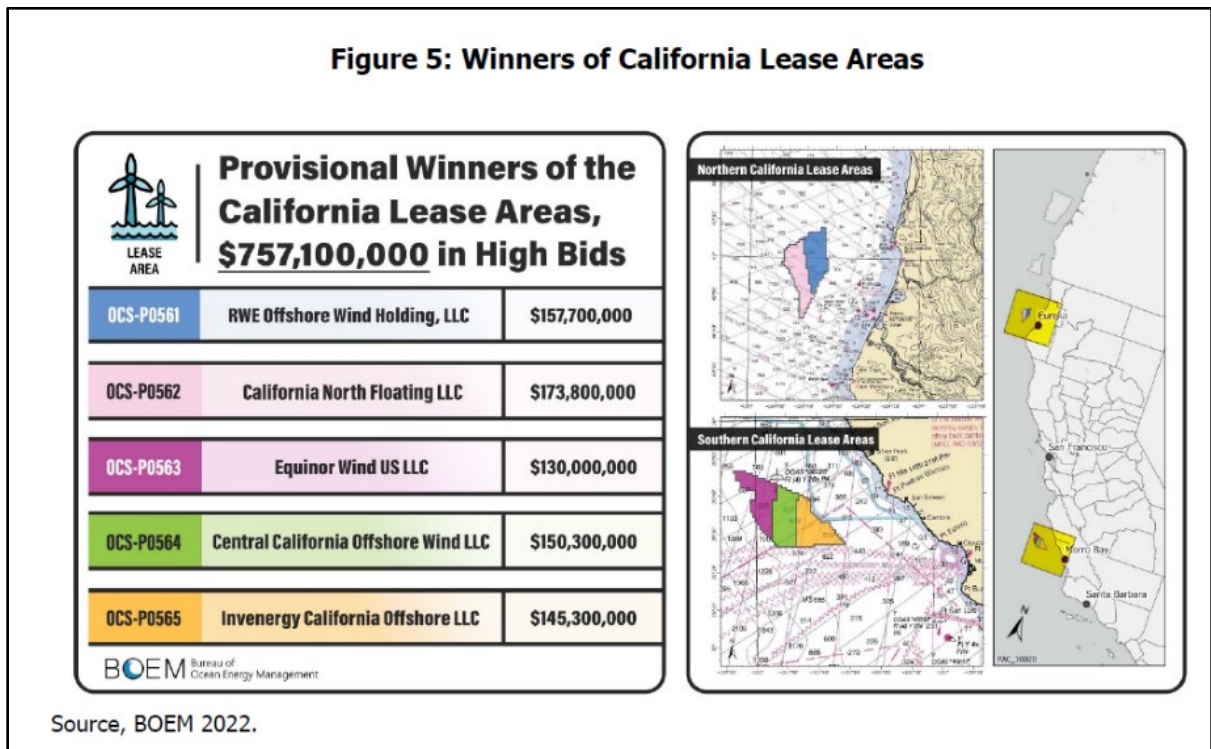
Figure 4: Offshore Wind Call Areas and Wind Energy Areas off the Coast of California



Source: California Energy Commission

On December 6, 2022, BOEM held the first California lease sale for areas on the Outer Continental Shelf off Northern and Central California; as well as the first national sale in support of commercial floating offshore wind development. The auction allowed qualified offshore wind developers to bid on five lease areas and resulted in winning bids for the five lease areas from five companies totaling \$757.1 million. The leased areas have the potential to produce 4.6 GW of offshore wind energy, enough to power more than 1.5 million homes. The provisional winning bidders of the California lease areas are shown in **Figure 5**.

Figure 5: Winners of California Lease Areas



LIKELY DEPLOYMENT IN LATE 2020S OR EARLY 2030S

As floating offshore wind energy develops off the coast of California, ports and waterfront facilities are expected to play an essential supporting role if the state is to realize the economic benefits from developing this resource. Significant investments may be needed to upgrade and expand California’s existing port facilities and waterfront infrastructure to support a broad range of offshore wind development activities, including but not limited to the assembly, fabrication, installation and maintenance of offshore wind turbines and related components. The construction of new facilities may also be needed.

Table 1 identifies a potential deployment schedule for offshore wind resources off the California coast used in a recent study to assess port facility needs. Under these scenarios, California will potentially require more than 10 port terminal sites to support the full offshore wind supply chain need to meet the 25 GW by 2045 goal.

This could require a multi-port strategy, with sites varying in size (5 to more than over 100 acres) and use for staging and integration, and the manufacturing of blades, towers, nacelles, floating foundations, and operations and maintenance. The potential development of port facilities and waterfront infrastructure should consider technology changes and the projected increase in size of offshore wind components over time, so that waterfront facilities and infrastructure can meet the needs of a growing industry. Port staff will continue to meet with state, federal, and industry stakeholders to as roles to support a successful launch of the industry are identified.

Table 1: Potential Rates of Offshore Wind Deployment off the California coast

Year	Target Deployment				
	Low		Medium	High	
Rate	0.5 GW/yr	1 GW/yr	1.5 GW/yr	2 GW/yr	2.5 GW/yr
2030	1 GW	2 GW	3 GW	4 GW	5 GW
2035	3.5 GW	7 GW	10.5 GW	14 GW	17.5 GW
2038	5 GW	10 GW	15 GW	20 GW	25 GW
2045	8.5 GW	17 GW	25 GW	34 GW	42.5 GW
2048	10 GW	20 GW	30 GW	40 GW	50 GW
2050	11 GW	23 GW	33 GW	44 GW	55 GW

Source: Moffat & Nichol, 2022

CADEMO – Which is short for California Demonstration, will kick-start the offshore wind industry on the U.S. West Coast with a deployment of four wind turbines in state waters, well ahead of the much larger, multi-gigawatt deployments in federal waters, thus allowing new information and lessons learned to benefit the larger developments. Situated off the Santa Barbara County coast, just west of the Vandenberg Space Force Base in California, the CADEMO Floating Offshore Wind Project will be a four turbine 60 MW demonstration project aimed at kick starting the emergent marine renewable energy sector off the west coast of the United States.

CADEMO aims to have the project operational by 2026, providing a new source of renewable energy for the California market. The project is further intended to explore workforce development and local industry opportunities, essential for sustainable and responsible development.

Port staff has met with CADEMO's to emphasize the alignment of their project with the Port's mission and portfolio objectives as well as the Port's ability to support their development. Based on these discussions CADEMO has included the Port as a potential location for fabrication of floating wind turbine "foundations" in its notice of preparation of an Environmental Impact Report (EIR) for their project. After consultation with SLC staff Port staff agreed to such inclusion to allow for further study of the potential use, while advising the project sponsor that it would need to enter a lease before it could use Port property in the manner proposed and that such a lease is subject to the approval of the Port Commission.

State Lands Commission staff are in the early stages of the EIR process. On September 26, 2022, the Commission posted a Request for Qualifications Notice to solicit environmental consultants for preparation of an EIR. A Notice of Preparation is anticipated in 2023 to solicit scoping comments from the public for the Draft EIR.

PORT STAFF ANALYSIS

Port's Maritime and Legislative Affairs staff have engaged with a range of stakeholders to learn more about the offshore wind energy opportunity. Based on information shared by potential developers, BOEM and CEC staffers, Port of San Francisco is well situated to compete for key role in the development of the California offshore wind industry based on several key attributes, including but not limited to:

- Deep water berths next to available underutilized wharves at Pier 92-96 and nearby backlands.
- Potential support opportunities at other maritime assets such as Pier 80 for receiving equipment and components from ships and storage, as well as the former shipyard Pier 68 for workforce training facilities.
- Access to San Francisco and Bay Area workforce.
- Reasonable proximity and equidistant to both Central and Northern California wind energy call areas

To further the Port's understanding of the upgrades needed to facilitate this business opportunity, Port staff has engaged an as-needed consultant to prepare the basis of design for structural load-bearing improvements that would be needed to support the significant heavy weights of OSW components. When completed, the basis of design document will allow staff to identify major roadblocks to potential site improvements, negotiate agreements with potential operators based on the needed upgrades and advocate for state and federal grants to fund site improvements.

Additionally, Port staff will continue to engage with CADEMO, regulators and other potential market participants (e.g., BOEM lease winners) for comment, to ensure any improvements the Port pursues along these lines will position the Port to be competitive for as much business as possible.

RECOMMENDATION

Port staff proposes to continue down the path as described herein, subject to Port Commission feedback at today's meeting.

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For: Andre Coleman, Deputy Director, Maritime