



## **Operations Board of Directors**

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June 26, 2019



# **Castle Wind Offshore**

## 1,000 MW floating offshore wind farm

**Monterey Bay Community Power**



Morro Bay, June 26, 2019

# Who are we?

## Joint Venture Partners – Trident Winds & EnBW



Alla Weinstein  
CEO

Trident Winds Inc. is based in Seattle, WA. The company focuses on offshore wind development in deep waters. Trident Winds' founder and CEO, Alla Weinstein, brings extensive experience:

- Multijurisdictional permitting of a wave energy project in Makah Bay, WA;
- Developing floating offshore wind technology while serving as a CEO of Principle Power Inc., and
- Being the first to submit an unsolicited lease request on behalf of Trident Winds for the MBO Project in Morro Bay, CA



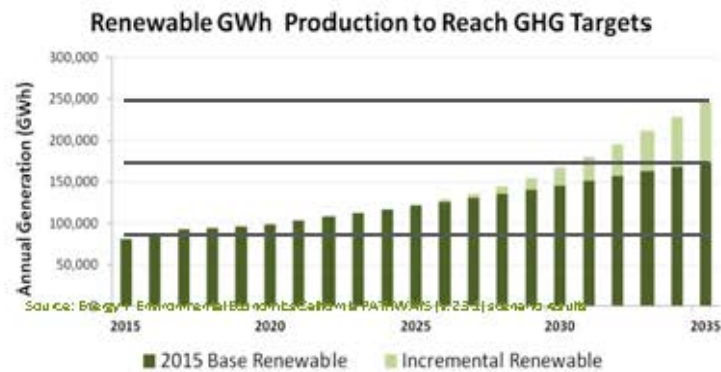
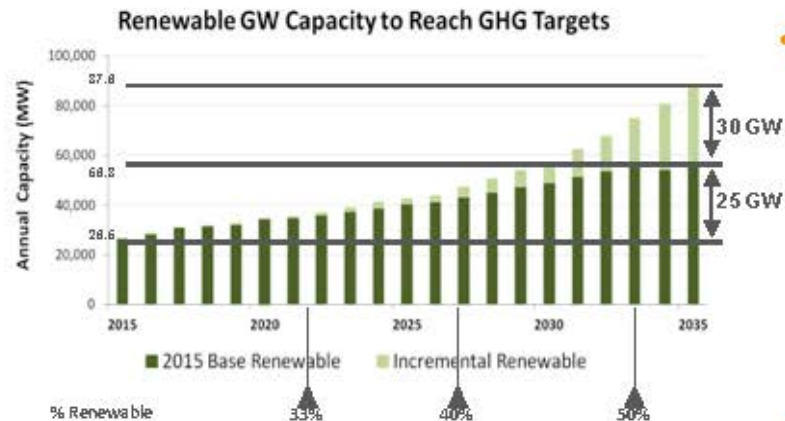
Holger Grubel  
Director



EnBW is the second largest utility in Germany and is one of the leading developers and operators of offshore wind farms in Europe.

- Offshore wind portfolio of 2,000 MW;
- Expertise in project development, construction and operation & management of offshore wind projects;
- EnBW constructs, operates and invests in the grid infrastructure;
- EnBW's business segments:
  - transmission & distribution of electricity and gas
  - provision of grid-related services
  - supply of water
  - security of energy supply
  - Energy system stability

## CA Market Demand for Renewables and Dynamics: GHG = significant demand for renewable energy



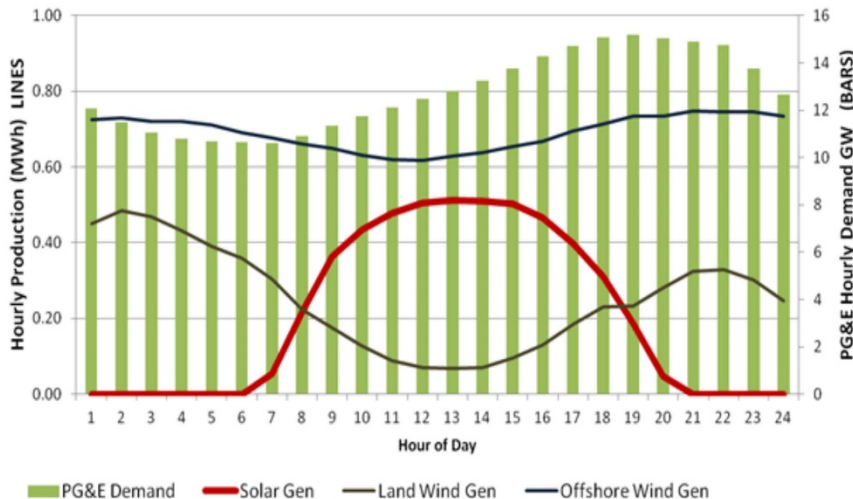
- Existing law in California (SB100 and AB32/SB32) will require approximately 15 to 25 GW of new renewable capacity by 2030 or ~2.5 GW/year
  - ~25 GW to transition the existing generation portfolio to renewables assuming zero load growth
  - ~30 GW for new renewable capacity to meet any load growth (economic growth, Electric Vehicles or other)
- SB100 was enacted into law on Aug 31, 2018, calling for 60% renewables by 2045, plus 40% of clean energy
- Market dynamics:
  - Market share is shifting from Utilities to Community Choice Aggregators (CCAs) and End Users (E-U)
  - CCAs and EUs are demanding renewable energy



# Market Needs: The “Duck Curve” / Offshore Wind (OSW) Characteristics



Hourly Generation vs Demand



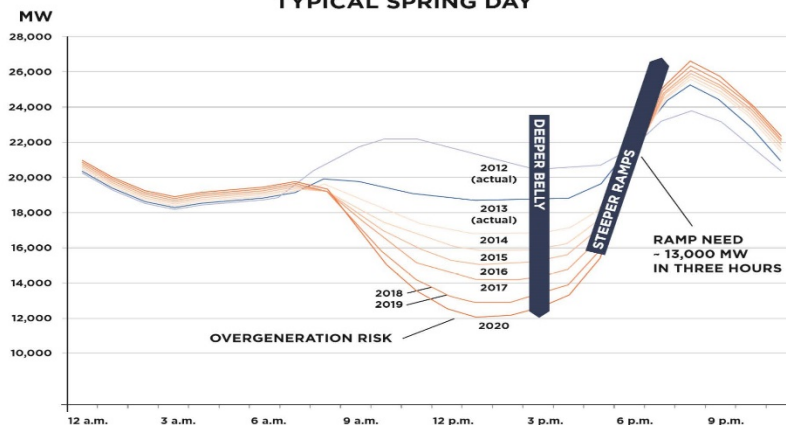
## Generation profile of OSW can offset the impact of high solar PV penetration

- During most months, the difference in the generation profile from peak to trough is minor - approximately 15% on average
- Production falls during the 24-hour period, it generates less during the mid-day period when over-generation risk is greatest, helping to offset operational problems
- Contribution to solve the duck curve is greatest in the late spring months when the operational challenges are the greatest for CAISO

## A generic 1 GW OSW farm could offset CAISO’s operational challenges of a 1 GW solar PV facility

- Over-generation risk is reduced, since production does not scale up as the sun rises (“the belly of the duck does not get deeper”)
- The afternoon ramp is reduced, since production is not affected by the setting of the sun (“the neck is not as steep”)

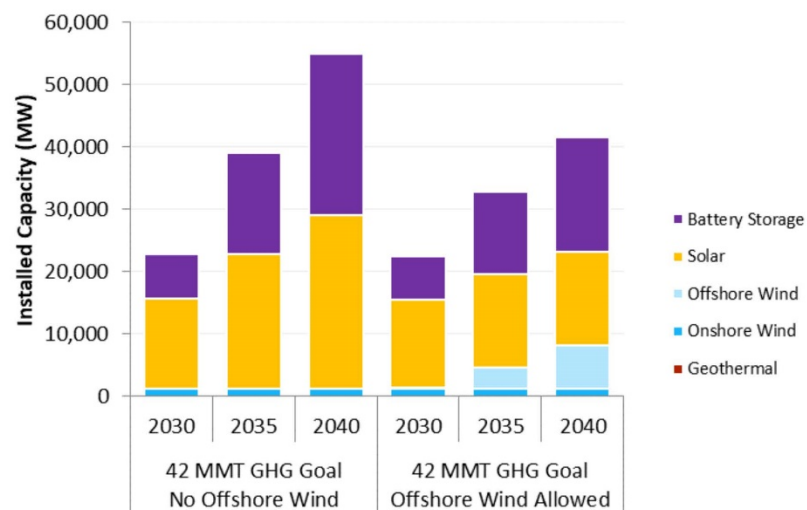
TYPICAL SPRING DAY



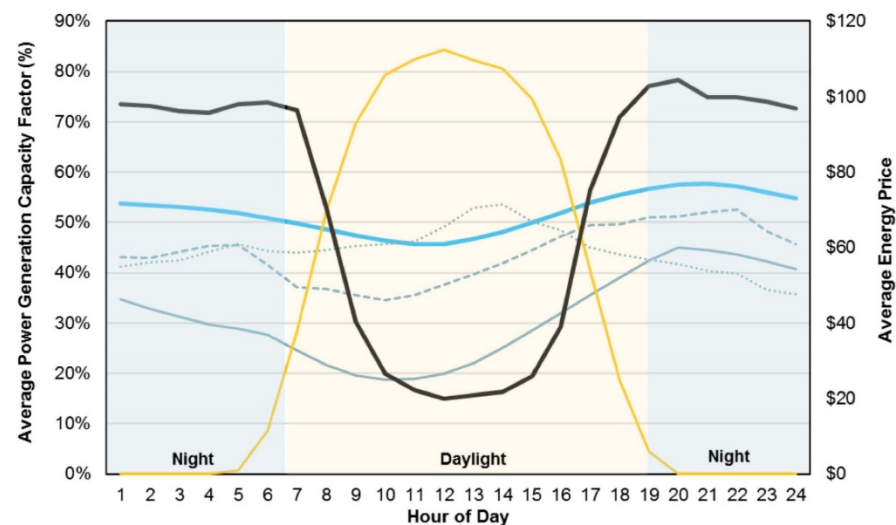
# Value of OSW to California



## Long-Term Resource Additions w/ and w/out Offshore Wind



## Offshore Wind Offers Highest Value Generation Profile

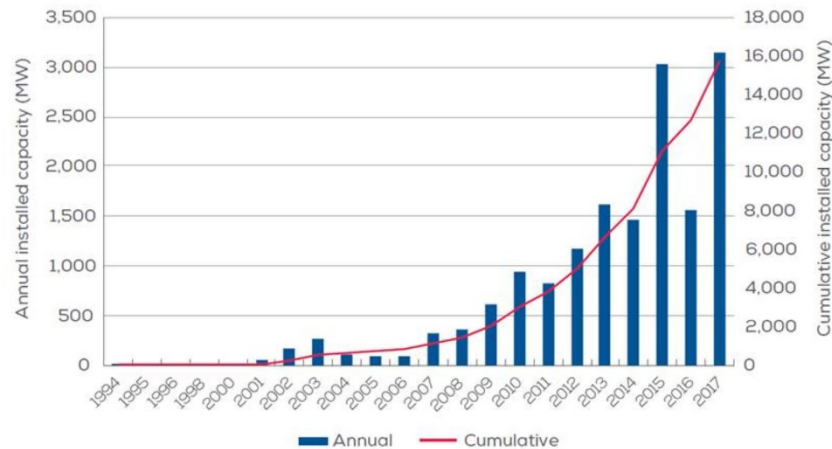


- ## Offshore Wind Experience:
- 16 GW Fixed installed in Europe
  - 8 MW Floating worldwide



### Fixed: 15,780 MW installed capacity in Europe

Cumulative and annual offshore wind energy installation

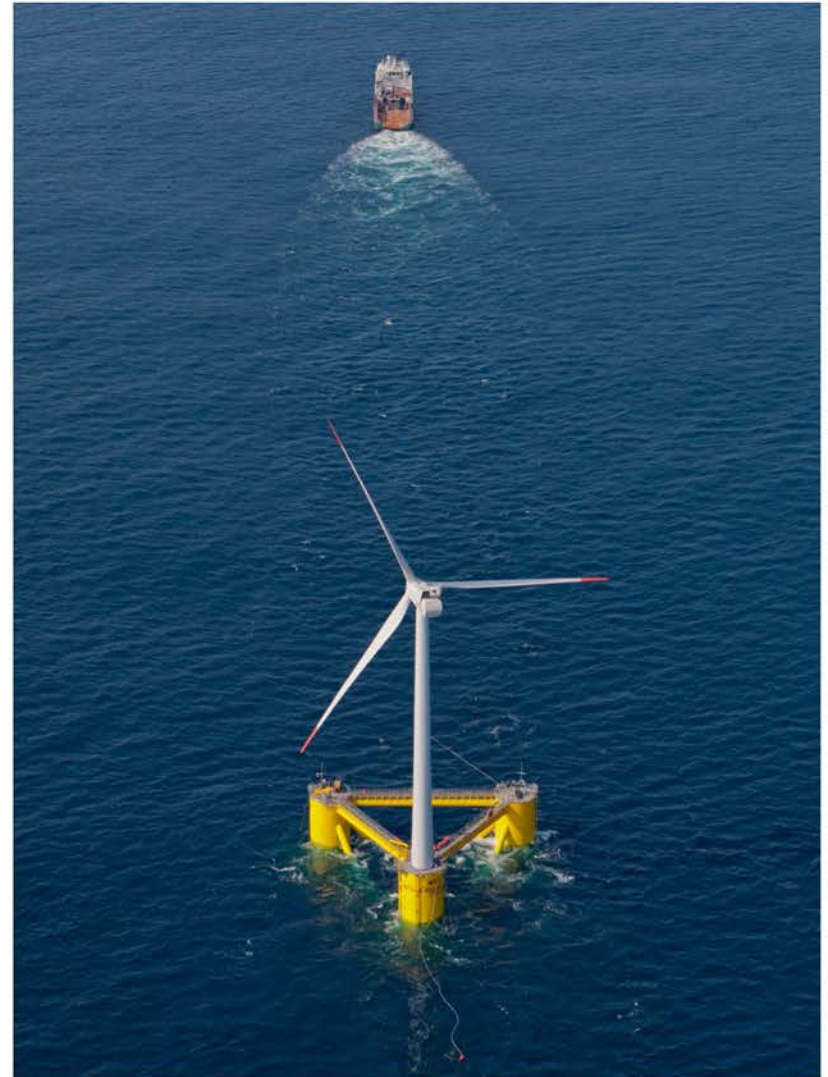


Source: WindEurope

### Floating: 38 MW installed capacity world-wide



## Floating Support Structures





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## Floating Offshore Wind: Deep Water locations / Reduces Environmental Impacts



### **Environmental Impact and Geotechnical Requirements**

- No Piling - eliminates noise, pile rejection, offers reduced weather dependence.
- Complete decommissioning – all infrastructure fully recoverable
- Reduced core sampling in field – drag embedment anchors

### **Flexible Site Location**

- Deep water solution – incremental cost increase minimum
- Conventional mooring – inexpensive, uses steel chain and cable
- Drag embedment anchors – effective in all soil conditions: clay, sand and layered soil.
- Produce more energy – site selection is based on resource energy density

### **Serial Production – On Shore Construction**

- Every floating support structure hull in a project is identical – learning curve of 80%
- Fabrication technique is modular – distributed manufacturing
- Load out is bottleneck but can be done in a few days

### **Quayside Commissioning and WTG Installation**

- All commissioning activity completed onshore – onshore labor rates infrastructure.
- Reduced weather dependence – everyone comes to work everyday in shipyard

## Events Timeline



### 2016

- Jan 14, 2016 - Trident Winds submits an Unsolicited Lease Request to BOEM;
- May 12 - Gov. Brown requests BOEM to form an Intergovernmental Task Force;
- Aug 20 - BOEM publishes Request For Interest (RFI) in the Federal Register, soliciting expressions of interest and comments;
- Sep 19 - BOEM receives 13 comments from various stakeholders and an Expression of a Competitive interest from Equinore (formerly Statoil)
- Oct 13 - BOEM & CEC hold Task Force meeting # 1, announces a competitive leasing process with an auction after Wind Energy Areas (WEA) have been identified; BOEM & CEC initiate data collection to identify WEAs

### 2017

- Aug - Navy publishes map that shows all of Central California having conflicts with DoD missions

### 2018

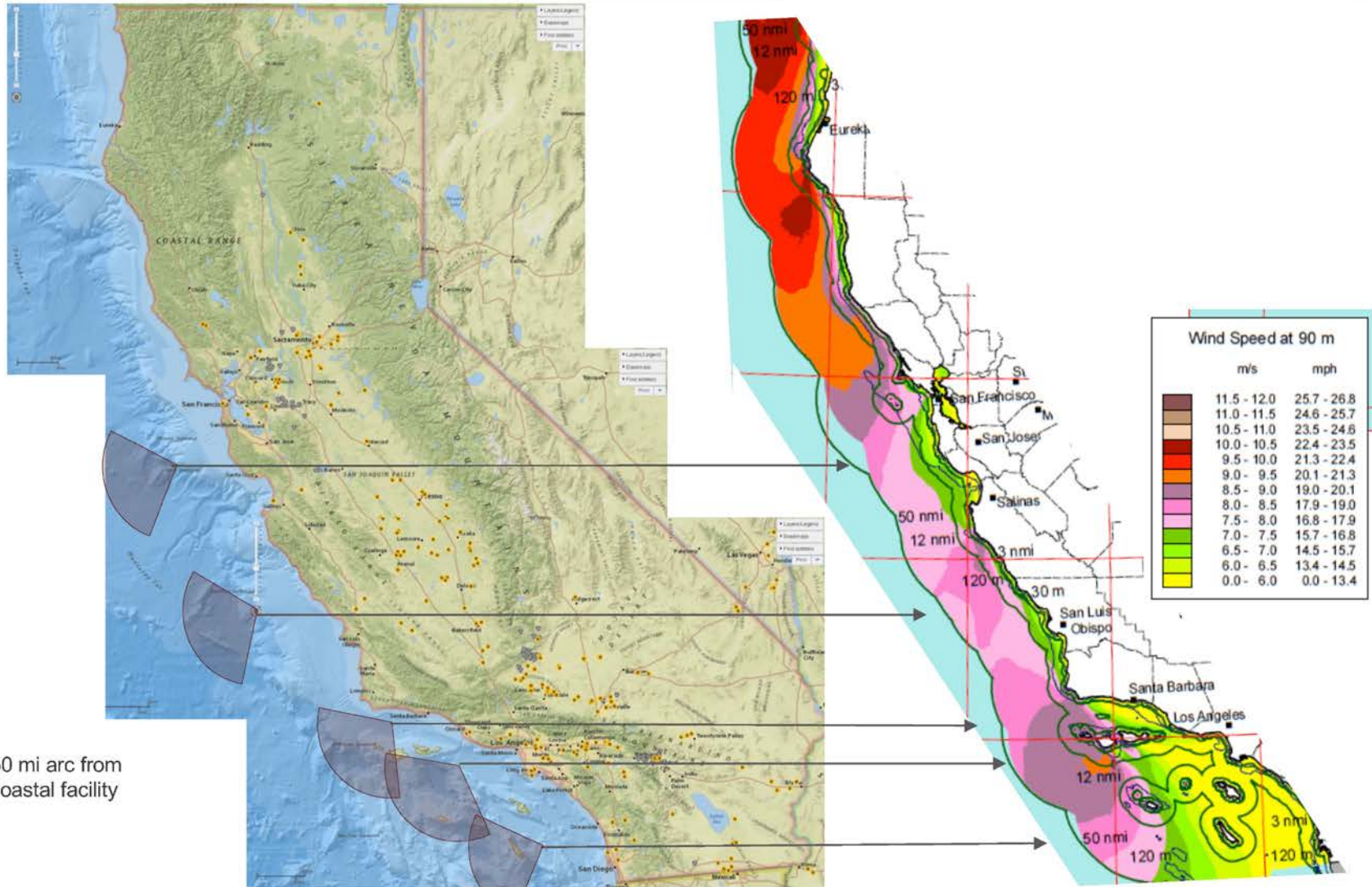
- Mar 30 – Trident Wind formed a JV with EnBW for the development and operation of the project;
- April 15 – JV submits Grid Interconnection Request to CAISO;
- Mar – Jun - JV partners work closely with the DoD on resolving military conflicts;
- Sep 17 – BOEM holds Task Force meeting #2.
- Sep 19 – BOEM published the Call for Information and Nominations (Call) for Humboldt, Morro Bay and Diablo Canyon Call Areas

### 2019

- Jan 29 – BOEM receives over 100 comments to the Call, and 14 nominations for all 3 Call areas
- Apr - Rep. Carbajal requests DoD to identify offshore wind areas
- Jun 13 - House Armed Services Committee passes legislation that includes report language that “calls for analysis of the compatibility of offshore wind turbines off the central California coast with military testing and training”



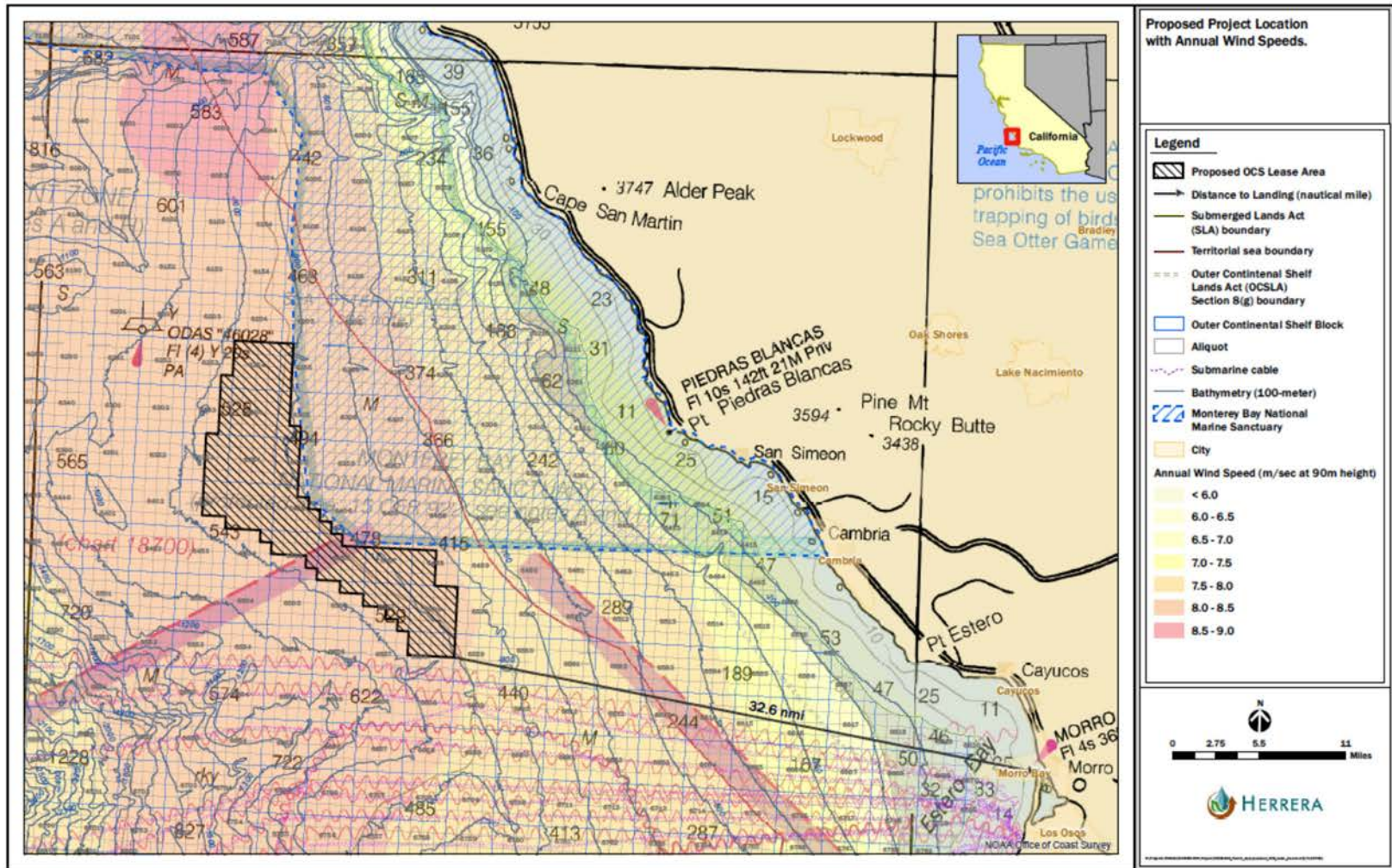
# CA Wind Resource/ Interconnection Points



## Interconnection: On Shore Infrastructure









# Offshore Renewable Energy Leasing Process



## Planning & Analysis

- **Intergovernmental Task Force**
- **Call for Information & Nominations (Call)**
- Area Identification
- Environmental reviews

## Leasing

- Publish leasing notices
  - Proposed
  - Final
- Issue lease(s)

## Site Assessment

- Site Characterization
- Site Assessment Plan (SAP) developed by Lessee


## Construction & Operations

- Construction and Operations Plan (COP) reviewed under NEPA
- Facility Design Report & Fabrication and Installation Report
- Decommissioning

*Public input opportunities throughout the process including public meetings and Federal Register notices providing for public comment periods and opportunity for tribal consultation throughout*

**Multi Year Process**





California Call – Planned for mid to late November



## What is the Call?

**BOEM**  
Bureau of Ocean Energy  
Management



- Notice published in the *Federal Register* for formal public comment
- Requests information on focused areas for BOEM to consider in the planning, analysis and decision making process
- Requests nominations of interest for leasing from project developers
- Not a decision to lease

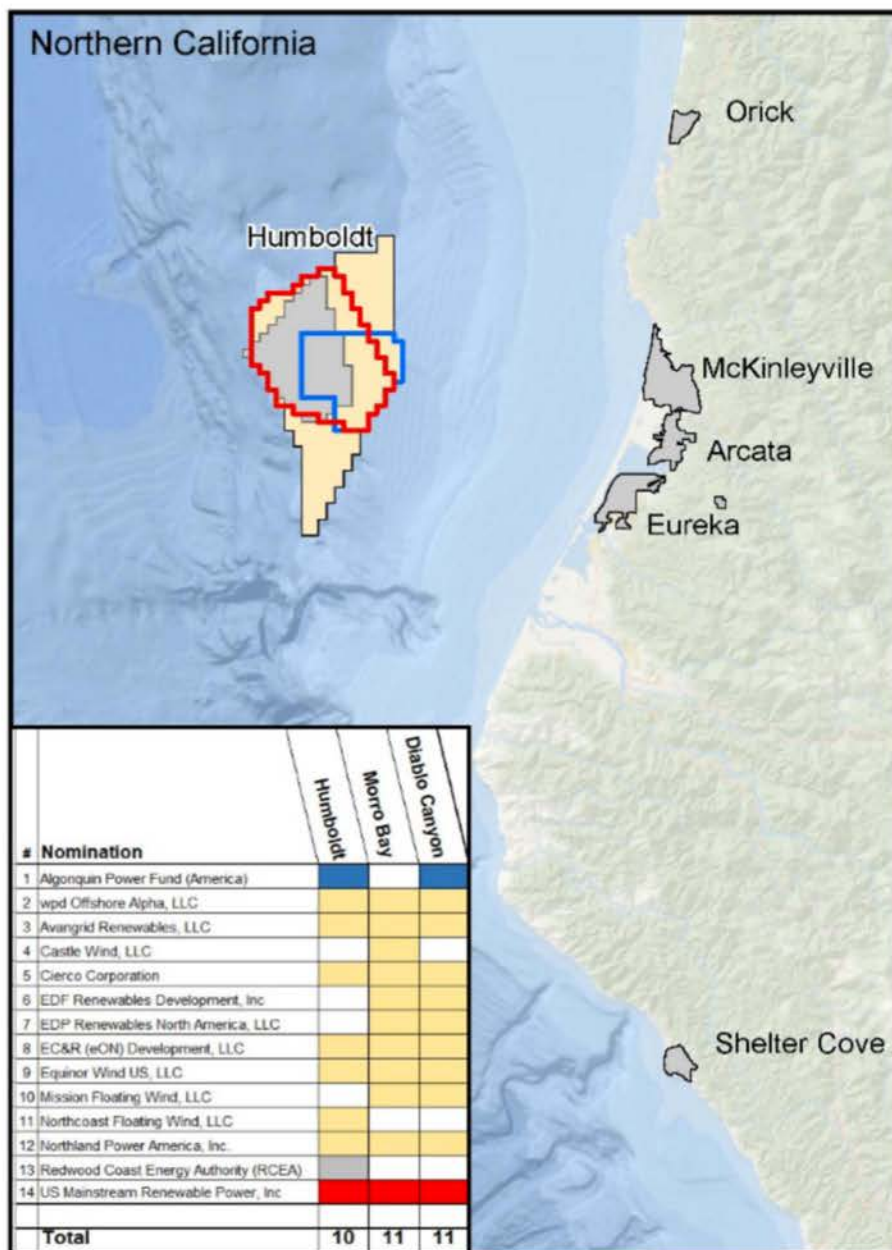
### Planning & Analysis

- Intergovernmental Task Force
- **Call for Information & Nominations (Call)**
- Area Identification
- Environmental reviews

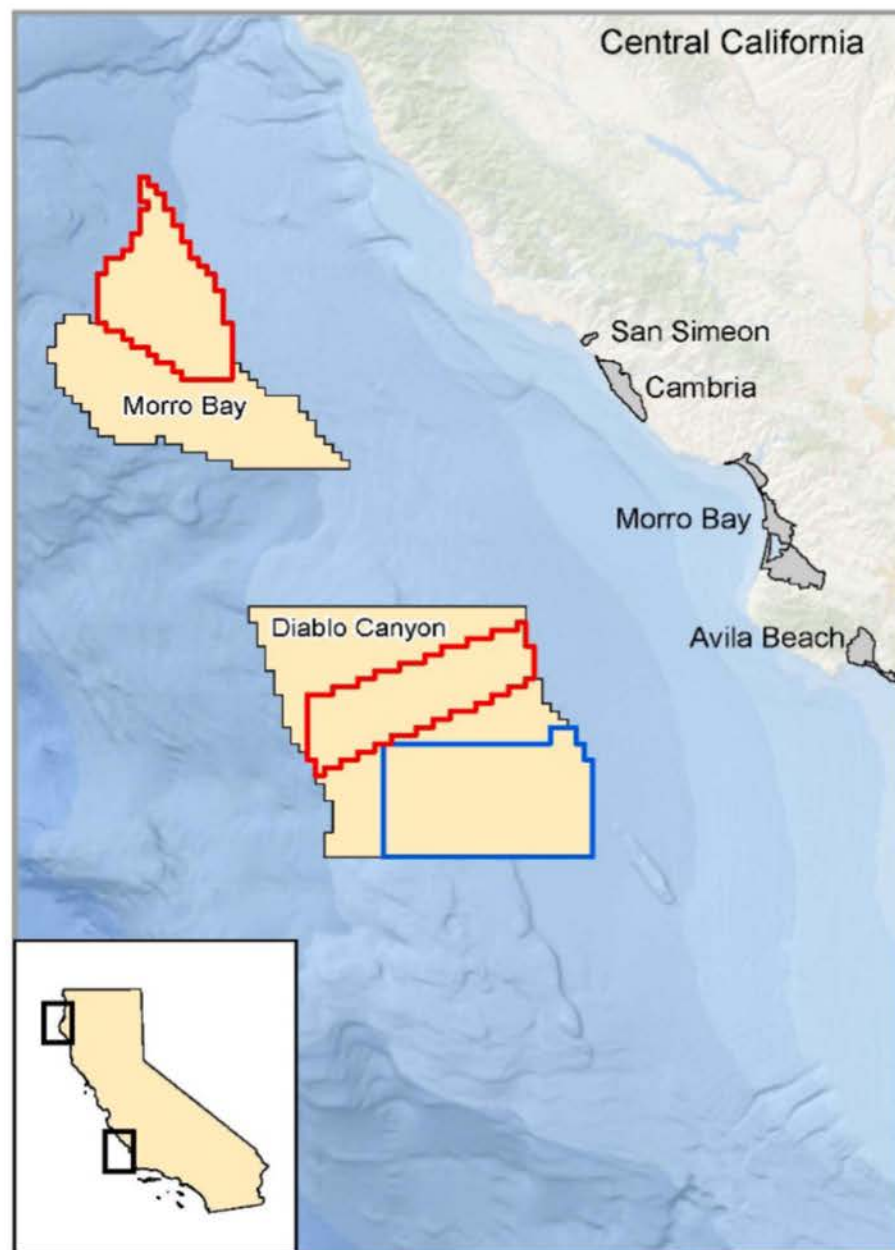




### Northern California

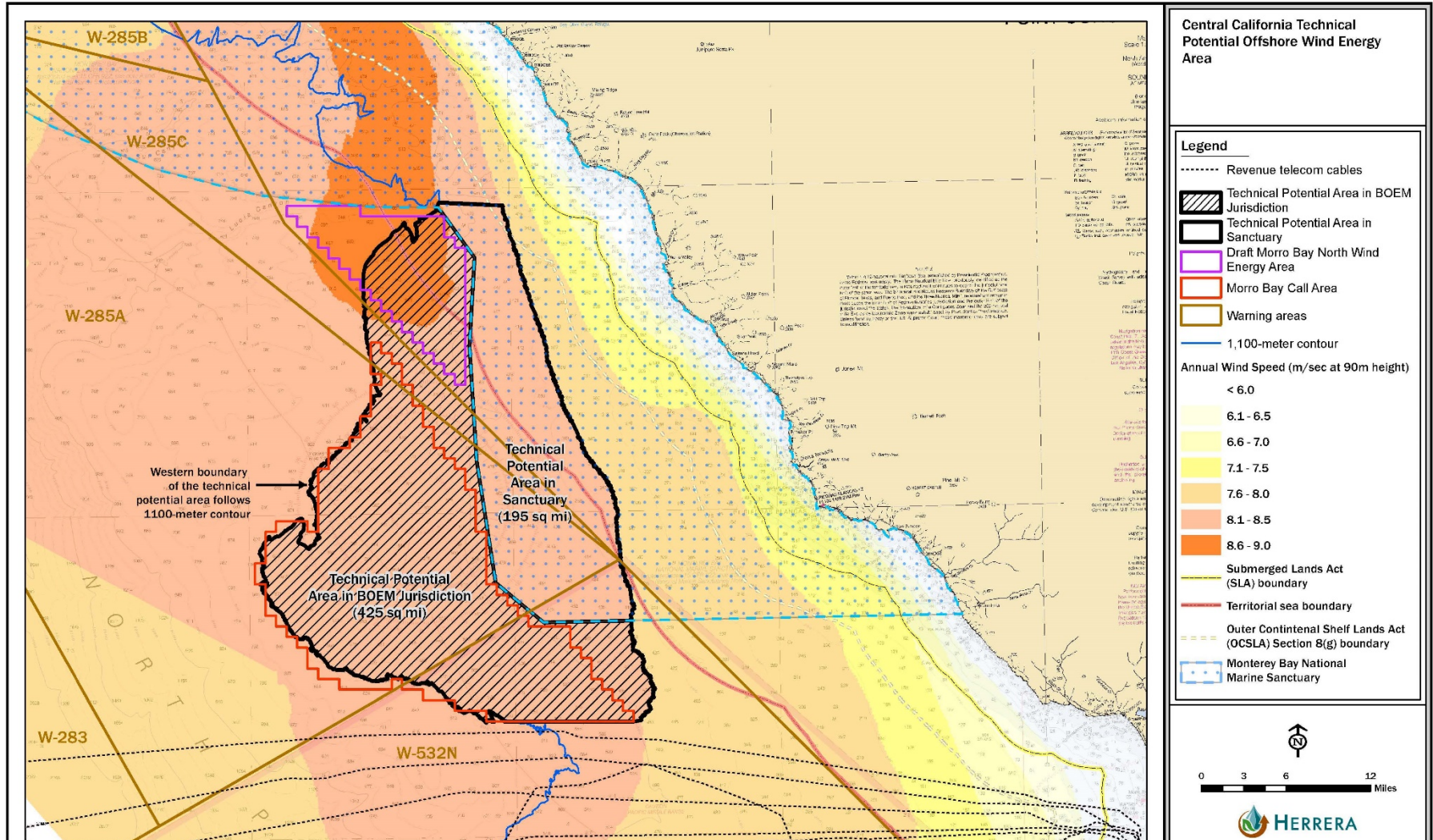


### Central California





# Morro Bay Area – Technical OSW Potential



And then?



## What is the next step after a Call?

- BOEM considers comments received during the Call and any nominations of interest
- BOEM may identify Wind Energy Area(s) (WEA) for environmental review: Area Identification (Area ID) Phase
- May include all or portions of the Call Areas
- WEAs would be analyzed under NEPA in an environmental analysis document

### Planning & Analysis

- Intergovernmental Task Force
- Call for Information & Nominations (Call)
- **Area Identification**
- Environmental reviews





## Upcoming Activities



### Future Activities:

- Draft Call to Task Force members early/mid October
- Publication of the Call in the *Federal Register* (60 day comment period due to holiday season)
- Area Identification
  - Review comments received during Call
  - Refine Area(s) based on input
  - Identify Wind Energy Areas (WEAs)
- Conduct NEPA on WEA(s)
- Publish Proposed Sale Notice (60 day comment period)
- Publish Final Sale Notice (at least 30 days before sale date)
- Hold Auction

## Permitting and Agency Stakeholders: It's a jackpot - 33 permits and licenses



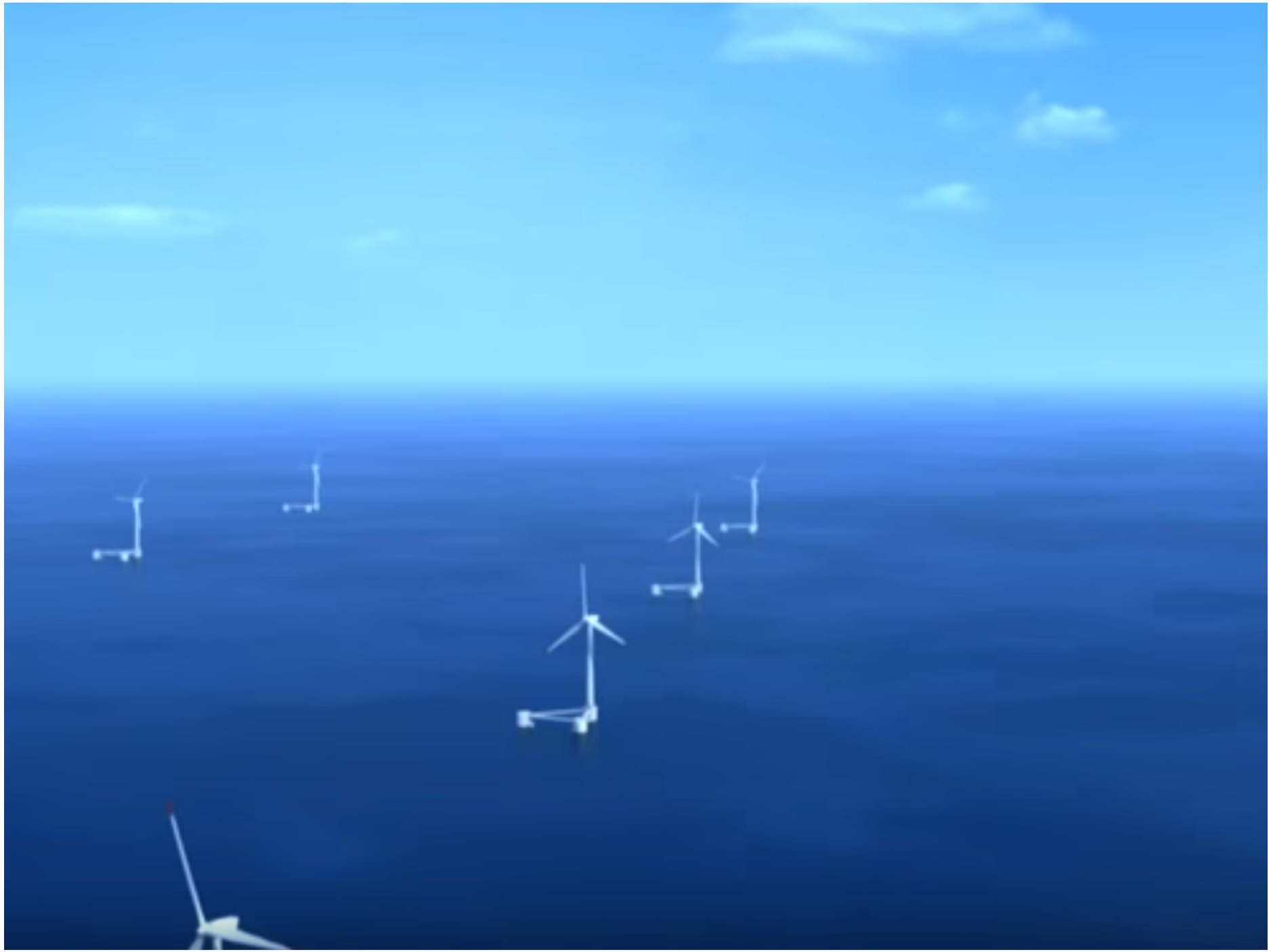
Federal Agencies	Jurisdiction	CA State Agencies	Jurisdiction
Bureau of Ocean Energy Management	Leasing, lead agency for NEPA	CA Department of Fish and Wildlife	Listed species, managed species
U.S. Fish and Wildlife Service	ESA, MBTA	CA Coastal Commission	CZMA, Coastal Development Permit
NOAA Fisheries	ESA, MMPA, MSFCA, CZMA	CA State Historic Preservation Office	Cultural/Archeology
U.S. Army Corp of Engineers	CWA 404; Rivers and Harbors Act	Regional Water Quality Control Board	CWA: WQ & Sediment transport
U.S. Coast Guard	Navigation	CA State Parks and Recreation	Parks and Recreation
Federal Aviation Administration	Aviation, Flight paths	CA Lands Commission	Jurisdiction for cable route and crossing through state waters
DOD	Military operations	CAISO/CPUC	Grid interconnection and transmission upgrades
		CA Ocean Protection Council	Management of CA ocean resources
		CPUC	PPA approval
		PG&E	Substation connection

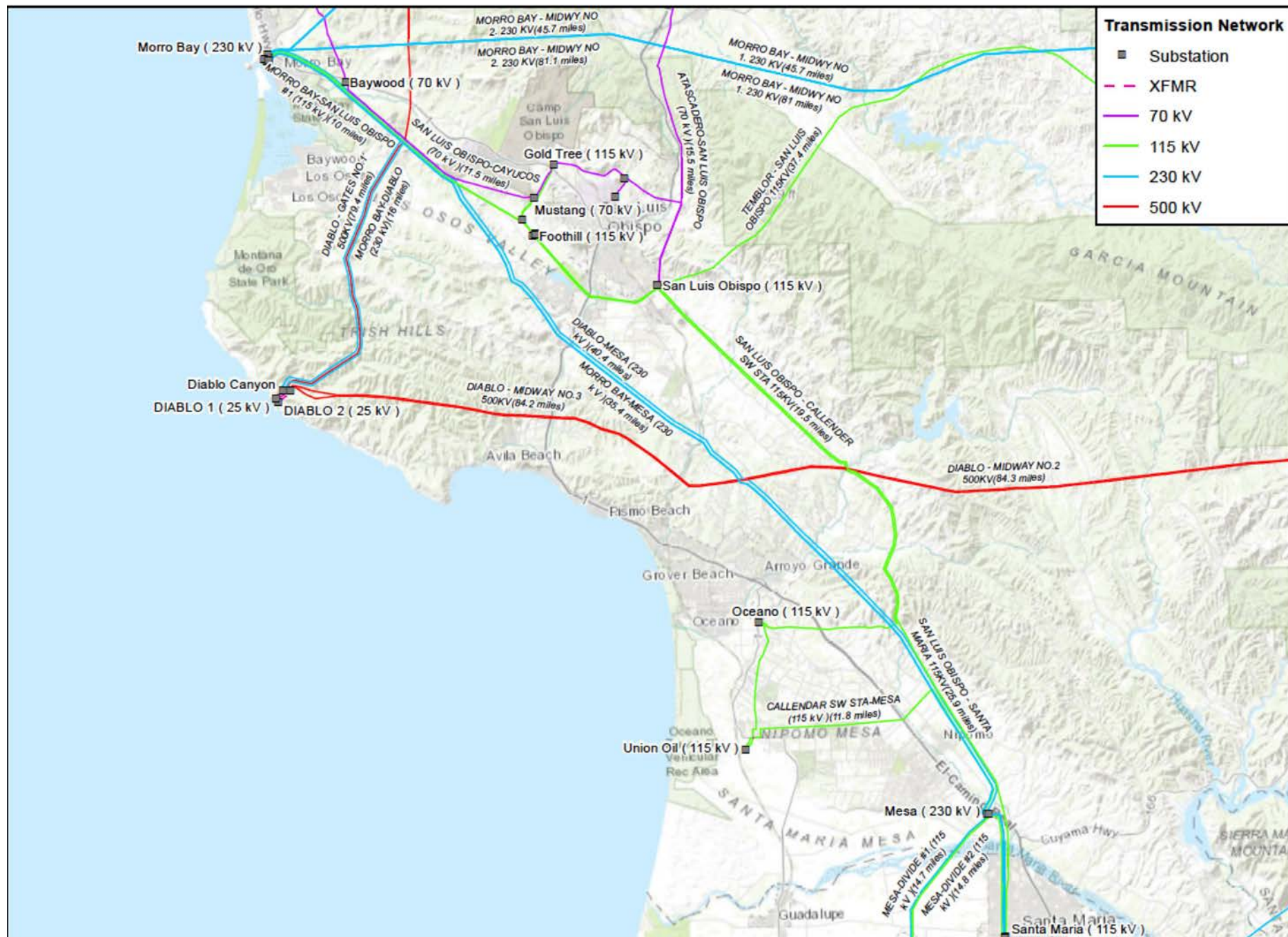
# Permitting: City, Tribes and Stakeholders



City/Tribes	Interests	Stakeholder Groups	Interests
NCTC	Sanctuary nomination	MBCFO	Fishing interests
City of Morro Bay	Community Benefits Agreement	The Sierra Club	Clean Air Act, Clean Water Act, and Endangered Species Act
City of Morro Bay	Local permits	The Audubon Society	Birds
City of Morro Bay	Outflow tunnel lease	Surfrider Foundation	Surfing
		The Nature Conservancy	Wildlife
		The Environmental Defense Fund	Smart economics, practical partnerships & rigorous science, clean energy, climate solutions
		Natural Resources Defense Council	Wildlife and wild places, clean energy, climate solutions







## AUTHORIZE CEO TO EXECUTE A MEMORANDUM OF UNDERSTANDING (MOU) WITH CASTLE WIND LLC

**RECOMMENDATION:** Authorize the CEO to execute a Memorandum of Understanding (“MOU”) with Castle Wind LLC.

Execution of this MOU will be an expression of MBCP’s good faith intent to draft, negotiate, and enter into a power purchase agreement (PPA) with Castle Wind LLC for output from the Morro Bay Offshore Wind Project and, thus, aid in the successful development of the project.