

DOCKETED	
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Project Title:	SB 605 Wave and Tidal Energy - Phase 2
TN #:	272968
Document Title:	Presentation - Introduction and Overview of SB 605 Draft Report
Description:	September 30 Workshop Presentation 1 - California Energy Commission
Filer:	Danielle Mullany
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Workshop on Senate Bill 605 Draft Commission Report: Wave and Tidal Energy

Siting, Transmission, and Environmental Protection Division
September 30, 2026

Introduction



- Remote workshop
- Recording will be posted
- Public comments
 - End of workshop
 - Written comment by **November 3, 2026**



Workshop Schedule



1. Overview of Senate Bill (SB) 605
2. Presentation on *Draft Senate Bill 605 Wave and Tidal Energy Report to the Governor and Legislature*
3. Speaker Series: What's Next for Wave Energy in California?
 - Ben Ruttenberg, Professor and Director, Center for Coastal Marine Sciences, Cal Poly SLO
 - Justin Klure, Managing Director, Pacific Energy Ventures, LLC
 - William Doyle, Business Hub Manager, AltaSea at the Port of Los Angeles
 - Dragan Tutic, CEO & Founder, Oneka Technologies
4. Public comment





Overview of Senate Bill 605

Eli Harland, Supervisor, Offshore Renewable Energy Planning Unit

SB 605 Overview

Legislation



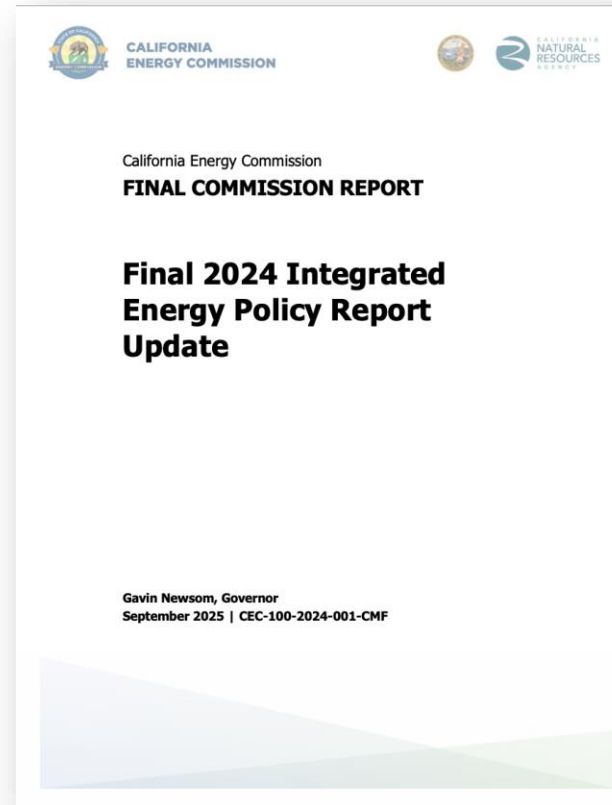
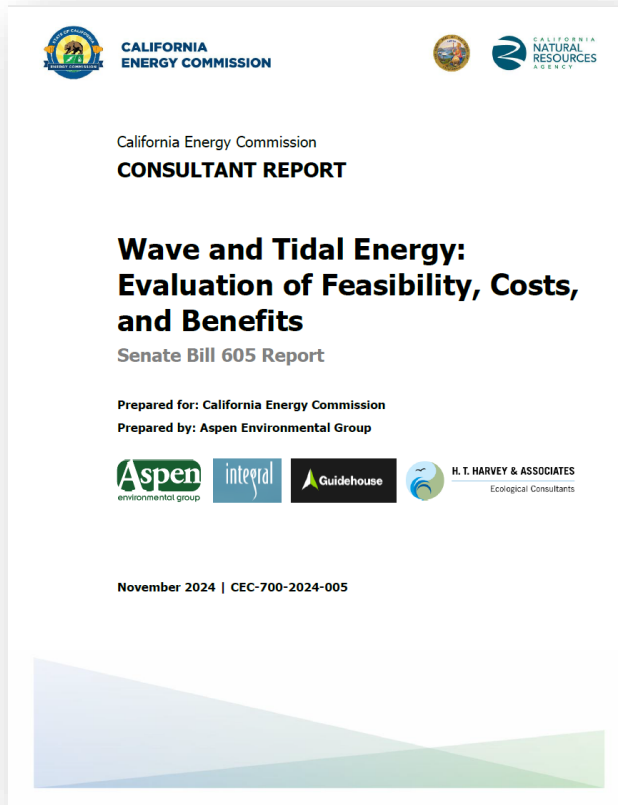
1. **Phase One Work:** As part of the 2024 IEPR, the CEC evaluated the feasibility, costs, and benefits of using wave and tidal energy.
2. **Phase Two Work:** The CEC coordinated and consulted with other state agencies, California Native American tribes, fishing communities, industry, nongovernmental organizations, and other interested parties, to...
 1. Identify suitable sea space for offshore wave and tidal energy projects in state and federal waters
 2. Identify measures for:
 - a) Avoiding, minimizing, and mitigating environmental and ecosystem impacts and use conflicts
 - b) Monitoring and adaptive management for offshore wave and tidal energy projects

SB 605 Overview

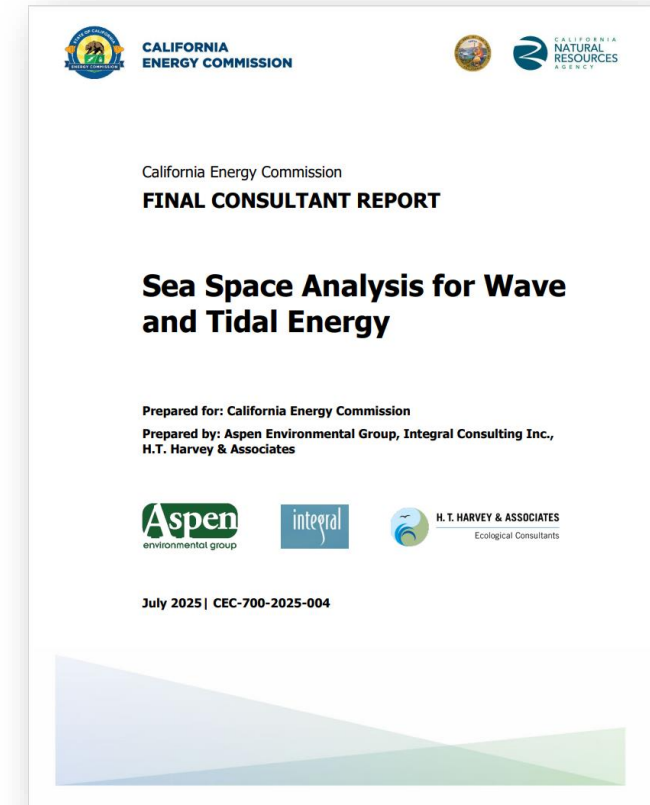
Reports published to date



Phase 1



Phase 2





Presentation of Senate Bill 605 Draft Commission Report: Wave and Tidal Energy

Danielle Mullany, Program Specialist, Offshore Renewable Energy Planning Unit

SB 605 Wave & Tidal Energy Draft Report

Report Organization and Chapter Objectives



➤ **Chapter 1: Introduction**

- Overview of SB 605 statutes, wave and tidal technology, marine energy applications

➤ **Chapter 2: Evaluation of Feasibility, Costs, and Benefits of Wave and Tidal Energy**

- Findings on technology, economics, transmission, permitting, and workforce needs

➤ **Chapter 3: Sea Space Analysis for Wave and Tidal Energy**

- Findings on identification of suitable areas, siting considerations, and monitoring strategies

➤ **Chapter 4: Next Steps and Considerations for Development**

- Overview of active marine energy test sites and pilot projects
- Considerations for the Legislature for advancing wave and tidal energy in California

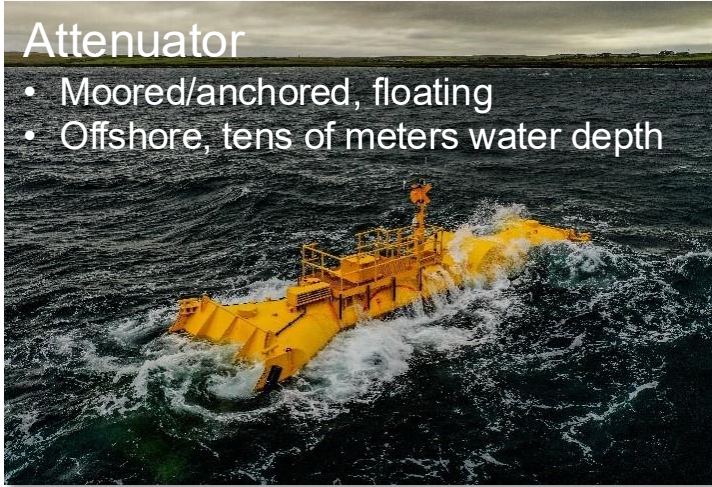
SB 605 Report: Chapter 1 – Introduction

Wave Energy Technology Overview



Attenuator

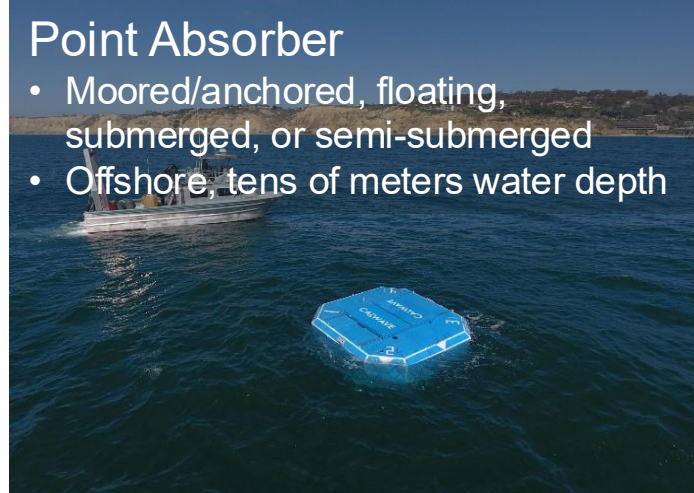
- Moored/anchored, floating
- Offshore, tens of meters water depth



Mocean Energy

Point Absorber

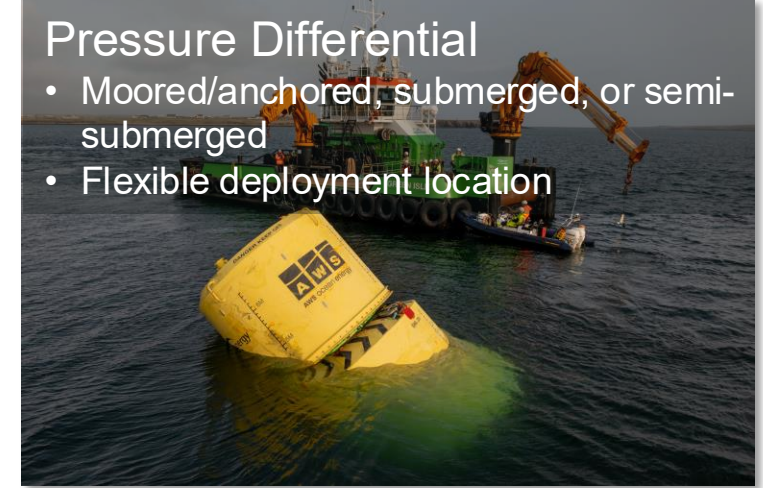
- Moored/anchored, floating, submerged, or semi-submerged
- Offshore, tens of meters water depth



CalWave

Pressure Differential

- Moored/anchored, submerged, or semi-submerged
- Flexible deployment location



AWS

Oscillating Water Column

- Fixed on land or seabed, or moored
- Shore-based, nearshore, or offshore



Ocean Energy

Overtopping

- Fixed on land or seabed or moored
- Shore-based, nearshore, or offshore



Wave Dragon

Oscillating Wave Surge

- Moored/anchored, floating, submerged, or semi-submerged, or bottom-fixed
- Nearshore, <12 water depth



Resolute Marine Energy

SB 605 Report: Chapter 1 – Introduction

Tidal Energy Technology Overview



Axial Flow Turbine

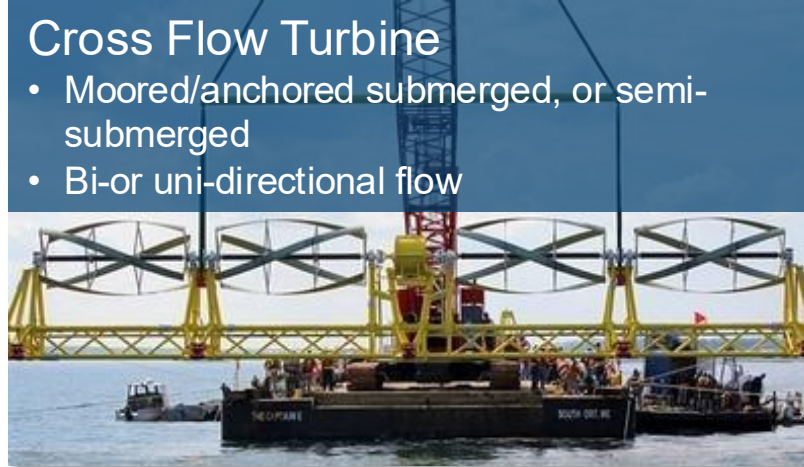
- Bottom-mounted
- Bi- or uni-directional flow



SAE Renewables

Cross Flow Turbine

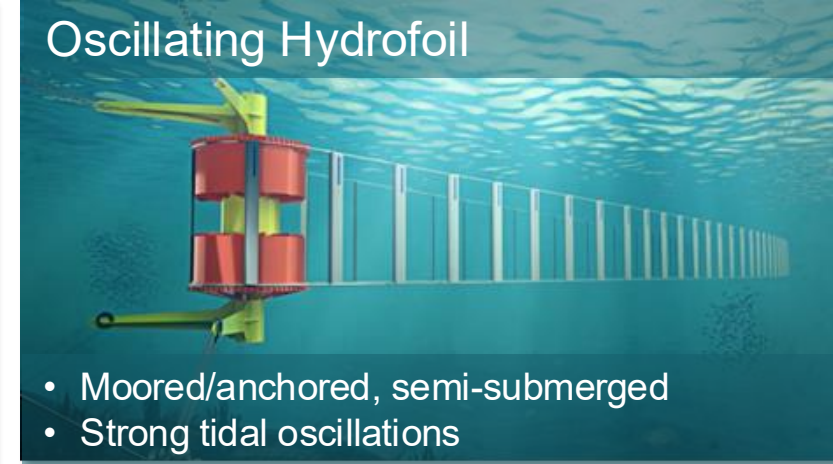
- Moored/anchored submerged, or semi-submerged
- Bi- or uni-directional flow



Ocean Renewable Power Company

Oscillating Hydrofoil

- Moored/anchored, semi-submerged
- Strong tidal oscillations



Tidal Sails

Tidal Kite

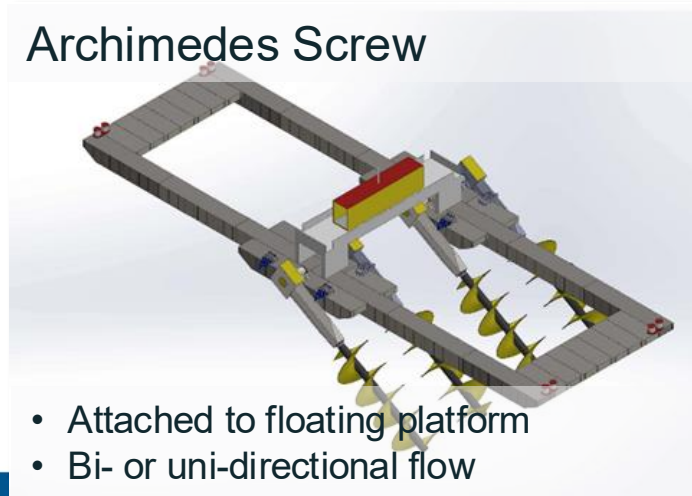
- Submerged, cabled to sediment bed
- Optimized to meet tidal conditions



Minesto

Archimedes Screw

- Attached to floating platform
- Bi- or uni-directional flow



Jupiter Hydro

Vortex Induced Vibration

- Bottom mounted attached to generator



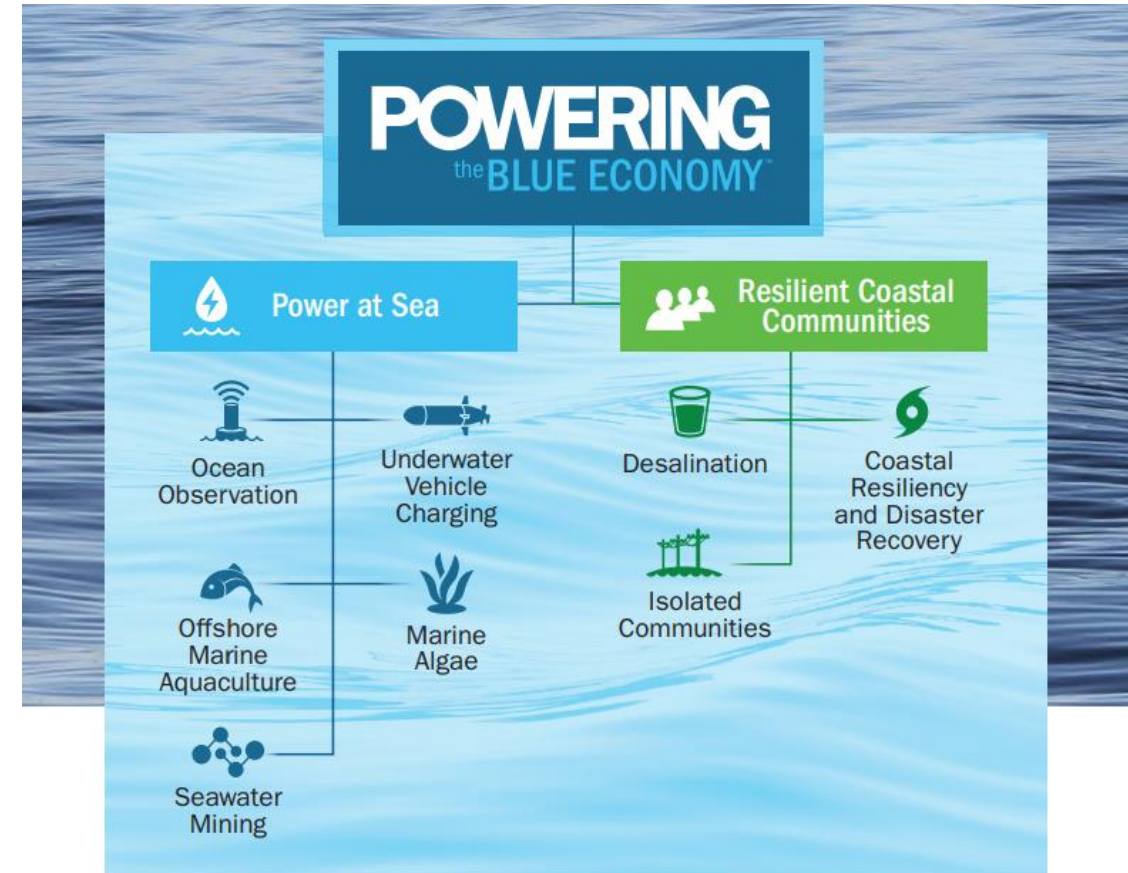
Vortex Hydro Energy

SB 605 Report: Chapter 1 – Introduction

Marine Energy Applications in California



- Commercial scale deployment
- Distributed marine energy
 - Ports and Harbors
 - Remote coastal communities
 - Community-based initiatives
 - Military installations and operations
 - Powering the “Blue Economy”
- Marine energy test sites



Source: US DOE, Office of Energy Efficiency & Renewable Energy

SB 605 Report: Chapter 2 – Feasibility Evaluation

Challenges and Opportunities to Development



Challenges to developing wave and tidal energy:

- Technology development
- Resource variability
- Grid integration
- Environmental impact
- Cost competitiveness
- Socioeconomics



Factors contributing to increased use of wave and tidal energy:

- Market signals
- Cost reductions
- Regional energy needs
- Improved understanding of environmental effects
- Pathway to permitting

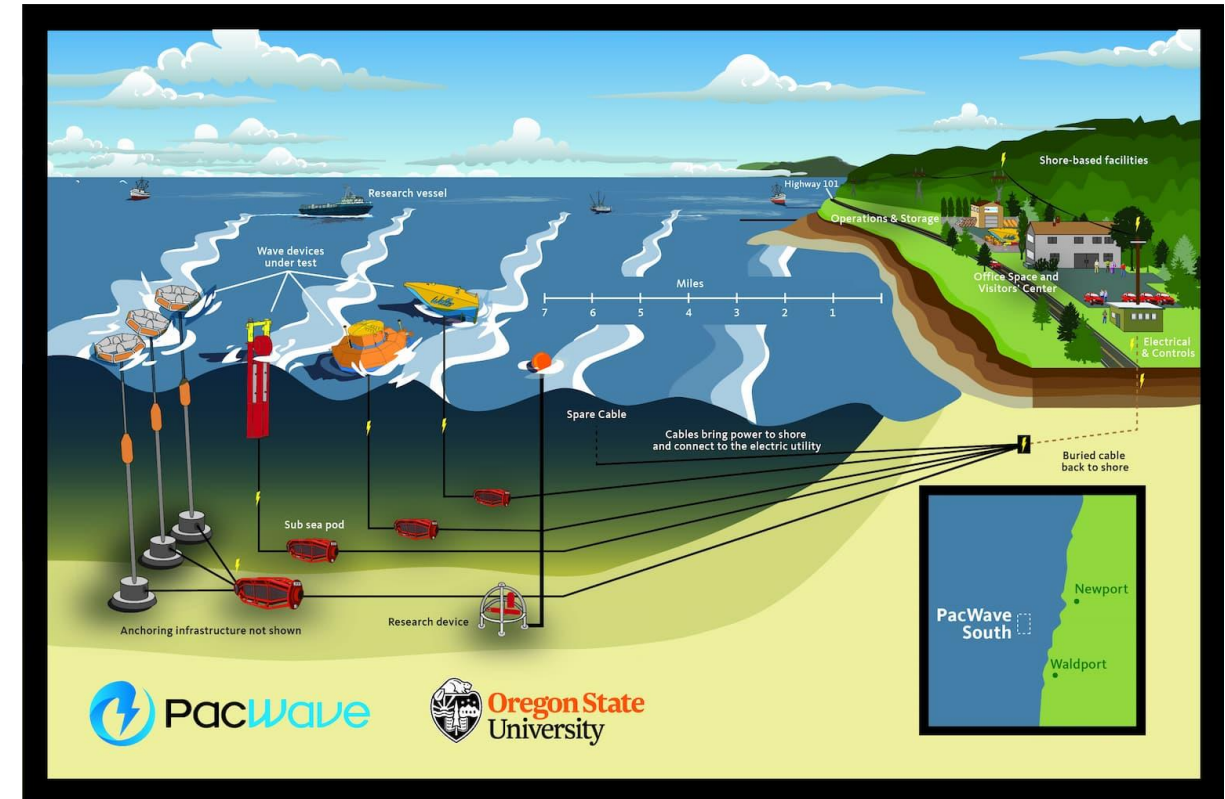
SB 605 Report: Chapter 2 – Feasibility Evaluation

Transmission Needs



Utility-scale generation (grid-connected)

- **Onshore projects** are generally mounted on coastal structures like breakwaters or piers.
- **Nearshore projects** are deployed in water depths of 10-25 meters, while **Offshore projects** are deployed in waters deeper than 25 meters.
- Transmission considerations for projects include:
 - Cables
 - Offshore substations
 - Transmission configurations



Source: PacWave

SB 605 Report: Chapter 2 – Feasibility Evaluation

State and Federal Permitting Requirements



Permitting requirements vary depending on location of deployment, purpose, size, and whether the power generated is grid-connected. Local governments may also have permitting responsibilities.

Primary State Agencies	Primary Federal Agencies
California State Lands Commission (CSLC)	Federal Energy Regulatory Commission (FERC)
California State Water Resources Control Board (SWRCB)	U.S. Army Corps of Engineers (USACE)
California Department of Fish and Wildlife (CDFW)	U.S. Coast Guard (USCG)
California Coastal Commission (CCC)/San Francisco Bay Conservation and Development Commission (BCDC)	Bureau of Ocean Energy Management (BOEM)

SB 605 Report: Chapter 2 – Feasibility Evaluation

Workforce Development Needs



- During construction and installation, most jobs required are in indirect industries (equipment and supply chain)
- During operating years, most jobs required are for direct industries (onsite operators and technicians)
- When scaling projects from 10 MW to 100 MW, workforce and economic impacts are ~8 times greater for wave energy and ~6 times greater for tidal energy



Source: CorPower Ocean

SB 605 Report: Chapter 3 – Sea Space Analysis

Wave and Tidal Resource



Key steps for evaluating suitable locations for marine energy deployments:

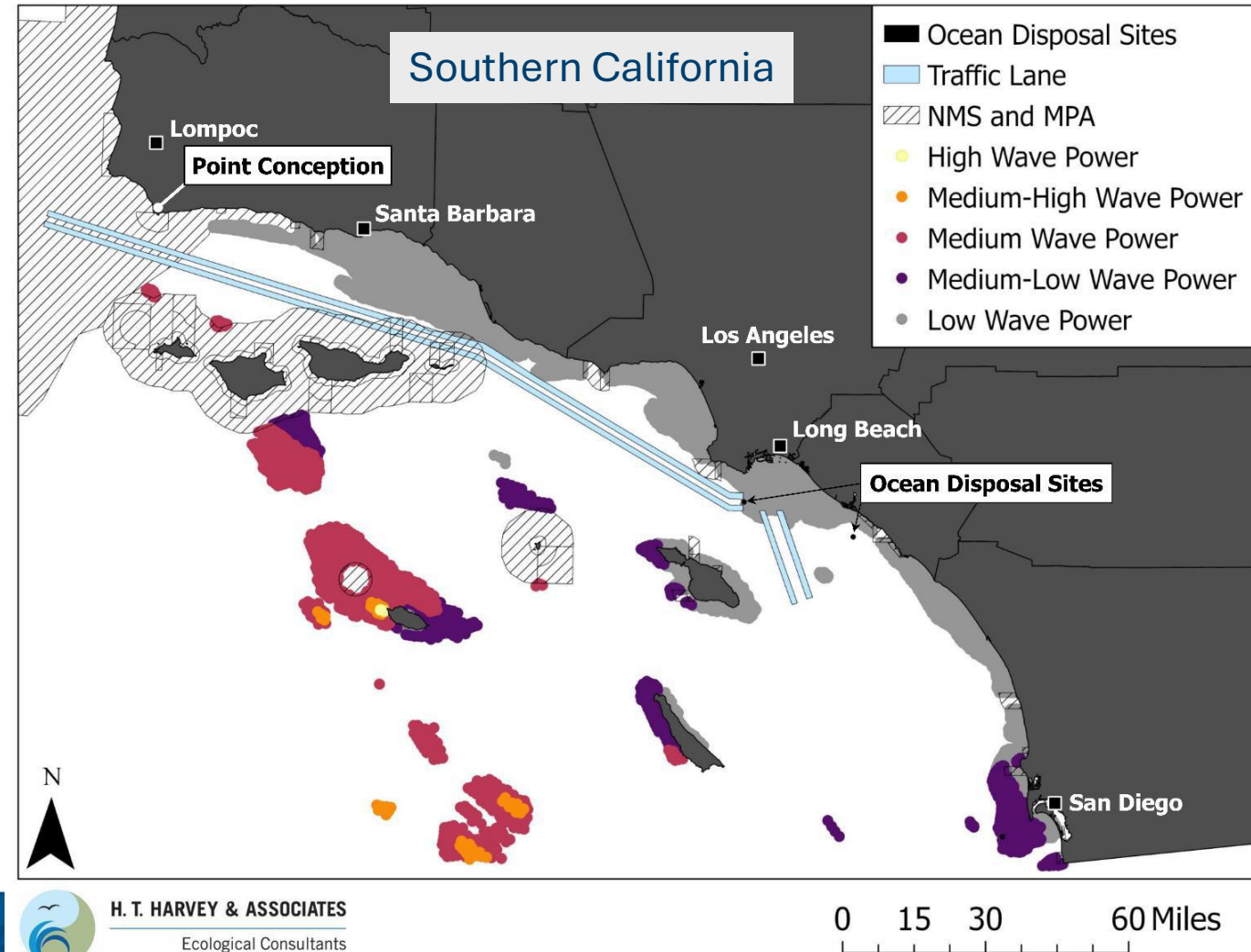
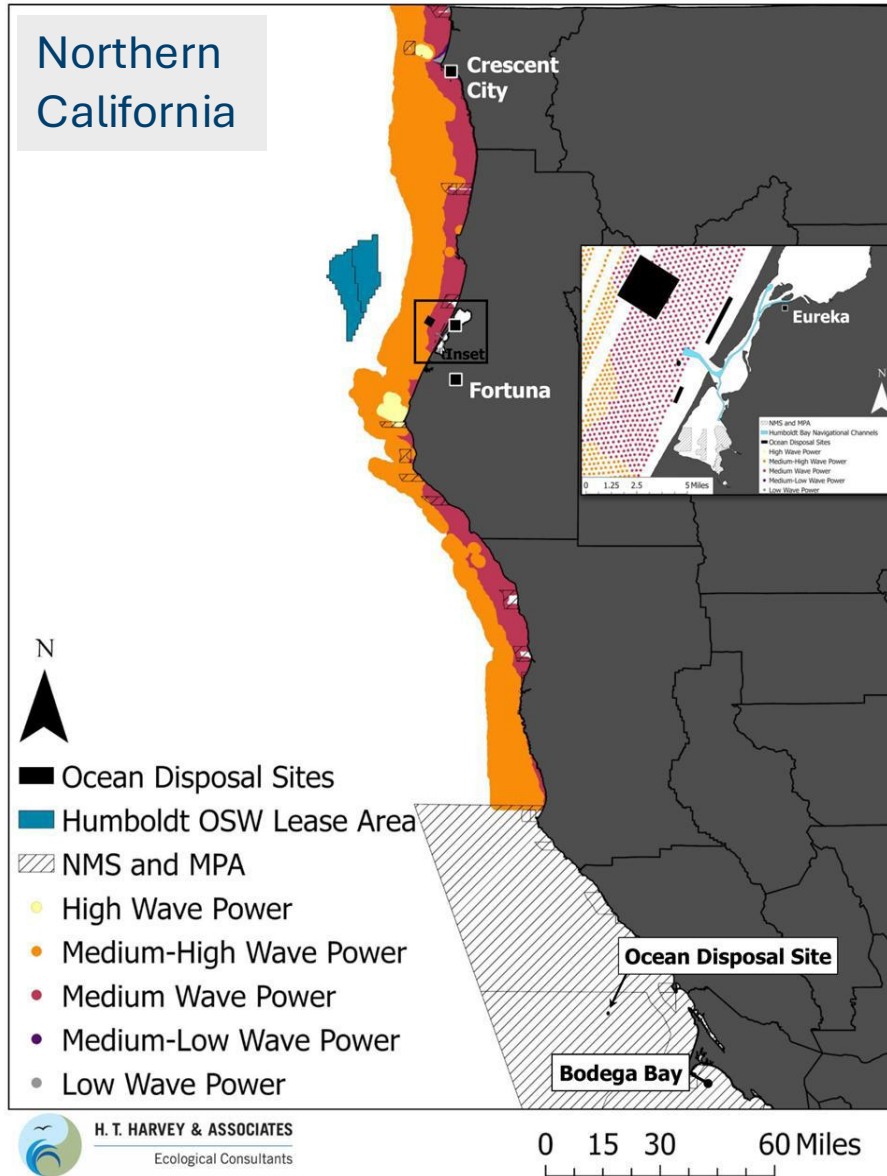
1. Identifying resource potential
2. Analyzing power matrices and device specifications
3. Evaluating site-specific considerations
4. Assessing economic viability and technological adaptation

“No-go” Zones are protected areas and other regions where commercial development is not permitted or where energy development would be dangerous/hazardous

- National marine sanctuaries and marine protected areas
- Commercial shipping lanes and navigational channels
- Ocean disposal sites (sediment disposal)

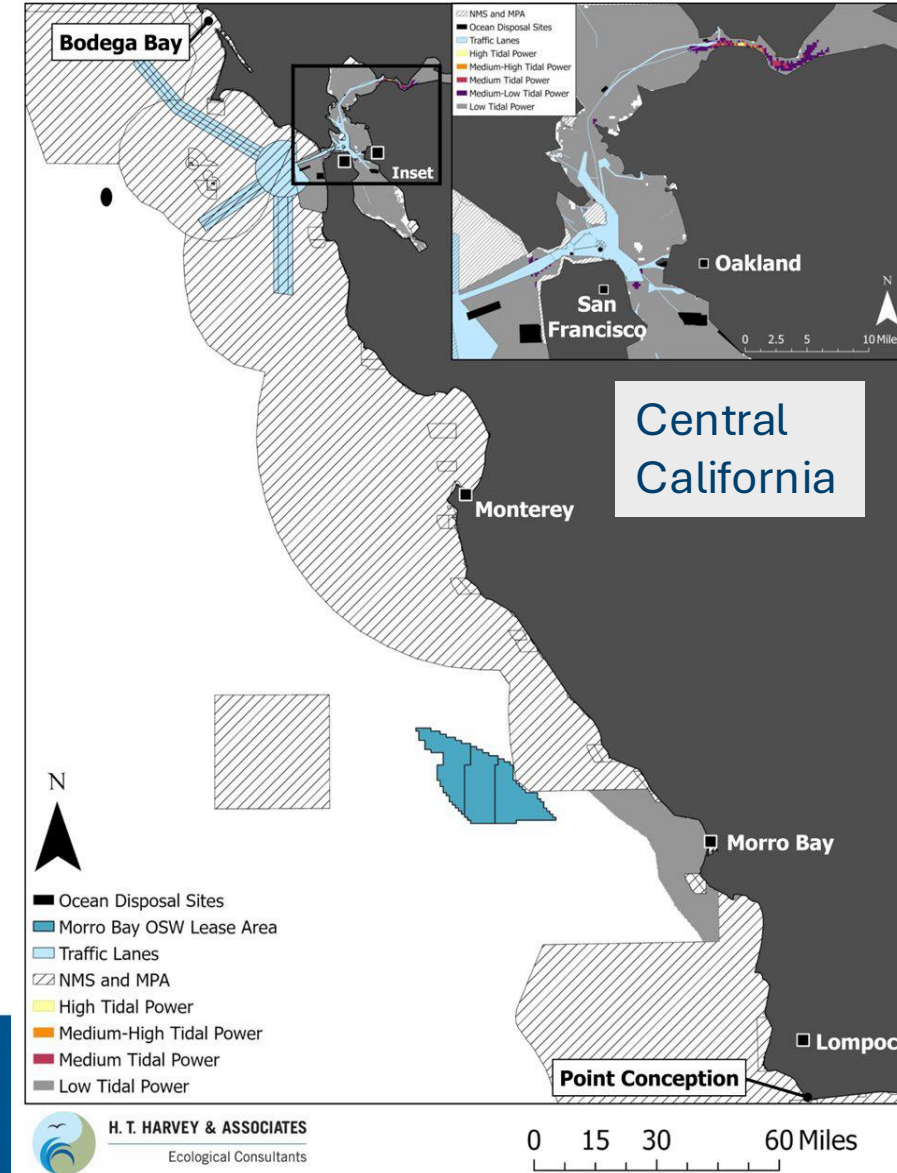
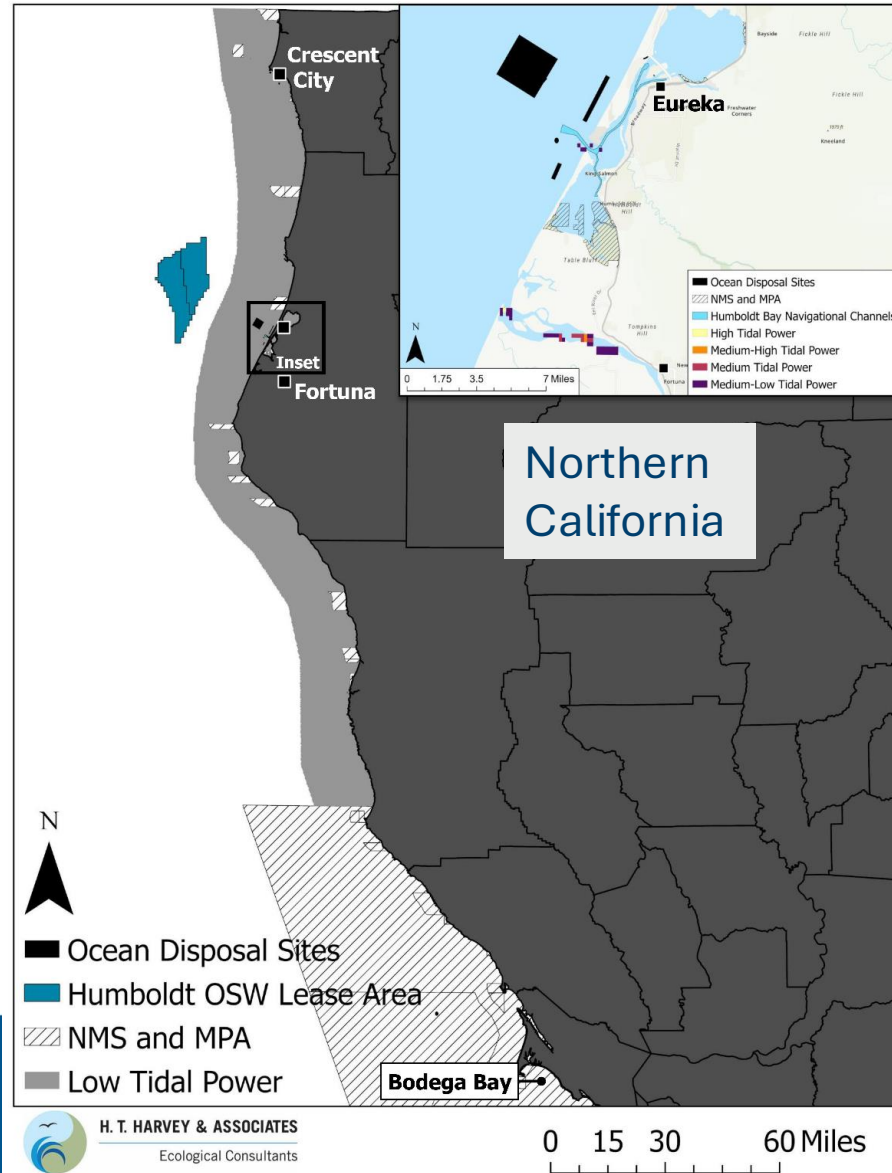
SB 605 Report: Chapter 3 – Sea Space Analysis

Wave Energy Resource Filtered by “No Go” Zones



SB 605 Report: Chapter 3 – Sea Space Analysis

Tidal Energy Resource Filtered by “No Go” Zones



SB 605 Report: Chapter 3 – Sea Space Analysis

Potential Sea Space Conflicts



➤ Infrastructure avoidance:

- Subsea data/fiber optic cables
- Pipelines
- Oil and gas platforms
- Oceanographic and meteorological ('metocean') buoys
- OSW lease areas (potential for co-location)

➤ Ocean Uses:

- Commercial shipping lanes
- Commercial and recreational fisheries
- Dredging and disposal sites
- Aquaculture (potential for co-location)
- State/county beaches, recreational areas, surfing areas
- Military operations

➤ Tribal, Cultural, and Historical Resources:

- Native American cultural sites, resources, and viewsheds
- Shipwrecks and archaeological sites

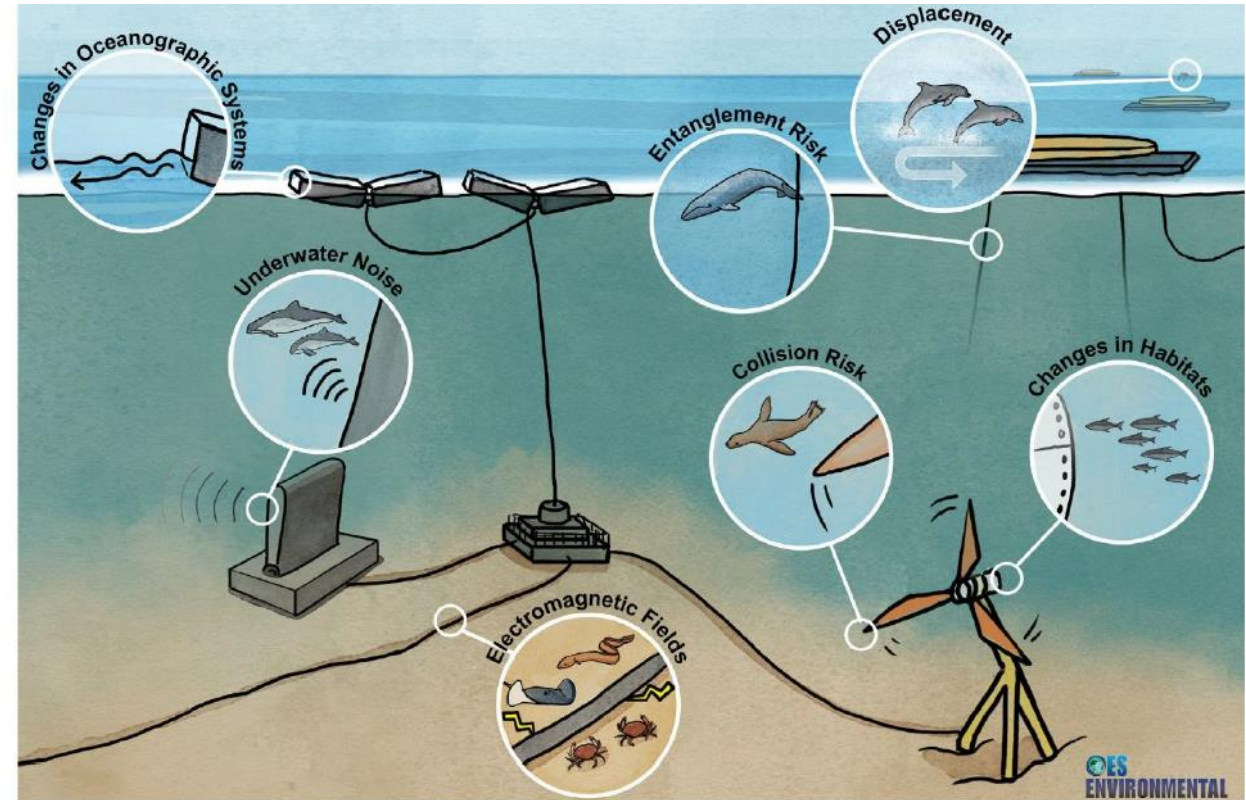
➤ Environmental Considerations:

- National Marine Sanctuaries
- Marine Reserves, Conservation Areas, and other Marine Protected Areas (MPAs)
- California Coastal National Monument
- Critical habitats for endangered species
- Biologically Important Areas (e.g. marine mammal feeding areas)
- Essential Fish Habitat (EFH), Habitat Areas of Particular Concern, and Conservation Areas

SB 605 Report: Chapter 3 – Sea Space Analysis

Potential Environmental Effects

- Collision, entrainment, impingement, and entrapment
- Underwater noise
- Electromagnetic fields (EMFs)
- Changes in habitats
- Entanglement
- Changes in oceanographic systems
- Displacement
- Water quality



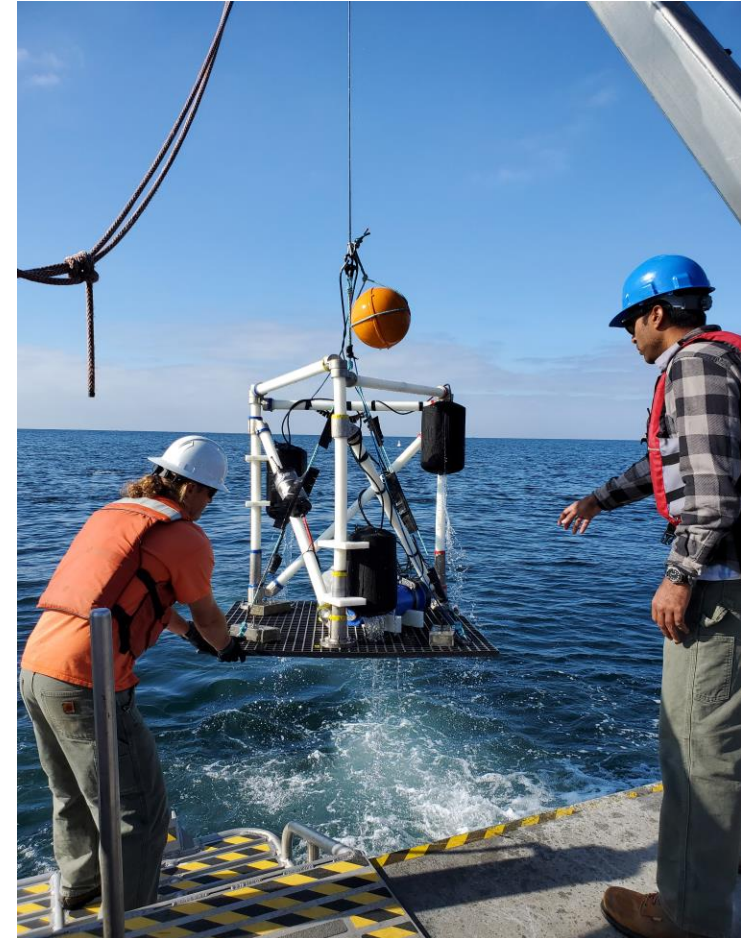
Potential stressor-receptor interactions between various marine renewable energy devices and marine organisms.

Source: Copping et al. (2024)

SB 605 Report: Chapter 3 – Sea Space Analysis

Monitoring and Adaptive Management Strategies

- Evaluate baseline and identify high-risk, high-uncertainty interactions
- Determine critical information gaps
- Develop targeted studies to address data gaps and identify thresholds of concern
- Develop data analysis and communication protocols
- Identify protection and mitigation measures and actions
- Consensus on monitoring timeline and milestones



Integral Consulting NoiseSpotter Acoustic Study,
CalWave, La Jolla CA



SB 605 Report: Chapter 4 – Considerations

Research Considerations for Development



- **Research on wave and tidal technologies**, including generation profiles, market signals, environmental and ocean-use impacts, transmission alternatives, and cost-benefit analysis.
- **Pilot projects and testing facilities** can reduce technological and environmental uncertainty by supporting standardization of technologies, informing adaptive management strategies, and streamlining permitting.
- **Spatial analyses** should address site-specific ecosystem impacts, sensitive species and habitats, fishing activities, and other ocean uses, to support siting and mitigation strategies.
- **Further assessments on distributed energy** resource applications and **colocation** opportunities of wave and tidal energy technologies could facilitate development of wave and tidal energy.

SB 605 Report: Chapter 4 – Considerations

Permitting/Regulatory Considerations for Development



- **Support a coordinated, multi-agency permitting framework** to improve the efficiency and clarity of permitting for DER installations and pilot-scale deployments across a range of project scales, technologies, and locations/jurisdictions in California.
- Include **baseline monitoring and adaptive management** thresholds in permitting processes to better assess, avoid, minimize, and mitigate environmental impacts.

SB 605 Report: Chapter 4 – Considerations

Engagement Considerations for Development



- **Continue coordination** among government agencies, tribes, fishing groups, coastal communities, labor unions, industry, and environmental organizations to ensure that diverse perspectives inform wave and tidal energy planning.
- Promote early and ongoing **coordination and consultation with California Native American tribes** to ensure Traditional Ecological Knowledge and cultural values are meaningfully incorporated into siting and planning efforts.

Closing Remarks



- Submit written comments to the SB 605 docket (Docket # 24-SB-605) from the SB 605 Workshop event page:
 - Go to the event web page, “[Staff workshop on the Draft Senate Bill 605 Wave and Tidal Energy Report](#)”
 - Click on “**Submit Comment (24-SB-605)**”
 - Comments are due **November 3, 2026, by 5:00pm**
- For technical questions, contact waveandtidalenergy@energy.ca.gov

