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Analytical Guidance and Benefits Assessment for AB 525 Strategic Plan

Seaport and Workforce Development for Floating Offshore Wind in California

Presented by: Ben Pogue
Director of Natural Resource Management
Catalyst Environmental Solutions

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Analytical Framework

Section 25991.3 of AB 525 – The Framework for Assessment

a. Based on the sea spaces identified pursuant to Section 25991.2, the commission, in coordination with relevant state and local agencies, shall **develop a plan** to improve waterfront facilities that could support a range of floating offshore wind energy development activities, including construction and staging of foundations, manufacturing of components, final assembly, and long-term operations and maintenance facilities.

b. The plan developed pursuant to subdivision (a) shall include all of the following:

(1) **A detailed assessment of the necessary investments in California seaports** to support offshore wind energy activities, including construction, assembly, and operations and maintenance. The assessment shall consider the potential availability of land and water acreage at each seaport, including competing and current uses, infrastructure feasibility, access to deep water, bridge height restrictions, and potentially impacted natural and cultural resources, including coastal resources, fisheries, and Native American and Indigenous peoples.

(2) **An analysis of the workforce development needs** of the California offshore wind energy industry, including **occupational safety requirements**, **the need to require the use of a skilled and trained workforce to perform all work**, and **the need for the Division of Apprenticeship Standards to develop curriculum for in-person classroom and laboratory advanced safety training for workers**.

(3) **Recommendations for workforce standards** for offshore wind energy facilities and associated infrastructure, including, but not limited to, prevailing wage, skilled and trained workforce, apprenticeship, local hiring, and targeted hiring standards, that ensure sustained and **equitable economic development** benefits.

c. In developing the plan pursuant to subdivision (a), the commission shall **consult with representatives of key labor organizations and apprenticeship programs** that would be involved in dispatching and training the construction workforce.

d. On or before December 31, 2022, the commission shall complete and submit to the Natural Resources Agency and the relevant fiscal and policy committees of the Legislature a **preliminary assessment of the economic benefits of offshore wind as they relate to seaport investments and workforce development needs and standards**.

e. The plan developed pursuant to this section shall be included in the chapter of the strategic plan relating to economic and workforce development and identification of port space and infrastructure as specified in paragraph (2) of subdivision (c) of Section 25991.

Principal Mandate: CEC is charged with preparing a chapter of the overall Strategic Plan that considers seaport and workforce development.

Seaport Assessment: Siting/screening analysis (SLC-M&N Team). Assess level of investment – serves as input value for economic benefits assessment (below).

Workforce Development Needs: what type and how many workers will be needed for the OSW workforce. How ready is California to meet this demand?

Workforce Occupational Safety Requirements: Empirical review of OSRs in other industries/states.

Training Needs Assessment: Existing training assets versus what is needed (gaps analysis). Need for unified training curriculum, in-person training/facilities.

Workforce Standards: Prevailing wage analysis. Empirical review (East Coast). Hiring/training standards and equitable hiring practices and recommendations.

Stakeholder Engagement: Interviews with unions, labor organizations, training experts, NREL, industry, and academics.

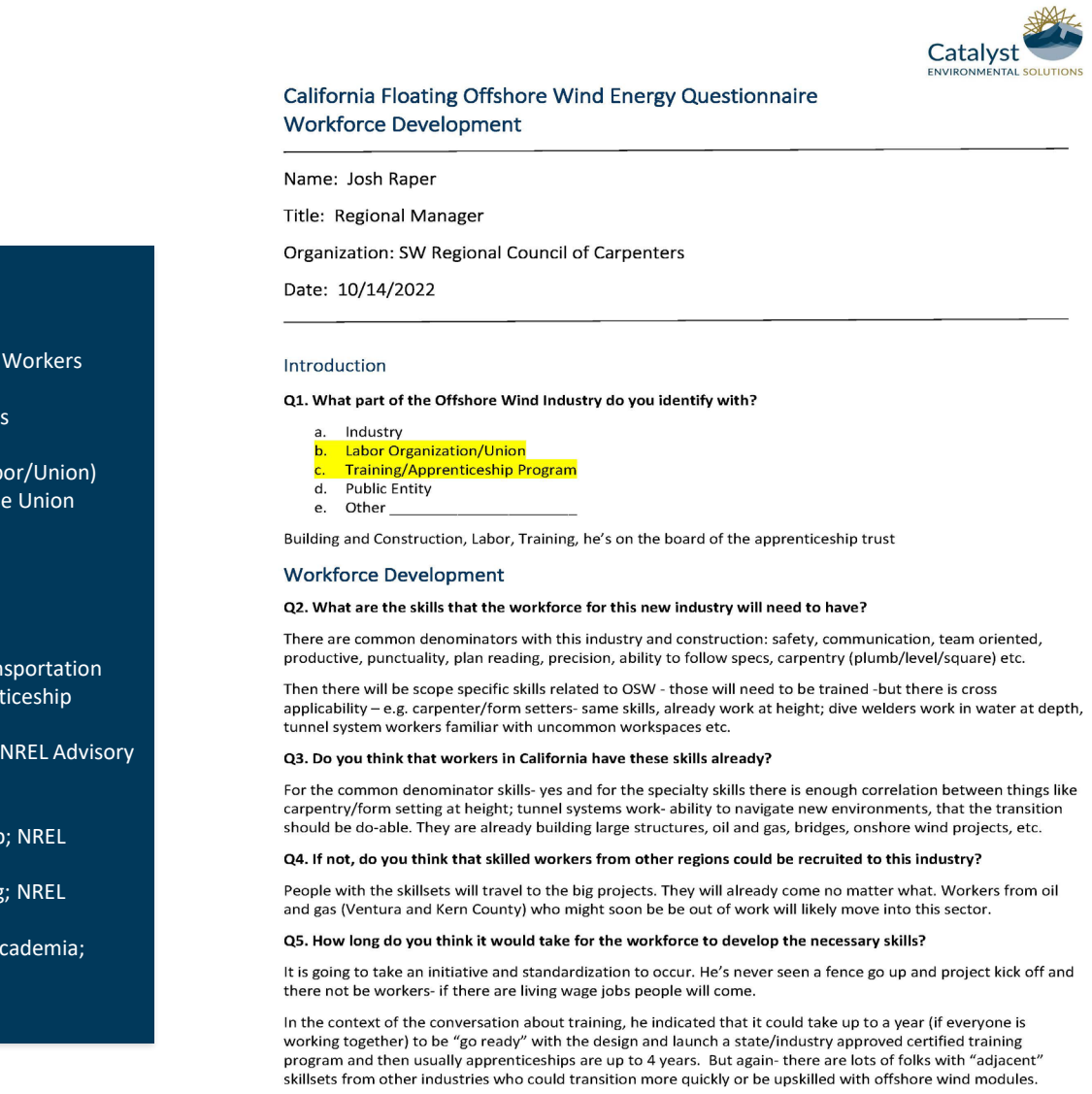
Economic Benefits Analysis & Supply Chain Opportunities: IMPLAN model of economic benefits (jobs, income, fiscal revenues, etc.) and policy options for capturing supply chain benefits.

OSW Area of Analysis	AB 525 Issue	Key Issue/Question	Section of Assessment	Summary of Finding
Workforce Development Needs	An analysis of the workforce development needs of the California offshore wind energy industry, including occupational safety requirements, the need to require the use of a skilled and trained workforce to perform all work.	How many workers/jobs will be required to develop the workforce that can meet the demands of the 2030 (2-5 GW) and 2045 (25 GW) goals?	Section 3.3 Number of Jobs Needed for Floating OSW Workforce	Approximately 2,375-8,280 jobs are expected to be required for California's floating offshore workforce by 2030, and 5,063-17,950 jobs by 2045. These estimates/ranges were derived from three keynote studies on forecasting California's workforce needs: • NREL/BOEM. April 2016. "Floating Offshore Wind in California: Gross Potential for Jobs and Economic Impacts from Two Future Scenarios." • American Jobs Project. February 2019. "The California Offshore Wind Project: A Vision for Industry Growth"; BVG/American Jobs Project. January 2019. "CA Jobs Modeling Methodology." • Guidehouse. May 2022. "California Supply Chain Needs Summary." California Energy Commission.
		What is the proportion of jobs for the supply chain, construction, and operations/maintenance phases?	Section 3.4 Distribution of Workforce Occupations Per Phase	Approximately 2/3rds of the OSW workforce will be in the supply chain and manufacturing sectors. This is a key finding of this Assessment and also represents California's primary opportunity to capture the economic benefits of developing an ambitious offshore wind industry. As observed in the infographic below, the construction and operations/maintenance phases offer similar levels of jobs, around 700-800 jobs, whereas the supply chain is expected to generate 4,020 jobs.
		What types of skills and occupations are needed for the OSW workforce?	Section 3.5 Occupational Skills Mapping	As provided in the radar/skills graphics in Figure 3-4, Technicians and Trades dominate the needed skills for supply chain, representing over 50% of the skill set needed for those occupations. Construction veered towards Construction and Assembly skills, but also had a significant need in the Technicians and Trades as well. The majority of skills for the Operations/Maintenance phase are in the Technicians and Trades skills, however Administrative and Clerical skills are also required. As observed in Figure 3-5, when compiling all three phases, the Technicians and Trades represent the primary skills area of need, followed by Construction/Assembly, and Administrative/Clerical.
		What is the existing occupational workforce supply?	Section 3.6.1 Existing Workforce	California maintains a large and diverse workforce, with approximately 16.5 million workers (2021). While the new offshore wind workforce will represent a cross-section of occupational types, requiring a wide variety of jobs to operate the industry, some of the key sectors that will be impacted by the offshore wind industry are Installation, Maintenance, and Repair (approximately 500,000 current workers); Construction and Extraction (approximately 650,000 current workers); and Production (approximately 750,000 current workers).
		What are the potential skills and occupational gaps for the California OSW workforce?	Section 3.6.2 Gaps Analysis	As observed in Figure 3-6, the majority of California's occupational types/sectors are in a position to internalize the new demand created by the offshore wind industry; however, a few occupational types are currently unprepared to meet the demand of the new industry. Those occupational types that are forecasted to experience an increase of more than 20% by 2030 and more than 60% by 2045 are: • Miscellaneous Plant and System Operators • Tank Care, Truck, and Ship Loaders • Forging Machine Setters, Operators, and Tenders (Metal and Plastic) • Wind Turbine Service Technicians • Engine and Other Machine Assemblers These findings track with the conclusion that nearly two-thirds of the new jobs created by California's offshore wind industry will be located in the supply chain (i.e., manufacturing, assembly, extraction, production, fabrication, etc.). While some speciality occupations, such as wind turbine technician, will essentially be wholly new job types in California, it is the State's supply chain sectors that will experience significant new demand for trained workers.

Engagement with Training, Industry, Labor, and Apprenticeship Organizations

Interviewees

- International Brotherhood of Electrical Workers (Labor/Union)
- CA State Building & Construction Trades (Labor/Union)
- SW Regional Council of Carpenters (Labor/Union)
- International Longshore and Warehouse Union (Labor/Union)
- Kiewit (EPCI)
- Orsted (Developer)
- Siemens Gamesa (Manufacturer)
- Maersk Training (Training)
- Center for International Trade and Transportation (CSU Long Beach) (Academia; Apprenticeship Program)
- Bristol Community College (Academia; NREL Advisory Group)
- NREL (Federal Government)
- Global Wind Organization (Trade Group; NREL Advisory Group)
- Cape and Islands Self Reliance (Training; NREL Advisory Group)
- Business Network on Offshore Wind (Academia; NREL Advisory Group)



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California Floating Offshore Wind Energy Questionnaire
Workforce Development

Name: Josh Raper

Title: Regional Manager

Organization: SW Regional Council of Carpenters

Date: 10/14/2022

Introduction

Q1. What part of the Offshore Wind Industry do you identify with?

a. Industry
b. Labor Organization/Union
c. Training/Apprenticeship Program
d. Public Entity
e. Other _____

Building and Construction, Labor, Training, he's on the board of the apprenticeship trust

Workforce Development

Q2. What are the skills that the workforce for this new industry will need to have?

There are common denominators with this industry and construction: safety, communication, team oriented, productive, punctuality, plan reading, precision, ability to follow specs, carpentry (plumb/level/square) etc.

Then there will be scope specific skills related to OSW - those will need to be trained -but there is cross applicability – e.g. carpenter/form setters- same skills, already work at height; dive welders work in water at depth, tunnel system workers familiar with uncommon workspaces etc.

Q3. Do you think that workers in California have these skills already?

For the common denominator skills- yes and for the specialty skills there is enough correlation between things like carpentry/form setting at height; tunnel systems work- ability to navigate new environments, that the transition should be do-able. They are already building large structures, oil and gas, bridges, onshore wind projects, etc.

Q4. If not, do you think that skilled workers from other regions could be recruited to this industry?

People with the skillsets will travel to the big projects. They will already come no matter what. Workers from oil and gas (Ventura and Kern County) who might soon be be out of work will likely move into this sector.

Q5. How long do you think it would take for the workforce to develop the necessary skills?

It is going to take an initiative and standardization to occur. He's never seen a fence go up and project kick off and there not be workers- if there are living wage jobs people will come.

In the context of the conversation about training, he indicated that it could take up to a year (if everyone is working together) to be "go ready" with the design and launch a state/industry approved certified training program and then usually apprenticeships are up to 4 years. But again- there are lots of folks with "adjacent" skillsets from other industries who could transition more quickly or be upskilled with offshore wind modules.

01 What are the critical skills that this new workforce will need?

02 What are some of the obstacles and limitations to fielding an offshore wind construction workforce?

03 What could expedite workforce training and development? What can CA do to facilitate workforce training and development?

04 What types of incentives would help recruit new workers to build a workforce pipeline?

05 How much of the future OSW workforce will be coming from existing sectors/industries?

06 What existing training and apprenticeship programs could be repurposes or expanded to train CA's OSW workforce?

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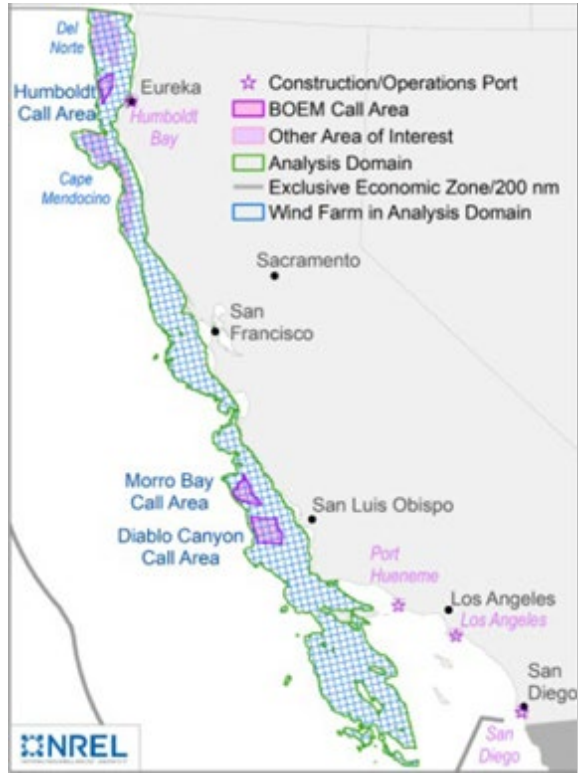
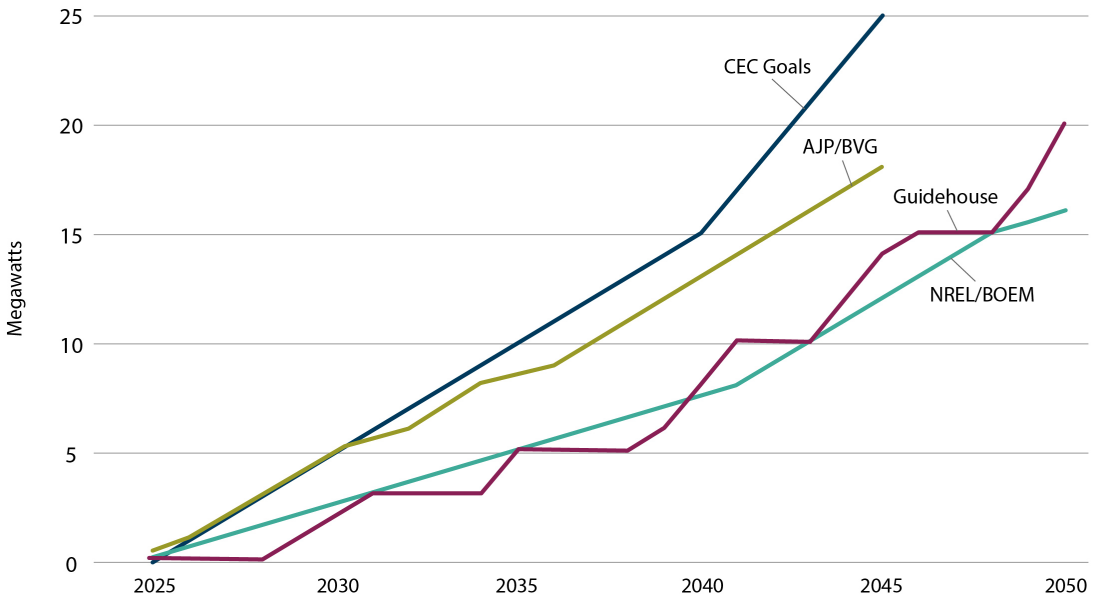
Benchmarking Installed Capacity to Forecast Workforce Development Needs

- NREL/BOEM. April 2016. "Floating Offshore Wind in California: Gross Potential for Jobs and Economic Impacts from Two Future Scenarios."
- American Jobs Project. February 2019. "The California Offshore Wind Project: A Vision for Industry Growth"; BVG/American Jobs Project. January 2019. "CA Jobs Modeling Methodology."
- Guidehouse. May 2022. "California Supply Chain Needs Summary." California Energy Commission.



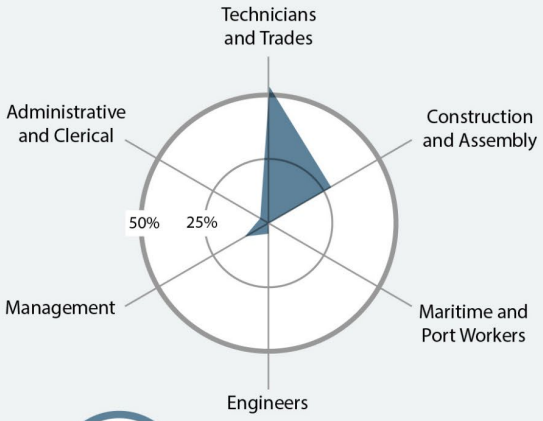
Conceptual Growth Patterns for Installed Capacity CEC Goals and Forecasting Models



Bounding Ranges/Estimates for Jobs Needed for OSW Workforce (2030 and 2045)

Source/Model	2030				2045			
	Supply Chain	Const.	O&M	Total Jobs	Supply Chain	Const.	O&M	Total Jobs
American Jobs Project	2,100	350	1,200	3,650	9,000	1,400	2,600	13,000
NREL/BOEM	5,490	1,130	1,660	8,280	11,280	2,340	4,330	17,950
Guidehouse	1,936	125	314	2,375	3,382	173	1,508	5,063
TOTAL RANGE	**1,936 – 5,490**	**125 – 1,130**	**314 – 1,660**	**2,375 – 8,280**	**3,382 – 11,280**	**173 – 2,340**	**1,508 – 4,330**	**5,063 – 17,950**

Supply Chain

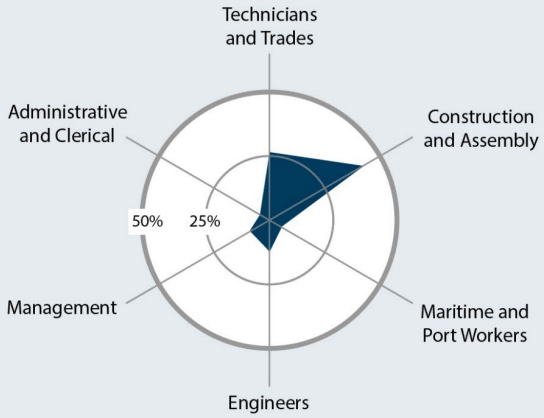


4020 jobs

Supply Chain

- Laborers and Freight, Stock, and Material Movers (Hand)
- Metal Furnace Operators, Tenders, Pourers, and Casters
- Operating Engineers and Other Construction Equipment Operators
- Engine and Other Machine Assemblers
- Forging Machine Setters, Operators, and Tenders, Metal and Plastic
- Miscellaneous Assemblers and Fabricators
- Computer Control Programmers and Operators
- First-Line Supervisors of Production and Operating Workers
- Structural Metal Fabricators and Fitters
- Welding, Soldering, and Brazing Workers

Construction

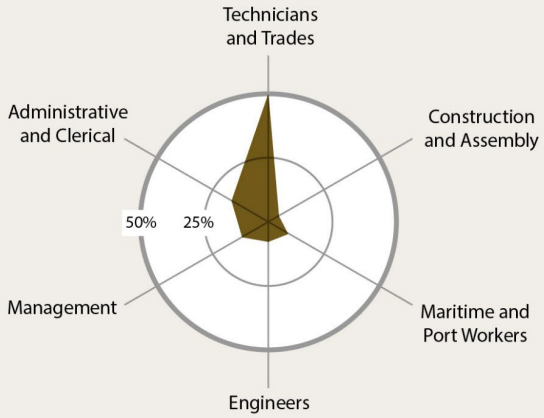


803 jobs

Construction

- Miscellaneous Installation, Maintenance, and Repair Workers
- Miscellaneous Electrical and Electronic Equipment Mechanics, Installers, and Repairers
- Industrial Engineers, Including Health and Safety
- Miscellaneous Plant and System Operators
- Wind Turbine Service Technicians
- General and Operations Managers
- Engineering Technicians, Except Drafters
- Construction Laborers
- Construction Equipment Operators
- Captains, Mates, and Pilots of Water Vessels

Operations and Maintenance

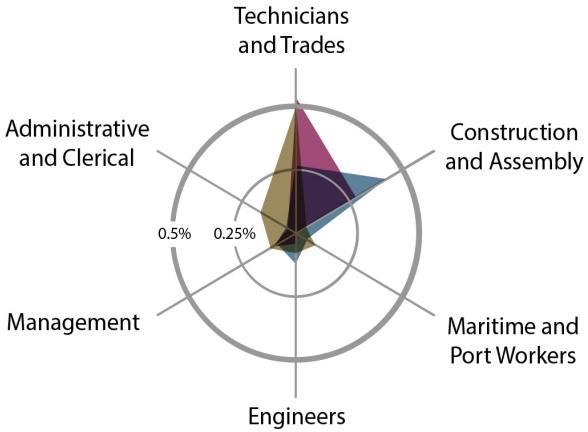


730 jobs

Operations and Maintenance

- General and Operations Managers
- Wind Turbine Service Technicians
- Captains, Mates, and Pilots of Water Vessels
- Engineering Technicians, Except Drafters
- Industrial Engineers, Including Health and Safety
- Miscellaneous Electrical and Electronic Equipment Mechanics, Installers, and Repairers
- Secretaries and Administrative Assistants
- Electrical and Electronics Engineers
- Compliance Officers
- Miscellaneous Installation, Maintenance, and Repair Workers

Combined



- Construction jobs
- Operations and maintenance jobs
- Supply chain jobs

Workforce Needs by Occupational Type/Sector (2030)

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Supply Chain Assessment – Policy Options

Policy, Incentive, Tax Break	Geography (who instituted the policy)	Component Supported	Input Supported	How California Could Adopt/Adapt Policy?
Feed in Tariffs and Other Subsidies	The Netherlands, Denmark, Germany	All	All	Develop a feed-in tariff and/or subsidy scheme to make floating OSW energy competitive and encourage the development of a local supply chain
Industry based Training Programs	New York, Rhode Island	Towers Foundations	Primary Concrete Laborers & Manufacturers	Adapt California's initiative for a High-Road Training Partnership Program for floating OSW, Expand Employment Training Panel funding to support floating OSW industry
			Concrete Product Laborers & Manufacturers	
			Steel Fabrication Laborers & Manufacturers	
Competitive Grant Funding	New Jersey, Maryland, US federal government	All	All	Dedicate state funding to an floating OSW supply chain improvement grant to promote creative collaborations & supply chain development
Local Source Requirements	New York, New Jersey, Massachusetts, Virginia, Rhode Island	All	All	Community workforce agreements or community benefits agreements
Direct Investment in Training Programs	Maryland, New Jersey, New York, Rhode Island, Massachusetts	All	All Component Part Production Labor Forces	Create partnership with academia (Cal Poly Humboldt and other local JCs) and fund floating OSW training opportunities through these facilities
Tax Credits	US federal government, New Jersey, Rhode Island	All	All Component Part Manufacturers & Investors	Adapt Capital Investment Incentive Program, promote CAEATFA sales and use tax credit
Public Private Partnerships	Maryland, New Jersey, New York, Rhode Island, Massachusetts	All	All Component Part Manufacturers	Collaborate with floating OSW project investors and dedicate state funding to manufacturing facilities
Hive Hub Development	Virginia, Maryland, North Carolina, Maine, Denmark, UK	All	All	Could create an floating OSW hub or center (near Humboldt Bay or San Francisco)

Materials (Steel) Production and Fabrication

Policies Successfully Used Elsewhere	Opportunity for California
Direct Public and Private Sector Investment (Maryland)	Create partnerships with floating OSW developers and combine funds to invest in a new steel manufacturing/fabrication facility or provide the needed upgrades to current steel fabrication facilities to support floating OSW manufacturing
Subsidies (Europe)	Offer tax breaks for steel manufacturing/fabrication facilities that support floating OSW production – this incentive could encourage facilities to invest in the equipment and training needed to support floating OSW component production
Local Source Requirements (East Coast & Europe)	Requiring local sources to support floating OSW production will guarantee local work and a consistent pipeline of projects that include steel manufacturing and fabrication

Component Manufacturing

Policies Successfully Used Elsewhere	Opportunity for California
Direct Public and Private Sector Development (New Jersey, New York)	Create partnerships with floating OSW developers and combine funds to invest in component part manufacturing facilities
Grants and Cooperative Agreements (New Jersey, Maryland, Federal Govt.)	Institute a grant program that covers necessary upgrades for Tier 2 facilities that support component manufacturing facilities. Design Cooperative Agreements that supply a percentage of the initial investment needed to build a floating OSW component manufacturing facility to lessen the risk for potential investors
Tax Credits and Rebates & Tax Deductions and Exemptions (East Coast & Europe)	Adapt the Capital Investment Incentive Program, increase sales use and tax exclusion program for all facilities that support floating OSW development

Supply Chain Workforce Development

Policies Successfully Used Elsewhere	Opportunity for California
Project Labor Agreements (East Coast)	Institute workforce agreements that require local supply chain and labor force.
Instituting New or Adapting Current Labor Training Programs (East Coast & Europe)	Adapt High-Road Training Partnership program to support floating OSW labor training and expand Employee Training Panel so it can support floating OSW labor employers by providing funds for proper training. Invest in a new training facility or program dedicated to floating OSW development.

Economic Benefits Analysis About the IMPLAN Model

Input

- Workforce Development
- Seaport Development
- Training Center

IMPLAN

- Statewide Economy
- Greater Humboldt County Region

- Without Policy Support
- With Policy Support

Economic Activity

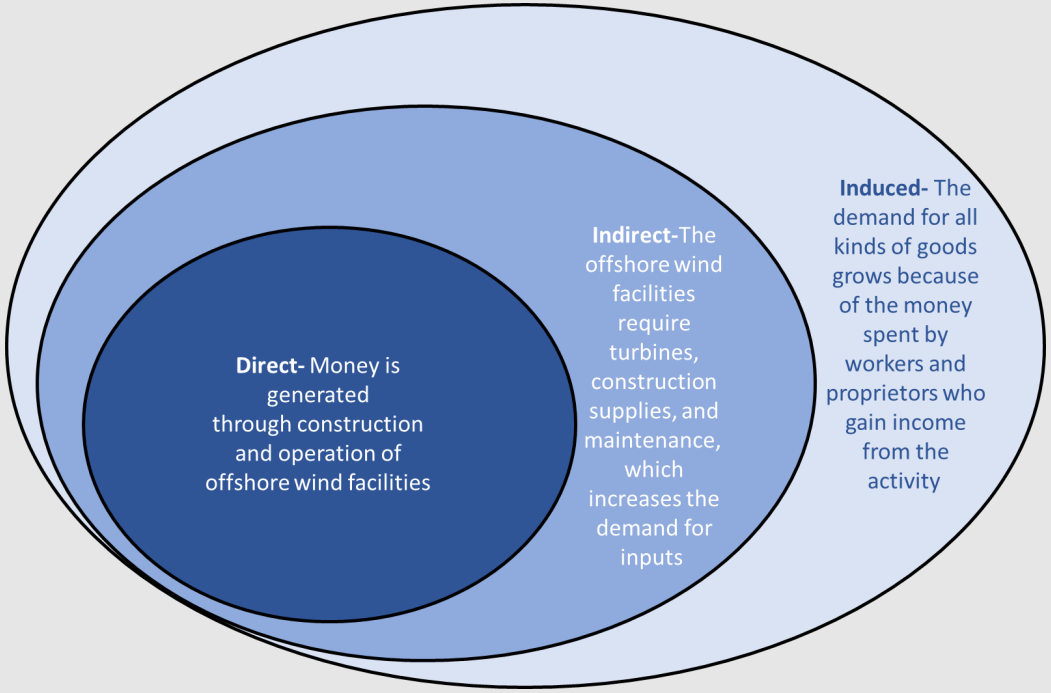
Jobs

Labor Income

Fiscal Revenues

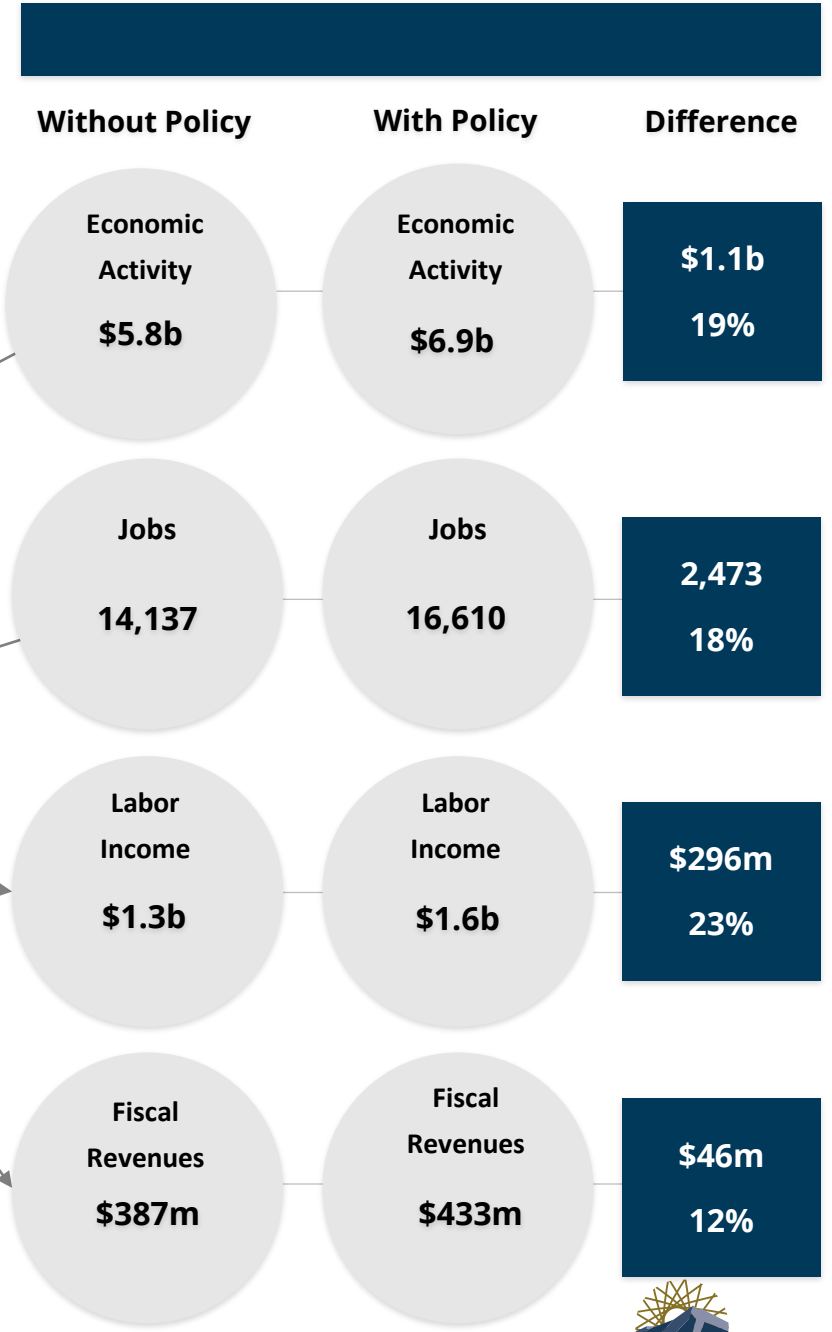
Types of Beneficial Economic Impacts

Direct, Indirect, and Induced Impacts



Economic Benefits Assessment
Statewide Analysis With & With Out Policy

Scenario	Investment Input	Output GDP		Number of Jobs		Labor Income		Fiscal Impacts	
	Year	2025	2045	2025	2045	2025	2045	2025	2045
Without Policy	Workforce Development		$5,803		14,137		$1,266		$386.8
	Seaport Development	$85.2		406		$33.5		$2.9	
	Training Center Construction	$18.7		98		$8.1		$0.66	
	Total	**$103.9**	**$5,803**	**504**	**14,137**	**$41.6**	**$1,266**	**$3.6**	**$386.8**
With Policy	Workforce Development		$6,883		16,610		$1,562		$432.8
	Seaport Development	$96.6		444		$36.8		$3.3	
	Training Center Construction	$18.7		98		$8.1		$0.66	
	Total	**$115.3**	**$6,883**	**542**	**16,610**	**$44.9**	**$1,562**	**$4.0**	**$432.8**



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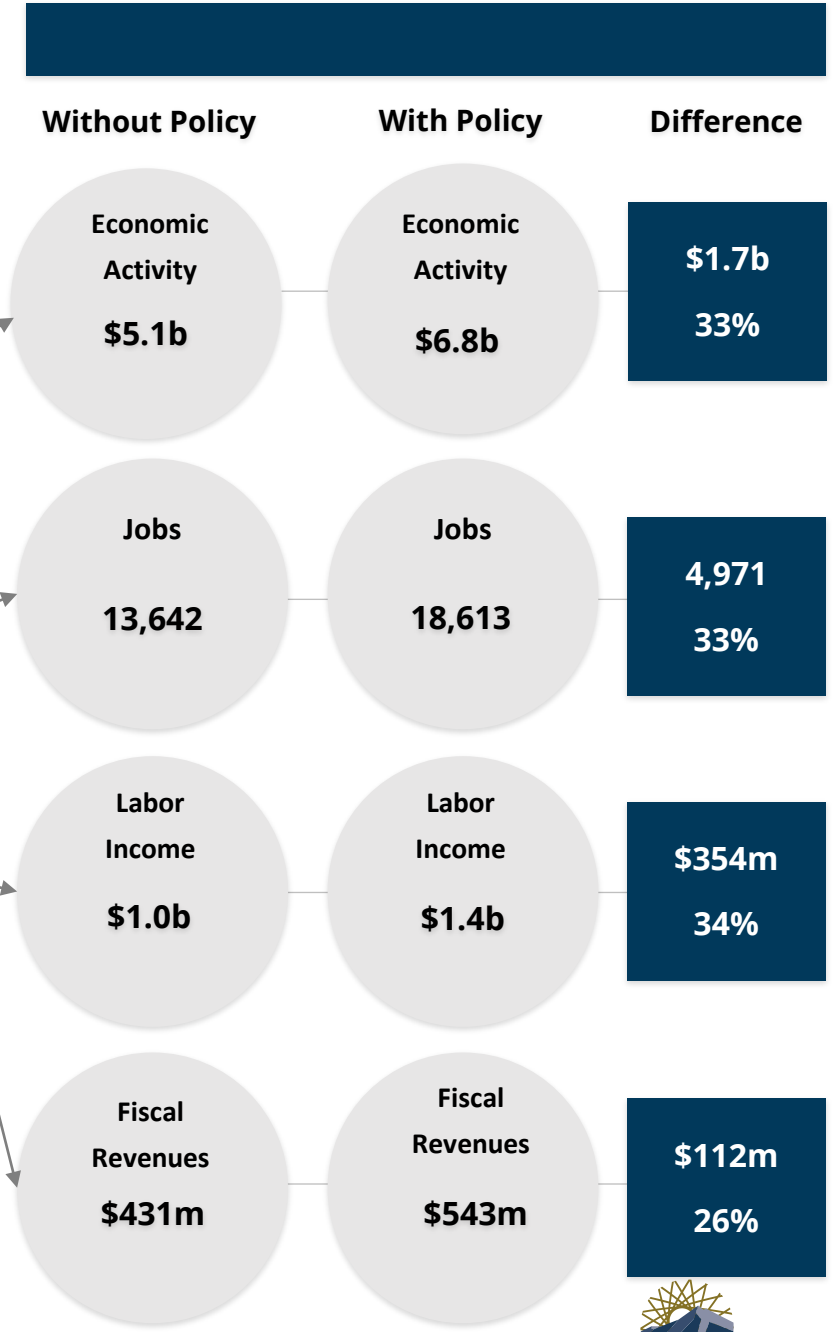
Economic Benefits Assessment
Greater Humboldt Analysis With & With Out Policy

Scenario	Investment Input	Output GDP		Number of Jobs		Labor Income		Fiscal Impacts	
	Year	2025	2045	2025	2045	2025	2045	2025	2045
Without Policy	Workforce Development		$5,126		13,642		$1,028		$431.4
	Seaport Development	$62.0		362		$23.4		$2.2	
	Training Center Construction	$14.4		93		$6.4		$0.5	
	Total	**$76.4**	**$5,126**	**455**	**13,642**	**$29.8**	**$1,028**	**$2.7**	**$431.4**
With Policy	Workforce Development		$6,820		18,613		$1,382		$543.3
	Seaport Development	$83.2		448		$28.6		$3.0	
	Training Center Construction	$14.4		93		$6.4		$0.5	
	Total	**$97.6**	**$6,820**	**541**	**18,613**	**$35.0**	**$1,382**	**$3.5**	**$543.3**



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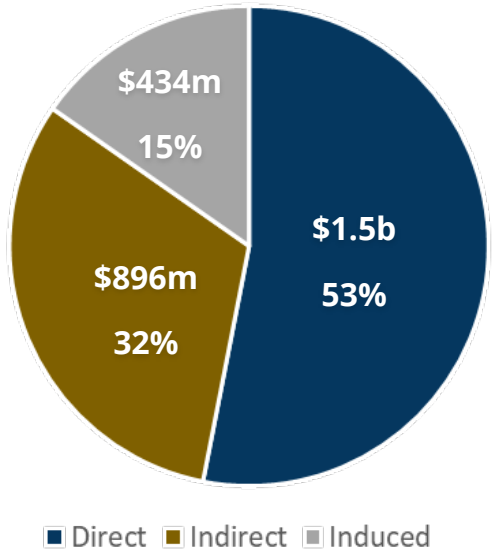
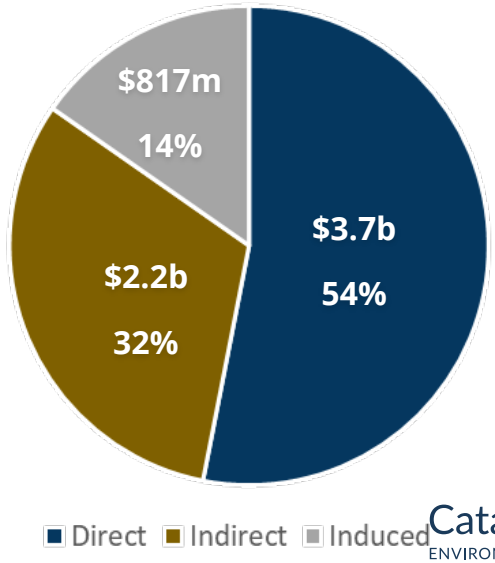
Economic Benefits Assessment
Direct, Indirect, and Induced Impacts – Economic Activity (GDP)

Investment	2023		2024/2025 annual		2030		2045	
DIRECT IMPACT								
Workforce Development					$1,504	$1,504	$3,694	$3,694
Seaport Development	$41.8	$41.8	$41.8	$41.8				
Training Center Construction			$10.0	$10.0				
Total	**$41.8**	**$41.8**	**$51.8**	**$51.8**	**$1,504**	**$1,504**	**$3,694**	**$3,694**
INDIRECT IMPACT								
Workforce Development					$535.2	$895.5	$1,292	$2,180
Seaport Development	$21.8	$30.9	$21.8	$30.9				
Training Center Construction			$3.4	$3.4				
Total	**$21.8**	**$30.9**	**$25.2**	**$34.3**	**$535.2**	**$895.5**	**$1,292**	**$2,180**
INDUCED IMPACT								
Workforce Development					$355.5	$433.6	$817.3	$1,009
Seaport Development	$21.6	$23.8	$21.6	$23.8				
Training Center Construction			$5.3	$5.3				
Total	**$21.6**	**$23.8**	**$26.9**	**$29.1**	**$355.5**	**$433.6**	**$817.3**	**$1,009**
TOTAL IMPACT								
Workforce Development					$2,395	$2,833	$5,803	$6,883
Seaport Development	$85.2	$96.6	$85.2	$96.6				
Training Center Construction			$18.7	$18.7				
Total	**$85.2**	**$96.6**	**$103.9**	**$115.3**	**$2,395**	**$2,833**	**$5,803**	**$6,883**

2030



2045



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SECTION 8

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