

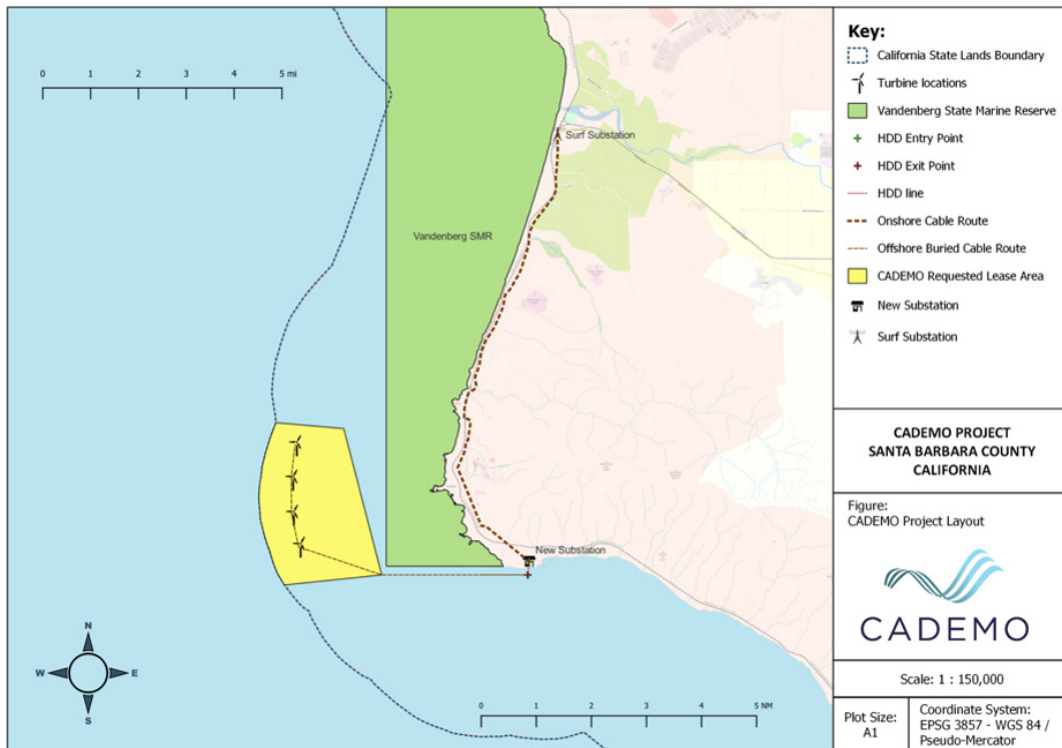
# EXECUTIVE SUMMARY

Offshore wind power generation appears on the verge of becoming a major growth industry in California. With hundreds of enormous turbines to be installed off the state's Central and North Coasts, economic benefits are projected to be high.<sup>1</sup> But these expectations are untested, based largely on desktop research.

This report takes an empirical approach instead, examining the potential economic and workforce benefits and trade-offs of one offshore wind project, CADEMO, which is likely to be the state's first in operation. The report was prepared by participants in the Offshore Wind High Road Training Partnership (H RTP) program, funded by the California Workforce Development Board. This H RTP, which is ongoing through early 2024, uses CADEMO to test the "high road" concept of labor-management cooperation, job creation, and community benefits – all amid the tough market competition of a nascent industry.

While this report does include an economic impact analysis using desktop models, its primary focus is on the practical requirements for CADEMO's supply chain and workforce. The report is, in effect, the result of a collaborative effort in industrial planning among the H RTP partners: CADEMO's owner and developer, Floventis Energy; the state's building and construction trades unions; electrical union IBEW 1245; California Polytechnic State University, San Luis Obispo (Cal Poly); the San Luis Obispo County Office of Education; and SLO Partners.

CADEMO is a demonstration project with four full-size, 15 MW turbines floating in state waters off the coast of Vandenberg Space Force Base in northern Santa Barbara County. Because CADEMO is expected to be operational in late 2027, years before the first commercial-scale projects planned in federal waters, it offers a test case of the workforce impacts and planning choices for the industry and government policymakers prior to the installation of hundreds of turbines farther offshore.



SOURCE: Floventis



PHOTO: Mammoet

## Lessons Learned: Labor Relations

The first of many lessons learned from this H RTP is simply that labor-management cooperation can be effective – but also hard to create. Floventis and the unions spent two years negotiating a project labor agreement (PLA), wrestling with the complexities of industrial cooperation and shared risk in a new industry with little existing supply chain. The resulting PLA, signed in November 2022, is intended to serve as a template for the state’s offshore wind industry as it expands in future years. The industrial expertise of these counterparties comes from naturally different perspectives but has jointly served to clarify the path forward on many key issues, including port facilities, supply chain, and workforce training.

The PLA’s initial signatories included the State Building and Construction Trades Council and IBEW 1245 and subsequently expanded to include other unions. It covers all construction-related work, plus all transmission and

substation installation, to be carried out in California onshore and offshore by CADEMO contractors and subcontractors. The PLA does not alter the customary jurisdiction of non-construction unions, such as the marine trades and the International Longshore and Warehouse Union (ILWU), which will be included in the project through their existing relationships with CADEMO contractors and subcontractors.

By including the relevant unions from the start, Floventis earns several win-win benefits: removing the risk of last-minute uncertainty in contract negotiations; ensuring a stable and well-trained workforce through the existing apprentice system and related programs; and gaining the support of influential union allies to partner in outreach to state and local policymakers.

## Lessons Learned: Ports and Jobs

For CADEMO and the initial projects in federal waters, the turbine components themselves – towers, nacelles, and blades – must be manufactured out of state because attracting such a capital-intensive industry to California will take a decade or more. But the logistical requirements of the construction, assembly, final integration and deployment of floating offshore platforms mean that these operations should be conducted in California. As a result, our HRTTP analysis, in tandem with CADEMO’s supply chain planning, began with the search for suitable ports.

Our initial outreach with port officials up and down the California coast found that the options for creating new facilities or upgrading existing port facilities to a sufficient standard were few and far between. In particular, it must be said directly from the start to avoid raising false hopes: Despite initial public discussions in the Central Coast region about a possible new mega-port facility sited in the immediate area where CADEMO and other offshore wind projects could create thousands of local jobs, we found such a scenario to be highly unlikely. The only port locations where construction, assembly, and final integration of the floating platforms might be feasible are located elsewhere in the state. As a result, offshore wind job creation in the Central Coast region will be relatively modest.

After much technical dialogue with port officials, CADEMO plans to construct its platforms at the Port of San Francisco, if the facilities there can be upgraded in a suitable timeframe, with final turbine integration at Port of Los Angeles. In the unlikely event that no California port facility becomes available in time to construct the platforms, the project would be obliged to import these from out of state and conduct final turbine integration them at Los Angeles.

Jobs creation from offshore wind in the Central Coast will take place through the local construction of electrical transmission infrastructure, as well as long-term operations and maintenance activities. In this latter O&M phase, an existing, local port facility such as Morro Bay or Port San Luis could serve, perhaps with small-scale infrastructure upgrades, for the docking of repair crew transfer boats. A related option for O&M servicing possibly could be the use of helicopter-based crews from a local airport such as Santa Maria. But as with other offshore wind projects on the Central Coast, CADEMO’s primary jobs impact – like that of the much larger projects in the federal Morro Bay lease area – will take place at major port facilities outside of the immediate region.



MAP: Floventis

## Overall Economic Impact of the CADEMO Project

Project Phase	Impact Categories	Jobs (FTE)	Earnings (\$ Millions)	Output (\$ Millions)	GDP (\$ Millions)
Construction	Onsite	20	2.0	2.0	2.0
	Supply Chain	677	66.1	156.6	84.7
	Induced	225	13.1	44.7	27
	<b>Total</b>	<b>922</b>	<b>81.2</b>	<b>203.4</b>	<b>113.7</b>
Operations (Annual)	Onsite	4	0.4	0.4	0.4
	Supply Chain	12	1.1	3.9	1.8
	Induced	7	0.4	1.3	0.8
	<b>Total</b>	<b>23</b>	<b>2.0</b>	<b>5.6</b>	<b>3.1</b>

## Overall Economic Impact of a Morro Bay Project

Project Phase	Impact Categories	Jobs (FTE)	Earnings (\$ Millions)	Output (\$ Millions)	GDP (\$ Millions)
Construction	Onsite	272	27	27	27
	Supply Chain	9,753	885.2	2,593	1,165.3
	Induced	3,177	185.7	631.3	381.2
	<b>Total</b>	<b>13,202</b>	<b>1,097.2</b>	<b>3,251.2</b>	<b>1,573.5</b>
Operations (Annual)	Onsite	100	9	9	9
	Supply Chain	394	33.6	126.2	57.9
	Induced	190	12	37.9	22.9
	<b>Total</b>	<b>684</b>	<b>54.6</b>	<b>173.1</b>	<b>89.8</b>

SOURCE: Cal Poly

The tables above, explained in **Chapter 3** and more fully in the Cal Poly report in the **Appendix**, show the projected economic impact from CADEMO and from a hypothesized model for one of the three gigawatt-scale projects in the federal Morro Bay leasing zone. The latter are not yet in the development stage, so their capital and operating expenses were estimated. In both categories, the “onsite” jobs – that is, those in Santa Barbara and San Luis Obispo Counties – will be modest in comparison to the jobs created in other phases. For methodological reasons, it

is impossible to determine with precision the geographic locations of each category listed, but it is safe to say that the San Francisco Bay Area and the Los Angeles-Long Beach area will inevitably be the big winners for CADEMO and the Morro Bay projects.

Nonetheless, Floventis is working with Central Coast partners, leading with the Santa Ynez Band of Chumash Indians, to create community benefits agreements that include targeted hiring and environmental cooperation.

## Lessons Learned: Supply Chain

Our research has found that the California jobs potential of manufacturing turbine components for offshore wind projects is slim, at least for CADEMO and the initial projects in federal waters, while the potential for construction and assembly of floating platforms is significant.

Of the many platform models currently available in the offshore wind industry's global marketplace, Floventis has not yet chosen which will be used for CADEMO. For the purposes of this HRTP, it has closely analyzed two models: a steel tension-leg platform and a concrete barge. With regard to the former, California lacks any fabricators for the huge rolled steel pieces that will be needed, so these pieces would likely be imported and then welded together at a U.S. port. The latter requires large concrete forms that could readily be made with locally produced concrete at San Francisco. For both, the Bay Area's large and highly skilled construction workforce would easily suffice to fill project needs.

For CADEMO as well as all projects in federal waters, the most difficult needs for supply chain and workforce are in the marine sector: the launch of floating platforms from wharf into water, final turbine integration, and anchor and cable laying. These are challenging not primarily because skilled workers are hard to find, but because legally compliant vessels themselves will be scarce and may need to be sourced from abroad. Difficulties are likely to arise with the Jones Act (requiring U.S.-flagged vessels) and California's newly strengthened offshore emissions standards. These dilemmas urgently require the attention of state and federal government agencies in cooperation with the offshore wind industry.

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## Lessons Learned: Workforce Training

For all construction work in the project, the PLA will provide access to California's highly effective system of state-certified joint union-employer apprenticeship programs. These programs are flexible and can be adapted with new modules tailored to the demands of the project. They are expected to resolve all workforce needs for the land-based phases of CADEMO and larger-scale offshore wind projects.

Floventis also expects to access the well-developed employer-union training programs in marine services and port terminal operations through its contractors' and subcontractors' relationships with marine services unions and the ILWU.

Our analysis found that CADEMO's key workforce training gaps derive directly from supply chain gaps – i.e., for the vessels launching the platforms, integrating the turbines, and laying the anchors and cables. West Coast marine contractors currently lack semi-submersible barges, jack-up wind turbine integration vessels, and vessels for laying anchors and cables. CADEMO's PLA stipulates that on board the U.S.-flagged vessels, all construction-related workers will need to be members of PLA signatory unions for the applicable craft categories. On foreign-flagged

vessels, 50 percent of construction-related workers must be PLA signatory union members. For these and other U.S. offshore workers, additional training will be needed.

California educational institutions and labor unions would be well advised to partner in creating offshore training programs, especially for the long-term operations and maintenance phases of offshore wind farms. A relevant example of such a program, which deserves consideration in California, is at Bristol Community College in New Bedford, Massachusetts, which offers associate degree programs in various offshore wind technology specializations, augmented with Global Wind Organization safety certificates.

Floventis also has identified potential opportunities for future offshore wind projects to partner with the offshore and onshore oil industry amid the region's transition from fossil fuels to renewable energy. These areas of collaboration could include offshore logistical assets, port facilities, and workforce retraining and upskilling. These opportunities deserve attention from industry and government officials in the coming years.



PHOTO: Shutterstock

## Conclusion

The final success or failure of this HRTP will be seen only when CADEMO is built and operating. The “high road” model for California’s offshore wind industry must be proven as part of a viable business strategy amid tough economic competition in the electricity marketplace. The green jobs that count are those created in California, not elsewhere. The job training that helps workers and communities is centered on the state-certified apprenticeship system, not in isolation from it. These challenges can be surmounted, but success is not guaranteed.

The key to achieving all these goals is early, proactive cooperation. By partnering sooner rather than later, the state’s labor unions, offshore wind companies, and educational institutions can ensure that this new industry will contribute to the state’s clean energy goals while providing equitable economic benefits for Californians.