Keynote Speaker:

Ronald Brown
Maritime Marketing and Commodities Representative
Port of Oakland

Central California District Export Council Member

Port of Oakland
Office: 510-627-1166
rbrown@portoakland.com | www.PortofOakland.com

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Overview of California's Ports

California has 12 ports, through which large volumes of goods are both imported and exported internationally. These ports vary in size, operations, and finances. For example, the state contains the nation's two largest ports, the Port of Los Angeles and the Port of Long Beach—both operated by public entities—as well as a small, privately owned port, the Port of Benicia. In recent years, California's ports have faced several challenges, including congestion and air pollution from associated facilities and vehicles. Both the California state government as well as the federal government have engaged in legislative, regulatory, and budgetary efforts to help ports address these challenges. In particular, the Legislature has prioritized ports in recent sessions by convening informational hearings, proposing and adopting policy bills, and providing targeted funding in the state budget. In this post, we provide some background on ports in California. We describe how ports across the state operate and are funded, summarize two important issues concerning ports—port congestion and air quality, and review recent state and federal actions regarding ports.

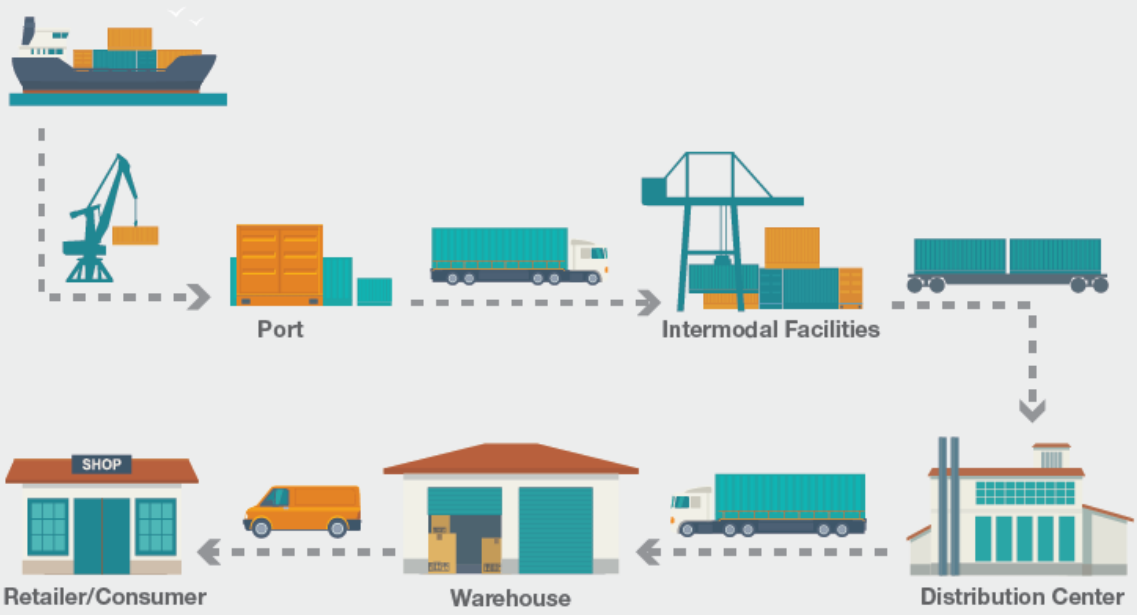
Ports in the Larger Goods Movement System

Businesses Move Goods Using Multiple Modes of Transportation. In order to produce and deliver goods and services to consumers, businesses often have to transport them from one place to another. Businesses might use several modes of transportation to move goods, such as ships, freight rail, planes, and commercial

trucks. Goods are moved through different types of facilities, such as ports, distribution centers, and warehouses. As an example, Figure 1 shows one pathway which goods that originate from overseas could take from the point of production to the consumer.

Figure 1

Example Pathway for How Goods Move From Production to Consumers



Ports Are an Important Component of International Commerce. Ports are facilities where goods are loaded and unloaded from ships, as well as where goods are processed and prepared for further distribution to retailers and consumers. Ports handle a significant portion of international commerce. For example, waterborne vessels were the leading transportation mode for international freight in 2020, moving 40 percent of U.S. international freight value (worth more than $1.5 trillion) and 70 percent of freight by weight (almost 1.5 trillion tons).

California Ports' Operations and Funding

California Ports Vary in Size and Types of Goods Handled. California has a total of 12 ports. Eleven of these are publicly owned, and one—the Port of Benicia—is privately owned. These ports process about 40 percent of all containerized imports and 30 percent of all exports in the United States. The Ports of Los Angeles and

Long Beach are the largest ports in the United States, as measured by container volume. Each California port differs in the types of goods it processes, as shown in Figure 2. For example, some of the Port of Oakland's highest value exports are food related—fruits and nuts, meats, and wines and spirits—because of its role in transporting goods from agricultural businesses in the region. In contrast, the Humboldt Bay Harbor District primarily imports and exports logs and wood chips due to the lumber businesses in its region.

Figure 2

Overview of California's Ports

Port	Operating Entity	Total Tons of Cargo Transported (2020)	Highest-Value Exports	Highest-Value Imports
Port of Long Beach	City of Long Beach Harbor Department	79,178,087	Petroleum Coke, Waste Paper, Chemicals, Scrap Metal	Crude Oil, Electronics, Plastics, Furniture,
Port of Los Angeles	City of Los Angeles Harbor Department	59,452,139	Wastepaper, Animal Feeds, Scrap Metal, Fabric, Soybeans	Furniture, Clothing, Automobile Parts, Electronic Products
Port of Richmond	City of Richmond	21,050,741	Vegetable Oils, Scrap Metal, Coke, Coal	Autos, Petroleum, Minerals, Vegetable Oils
Port of Oakland	City of Oakland	19,439,762	Fruits and Nuts, Meats, Machinery, Wine and Spirits	Machinery, Electronics, Furniture, Plastics
Port of Stockton	Stockton Port District	4,613,258	Iron Ore, Sulfur, Coal, Wheat, Rice	Liquid Fertilizer, Molasses, Bulk Fertilizer, Cement
Port of San Francisco	City and County of San Francisco	2,188,681	Tallow, Vegetable Oil	Steel Products, Boats, Wind Turbines, Aggregate
Port of Redwood City	City of Redwood City	1,934,358	Iron Scrap	Aggregates, Sand, Gypsum
Port of Hueneme	Oxnard Harbor District	1,844,182	Autos, Produce, General Cargo	Autos, Produce, Liquid Fertilizer, Bulk Liquid
Port of San Diego	San Diego Unified Port District	1,542,384	Machinery, Metals, Autos, Heavy Equipment	Vehicles, Perishables, Construction Materials, Heavy Equipment
Port of West Sacramento	City of West Sacramento	1,200,184	Agricultural and Industrial Products	Agricultural and Industrial Products
Humboldt Bay Harbor District	Humboldt Bay Harbor, Recreation and Conservation District	Unknown	Logs, Wood Chips	Logs, Petroleum, Wood Chips
Port of Benicia	Amports	Unknown	Petroleum Coke	Automobiles

Source: U.S. Army Corps of Engineers Waterborne Commerce Statistics Center, California Freight Mobility Plan 2020.

Several State Agencies Support California's Ports. State involvement with ports in California is distributed across several agencies, including the California Department of Transportation (Caltrans), California State Transportation Agency (CalSTA), California Air Resources Board (CARB), and Governor's Office of Business and Economic Development (GO-Biz). Each entity has different responsibilities regarding both ports as well as goods movement in general. Caltrans leads the state planning processes for freight transportation, which includes ports. CARB regulates the emissions of ports and enforces state goals for ports to transition to zero-emission technologies. GO-Biz assists ports by facilitating meetings with local, state, and federal representatives on issues impacting California's freight movement. As discussed below, the state also recently established a new freight policy team at CalSTA.

Ports Are Eligible to Apply for Few State Grants. Ports in California are primarily funded by lease and fee revenues from shipping businesses and freight operators. Currently, no ongoing state funding is dedicated to port operations or infrastructure projects. Instead, port projects are eligible to receive funding through a few competitive state funding programs designed primarily for developing and maintaining infrastructure. These programs include the Trade Corridor Enhancement Program (TCEP) (about $400 million in state funds and $120 million in federal funds available annually), several Low Carbon Transportation programs administered by CARB (funding varies annually), and a couple of programs administered by the California Energy Commission for charging infrastructure. Ports have received some funding through these programs in recent years. For example, in 2021-22, TCEP provided $4.4 million to the Port of Stockton for rail improvements and $8 million to the Port of Long Beach for rail expansion. (Private businesses that operate within ports—such as truck owner-operators—also are eligible for some competitive state grants, mainly to purchase zero-emission vehicles.) Most of these programs are funded with special funds, such as the Greenhouse Gas Reduction Fund (which receives revenues from the state's cap-and-trade program). In addition to these programs, the state recently provided $1.2 billion on a one-time basis for port infrastructure, which is discussed in a later section of this post. Because funding is awarded on a competitive basis, state funding does not make up a significant portion of ports' budgets. For example, state funds contributed less than 1.2 percent of the Port of Long Beach's budget in 2020-21.

Ports Are Also Eligible for Several Federal Grants. Similar to state funding, there is no ongoing federal funding dedicated to California's port operations or infrastructure projects. Port projects are eligible to receive funding from several competitive federal programs, including the Port Infrastructure Development Program (PIDP) and the Marine Highway Program. In 2021, PIDP provided $241 million in grants and the Marine Highway Program awarded $12.6 million in grants, nationwide. (These programs have been significantly augmented for the next several years due to the federal Infrastructure and Investment Jobs Act (IIJA), which we discuss in a later section of this post.) California projects have regularly received funding through PIDP in the last several years, including $32.7 million in 2019, $10 million in 2020, and $57.5 million in 2021. Ports are also eligible for competitive federal programs that fund different types of transportation projects. For example, the Local and Regional Project Assistance Grants Program funds transportation projects that have significant local or regional impacts. Ports are eligible applicants, along with other entities such as states, other local government agencies, and tribes. As with state funds, federal funds typically make up a relatively small share of ports' budgets. For example, federal funds contributed less than 1 percent of the Port of San Francisco's budget in 2020-21.

California Ports and Air Quality

Vehicles and Equipment at Ports Are Significant Sources of Air Pollution. Ships, trucks, and cargo handling equipment at ports are often fueled by diesel and therefore emit air pollutants such as particulate matter (PM) and nitrogen oxides (NOx). Given the significance of port-related air pollution in local air quality, ports have taken some action to reduce emissions of air pollutants in their core activities. For example, in 2006, the Ports of Long Beach and Los Angeles adopted a Clean Air Action Plan, which contains a number of pollution reduction programs and strategies. As a result of implementing this plan and other strategies, between 2005 and 2020, the ports reported <https://kentico.portoflosangeles.org/getmedia/7cb78c76-3c7b-4b8f-8040-b662f4a992b1/2020_Air_Emissions_Inventory> significant reductions in PM, NOx, and sulfur oxides emissions. However, the Ports of Los Angeles and Long Beach remain some of the largest sources of air pollution in the South Coast Air Basin. These ports are responsible for about 10 percent of the basin's total NOx emissions. As discussed below, a rise in congestion at California's ports has further increased their airborne emissions in recent years.

Port-Related Air Pollution Impacts Public Health and the Environment. Air pollution from port activities has significant public health and environmental implications. For example, exposure to air pollution is associated with an increased risk of heart and lung disease, increased cancer risk, and increased respiratory symptoms. Harmful emissions also have been associated with negative impacts on birth and developmental outcomes, such as contributing to low birth weight, premature births, and lower lung function in children. In addition, diesel fuel consumption emits greenhouse gases, which accelerates climate change.

Port-Related Air Pollution Disproportionately Impacts Disadvantaged Communities. Communities that neighbor ports face the highest exposure of air pollutants from port operations. As a result, these communities tend to experience a disproportionate share of the pollution burden in the state. For example, nearly all of the census tracts that surround the Ports of Long Beach and Los Angeles are ranked in the top one-third of the most pollution burdened in the state, according to the California Communities Environmental Health Screening Tool (CalEnviroScreen), a tool which assesses communities' pollution burden and vulnerability. In addition to greater exposure, these communities also are relatively more vulnerable to pollution impacts. This is because these areas tend to have (1) a higher share of sensitive populations—those with physiological conditions, such as asthma and heart disease, that make them more vulnerable to pollutants—and (2) socioeconomic factors associated with higher pollution vulnerability, such as poverty and lower educational attainment. This combination of disproportionately high pollution exposure *and* vulnerability results in the neighborhoods adjacent to the Long Beach and Los Angeles ports scoring in the top quartile for their overall CalEnviroScreen assessment. Such a score indicates high levels of cumulative environmental and health impacts, and identifies these areas as "disadvantaged communities" eligible for prioritized funding from certain state programs.

State and Local Regulators Have Increased Efforts to Manage Ports' Air Quality Impacts. In the last several years, CARB has adopted several regulations aimed at controlling air pollution from both ships and vehicles at ports. For example, in 2007, CARB adopted an "At-Berth Regulation" that requires ships to control pollution while docked. As another example, in 2018, CARB adopted regulations which require all drayage trucks to be registered with CARB and meet specific emission standards. Local regulators also have increased their efforts to regulate air pollution in and around ports. For example, the South Coast Air Quality Management District, which encompasses the Ports of Long Beach and Los

Angeles, currently is developing regulations that would require ports to significantly reduce emissions from their operations. Though the specific details of the regulations are not yet finalized, they could include measures such as port-wide average emissions targets. The regulations are expected to be finalized in 2023.

Ports Are Planning Electrification Projects to Meet State Air Quality Regulatory Requirements and Goals. Many ships, trucks, and cargo handling equipment at ports still use diesel fuel, which, as noted above, results in the emission of several harmful air pollutants. To reduce these emissions in the long term, ports will need to electrify their heavy-duty fleets. However, several barriers impede ports' progress in pursuing this goal, including: (1) certain electric vehicles and equipment are not yet widely available, (2) costs are high, and (3) current battery reliability may not suit port operations. Given these uncertainties, the time line associated with implementing zero-emission technologies at ports is unclear and costs likely are high. Given the scope of the types of equipment and vehicles that will need to be electrified across all California ports, the costs could easily reach billions of dollars.

Recent Rise in Port Congestion

Recent Increase in Goods Volume Has Resulted in Port Congestion. In the last year, ports have experienced higher than normal levels of congestion. Several factors, including greater consumer demand for goods, labor disputes and protests, as well as COVID-19-related port closures and labor shortages, have helped lead to a record volume of cargo accumulating at many ports.

Port Congestion Likely Contributing to Rising Consumer Prices. Across all goods and services purchased by U.S. consumers, prices have risen by 8.5 percent over the past year, which reflects a considerably faster growth rate than recent history. Increasing consumer prices primarily result from a surge in the amount of goods consumers want to buy, combined with businesses struggling to produce and deliver those goods. One result of this dynamic is a dramatic increase in ocean freight costs, which businesses may pass on to consumers through higher prices. Port congestion appears to be a key driver of rising freight costs. Port congestion also may reduce the availability of some goods to retailers, which could, in turn, increase the prices of some of those goods for consumers.

Congestion Has Increased Emissions at Ports. Due to greater congestion, more ships have had to anchor offshore, waiting to load and offload goods. Anchored ships require the use of auxiliary engines, which emit NOx and PM. As a result, containership emissions were particularly high in the fall of 2021. According to CARB's estimates <https://ww2.arb.ca.gov/sites/default/files/2021-11/SPBP_Congestion_Anchorage_Emissions_Final.pdf> , as of October 2021, increased port congestion resulted in overall containership emissions increases of 20 tons per day (tpd) of NOx and 0.5 tpd of PM in the South Coast Air Basin relative to average pre-pandemic baseline levels. While containership emissions at ports have since returned to baseline levels—primarily due to recently implemented policies that require ships to wait further offshore—overall port-related emissions have continued to exceed pre-pandemic levels. This is due to the higher than normal volume of goods at ports leading to increased activity from cargo handling equipment and drayage trucks moving goods to and from ships and other modes of transport. These vehicles often are powered by fuel combustion engines which also emit air pollutants such as NOx and PM. As a result, CARB estimates <https://ww2.arb.ca.gov/sites/default/files/2022-06/SPBP_Freight_Congestion_Emissions_30JUN2022.pdf> that over the last several months, NOx and PM emissions from port-related equipment, such as port trucks, regional rail, and cargo handling equipment, have exceeded baseline levels by 6.3 tpd of NOx and 0.1 tpd of PM.

Increased Demand for Goods Has Led to Calls for Expanding Ports' Capacity. Many port infrastructure projects help improve the capacity of ports to process goods. For example, port deepening projects make navigation channels deeper and wider, which helps to accommodate larger ships that can carry more goods. As another example, a project expanding freight railyards at ports could increase goods movement capacity if more freight rail can pick up and drop off goods. Because the recent increase in demand for goods has strained ports' goods movement capacity, ports have begun planning infrastructure projects to make improvements. For instance, according to the California Association of Ports (which represents all of the publicly operated ports in the state), port authorities have identified $3.6 billion in infrastructure projects that could be potential candidates for state or federal infrastructure grant programs.

Recent State Actions to Address Port Congestion and Air Quality

Governor Issued Executive Order Aimed at Reducing Port Congestion. In October 2021, Governor Newsom issued Executive Order N-19-21, which directed state agencies to identify additional ways to alleviate congestion at California's ports. In response, the Department of General Services (DGS) identified six surplus state properties in proximity to highly congested ports which can store up to 20,000 containers. The state plans to lend these properties to support port operations for one year, with an option to renew for another year. At the time of this writing, DGS had leased these properties to a warehousing company that will work with importers to store containers on these sites. In addition, CalSTA and the U.S. Department of Transportation (USDOT) entered into an Emerging Projects Agreement, under which CalSTA developed a list of goods movement infrastructure projects for which USDOT will provide technical assistance to develop and apply for federal funding opportunities.

Legislature Has Prioritized Ports in Recent Sessions. In recent years, the Legislature has engaged on several budget and policy efforts regarding ports. For example, as shown in Figure 3, the Legislature has committed nearly $1.9 billion in one-time funds over the next several years for port-related issues, such as infrastructure projects, workforce development, and operational improvements. The Legislature has prioritized port issues through nonbudgetary channels as well, such as by convening the Assembly Select Committee on Ports and Goods Movement for two hearings, one on congestion (November 2021) and another on the impact of port congestion on agriculture (February 2022). The Legislature is also considering a number of policy bills that are still pending at the time of this writing.

Figure 3

Recent State Budgets Have Included Funding for Ports[a]

(In Millions)

Department	Item	2021-22	2022-23	2023-24	2024-25
CalSTA	Port of Oakland	$280	—	—	—
SLC	Economic Support for Ports	250	—	—	—
CalSTA	Supply Chain Resilience Package	—	$600	$600	—
CWDB	Goods Movement Workforce Training Campus	—	30	40	$40
GO-Biz	Operational and Process Improvement at Ports	—	30	—	—

[a]All of these items are funded from the General Fund, with the exception of Economic Support for Ports, which was funded with federal funds.

CalSTA = California State Transportation Agency; SLC = State Lands Commission; CWDB = California Workforce Development Board; and GO-Biz = Governor's Office of Business and Economic Development.

2022-23 Budget Includes Funding for Freight Policy Team at CalSTA. With the goal of supporting a more cohesive approach towards freight policy—including at ports—the 2022-23 budget package established a new freight policy team under CalSTA to play a coordinating role and included positions for the team on a three-year, limited-term basis with a reporting requirement on its efforts. This report is intended to inform future decisions on an ongoing approach to improving coordination of statewide freight policy.

Recent Federal Actions to Address Port Congestion and Air Quality

Significant New Funding for Port Infrastructure. In November 2021, IIJA was signed into law. The act provides $1.2 trillion for infrastructure nationwide, including about $17 billion for ports and waterways. Most of this funding is targeted for federally owned infrastructure, through the Army Corps of Engineers, General Services Administration, U.S. Customs and Border Protection, and Department of Homeland Security. About $2.7 billion is available for non-federally owned port infrastructure, to be distributed through three competitive programs over the next five years: (1) $2.3 billion through PIDP, (2) $400 million through the new Reduction of Truck Emissions at Port Facilities Program, and (3) $25 million

through the Marine Highways Program. California's ports are eligible to apply for these funds. Currently, all of these federal programs have begun the funding allocation process for federal fiscal year 2022. Each of these programs require a 20 percent funding match from a nonfederal source, which could include state funding.

In addition to the funding included in IIJA, the federal government recently enacted the Inflation Reduction Act of 2022, which includes $3 billion for ports to reduce air pollution and carbon emissions. Of this amount, about $2.3 billion will be available on a competitive basis for all ports and $750 million through competitive grants for ports in areas that do not meet federal air quality standards. Several ports in California likely will be eligible for the latter grant.

White House Issued Action Plan for Ports and Waterways. Alongside the enactment of IIJA, in November 2021, the Biden administration announced a set of near- and longer-term actions to improve port and waterway infrastructure. These included efforts to accelerate federal grant awards, identify and develop port infrastructure projects, and facilitate data sharing to support supply chain efficiency.

Conclusion

California's ports have significant implications for both the state's economy as well as the environment. As a crucial component of the global supply chain, efficiency and capacity at ports are critical to ensure the cost-effectiveness and timeliness of goods movement, both for consumers as well as businesses. In addition, ports remain significant sources of air pollution and emissions, which are associated with negative public health outcomes and are detrimental to the state's climate change mitigation efforts. These issues have only heightened with the recent port congestion challenges—highlighting the need for port infrastructure to expand capacity and efficiency as well as improve technologies and equipment to reduce air quality impacts. These issues will confront the Legislature in the coming years as it seeks to further improve goods movement and air quality at California's ports.