



THE PORT OF OAKLAND'S PATHWAY TO ZERO EMISSIONS



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The Port of Oakland strives for the cleanest operations to support the right to clean air for its workers and neighboring community. In June 2019, the Board of Port Commissioners approved the “Seaport Air Quality 2020 and Beyond Plan: The Pathway to Zero Emissions” (Plan) to minimize diesel particulate matter and greenhouse gas emissions. The Port is a landlord port and does not own or operate equipment including trucks, cargo handling equipment, ships or locomotives.

As the property owner and a public agency, the Port functions as a liaison with Port tenants (and associated equipment owners and operators), the West Oakland community and air quality regulators. To implement the Plan, Port staff evaluate the feasibility of zero and near zero-emissions equipment and encourage equipment owners to operate the cleanest equipment. The feasibility criteria in the Plan include

commercial availability, operational feasibility, cost, community exposure reduction, cost-effectiveness, acceptability and need.

This article summarizes efforts to minimize four major mobile source categories: cargo handling equipment, drayage trucks, tugs and ships.

CARGO HANDLING EQUIPMENT (CHE) AND DRAYAGE TRUCKS

Zero emissions CHE and drayage trucks have been a focus in California especially since the Ports of Los Angeles and Long Beach announced their joint goals of all zero-emissions CHE by 2030, and all zero emissions drayage trucks by 2035. While applauding the San Pedro Bay ports for establishing these goals at the nation’s largest seaport, the approach in Oakland is to establish goals based on the feasibility criteria in the Plan. The Port recently

conducted two feasibility studies focused on CHE and drayage trucks as discussed below.

CHE: The feasibility study concludes that zero-emissions yard tractors operating in ancillary support areas (outside marine terminals or off-dock) meet the Port’s feasibility criteria. Battery electric yard tractors are commercially available (vendors include OrangeEV, BYD and Kalmar); they are operationally feasible, and they are affordable with State of California incentive funding. The best source of incentive funding is the California Air Resources Board’s (CARB) voucher program which can fund up to \$150,000 for the tractor, \$30,000 for electric infrastructure, plus another 10% because the seaport is adjacent to a disadvantaged community. To date, six OrangeEV yard tractors are operating off dock at the seaport.

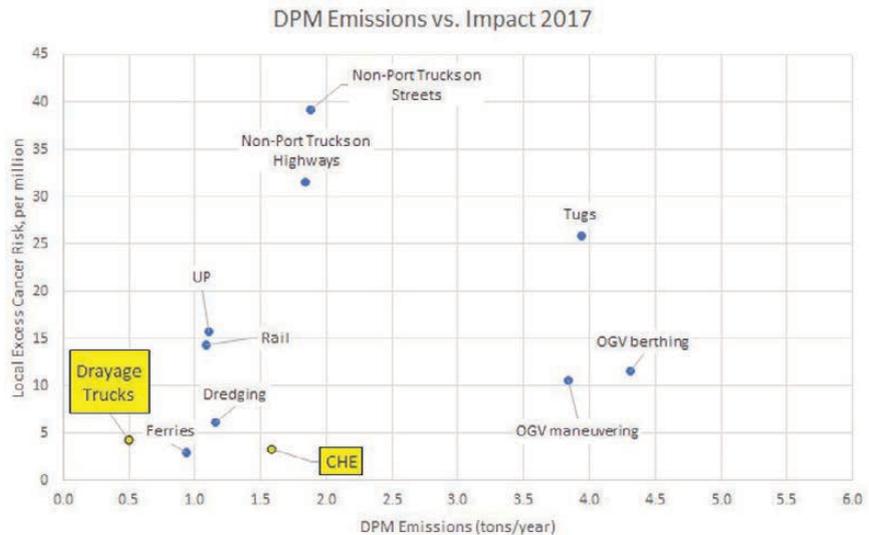
However, zero-emissions yard tractors are not yet operationally feasible at marine terminals. Terminal operators need tractors that can pull two loaded 20-foot containers on a chassis (or “bomb cart” - a chassis where import containers from vessels are dropped) for one or more shifts. Another issue at marine terminals is the desire for inductive versus manual charging of battery electric equipment.

Another type of CHE determined to be feasible is hybrid rubber tired gantry (RTG) cranes. RTG cranes are used to stack and load import containers onto drayage trucks. Currently, all 13 RTG cranes at Oakland’s largest marine terminal, Oakland International Container Terminal (OICT), are being retrofitted using Mi-Jack Products hybrid electric technology. In Oakland, RTG cranes are used to stack imports in the yard and then load them onto drayage trucks. The terminal operator reports that diesel consumption has reduced from 10-12 gallons/hour to 1.2 gallons/hour.

Drayage Trucks: Over 5,000 drayage trucks transport containers to and from Oakland’s four marine terminals. Currently, two off dock tenants operate a total of seven battery electric BYD drayage trucks which have all been funded by CARB. Currently, the retail cost of a new battery-electric drayage truck is unknown, but it is likely several \$100,000’s more than a used diesel drayage truck (which is what independent owner-operators typically buy). Another consideration is that currently, battery-electric drayage trucks are only commercially available for sale by one manufacturer.

The Port, in collaboration with the Port of Long Beach and others received a Zero and Near Zero Freight Facilities (ZANZEFF) grant from CARB to install electric infrastructure and operate ten zero-emissions Peterbilt/Transpower drayage trucks at a tenant facility. The estimated cost for these trucks is about \$500,000 each, plus \$200,000 each for Transpower’s proprietary charging units. Construction of the infrastructure costs approximately \$1 million with construction commencing in spring 2020.

Community Exposure from CHE and Drayage Trucks: As part of the West Oakland Community Action Plan recently approved by CARB, the local air district prepared a health risk assessment from the seaport and other sources of emissions. The risk assessment indicates that excess cancer risk from CHE and drayage trucks is lower than non-Port sources such as non-Port trucks on local streets and highways, and water based sources such as tugs and ocean going vessels.



The West Oakland Community Action Plan is a local plan funded by CARB’s Community Air Protection Program.

TUGS AND OCEAN-GOING VESSELS

The following summarizes emission reduction measures for tugs and ocean-going vessels (OGV).

Tugs: Large ships may require up to four tugs to assist San Francisco bar pilots maneuver ships to berths. Many of these tugs have been or will be retrofitted with Tier 3 engines using incentive funding. As part of the ZANZEFF grant mentioned above, a tug operator plans to construct a new Tier 4 tug with a power management system to operate its main and auxiliary engines based on demand.

OGV: California is the only place in the world that requires container ships to plug into shorepower, and to use 0.1% sulfur marine distillate oil (MDO). In 2019, Oakland had 1,419 vessel calls from approximately 300 unique container ships of which approximately 80% plugged into shore power. It costs approximately \$1,000,000 to retrofit a ship to be shore power capable. The biggest reason for not plugging in is unequipped vessels; about 15% of vessel calls in 2019. Significant incentive funding was provided by CARB to install shorepower in Oakland. The Port of Oakland has a robust shorepower program including vessel commissioning by Port staff, investigating and recording why a ship did not plug in, and monthly and annual reporting.

Another major emissions reduction measure is the use of lower sulfur fuel. While the IMO recently required that all ships transition from 3.5% to 0.5% sulfur fuel, CARB has required the use of 0.1% MDO for several years. Based on Port research, actual fuel sulfur content may be less than 0.1% sulfur (0.05% or less). The

associated emission factors are unknown but will be quantified in a 2019 emissions inventory.

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ABOUT THE AUTHOR

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 Diane Heinze oversees the seaport’s environmental work. Together with four staff they obtain entitlements for projects and ensure compliance with environmental laws and regulations. Diane also manages the Port’s archives.

ABOUT THE ORGANIZATION

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 Oakland’s seaport originated in 1852 when Horace Carpentier, a lawyer and Oakland’s first mayor, was granted exclusive control of the waterfront. In 1911, the State of California determined that the waterfront belonged to the public and Oakland’s Harbor Commission was created. In 1927, the citizens of Oakland voted to establish a separate department to manage the port and created the Port of Oakland. The Port of Oakland’s seaport is the ninth largest container port in the U.S. and handled 2.5 million TEUs in 2019. The Port of Oakland also includes the Oakland International Airport and commercial real estate property between the seaport and the airport.

ENQUIRIES

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