



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

Bay Area Air Quality Management District

BAAQMD Assessment of Available Zero- and Near-Zero Equipment

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Key Requirements of San Pedro Bay's Clean Ports Initiative

Ports of Los Angeles & Long Beach

- Trucks:
 - Beginning 2023, *all new trucks* must be ZE
 - After 2035, non-ZE trucks must pay fee to enter
- Cargo Handling Equipment (CHE)
 - Beginning 2020, *all new CHE* must be ZE (if feasible) or cleanest available
 - Terminals to submit equipment inventory & 10-year procurement schedule 1/1, 2019
- Marine Vessels
 - Capture up to 100% of vessel at-berth emissions by 2030
 - Repowers harbor craft to Tier 3 and Tier 4
 - Vessel Speed Reduction





Upcoming Proposed ARB Regulations

- ZE CHE regulation for ARB Board consideration in 2022, with potential starting date of 2026+
- Trucks:
 - Advanced Clean Truck Rule (formerly last mile delivery rule) to be considered in by 2019
 - ZE drayage truck regulation to be developed for ARB Board consideration in 2022 (with 2026-2028 starting date)
- Commercial Harbor Craft at Seaports amendments for ARB Board consideration in 2020, with potential starting date of 2023
- ZE Transportation refrigeration unit regulation for ARB Board consideration in 2019, with a potential starting date of 2020+
- School & Transit Buses
- Freight Facilities






Zero Emissions Vehicles/Equipment

- Commercially Available

Zero-Emissions (Electric and/H2)








	Category	Technology Readiness Level		
		Demonstration	Early Commercialization	Commercially Available
	Bus			
	Light-Duty Cars/SUVs			
	Transportation Refrigeration Unit			
	CHE: RTG/RMG cranes, Ship-to-Shore Cranes, Yard Hustlers/Trucks, Forklifts, Loaders/Material Handlers, Railcar Movers, and Airport Ground Support			
	Locomotives: Switchers/Yard Goats			catenary and electrified rail
	CHE: Top/side Picks			

Legend	
	Not available
	Available
	Limited availability



Zero Emissions Vehicles/Equipment

- Not Commercially Available

Zero-Emissions (Electric and/H2)				
	Category	Technology Readiness Level		
		Demonstration	Early Commercialization	Commercially Available
	Light-, Med-, Light Heavy-, and Medium-Heavy Duty Trucks			
	Heavy-Heavy Duty Trucks		By 2020	
	Small Construction Equipment		By 2020	
	Large Construction Equipment			
	Ocean Going Vessels	Other technologies in research		Shorepower & Vessel Speed Reduction
	Tug Boats			
	Locomotive - Line haul	non-catenary and non-3rd rail electrified		

	Available
	Limited availability



Results of Technology Review

Partners: City, Port, Metropolitan Transportation Commission (MTC), Alameda County Transportation Commission (ACTC), Alameda County Public Health Department (ACPHD), ARB, United States Environmental Protection Agency (USEPA)

Results: 6 TPY DPM Reduction possible from current operations for \$220 million

- Yard Trucks
- Tug Boats
- Top Pick Cranes
- Drayage Trucks



Options and Considerations for Infrastructure

- Electric-powered
 - Grid power (PG&E or Port-served Areas), or
 - Micro-grid battery storage & solar
- Hydrogen-powered
 - Hydrogen storage and re-fueling infrastructure, or
 - Stationary fuel cell to generate electricity

