

California Air Resources Board (CARB) Staff: Update on Concepts to Minimize the Community Health Impacts from Large Freight Facilities

ADVANCE MATERIALS
(Revised)

At the March 2018 Board Meeting, staff will provide an informational update on actions to minimize emissions and community health impacts from freight facilities. This update will describe staff's evaluation of potential concepts to reduce emissions from large freight facilities, including Indirect Source Review (ISR) rules and other measures capable of achieving similar levels of emission reductions. Staff will also propose a path forward with additional CARB regulations and other actions, beyond those included in the State Implementation Plan (SIP), to further cut emissions. Such actions may require earlier implementation in the most impacted communities or regions. Finally, staff will propose to provide an annual update to the Board on freight activities to reflect the latest developments.

The additional freight regulations being considered include amendments to CARB rules for commercial harbor craft, cargo handling equipment, and drayage trucks to transition those sources to zero- or near-zero emission operation, as well as potential new rules for rail yard and locomotive emissions not preempted by the federal Clean Air Act. CARB staff anticipate that these regulatory efforts would establish new requirements for equipment owners and for large facilities where they congregate. Facility responsibilities may include providing infrastructure for charging/fueling and ensuring only compliant equipment is operated on site. These actions would provide critical benefits to reduce community health risk, fulfill SIP commitments to attain federal air quality standards, and meet greenhouse gas targets.

Staff is also proposing to begin development of a Freight Handbook with recommendations for the siting, design, construction and operation of new and expanded freight facilities, and potentially the operation of existing facilities. The first module for development would focus on warehouses and distribution centers. Subsequent modules would address seaports, rail yards, and other freight hubs.

This document includes a table outlining a prospective schedule for Board consideration (where necessary) and implementation of each additional action, as well as each existing SIP commitment, for freight-related sources. It also provides a brief description of the additional CARB actions to reduce freight emissions. These actions and the SIP commitments will need to be implemented with existing resources.

Staff published a draft of the schedule and descriptions as Advance Materials to support discussion at a series of public meetings in February 2018. At those meetings, we also identified some of the choices to be made in sequencing the new development work, based on staff expertise and availability. That discussion and additional CARB staff analysis informed the revised schedule and action descriptions within this updated document. CARB staff expects the public and the Board to provide additional input on priorities and scheduling at the March 22, 2018 meeting.

Following the Board meeting, we will begin development of the first series of additional actions. For each new action, CARB staff employs an extensive public process to seek information and ideas, share concepts, receive feedback, and fine-tune proposals.

During the public consultation meetings, stakeholders raised questions about CARB's rulemaking process and asked for information about the types of staff analyses that the Board relies on to balance the benefits, costs, and impacts of regulatory decisions. In addition to assessing any statutory requirements and limitations, CARB staff gather data and conduct analyses to develop regulatory proposals, such as:

- industry operations, including the equipment population, useful life, activity levels, and any mandated safety requirements;
- air pollutant emissions, and the resulting health impacts and economic valuations;
- vehicle/equipment technologies and fuels, including the feasibility and performance of options to reduce emissions;
- cost of advanced technologies, infrastructure, and operational changes, as well as cost-effectiveness and any cost savings, plus innovative financing and incentives;
- potential economic and environmental impacts of compliance; and
- environmental justice considerations.

In the outreach process, CARB staff also heard questions and concerns about transitioning to zero emission technology and zero-emission operations in impacted communities that we will need to address in the rulemakings. Examples include:

- issues associated with fueling and/or charging infrastructure required to support those technologies, like specifications for compatible connections, facility planning and financing needs, resilience in the face of climate change (e.g., sea level rise);
- opportunities for incentives, both traditional grants/loans and preferential access programs to avoid congestion;
- efficiency improvements and potential industry choices for automation and the associated workforce impacts;
- information technology-related items like geo-fencing software and hardware, as well as electronic reporting and compliance checks; and
- identification of all parties that must act to ensure success, so that the regulations can assign the appropriate responsibilities.

CARB Actions to Further Reduce Emissions from Freight Sources and Facilities

Sector and/or Facility Type	Action	Potential Timeframe		
		Board to Consider	Begin to Implement	
ADDITIONAL FREIGHT-RELATED ACTIONS				
1.	Drayage Trucks at Seaports and Rail Yards	Participation in the San Pedro Bay Ports' determination of drayage truck rates to incentivize zero- and near-zero emission truck trips	---	2018-19
2.	Drayage Trucks at Seaports and Rail Yards	Drayage truck regulation to transition to zero-emission operation	2022	2026-28+
3.	Commercial Harbor Craft at Seaports	Commercial harbor craft regulation amendments	2020	2023+
4.	Cargo Handling Equipment at Seaports and Rail Yards	Cargo handling equipment regulation to transition to zero emissions	2022	2026+
5.	Rail Yards, Rail Stations, Rail Sidings, Seaports, Warehouses, and Other Hubs	Evaluation and potential development of regulation to reduce idling emissions from all rail yard sources and emissions from other stationary locomotive operations	2020	2023+
6.	Locomotives	Evaluation and potential development of regulation to reduce emissions from locomotives not pre-empted under the Clean Air Act	2022	2025+
7.	All	Freight Handbook – Module 1 (warehouses and distribution centers)	2019	2019
8.	All	Freight Handbook – Module 2+ (seaports, rail yards, and others tbd)	2021+	2021+
9.	Warehouses and Distribution Centers	Form " <i>Freight Hub Enforcement Team</i> "	---	2018

CARB Actions to Further Reduce Emissions from Freight Sources and Facilities

Sector	Action	Potential Timeframe	
		Board to Consider	Begin to Implement
FREIGHT-RELATED COMMITMENTS FOR NEW MEASURES IN THE SIP			
Trucks	Lower in-use performance level – multiple regulations (e.g., inspections, warranties)	2017-2020	2018-2024
Trucks	Heavy-duty on-board diagnostics amendments	2018	2019
Trucks	Heavy-duty vehicle zero-emission certification procedures	2018	2023
Trucks	Advanced clean local trucks regulation (last-mile delivery)	2018	2023
Trucks	Medium- and heavy-duty greenhouse gas phase 2	2018	2018+
Trucks	Low-oxides of nitrogen standard for truck engines	2019	2023-24
Trucks	Innovative truck technology certification flexibility	Ongoing	
Transport refrigeration units	Transport refrigeration unit regulation to transition to zero emissions	2019	2020+
Locomotives	Petition to US EPA for more stringent national locomotive (Tier 5) emission standards	2017 (done)	2023
Ships	Ships at-berth amendments	2019	2023
Ships	Advocate for Tier 4 vessel standards	Ongoing	
Ships	Incentivize low emission efficient ship visits	Ongoing	
Forklifts	Zero-emission forklift regulation	2020	2023
Off-Road Equipment	Zero-emission off-road emission reduction assessment (evaluate transfer of ZE technologies to larger equipment)	2025+	---
Off-Road Equipment	Zero-emission off-road worksite emission reduction assessment (increase worksite efficiency using ZE equipment)	2018+	---
All	Low-emission diesel fuel requirement	2020	2023
All	Incentive funding	Ongoing	
All	Further deployment of cleaner technologies	Ongoing	

Sector or Facility Type	Drayage Trucks at Seaports and Rail Yards
CARB Action	
1. Participation in the San Pedro Bay Ports' determination of drayage truck rates to incentivize zero- and near-zero emission truck trips	
Timeframe for Board consideration (estimated)	
No Board action necessary	
Description of approach	
<p>Participate in the San Pedro Bay Ports' development of gate rates that assist in the transition to zero and near-zero emission heavy-duty trucks operating at the ports. This rate will apply to the beneficial cargo owners for all heavy duty trucks that enter the port terminals. CARB staff has urged the Ports to establish initial rates that include temporary exemptions for trucks with CARB-certified near-zero engines, and a per-trip rebate for trucks with zero-emissions or zero-emission operation.</p> <p>CARB is scheduled to consider new low-NOx truck engine emission standards in 2019 that would apply to manufacturers of new heavy duty truck engines sold in California. CARB staff has not determined the specific emission levels that will be proposed in conjunction with these standards. The agency will also certify whether or not particular truck engines developed by various manufacturers meet the required emission levels.</p> <p>Please note that some stakeholders refer to CARB's three adopted optional low-NOx truck engine standards as being "near-zero" emissions. CARB staff's current thinking is that that the term "near-zero emissions" for drayage trucks operating at the San Pedro Bay Ports should include emission levels meeting the mandatory low-NOx standards once identified, and use of low-carbon renewable fuels. Staff is also considering the feasibility and timing for near-zero emission trucks that are capable of zero-emission miles in designated areas.</p>	
Potential impacts	
This action could achieve moderate emission reductions of toxic, criteria, and greenhouse gas pollutants beginning in 2020, with significant emission reductions of all pollutants after full implementation (in 2035).	
Considerations	
<ul style="list-style-type: none"> • Return on investment • Demonstrations underway • Cost & innovative financing • Preferred access (ports, I-710) 	
References	
<ul style="list-style-type: none"> • San Pedro Bay Ports 2017 Clean Air Action Plan; November 2017, pgs. 32-45, http://www.cleanairactionplan.org/documents/final-2017-clean-air-action-plan-update.pdf • CARB Optional Low NOx Emission Standards Information, https://www.arb.ca.gov/msprog/onroad/optionnox/optionnox.htm 	

Sector or Facility Type	Drayage Trucks at Seaports and Rail Yards
CARB Action	
2. Drayage truck regulation to transition to zero-emission operation	
Timeframe for Board consideration (estimated)	
2022	
Description of approach	
<p>Amend the existing Drayage Truck Regulation, or adopt a new regulation, to direct a transition to zero-emission operations, beginning 2026-2028. CARB's current Truck and Bus regulation contains requirements for existing trucks to have an engine meeting 2010 or newer emissions standards, with full implementation in 2023. The new drayage truck regulation would establish a schedule for phasing in the use of zero-emission technology. Options to be considered include, but are not limited to, requirements for full zero-emission technology (e.g., a battery or fuel-cell electric short-haul truck) and zero-emission mile capability (e.g., a natural gas-electric hybrid that could drive interstate but switch to zero-emission electric mode while operating in impacted communities). CARB staff would also consider the opportunities to prioritize the earliest implementation in the communities most impacted by air pollution.</p>	
Potential impacts	
<p>This action could achieve moderate reductions in toxic and criteria pollutant emissions beginning in 2026, or earlier if drayage truck fleets choose to invest early in technology for long-term compliance (likely motivated by port rate structures and incentives), with significant reductions of toxic, criteria, and greenhouse gas pollutants expected after full implementation. These reductions would provide critical benefits to reduce community health risk, fulfill State Implementation Plan commitments to attain federal air quality standards, and meet greenhouse gas targets.</p>	
Considerations	
<ul style="list-style-type: none"> • Return on investment • Demonstrations underway • Cost & innovative financing • Preferred access (ports, I-710) 	
References	
<ul style="list-style-type: none"> • CARB Drayage Truck Regulatory Activities, https://www.arb.ca.gov/msprog/onroad/porttruck/porttruck.htm • CARB Truck and Bus Regulation, https://www.arb.ca.gov/msprog/truckstop/tb/truckbus.htm • CARB Technology and Fuel Assessments, https://www.arb.ca.gov/msprog/tech/tech.htm 	

Sector or Facility Type	Commercial Harbor Craft at Seaports
CARB Action	
3. Commercial harbor craft regulation amendments	
Timeframe for Board consideration (estimated)	
2020	
Description of approach	
<p>Amend CARB's existing Commercial Harbor Craft regulation to include more stringent in-use and new vessel requirements for both freight-related and passenger vessels. The existing regulation requires the majority of older engines (e.g., Tier 0 or Tier 1) to be repowered with engines meeting newer standards (e.g., Tier 2 or Tier 3) by 2025. After full implementation, staff estimates that commercial harbor craft emissions will still contribute significantly to health risk, and need to be further reduced to help attain air quality standards. Development of these amendments would include re-evaluation of the feasibility of Tier 4 engine technology and the performance of advanced retrofit emission control devices in commercial harbor craft applications, and other operational control strategies for reducing emissions. CARB staff will continue to assess the availability of zero and near-zero emission technologies for the sector, for potential inclusion in these regulatory amendments or future amendments. CARB staff would also consider opportunities to prioritize the earliest implementation near the communities most impacted by air pollution.</p>	
Potential impacts	
<p>The adoption of Tier 4 engine technology, advanced retrofit emission control devices, and/or operational control strategies could achieve significant reductions of toxic and criteria pollutant emissions beginning in 2023, providing critical benefits to reduce community health risk and to fulfill State Implementation Plan commitments to attain federal air quality standards. Incorporation of zero and near-zero emission technologies could further reduce toxic and criteria pollutant emissions, as well as greenhouse gas emissions, and accelerate the deployment of zero-emission operations in other freight and heavy-duty applications.</p>	
Considerations	
<ul style="list-style-type: none"> • Return on investment • Feasibility of Tier 4 marine retrofits • Zero emission potential 	
References	
<ul style="list-style-type: none"> • CARB Commercial Harbor Craft Regulatory Activities, https://www.arb.ca.gov/ports/marinevess/harborcraft.htm • CARB Technology and Fuel Assessments, https://www.arb.ca.gov/msprog/tech/report.htm 	

Sector or Facility Type	Cargo Handling Equipment at Seaports and Rail Yards
CARB Action	
4. Cargo handling equipment regulation to transition to zero emissions	
Timeframe for Board consideration (estimated)	
2022	
Description of approach	
<p>Amend CARB’s existing Cargo Handling Equipment regulation to transition to zero-emissions. The existing regulation sets in-use requirements for diesel cargo handling equipment at ports and rail yards, including but not limited to: yard trucks (hostlers), rubber-tired gantry cranes, container handlers, and forklifts. Staff would assess the availability and performance of zero-emission technology as an alternative to all combustion-powered cargo equipment and evaluate additional solutions that may include efficiency improvements. The regulatory amendments would propose an implementation schedule for new equipment and facility infrastructure requirements, with effective dates beginning in 2026. In this potential action, all mobile equipment at ports and rail yards, including but not limited to: diesel, gasoline, natural gas, and propane-fueled equipment, would be subject to new requirements. CARB staff would also consider opportunities to prioritize the earliest implementation in or adjacent to the communities most impacted by air pollution.</p>	
Potential impacts	
<p>This action could potentially achieve emission reductions of criteria pollutants, air toxics, and greenhouse gases, beginning in 2026, with the majority of reductions occurring before 2031. These reductions would provide critical benefits to reduce community health risk, fulfill State Implementation Plan commitments to attain federal air quality standards, and meet greenhouse gas reduction targets. The new technologies used to achieve these reductions are expected to transfer and accelerate the deployment of zero-emission operations in other freight and heavy-duty applications.</p>	
Considerations	
<ul style="list-style-type: none"> • Return on investment • Zero emission potential • Planning/funding for infrastructure • Labor • Automation 	
References	
<ul style="list-style-type: none"> • CARB Cargo Handling Equipment Regulatory Activities, https://www.arb.ca.gov/ports/cargo/cargo.htm • CARB Technology and Fuel Assessments, https://www.arb.ca.gov/msprog/tech/report.htm 	

Sector or Facility Type	Rail Yards, Rail Stations, Rail Sidings, Seaports, Warehouses, and Other Hubs
CARB Action	
5. Evaluation and potential development of regulation to reduce idling emissions from all rail yard sources and emissions from other stationary locomotive operations	
Timeframe for Board consideration (estimated)	
2020	
Description of approach	
<p>Evaluate and potentially develop a new regulation that would require operators to limit idling of all combustion-powered vehicles and mobile equipment operating at rail yards and other locations, as well as reducing emissions from stationary locomotive operations (e.g., maintenance and testing). The scope could include both freight and passenger rail activities, in and around intermodal, classification, and maintenance rail yards, at seaports, at warehouses, on sidings, at passenger rail stations, and at maintenance and service locations. Compliance options might include operational practices, installation of idle-limiting technology, emission capture and control technology, or other effective techniques. Locomotives with zero-emission capability could be exempt, if operators show that zero-emission operation is maximized. CARB staff would also consider the opportunities to prioritize the earliest implementation in the communities most impacted by air pollution.</p>	
Potential impacts	
<p>This action could achieve significant reductions in toxic and criteria pollutant emissions, beginning in 2023, providing critical benefits to reduce community health risk and to fulfill State Implementation Plan commitments to attain federal air quality standards. For greenhouse gases, it would achieve moderate reductions, beginning in 2023, and significant reductions after full implementation.</p>	
Considerations	
<ul style="list-style-type: none"> • Federally mandated activities • Funding • Technology for stationary locomotive control 	
References	
<ul style="list-style-type: none"> • CARB Locomotive Petition to U.S. EPA, https://www.arb.ca.gov/railyard/docs/final_locomotive_petition_and_cover_letter_4_13_17.pdf • CARB Final Technology Assessment: Freight Locomotives, December 2016, https://www.arb.ca.gov/msprog/tech/techreport/final_rail_tech_assessment_112820_16.pdf • U.S. EPA, National Port Strategy Assessment: Reducing Air Pollution and Greenhouse Gases at U.S. Ports, September 2016, https://www.epa.gov/sites/production/files/2016-09/documents/420r16011.pdf 	

Sector or Facility Type	Locomotives
CARB Action	
6. Evaluation and potential development of regulation to reduce emissions from locomotives not pre-empted under the Clean Air Act	
Timeframe for Board consideration (estimated)	
2022	
Description of approach	
<p>Evaluate and potentially develop a new regulation that would require retrofit, repower, remanufacture, or replacement of freight and passenger locomotives not preempted under the Clean Air Act, beginning in 2025. CARB staff estimates that there are 200 to 300 of these units in California. Locomotives in operation beyond their useful life are typically operated by Class 3 freight railroads, industrial facilities, and passenger railroads, as well as a smaller number run by Class 1 railroads that can readily transfer those units to other states. Although the activity levels on these locomotives are lower than interstate locomotives, the oldest locomotives are the highest emitting (per unit of work performed) in the State. CARB staff would also consider the opportunities to prioritize the earliest implementation in the communities most impacted by air pollution.</p> <p>As an alternative, CARB could also consider a voluntary agreement with the major railroads to secure greater community health benefits by reducing emissions from interstate locomotives (the dominant source of emissions and community health risk at rail yards), if that agreement was developed in a transparent public process and included clear enforcement provisions. In CARB staff's experience, the Class 1 freight railroads have reliably fulfilled their obligations under two prior agreements.</p>	
Potential impacts	
<p>This action could achieve significant reductions in toxic and criteria pollutants, beginning in 2025, providing critical benefits to reduce community health risk and to fulfill State Implementation Plan commitments to attain federal air quality standards. For greenhouse gases, it would achieve moderate reductions, beginning in 2025.</p>	
Considerations	
<ul style="list-style-type: none"> • Funding 	
References	
<ul style="list-style-type: none"> • CARB Locomotive Petition to U.S. EPA, https://www.arb.ca.gov/railyard/docs/final_locomotive_petition_and_cover_letter_4_13_17.pdf • CARB Final Technology Assessment: Freight Locomotives, December 2016, https://www.arb.ca.gov/msprog/tech/techreport/final_rail_tech_assessment_112820_16.pdf • University of Illinois Report on Zero or Near-Zero Emission Rail in California, June 2016, https://www.arb.ca.gov/msprog/tech/techreport/final_rail_tech_assessment_112820_16.pdf 	

Sector or Facility Type	Warehouses/Distribution Centers, Seaports, Railyards and Other Freight Hubs
CARB Actions	
7. Freight Handbook, Module 1 8. Freight Handbook, Module 2	
Timeframe for Board consideration (estimated)	
2019 (Module 1), 2021+ (Module 2+)	
Description of approach	
<p>Develop a freight handbook document that identifies best practices for the siting, design, construction, and operation of freight facilities to: minimize community exposure to air pollution, incorporate the use of zero-emission technologies, install any needed fueling/charging infrastructure, and maximize the capacity of freight transportation infrastructure.</p> <p>This handbook could serve as a resource for local decision makers, community advocates, and lead agencies for environmental review and analysis, plus freight facility developers, builders, and operators. CARB staff anticipates working with a broad range of public and private entities to develop the recommendations for best practices and to promote their implementation.</p> <p>To address the growth of new warehousing and distribution facilities throughout the State, CARB staff would focus the first module on those facility types. Subsequent modules would consider other types of freight hubs, such as seaports, rail yards, and other facilities that attract freight sources, such as truck stops, fueling facilities and crude oil terminals. The results of the work being done in California to implement Assembly Bill 617 (C. Garcia, Chapter 136, Statutes of 2017), could help guide staff's priorities for development of these subsequent handbook modules.</p>	
Potential impacts	
<p>The action could result in freight operations with less impact on nearby communities and regional/global air pollution. Facilities using the best practices could emit significantly lower levels of toxic, criteria, and greenhouse gas pollutants, beginning in 2019. These reductions would provide critical benefits to reduce community health risk, fulfill State Implementation Plan commitments to attain federal air quality standards, and meet greenhouse gas targets.</p>	
Considerations	
<ul style="list-style-type: none"> • State partners • Extensive engagement • Freight clusters & pollution burden • Sensitivity to local authority • State & district California Environmental Quality Act (CEQA) guidelines 	
References	
<ul style="list-style-type: none"> • CARB Sustainable Freight Pathways to Zero and Near-Zero Emissions Discussion Document, April 2015, pg. 47, https://www.arb.ca.gov/gmp/sfti/sfti.htm • California Sustainable Freight Action Plan, July 2017, Appendix C pgs. C14 – C15, http://www.casustainablefreight.org/ 	

Sector or Facility Type	Warehouses and Distribution Centers
CARB Action	
9. Form a “Freight Hub Enforcement Team“	
Timeframe for Board consideration (estimated)	
No Board action necessary	
Description of approach	
<p>Form a Freight Hub Enforcement Team to focus on warehouses and distribution centers to ensure compliance at freight hubs across the State. The new team will be responsible for enforcing CARB regulations that apply to combustion vehicles and equipment, including trucks, transport refrigeration units, large spark ignition engines, and off-road equipment. The team’s enforcement efforts will place additional emphasis on warehouses and distribution centers, and the fleets that serve those facilities, to achieve the full benefits of adopted regulations, with a focus on facilities in disadvantaged communities. This new team will complement the existing team directed to enforcement at seaports and rail yards.</p> <p>CARB will utilize additional agency personnel to expand its enforcement at warehouse and distribution center locations, as well as pursue opportunities for additional enforcement partnerships. Some of the areas the new section will likely begin to focus on are Riverside/San Bernardino, Imperial Valley, and the Central Valley.</p>	
Potential impacts	
This action could potentially achieve moderate emission reductions of criteria pollutants and air toxics beginning in 2018 (depending on the increased compliance achieved).	
Considerations	
<ul style="list-style-type: none"> • Responsiveness to community concerns • Level playing field within supply chain (vehicle operators, brokers, shippers, and receiving facilities) • Additional enforcement partnerships 	
References	
<ul style="list-style-type: none"> • CARB Sustainable Freight Pathways to Zero and Near-Zero Emissions Discussion Document, April 2015, Appendix C pg. 66. https://www.arb.ca.gov/gmp/sfti/sustainable-freight-pathways-to-zero-and-near-zero-emissions-discussion-document.pdf. 	