



REGULATORY DEVELOPMENT OVERVIEW: POTENTIAL WAREHOUSE RULE



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Bay Area Air District
REGULATORY DEVELOPMENT DIVISION



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Executive Summary

Over the past two years, Bay Area Air District staff has conducted preliminary research on indirect sources of air pollution and developed early concepts for a potential warehouse indirect source rule (“Warehouse Rule”). This Regulatory Overview report summarizes key considerations for the rulemaking process, including the impetus for addressing indirect sources such as commitments to address community concerns, an accounting of engagement between Air District staff and the Board of Directors regarding indirect sources, available reports and analysis related to the South Coast Air Quality Management District’s (SCAQMD) Warehouse Actions and Investments to Reduce Emissions (WAIRE) Program, and indirect source rulemaking efforts at the San Diego Air Pollution Control District (SDAPCD). Members of the Air District’s Stationary Source Committee (SSC) requested this information be provided to the full Board of Directors to inform the process for moving forward with rulemaking.

Warehouses attract activity from diesel trucks and other mobile sources of pollution, resulting in significant localized pollution in nearby communities. With the growth of the goods movement sector, concerns about warehouse pollution have been raised by many stakeholders in the Bay Area and beyond. Air districts can address warehouse pollution through two main avenues: incentives and rulemaking. The Bay Area Air District has created several incentive programs to promote low- and zero-emission goods movement technologies but has thus far not pursued rulemaking. Given recent deregulatory actions at the federal level that threaten or eliminate anticipated emission reductions for the warehousing industry, there is an increased importance for rulemaking at the Air District level.

A key motivation for considering rulemaking stems from commitments made under Assembly Bill (AB) 617 Community Emissions Reduction Plans (CERPs) and the Air District’s commitment to reducing localized emissions in impacted communities. Staff has presented preliminary data, regulatory considerations, and potential rule concepts to the SSC. Additionally, staff published *Exploring an Indirect Source Rule for Warehouses in the Bay Area* in April 2026 on potential rule concepts. The Air District Board of Directors has supported this work by approving staffing and budget allocations specifically for indirect source rulemaking in the Fiscal Year 2025-2026 Budget.

Findings from other air districts may inform development of a potential Bay Area program. Board members and external stakeholders are interested in the WAIRE Program’s performance to date, as well as the San Diego Air Pollution Control District’s recent indirect source rulemaking efforts. Staff reviewed the WAIRE Program’s performance as detailed in



SCAQMD's WAIRE Annual Reports and found that the WAIRE Program has achieved measurable emission reductions. Staff reviewed a third-party analysis conducted by Ramboll, a consulting firm commissioned by the Supply Chain Federation, a business association, and found that some of Ramboll's critiques highlight credible shortcomings in the program's potential for emission reductions. However, staff also found that other claims were overstated, such as the potential for warehouse closure and relocation outside the district. Review of SDAPCD's indirect source rulemaking effort as detailed in a January 2026 White Paper revealed that their specific focus on NOx, cost effective comparisons to direct-control source categories, and their relatively small warehouse population contributed to their decision to not pursue further rulemaking in favor of incentive-based approaches.

Overall, rule development direction and progress to date have been undergirded by the Air District's commitments to address indirect sources as documented in AB 617 CERPs as well as goals to promulgate stronger regulations and reduce inequities for communities burdened by cumulative impact as detailed in the Air District's Strategic Plan. These goals have been supported by the Board of Directors through direction at multiple Committee meetings and budgetary approvals. Current and further rulemaking efforts are informed by insights from available material on existing programs and those under deliberation.

Background

Indirect sources of pollution, such as ports, railyards, and warehouses, are different from other sources that the Air District currently regulates, such as landfills or refineries. While there are some emissions from the facilities themselves, most of the air pollution comes from mobile sources that go to and from the facility. In the case of warehouses, including distribution centers, diesel trucks and other mobile sources generate significant emissions as they move the goods into and out of the warehouses. Warehouse emissions have emerged as a concern across several jurisdictions nationwide, spurring legislative and rulemaking efforts in California, Illinois, and New York.¹ SCAQMD adopted the nation's first indirect source rule (ISR) applicable to existing warehouses, known as the WAIRE Program.²

The Air District has initiated the early stages of rule development for a potential Warehouse Rule following the Air District's commitments under AB 617 CERPs, community concerns

¹ SDAPCD. Warehouse Work Group. <https://www.sdapcd.org/content/sdapcd/rules/warehouse-work-group.html>; LegiScan. Bill Text: IL HB5600 | 2025-2026 | 104th General Assembly | Introduced. <https://legiscan.com/IL/text/HB5600/id/3355751>; New York State Senate. Senate Bill S1180A. <https://www.nysenate.gov/legislation/bills/2025/S1180/amendment/A>

² SCAQMD. Rule 2305 Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions (WAIRE) Program. May 2021. <https://www.aqmd.gov/docs/default-source/rule-book/reg-xxiii/r2305.pdf?sfvrsn=15>



raised at Board of Director meetings, the Air District’s goal to focus on reducing localized emissions in impacted communities, as well as addressing emissions that have regional impacts to air quality.

Rule Development Process

Creating a new air quality regulation is a rigorous, multi-step process designed to maximize comprehensive evaluation, public participation, and a balancing of environmental protection and economic impacts. The journey from conceptualization through implementation is illustrated in Figure 1.

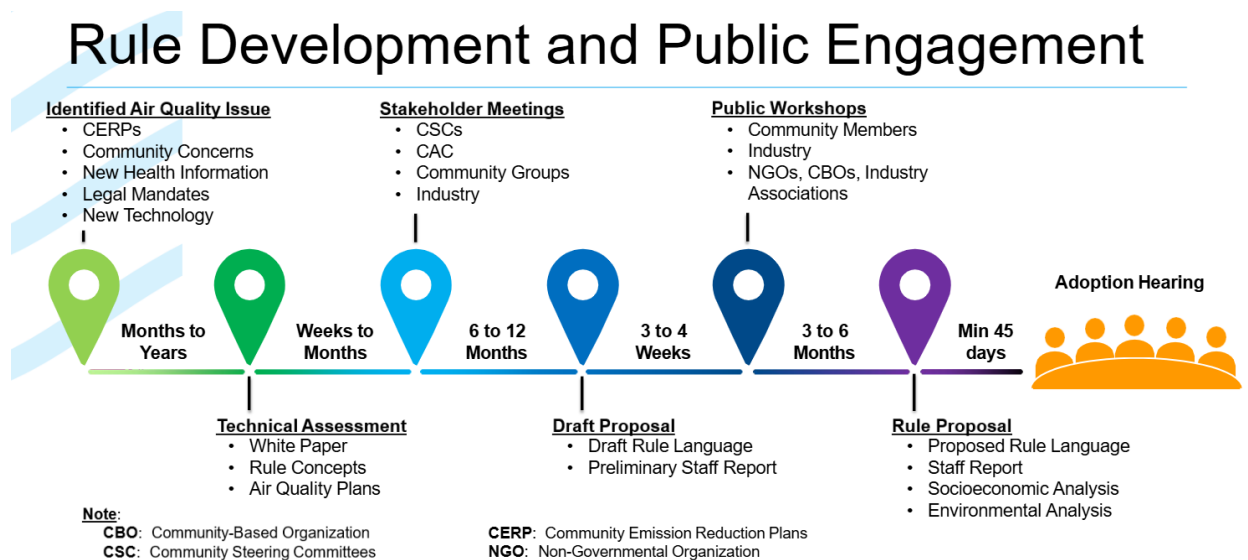


Figure 1. Conceptual diagram of the rule development process.

Current Status of the Warehouse Rule Efforts

The Air District is currently in the early, exploratory stages of the rulemaking process regarding a potential Warehouse Rule, consisting of identifying the air quality issue at hand and conducting a preliminary technical assessment (denoted by the dark green pin in Figure 1). Consistent with our strategic approach, the Air District is studying the feasibility of this rule to address the attainment of national standards (e.g., National Ambient Air Quality Standards), regional air quality concerns, and cumulative, local health impacts, but formal rule language has not yet been drafted or evaluated.

Recent rulemaking milestones include:

- **The Concept Paper:** On April 16, 2026, the Air District published a Warehouse Rule Concept Paper to support early public discussion. This document explores regulatory ideas, including an applicability threshold of 100,000 square feet (with potential



lower thresholds for impacted communities), a phased implementation approach, and flexible compliance menus.

- **Public Feedback Phase:** The official public comment period for the concept paper closed on June 1, 2026. Staff has reviewed the 24 written comments submitted by 71 individuals and organizations. This feedback will inform staff recommendations on regulating warehouse emissions.
- **Stationary Source Committee Presentation:** Staff presented rule concepts, public written feedback, and potential next steps to the Stationary Source Committee (SSC) of the Board of Directors, representing the fifth staff presentation on indirect sources to the SSC.
- **Next Steps:** Following Committee direction at the June SSC meeting, staff will present a regulatory overview to the full Board of Directors in October. During this October presentation, the Board of Directors may provide direction on the next steps for rule development.

Regulatory Context

Regulating warehouses as an indirect source is consistent with the Air District’s statutory authority under state and federal law, as well as responsive to the recent changes in the regulatory landscape.

The California Health and Safety Code (HSC) provides air districts with authority to adopt an indirect source rule designed to maintain attainment of the ambient air quality standards and to establish zones of special regulation that consider population density and the nature of local sources of air pollution.³ The Federal Clean Air Act expressly recognizes that states may use such authority to adopt “any indirect source review program” as part of a State Implementation Plan to attain National Ambient Air Quality Standards for criteria pollutants which includes particulate matter (PM) and nitrogen oxides (NOx), and defines an indirect source as a “facility, building, structure, installation, real property, road, or highway which attracts, or may attract, mobile sources of pollution.”⁴

The regulatory context has also shifted in ways that make local action more urgent. Communities and air districts across California had expected the California Air Resources Board (CARB) Advanced Clean Fleets and other regulations to drive significant reductions in heavy-duty vehicle emissions. In January 2025, CARB withdrew its request for a federal Clean Air Act waiver needed to implement certain portions of the regulation, citing

³ HSC Sections 40716, 40000, 40702, 39002, and 40230.

⁴ Clean Air Act Section 110(a)(5).



uncertainty about the incoming federal administration's stance on the waiver.^{5,6} Without the waiver, CARB cannot enforce the high-priority fleet and drayage fleet electrification requirements.⁷ CARB also withdrew waiver requests for its in-use locomotive standards and portions of its commercial harbor craft rule at the same time.^{8,9} Together, these withdrawals represent a significant decrease in the emission reductions that would have significantly improved air quality throughout the Bay Area, especially in communities near warehouses, ports, and freight corridors.

On the federal side, EPA finalized a more stringent annual PM_{2.5} standard in 2024, lowering it from 12.0 to 9.0 micrograms per cubic meter.¹³ EPA has not yet made a designation of attainment with regards to the new PM_{2.5} standard in the Bay Area, but recent monitoring data suggests the new standard has not been met.¹⁰ Standards notwithstanding, Particulate Matter from diesel engines (DPM) remains a primary driver of cancer risk in communities near warehouses, and the Air District's goals for emissions and health-risk reduction in impacted communities provide an additional, independent basis for prioritizing PM reductions under a Bay Area Warehouse Rule.

Warehouse Rule Concept Paper

In April 2026, Air District staff released *Exploring an Indirect Source Rule for Warehouses in the Bay Area*, a concept paper intended to launch public engagement at the outset of rule development.¹¹ The paper does not propose rule language; however, it summarizes staff's

⁵ RE: Withdrawal of California's Request for a Waiver, Pursuant to Clean Air Act Section 209(b), and Request for Authorization, Pursuant to Clean Air Act Section 209(e)(2), for the Advanced Clean Fleets (ACF) Regulation, Docket ID EPA-HQ-OAR-2023-0589. CARB. January 13, 2025.

<https://www.epa.gov/system/files/documents/2025-01/ca-acf-carb-withdrawal-ltr-2025-1-13.pdf>

⁶ CARB Withdraws ACF Waiver Request. ACT News. January 15, 2025. <https://www.act-news.com/news/carb-withdraws-acf-waiver-request/>

⁷ Advanced Clean Fleets Regulation No Longer in Force for Most Fleet Operators and Owners. Morrison Foerster. February 25, 2025. <https://www.mofo.com/resources/insights/250225-advanced-clean-fleets-regulations-no-longer-in-force>

⁸ RE: Withdrawal of California's Request for Authorization, Pursuant to Clean Air Act Section 209(e)(2), of the In-Use Locomotive Regulation, Docket ID EPA-HQ-OAR-2013-0574. CARB. January 13, 2025.

<https://www.epa.gov/system/files/documents/2025-01/ca-loco-carb-withdrawal-loco-ltr-2025-1-13.pdf>

⁹ RE: Withdrawal of Elements of California's Request for Authorization, Pursuant to Clean Air Act Section 209(e)(2), for the Commercial Harbor Craft (CHC) Regulation, Docket ID EPA HQ-OAR-2023-0153. CARB. January 13, 2025. <https://www.epa.gov/system/files/documents/2025-01/ca-chc-carb-withdrawal-ltr-2025-1-13.pdf>

¹⁰ A federal district court has ordered EPA to make final designations for all areas of the country by February 6, 2027. *Alliance of Nurses for Healthy Environments et al., v. Zeldin*, N. 4:26-cv-06341 (N.D. Cal.), Order Denying Motion for Abeyance and Granting in Part and Denying in Part Motions for Summary Judgment (Jul. 17, 2026) at 29.

¹¹ More information at the Air District's Warehouse Rule webpage: <https://www.baaqmd.gov/en/rules-and-compliance/rule-development/warehouse-ISR>



early thinking and invites feedback from communities, industry, labor, local governments, and other stakeholders before conducting more detailed technical work and drafting rule language. Because these are early concepts rather than a defined program design, the concept paper includes only preliminary, screening-level emissions estimates. The concept paper does not include a detailed emissions impact analysis or a socioeconomic impact analysis. Such analyses cannot be meaningfully conducted until more specific rule provisions are developed, such as compliance obligations, applicability, and implementation timelines. Rule language, detailed emissions benefits information, and other analyses will follow later in the rule development process, once program design is more fully developed and there is a specific proposal to evaluate.

The concepts presented were shaped around the Air District's objective to emphasize reducing DPM, which drives elevated health risk in overburdened and AB 617 communities, alongside the broader goal of attaining and maintaining the region's ambient air quality standards for PM and ozone. In considering how to design a potential Bay Area Warehouse Rule, staff drew lessons from existing indirect source rules, principally SCAQMD's WAIRE Program (Rule 2305), along with SCAQMD's Rule 2306 (Freight Rail Yards) and San Joaquin Valley's Rule 9510.^{12,13,14} Staff adapted these lessons to Bay Area conditions, including the region's different nonattainment status, distinct warehouse geography and population, and an emphasis on environmental justice consistent with the Air District's CERP and Strategic Plan commitments.

The concept paper addresses the following: applicability thresholds and how scope might vary for facilities in impacted communities; a phased, adaptive implementation approach; options for structuring each facility's compliance obligation, including menu-based options for increased compliance flexibility; a stronger emphasis on local PM and DPM reduction than WAIRE's NO_x-focused design; and reporting requirements needed to support implementation and enforcement.

The public comment period on the concept paper closed June 1, 2026. Staff is incorporating that feedback into the technical work described elsewhere in this overview. It is anticipated that the next step in rule development will be a series of public workshops and targeted stakeholder meetings to continue engaging stakeholders in the process. For the full set of concepts, see the [Warehouse Rule Concept Paper](#).

¹² SCAQMD. Rule 2305 Warehouse Indirect Source Rule.

¹³ SCAQMD. Rule 2306 Freight Rail Yards. August 2024. <https://www.aqmd.gov/docs/default-source/rule-book/reg-xxiii/rule-2306-freight-rail-yards.pdf>

¹⁴ SJVAQMD. Rule 9510 Indirect Source Review (ISR). Amended December 2017. <https://ww2.valleyair.org/media/cjlnn0u1/r9510-a.pdf>



Impetus for Rule Development

There are several primary considerations that drive the impetus for rule development. First, the Air District has approved several AB 617 CERPs that commit to evaluating policy related to reducing the impact of indirect source emissions. AB 617 CERPs are also approved by CARB, affirming these commitments at the state level. While AB 617 communities bear a disproportionate burden from air pollution, all communities with warehouse operations attract substantial heavy-duty truck traffic and other mobile source activity, contributing to PM, DPM, and NOx pollution. Efforts to reduce community health risk should be made for all impacted communities regardless of AB 617 designation. Finally, an effective Warehouse Rule would support the Air District's efforts in attaining and maintaining the regional ambient air quality standards for PM and ozone through PM and NOx emissions benefits.

Commitments under Community Emissions Reduction Plans

Members of AB 617 Community Steering Committees (CSCs) have identified indirect sources of pollution as a concern for their communities. Actions addressing indirect sources have been included in all three final CERPs, which were adopted by the Air District Board of Directors and approved by the California Air Resources Board. Indirect sources are also addressed in the draft Bayview Hunters Point/Southeast San Francisco (BVHP/SESF) CERP. The CERP actions are summarized in Table 1 below.

Table 1. Summary of CERP Actions Related to Indirect Sources

AB 617 Community	Date Approved by CARB	Action Name	Action Description
West Oakland	December 2019	Mobile Sources Strategy #67	The Air District intends to pursue future programs to reduce emissions and risk from magnet sources related to the goods movement industry via an Indirect Magnet Source Policy Package. The policy package could include rule making, model ordinances and technical support to local governments to develop their own policies. Emission reductions may come from the transport trucks serving the Port of Oakland, warehouse distribution centers and other freight locations.



AB 617 Community	Date Approved by CARB	Action Name	Action Description
Richmond, North Richmond, San Pablo	November 2024	Mobile Action 1.4 – Magnet Source Rule	Magnet Source Rule. Air District will study feasibility and approach for a Bay Area Indirect Source (Magnet Source) Rule.
East Oakland	June 2026	Transportation and Mobile Sources Action 1.1 – Indirect Source Policy Package	Study feasibility and approach for a Bay Area Indirect Source (Magnet Source) policy package to address the impacts of large warehouses and other types of businesses that are “magnets” for heavy duty truck trips. The policy package could include rule making, model ordinances and technical support to local governments to develop their own policies. The Air District will proactively update and seek input from all Bay Area CSCs and other impacted communities across the region.
Bayview Hunters Point/South east San Francisco (draft)	N/A	Traffic and Transportation Action 2.1 – Indirect Source Policy Package	Study feasibility and approach for a Bay Area Indirect Source (Magnet Source) policy package to address the impact of large warehouses and other types of businesses that are “magnets” for heavy-duty truck trips. This package should assess the feasibility of reducing emission associated with warehouses and distribution centers including heavy-duty diesel vehicles, emergency generators, and Transportation Refrigeration Units (TRUs) in BVHP/SESF. The policy package could include rule making, model ordinances, and technical support to local governments to develop their own policies. The Air District will proactively update and seek input from all Bay Area CSCs and other impacted communities across the region.

Other Impetus for Rule Development

Beyond AB 617 communities covered by CERP commitments, there are other impacted communities that are affected by warehouse operations that attract substantial heavy-duty truck traffic and other mobile sources, leading to localized PM, DPM, and NO_x pollution. These pollutants have well-documented health impacts on nearby communities. Warehouse operations and traffic corridors are often located close to lower-income communities and communities of color, who bear a disproportionate pollution burden within the Bay Area. In its 2024 - 2029 Strategic Plan, the Air District has made a commitment to address environmental justice by reducing the cumulative health impacts faced by these communities. Figure 2 shows the location of warehouses larger than 100,000 square feet in floor area relative to designated AB 617 communities and the most environmentally burdened (70th percentile and higher) communities according to CalEnviroScreen.

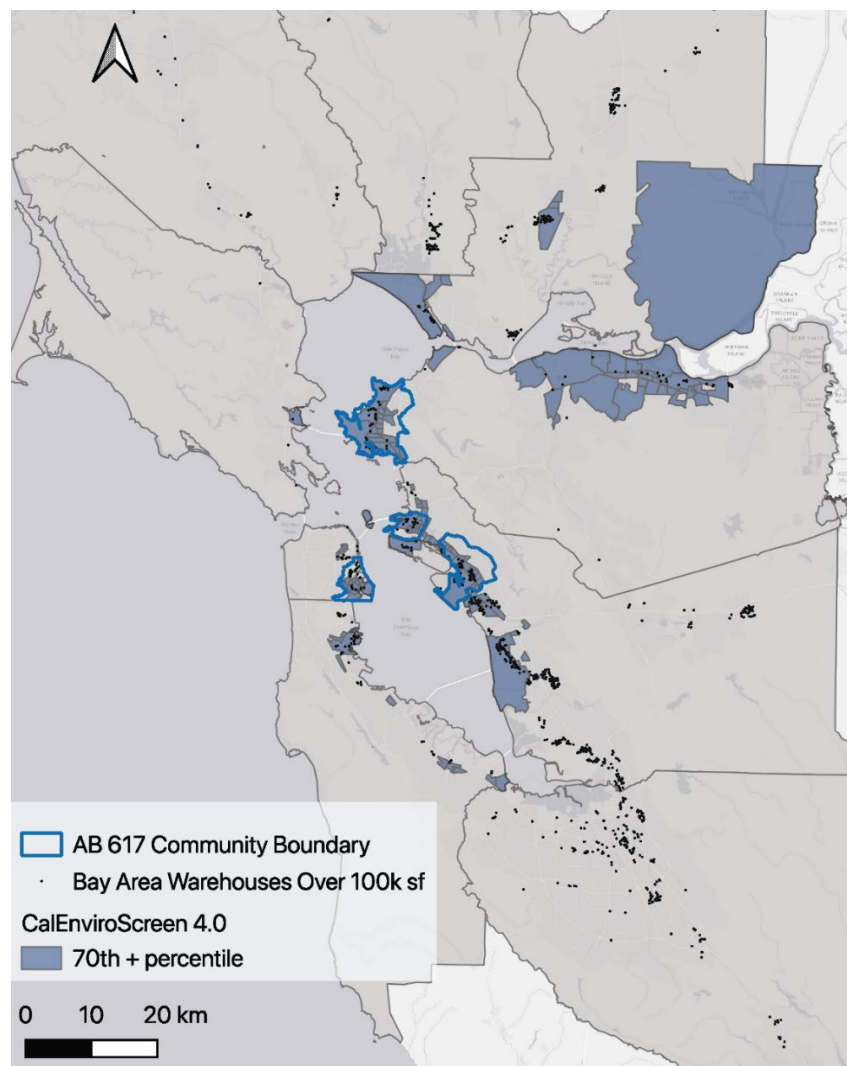


Figure 2. Map of Large Warehouses and Impacted Communities in the Bay Area.



Additionally, a primary impetus for a Warehouse Rule development effort is to facilitate attainment and maintenance of the ambient air quality standard. The Air District is exploring a rule that serves dual purposes: 1) attaining and maintaining the regional ambient air quality standards for PM and ozone by reducing emission of PM and NO_x; and 2) protecting nearby communities by placing a strong emphasis on local reduction of particulate matter emissions associated with warehouse facilities, particularly DPM that can cause elevated cancer risk.

Timeline of Engagement with Board of Directors

Stationary Source Committee

Staff recognizes the importance of engaging early and often with stakeholders, particularly for the development of a potential new rule. As such, staff has presented a series of updates to the Stationary Source Committee (SSC) since 2024, outlining progress on indirect source rulemaking. Table 2 summarizes the SSC meetings in which staff presented various information on indirect sources, including a potential Warehouse Rule, and sought Committee feedback on overall direction.

Table 2. Stationary Source Committee Presentations on Indirect Sources

Date	Rule Development Stage	Key Discussion Points
March 13, 2024	Identify issue	Staff discussed: • Background on indirect sources • Current regulatory landscape • Discuss next steps Committee feedback: • Develop a framework to move forward and return to the committee
September 11, 2024	Identify issue	Staff discussed: • Update on indirect sources, rule development opportunities, and other policy tools Committee feedback: • Identify the Air District's capacity to accomplish in the next few years regarding indirect sources • Explore options for addressing warehouse emissions, marine emissions, and land use concerns



Date	Rule Development Stage	Key Discussion Points
November 13, 2024	Identify issue	Staff discussed: • Overview of regulations on marine sources • Estimated impacts of marine, truck, and rail emissions on AB 617 communities • Heavy-duty trucks to be addressed more in depth at next SSC presentation Committee feedback: • Provide more information on breakdown of vessel types, incentives available for shore power
March 12, 2025	Identify issue	Staff discussed: • Overview of warehouses and distribution centers in the Bay Area • Potential rule impacts and considerations • Relevant regulatory activity and options for future actions, including staffing requirements for rule development Committee feedback: • Federal regulatory landscape is uncertain, and the withdrawal of Advanced Clean Fleets regulation increases the impetus for an indirect source rule • Want to understand most effective use of staff time, while recognizing the need to invest in staff resources
June 10, 2026	Concept paper	Staff discussed: • Regulatory context relevant to indirect sources • Potential rule concepts for a Bay Area warehouse indirect source rule • Public comments on April 2026 concept paper and planned stakeholder engagement Committee feedback: • Provide more information on the WAIRE Rule, including annual reports and third-party analysis • Request to bring the information to the whole Board of Directors, potentially for a vote on future direction

At five SSC meetings between March 2024 and June 2026, staff provided the Committee information on indirect sources of truck, marine, and other emissions, including the regulatory background on indirect sources, preliminary data on emissions impacting AB 617



communities, and early rule concepts for a potential Warehouse Rule. Each presentation built upon the previous one, with staff adjusting program direction based on Committee member feedback. This measured approach was intended to maximize Committee deliberation and meet the Air District's commitments under its Strategic Plan and AB 617 CERPs, while ensuring the Air District was able to determine the appropriate policy response to community concerns about warehouses after full consideration of the costs and benefits of various options.

At these meetings, Committee members expressed interest in more information on a wide range of topics, including what a potential rule could look like in the Bay Area. Staff and Committee members discussed considerations for pursuing a Warehouse Rule, weighing the impetus for rulemaking, staff time, rule prioritization, potential emission reductions, and the regulatory landscape. While not specific to indirect sources, Committee feedback on a subsequent rule development presentation at the March 12, 2025 SSC meeting noted the need to prioritize rules that address concerns included in CERPs and raised by community members, including indirect sources, fenceline monitoring, and flaring.

Budgetary Approval

On March 19, 2025, Air District staff presented to the Board of Directors' Finance and Administration Committee the proposed 2025-2026 budget, which included a request to add four full-time equivalent (FTE) positions to the budget to support indirect source rulemaking. Three FTE positions were allocated to the Regulatory Development Division, and one to the Legal Division. The Committee moved to recommend to the Board to adopt the Fiscal Year (FY) 2025-2026 Proposed Budget and Fee Amendments.

The Amended FY 2025-2026 Proposed Budget with additional FTEs to support indirect source rulemaking was presented at the Board of Directors meeting on May 7, 2025. During the presentation, staff noted to the full Board of Directors that the four FTE positions were intended to support indirect source rulemaking. At the June 4, 2025 Board of Directors meeting, the Board passed the budget, indicating their acknowledgement of and support for these staffing allocations.

No new FTEs were added to the FY 2026-2027 Budget, which was approved at the June 3, 2026 Board of Directors meeting.

Lessons Learned from the Other Air Districts

This section responds directly to questions raised by the Stationary Source Committee members on June 10, 2026, in response to concerns raised by stakeholders about a potential



Bay Area Warehouse Rule given reports assessing the SCAQMD WAIRE Program and a potential warehouse ISR in San Diego County. Committee members asked for more information on WAIRE Program performance, San Diego County's warehouse ISR efforts, and how a June 2025 industry-commissioned technical review by Ramboll compares to WAIRE implementation reporting on the program's costs and benefits. This section summarizes the WAIRE Program's own implementation record, as reported in SCAQMD's three published Annual Reports, and then evaluates Ramboll's comments against that record.

WAIRE Rule Overview

SCAQMD's Rule 2305, WAIRE Program, addresses the growing air pollution concerns regarding the rapidly expanding warehousing industry.¹⁵ Since taking effect in May of 2021, the rule has applied to warehouse facilities 100,000 square feet or larger and requires warehouse operators to reduce emissions associated with their facilities, including those from heavy-duty truck activity. Each subject operator must earn a set number of WAIRE Points (calculated based on truck trips visiting the facility) by choosing from a menu of zero- and near-zero-emission (ZE/NZE) actions, or by paying a mitigation fee of \$1,000 per Point in lieu of taking an action. Applicability is determined through the following process¹⁶:

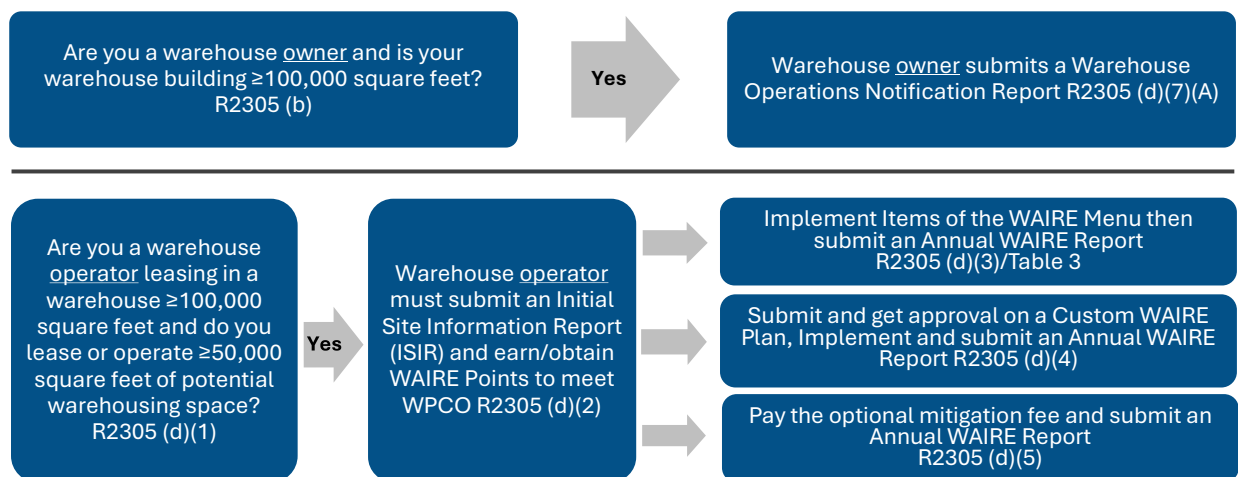


Figure 3. Applicability Flow Chart (adapted from SCAQMD, 2021)

WAIRE has withstood legal challenge and gained federal recognition since adoption, having been upheld against a federal preemption challenge in 2023 and incorporated into

¹⁵ SCAQMD. Rule 2305 Warehouse Indirect Source Rule.

¹⁶ More information on the applicability of SCAQMD's WAIRE Program Implementation:

<https://www.aqmd.gov/docs/default-source/planning/fbmsm-docs/waire-implementation-guidelines.pdf>



California's State Implementation Plan (SIP) by EPA in 2024.¹⁷ SCAQMD's Final Staff Report for Rule 2305 Response to Comments states the rule was not expected to receive SIP credit for a specific, quantified amount of emissions reductions, noting this reflects one of several options available for incorporating an ISR's reductions into the SIP inventory.¹⁸ As precedent, the staff report points to San Joaquin Valley Air District's own indirect source rule, which was approved into the SIP without specific SIP credit, with its reductions instead reflected through CARB's regular updates to the statewide mobile source emissions inventory. This does not mean the program fails to produce emissions reductions; it means those reductions were not assigned a specific numeric value in the SIP submission. EPA's approval confirms Rule 2305 is federally enforceable by EPA, citizens, and SCAQMD regardless of SIP credit status.

Following its implementation, SCAQMD has released annual reports that summarize and explore the impact of this rule on its jurisdiction. Annual reports summarize the program annually, covering each completed year of implementation which address rule implementation activities, such as outreach, reporting, compliance, mitigation fee program, enforcement, program results, and other rule-related activities.

Emissions Reductions Reported to Date

As reported in the 3rd Annual Report, WAIRE Program actions produced the following emissions reductions as the program has phased in.

Table 3. Summary of WAIRE Annual Report Findings

Emissions Reductions by Compliance Year (tons/year ¹⁹)		
Compliance Year	NOx Emissions	Diesel PM
2021	47	1.5
2022	240	5.5
2023	340	7.7
2024	537	13

¹⁷ 89 Fed. Reg. 73,533 (Sept. 11, 2024) (EPA approval of WAIRE Program into California SIP). <https://www.federalregister.gov/documents/2024/09/11/2024-20349/air-plan-approval-california-south-coast-air-quality-management-district>

¹⁸ SCAQMD. Final Staff Report for PR 2305 and PR 316 (May 2021), Response to Comments, "PR 2305 would not receive SIP credit," p. 2. <https://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2021/2021-May7-027.pdf?sfvrsn=10>

¹⁹ Values are presented as tons per year while SCAQMD's WAIRE Program Annual Reports originally report reductions in tons per day (tpd). Air District staff converted the reported daily values to tons/year by multiplying each tpd figure by 365 days per year. This conversion assumes the reported daily reduction rate



Source: SCAQMD, 3rd Annual Report for the WAIRE Program (January 2026), p. 7 (summary) and p. 30, Figures 17–18 (category detail). Figures are based on operator-reported data through August 31, 2025 and remain subject to SCAQMD's final auditing. Reported values for a given year have been revised in each successive Annual Report as more Annual WAIRE Reports (AWRs) are received; for example, 2022 and 2023 NO_x reductions were reported as 0.69 and 0.86 tons per day (tpd) in the 2nd Annual Report (October 2024), p. 24, Figure 18, and as 0.65 and 0.94 tpd in the 3rd Annual Report (January 2026).

SCAQMD reports that both NO_x and DPM emission have decreased annually since rule implementation as a result of WAIRE-related actions (Table 3).²⁰ At the time of rule adoption, SCAQMD conservatively estimated NO_x emissions would be reduced by between 550 to 1100 tons/year.²¹ A more recent SCAQMD status report, covering activity through July 31, 2026, estimates that if the WAIRE Points-to-NO_x ratio observed in the 3rd Annual Report has held steady, cumulative NO_x reductions since rule adoption would total approximately 1,955 tons. SCAQMD presents this as an extrapolation rather than a directly measured figure, since the ratio itself has not been independently re-verified since the 3rd Annual Report's publication.²²

SCAQMD's Final Staff Report analyzed DPM reductions at the same detailed, scenario-by-scenario level as NO_x, but did not synthesize these into a single average estimate the way it did for NO_x. Diesel PM was treated as a co-benefit of NO_x-focused compliance actions rather than tracked toward a standalone target. This is one area where the Bay Area's concept paper takes a different approach, placing a stronger emphasis on primary PM and DPM reduction alongside NO_x reduction.

Operator Compliance Reporting

One WAIRE implementation challenge has been compelling warehouse owners to file the Warehouse Operations Notification (WON) that establishes the regulated universe. Owner reporting compliance has improved steadily but remains incomplete (Table 4).

holds uniformly across the year and does not reflect an independent annual emissions calculation reported by SCAQMD.

²⁰ SCAQMD. WAIRE 3rd Annual Report. January 2026. https://www.aqmd.gov/docs/default-source/planning/fbmsm-docs/3rd-annual-report-for-the-waire-program.pdf?sfvrsn=1526a7e_2

²¹ Ibid, p. 29. Values were also converted from daily values as described above.

²² SCAQMD, Rule 2305 Implementation Status Report (June 1–July 31, 2026), Mobile Source Committee Agenda, August 21, 2026, Item 2, p. 1.



Table 4. Warehouse Operations Notification (WON) Compliance Over Time

Annual Report	As of Date	Estimated WONs Received and Warehouses Covered	Estimated Share of Warehouse Population
1st Annual Report Jan. 2023	~ September 2022	490 WONs 1,650 warehouses	47%
2nd Annual Report Oct. 2024	August 31, 2024	1,074 WONs 2,383 warehouses	61%
3rd Annual Report Jan. 2026	August 31, 2025	1,352 WONs 2,534 warehouses	63%

Source: SCAQMD WAIRE Program Annual Reports: 1st (January 2023), p. 10; 2nd (October 2024), p. 10; 3rd (January 2026), p. 16.

SCAQMD staff has attributed the reporting gap to the size and turnover of the warehouse population rather than a single fixable cause and has paired continued outreach with escalating compliance and enforcement action against non-reporting facilities. For Bay Area program design, this history reinforces the value of using owner registration as a gateway to operator reporting rather than a separate compliance track, and of investing early in a reporting portal (e.g., SCAQMD's WAIRE Program Online Portal, or WAIRE POP) given how central it has been to both compliance and data quality.

The Annual WAIRE Report (AWR) is the compliance report submitted by warehouse operators, providing details about how each facility met their WAIRE Points Compliance Obligation (WPCO). Table 5 summarizes AWR participation by presenting the AWR ratio, which compares the number of AWRs received to the number expected, and the corresponding completion percentage, which indicates the share of expected reports submitted for each reporting year.



Table 5. Summary of WAIRE Annual Report (AWR) Findings

Annual Report	Annual WAIRE Report Completion Ratio	Completion Percentage
2nd Annual Report Oct. 2024	1,556 / 4,102	38%
3rd Annual Report Jan. 2026	3,131 / 8,829	35%

Source: SCAQMD WAIRE Program Annual Reports: 2nd (October 2024), p. 16, Table 4; 3rd (January 2026), p. 21, Table 4. The 1st Annual Report (January 2023) predates the first AWR due date and has no comparable figure. 'Expected' AWRs are SCAQMD's own estimate of the potential operator universe and are revised each year as the warehouse inventory and tenant data improve.

Additionally, the annual reports highlight key successes and challenges throughout the implementation process. The largest challenge across all three reports was identified as roughly two-thirds of subject operators not submitting the required AWR (e.g., 38 percent completion in 2nd Annual Report and 35 percent completion in 3rd Annual Report). This contributed to a substantial number of Notices of Violation (NOVs) for missing and late reports. As of July 31, 2026, SCAQMD had issued over 970 NOVs since December 2023, of which approximately 450 warehouses had contacted SCAQMD in response, 460 had subsequently filed the required reports, and 325 NOVs had been resolved. Approximately 520 facilities had not yet responded to their NOVs.²³ Due to limitations in AWR completion, the reported emissions reductions may not fully reflect program outcomes and remain dependent on increased operator compliance.

SCAQMD's Annual Reports describe the regulated warehouse population as inherently dynamic and difficult to fully enumerate through self-reporting alone. Operator counts are "expected to change over time due to normal fluctuations in the warehousing industry, including changes in facility operations, ownership, leasing activity, and building use," and are treated as "a dynamic estimate rather than a static count." The reports note that some operators have been identified only through site visits by inspectors, rather than through owner or operator self-reporting. SCAQMD has also conducted extensive outreach, including tens of thousands of compliance mailers and informational emails, warehouse site visits, and compliance training webinars and videos, to build awareness of Rule 2305 requirements.²⁴ Separately, the WON-to-AWR completion gap reflects a difference in reporting burden: the WON requires only basic ownership and lease information, while the

²³ SCAQMD. Rule 2305 Implementation Status Report (June 1–July 31, 2026).

²⁴ SCAQMD. 2nd Annual Report for the WAIRE Program, p. 30. October 2024.



AWR requires operators to report truck trip counts and document how WAIRE Points were earned across each compliance action taken.²⁵

Across all three Annual Reports, a small number of WAIRE Menu categories account for most of the points warehouse operators report earning. Usage of zero-emission (ZE) hostlers (yard tractors that move trailers and containers within a facility) has consistently been the single largest category, and mitigation fees have consistently represented a small share of total points earned (Table 6). The mitigation fee share of total points earned has declined from 4.7% in the 2nd and 3rd Annual Reports to 3.7% in the most recent status report. Because these totals are calculated only from operators who did report, they describe roughly a third of the regulated population. The compliance choices of the remaining two-thirds are not yet known.

Table 6. Summary of Operator Compliance Metrics

Annual Report	Leading Menu Categories	Total WAIRE Points Earned	Mitigation Fee Points (% of total)	Cumulative Mitigation Fees Reported Since 2023
1st Annual Report Jan. 2023	(estimated at time of AWR publishing) • ZE Hostler Usage (40%) • NZE Truck Visits (27%) • ZE Hostler Acquisition (8%)	176,439 (projected) ²⁶	5,545 (3.0%)	\$5.5 Million
2nd Annual Report Oct. 2024	• ZE Hostler Usage (42%) • NZE Truck Visits (27%) • ZE Infrastructure & Usage (11%)	634,671	29,700 (4.7%)	\$29.7 Million
3rd Annual Report Jan. 2026	• ZE Hostler Usage (43%) • NZE Truck Visits (27%) • ZE Infrastructure & Usage (9%)	1,180,685	55,116 (4.7%)	\$55.1 Million

²⁵ SCAQMD. 3rd Annual Report for the WAIRE Program. January 2026. Appendix A, Table A-5 and Table A-6 notes (population dynamics, site-visit identification); pp. 15–16, 20 (WON and AWR reporting requirements).

²⁶ Figures for the 1st Annual Report are based on Initial Site Information Reports (ISIRs), a facility-level planning exercise in which operators project anticipated compliance actions. The 1st Annual Report (January 2023) predates the first Annual WAIRE Report (AWR) deadline, so these figures reflect operators' projected compliance plans rather than confirmed outcomes. Total WAIRE Points figures for the 2nd and 3rd Annual Reports are based on AWRs and reflect actual reported compliance actions.



Annual Report	Leading Menu Categories	Total WAIRE Points Earned	Mitigation Fee Points (% of total)	Cumulative Mitigation Fees Reported Since 2023
Status Report Aug. 2026 (data through July 31, 2026)	<i>Not reported at this reporting cadence</i>	2,118,373	80,373 (3.7%)	\$80.4 Million

Source: SCAQMD WAIRE Program Annual Reports: 1st (January 2023), p. 15; 2nd (October 2024), p. 18 (menu share) and p. 25 (fee total); 3rd (January 2026), p. 23 (menu share) and p. 24 (fee total); SCAQMD, Rule 2305 Implementation Status Report (June 1–July 31, 2026), Mobile Source Committee Agenda, August 21, 2026, Item 2, p. 1 (points earned and mitigation fee totals).

This concentration of menu categories matters for Bay Area Warehouse Rule design in two ways. First, it confirms that points-menu design has an outsized influence on what operators actually do. A handful of categories are driving most reported compliance, which demonstrates the importance of calibrated menu design that does not assume a broad, even distribution across the menu. However, the leading menu categories may change over time. Second, it means that the credibility of the WAIRE Program's overall emissions benefit rests heavily on the accuracy of the emission reduction methodology for just a few menu categories, which is directly relevant to the Ramboll comments discussed below.

San Diego County APCD White Paper

Since 2021, the San Diego County Air Pollution Control District (SDAPCD) has conducted a multi-year evaluation of a potential warehouse ISR, moving from an initial legal and technical framework in 2023 through a [Warehouse Working Group process](#) and a 2025 Framework Supplement. This effort culminated in a [White Paper](#), published in January 2026 (and revised in February 2026), presenting SDAPCD staff's findings and recommendation to its Governing Board.

The White Paper concludes a potential warehouse ISR would (among other reasons) cost more per ton of emissions reduced than other options available to the district and recommends prioritizing non-regulatory strategies over pursuing a local warehouse ISR at this time.

SDAPCD's preliminary emissions and cost estimates in the initial framework were developed by evaluating a potential warehouse ISR using SCAQMD Rule 2305 data scaled to San Diego County's own warehouse population, a methodology similar to the approach the Air District



used in its March 2025 SSC presentation to generate early, screening-level estimates for the Bay Area.

Because these initial estimates were modeled from Rule 2305, a NO_x-focused rule designed to reduce regional emissions, characterizing the local air quality impact a warehouse ISR could have on communities near warehouse clusters and freight corridors in San Diego County was not well understood at that point, whereas the Air District's concept paper considers primary PM and DPM reduction. SDAPCD's Supplement and White Paper further evaluated the localized impacts of a warehouse ISR utilizing San Diego-county specific data inputs (e.g., traffic data from the 2021 Regional Plan and SANDAG 2022 Commercial Vehicle Survey results) to produce truck trip rates specific to San Diego County. SDAPCD's analysis ultimately concluded most air quality benefits associated with a warehouse ISR in the region would occur outside of environmental justice communities.

SDAPCD's cost-effectiveness comparisons were also made primarily against that district's recent rulemakings for direct-control source categories, such as boilers, furnaces, and stationary engines. Unlike those rules, which regulate emitting equipment directly, an ISR regulates a fixed facility that attracts mobile sources it doesn't necessarily own. Under a Rule 2305 framework, compliance often means paying to incentivize cleaner equipment adopted and operated by third parties. Further, decades of tightening on-road engine standards mean modern diesel and near-zero-emission trucks already emit relatively little NO_x and PM. As a result, a warehouse ISR compares unfavorably to those direct-control rules on a dollars-per-pound basis for anticipated emissions reductions in the San Diego air basin.

SDAPCD's evaluation also reflects the scale of its own program. San Diego County has approximately 240 warehouses of 100,000 square feet or larger, compared to over 1,000 in the Bay Area and over 3,000 in the South Coast region, a difference that affects both achievable emission reductions and the administrative capacity needed to run a program at that scale. Given these differences in warehouse inventory, industry composition, geography, and program capacity, SDAPCD's finding may provide a useful point of comparison for issues to consider, but it is not a direct indication of how a Bay Area Warehouse Rule would perform.

Industry Study on WAIRE Implementation

In reaction to the WAIRE program's adoption and implementation, the Supply Chain Federation commissioned Ramboll to investigate and report on the program's execution and



implementation (Industry Study), published in June 2025.²⁷ Ramboll released an updated version of the Study in April 2026, incorporating data from SCAQMD’s 3rd Annual Report.

The core conclusions from the industry study’s investigation of the WAIRE Program are:

- The emissions reductions for NOx and DPM are attributed to mobile-source regulations rather than the WAIRE Program.
- WAIRE operates more as a tax, imposing a financial burden on industry.
- Compliance costs are 3.3 to 9.4 times higher than SCAQMD’s estimates.
- Following the release of the 3rd Annual Report, Ramboll’s findings did not change.

Each row in the table on the next page distinguishes the industry study’s comment from what the WAIRE Program record shows, and flags where a claim raises an open question that the Air District may consider for a Bay Area Warehouse Rule.

²⁷ Ramboll. Review of the South Coast AQMD Warehouse Indirect Source Rule (updated). April 30, 2026. https://supplychainfederation.com/wp-content/uploads/2026/04/Ramboll-Study-SCAQMD-Warehouse-ISR_20260430.pdf



Table 7. Industry Study Comments Compared to WAIRE Program Record

Industry Study Comment	Basis for Comment	What the WAIRE Program Record Shows
<i>Emission benefits claimed for ZE hostler usage are overstated</i>	Ramboll's updated analysis compares SCAQMD's Rule 2305 baseline hostler emissions (0.09 tpd NOx in 2023) to the 3rd Annual Report's reported reductions (0.22 tpd in 2022, 0.31 tpd in 2023, 0.52 tpd in 2024) — three to seven times the baseline. Ramboll attributes this to SCAQMD assuming every reported ZE hostler use represents the retirement of an equivalent diesel hostler, when Rule 2305 does not actually require retiring a diesel unit to earn points.	ZE Hostler Usage is confirmed as the largest WAIRE Points category (40–43% of points across all three reports). The premise of the critique appears accurate as a matter of rule design: Rule 2305 does not condition hostler points on retiring an existing diesel unit. Without scrappage, ZE hostler usage does not strictly correspond to emission reductions. A facility may operate both diesel and ZE hostlers side by side. SDAPCD's review (Section 4.5.2, Zero Emission Yard Hostlers) echoes this concern, noting that the size of the reported benefit relative to the baseline “calls into question the validity of the numbers (Section 4.5.2, p. 64–65).” ²⁸ The WAIRE Program is still the reason many of these zero-emission hostlers are in operation. No other state or federal regulation currently mandates their adoption. In discussion, SCAQMD staff explained that requiring proof of diesel hostler retirement was considered during rule development but rejected as administratively intensive to verify and enforce.
<i>NOx emission reductions attributed to NZE truck visits are not attributable to the WAIRE Program</i>	Rule 2305 requires NZE trucks to meet the lowest optional NOx standard at time of manufacture, which dropped to 0.01 g/hp-hr when WAIRE took effect in 2022. No engine has ever been certified to that standard, so operators cannot purchase qualifying new NZE trucks, and all NZE trucks in operation run Model Year 2021 or older engines certified to the older 0.02 g/hp-hr standard that predates WAIRE. Per Ramboll, any	NZE Truck Visits are a substantial share of reported points. NZE/Low-NOx truck trips specifically accounted for 40% of Phase 2 facility points in compliance year 2023. The underlying facts appear accurate: no engine has been certified to the tightened 0.01 g/hp-hr standard, so current NZE credit traces to engines that predate the rule. If these reductions are not attributable to WAIRE, the program's reported benefit is likely overstated, a conclusion SDAPCD treats as plausible (Section 4.5.1, Near Zero Emission Truck Visits). That said, Ramboll's critique addresses

²⁸ A Bay Area program could consider conditioning ZE equipment credit on documented retirement of the replaced diesel unit, which would close this specific gap.



Industry Study Comment	Basis for Comment	What the WAIRE Program Record Shows
	NOx reductions SCAQMD attributed to NZE truck trips cannot be attributed to the WAIRE Program.	the technology's origin, not whether the rule changes utilization. WAIRE awards points for NZE truck visits, not just NZE truck acquisition, giving facilities a direct incentive to route existing NZE trucks to their site over higher-emitting diesel trucks, regardless of when or to what standard those NZE trucks were originally certified.. Reported NZE truck visits have grown sharply since 2021, though this is confounded by more warehouses phasing into reporting each year. ²⁹
<i>Emission reductions attributed to ZE truck visits are not attributable to the WAIRE Program</i>	Ramboll argues ZE truck adoption reflects CARB's Advanced Clean Trucks and Advanced Clean Fleets regulations, HVIP incentives, and improving ZE cost-effectiveness rather than WAIRE-specific incentives, and cites EPA's 2024 SIP approval, which states EPA "did not find a sufficient basis to credit Rule 2305 with achieving a specific amount of emissions reductions," as further support.	ZE Truck Visits are a smaller, but growing, share of reported points relative to NZE trucks. Regarding the EPA citation, EPA's approval explains that the "insufficient basis to credit" finding means EPA did not assign Rule 2305 credit for a specific amount of emissions reductions, in part due to specific enforceability deficiencies in the rule text (ambiguous definitions, a sunset clause, and unbounded director discretion). Separately, SCAQMD's staff report states the rule was <u>not expected</u> to receive SIP credit for a specific, quantified amount of emission reductions, noting this reflects one of several options available for incorporating an ISR's reductions into the SIP inventory (see p. 16 of this report for more detail). Regardless of which other programs are driving ZE truck adoption, WAIRE Points function as an additional, stacked incentive layered on top of those programs: a facility earns WAIRE Points for ZE truck visits regardless of what other incentive supported the truck's acquisition, so WAIRE's credit plausibly reinforces adoption and routing decisions even where no single purchase or trip can be attributed to WAIRE alone. The rule remains federally enforceable, and EPA states

²⁹ A Bay Area program could design NZE eligibility criteria that reflect an achievable threshold so that NZE credit corresponds to real emissions benefit rather than fleet composition.



Industry Study Comment	Basis for Comment	What the WAIRE Program Record Shows
		directly it expects Rule 2305 to achieve additional emission reductions. Separately, the Advanced Clean Trucks waiver Ramboll cites as one driver of ZE truck adoption is itself subject to unresolved federal litigation over its status. ³⁰
<i>Indirect source rules can cause emissions leakage, and the mitigation fee's cost burden could be passed to consumers or force small operators to close or relocate</i>	General critique of the ISR model. Ramboll's updated report adds that increased costs could be passed to consumers, could cause smaller operators unable to absorb them to close, or could prompt relocation outside SCAQMD's jurisdiction, increasing trip lengths and regional NOx.	A pre-rule adoption, SCAQMD-commissioned third-party study ³¹ modeled relocation decisions across compliance cost scenarios from \$0 to \$2.00 per square foot and projected no incremental relocations at or below \$1.50 per square foot, nearly double Rule 2305's actual maximum cost of \$0.83 per square foot. SCAQMD has continued to see growth in the warehousing industry in its region since Rule 2305's adoption, with no indication that relocation is occurring. An independent peer review of the study noted it could not quantify some factors, such as labor availability in outlying markets, so some uncertainty remains. San Diego County APCD's white paper flags the same concern. Given differences between the Bay Area's and South Coast's warehouse industry, a Bay Area-specific relocation analysis would be needed to assess this risk locally.
<i>WAIRE functions primarily as a tax on warehouse operators</i>	Ramboll's updated report cites the 3rd Annual Report finding that mitigation fees met about 15% of the total compliance obligation among reporting operators, and separately notes about 65% of subject warehouses had not submitted an AWR. Ramboll projects that if all non-reporting warehouses default to the fee, roughly 70% of the program's total	The 65% non-reporting figure aligns with this overview's own calculation from SCAQMD's AWR completion data (Table 5). The 70% projection is Ramboll's extrapolation, not an observed SCAQMD figure, and rests on an assumption that non-reporters earn zero points. SCAQMD's own reporting shows mitigation fees account for about 5% of total WAIRE Points earned (55,116 of 1,180,685). This is not inconsistent with Ramboll's 15% figure; the two numbers use different

³⁰ California v. United States, No. 4:25-cv-04966 (N.D. Cal.)

³¹ Industrial Economics, Inc., peer reviewed by Kleinhenz Economics



Industry Study Comment	Basis for Comment	What the WAIRE Program Record Shows
	compliance obligation would ultimately be met through mitigation fees.	denominators. SCAQMD's 5% measures fee points against total points earned, while Ramboll's 15% measures fee points against the total compliance obligation, or WPCO (55,116 of 378,517). The gap between these totals reflects that reporting operators earned roughly three times more points than required, consistent with this section's earlier finding that operators who report tend to exceed their required WPCO.
<i>SCAQMD underestimated compliance costs</i>	Ramboll's updated cost modeling finds costs for third-party ZE truck compliance pathways run 3.3 to 9.4 times SCAQMD's \$0.14/sq ft/yr low-end estimate, driven partly by SCAQMD projecting ZE truck prices would fall (to \$170,748 by 2031) when CARB's 2024 data show prices have instead risen (to \$436,839 in 2024).	The gap is concentrated in the third-party ZE truck pathway. SCAQMD's low-end estimate assumed increased third-party ZE truck availability, an assumption undercut by CARB's withdrawal of its Clean Air Act waiver request for Advanced Clean Fleets' high-priority and drayage fleet requirements, which has left those provisions unenforceable since January 2025. For mitigation-fee-only compliance, Ramboll's updated estimate (\$0.79–\$0.83/sq ft/yr) matches SCAQMD's top-end estimate of \$0.83/sq ft/yr. Furthermore, incentives like California's Clean Truck and Bus Voucher Incentive Project (HVIP) ³² and the Bay Area Air District's Zero-Emission Truck Voucher Incentive Program ³³ can significantly offset capital costs. Truck purchase data from 2025 shows that the median incentive received offsets the medium purchase cost by 53%. ³⁴
<i>The administrative burden on the implementing</i>	Ramboll's updated report states SCAQMD has allocated 6.3 FTE to WAIRE Program implementation. SCAQMD initially allocated	A more recent SCAQMD status report shows enforcement activity has continued: as of July 31, 2026, over 970 NOVs had been issued (up from 724), with 325 resolved (up from 200) and

³² California HVIP. Accessed September 17, 2026. <https://californiahvip.org/funding/>

³³ Bay Area Air District. Accessed September 21, 2026. <https://www.baaqmd.gov/en/Funding-and-Incentives/Businesses-and-Fleets/Small-Fleet-ZE-Truck-Program>

³⁴ International Council on Clean Transportation. Battery electric commercial vehicle pricing in the United States. September 8, 2025. <https://theicct.org/publication/battery-electric-commercial-vehicle-pricing-in-the-us-sept25/>



Industry Study Comment	Basis for Comment	What the WAIRE Program Record Shows
<i>agency is greater than recognized</i>	roughly \$500,000 to a contractor (AgreeYa Solutions) for the WAIRE POP reporting portal in 2021. A March 2024 SCAQMD board package updated that total to approximately \$900,000. Ramboll also reports staff response times of up to several months with some report-amendment requests unresolved over a year, 724 Notices of Violation issued as of January 16, 2026 with only 200 resolved, and notes the WAIRE Mitigation Program was not yet operational as of the report date.	approximately 460 facilities having filed the required reports in response. Roughly 520 facilities had not yet responded. This is a lesson the Bay Area Warehouse Rule concept paper has already built in through discussion of a phased approach designed with administrative feasibility as an explicit consideration. A Bay Area Warehouse Rule is not committed to replicating WAIRE's structure or reporting. WAIRE's administrative cost experience should inform program and portal design directly rather than stand as an argument against pursuing a Warehouse Rule.

Source: Ramboll, WAIRE Program Comments (June 24, 2025) and updated WAIRE Program review prepared for the Supply Chain Federation (April 30, 2026); SCAQMD Final Staff Report for Rule 2305 and Rule 316 (May 2021), Table 13, p. 52 (baseline hostler “yard truck” emissions) and Socioeconomic Impact Assessment, Table 20, p. 72 (SCAQMD's own cost estimates); SCAQMD WAIRE Program Annual Reports: 2nd (October 2024), p. 20 (Early Action AWR totals); 3rd (January 2026), p. 30, Figure 17 (hostler and NZE reductions by year) and p. 32 (enforcement totals); p. 22 (total WPCO and points earned) and p. 24 (mitigation fee share of points earned); EPA, Air Plan Approval, California, South Coast Air Quality Management District, 89 Fed. Reg. 73,533 (Sept. 11, 2024); San Diego County APCD, Strategies to Reduce Indirect Source Emissions at Warehouses and Distribution Centers, White Paper (January 2026), Section 4.5, p. 64; SCAQMD, Rule 2305 Implementation Status Report (June 1–July 31, 2026), Mobile Source Committee Agenda, August 21, 2026, Item 2, pp. 1–2. The 40%-of-Phase-2-points and 65%-non-reporting figures are calculations by San Diego County APCD and Ramboll, respectively, not statements published verbatim in a SCAQMD Annual Report.

Assessment

Taken together, the Industry Study and the WAIRE Program's own record present a mixed picture: some claims are supported by the record, others remain open questions, and a few rest on specific figures that align closely between the two sources even where the broader claim does not. Mitigation fees remain a small share of reported points, but only about a third of subject operators had filed an AWR as of the most recent SCAQMD Annual Report, so that figure describes a minority of the regulated population rather than the full picture. ZE hostler usage and NZE/ZE truck visits together account for most points earned, so the program's benefit case rests heavily on a small number of menu items.



On attribution, the underlying premises of the industry study's analysis, for both NZE and ZE hostler credit, appear accurate. No engine has been certified to the tightened NZE standard, and Rule 2305 does not require retiring a diesel hostler to earn ZE hostler points. If these categories are not fully attributable to WAIRE, the program's reported benefit is likely overstated to some degree, consistent with San Diego County APCD's own review. Regarding the EPA SIP citation, the "insufficient basis to credit" finding reflects that EPA did not assign Rule 2305 credit for a specific amount of reductions, consistent with SCAQMD's own decision not to pursue that kind of credit given the rule's menu-based structure (see WAIRE Rule Overview and Table 7). EPA's statement does not reflect doubt that the rule reduces emissions, and the rule remains federally enforceable. On cost, Ramboll's own mitigation-fee-only estimate is close to SCAQMD's own top-end figure. The larger cost gap is concentrated in a third-party ZE truck pathway that has become less viable given recent regulatory changes. On administrative burden, Ramboll's figures are drawn from SCAQMD's own public records and are consistent with this section's findings on reporting lag, a genuine, well-documented cost of implementation.

None of these findings, however, translate directly to the Bay Area. SCAQMD's nonattainment status, warehouse geography, industry composition, and community context differ from the Bay Area's in ways that affect both the emissions case for a potential Warehouse Rule and the administrative burden of running one. WAIRE's implementation record, and the questions raised by the industry study's critique of it, are useful inputs for program design, not a blueprint for or a preview of how a Bay Area program would perform.



Appendix A

Stationary Source Committee Presentation Slides



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

AGENDA: 6

Indirect Source Regulations Overview

**Stationary Source Committee Meeting
March 13, 2024**

**Dr. Philip M. Fine
Executive Officer/APCO
pfine@baaqmd.gov**

Presentation Outcome



- Informational item
- Provide background on indirect sources and current regulatory landscape and discuss next steps

Outline



- Introduction and Background
- Air Quality Issues
- Current Regulatory/Legal Landscape
- Next Steps Discussion

Introduction and Background



Clean Air Act - 42 U.S.C. § 7410(a)(5)

Any State may include in a State implementation plan, but the Administrator may not require as a condition of approval of such plan under this section, any indirect source review program.

For purposes of this paragraph, the term “indirect source” means a facility, building, structure, installation, real property, road, or highway which attracts, or may attract, mobile sources of pollution.

Introduction and Background (cont.)



California Code, Health and Safety Code - HSC § 40716

- (a) In carrying out its responsibilities pursuant to this division with respect to the attainment of state ambient air quality standards, a district may adopt and implement regulations to accomplish both of the following:
- (1) Reduce or mitigate emissions from indirect and areawide sources of air pollution.
 - (2) Encourage or require the use of measures which reduce the number or length of vehicle trips.
- (b) Nothing in this section constitutes an infringement on the existing authority of counties and cities to plan or control land use, and nothing in this section provides or transfers new authority over such land use to a district.

Goods Movement in California



LAO, "Overview of California's Ports," August 23, 2022.

Indirect Emissions Infrastructure

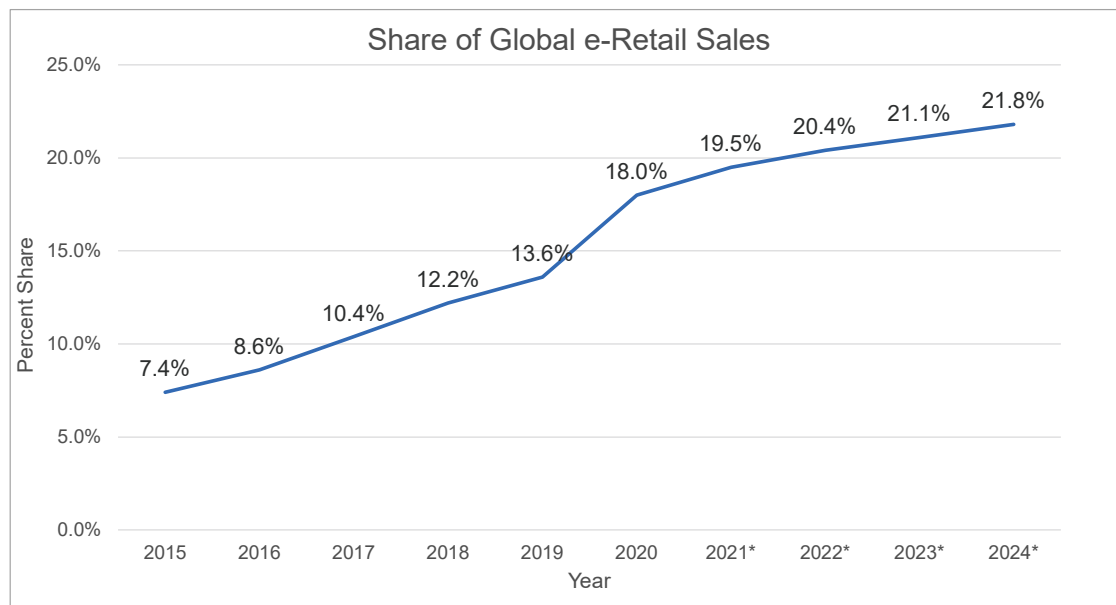


- California ports account for approximately one-third of all US containerized imports
- Growth of indirect source facilities associated with growth in goods movement and port activities

PORT	OPERATING ENTITY	TOTAL TONS OF CARGO, 2020
Port of Richmond	City of Richmond	21,050,741
Port of Oakland	City of Oakland	19,439,762
Port of Benicia	Amports	Unknown

LAO, "Overview of California's Ports," August 23, 2022.

Growth of e-Commerce



Source: International Trade Association. "Impact of Covid Pandemic on e-Commerce," 2023.

COVID Impacts on e-Commerce



- The pandemic significantly expedited the growth of e-commerce
- e-Commerce experienced approximately a 32 percent increase in year-over-year increase in share of retail (2020 vs 2021)
- Accelerated e-commerce growth and technological advances in retail and on-line communications
- These changes in retail infrastructure appear persistent and permanent

Source: International Trade Association. "Impact of Covid Pandemic on e-Commerce," 2023.

Recent Indirect Source Projects in the Bay Area



- With growth in e-commerce, there is associated growth in distribution centers and warehouses
- Recent CEQA notices/documents issued for projects in the Bay Area:

Project	Date
3600 Alameda Avenue Project NOP	May 2022
455 Piercy Road Industrial Warehouse Project MND	July 2022
3636 Enterprise Avenue Industrial Project MND	August 2022
5853 Rue Ferrari Project MND	August 2022
San Francisco Gateway Project NOP	August 2022
San Francisco Gateway Project DEIR	December 2023
880 Doolittle Industrial Project NOP	December 2023

- 11

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Current Regulatory Landscape



- California Environmental Quality Act (CEQA) Guidelines
- CEQA Best Practices Document
- CARB Regulations
- Other air districts
 - SCAQMD
 - SJVAPCD
- Local Ordinances

California Environmental Quality Act (CEQA)



- Air District published updated CEQA guidelines in 2022
- Includes new chapter with best practices for centering Environmental Justice, Health, and Equity
- Identifies ways to assess and improve EJ practices in CEQA review for all projects
- By using this guidance, lead agencies should be able to:
 - Inform, consult, or engage overburdened and/or AB 617 communities in CEQA analysis and decision making
 - Identify projects located in overburdened and/or AB 617 communities
 - Analyze project-level impacts on overburdened and/or AB 617 communities
 - Determine whether the project is centering nondiscrimination and environmental justice through its mitigation plan, cumulative impact analysis, and alternatives analysis

CEQA Best Practices



- California Attorney General's Bureau of Environmental Justice released CEQA best practices and mitigation measures for warehouse projects (2022)
- Assist lead agencies in pursuing CEQA compliance and promoting environmentally-just development
- Community engagement, siting and design considerations, impact analysis best practices and mitigation
- Key Air Quality and Greenhouse Gas Analysis and Mitigation Components:
 - Analysis Best Practices – Cumulative impacts, quantitative air quality studies, health risk assessments
 - Construction Mitigation – Tier 4 engines, electrical power on site, idling restrictions
 - Operational Mitigation – Zero emissions equipment and vehicles, idling restrictions, solar requirements, EV charging stations, energy efficiency requirements

CARB Regulations



Medium and Heavy Duty Vehicles

- Advanced Clean Trucks:
 - Requirement to sell zero-emission trucks as an increasing percentage of California sales from 2024 to 2035
 - 2035: Zero-emission truck/chassis sales would need to be 55% of Class 2b – 3 truck sales, 75% of Class 4 – 8 straight truck sales, and 40% of truck tractor sales
- Advanced Clean Fleets:
 - Accelerating the deployment of zero-emission medium and heavy-duty trucks in order to achieve a zero-emission California truck and bus fleet by 2045
- Zero Emission Transport Refrigeration Unit (TRU):
 - Transition truck TRUs to zero-emission
 - Impose a stricter diesel PM emission standard for newly manufactured TRUs in the remaining categories
 - Require the use of lower global warming potential refrigerant and include facility reporting requirements

CARB Regulations (cont.)



Cargo Handling

- Mobile Cargo Handling Equipment (CHE) Regulation adopted in 2005
 - Reductions in toxic and criteria emissions, fully implemented by the end of 2017
 - CARB is currently assessing the availability and performance of zero-emission technology to further reduce emissions
- Governor's Executive Order N-79-20 signed in September 2020
 - Zero Emissions Forklift requirements
 - CARB proposed draft regulatory concepts in August 2021, currently in progress

Rail Activities

- In-Use Locomotive Regulation adopted in 2023
 - Operators required to pay into a spending account based on operator emissions
 - Companies will be able to use the funds to upgrade to cleaner locomotive technologies
 - Locomotives also will have a 30-minute idling limit
 - Switch, industrial and passenger locomotives built in 2030 or later required to operate in zero-emissions configurations while in California, and in 2035 for freight line haul

CARB Regulations (cont.)



Port Activities

- At-Berth Regulation (2007)
 - Affects ships at six California ports, including Oakland and San Francisco
 - Vessel visit limit requirements
 - 80% emissions reduction requirement
- Updated "At-Berth Regulation" (2020)
 - Achieve further emission reductions by including smaller fleets, additional vessel types (such as roll-on/roll-off vehicle carriers and tankers), and additional operations
- Advanced Clean Fleets Regulation (2023)
 - Includes Drayage Truck Requirements for seaports and railyards
 - Progress toward the directive of Executive Order (EO) N-79-20, which set a goal for 100 percent zero-emission drayage trucks in the State by 2035

South Coast AQMD



- **Specific Authority:** California Health and Safety Code section 40440 – SCAQMD may “provide for indirect source controls in those areas of the south coast district in which there are high-level, localized concentrations of pollutants or with respect to any new source that will have a significant effect on air quality.”
- **Rule 2305:** Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions (WAIRE) Program
 - Applies to new and existing warehouses greater than or equal to 100,000 square feet in indoor floor space in a single building
 - Menu-based point system
 - Options include fleet electrification, charging infrastructure, mitigation fees, etc.
 - Rule phased in by warehouse size, increasing stringency
 - *California Trucking Association v. SCAQMD* ruling issued in December 2023
- **Proposed Rule 2304:** Indirect Source Rule for Commercial Marine Ports
 - Emissions controls for container terminals
 - NOx limits on ocean-going vessels and cargo handling equipment

San Joaquin Valley APCD



- **Specific Authority:** California Health and Safety Code section 40604: The San Joaquin Valley Unified Air Pollution Control District “shall adopt a schedule of fees to be assessed on areawide or indirect sources of emissions that are regulated. By the district to recover the costs of district programs related to these sources.”
- **Rule 9510:** Indirect Source Review (ISR)
 - New sources only
 - Size thresholds based on project type (heavy industrial, office, residential, etc.)
 - Emission reduction requirements for NOx and PM₁₀
 - On-site project design elements or off-site fees

Local Ordinances



- County and City ordinances/guidelines:
 - North Richmond Heavy Distribution Use Prohibition (2023)
 - Zoning IS emissions sources away from sensitive land uses
 - Western Riverside Council of Governments (WRCOG) - Good Neighbor Guidelines For Siting New and/or Modified Warehouse/Distribution Facilities (2020)
 - Establishes best practices for IS sources
 - Idling restrictions
 - Education on health effects of DPM
 - City of Fontana Ordinance 1840 (2021)
 - Buffering zones and routing IS sources away from residential

Implementation Challenges – Case Law



National Association of Home Builders v. San Joaquin Unified Air Pollution Control District, 627 F.3d 730 (9th Cir. 2010)

"Emissions from any indirect source come from the direct sources located there. If an indirect source review program were not allowed in some circumstances to impute direct sources of emissions to an indirect source as a whole, there could be no regulation of the emissions from indirect sources and no indirect source review program could exist."

California Building Industry Association v. San Joaquin Valley Air Pollution Control District, 178 Cal.App.4th 120 (2009)

"[T]he District is not attempting to do 'indirectly' that which it is prohibited from doing directly. The District is specifically authorized to both regulate and assess fees on developments that attract mobile sources of pollution, i.e., emissions generated by motor vehicles."

76 Ops. Cal. Atty. Gen. 11 (Mar. 11, 1993)

"Although the ability to issue permits might well be helpful in ensuring timely or effective compliance with regulations pertaining to indirect sources, that alone is insufficient. Because of the controversial nature of indirect source review and the statutory reference to permits solely in connection with stationary sources, imposition of a permitting system upon indirect sources lacks the definitive indication of legislative intent required by the courts."

Patrick Del Duca & Daniel Mansueto, *Indirect Source Controls: An Intersection of Air Quality Management and Land Use Regulation*, 24 Loy. L.A. L. Rev. 1131 (June 1991)

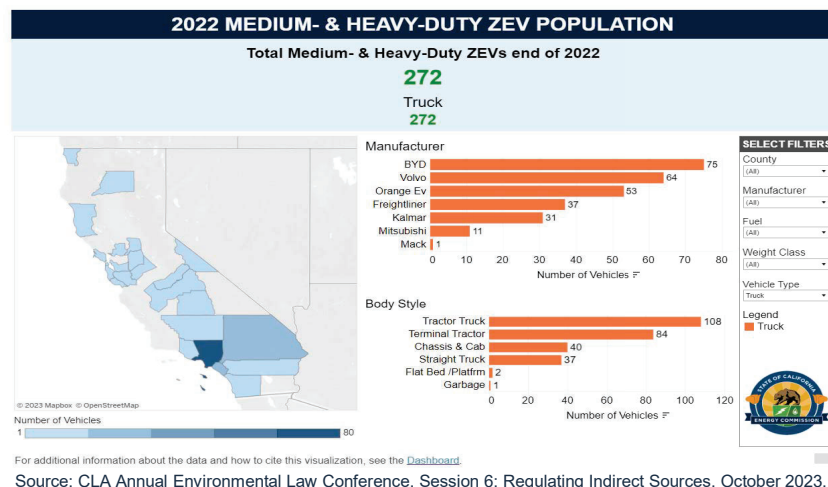
"[I]ndirect source controls directly impact land use by attempting to reduce emissions by shifting the transportation demand function."

Source: CLA Annual Environmental Law Conference, Session 6: Regulating Indirect Sources, October 2023.

Implementation Challenges – ZEV Availability and Adoption



- Slow adoption: At end of 2022, only 272 ZEV trucks operated in California out of an estimated 504,000 Class 4-8 trucks
- 0.05% of trucks statewide are ZEVs



Implementation Challenges – Electrification Infrastructure



- ZEVs require charging infrastructure
- Sufficient electricity transmission infrastructure/supply currently does not exist at all sources
- Some charging facilities and infrastructure cannot be developed without utility upgrades
- Timeline and approvals for utility upgrades

Source: CLA Annual Environmental Law Conference, Session 6: Regulating Indirect Sources, October 2023.

Next Step Discussion



- Continue to follow and track landscape and implementation of State and local programs
- Collaborate with local governments and other agencies on supporting development of policies, ordinances, and regulations
- Strategic efforts to look for opportunities and gaps in the landscape to leverage expertise and authority, including ISR



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AGENDA: 5

Update on Indirect Sources

**Stationary Source Committee Meeting
September 11, 2024**

Laura Cackette
Principal Environmental Planner
lcackette@baaqmd.gov

Mark Tang
Assistant Manager
mtang@baaqmd.gov

Presentation Outcome

- Informational item
- Provide update on indirect sources, rule development opportunities, and other policy tools – and discuss next steps



Outline

- Recap of March Presentation, Background, Objective
- Regulatory Landscape
- Emissions Overview
- Rule Development as a Tool
- Local Action to Address Indirect Sources
- Next Steps Discussion



Recap of March Presentation

• Presentation Contents

- Overview of indirect emissions sources, growth, and current regulatory landscape
- Impacts on air quality, especially Assembly Bill (AB) 617 and overburdened communities
- Challenges related to existing and future indirect source efforts, including both legal and technical implementation challenges

• Committee Discussion

- Concern about warehouses as indirect sources
- Consult with South Coast Air Quality Management District (SCAQMD) on their Indirect Source Regulations (ISR) efforts
- Follow up with committee on potential approaches for addressing impacts from indirect sources



Recap of Background

- Clean Air Act: "Indirect source" means a facility, building, structure, installation, real property, road, or highway which attracts, or may attract, mobile sources of pollution

- Trucks, Cargo Handling Equipment, Ships, Trains, Cars, etc.

• Existing Regulations

- Existing statewide "direct" regulations for mobile sources
- Additional federal/international "direct" regulations for some mobile sources
- Regional and local rules, ordinances, and policies from air districts and local governments addressing indirect sources



Recap of Objective

- Conduct a Preliminary Analysis for a Bay Area Indirect Source Rule
 - Including assessment for warehouses
- Assessment covers
 - Regulatory Landscape
 - Emissions
 - Resource Needs
 - Other Tools



Regulatory Landscape – Air Districts

- Indirect Source Regulations from Other Air Districts
 - SCAQMD, San Joaquin Valley Air Pollution Control District (APCD), San Diego APCD (in development)
- SCAQMD
 - Rule 2305: Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions (WAIRE) Program
 - Adopted and currently being implemented
 - Rule 2306: Freight Rail Yards
 - Adopted August 2, 2024
 - Proposed Rule 2304: Commercial Marine Ports – Container Terminals
 - Under development



Regulatory Landscape – Statewide [California Air Resources Board (CARB)]

- For warehouses, the predominant source of emissions is trucks
- CARB Regulations for Medium- and Heavy-Duty Trucks
 - Truck and Bus Rule – Port and Non-Port Trucks
 - Final deadline in the regulation was January 1, 2023: required upgrade of existing trucks to 2010 or newer model year engines
 - Advanced Clean Trucks
 - Requirement to sell zero-emission trucks as an increasing percentage of California sales from 2024 to 2035
 - Advanced Clean Fleets
 - Accelerating the deployment of zero-emission medium and heavy-duty trucks in order to achieve a zero-emission California truck and bus fleet by 2045
- State regulations are **expected to provide significant emissions reductions over the next 5-15 years**, and beyond



Regulatory Landscape – New Legislation

Assembly Bill (AB) 98 (Carillo) would require:

- Statewide warehouse design and building standards
- Truck routing plans
- Updates to City and County General Plan Circulation Elements
- SCAQMD:
 - Establish a process for receiving community input for WAIRE penalties
 - Deploy mobile air monitoring at warehouse developments, conduct air modeling analysis, and evaluate impact to sensitive receptors

Approved by State Legislature
For Governor's Approval and Signature



Emissions Data

Emissions context:

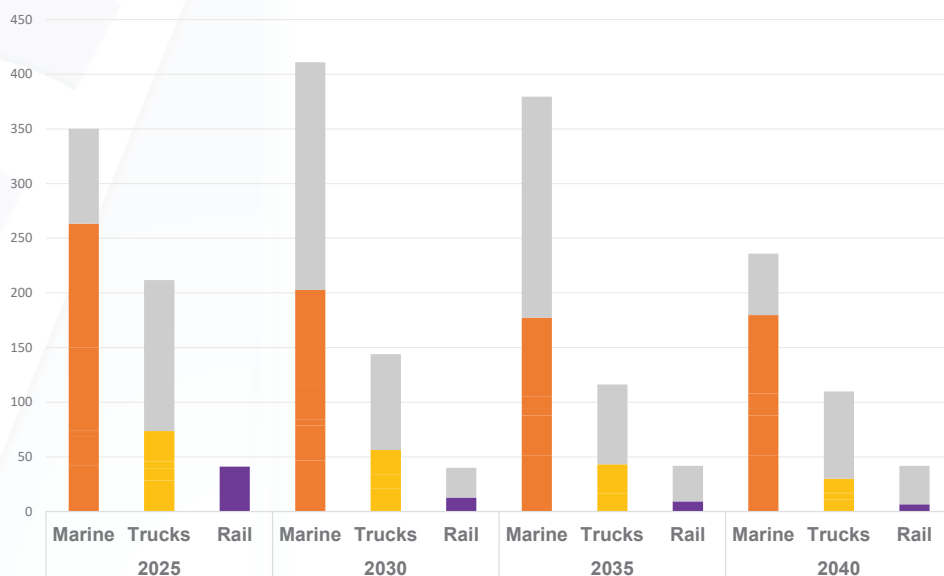
- Various types of equipment associated with indirect sources
- Trucks, Marine, Rail

Implementation &

Remaining Emissions:

- Gray = reductions from implementation of state regulations
- Colors = remaining emissions or the emissions left after implementation

Marine, Medium/Heavy Duty Trucks, and Rail
PM10 Emissions Over Time (Tons per Year)



Gray= without emissions reductions from regulations; Color = emissions with regulations in place)

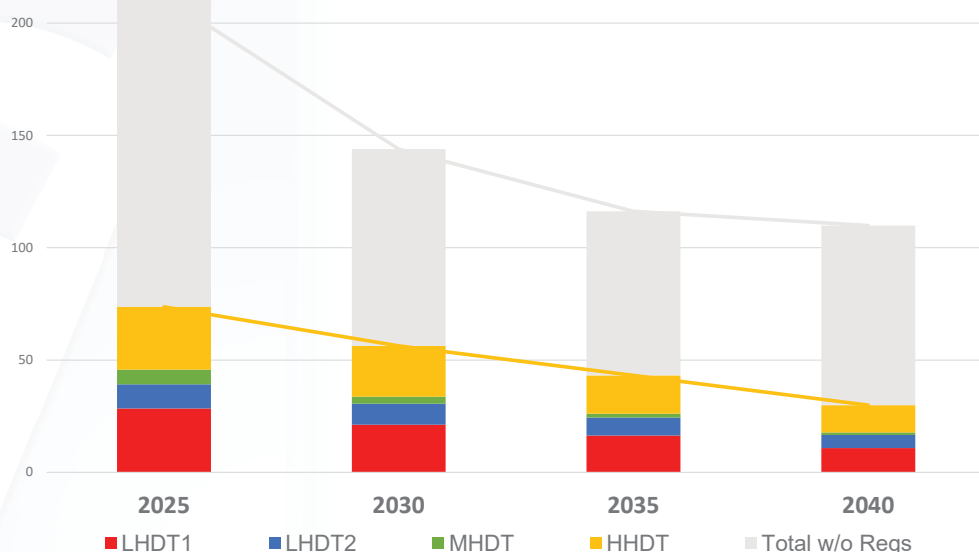


Emissions Data - Trucks

With and Without CARB Regulations

Medium + Heavy Duty Trucks
PM10/DPM Emissions (TPY)

- Medium and Heavy-duty trucks
- Diesel Particulate Matter (PM₁₀ exhaust) Emissions
 - Reductions from normal fleet turnover
 - Reductions from CARB rules
- Q: Are additional reductions feasible given stringency of CARB rules?



*LHDT = Light Heavy-Duty Truck; MHDT = Medium Heavy-Duty Truck; HHDT = Heavy Heavy-Duty Truck



Resources Needed for Rule Development and Implementation

For a rule similar to South Coast AQMD Rule 2305: WAIRE Rule:

- Rule development process
 - 3 Full Time Equivalent (FTE) staff (~one-third of rulemaking team), plus significant Legal support
 - Approximately 3 years
- Rule and program implementation
 - Dependent on rule and program details
 - Ongoing plan/reporting review and enforcement
 - South Coast AQMD estimated 5 FTE for ~3,000 facilities
 - Technology Infrastructure needs



Local Action to Address Indirect Sources

Benefit of local action:

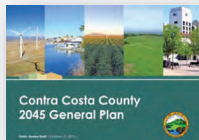
- Local governments have direct land use authority
- Local governments can address community concerns beyond air quality
- Local action can be customized to address specific concerns

Local approaches the Air District can support:

- Proactive long-range planning and ordinance development
- Local land use decisions



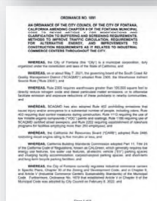
Proactive Long-Range Planning



General Plan policies to guide local planning and infrastructure decisions ([Draft Contra Costa County 2045 General Plan](#))



Good Neighbor Guideline recommendations for air quality, noise and neighborhood character ([Western Riverside Council of Governments](#))



Local Ordinance requirements related to construction and operations ([City of Fontana Industrial Commerce Center Sustainability Standards](#))



Example: Draft Contra Costa County 2045 General Plan

Health and Safety Policy (HS-P)1.8

Require new or expanded commercial and industrial projects exceeding 25,000 square feet of gross floor area to be near zero-emissions (NZE) operations, including the facilities themselves and the associated fleets. Require all necessary measures, such as the following, to achieve NZE:

- (a) Reduce on-site energy consumption and increase on-site energy generation and energy storage.
- (b) Provide adequate on-site ZE vehicle-capable parking for all anticipated truck traffic to prevent idling and off-site queuing.
- (c) Provide electrified loading docks with receptacles allowing plug-in of refrigerated trailers.
- (d) Use heavy-duty trucks that are model year 2014 or later and expedite a transition to ZE trucks by establishing a clear timeline for electrification of trucks as they become commercially available. Ensure contracts with motor carriers include air quality incentives or requirements, such as providing incentives to fleets that meet United States Environmental Protection Agency (US EPA) SmartWay standards or requiring use of ZE or NZE trucks.
- (e) Use a "clean fleet" of delivery vehicles as they become commercially available, but no later than 2025.
- (f) Use ZE yard equipment, such as forklifts, pallet trucks and jacks, and stackers.
- (g) Implement practices to control and remove fugitive dust and other contaminants from paved areas.
- (h) Uses with fewer than five vehicles domiciled on-site are exempt from this policy.



Local Land Use Decisions

Local land use decisions can consider:

- > **Spatial Distribution**
- > **Design**
- > **Operations**

MECHANISMS	Zoning
	Overlay Zones or Special Districts
	Conditional Use Permits
	Conditions of Approval
	Site Development Standards



Local Land Use Decisions (cont.)

In complying with **California Environmental Quality Act (CEQA)**, lead agencies can follow best practices for evaluating air quality and greenhouse gas impacts and adopt feasible, enforceable and effective mitigation measures.



The Air District's [2022 CEQA Guidelines](#) includes guidance on analysis and mitigation of air quality and climate impacts, and includes a chapter with best practices for centering Environmental Justice, health, and equity in the siting, design, and development of land use projects



The California Attorney General's Bureau of Environmental Justice's [Warehouse Projects: Best Practices and Mitigation Measures to Comply with the California Environmental Quality Act](#) includes guidance on the analysis and mitigation of air quality, greenhouse gas, noise, traffic and other significant environmental impacts



Example Best Practices for Indirect Sources

- ✓ Require a buffer zone between indirect sources and sensitive receptors (e.g., 1,000 ft)
- ✓ Locate loading docks, truck entries, and truck drive aisles away from sensitive receptors
- ✓ Provide screening and buffering using trees, ground landscaping and solid decorative walls between indirect sources and sensitive receptors
- ✓ Design, clearly mark and enforce truck routes to keep trucks out of residential neighborhoods
- ✓ Provide adequate on-site electric vehicle (EV) capable parking for anticipated truck and passenger vehicles



*Electric vehicle charging stations.
Bay Area Air Quality Management District.*



Example Best Practices for Indirect Sources (cont.)



*Truck equipped with zero-emission transportation refrigeration unit.
Courtesy Mark Tang.*

- ✓ Electrify loading docks and required plug-in of refrigerated and other trailers
- ✓ Require “clean fleets” of delivery vehicles
- ✓ Use only zero-emission yard equipment, such as forklifts, pallet trucks and jacks, and stackers
- ✓ Ensure contracts with motor carriers include air quality incentives or requirements for using zero-emission (ZE) or near zero-emission (NZE) trucks



Next Steps Discussion

CONSIDERATIONS

What indirect source sectors and types should be prioritized with respect to emissions benefit opportunities?

What policy tool(s), including rulemaking and additional support to local jurisdictions, provide the best opportunity to address indirect source impacts, particularly in overburdened communities?

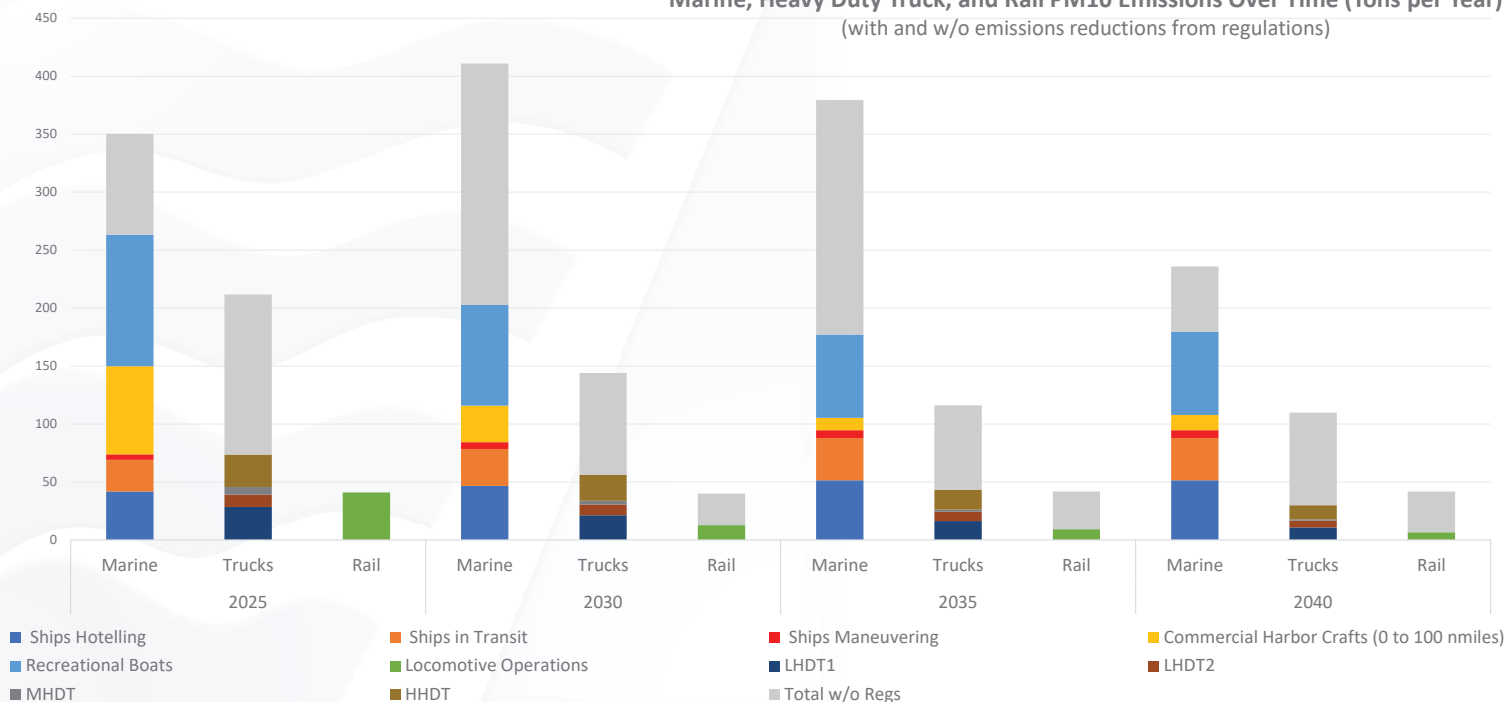
What are the resource implications of our approach relative to other priorities?

Other thoughts?



Extra Slide: Detailed Emissions

Marine, Heavy Duty Truck, and Rail PM10 Emissions Over Time (Tons per Year)
(with and w/o emissions reductions from regulations)





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Agenda 5

Indirect Sources - Update

**Stationary Source Committee Meeting
November 13, 2024**

**Virginia Lau
Assessment, Inventory & Modeling, Manager
vlau@baaqmd.gov**



Outline

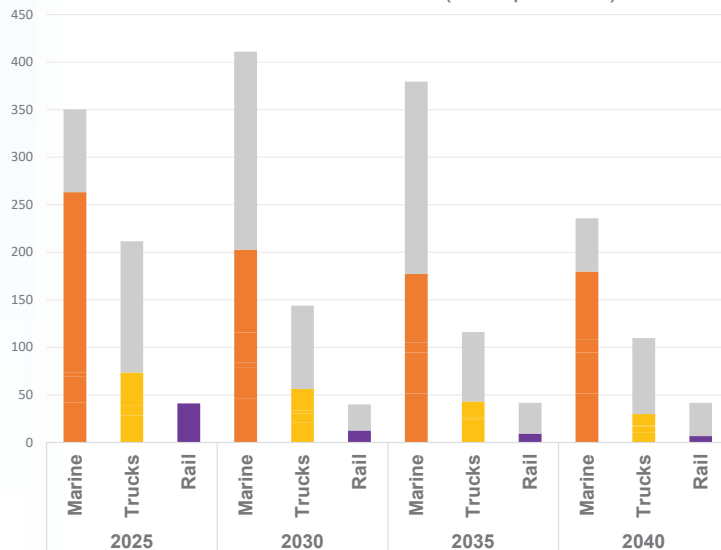
- Recap of September Stationary Source Meeting
- Responses to questions concerning marine sources
 - Brief overview of California Air Resource Board (CARB) regulations on marine sources
 - Marine source emissions impact on Assembly Bill (AB) 617 communities



Recap of September Stationary Source Meeting

- How many truck-related businesses/warehouses are in the Bay Area?
- What is the projected growth of these businesses?
- What are the marine source impacts to AB 617 communities?
- Are the health impacts different when ships are berthing versus maneuvering?

Bay Area Marine, Medium/Heavy Duty Trucks, and Rail
PM10 Emissions Over Time (Tons per Year)



Gray= without emissions reductions from regulations; Color = emissions with regulations in place)



California Air Resources Board Regulations on Marine Sources

OGV Fuel Regulation

Phased requirement using progressive lower sulfur distillate grade marine fuels starting in 2009

Commercial Harbor Craft Regulation

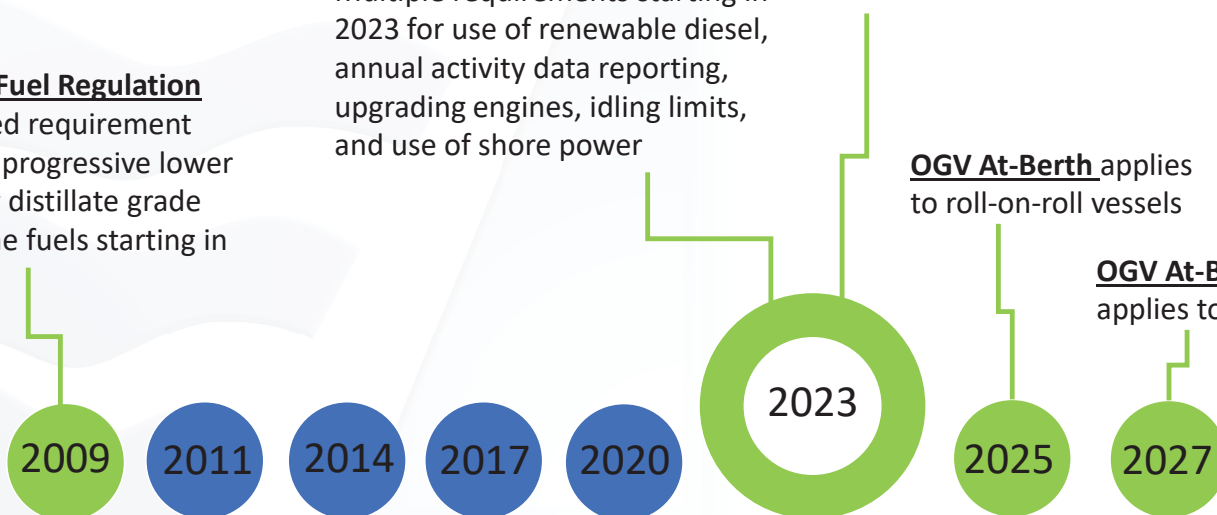
Multiple requirements starting in 2023 for use of renewable diesel, annual activity data reporting, upgrading engines, idling limits, and use of shore power

Ocean-going Vessel (OGV) At-Berth Regulation

Requires containers, reefers, cruise vessels (for visits to all regulated terminals) to use shore power by 2023

OGV At-Berth applies to roll-on-roll vessels

OGV At-Berth applies to tankers



Key Takeaways

Regional Level

- Marine sources are significant contributors to the regional emissions inventory; nitrogen oxide (Nox) emissions from ships are twice as much of those from all stationary sources in the Bay Area
- Marine sources are major contributor to secondary particulate matter (PM), which has important health impacts

Local Level

- Exposure analysis for communities indicate that marine sources have lower impacts per ton of emissions than trucks or locomotives (mainly due to proximity differences)

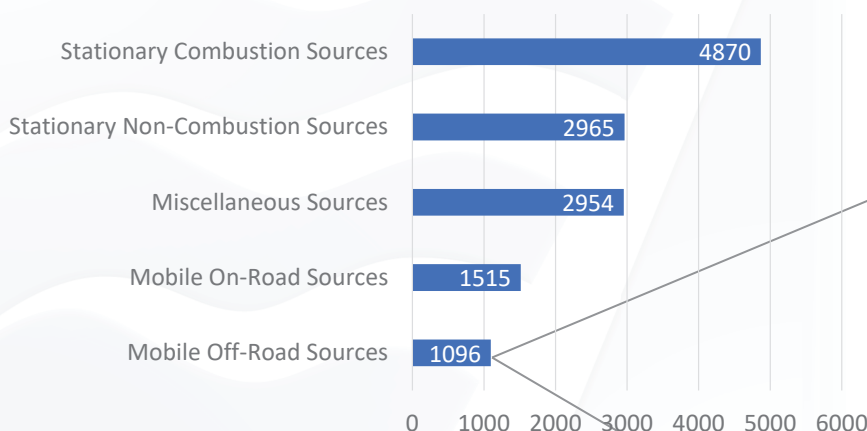
Emissions/Impact Reduction

- CARB At-Berth regulations and new Environmental Protection Agency (EPA) grant will further reduce ship emissions when fully implemented

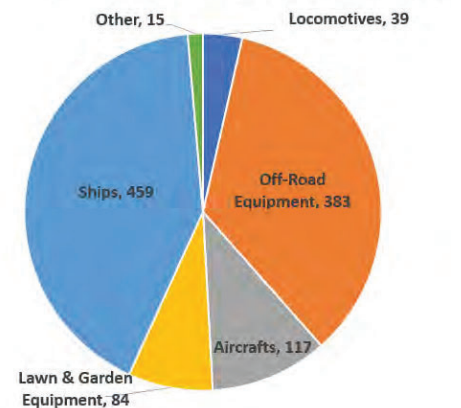


Regional Emissions Inventory for the Bay Area (PM_{2.5})

2023 Regional Inventory by Sector for PM_{2.5} (tons/yr)

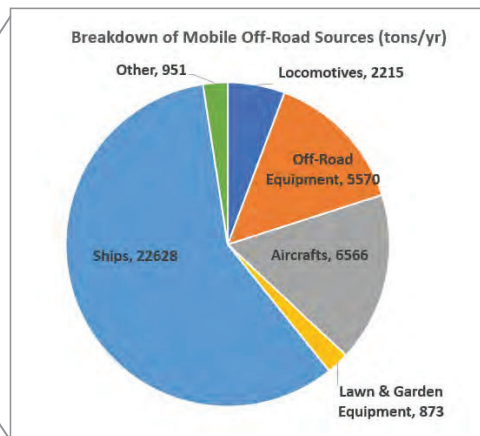
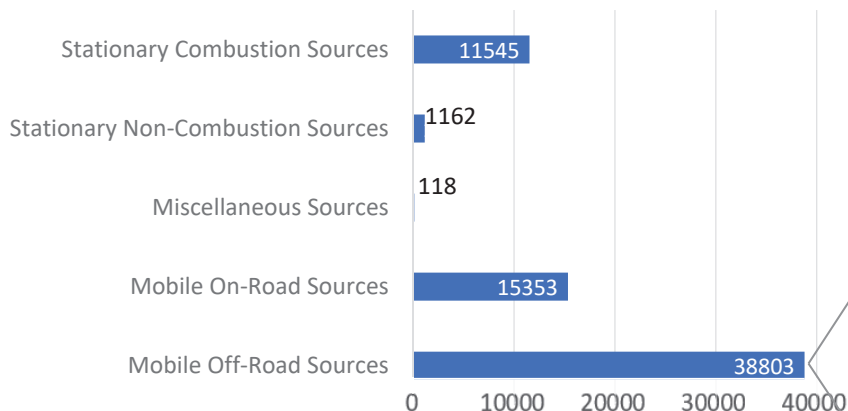


Breakdown of Mobile Off-Road Sources (tons/yr)



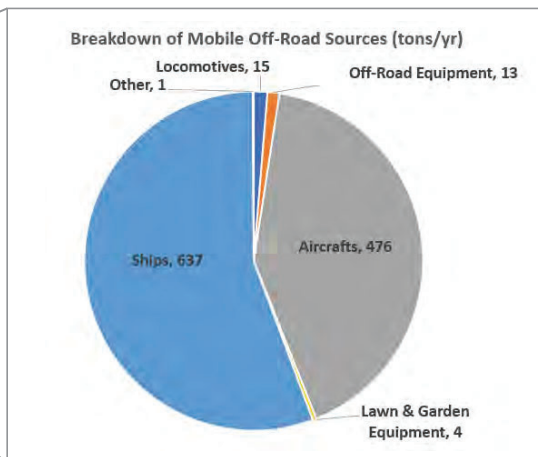
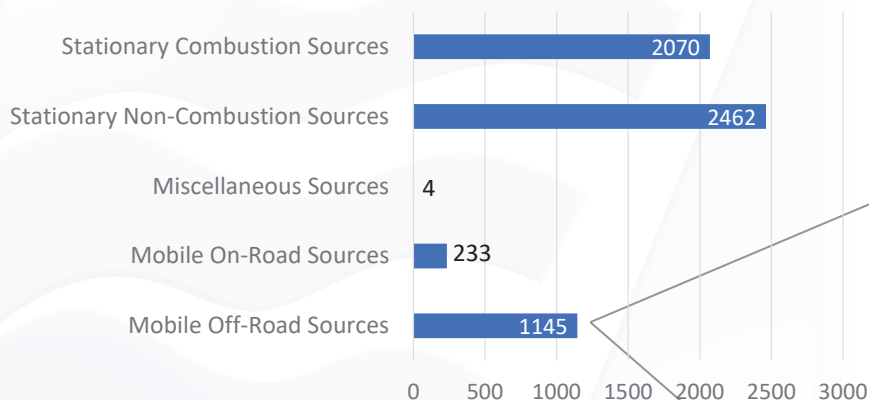
Regional Emissions Inventory for the Bay Area (NOx)

2023 Regional Inventory by Sector for NOx (tons/yr)



Regional Emissions Inventory for the Bay Area [(Sulfur Dioxide (SO₂))]

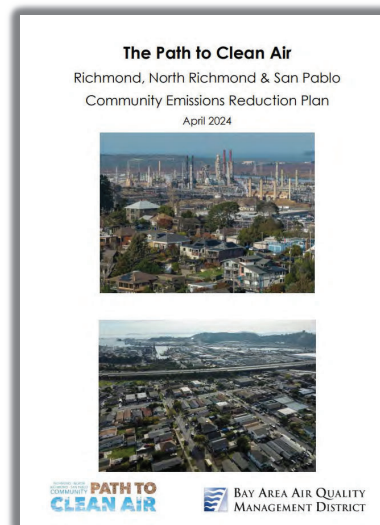
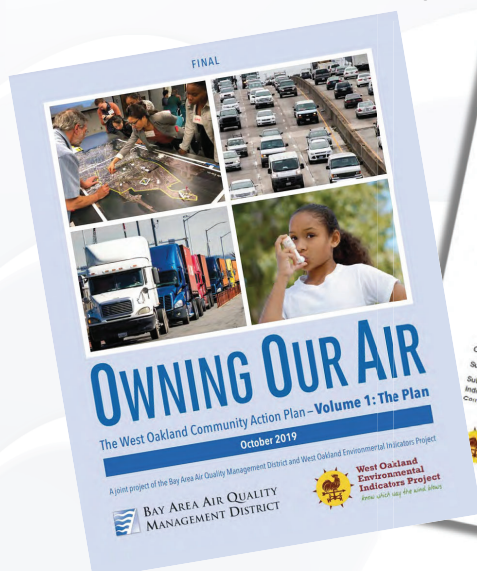
2023 Regional Inventory by Sector for SO₂ (tons/yr)



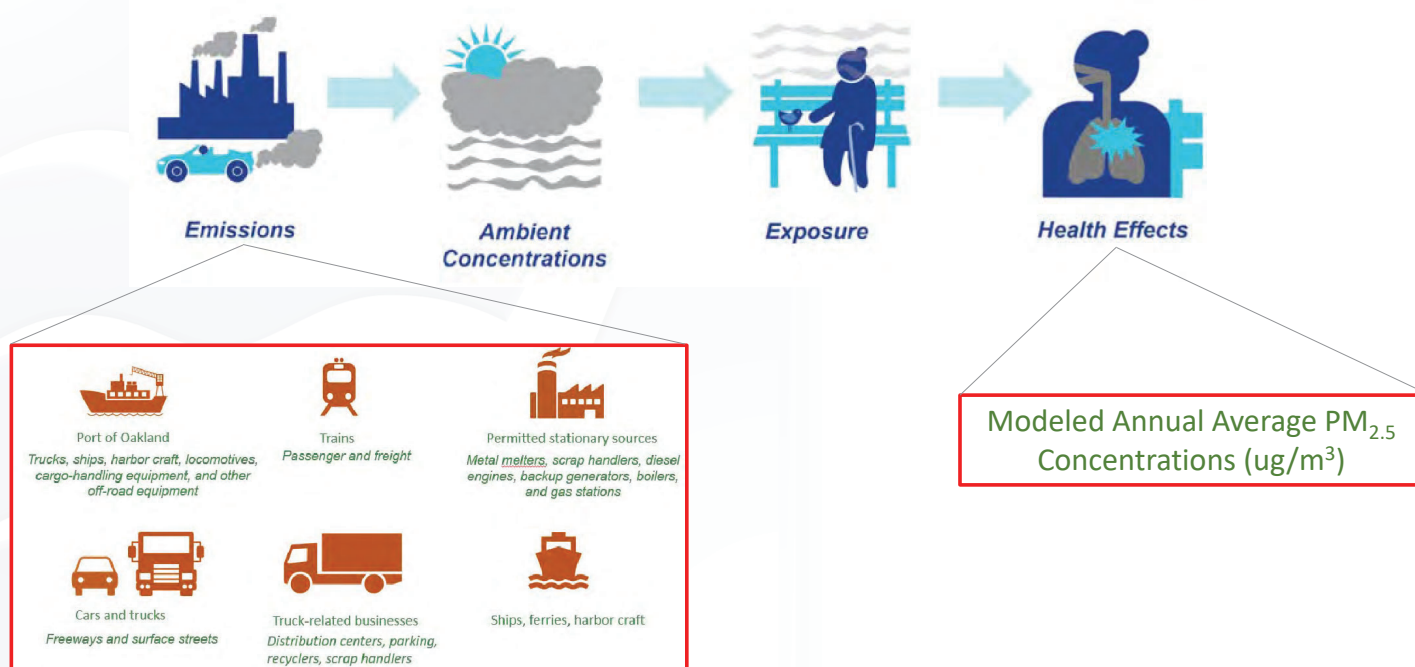
Assembly Bill (AB) 617 Community Assessments

West Oakland Community Action Plan (2019) and Fifth Year Annual Report (2024)

Richmond, North Richmond, and San Pablo Community Emissions Reduction Plan (2024)

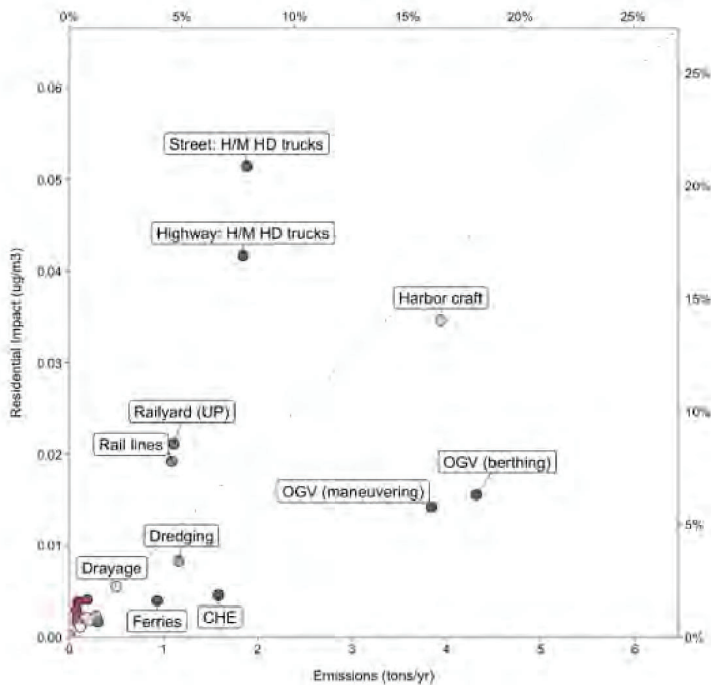


General AB 617 Assessment Methodology



Impact Per Ton: Diesel PM in West Oakland

Circles are modeled local sources.
Red circles create more impact per ton of emissions; blue circles, less.
Percentages are shares of the total modeled impact from these local sources.



West Oakland Highlights (base year 2017)

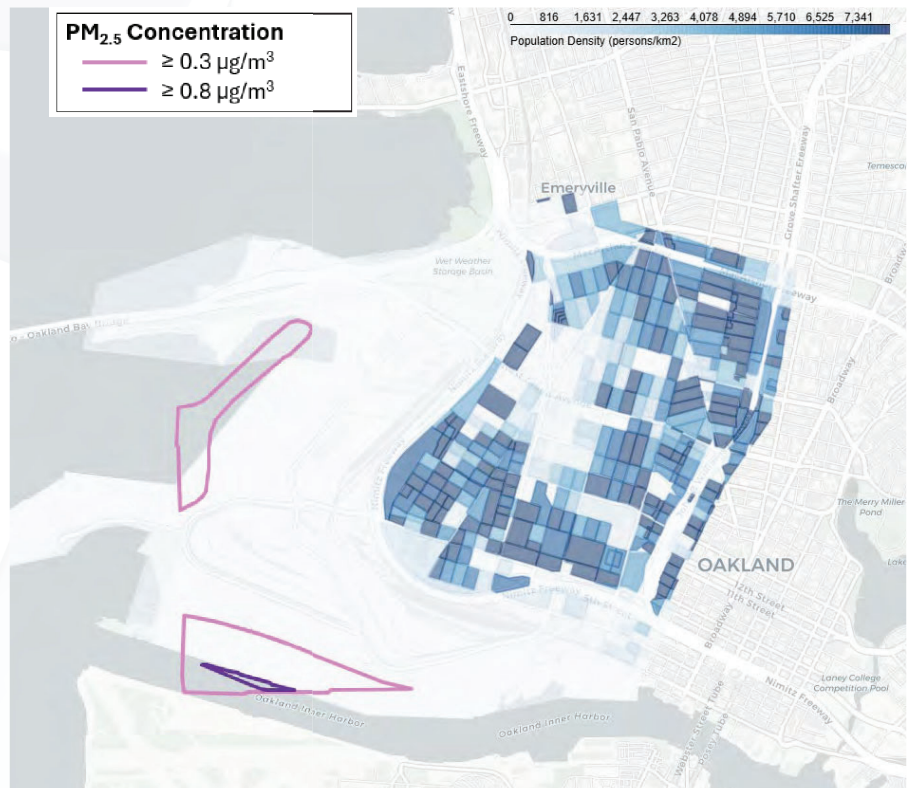
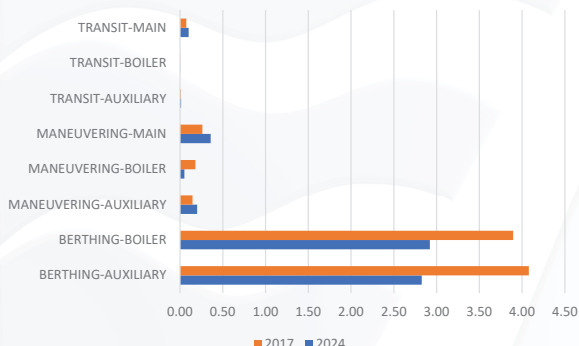
- The magnitude of diesel particulate matter (DPM) emissions from trucks, OGV berthing, and OGV maneuvering are similar
- The relative exposure impact of OGV berthing and maneuvering is much lower than trucks, which are 5 x higher than OGV



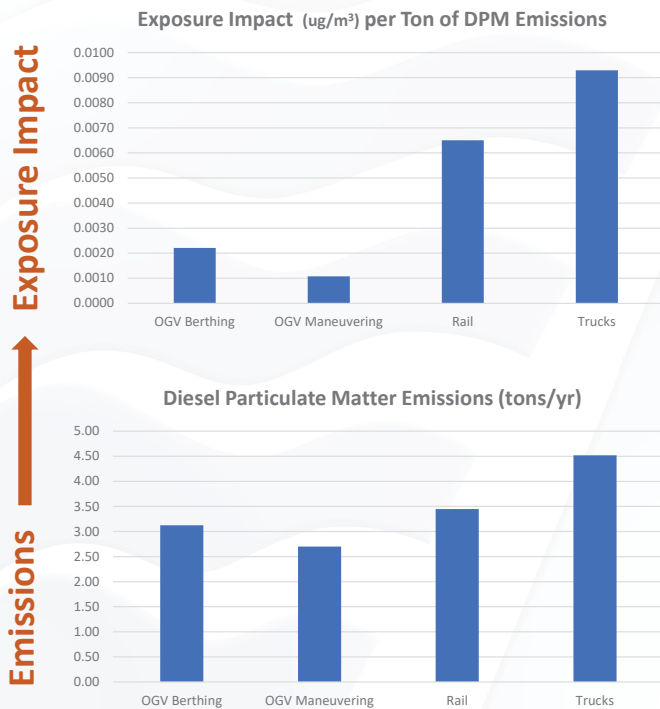
West Oakland OGV Particulate Matter (PM_{2.5}) Impacts

Modeled annual average PM_{2.5} concentrations using 2017 emissions against 2020 block level census tract data

West Oakland OGV PM_{2.5} Emissions (tpy) for 2017 and 2024



Richmond-North Richmond-San Pablo (Path To Clean Air - PTCA) Recap (base year 2024)

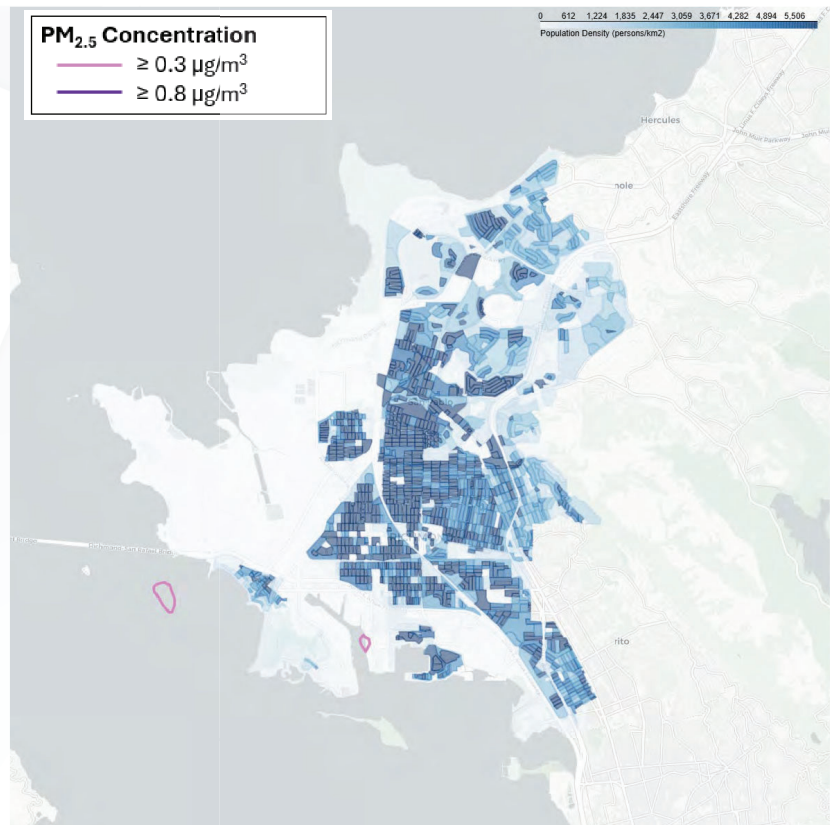
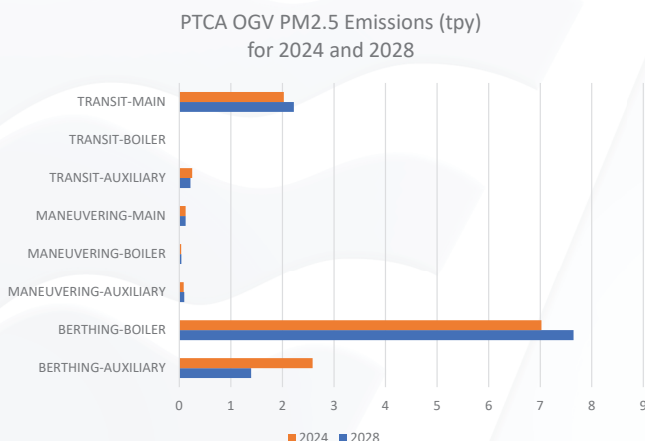


- Most of the $\text{PM}_{2.5}$ emissions are associated with Chevron Refinery in the PTCA community
- OGV berthing exposure impacts per ton of DPM emissions are double of those for OGV maneuvering
- Truck exposure impacts per ton of DPM emissions are 4 times higher than OGV berthing exposure impacts and 8 times higher than OGV maneuvering exposure impacts



PTCA OGV $\text{PM}_{2.5}$ Impacts

Modeled annual average $\text{PM}_{2.5}$ concentrations using 2024 emissions against 2020 block level census tract data



Recent Headlines for EPA's Clean Port Program

- The awarded \$322 million grant will be used to finance zero-emission trucks and cargo handling equipment (CHE) and improve infrastructure:
 - 475 drayage trucks
 - 180 yard tractors
 - 250+ charging stations/infrastructure
- The Port of Oakland project is scheduled to start in Dec 2024 and complete by Nov 2028.
- The Air District has committed to:
 - Continue participation in the West Oakland Sustainable Port Collaborative and Community Electrification Committee
 - Deploy air monitoring to measure the effectiveness of the project and understand the emissions reductions impacts

Port of Oakland awarded historic \$322 million EPA grant

October 29, 2024

Grant to fund hundreds of zero-emissions trucks and cargo-handling equipment



Source: <https://www.portofoakland.com/port-of-oakland-awarded-historic-322-million-epa-grant/>



Follow-up Meeting

- Staff to present findings on the number of truck-related businesses/warehouses and their growth projections by early next year
- Staff plan to further assess secondary PM formation and its impact from various sources (including marine sources) as part of our ongoing PM control strategies development



Warehouse Indirect Source Rule Considerations

Stationary Source Committee

March 12, 2025

Christopher Easter
Senior Air Quality Specialist
Rules & Strategic Policy

Presentation Outline

- Background
- Warehouses and Distribution Centers in the Bay Area
- Potential Indirect Source Rule (ISR) Impacts and Considerations
- Updates on Relevant Regulatory Activity
- Possible Timeline and Options for Future Actions

Background

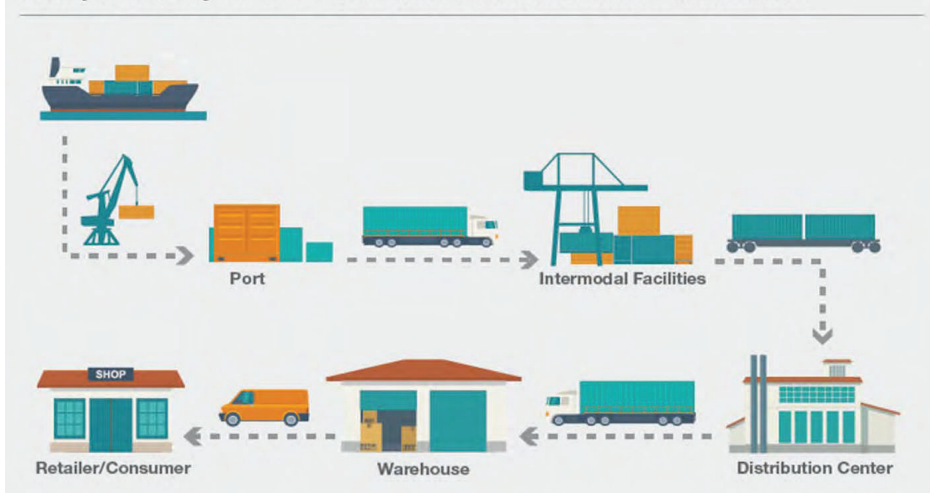
What is an Indirect Source?

- Any Facility that attracts mobile sources of emissions...defined by United States Environmental Protection Agency (US EPA) within the Clean Air Act as "... a facility, building, structure, installation, real property, road, or highway which attracts, or may attract, mobile sources of pollution."

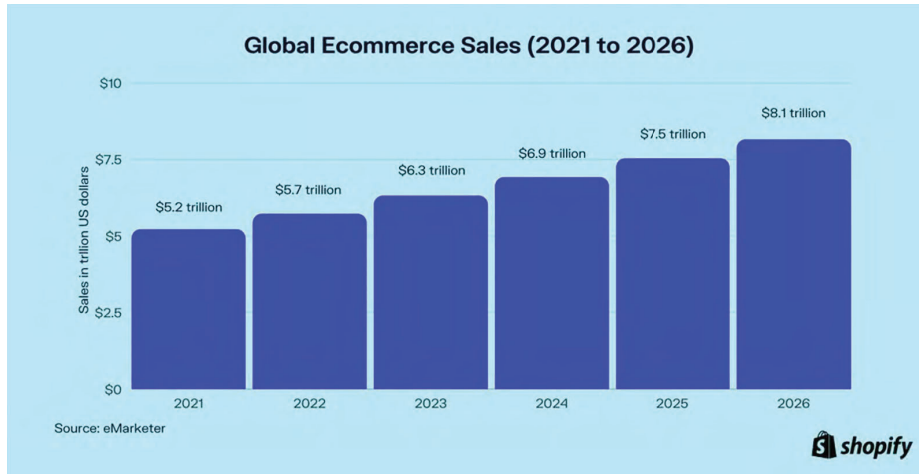
42 U.S.C. § 7410(a)(5)(C)

Background: Goods Movement

Example Pathway for How Goods Move From Production to Consumers



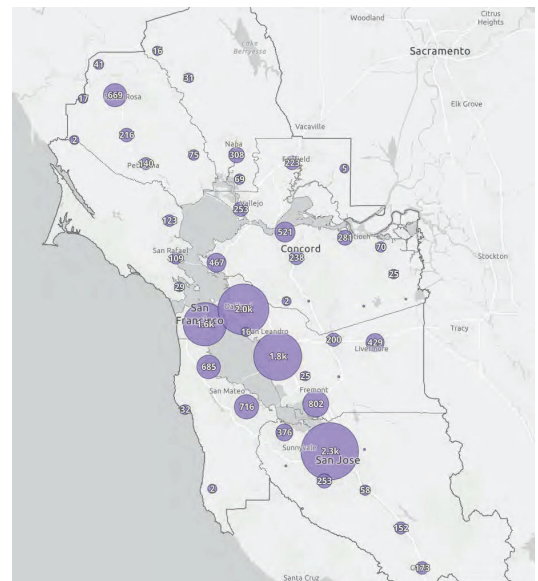
Background: Growth in e-commerce



Annual Meeting and Mobile Ecommerce Trends Transforming The Industry In 2023

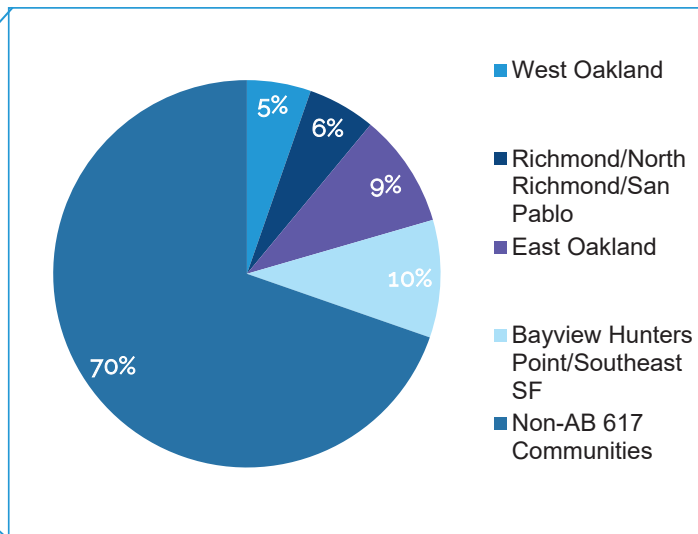
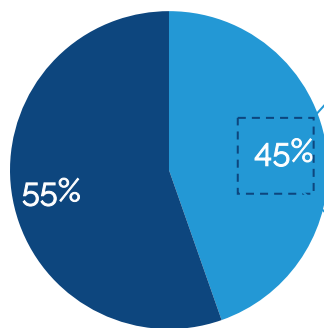
Warehouses in the Bay Area

- ~16,000 total warehouses
- Individual sites range from less than 1000 square feet to more than 1 million (M) square feet



Warehouses in the Bay Area

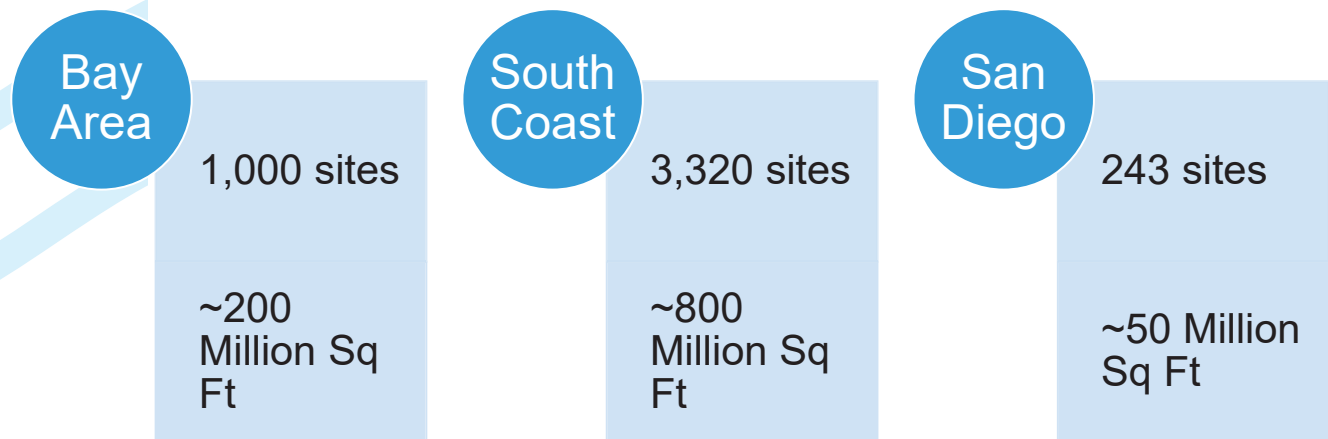
- Warehouses in Overburdened Communities (OBC)
- Warehouses Outside OBC



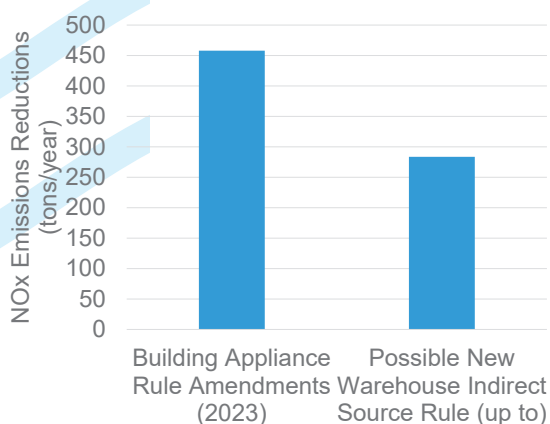
Indirect Source Rules in Other Air Districts

- San Joaquin Valley Air Pollution Control District
 - Rule 9510: Indirect Source Review
- San Diego Air Pollution Control District
 - Warehouse Indirect Source Rule under evaluation
- South Coast Air Quality Management District (South Coast AQMD)
 - Rule 2305 - Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions (WAIRE) Program
 - Annual WAIRE points (or mitigation fee) compliance obligation
 - Only applies to warehouses >100,000 square feet (sq. ft.)

Warehouses Greater Than 100,000 Sq Ft



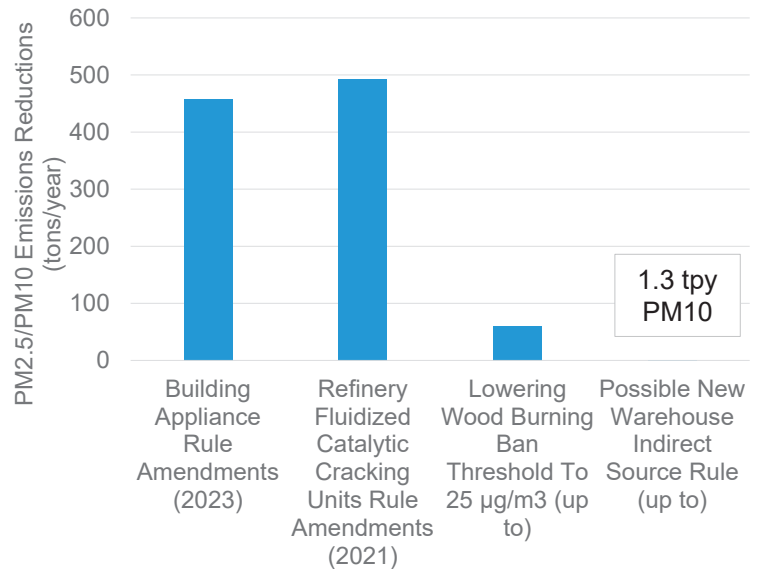
Potential Nitrogen Oxides (NOx) Reductions in the Bay Area



- Screening-level assessment assuming a similar approach as WAIRE
- WAIRE is a NOx-focused rule supporting efforts to attain ozone and fine particulate matter (PM_{2.5}) National Ambient Air Quality Standards

Potential Particulate Matter (PM) Reductions in the Bay Area

- California Air Resources Board (CARB) Truck & Bus, Advanced Clean Trucks, Low NOx Omnibus, and Heavy-Duty Inspection and Maintenance Regulations impact baseline emissions from heavy duty trucks
- Primarily diesel particulate matter reductions



Relevant Regulatory Activities

Advanced Clean Fleets waiver request withdrawn by CARB on 1/13/25

- Advanced Clean Trucks (supply side) program still in effect
- Implementation of additional CARB programs, including incentives in disadvantaged communities, can function to fill the gap
- Requirements for state and local public fleets will continue to move forward
- Emissions estimates assume no Advanced Clean Fleets implementation

Considerations for Next Steps

- Rule Development Process
 - 3 Full Time Equivalent (FTE) staff (~one-third of rulemaking team), plus significant Legal support
 - Approximately 3 years
- Rule and Program Implementation
 - Dependent on rule/program design
 - South Coast AQMD estimated 5 FTE plus technology/data infrastructure needs
- Rule Development Prioritization

Questions/Feedback

For more information:

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Warehouse Indirect Source Rule: Overview, Concept Paper, and Next Steps

Stationary Source Committee

June 10, 2026

Christopher Easter
Senior Air Quality Specialist
Regulatory Development Division

Presentation Outline

- Background
- Regulatory Context
- Rule Concepts
- Stakeholder Engagement and Public Workshops

Background

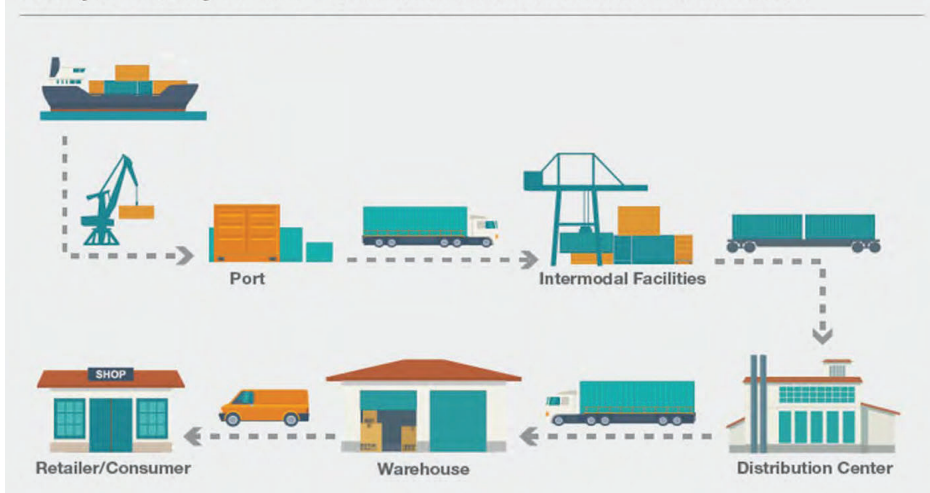
Warehouses as indirect/magnet sources

Warehouses attract activity from sources like heavy-duty trucks and cargo handling equipment, thereby *indirectly* causing emissions. An indirect source rule (ISR) would require warehouse operators to reduce emissions.



Background: Goods Movement

Example Pathway for How Goods Move From Production to Consumers



Recap of Committee Presentations

March 2024

- Background on indirect sources; regulatory landscape; Assembly Bill (AB) 617 impacts

September 2024

- Emissions data; considerations for managing indirect sources

November 2024

- Marine emissions; emissions inventory; AB 617 community assessments

March 2025

- Potential warehouse ISR emission reductions; regulatory update

Regulatory Context: Federal and State

Clean Air Act – 42 U.S.C. § 7410(a)(5)

- (A)
- (i) Any State may include in a State implementation plan, but the Administrator may not require as a condition of approval of such a plan under this section, any **indirect source review program**...
- (C) For purposes of this paragraph, the term “**indirect source**” means a facility, building, structure, installation, real property, road, or highway which attracts, or may attract, mobile sources of pollution.

California Health and Safety Code § 40716

- (a) In carrying out its responsibilities pursuant to this division with respect to the attainment of state ambient air quality standards, a district **may adopt and implement regulations** to accomplish both of the following:
- (1) Reduce or mitigate emissions from **indirect** and areawide sources of air pollution.
 - (2) Encourage or require the use of measures which reduce the number or length of vehicle trips.

Regulatory Context: Federal and State (cont.)

- Advanced Clean Fleets (ACF) was expected to drive significant heavy-duty emission reductions
- California Air Resources Board (CARB) withdrew its waiver request for ACF, In-Use Locomotive Regulation, Commercial Harbor Craft
- Other CA regulations affected by federal action: Advanced Clean Trucks, Heavy Duty Low Nitrogen Oxides (NOx) (“Omnibus”), Clean Truck Check (Heavy Duty Inspection/Maintenance)
- More impetus for local agency action, e.g. ISRs

Regulatory Context: Other Air District ISRs

- San Joaquin Valley Air Pollution Control District
 - Rule 9510: Indirect Source Review
- San Diego Air Pollution Control District
 - Warehouse Indirect Source Rule under evaluation
- South Coast Air Quality Management District (SCAQMD)
 - Rule 2304: Commercial Marine Ports
 - *Initially a Ports ISR but changed to a cooperative agreement on zero-emission infrastructure planning*
 - Rule 2305: Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions (WAIRE) Program
 - Rule 2306: Freight Rail Yards Indirect Source Rule

SCAQMD WAIRE

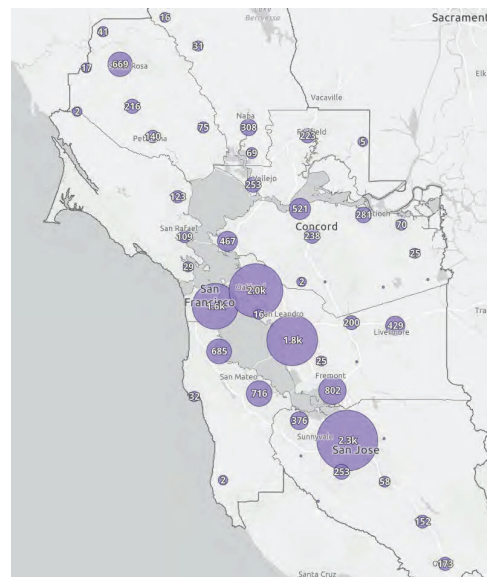
Key Elements of WAIRE

- Applicability: warehouses >100,000 square feet (sq. ft.)
- Requirement: earn required WAIRE points annually, based on site activity
- Compliance options: select actions from a menu, submit custom WAIRE plan, or pay mitigation fee
- Implementation: three-phase implementation based on warehouse size with ramp up to full stringency (% stringency values below)

Warehouse Size	2022	2023	2024	2025	2026 onwards
≥ 250,000 sqft.	33%	67%	100%	100%	100%
≥ 150,000 to < 250,000 sqft.	0%	33%	67%	100%	100%
≥ 100,000 to < 150,000 sqft.	0%	0%	33%	67%	100%

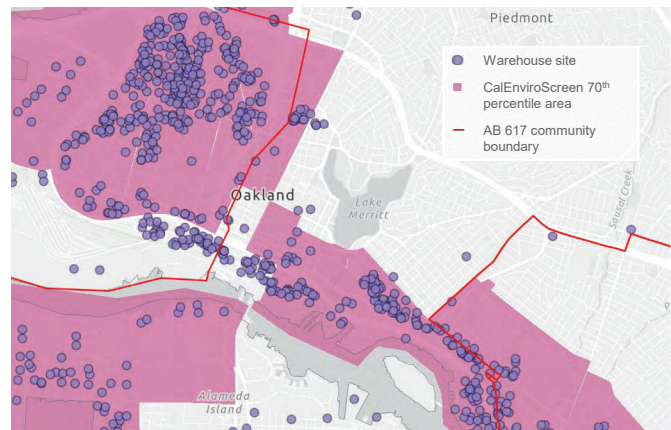
Warehouses in the Bay Area

- ~16,000 total warehouses across 9 counties
- Individual sites range from less than 1000 square feet to over 1 million square feet



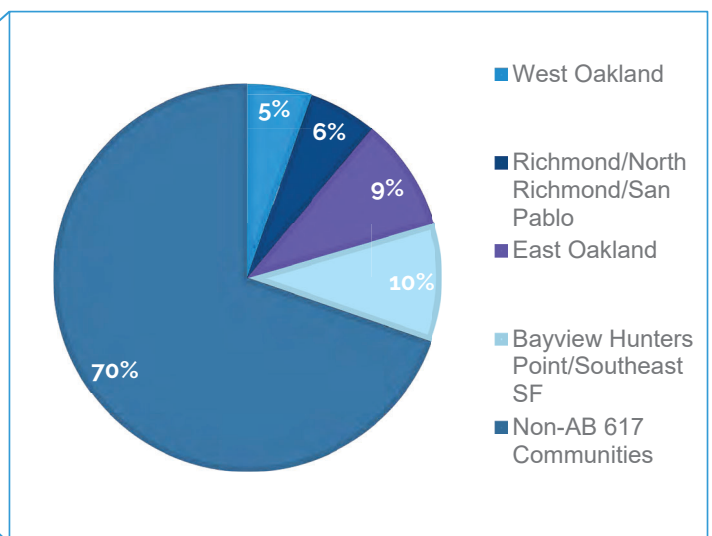
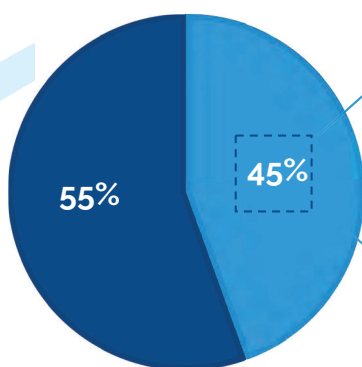
Warehouses in the Bay Area (cont.)

- Many warehouses are in impacted communities
- There is a wide range in warehouse sizes and activity levels which creates a cumulative impact on air quality



Warehouses in the Bay Area (cont.)

- Warehouses in Overburdened Communities (OBC)
- Warehouses Outside OBC



Warehouse ISR Concept Paper

- Published a concept paper on April 16 outlining initial regulatory concepts
- Public comment period closed June 1
- Launched alongside an ISR landing page, new mailing list, and plain-language flyer

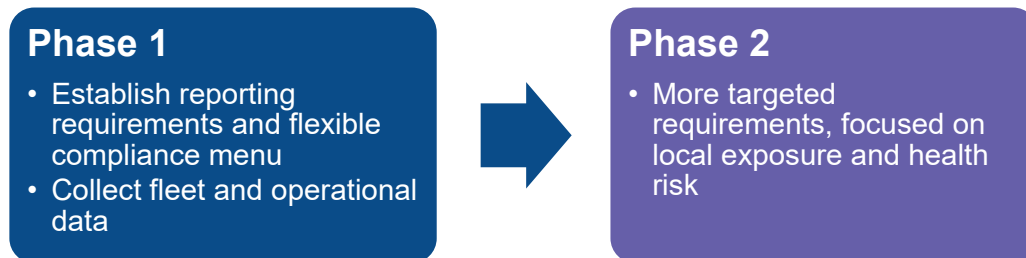


Concepts: Applicability

Warehouse Floor Area Category (square feet)	Number of Warehouses	Total Floor Area (square feet)	Number of Warehouses in Overburdened Communities (OBCs)	Percent of Total Warehousing Floor Area	Percent Floor Area in OBCs
450k+	50	38,865,787	15	8%	30%
350k–450k	36	14,167,491	12	3%	33%
250k–350k	121	34,819,276	46	7%	38%
150k–250k	297	57,399,770	119	12%	40%
100k–150k	521	62,061,949	194	13%	37%
50k–100k	1,268	88,539,393	442	18%	35%

- Considering an applicability threshold of 100,000 square feet
- Potential lower threshold for warehouses in impacted communities

Concepts: Implementation



Concepts: Compliance Options

Activity-based allocation	Reduction from baseline	Screening-based approach	Two-stage obligation
• Set Bay Area emission reduction goals • Allocate compliance obligation based on truck activity	• Establish baseline emissions per facility • Percentage reduction requirement	• Screening assessment determines obligation based on warehouse size, location, other factors	• Set initial emission reduction target • Refine target with additional data or health risk assessment

Concepts: PM Reductions, Reporting and Emissions Benefits

- Focus on particulate matter reductions, potentially assigning greater weight to Particulate Matter (PM)-reducing actions
- One time Warehouse Operations Notification and Initial Site Information Report, followed by annual compliance reporting
- Screening-level analysis shows reductions of 280 tons per year of NO_x and 1.3 tons per year of PM₁₀
- Important Co-Benefit of health risk impact reductions correlated with PM₁₀ reductions in overburdened communities

Stakeholder Engagement

- Direct outreach to stakeholders
- Public comment on the concept paper closed on June 1
- Public workshops in Quarter (Q)3 2026

Public Comments

Summary of Public Comments

- Number of Comments
- Stakeholders Commenting
- General Themes

Questions & Discussion

For more information:

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