



San Diego County
**Air Pollution
Control District**

**Warehouse Indirect Source Rule (ISR)
Framework Supplement
*Executive Summary***

April 2025

**SAN DIEGO COUNTY
AIR POLLUTION CONTROL DISTRICT**
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San Diego, CA 92131

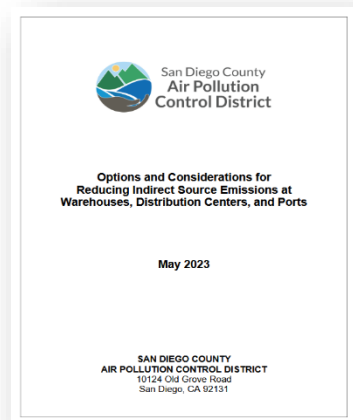
EXECUTIVE SUMMARY

Introduction

This “Warehouse Indirect Source Rule (ISR) Framework Supplement” (or Supplement) presents staff’s findings to date and provides an opportunity to gain public input and direction from the Governing Board on the preferred nature and scope of any potential District rule or program. Note that this Supplement provides an informational update only and does not present the District’s recommendations to the Governing Board regarding a potential warehouse ISR for San Diego County.

Background

Starting in November 2021, the San Diego County Air Pollution Control District (SDAPCD or District) staff began work pursuant to California Assembly Bill (AB) 423 (Gloria, 2019) to evaluate the feasibility of various actions to address indirect sources of pollution, particularly warehouses and distribution centers. More specifically, AB 423 required the District to “*consider* adopting an indirect source rule to address pollution from mobile sources that is associated with stationary sources, such as ports, warehouses, and distribution centers.” In May 2023, District staff prepared a report titled “Options and Considerations for Reducing Indirect Source Emissions at Warehouses, Distribution Centers, and Ports,” also referred to as the “ISR Framework” (Attachment A), and presented the preliminary findings at the June 2023 Governing Board meeting.



This “Warehouse Indirect Source Rule (ISR) Framework Supplement” (or Supplement) presents an update to pertinent sections found in the initial ISR Framework for warehouses and distribution centers. This Supplement also provides new or updated information through analysis that was either directed by the Governing Board, Planning and Policy Committee, and/or discussed through the Warehouse Working Group (WWG). Consequently, staff believes that the Governing Board’s consideration and acceptance of this Supplement, together with the initial ISR Framework and WWG meeting series, will fulfill the requirement set forth by AB 423 to consider an ISR for warehouse and distribution centers.

Comments

Comments regarding this Supplement may be submitted in writing no later than **May 15, 2025**. Please submit all written comments to APCDRules@sdapcd.org.

Warehouse Working Group (WWG) Meetings and Activities

As directed by the Governing Board, between September 2023 and October 2024, staff conducted 10 virtual public meetings with WWG participants, comprising almost 20 hours of in-



depth, technical conversations about indirect source emissions. Over 90 stakeholders were invited, comprising of key local community, environmental, industrial, and government stakeholders, to collect varying perspectives from a wide variety of stakeholders. The group was not typically able to reach a consensus on most topics. While such agreements were not anticipated, the WWG nonetheless continually provided thoughtful and meaningful information for the District's consideration.

One area of general agreement was for a non-regulatory incentive option(s) to be available in some capacity. Staff presented a possible three-tiered strategy for such incentive opportunities to the WWG, and feedback was generally well-received by industry, environmental groups, and trucking and logistics companies.

From industry's perspective, several topics were frequently elevated for further analysis including: (1) better evaluating the impacts and emission reductions associated with CARB mobile source regulations, (2) concerns whether identified warehouses were actually engaging in goods movement activity, (3) Zero-Emission Vehicle (ZEV) truck and infrastructure availability issues, (4) difficulty in tracking truck activity at potentially subject facilities, and (5) noting the unique circumstances of warehousing activity along the international border.

From the environmental perspective, comments included: (1) ensuring that Community Emissions Reduction Plan (CERP) goals are prioritized to further improve the health and wellness of residents in disadvantaged communities, (2) consider the possible cumulative impact of many smaller warehouses clustered around sensitive receptors, and (3) developing an ISR (as opposed to a voluntary incentive program) could potentially provide more certainty for achieving emission reductions if framed in a way that could target such facilities in disadvantaged communities.

From an implementation perspective, the District highlighted several topics throughout the WWG meeting series including the following: (1) the importance and difficulty of achieving regionwide emission reductions in a manner that does not run afoul of federal preemption issues while achieving localized emission reductions, and (2) continued following of the SCAQMD's implementation of their Rule 2305 to prepare for future challenges if a rulemaking is locally pursued (Section 2.1).

Stakeholder Comments for District Consideration

Stakeholders were engaged throughout the WWG process. Though the District received much feedback, four alternative concepts/comments were received for consideration as alternatives to, or in modification of, a possible warehouse ISR in San Diego County. These four concepts along with summarized responses are listed in the table below, with more detailed descriptions included in this Supplement (Section 2.1.5).



Comment/Concept	District Response (summarized)
<p>Appointment System at Otay Mesa Port of Entry <i>(An appointment system at the International Border could provide more emission reduction benefits from reduced idling times at the ports of entry.)</i></p>	<p>“Induced Demand” needs further evaluation. Further assessment of pilot project in Calexico is necessary to determine extent of benefits/feasibility of expansion to other areas.</p>
<p>Industry Warehouse Analysis <i>(Truck volumes in SD County areas with warehouses are not higher than other high traffic areas affected by diesel particulate matter; other disadvantaged communities in SD County could benefit most by electrification.)</i></p>	<p>Freeway truck counts being used as the basis for analysis is a concern. Utilizing “normal” traffic data in place of “truck” traffic data may not be appropriate.</p>
<p>ISR vs. Incentive Analysis <i>(An incentive program aimed at electrifying light commercial vehicles instead of an ISR could provide a better overall reduction in NOx and PM2.5.)</i></p>	<p>Targeted incentive programs within certain communities could achieve similar emission reductions as a possible ISR, but at a greater capital cost, and primarily subsidized by District grant programs. Number of vehicles needed to achieve equivalent emission reductions, as well as funding availability, are also significant barriers.</p>
<p>Focus on Localized Sensitive Receptor Impacts <i>(An ISR should regulate warehouses 100k sq ft or more countywide, and all warehouses in disadvantaged communities of any size operating within 1,000 ft of a sensitive receptor.)</i></p>	<p>Regulating warehouses smaller than 100,000 sq ft poses significant logistical and legal challenges to implementation. Compliance options may be severely limited with smaller warehouses being encompassed. Uncertainty regarding land-use changes in a neighborhood, as well as whether smaller warehouses are truly goods-movement related activities, are also a complicating factor.</p>

Truck Trip Rate Analysis

In response to Governing Board direction, staff developed a novel truck trip rate analysis using truck trip data specific to San Diego County to estimate truck trip rates for warehouses of different sizes. Truck trip rates are critical for estimating baseline emissions from warehousing activities. Using baseline emissions, other estimates including emission reductions, cost-effectiveness, and public health benefits of proposed strategies can be calculated.

Staff estimated truck trip rates for various sizes of warehouses and truck classes. To do this, a map was developed with known potential warehouse locations based on data acquired from commercial real estate analytics firm CoStar. Transportation analysis zones (TAZs), with San Diego Association of Governments (SANDAG) modeled truck activity data that was used to support the most recently adopted 2021 Regional Plan, were also included. For TAZs that included one or more warehouse buildings in that zone, total truck volumes, number of warehouses, warehouse square footage, and average warehouse size were tabulated. This was

done for 10 specific warehouse clusters found throughout San Diego County and was statistically evaluated (via correlation coefficients) to determine the strength of the relationship between warehouse floor area and total truck volume. The results of the analysis showed a strong positive correlation, i.e., as warehouse square footage increases truck volume also proportionately increases. Conversely, the opposite is also true, that as warehouse square footage decreases, the truck volume also proportionately decreases.

Staff differentiated the total daily truck volumes into various truck classes (light-heavy, medium-heavy, and heavy-heavy duty) using modeled truck volume data along street segments in the San Diego region. Additionally, adjustment factors were developed to account for uncertainties in the datasets including: (1) facilities potentially not conducting warehousing activities, and (2) the total truck volumes servicing warehouses as opposed to trucks used for other purposes.

From the analysis, staff estimated the countywide average daily truck trip rates per 1,000 sq ft for various warehouse sizes as shown in the table below.¹

Warehouse Floor Area (sq ft)	Class 2B to 5 Daily Truck Trip Rate (per 1,000 sq ft)	Class 6 to 7 Daily Truck Trip Rate (per 1,000 sq ft)	Class 8 Daily Truck Trip Rate (per 1,000 sq ft)
100k and greater	0.05	0.02	0.08
50k to <100k	0.09	0.03	0.14
25k to <50k	0.12	0.04	0.19
12.5k to <25k	0.15	0.05	0.23
<12.5k	0.31	0.09	0.48
County average (all sizes)	0.14	0.04	0.22

The results indicate that for each truck class the daily truck trip rates increase as warehouse floor area decrease. However, this does **not** mean that smaller warehouses generally receive more truck visits than larger warehouses. This is because the estimated number of truck trips are calculated with floor area and the applicable truck trip rate for a specific warehouse size category.²

Staff then compared these truck trip rates to the rates estimated by the South Coast Air Quality Management District (SCAQMD) when they developed their warehouse Rule 2305. The SCAQMD rates range from 0.12 to 0.75 trucks per 1,000 sq ft. All the estimated truck trip rates derived in this analysis are less than 1.0 trips per 1,000 sq ft for each warehouse size category. This is significant because the trip rates derived from the District's analysis using San Diego County-specific traffic data are within the range of the trip rates developed by the SCAQMD and other references. Taken together with other considerations, staff determined that it was reasonable and appropriate to use the truck trip rates calculated using the methodology explained in this Supplement (Section 2.3) to estimate baseline emissions from warehousing activities in the San Diego region.

Air Quality and Health Benefits

Using the estimated truck trip rates listed in the table above, SANDAG Vehicle Miles Traveled data, building floor area, and composite truck emission factors developed using data from the

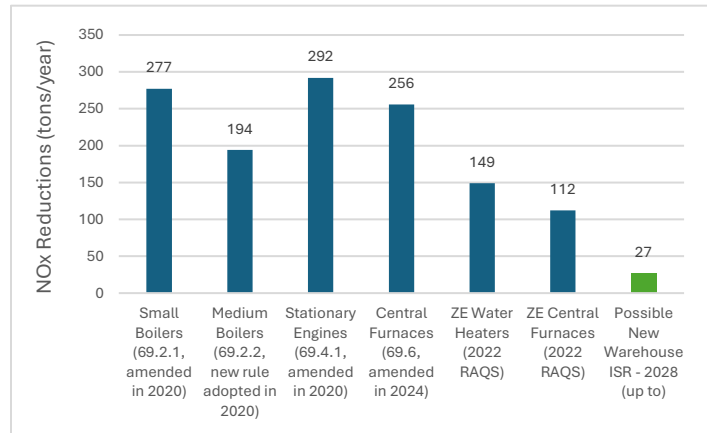
¹ Preliminary estimates subject to change.

² See Table 6, Section 2.3.6 – Truck Trip Rate Analysis Results.

California Air Resources Board (CARB), staff estimated baseline emissions for nitrogen oxide (NOx) and particulate matter (PM2.5) for the baseline year scenarios of 2028 and 2032. These years reflect the anticipated implementation start date if a proposed ISR would be first implemented (2028), and when all subject facilities would be fully phased in (2032). To account for CARB mobile source regulations already in effect, staff incorporated scaling factors from CARB. Baseline emissions from warehouses in San Diego County subject to a possible ISR are estimated to be 17 - 36 tons per year of NOx, and 0.3 - 0.7 tons per year of PM2.5, depending on the applicability threshold used.³

Staff also conservatively calculated the possible emission reductions a warehouse ISR may achieve if developed for San Diego County. In line with Governing Board direction, staff evaluated applicability thresholds for two size ranges: warehouses with floor area of 100,000 sq. ft. or more, and warehouses with floor area of 50,000 sq. ft. or more. For each applicability threshold, staff evaluated three best-case emission reductions scenarios, which comprise of: (1) Scenario 1, where all facilities select the Low-NOx truck option to comply; (2) Scenario 2, where all facilities select the ZEV truck option to comply; and (3) Scenario 3, where facilities select a combination of options such as Low-NOx trucks, ZEV trucks, or other compliance options (e.g., solar panels, air filters, mitigation fee) that are consistent with how facilities are complying with Rule 2305 in the SCAQMD. Because Scenarios 1 and 2 limit compliance options, which would be critical components to include in a potential warehouse ISR to avoid federal preemption issues, staff evaluated possible emission reductions based on the more “realistic” Scenario 3.

Possible NOx emission reduction estimates compared to those achieved by other regulations recently adopted by the District are included in the graph to the right. Estimated emission reductions from warehouses in San Diego County subject to a potential ISR are between 13 - 27 tons per year of NOx, and 0.1 - 0.3 tons per year of PM2.5, depending on the applicability threshold used (Section 2.4.3). It's important to note that this analysis assumes that all the facilities identified in the various size



categories conduct warehousing activities and would be subject to a potential warehouse ISR. However, a portion of these facilities may likely be conducting non-warehousing activities (e.g., retail, office, or other light commercial use) in buildings classified as warehouses, and thus would not be subject to a potential warehouse ISR. Therefore, the baseline emissions, and consequently emission reductions, are likely to be **less in practice** than the estimated values, and should be considered best-case estimates.

Possible health benefits associated with a potential warehouse ISR, based on the estimated emission reductions presented above, were tabulated using the EPA CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA). Implementation of a potential warehouse ISR could result in avoiding between 25 and 68 health-related incidences

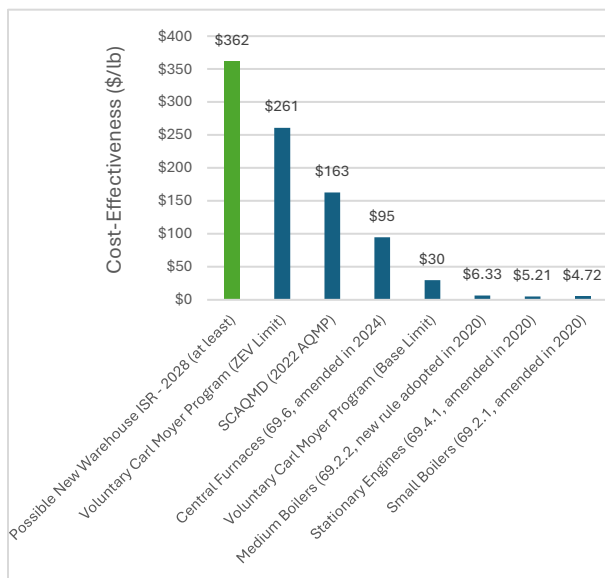
³ Approximately 0.15% of the regionwide NOx emission inventory (23,587 tons/year), and 0.01% of the regionwide PM2.5 emission inventory (7,531 tons/year), per CARB CEPAM2019v1.04.

per year, and a potential savings of \$313k to \$1.1 million per year in associated healthcare costs, depending on the applicability threshold used and baseline year evaluated (Section 2.4.4).

Compliance Costs and Cost-Effectiveness

Total annual compliance costs were derived from SCAQMD information on average costs and WAIRE menu items implemented to comply with their Rule 2305. Average annual compliance costs that would be incurred by each local warehouse subject to a possible ISR are estimated to be between \$29,000 and \$49,000 per year.

State law requires air districts to evaluate cost-effectiveness of proposed rules, which is typically expressed in terms of total compliance costs (dollars) per units of emissions reduced (tons or pounds). Cost-effectiveness values were estimated using the total annual compliance costs and the estimated emission reductions listed above. Preliminary cost-effectiveness estimates for a



potential warehouse ISR in San Diego County currently range between \$362 to \$464/lb of NOx reduced in 2028. The cost-effectiveness values are estimated to increase to a range between \$485 and \$622/lb in 2032 as NOx emission reductions are anticipated to decrease each year due to increasing emission benefits from various CARB mobile source regulations. The estimated cost-effectiveness for a possible ISR now far exceeds the cost-effectiveness values estimated for recent District rulemakings, as well as for incentive-based projects within the Carl Moyer program, which are generally recognized as some of the highest cost-effectiveness values for achieving emission reductions (Section 2.5).

District Costs for Rule Development and Administration

Staff re-evaluated potential costs associated with Rule Development, implementation, and administration of a possible warehouse ISR in San Diego County, including ongoing rule administration, outreach, possible litigation defense, and enforcement activities (Section 2.6). Such costs include the items listed below, which are subject to revision during a possible future rulemaking process. While “direct” costs associated with implementation of the program could be recouped through District fees, other “one-time” costs would likely not be recoupable.

- Approximately \$250,000 (one-time) to prepare required CEQA documentation.
- Approximately \$250,000 (one-time) to prepare required socioeconomic impact assessment documentation.
- Up to \$900,000 per year (ongoing) for additional staff to administer the program (e.g., report evaluation, compliance, outreach activities).
- Approximately \$200,000 (one-time) to develop a new District web portal.
- Approximately \$25,000 per year (ongoing) to annually maintain the District web portal.

- Approximately \$135,000 (one-time) for District/County legal costs to defend a possible ISR if litigated.
- Unknown outside legal counsel costs if a possible ISR is litigated (if necessary).
- Approximately \$75,000 per year (ongoing) for enhanced enforcement-related actions (if necessary).

Staff believes ongoing staff costs associated with the direct implementation of the program (e.g., costs associated with reviewing, evaluating, and enforcing standard rule provisions) could be recouped by District fees. However, costs associated with CEQA document development, socioeconomic impact assessment development, web portal development, internal/external legal counsel, and enhanced enforcement activities may not be recouped through fees alone, though legal judgements and enforcement agreements could potentially recoup some costs incurred.

Additional Considerations

Since the ISR Framework was prepared, several additional considerations in relation to a possible warehouse ISR in San Diego County have developed (Section 2.7). They include the following:

- **Litigation involving SCAQMD Rule 2305** – Courts granted summary judgement to the SCAQMD and denied plaintiffs’ claims. To date, no other appeals have been filed.
- **EPA approval of Rule 2305** – While the EPA approved the rule as a measure strengthening the State Implementation Plan (SIP), full approval was not granted due to specific deficiencies. Thus, the EPA cannot assign emission credit in the SIP until such deficiencies are resolved.
- **WAIRE Program Implementation Update** – In October 2024, SCAQMD released results of the 2nd year of Rule 2305 implementation. Highlights include: warehouses are earning more WAIRE points than required; the WAIRE Program is reducing emissions and facilitating new actions/business models to support zero-emissions technologies; significant staff efforts required for program implementation; most common compliance options utilized are ZE hostlers and near-zero emission truck visits; and significant outreach and compliance/enforcement activities have been required.
- **CARB Mobile Source Regulations** – CARB has adopted many mobile source regulations, and three in particular (Advanced Clean Trucks, Advanced Clean Fleets, and a possible future ZE Truck Measure) could all reduce emissions at indirect sources such as warehouses if implemented.⁴ The Supplement provides information and updates as to the status of these three regulatory actions.
- **Assembly Bill (AB) 98** – In September 2024, AB 98 was enacted in California to apply to new and expanded warehouses that are proposed for any floor size, though more requirements apply to proposed facilities over 250,000 sq. ft. in size. Such requirements include but are not limited to: (1) requiring minimum standards to minimize impacts to sensitive receptors, and (2) prohibiting local agencies from approving such facilities

⁴ By letter dated January 13, 2025, CARB withdrew their request for a waiver from the EPA for the Advanced Clean Fleets Regulation. <https://www.epa.gov/system/files/documents/2025-01/ca-acf-carb-withdrawal-ltr-2025-1-13.pdf>

without such standards incorporated. While existing warehouses may not be directly impacted, its impact on the warehouse industry statewide is still unclear.

- **District Study of Warehouse facilities in Portside community** – In December 2024, staff conducted an informal case study of warehouses in the Portside Community located in the vicinity of a specific sensitive receptor. In all, staff researched 70 buildings classified in the CoStar inventory as a “warehouse” to better determine how many facilities may be conducting goods-movement related activities that may be subject to a possible warehouse ISR. The findings concluded that: (1) many facilities did not appear to be doing prototypical goods-movement activities, (2) uncertainty whether smaller facilities would have adequate pathways to comply with a possible ISR similar in scope to SCAQMD Rule 2305, and (3) 14% of the 70 facilities researched may likely be conducting goods-movement related activities. If these results are extrapolated for the warehouse inventory countywide, then the possible ISR emission reduction estimates presented above may very likely be a best-case scenario.

Staff’s Conclusions

Over the past 2 years, in response to Governing Board direction, staff has prepared the ISR Framework, convened a multi-stakeholder working group (WWG), and prepared this Supplement, among other activities. This work included development of a truck trip rate analysis specific to the San Diego region (Section 2.3), baseline emissions, potential emission reductions and public health benefits (Section 2.4), and cost-effectiveness values (Section 2.5). Together, these estimates help inform the District’s evaluation of a potential warehouse ISR, the impacts for AB 617 communities and countywide, as well as challenges with implementation (EHC Comment Letter). Staff believes the Governing Board’s consideration and acceptance of this Supplement, together with the initial ISR Framework and WWG meeting series, will fulfill the requirement set forth by AB 423 to consider an ISR for warehouse and distribution centers.

In line with commitments made with the WWG, this Supplement will be released for public comment for 30 days. Following this public comment period, the District intends to present its findings to the Governing Board, including any feedback received from stakeholders during the public comment period.