

5.A. Environmental Impacts

California's freight network is a vital engine for the State's economy. California's supply chain network also provides significant benefits to the nation with goods moving through California gateways to each Congressional District in the country¹. California's deep-water ports serve a substantial share of all marine cargo deliveries to the United States (U.S.), which are transferred and distributed through California to the rest of the nation. California airports are also major air cargo destinations for the country. The freeway and railway networks serve substantial shares of freight entering the southern and northern borders of the U.S., as well as marine ports and airports. The preeminence of California's ports of entry, and proximity to supply chains from the Pacific Rim, ensure that the State enjoys disproportionate economic benefits from trade into, and out of the U.S. compared with other states.

Although California's robust freight sector provide significant benefits to communities, regions, and the State, it also negatively contributes to environmental impacts, primarily in the form of emissions and noise. Similar to large, heavy-duty vehicles (trucks, trains, and cargo handling equipment), smaller equipment (individual refrigeration units on truck trailers, forklifts, and onboard ship equipment) traditionally use diesel fuel. The emissions generated by diesel fuel consumption include diesel particulate matter (DPM), other particulate matter (PM), nitrogen oxides (NOx), sulfur oxides (SOx), and other air pollutants which can cause health and environmental challenges. Reduction of non-exhaust particulate matter such as brake, tire, and road wear and road dust may become a more crucial factor in emission reduction efforts². The reduction of emissions from the freight sector, including but not limited to, greenhouse gases, toxins, and criteria pollutants, are needed to meet state mandates, federal air quality standards, and to reduce community health risks.

Freight Affected Communities

Community impacts from the freight industry, such as emissions and noise, have been longstanding issues. Emissions are the primary freight-related impact of concern for communities near freight facilities due to the potential for significant negative health impacts.

The freight industry is widely distributed within California along and near truck and rail corridors, rail yards, warehouse districts, sea and airports, intermodal transfer facilities, agricultural processing plants, and industrial and manufacturing facilities. While negative impacts of the freight affect all residents, children, the elderly, pregnant women, and those in poor health are particularly impacted. Communities in close proximity to freeway and railroad facilities disproportionately experience the harmful health effects.

or a statewide approach to understanding how and the extent of these impacts, a combination of CalEnviroScreen evaluations of disadvantaged communities and air basin data was used since location specific data for freight related networks and facilities are not consistently available throughout the state.

Disadvantaged Communities

Disadvantaged communities refer to the areas throughout California which disproportionately experience hardships relating to economic, health, and environmental equity. These areas have high poverty rates, high unemployment, suffer from air and water pollution as well as the presence of hazardous wastes, and the high rates of asthma and heart disease. Programs funded through proceeds from the State’s Greenhouse Gas Reduction Fund (GGRF), use the definition of disadvantaged communities defined by the California Environmental Protection Agency (CalEPA) in accordance with SB 535³ (De Leon Chapter 830, Statutes of 2012). CalEPA uses the CalEnviroScreen tool to assess areas that are disproportionately affected by multiple types of pollution and areas with vulnerable populations. CalEnviroScreen includes numerous indicators in two broad categories – “burden of pollution,” which includes exposures and environmental effects, and “population characteristics,” which includes sensitive populations and socioeconomic factors. Additional information regarding CalEnviroScreen for all census tracts, including those defined as SB 535 disadvantaged communities, can be found on the CalEPA website.

The CalEnviroScreen formula calculates a score based on the pollution burden and population characteristics. The Census Tracts in the top 25 percent of the CalEnviroScreen score are considered disadvantaged (**Table 5A.1**). CalEnviroScreen includes pollution and environmental effects that are less directly associated with freight and logistics including the following:

- Exposures
 - Pesticide Use
 - Drinking Water Contaminants
- Environmental Effects
 - Groundwater Threats
 - Cleanup Sites
 - Impaired Bodies of Water

To determine the disadvantaged communities with the highest rate of exposure to freight-related emissions, the top 25 percent of tracts were evaluated to determine how many are located within California air basins that are considered nonattainment areas and do not conform to State air quality standards for pollutants that have a known negative impact on human health. These pollutants include particulates (PM_{2.5} and PM₁₀), carbon monoxide, NO_x, and SO_x. Because the transportation sector, inclusive of freight, is the primary emitter within these air basins, many of the disadvantaged communities within these air basins are affected by freight. As of June 2017, all California air basins are in attainment for carbon monoxide, NO_x, SO_x. However, many air basins are in nonattainment for ozone and particulate emissions. Nanoparticles (< PM_{2.5} or ultrafine) have been linked to lung damage and disease. **Table 5A.2**

provides a list of air basins that are in nonattainment for particulate emissions (PM2.5 and PM10).⁴

Table 5A.1. CalEnviroScreen Top 25 Percent Disadvantaged Census Tracts by Air Basin

Air Basin	Number of Census Tracts
South Coast	1,326
San Joaquin Valley	410
San Francisco Bay Area	106
Sacramento Valley	54*
San Diego	37
Salton Sea	23
Mojave Desert	14
South Central Coast	8
North Central Coast	5
Total	1,983
Source: California Office of Environmental Health Hazard Assessment	
*Sacramento Valley's attainment is mixed, meaning at least some of the counties within it are in nonattainment.	

The majority of California's air basins are in nonattainment for PM2.5 and PM10, both of which are generated in large quantities by the freight industry. All of the CalEnviroScreen top 25 percent disadvantaged Census Tracts are located within a nonattainment air basin, and therefore are likely to experience some level of freight-related pollution burden.⁵

The following five counties have the largest share of top 25 percent disadvantaged Census Tracts based on CalEnviroScreen:

- Los Angeles (51 percent of Tracts)
- San Bernardino (8 percent of Tracts)
- Fresno (6 percent of Tracts)
- Riverside (5 percent of Tracts)
- San Joaquin (4 percent of Tracts)

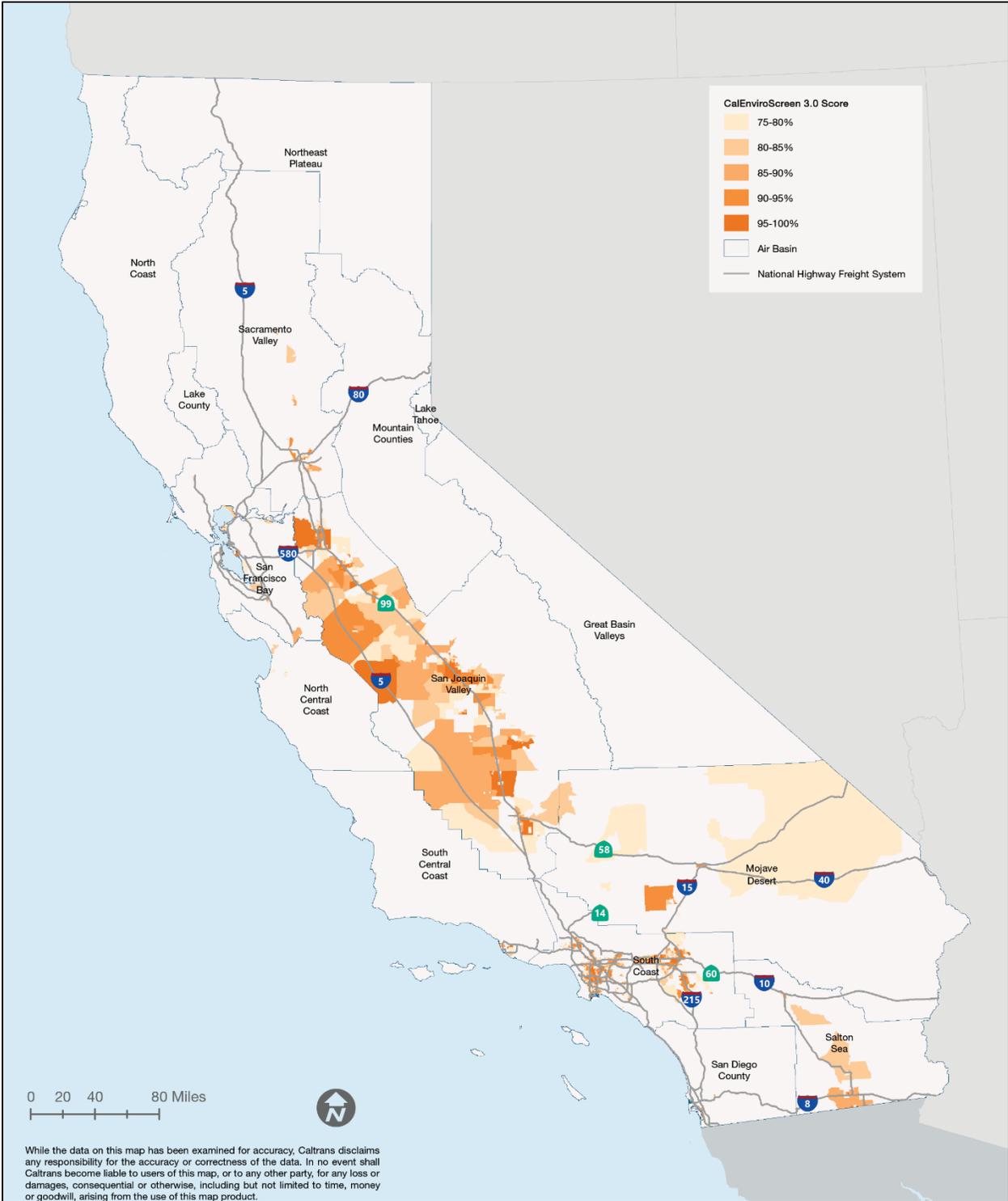
These disadvantaged communities are affected by emissions from the transportation sector, inclusive of the freight network. These communities tend to have a greater share of households living in poverty, greater unemployment, lower educational attainment, more linguistic isolation, and more housing burdened than other communities in the state.

Table 5A.2. California Particulate Emissions Nonattainment by Air Basin

Air Basin	PM2.5	PM10
North Coast	✓	≠
San Francisco Bay Area	✗	✗
North Central Coast	✗	✗
South Central Coast	✗	✗
South Coast	✗	✗
Northeast Plateau	✓	≠
Sacramento Valley	≠	✗
San Joaquin Valley	✗	✗
Great Basin Valleys	✗	✗
Mojave Desert	✗	✗
San Diego	✗	✗
Mountain Counties	✗	✗
Lake County	✓	✓
Lake Tahoe	✗	✗
Salton Sea	✗	✗
Source: Air Quality and Land Use Handbook, California Air Resources Board (2005)		

✓	Attainment
≠	Mixed (attainment is not uniform for all counties in the basin)
✗	Non-attainment

Figure 5A.1. CalEnviroScreen Top 25 Percent Disadvantaged Census Tracts by Air Basin



Source: California Office of Environmental Health Hazard Assessment, CalEnviroScreen 3.0, 2017

Emissions

California has implemented legislation to reduce greenhouse gas emissions (GHG), including AB 32⁶ and SB 350.⁷ AB 32 established GHG emissions reduction target of 15 percent below 1990 levels by 2020. SB 350, SB 32⁸ and Executive Order (EO) B-30-15⁹ furthered the GHG reduction goal by setting a new target of 40 percent below 1990 levels by 2030.

In addition, EO N-19-19¹⁰ leverages California’s pension investments, transportation systems and purchasing power to strengthen and advance the State’s climate leadership and resiliency, with the objective to reduce GHG emissions and mitigate the effects of climate change. Two important bills were also signed into law to strengthen emission standards for trucks, semis and other high-pollution vehicles. The first bill, SB 210 by Senator Connie Leyva (D-Chino) requires CARB to develop and implement a Heavy-Duty Inspection and Maintenance Program for non-gasoline, heavy-duty trucks.¹¹ This will be the first ‘smog check’ program of its kind in the nation. The second bill, SB 44 by Senator Nancy Skinner (D-Berkeley) requires CARB to create a comprehensive plan for reducing GHG emissions from medium and heavy-duty vehicles.¹²

In addition to the statewide targets, many regional air quality districts and local agencies have their own GHG emissions thresholds for environmental review, as well as, GHG emissions targets. For the purposes of the CFMP, this section focuses only on the State targets¹³ and specifically, on reducing carbon emitted from fossil fuels, as well as renewable natural gas. CARB strategies focus on electricity and hydrogen as the future energy sources for transportation. The California Sustainable Freight Action Plan (CSFAP) indicates two targets to help achieve the GHG emissions reductions as summarized in **Table 5A.3**.

Table 5A.3. GHG Emission Reductions Targets

Type	Description	Target/Metrics	Target Date
System Efficiency	Improve freight efficiency relative to goods and services produced (NAICS 48-49)	25% efficiency gain Speed, reliability, delay reductions, etc. GDP/CO2	2030
Transition to Zero-Emission (ZE) Vehicles	Deploy ZE freight vehicles and equipment capable of ZE operations	100,000 pieces of ZE equipment	2030

Source: California Sustainable Freight Action Plan (2016)

Air Quality

Oxides of nitrogen (NOx) are a group of gases that, with prolonged exposure, can cause respiratory illnesses, such as asthma, and worsen existing health conditions. Mobile sources have been found to be the largest emitters of NOx, and medium- and heavy-duty vehicles are responsible for 35% of all NOx emissions.¹⁴ Diesel exhaust from ships, trains, trucks, and cargo handling equipment contain particulates, sulfur dioxide, carbon monoxide, hydrocarbons, and various air toxics. DPM has been identified to increase risk of lung cancer and respiratory disease in exposed populations, DPM levels vary regionally due to the non-uniform distribution of sources throughout the state and in aggregate, and DPM contributes about eight percent of PM2.5 in California ambient air. Higher concentrations of diesel emissions occur in and around ports, rail yards, warehouses, and high-volume roadways when located near densely populated urban areas, these urban areas experience greater health consequences. Diesel exhaust also contributes to environmental degradation in the form of haze and reduced visibility in outdoor areas. This is particularly an issue in the San Joaquin Valley and Southern California regions, where particles and gases from diesel emissions absorb and scatter sunlight. Furthermore, a primary component of DPM, black carbon, is the second largest contributor to climate change.

Particulate Matter causes the majority of health problems in persons living in areas with poor air quality. These communities experience higher rates of asthma, cardio-vascular problems, and other ailments.

Noise and Vibration

Freight operations rely on multiple modes of transportation and a variety of cargo handling equipment (CHE) at seaports, airports, intermodal rail yards, warehouses, distribution centers, etc. These activities often generate noise and vibrations from diesel engines of trucks, CHE and locomotives, loading and unloading containers, coupling and de-coupling rail cars, etc. Both at the federal level and at the state level, noise and vibration impacts are identified during the project development process and mitigated to the extent possible. Under the National Environmental Policy Act (NEPA), the Federal Transit Administration established the guidelines for assessing noise for rail, Federal Aviation Administration for air, and Federal Highway Administration for roadway activities. In addition to NEPA, major airports and seaports in California have established thresholds of significance pursuant to the California Environmental Quality Act (CEQA) aimed at minimizing community impacts.

The true impacts of noise vary, but the latest research shows that long-term impacts of noise can alter how the brain processes speech and increases difficulty in distinguishing speech sounds. In young children, this can impair cognitive development. Excessive noise can also create stress and reduce sleep resulting in hypertension, ischemic heart disease, and psychological disorders. Noise has also been linked to birth defects resulting from vasoconstriction in the mother that reduces oxygen and nutrition to the fetus. This research notes differences in intermittent noise and constant noise, low tones and high tones, as well as the times of day that noise occurs. Some freight-related noise impacts are intermittent, such as

blowing train horns at at-grade rail/road crossings, coupling/de-coupling rail cars in rail yards located near residential neighborhoods, and loading and unloading trucks at warehouses near residential neighborhoods.

These impacts can be reduced or mitigated by creating adequate separation between land uses when developing new communities, limiting hours of operations for existing freight facilities located near residential areas, and constructing grade separations to minimize the sounds of train horns.

Analytical Approach

This analysis is based on readily available data to allow for the ongoing monitoring of economic and environmental sustainability of the freight network and its effects on California communities. To understand the benefits and impacts geographically, three metrics have been calculated and mapped.

Metrix 1 - Freight-Related Job Distribution

Data from the U.S. Census Bureau's County Business Patterns data for the following sectors are summarized by county and broken into sectors using North American Industry Classification System (NAICS) codes.¹⁵ While the data captures most of the freight sector jobs and mostly excludes other non-freight industries, there is not a one-to-one correlation between NAICS sectors and freight-related jobs. The sectors used for this analysis that directly or indirectly use the freight network included the following (job data obtained for 2010 and 2015):

- Primary: NAICS Sectors 11 [Agriculture], 21 [Mining, Oil & Gas Extraction], 23 [Construction], 31-33 [Manufacturing], 44-45 [Retail Trade]
- Wholesale Trade: NAICS Sector 42
- Transportation & Utilities: NAICS Sectors 22 [Utilities], 48-49 [Transportation & Warehousing]

Metrix 2 - Tons of Freight Related Emissions Per Day

Freight emissions data were obtained from CARB estimated annual average emissions estimates for stationary and mobile sources and are summarized by county. The following pollution source categories were selected, as they are either directly related to transportation or rely heavily on the freight network, which makes up a disproportionately large share of the total pollutant emissions from the transportation sector as a whole:

- Industrial Processes
 - Chemical
 - Electronics
 - Food and Agriculture
 - Glass and Related Product
 - Metal
 - Other Industrial
 - Wood and Paper
- On-Road Trucks

- Light-Duty Trucks
- Medium-Duty Trucks
- Heavy-Duty Trucks

Emissions data were obtained for 2010 and 2015 and projected for 2035.

Metrix 3 - Freight-Related Emissions per Freight-Related Jobs

Freight emissions per freight jobs were calculated by dividing tons of freight-related emissions per day by the number of freight related jobs in a county for 2010 and 2015. This metric links the economic benefit of freight (jobs) to the negative externalities (emissions) to investigate how benefits and externalities are distributed throughout the state.

Freight-Related Job Distribution

Most (81 percent) freight and logistics-related jobs in California are located within counties that are in nonattainment for PM_{2.5} and have a substantial portion of the CalEnviroScreen disadvantaged communities. As part of the South Coast Air Basin, Los Angeles County contains 51 percent of the top 25 percent disadvantaged Census Tracts and more than a quarter of all freight related jobs in California – a greater portion than any other county. Given that the South Coast Air Basin is in nonattainment for PM_{2.5} and PM₁₀, residents of Los Angeles County are likely exposed to a considerable amount of freight-related pollution.

Figure 5A.2 illustrates the distribution of freight jobs by county for 2010, 2015, and the net change between the two years. The greatest freight employment concentration in 2015 was found in 11 counties that had 100,000 or more freight-related jobs. Much of the growth in freight-related jobs from 2010 to 2015 occurred outside of the top 11 counties, except for San Mateo County, which experienced a 40 percent increase in freight-related jobs over that period. Five counties that were not in the top 11 in 2015 experienced between 45 percent and 60 percent growth in freight employment from 2010 to 2015. Of those counties, only Madera County is currently in nonattainment for PM_{2.5} and PM₁₀.

Tons of Freight Related Emissions Per Day

Freight-related emissions are mapped by county for 2010, 2015, and the net change between the years in **Figure 5A.3**. The counties with the largest share of freight-related emissions are also those in nonattainment areas with larger shares of CalEnviroScreen disadvantaged communities. Los Angeles County has the highest freight-related emissions of any county in California. Unfortunately, geography and a pervasive inversion layer that traps ozone in California's valleys creates the perfect environment for the formation of smog. Given these conditions, achieving complete attainment conditions requires extensive and continuous effort.

Freight-Related Emissions per Freight-Related Job

Pollution burden per freight job is another indicator of the balance between the benefits (jobs) of freight and logistics, and the negative impacts (emissions). Freight jobs are more likely to

create negative impact in non-attainment areas than other places. However, it is possible to gain economic benefit from freight jobs without impacting communities. For example, a majority of the San Joaquin Valley is in PM and Ozone nonattainment areas. Although, the number of freight jobs within the region have been increasing, causing the reduction of emissions per freight job between 2010 and 2015, larger efforts are still needed to substantially decrease emissions from the freight sector including greater transition to cleaner and more efficient infrastructure and equipment.

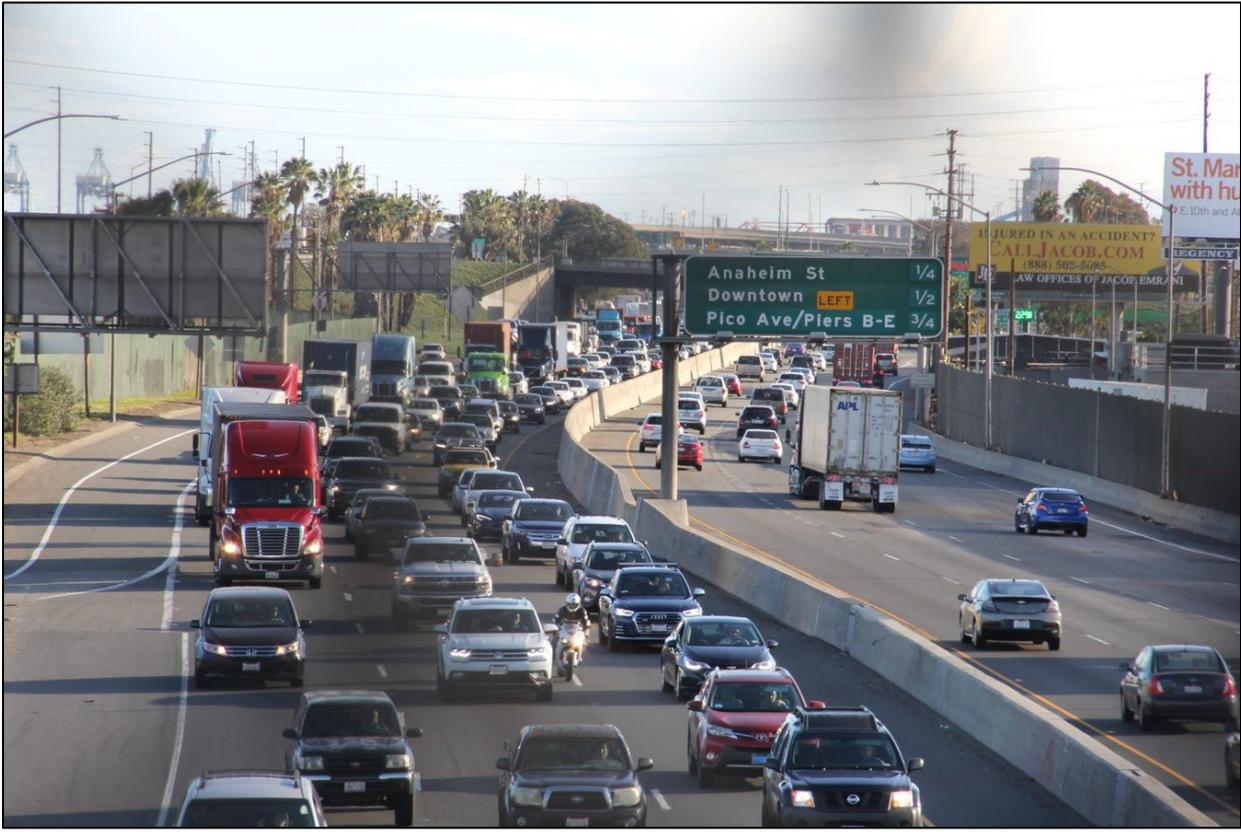
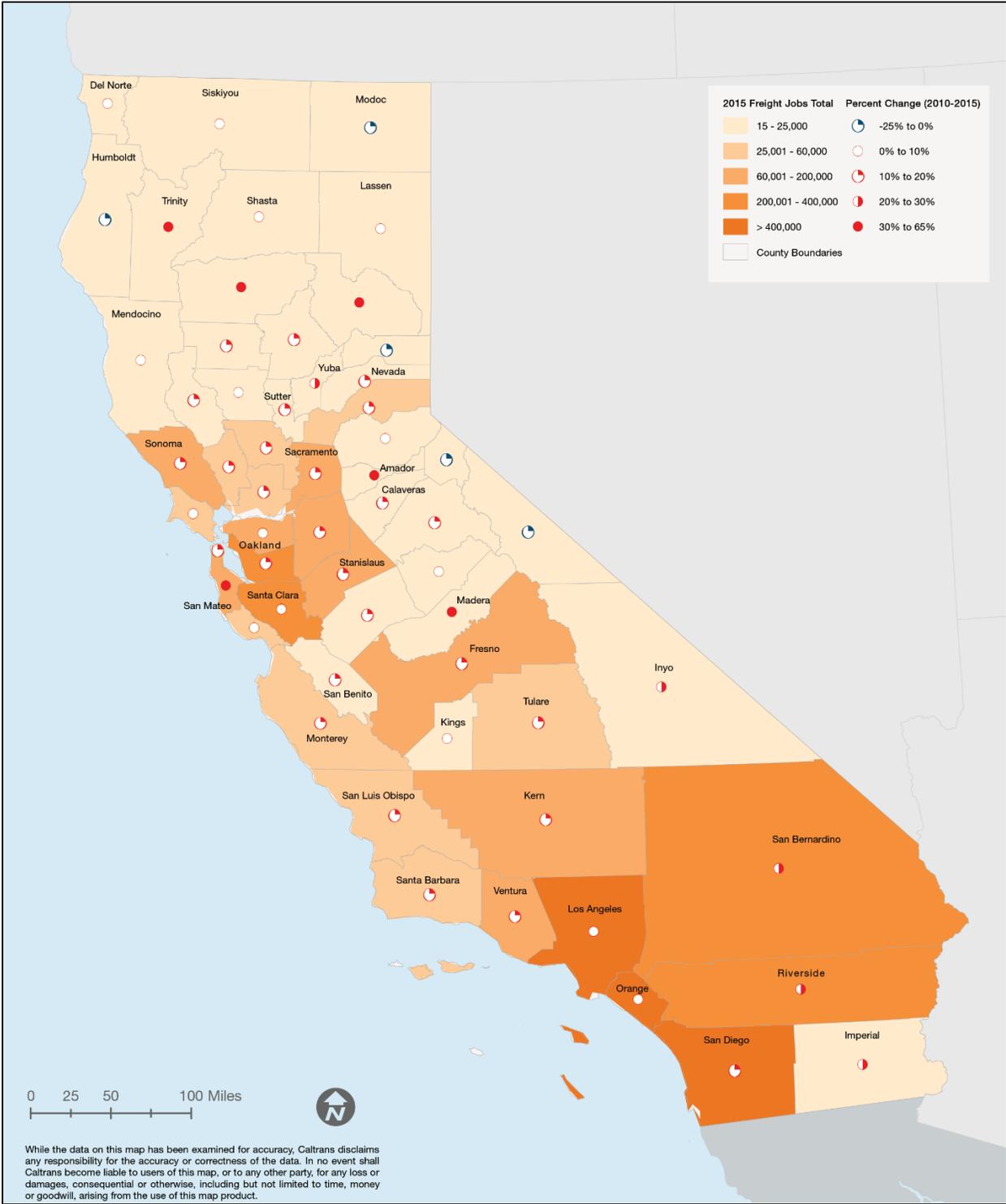


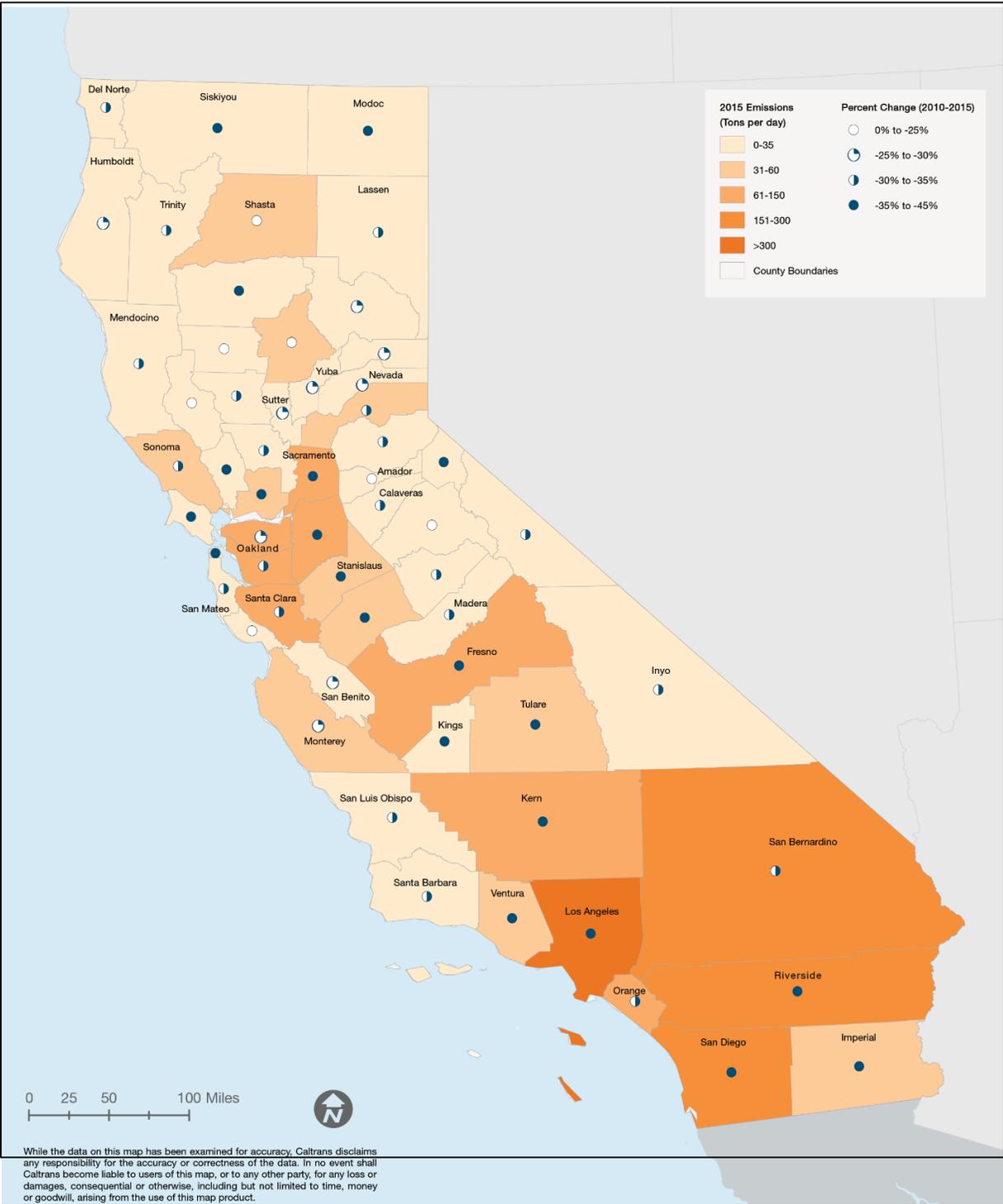
Image: 710 Freeway, Los Angeles, California

Figure 5A.2. Distribution of Freight Jobs by County, 2010-2015



Source: Census Data, 2010-2015, California Statewide Freight Forecasting model data base, Fehr and Peers

Figure 5A.3. Freight-Related Emissions by County, 2010-2015



Source: California Air Resource Board, EMFAC 2017, Analysis and summaries by Fehr & Peers

Ongoing Progress for a Healthier California

CARB, various State, and regional agencies, in collaboration with freight partners and stakeholders, continue to implement broad air quality improvement programs through a combination of regulations, incentives, and policies designed to support the transformation of the freight system and reduce community impacts from freight operations in California. These ongoing freight sustainability initiatives focus on emissions reductions through a program of data collection, emissions monitoring, technology advancement, and technology replacement. The following describes some ongoing freight initiatives and key progress.

Cap and Trade Program

CARB oversees the California Cap and Trade program, a system designed to reduce the amount of GHG emissions that are released into the atmosphere by corporate operations (the “cap”). The “trade” part of the system allows companies to buy and sell their emissions allowances, which incentivizes companies to decrease emissions where possible and to sell the extra credits. Each year, the emissions cap is split into allowances that CARB distributes (one allowance equals to one ton of emissions) to companies for free or by auction. The cap total declines every year, which gives an incentive for companies to find ways to continue to decrease its emission totals.¹⁶

Since 2017, CARB has used Cap and Trade dollars to implement over \$3 billion worth of projects spanning 60 programs. The programs vary from, focusing on the reduction of climate pollution, building affordable housing, to protecting communities from wildfires. Currently, over 60 percent of all investments fund projects that help low-income and communities disproportionately burdened by pollution.

CARB Community Air Protection Program

In 2018, in support of AB 617 (Assembly Bill 617) (C. Garcia, Chapter 136, Statutes of 2017), CARB created the Community Air Protection Program (CAPP) focused on reducing emissions exposure in communities.¹⁷ The program intends to collect emissions data in these communities for statewide planning initiatives. **Table 5A.4** shows the milestones listed on the program’s webpage.¹⁸

Table 5A.4. AB 617 Summary of Milestones

Summary of Milestones	
July 2017	AB 617 signed by Governor Edmund G Brown Jr.
By Late 2018	Air districts form community steering committees for first year communities and begin to develop the community emissions reduction programs.
By January 2019	Air districts develop expedited schedules for implementing best available retrofit control technology, which must be implemented by the end of 2023.
By July 2019	Air districts deploy monitoring in first-year communities selected for community air monitoring systems.
By September 2019	Air districts adopt programs in the first-year communities selected for community emissions reduction programs.
October 2019	Adoption of the West Oakland Community Action Plan ¹⁹
By December 2019 & annually thereafter	The California Air Resources Board selects additional communities for air monitoring and community emissions reduction programs. The Board considers air districts community emissions reduction programs.
By October 2020	Air districts provide annual reports for first-year communities selected for community emissions reduction programs.
By January 2021 & annually thereafter	Within one year after the selection of additional communities, air districts adopt community emissions reduction programs.
By September 2023	The California Air Resources Board updates the Statewide Strategy, which is required to be updated once every five-years.
Source: CARB Community Air Protection Program	

CAPP's focus is to reduce exposure in communities most impacted by air pollution, including community air monitoring and community emissions reduction programs. There is appropriated incentive funding to deploy cleaner technologies in these communities, as well as grants to support community participation in the AB 617 process. AB 617 also includes new requirements for accelerated retrofit of pollution controls on industrial sources, increased penalty fees, and greater transparency and availability of air quality and emissions data, which will help advance air pollution control efforts throughout the state.²⁰ CARB intends to use this information in its planning decisions. The freight regulatory program proposed by CARB aims to address emissions generated by freight-related operations throughout the state through a series of local and state programs that include indirect source rules as an element.²¹ In 2018, CARB began moving forward with a plan to transition cargo handling equipment at facilities in impacted areas to ZE. CARB recently awarded \$110 million to help industry convert CHE to ZE equipment. CARB's path forward for freight presented in March 2018 lists four strategies to protect communities near freight facilities:

- Tighten CARB rules and add facility infrastructure and compliance requirements
- Pursue stricter federal and international standards
- Support district facility-based measures and port initiatives

- Coordinate and expand incentives for freight transition to ZE operations

The most significant implementation challenge of an indirect source rule that includes thousands of privately-owned industrial warehousing facilities, will be regulation enforcement throughout the state, including ways to regulate out-of-state trucks and trucks registered in Mexico and/or Canada. While California has one of the strictest air quality frameworks, the U.S. EPA is also considering regulations that would prevent individual states from mandating emission standards that are more stringent than the federal emissions standards.

CARB Air Quality and Land Use Handbook

The connection between location and exposure impacts prompted CARB to develop recommendations for locating new sensitive land uses in its Air Quality and Land Use Handbook. This handbook includes recommendations for minimum distances of sensitive land uses – such as residences, schools, day care centers, playgrounds, and medical facilities – from highways and high-traffic roads, distribution centers, rail yards, and port facilities. Based on pollution exposure risk, the handbook defines minimum distance recommendations for sensitive land use categories for the following freight related emissions sources.

To define freight-related communities, the handbook siting recommendations can be used to define buffer distances from known freight-related emissions sources to determine the size and characteristics of the communities located within the buffer area. This analysis can be used to evaluate the communities that experience the most direct impact of freight. Development and transportation projects can be weighed against the economic opportunities provided.

San Pedro Bay Ports Clean Air Action Plan

The San Pedro Bay Ports, comprised of both Ports of Long Beach (POLB) and Los Angeles (POLA), developed a Clean Air Action Plan (CAAP) which initiated a menu of strategies to reduce emissions generated by port activities. One of those strategies is an emissions reduction of select criteria pollutants. The CAAP set 2023 as the target year in which DPM, NO_x, and SO_x should fall compared to 2005 levels. Every year since 2006, the two ports have prepared an emissions inventory to monitor and measure annual progress towards the CAAP 2023 goals. **Table 5A.5** summarizes the total reduction for each type of emissions and illustrates positive progress the ports are making to meeting the 2023 targets.

Table 5A.5. San Pedro Bay Ports Emissions Reductions Compared to 2023 Goal

Criteria Pollutant	2023 Goal	POLA (2017)	POLB (2018)
DPM	77%	87%	87%
NO _x	59%	60%	56%
SO _x	93%	98%	97%

Source: Port of Los Angeles 2017 Air Quality Report Card and Port of Long Beach 2018 Air Emissions Inventory

San Pedro Bay Ports Technology Advancement Program (TAP)

The TAP, founded by POLB and POLA, in collaboration with SCAG, Metro, SCAQMD, and CARB, has provided support to original equipment manufacturers (OEM) for more than a decade. TAP has led to the deployment of cleaner equipment by providing funding, research, and testing support for over 30 projects spanning test cycle development, hybrid and alternative fuel technology demonstrations, and ZE equipment operation. Through these initiatives, major OEMs have invested in, and developed commercially available clean equipment, such as electric, hybrid, hydrogen and natural gas trucks, and CHE.

POLB Community Grants Program

The POLB Community Grants program, an unprecedented effort to lessen freight effects on local communities, began in 2009 with an investment of \$17.4 million to fund three different program initiatives: Community Health, Facility Improvements, and Community Infrastructure. To date, the community-based grants have funded a variety of community betterments, such as asthma vans providing mobile medical services, tree planting, double-paned windows, and upgrades to heating ventilation

Over the next 12 to 15 years, POLB plans to invest an additional \$46.4 million toward more of these projects that reduce impacts on air quality, traffic, noise, and water quality.

Port of Oakland

The Port of Oakland began collecting data and monitoring emissions generated by a variety of sources in 2005. Pursuant to reducing port-generated emissions, the Port is actively managing three key programs:

- Seaport Air Quality 2020 and Beyond Plan
- Comprehensive Truck Management Plan (CTMP)
- Port of Oakland Shore Power Program

The Seaport Air Quality 2020 and Beyond Plan envisions a zero-emissions operation for the Port of Oakland. Example of projects envisioned in the plan include converting the port's fleet vehicles and equipment to zero-emission, identifying cleaner fuels and renewable power sources, installing electric infrastructure at container terminals, and monitoring fuel consumption, operations, and performance. This is the successor to the Maritime Air Quality Improvement Plan (MAQIP) that was adopted prior to 2010.

Both the CTMP and the Shore to Ship Power program are key elements of the overall Seaport Air Quality and Beyond Plan 2020. These programs address the deep concerns of the community, including minimizing emissions from ocean-going vessels, the removal of trucks from residential areas for air quality reasons, and minimizing noise, improving safety, and mitigating roadway maintenance impacts.

Future Considerations

While California has some of the most vigorous environmental standards in the nation because of its shared values in protecting communities and natural resources, more efforts are needed. Early collaboration between regulators and the target industries can help mitigate the uncertainty regarding the roll-out of zero-emission vehicle guidelines and specific benchmarks for the implementation of sustainable actions. Notice of available funding for zero-emission and low-emission vehicles to private industry should be communicated more vehemently and earlier in the process.

There are marked improvements to California’s environment in part due to enacted regulations and policies. CARB’s Statewide Freight Emission Inventory highlights the State’s air quality improvements which are contributed to the holistic advances in cleaner fuels and technologies that have been regulated by public entities and adopted by private enterprises.²² **Table 5A.6** shows a decline in all emissions types to 2015, but also projects an uptick in emissions by 2035. This upswing points to the need for continued commitment to cleaner energy, new technologies, and public and private dedication and responsibility for California’s environmental health.

Table 5A.6. Freight Emissions Statewide Forecast

Emissions	2000	2005	2010	2015	2020	2025	2030	2035
NOx (tons/day)	1,246.84	1,250.93	870.00	618.98	499.65	433.60	449.60	450.63
PM2.5 (tons/day)	48.17	51.41	28.95	15.75	10.49	8.31	8.62	9.21
SOx (tons/day)	118.45	146.92	15.45	5.65	6.46	7.43	8.55	9.56
GHG (MMT CO2E/Year)	39.41	45.40	37.78	36.85	39.34	39.43	39.90	41.09
Source: CARB Staff Presentation								

Despite the progress, California looks to new regulations to further improve environmental health. There are wide-ranging, upcoming regulations that can further contribute to cleaner air for Californians. These freight-focused regulations include ZE and cleaner combustion requirements across trucking, rail, and maritime freight industries. The following regulations are currently proposed and will not be implemented until the CARB Board votes to approve the measures.

Truck Sales Requirements (Advanced Clean Trucks)

The proposed Advanced Clean Truck Regulation is part of a holistic approach to accelerate a large-scale transition of ZE medium-and heavy-duty vehicles from Class 2B to Class 8. The proposal is subject to change until the CARB Board makes a final decision, expected in 2020. The proposed regulation has two components including a manufacturer sales requirement, and a reporting requirement.

Ships At-Berth

CARB's existing regulation for ships at berth at California ports requires three types of vessel fleets to control emissions during 70 percent of their visits now, rising to 80 percent by 2020. The new regulation under development would capture more vessel visits, more vessel types, and more ports and marine terminals. The additional vessel types include tankers such as oil tankers, and roll-on, roll-off vessels carrying automobiles. The new rule is also designed to hold terminals, ports, and technology providers accountable for doing their part to successfully reduce emissions at berth, in addition to the vessel fleets that are responsible under the existing rule.

Locomotive

Evaluate and potentially develop new regulations to require operators to limit idling of all combustion-powered vehicles and mobile equipment operating at rail yards and other locations, as well as reducing emissions from stationary locomotive operations (e.g., maintenance and testing). The scope could include both freight and passenger rail activities in, and around intermodal, classification, and maintenance rail yards, at seaports, at warehouses, on sidings, at passenger rail stations, and at maintenance and service locations. Compliance options might include operational practices, installation of idle-limiting technology, emission capture and control technology, or other effective techniques. Locomotives with ZE capability could be exempt if operators show that ZE operation is maximized.

Truck Omnibus

This will focus on regulatory concepts to reduce NOx emissions from new on-road heavy-duty vehicles greater than 10,000 pounds gross vehicle weight rating.

Truck Inspection and Maintenance

SB 210 (Levy, 2019) requires the implementation of a pilot program that will develop and demonstrate technology to bring heavy-duty trucks into an inspection and maintenance program. A Heavy-Duty Vehicle Inspection and Maintenance (HD I/M) program would ensure that emissions from heavy-duty vehicles operating in California rarely exceed the NOx and PM emissions levels established by CARB.

Drayage Trucks

A new drayage truck regulation would establish a schedule for phasing in the use of ZE technology. Options to be considered include, but are not limited to, requirements for full ZE technology (e.g., a battery or fuel-cell electric short-haul truck) and ZE mile capability (e.g., a natural gas-electric hybrid that could drive interstate but switch to zero-emission electric mode while operating in impacted communities, potentially via geofencing).

Cargo Handling Equipment

The regulatory amendments would propose an implementation schedule for new equipment and facility infrastructure requirements, with effective dates beginning in 2026. In this potential action, all mobile equipment at ports and rail yards, including but not limited to, diesel, gasoline, natural gas, and propane-fueled equipment, would be subject to new requirements.

Endnotes

- ¹ Port of Long Beach. “About the Port.” *Port of Long Beach*, <http://polb.com/about/default.asp>.
- ² California Air Resources Board. “Brake & Tire Wear Emissions.” *California Air Resources Board*, <https://ww2.arb.ca.gov/resources/documents/brake-tire-wear-emissions>.
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