California Environmental Protection Agency
AIR RESOURCES BOARD

STAFF REPORT: INITIAL STATEMENT OF REASONS FOR PROPOSED RULEMAKING

PROPOSED REGULATION FOR IN-USE ON-ROAD DIESEL VEHICLES

Mobile Source Control Division
Heavy-Duty Diesel In-Use Strategies Branch

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State of California
AIR RESOURCES BOARD

STAFF REPORT: INITIAL STATEMENT OF REASONS FOR PROPOSED RULEMAKING

Public Hearing to Consider

ADOPTION OF THE PROPOSED REGULATION FOR IN-USE ON-ROAD DIESEL VEHICLES

To be considered by the Air Resources Board at a two-day meeting of the Board that will commence December 11, 2008, and may continue to December 12, 2008, at

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AIR RESOURCES BOARD

PROPOSED REGULATION FOR IN-USE ON-ROAD VEHICLES

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A. Proposed Regulation to Reduce Emissions from In-Use Diesel Vehicles

A1. Summary of Proposed Regulation to Reduce Emissions -Use On-road Diesel Vehicle Regulation

B. Proposed Amendments to Existing Regulations

I. OVERVIEW AND STAFF RECOMMENDATION

A. Overview

Staff of the Air Resources Board (ARB or Board) is proposing a regulation that would reduce emissions of diesel particulate matter (PM) and oxides of nitrogen (NOx) from over 400,000 diesel vehicles registered in the State, and another half a million out-of-state trucks that visit California each year. The regulation would achieve these emission reductions by requiring fleet owners to modernize their fleets and install exhaust retrofits. The regulation is projected to achieve significant emission reductions, but at a significant cost to affected fleets.

The scope of the proposed regulation is broad. It would affect about 170,000 California businesses (including over 150,000 small businesses) in most sectors of the State's economy, and almost a million vehicles. Some common industry sectors that operate trucks and buses subject to the regulation include: for-hire transportation, construction, manufacturing, retail and wholesale trade, vehicle leasing and rental, bus lines, and agriculture. Within each of these broad sector categories, there is a wide variety of vehicle types. The potential impact of this regulation on various business sectors depends on the number, type and age of the affected vehicles operated by each sector. A copy of the regulation is provided in Appendix A, and a simplified summary is provided in Appendix A1.

The proposed new regulation would apply to any person, business, school district, school transportation provider, or federal government agency that owns or operates affected vehicles in California. Affected vehicles include heavy-duty diesel-fueled vehicles with a gross vehicle weight rating greater than 14,000 pounds, yard trucks with off-road certified engines and certain diesel-fueled shuttle vehicles regardless of weight. The proposed regulation would be applicable regardless of where the vehicle is registered. However, the proposed regulation would not apply to military tactical support vehicles, authorized emergency vehicles, or private motor homes not used for commercial purposes.

In general, the regulation would require owners to reduce PM and NOx emissions from their fleets by upgrading the vehicles to meet specific performance standards for these pollutants (defined as best available control technology, or BACT). The BACT standard for PM is generally an engine equipped with a diesel particulate filter, and the BACT standard for NOx is an engine newly manufactured in 2010 or later. A fleet may meet these performance requirements by retrofitting a vehicle with a verified diesel emission control strategy (DECS)[1] that will achieve PM or NOx reductions or both as required, replacing an engine with a newer cleaner one, or replacing a vehicle with one having a cleaner engine. This replacement vehicle can be either new or used.

The proposed regulation begins in 2010, and requires the installation of verified PM DECS on certain vehicles depending on their model year. Then, beginning in 2012,

[1] A retrofit device that has been verified under ARB's Verification Procedure, which ensures the effectiveness and durability of diesel engine retrofits.

fleets would need to begin replacing their vehicles with newer used or new vehicles that meet the most stringent 2010 model year engine emission standards. Through this, by the beginning of 2014, nearly all on-road diesel engines operating in California will either have a verified PM DECS installed, or will be engines that came with a diesel particulate filter from the engine manufacturer. Then, between 2012 and 2022, the remaining older vehicles would be need be replaced such that by 2023, all on-road diesel vehicles operating in California would have the cleanest engines available - that is, they would meet the 2010 model year emission standards.

Each year, the proposed regulation provides three options for complying with the performance requirements. First, a fleet could retrofit and replace vehicles in its fleet, according to a prescriptive schedule, based on each vehicle's engine model year. Second, a fleet could meet a limit that sets an annual cap on the number of retrofits to be installed and the minimum number of engines to be replaced that meet the 2010 engine requirements. Third, a fleet could meet a fleet average option, with targets that decline over time. Each fleet has the flexibility to meet any one of these options each year, and is not required to meet the same option for both pollutants. That is, a fleet could met the BACT schedule for PM, but meet the fleet average for NOx, and be fully compliant with the proposed regulation.

The proposed regulation also contains special provisions to address the unique issues facing small fleets. Under staff's proposal, small fleets, those with one to three vehicles, are exempt from any clean up requirements until 2012. Then, in 2013, small fleets would need to show they cleaned up one vehicle to a lesser requirement. That vehicle would then not need to meet the 2010 engine requirement until 2018. In fleets of two or three, additional time is then provided for the second or third vehicle to meet the PM and NOx performance requirements.

Because of the wide variety of fleets and vehicles subject to the proposed regulation, certain special provisions have been included. First, the proposed regulation would exempt certain lower use vehicles from some or all of the clean-up requirements. The proposed regulation would establish requirements to clean up diesel PM emissions from school buses, although it would not require the replacement of any school buses newer than 1977. Also, special provisions would be provided for unique vehicles and certain types of agricultural vehicles. The regulation would provide credits for actions which reduce emissions from these vehicles earlier than required, as well as for the early adoption of hybrid vehicle technology and for the use of alternative fuels. Staff is also proposing to address a number of regulatory issues with two-engine cranes and two-engine street sweepers which are subject to a number of different ARB regulations.

To aid in its enforcement, the proposed regulation would impose certain reporting and recordkeeping requirements. The proposed regulation would also establish requirements for any in-state or out-of-state motor carrier, California-based broker, or any California resident who hires or dispatches vehicles subject to the regulation. Also, California sellers of a vehicle subject to the proposed regulation would have to disclose the regulation's potential applicability to buyers of the vehicles.

The proposed regulation would provide significant diesel PM and NOx emissions reductions that would have a substantial positive air quality impact throughout California. By reducing emissions of pollutants that contribute to elevated ambient levels of PM and ozone, the regulation would help achieve attainment of the federal and state clean air standards for PM and ozone. In 2020, the regulation is expected to reduce diesel PM emissions by 5.2 tons per day and NOx emissions by about 79 tons per day statewide, which represents a 43 percent reduction in diesel PM and a 23 percent reduction in NOx from emission levels that would be anticipated in the absence of the regulation. In addition, the proposed regulation would provide a slightly positive change in emissions of greenhouse gases, and would reduce emissions of black carbon – a component of diesel PM and a likely contributor to global warming.

In addition, the proposed regulation is the critical piece in California's efforts to meet federal clean air standards. In 2007, the State approved its blueprint to attain the federal clean air standard for fine particulate (PM2.5) and ozone. This document, known as the State Implementation Plan or SIP, committed to significant emission reductions from trucks operating throughout the state, in particular in the South Coast and San Joaquin Valley air basins. The proposed regulation would meet or exceed the combined NOx and PM2.5 SIP fleet rule targets in both the South Coast and San Joaquin Valley air basins for all years. In 2014, in the South Coast Air Basin, the SIP target would be met by achieving slightly more PM2.5 reductions and slightly less NOx than expected. The proposed regulation would also help achieve the SIP reduction goals in 2020 for attainment in regions downwind of the South Coast and the San Joaquin Valley air basins.

Also, significant additional health benefits would also be obtained with the reductions of ambient levels of diesel PM. The emission reductions from the regulation are expected to prevent approximately 9,400 premature deaths over the course of the regulation (2,800 to 17,000, 95 percent confidence interval), and would result in about 150,000 fewer asthma-related cases and 950,000 fewer lost work days. The economic valuation of these health benefits is estimated to range from $48 to $68 billion.

The proposed regulation would not quite achieve the overall goal set forth in the 2000 Diesel Risk Reduction Plan (ARB, 2000) of reducing diesel PM by 85 percent from 2000 baseline levels. However, staff projects that the proposed regulation would reduce in-use on-road vehicle diesel PM emissions from the 2000 baseline by 80 percent in 2020. These reductions represent the maximum achievable reductions of diesel PM emissions from in-use on-road heavy-duty diesel vehicles.

While the benefits of the proposed regulation are significant, so are the costs. Staff estimates that the total cost of the proposed regulation is about $5.5 billion, in 2008 expenditure equivalent dollars (2008 dollars). Of this, about $4.5 billion will be incurred by California based fleets, and $1 billion will be borne by out-of-state fleet operators. These costs will be spread out over 16 years, from 2010 through 2025, with costs varying between years; in its highest year, 2013, the capital costs of the proposed regulation are

expected to be about $566 million. Overall, about 40 percent of the cost of the proposed regulation is expected to be incurred directly by the transportation and warehousing industry, more than 20 percent by the construction industry, and about 10 percent by the wholesale and retail trade industry. The remaining costs are spread among various other affected industries.

Costs to individual fleets would vary depending on the size of each fleet, vehicle types, vehicle ages, and its normal purchasing practices. Costs also would vary depending on the compliance strategy chosen by each fleet (retrofit, repower, buy new, and/or buy used). For newer fleets, the costs will be minimal, while for older fleets that need to upgrade a significant number of vehicles, the cost will be significantly more substantial. The same holds true for small fleets, where some would experience no increased costs while others would experience higher costs. The total estimated cost over the lifetime of the regulation for small fleets is approximately $1.7 billion (2008 dollars).

Staff expects many, if not most, affected businesses to pass through the proposed regulation's costs to their customers. This could be achieved, for example, through higher shipping rates, or higher costs for manufactured goods, resulting in higher revenue (but not necessarily higher profits) for affected fleets. However, the ability to pass on costs will vary by business sector. While the overall impact on most business sectors covered by the proposed regulation is small, generally averaging less than one-tenth of one percent of their overall gross domestic product, some companies may not be able to pass thorugh these costs, and will have to absorb them out of their gross revenues. While the extent of the ability for fleets to absorb the costs of the proposed regulation is unclear, this may likely impact the profitability of companies that cannot pass through their compliance costs.

Despite affected fleets passing though these costs, consumers can expect to pay a negligible additional amount for common consumer goods such as food, produce, consumables and other commodities as a result of the proposed regulation.

In considering the ability of fleets to handle the compliance requirements associated with the proposed regulation and other ARB regulations, staff believes this issue is addressed in that ARB's various regulations have different compliance dates, regulatory requirements, and flexibility, which staggers the compliance dates and requirements for various regulations such that any overlap is typically minimal. Also, while many fleets subject to the proposed regulation are also subject to other ARB regulations, staff does not believe the cumulative cost impacts of these various regulations will impact affected fleets' ability to comply overall. For example, for construction fleets subject to the proposed regulation, the cumulative impact of the proposed regulation and the in-use off-road diesel vehicle regulation is an additional 6 percent over the anticipated costs of that regulation.

While the cost of the proposed regulation is significant, there are also significant amounts of incentive money available for fleets to assist in cleaning up and modernizing their vehicles. In November 2006, California voters approved Proposition 1B, which included

$1 billion to reduce emissions from the movement of goods throughout the state. ARB has earmarked over $300 million towards vehicles covered by the proposed regulation, and in particular vehicles operated by small fleets. California's Carl Moyer Program provides $140 million per year to help reduce emissions from existing diesel engines, and has historically funded a significant number of projects targeting on-road vehicles. Finally, with the approval of Assembly Bill (AB) 118, ARB has been allocated up to $50 million per year to achieve emission reductions from vehicles and equipment, as well as for research on the air quality impacts of alternative fuels and advanced technology vehicles. In fiscal year 2008/2009, $48 million has been allocated for the establishment of a heavy-duty vehicle air quality loan program. While these programs, and the dollars they provide, are significant, they are not enough to cover the anticipated costs of the regulation. However, for those that take advantage of them, the combined assistance these programs could provide will be significant. For example, a truck owner/operator could obtain a 2010 model year truck, which would comply with all of the requirements of the proposed regulation, for about less than $800 per month in loan payments.

Staff has made an enormous effort to notify affected fleets and interested parties about the proposed regulation, and to solicit their input on the proposed regulation. Staff held 54 public workshops and workgroup meetings throughout the state, dozens of site visits and private meetings with fleet owners, vehicle dealers, and industry groups, and sent a mailing to nearly 300,000 owners of registered diesel vehicles in California notifying them of the proposed regulation, how to participate in an online survey, and how to obtain additional information about staff's proposal.

In addition to this Staff Report, staff has also prepared a companion Technical Support Document (TSD) which provides additional information about the proposed regulation.

B. Recommendation

Staff recommends the Board adopt a new section 2025 in Title 13, California Code of Regulations. In addition, staff recommends that the Board approve the proposed amendments to the existing regulations identified Chapter V of this staff report.

The proposed regulation is set forth in the proposed Regulation Order in Appendix A, and a summary of the proposed regulation is provided in Appendix A1. The accompanying amendments to other existing regulations are set forth in the proposed Regulation Order in Appendix B.

II. NEED FOR EMISSION REDUCTIONS

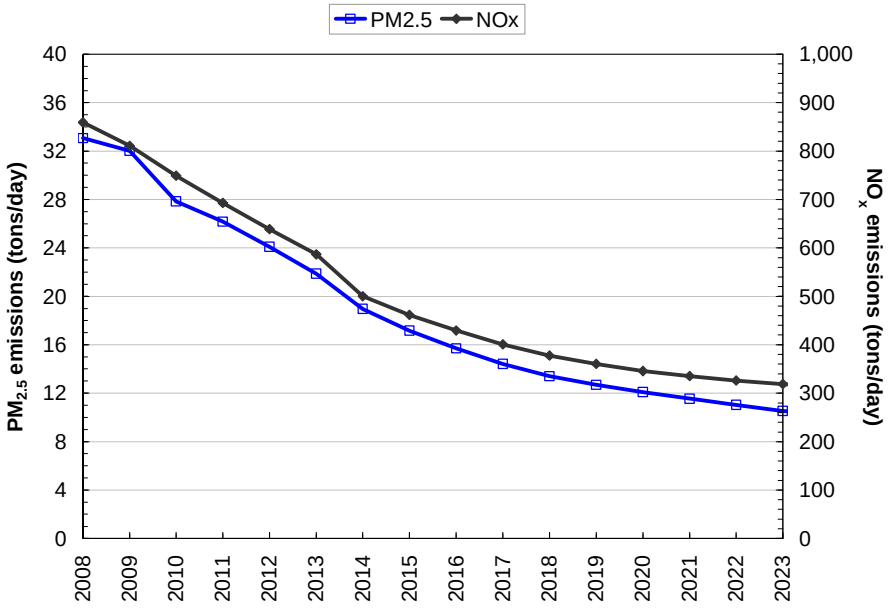
This chapter discusses the need for substantial new reductions in emissions from on-road diesel vehicles subject to the proposed regulation to attain and maintain the state and federal clean air standards, and to reduce the significant health impacts associated with their emissions.

A. How significant are the emissions targeted by the regulation?

On-road diesel vehicles are a significant source of diesel PM and NOx emissions that lead to ozone and ambient PM. Although increasingly stringent new engine standards are reducing emissions from on-road diesel vehicles over time, because of the long useful life of diesel engines, these newer lower emitting engines will be introduced into the state and national fleets relatively slowly. Therefore, in-use on-road diesel vehicles would continue to pose a significant health risk for many years if this proposed regulation is not adopted. Additionally, without reductions from these vehicles, especially in the South Coast and San Joaquin Valley, the state would be unable to attain federal ambient air quality standards.

If adopted, the proposed regulation is projected to affect almost one million vehicles that operate in California each year. In 2010, these vehicles are estimated to emit approximately 750 tons per day of NOx emissions and nearly 28 tons per day of PM emissions. Figure II-1 shows the statewide trend in diesel PM and NOx emissions that would be expected beginning in 2010 without the proposed regulation. As can be seen, emissions decrease over time as the older vehicles are replaced with newer, cleaner vehicles. However, unless these reductions are accelerated, they are not enough for many areas of the state to meet clean air standards.

Figure II-1: Statewide PM and NOx Emissions Without Regulation



Today, trucks and buses subject to the proposed regulation are a significant contributor of NOx and diesel PM emissions in California. As can be seen in Figure II-2 below, in 2005 these vehicles represent 32 percent of statewide NOx emissions and 39 percent of statewide diesel PM emissions from all mobile diesel engines. In 2020, without the proposed regulation, trucks and buses will still represent 36 percent of the mobile source diesel PM emissions, and 23 percent of mobile source NOx emissions, as shown in Figure II-3.

Figure II-2: Truck and Bus Contribution to Statewide Mobile Source Diesel Particulate Matter and NOx Emissions: 2005

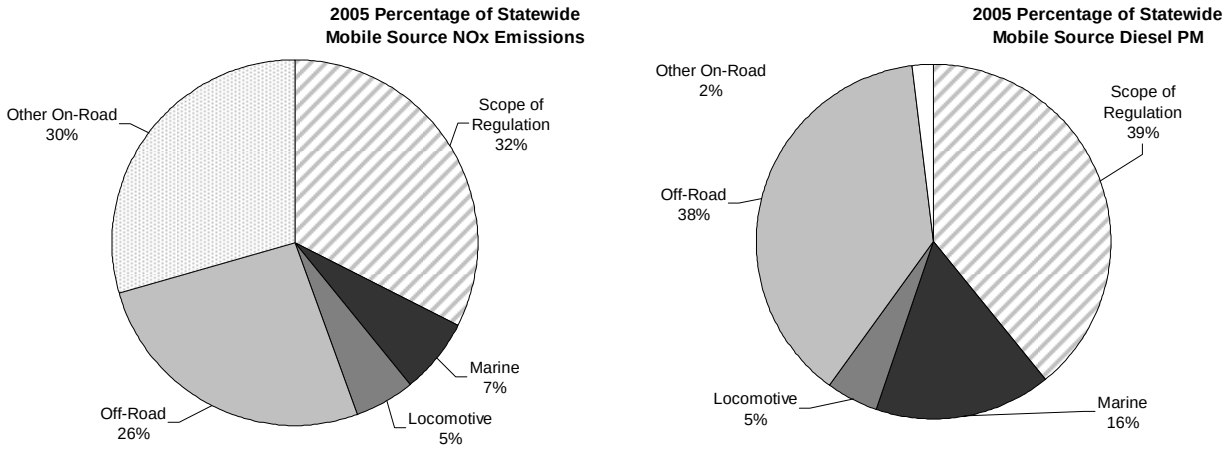
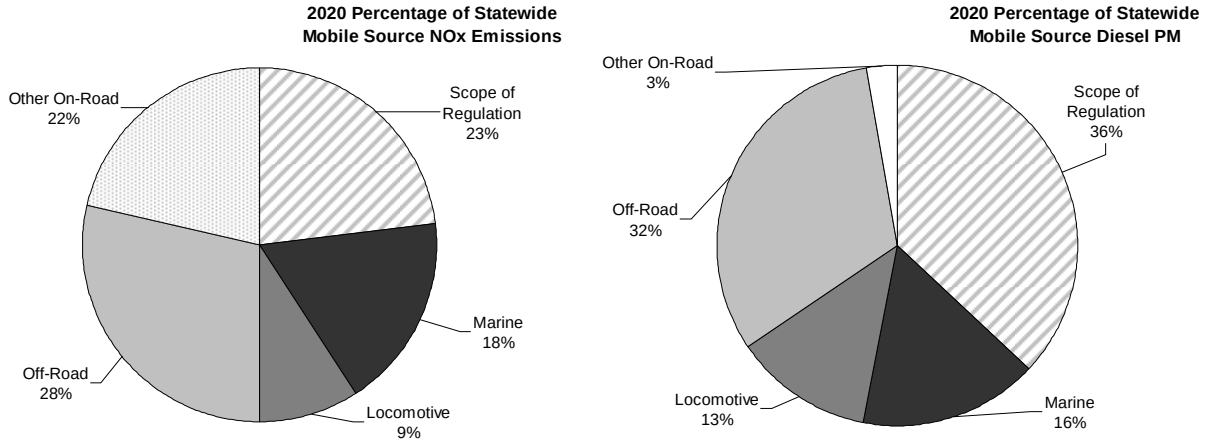


Figure II-3: Truck and Bus Contribution to Statewide Mobile Source Diesel Particulate Matter and NOx Emissions: 2020, Without Regulation

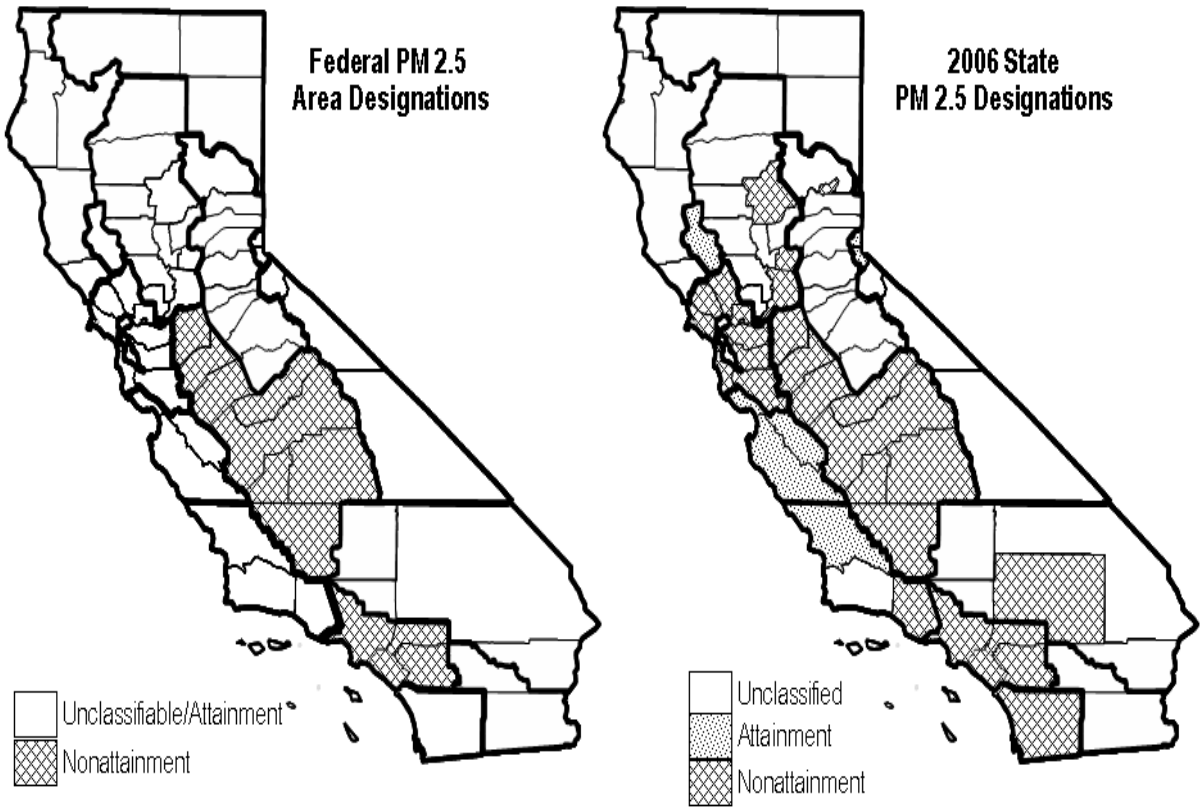


B. Why are reductions of diesel particulate matter emission needed?

In 1998, the Board identified diesel PM as a toxic air contaminant (TAC) and in 2001, adopted the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles (Diesel Risk Reduction Plan or diesel RRP). The diesel RRP identified strategies, including air toxic control measures (ATCMs) and regulations, to reduce diesel emissions and associated potential cancer risks from 2000 baseline levels by 75 percent by 2010, and by 85 percent by 2020. Diesel PM is a primary contributor to adverse health impacts throughout the state, and a major contributor to ambient risk levels, including an estimated 70 percent of the average cancer risk from all TACs. The proposed regulation would provide needed progress towards achieving the emission reduction goals of the diesel RRP for on-road vehicles subject to the proposed regulation.

PM emission reductions are also needed because diesel PM contributes to ambient concentrations of fine particulate matter (PM2.5). Ambient PM2.5 is associated with premature mortality, aggravation of respiratory and cardiovascular disease, asthma exacerbation, chronic and acute bronchitis and reductions in lung function.

Figure II-4: Areas in California that Exceed the Federal and State Annual PM2.5 Standard



Under the federal Clean Air Act (CAA), the U.S. Environmental Protection Agency (U.S. EPA) has established National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health, including PM2.5. Set to protect public health, the NAAQS are adopted based on a review of health studies by experts and a public process. Areas in the State that exceed the NAAQS are required by federal law to develop State Implementation Plans (SIPs) describing how they would attain the standards by certain deadlines.

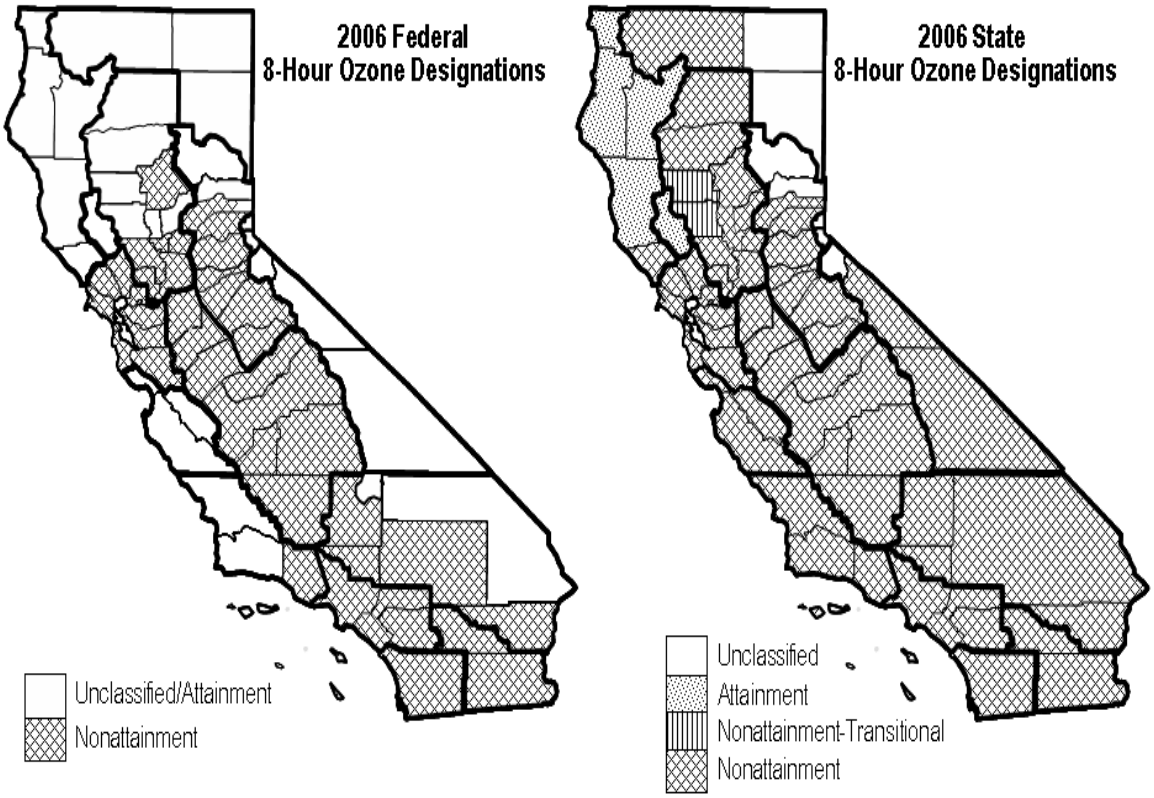
In addition, the state has established its own ambient air quality standards for PM2.5. California's ambient air quality standards for PM2.5 are more stringent than the national standards and are intended to provide protection for the most sensitive groups of citizens, including infants and children, the elderly, and persons with heart or lung disease. Figure II-4 shows the areas of California that exceed the federal and state PM2.5 standards.

C. Why are oxides of nitrogen emission reductions needed?

NOx emission reductions are needed because NOx leads to formation in the atmosphere of ozone and PM2.5. Scientific studies show that exposure to ozone can result in reduced lung function, increased respiratory symptoms, increased airway hyperreactivity, and increased airway inflammation. Exposure to ozone is also associated with premature death, hospitalization for cardiopulmonary causes, emergency room visits for asthma, and restrictions in activity (ARB, 2005a).

In July 1997, the U.S. EPA promulgated a new 8-hour ozone national standard (replacing the previous federal 1-hour standard) effective September 1997, and in 2004 issued new area designation maps for the new standard. The new standard was set at a lower level to address the cumulative impact of ozone exposure at lower levels for a longer period of time and is more protective of human health. The national 1-hour ozone standard was revoked effective June 15, 2005, for all areas except the 8-hour ozone non-attainment Early Action Compact areas that have deferred effective dates for their designations under the 8-hour ozone standard. California also established an 8-hour standard based on the results of an evaluation of the adequacy of the 1987 standard, as required by the Children's Environmental Health Protection Act (Senate Bill 25, Escutia, 1999). Senate Bill 25 (SB25) directed the ARB, in consultation with the Office of Environmental Health Hazard Assessment (OEHHA), to "review all existing health-based ambient air quality standards to determine whether these standards protect public health, including infants and children, with an adequate margin of safety. Figure II-5 shows that many areas in the state violate the federal 8-hour ozone standard and most of California violates the state 8-hour ozone standard.

Figure II-5: Areas in California that Exceed the Federal and State 8-Hour Ozone Standard



D. What are the State's SIP commitments to reduce emissions from vehicles covered by the proposed regulation?

In September 2007, the Board adopted a SIP committing the State to develop measures to achieve emission reductions from sources under State regulatory authority. The reductions are needed to attain the NAAQS for ozone and PM2.5. While multiple areas across the State exceed federal air quality standards, the air quality in the South Coast and the San Joaquin Valley poses the greatest challenge and defines the amount of reductions needed. Reductions are needed by 2014 to meet the PM2.5 attainment deadline and by 2023 to meet the ozone attainment deadline. An interim target date of 2017 was adopted by ARB for the San Joaquin Valley to meet the ozone NAAQS as part of an effort to accelerate progress toward attainment before 2023.

The largest share of new emission reductions in the 2007 SIP is expected from trucks. In 2014, reductions from both NOx and PM2.5 are needed to meet the PM2.5 standard. In 2023 and 2017, the focus from an ozone air quality standard attainment perspective is NOx. Therefore, ARB adopted 2014 reduction commitments for both NOx and PM2.5, and NOx commitments in 2017, 2020 and 2023. As part of the overall SIP commitment, Staff is also obligated to bring measures to the Board for its consideration. Board

consideration of the proposed regulation is one of these commitments. Staff has used the targeted reductions estimated in the SIP as the goal for this rulemaking.

E. What statewide health impacts are occurring today due to the emissions from vehicles covered by the proposed regulation?

Table II-1 below summarizes the adverse health impacts occurring in 2008 from on-road diesel vehicles that would be included in the proposed regulation. Staff estimates that in the year 2008, approximately 4,500 premature deaths were associated with the estimated baseline emissions from in-use on-road diesel vehicles subject to the proposed regulation. The health impacts of NOx as a precursor to ozone are not included in the estimates. Because only a subset of health outcomes was considered, the estimates in Table II-1 should be considered an underestimate of the total public health impact of diesel PM exposure.

The statewide health impacts from in-use on-road diesel vehicles are significant. To put the magnitude of the health impacts in context, the number of premature deaths estimated for 2008 associated with emissions from in-use on-road diesel vehicles is similar to the number of deaths due to environmental tobacco smoke (secondhand smoke), and to the number of deaths due to motor vehicle accidents. Secondhand smoke is estimated to cause about 4,000 premature deaths per year in California (ARB, 2006), while motor vehicle accidents killed 4,236 people in California in 2006 (NCSA, 2007).

Table II-1: Statewide Health Impacts of Baseline 2005 Emissions from In Use On-Road Diesel Vehicles Covered by the Regulation[2]

Endpoint	Pollutant	Number of Cases (Mean)	Range (95% C.I.)
Premature Mortality	PM	1,100	330 – 2,000
	NOx	3,400	1,000 – 6,000
	Total	4,500	1,400 – 8,000
Hospital admissions (Respiratory)	PM	21	8 – 35
	NOx	560	320 – 830
	Total	590	330 – 860
Hospital admissions (Cardiovascular)	PM	90	47 – 130
	NOx	530	330 – 780
	Total	620	380 – 910
Asthma & Lower Respiratory Symptoms	PM	18,000	6,900 – 28,000
	NOx	53,000	21,000 – 83,000
	Total	71,000	28,000 – 110,000
Acute Bronchitis	PM	1,500	0 – 3,200
	NOx	4,200	0 – 8,700
	Total	5,700	0 – 12,000
Work Loss Days	PM	110,000	93,000 – 130,000
	NOx	340,000	290,000 – 390,000
	Total	450,000	380,000 – 520,000
Minor Restricted Activity Days	PM	640,000	520,000 – 760,000
	NOx	2,000,000	1,600,000 – 2,300,000
	Total	2,600,000	2,100,000 – 3,100,000

F. What localized health impacts are occurring today due to the emissions from vehicles covered by the proposed regulation?

To evaluate the health impacts from in-use on-road heavy-duty diesel vehicles at a local level, staff performed a localized urban study in and around the city of Commerce (Commerce Study). This study area was a 10 mile by 10 mile region with Commerce as its center.

This study area was selected due to the large number of freeways and major arterials in the area which historically have had high volumes of on-road diesel truck traffic. This area contains a broad mix of land uses including industrial; light industrial; commercial; and residential and about 1.1 million people reside in the study area. The expected concentrations for the vehicle activity are high enough and there is a sufficiently large

[2] Table includes indirect health impacts from NOx formation of secondary particulate as well as direct health impacts from PM. Table does not include indirect health impacts from NOx formation of ozone.

exposed population to allow quantification of the non-cancer health impacts of direct diesel PM in the urban study area.

Table II-2 summarizes the estimated adverse health impacts for this area in 2003. Staff estimates that in 2003, approximately 42 premature deaths were associated with exposure to directly emitted diesel PM emissions from in-use on-road diesel vehicles operating in the urban study area. The health impacts of indirect PM (nitrates formed from precursor NOx emissions) and NOx as a precursor to ozone are not included in the estimates. Because only a subset of health outcomes was considered, the estimates in Table II-2 should be considered an underestimate of the total public health impact in this area from diesel PM exposure.

Table II-2: Localized Non-Cancer Health Impacts Associated with In-Use On-Road Diesel Vehicles Operating in and Around the City of Commerce[1] - 2003 Emissions

Endpoint	Number of Cases per Year (Mean)	Number of Cases per Year (Range: 95% Confidence Interval)
Premature Mortality	42	12 – 72
Hospital admissions (Respiratory and Cardiovascular)	32	13 – 50
Asthma – Related & Lower Respiratory Symptoms	1,400	540 – 2,200
Acute Bronchitis	120	0 – 260
Work Loss Days	7,400	6,200 – 8,900
Minor Restricted Activity Days	43,000	36,000 – 50,000

[1] The estimated population of the study area is 1.1 million residents.

G. What is the localized potential cancer risk from exposure to diesel PM emissions from on-road diesel vehicles?

As part of the Commerce Study, staff estimated the localized potential cancer risk in 2003 from exposure in this community to ambient levels of directly emitted diesel PM emitted from on-road diesel trucks that would be subject to the proposed regulation. The results from this analysis provide a quantitative estimate for this community, as well as a qualitative indicator for other similar urban areas.

Potential cancer risk is expressed as chances per million people. The methodology used to estimate the potential cancer risks assumes that an individual is exposed to an annual

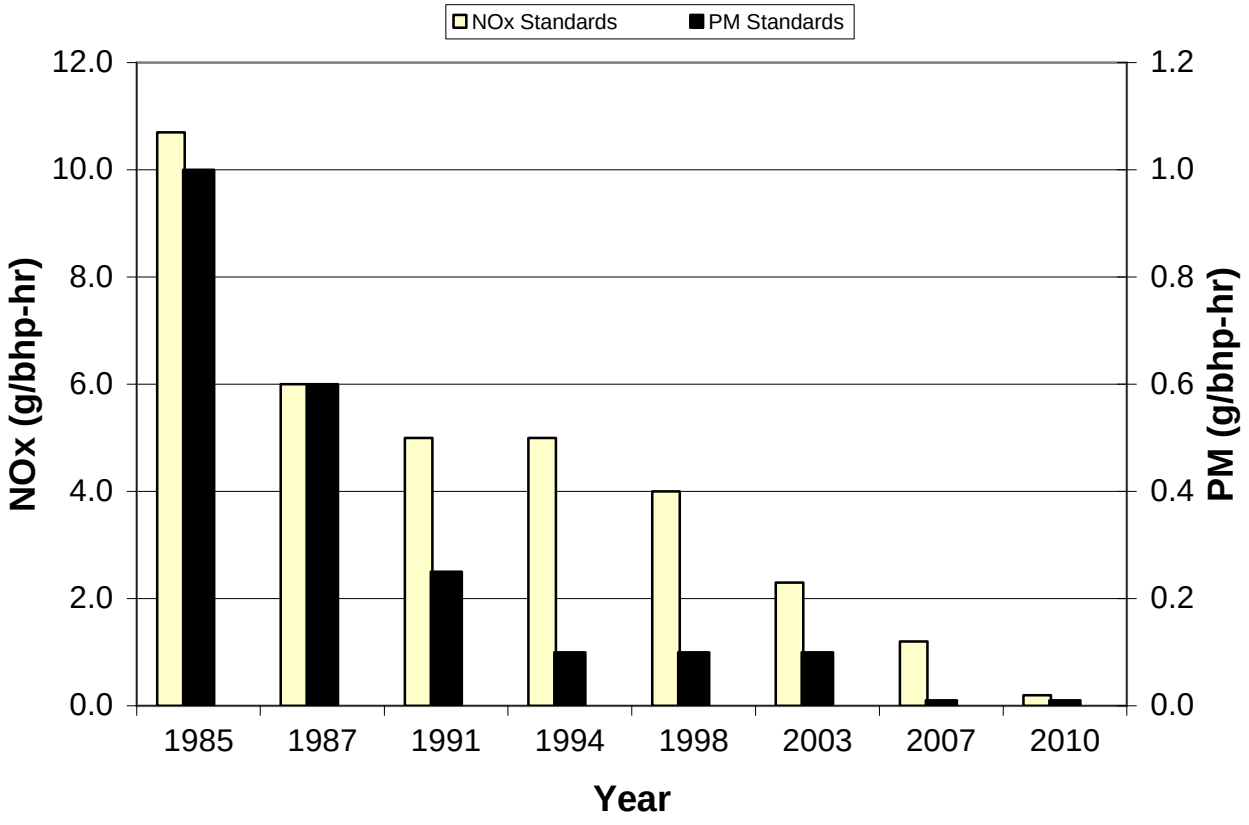
average concentration of a pollutant continuously for 70 years.[3] A cancer risk of 10 in a million is the most commonly used threshold above which facilities are required by the Air Toxics Hot Spots Information and Assessment Act to notify all exposed persons (ARB, 2005c). The overall average potential ambient cancer risk within the Commerce Study area is about 375 in a million. This represents nearly a third of the overall potential ambient cancer risk in this community, which was estimated (on a regional basis) to be about 900-1000 in a million for all diesel PM emissions in 2000 (SCAQMD, 2000). By comparison, an estimated cancer risk of 500 in a million occurs at approximately 500 to 5,000 feet from the edges of the major freeways.

H. What new engine emission standards apply to vehicles covered by the proposed regulation?

Emissions from heavy-duty diesel vehicles were first regulated by California in 1969 and later by the U.S. EPA in 1974. However, over the years, California had set its own emission standards apart from U.S. EPA until 1998, when ARB adopted the U.S. EPA's emission standards for 2004 and later model year heavy-duty engines. In January 2001, in light of the advanced development of diesel exhaust aftertreatment technologies, U.S. EPA followed with another rule further lowering emission standards for 2007 and subsequent model year heavy-duty engines; ARB subsequently adopted the same emission standards. The progression of ever increasingly stringent standards for new diesel engines is shown in Figure II-6 below.

[3] According to the Office of Environmental Health Hazard Assessment Guidelines, the relatively health-protective assumptions incorporated into the Tier-1 risk assessment make it unlikely that the risks are underestimated for the general population.

Figure II-6: California PM and NOx New Diesel Engine Emissions Standards (Based on Engine Model Year)



The 2007 model year engine standards reduce exhaust emissions from new diesel engines by 90 percent for NOx, 72 percent for non-methane hydrocarbons (NMHC), and 90 percent for PM from 2004 levels. The requirements to meet the NOx and NMHC emission standards are phased in from 2007 to 2010. The phase in schedule shown in Table II-3 represents the percentage of new engines produced for sale in California that are required to meet the more stringent emission standards beginning in 2007. Full implementation is required starting with the 2010 model year.

Table II-3: Exhaust Emission Standards and Phase-In Schedule for 2007 and Later Model Year Heavy-Duty Diesel On-Road Engines

Pollutant	Standard (g/bhp-hr)	Phase in by Model Year (percent of sales)			
		2007	2008	2009	2010
NOx	0.20	50%	50%	50%	100%
NMHC	0.14	50%	50%	50%	100%
PM	0.01	100%	100%	100%	100%

III. AFFECTED INDUSTRIES AND VEHICLES

This chapter presents an overview of the types of businesses and vehicles that would be affected by the proposed regulation.

A. What industries and types of fleets will be affected by the proposed regulation

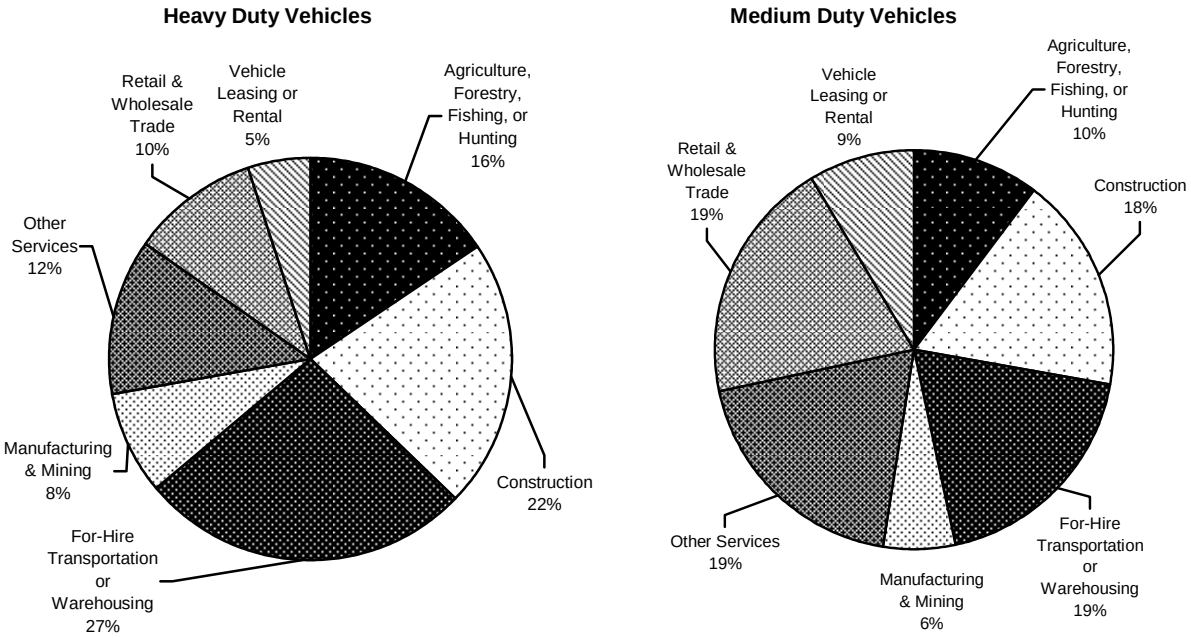
The use of on-road heavy-duty diesel vehicles is ubiquitous through the state. Nearly all sectors of the economy use on-road diesel vehicles that will be subject to the proposed regulation in one way or another. All told, approximately 170,000 businesses in California, and almost a million vehicles that operate on California roads each year, will be affected.

Some common industry sectors that operate vehicles subject to the regulation include:

- For-hire transportation
- Construction
- Manufacturing
- Retail and wholesale trade
- Vehicle leasing and rental
- Federal government and Tribal reservations
- Bus lines, and
- Agriculture, forestry and fishing

The California industries most affected by the proposed regulation are those that use significant numbers of heavy-duty trucks. While California specific data is not available, Figure III-1 provides national data showing the percentage of medium-duty and heavy-duty vehicles in various industry sectors which would be subject to the proposed regulation.

Figure III-1: Percentage of Vehicle Population by Business Sector from National 2002 VIUS* Data



*Vehicle Information and Use Survey

As can be seen in Figure III-1, overall, the for-hire transportation industry sector is the largest sector that would be affected by the proposed regulation. This industry provides over-the-road transportation of cargo using medium-duty and heavy-duty vehicles, such as trucks and tractor trailers.

B. How many and what types of vehicles are subject to the regulation?

The proposed regulation would affect nearly one million vehicles operating in California each year. Among these vehicles, there are thousands of vehicle types that will be subject to the proposed regulation. They include over-the-road tractors, dump trucks, buses, street sweepers, cranes, fuel delivery trucks, and many others. Also included are buses, school buses (both private and public), as well as motor coaches and shuttle buses. In general, vehicles are classified as medium heavy-duty (MHD) if their gross vehicle weight rating (GVWR) is less than 33,000 pounds, and as heavy heavy-duty (HHD) if their GVWR is greater than 33,000 pounds. The GVWR is the weight of the vehicle and the payload it can haul.

The most common type of vehicle is as an over-the-road tractor. Tractors typically have either a single or dual rear axles. A single drive axle tractor is often used to pull shorter trailers or lighter loads and is easier to maneuver. A dual (tandem) axle tractor is commonly used in long haul operations and for transporting heavier loads, and often is equipped with a sleeper berth. Figure III-2 below shows both kinds of common over-the-road tractors.

Figure III-2: Common Types of Over-the-Road Tractors

Tandem Axle Tractor with Sleeper

Single Axle Tractor

Most vehicles can be broadly categorized by whether they operate on an in-state or interstate basis, and by their weight. Interstate vehicles are typically heavy heavy-duty vehicles, and can be registered either in California or through the International Registration Program (IRP). In-state vehicles include both medium and heavy heavy-duty vehicles that are registered to operate exclusively in California (except for some agricultural vehicles which don't leave a farm and are not registered to be driven on-road).

Table III-1 below shows the number and types of vehicles that would be subject to the proposed regulation. As can be seen, there are almost 400,000 in-state vehicles, and just over 550,000 interstate vehicles that operate in California each year. Less than 5 percent of these vehicles are motor coaches and school buses.

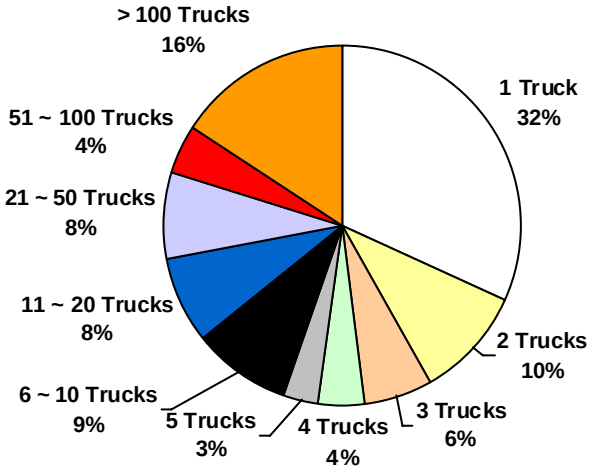
Table III-1: Vehicles Potentially Affected by the Proposed Regulation, by Fleet Type - 2008

Fleet/Population Type	Number of Vehicles	Percent of Vehicles
Instate Total	***379,168***	***40%***
Instate MHD	210,760	22%
Instate HHD	141,964	15%
Motor Coach & School buses	26,443	3%
Interstate Total	***561,499***	***60%***
Interstate MHD	8,896	1%
Interstate HHD (CA Registered)	60,263	6%
Interstate HHD (non-CA Registered)	492,340	52%
Total	***940,667***	***100%***

C. How many vehicles are owned by small fleets?

Out of the nearly 170,000 California-based fleets that would be subject to the proposed regulation, nearly 90 percent, or 156,000, are small fleets. A small fleet is defined in the proposed regulation as a fleet that owns or operates three or fewer vehicles; these fleets range from small companies having just a few vehicles to truck owner/operators. All told, over 190,000 vehicles (representing nearly 50 percent of the in-state vehicles) are owned by small fleets. The number of California registered vehicles, by fleet size, is shown below in Figure III-3.

Figure III-3: Number of Trucks by Fleet Size (California Department of Motor Vehicles, 2006)



IV. DESCRIPTION OF PROPOSED REGULATION

The major requirements of the proposed regulation are summarized in this chapter. It provides basic information on who must comply with the proposed regulation, the types of vehicles affected, and the major compliance requirements. The language of the proposed regulation is provided in Appendix A, and a summary is provided in Appendix A1. A more detailed plain English summary of the proposal is available in the TSD.

A. Who must comply with the proposed regulation?

The proposed regulation would apply to any person, business, school district, or federal government agency that owns, operates, leases or rents affected vehicles in California. The proposed regulation would also establish requirements for any in-state or out-of-state motor carrier, California-based broker, or any California resident who hires or dispatches vehicles subject to the regulation. California sellers of a vehicle subject to the proposed regulation would have to disclose the regulation's potential applicability to buyers of the vehicles.

B. What vehicles are affected by the proposed regulation?

Affected vehicles include heavy-duty diesel fueled vehicles with a GVWR greater than 14,000 pounds, yard trucks with off-road certified engines, and diesel fueled shuttle vehicles of any GVWR that have a capacity of 10 or more passengers and routinely drive an average of 10 trips per day to or from airport terminals, marine terminals, and rail based stations. Drayage trucks and utility owned vehicles would be subject to the regulation beginning January 1, 2021.

C. Does the regulation apply to out-of-state companies?

The proposed regulation would apply to any vehicle operating in California, regardless of where the vehicle is registered.

D. What vehicles are not subject to the proposed regulation?

The proposed regulation would not apply to military tactical support vehicles, authorized emergency vehicles, private motor homes not used for commercial purposes, dedicated snow removal vehicles, and historic vehicles. The regulation would also not apply to the following vehicles:

- Vehicles subject to the regulation for solid waste collection vehicles;
- Public agency and utility owned vehicles, except that vehicles owned or operated by a private utility would become subject to the regulation on January 1, 2021;
- Transit urban bus fleets;
- Transit fleet vehicles;
- Vehicles subject to the regulation for mobile cargo handling equipment at ports and intermodal rail yards;

- Off-road vehicles subject to title 13, California Code of Regulations (CCR), sections 2401, 2421, 2411, 2432, and 2449; and
- Two-engine cranes, as defined in title 13, CCR, section 2449(c)(56).

E. What would the proposed regulation require?

In general, the regulation would require owners to reduce PM and NOx emissions in their fleet by upgrading existing vehicles to meet best available control technology (BACT) standards for PM and NOx. A fleet may meet these performance requirements by retrofitting a vehicle with a verified diesel emission control strategy (DECS)[4] that will achieve PM or NOx reductions or both as required, replacing an engine with a newer cleaner one, or replacing a vehicle with one having a cleaner engine.

The regulation provides three options for complying with the performance requirements. They are: the BACT compliance option, the BACT percentage limits option, and the fleet averaging option. Once a fleet meets any one of these compliance options for NOx and PM, they have met the performance requirements for that year. In addition, the proposed regulation allows fleets to meet the NOx and PM performance requirements separately, using different compliance options for each pollutant. For example, a fleet may choose to meet the fleet average option for NOx, and separately comply with the BACT percent limit for PM.

The BACT standard for PM is an engine equipped with the highest level verified DECS for PM or an engine originally equipped with a diesel particulate filter by the engine manufacturer. The BACT standard for NOx is an engine newly manufactured in 2010 or later or a 2010 emissions equivalent engine. The regulation defines a 2010 equivalent engine based on the model year of the older engine and the emissions reduction that would be required to make the older engine equivalent to a 2010 model year engine.

F. What is required by the BACT compliance option?

Using this option, a fleet would be required to comply with a prescribed BACT schedule (Table IV-1) that would determine, based on the vehicle's engine model year, which engines would be required to have the highest level verified DECS and which would be required to be replaced.

For fleets using this compliance option, starting January 1, 2011, any vehicle with a model year engine older than 1994 would have to meet the PM BACT requirements. This requirement would expand in subsequent years to ensure that, by January 1, 2014, all vehicles have a verified DECS or an engine originally equipped with a diesel particulate filter by the engine manufacturer. The proposed regulation would also require owners to reduce NOx emissions from the fleet by accelerating vehicle replacement

[4] A retrofit device that has been verified under ARB's Verification Procedure, Warranty and In-Use Compliance Requirements for In-Use Strategies to Control Emissions from Diesel Engines, title 13, CCR, sections 2700 et seq.

beginning in 2013; so that by 2023, all engines would be manufactured in 2010 or later, or be retrofitted to achieve equivalent emission reductions.

Table IV-1: Best Available Control Technology Compliance Schedule

Compliance Deadline, Jan 1	Engine Model-Years	BACT Requirements
2011	Pre-1994	PM BACT
2012	2003 – 2004	PM BACT
2013	2005 – 2006	PM BACT
	1994 – 1999	NOx and PM BACT
2014	2000 – 2002	NOx and PM BACT
	All other model years	PM BACT
2015	Pre-1994	NOx and PM BACT
2016	2003 - 2004	NOx and PM BACT
2017	2005 - 2006	NOx and PM BACT
2018	All pre-2007	No new requirements
2019	All pre-2007	No new requirements
2020	All pre-2007	No new requirements
2021	2007 or equivalent	NOx and PM BACT
2022	2008	NOx and PM BACT
2023	2009	NOx and PM BACT

G. What is required by the BACT percent limit option?

This option specifies the minimum number engines each year that must have the highest level verified DECS to meet the PM performance requirements regardless of engine model year, and the minimum number of engines required to meet the 2010 engine requirements to satisfy the NOx performance requirements. Engines originally equipped with a diesel particulate filter by the manufacturer would count towards the number of verified DECS. The requirements of this option are shown in Table IV-2 below.

This option would allow a fleet to decide the order in which the vehicles will be retrofit and replaced, regardless of their age. This would provide additional flexibility to fleets such that they may be able to keep older, more expensive or specialized vehicles in their fleet longer than would be allowed under the BACT schedule, so long as they replace and/or retrofit a certain number of other vehicles first.

Table IV-2: Percent of Fleet That Must Comply with PM and NOx BACT Standard

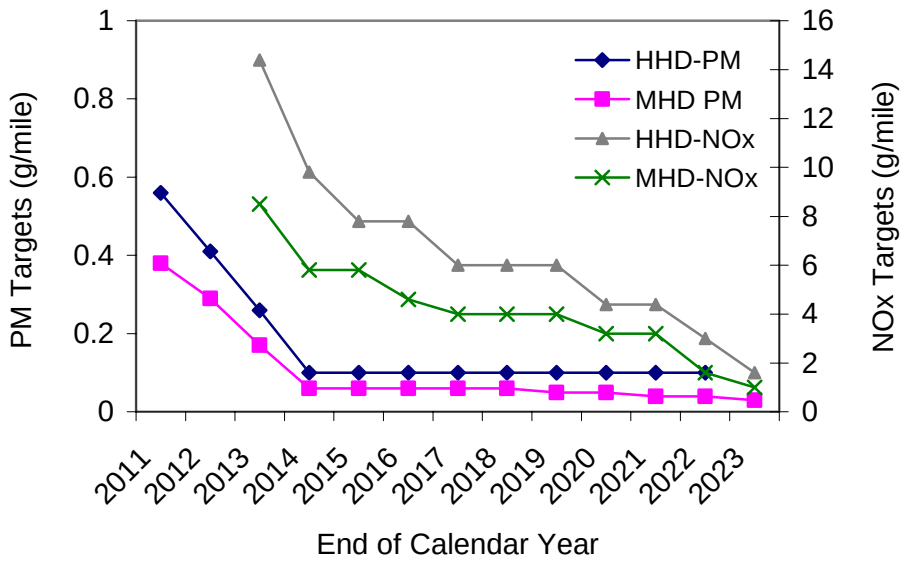
Compliance Deadline as of January 1	Percent of Total Fleet Complying with BACT	
	PM BACT	NOx BACT
2011	25%	N/A
2012	50%	N/A
2013	75%	25%
2014	100%	50%
2015	100%	50%
2016	100%	60%
2017	100%	80%
2018	100%	80%
2019	100%	80%
2020	100%	90%
2021	100%	90%
2022	100%	90%
2023	100%	100%

H. What is required by the fleet averaging option?

The owner would use PM and NOx emission factors established by the regulation to calculate the average emissions of the fleet. By the applicable compliance date each year, the owner would have to demonstrate that the fleet average emissions for PM and NOx did not exceed the PM and NOx fleet average emission rate targets set by the regulation. The targets would decline over time, requiring fleets to reduce their emissions further as time goes on. The proposed fleet average targets for PM and NOx are shown below, in Figure IV-1, for medium-heavy duty and heavy-heavy duty vehicles.

This option would allow a fleet to select the order of vehicles that will be retrofit and replaced, considering their relative emissions. This would provide additional flexibility to fleets such that they may be able to keep older, more expensive or specialized vehicles in their fleet longer than would be allowed under the BACT schedule, so long as they also have cleaner vehicles in their fleet. Staff has developed a fleet calculator to assist fleet owners simplify the fleet averaging calculation.

Figure IV-1: Fleet Average Targets



I. Are there provisions for small fleets?

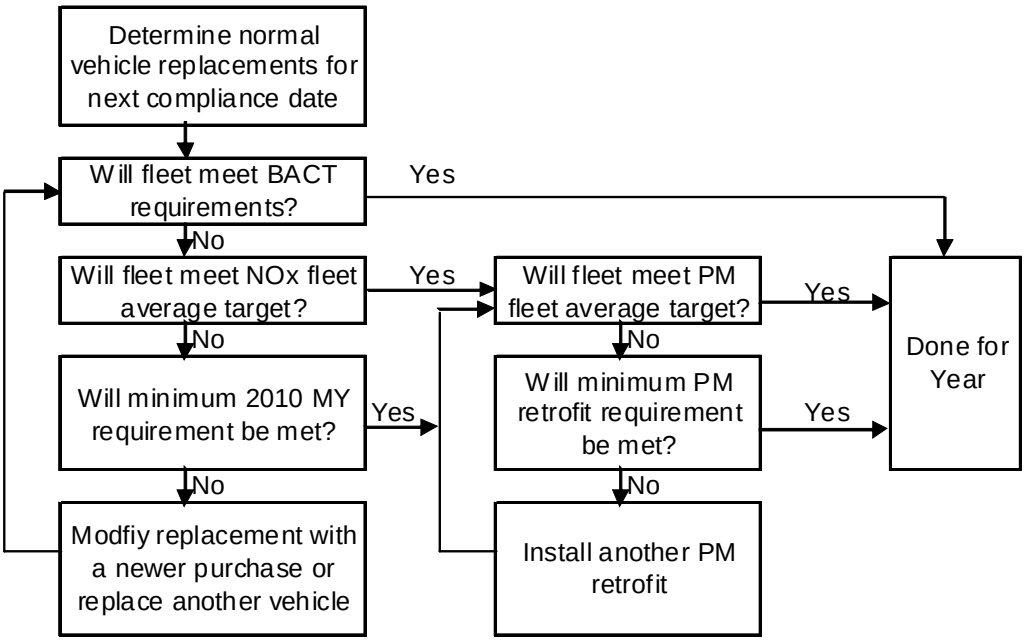
Yes. Fleets with three or fewer vehicles would be exempt from all clean-up requirements through 2012. Then, by January 1, 2013, a small fleet would need to show that it has at least one vehicle equipped with a 2004 model year or newer engine having a verified PM DECS. By January 1, 2018, that vehicle would need to meet the proposed PM and NOx performance requirements of the regulation. For fleets of just a single vehicle, these are the only performance requirements that must be met. For fleets with two vehicles, the second vehicle would be required to meet the PM and NOx performance requirements by January 1, 2014.

For fleets of three vehicles, two compliance paths are available. After having shown that it equipped its first vehicle with a 2004 model year or newer engine having a PM exhaust retrofit, a fleet of three vehicles could comply by having its two remaining vehicles meet the PM and NOx performance requirements by January 1, 2014, or electing to have the second vehicle meet the 2010 engine emissions requirements by January 1, 2014, and the third vehicle meet the PM and NOx performance requirements by January 1, 2016.

J. What would the regulation actually require fleets to do?

Because of the unique nature of each fleet, the proposed regulation would mean different things to different fleets. For newer fleets, the regulation may not require any actions, as their normal business model is to purchase new vehicles and keep them for only a few years until they are sold and replaced. However, for older fleets, the proposed regulation would require that they retrofit certain vehicles in 2010 and 2011, and begin to replace vehicles or engines beginning in 2012. For fleets that do not meet the NOx and PM performance requirements of the proposed regulation, Figure IV-2 provides a graphical depiction of the compliance process.

Figure IV-2: Annual Compliance Flowchart



Each year, the fleet owner would first determine whether the fleet will meet the BACT requirements. If the fleet meets the requirements, then there is no need to take any further action that year. However, if the fleet won't meet the BACT requirements, then, the owner would take several steps to meet the NOx and PM performance requirements.

First, the fleet owner would check whether the fleet will meet the NOx fleet average target. If the owner does not meet the NOx fleet average, the fleet owner would check to see if the NOx BACT percent limit is satisfied. If none of the NOx performance requirements are met, the fleet owner must begin replacing vehicles with newer vehicles until one the NOx requirements is satisfied.

Once an owner has met one of the NOx performance requirements, then the fleet owner would check as to whether the fleet would meet one of the PM compliance options – either the PM BACT percent limit or the PM fleet average target. Once one of these requirements is satisfied, then the fleet is compliance for the year. Otherwise, the fleet owner would need to plan to install verified PM DECS as necessary for compliance for that year.

K. What are the requirements for school buses?

Unlike the other vehicle sectors subject to the NOx and PM performance requirements, school buses would only be required to meet the proposed PM requirements, and would be subject to several special provisions and timetables specifically designed for school buses.

School buses manufactured prior to April 1, 1977, before minimum federal safety standards were established, will be required to be removed from service by January 1, 2012. All remaining diesel-fueled school buses may meet one of the three proposed compliance options. To address the unique nature of school buses and school districts, a different BACT Compliance Schedule has been proposed, as shown in Table IV-3

Table IV-3: Proposed PM BACT Schedule for School Buses

Compliance Deadline as of January 1	Engine Model Year
2011	2000 and newer
2012	1994 – 1999
2013	1987 – 1993
2014	Pre – 1997

School buses would be considered in compliance with the proposed regulation when they have installed the highest level verified DECS available for the school bus engine. If it is not technologically feasible for the school bus engine to be retrofitted with a highest level verified DECS, then compliance with the PM performance requirements of the regulation may be delayed until January 1, 2018. However, by this date, either the school bus engine needs to be replaced with an engine that is in compliance with the proposed regulation (that is, can be retrofit or already has highest level verified DECS installed) or the school bus needs to be replaced.

Engines equipped with a diesel particulate filter by the engine manufacturer as original equipment are considered in compliance with the requirement. School buses registered as historic vehicles or designated as low-use vehicles are exempted from the PM performance requirements.

L. What are the requirements for drayage trucks?

Drayage trucks are vehicles over 33,000 pounds GVWR that pick-up or deliver containers, bulk, and break-bulk goods to and from ports and intermodal rail yards. These trucks are currently regulated under the in-use on-road diesel-fueled heavy-duty drayage truck regulation. Staff is proposing that drayage trucks with 2004 model year engines would need to be equipped with the highest level verified DECS for PM by January 1, 2012, and drayage trucks with 2005 - 2006 model year engines would need to be equipped with the highest level verified DECS for PM January 1, 2013. This requirement would align the drayage truck rule with the proposed regulation. In addition, the proposed regulation would require that all drayage trucks comply with the PM and

NOx performance requirements of the proposed regulation starting January 1, 2021. Similar provisions would also be added to the drayage truck regulation.

M. Does the regulation provide any special credits?

The proposed regulation would provide credit for early compliance action. If an owner installs the highest level verified DECS for PM by January 1, 2010, compliance with the NOx requirement of the regulation may be delayed for 4 years (until January 1, 2014).

The proposed regulation also provides credit towards compliance with the proposed fleet average requirements for using hybrid vehicles where that the fuel economy of the hybrid vehicle is at least 20 percent better than an equivalent vehicle. The credit would expire January 1, 2018. The regulation also gives towards compliance with the fleet average to fleets using vehicles equipped with alternative fuel or heavy-duty pilot ignition engines.

N. Are there special provisions for low-use vehicles?

A vehicle would be exempt from both the PM and NOx cleanup requirements if the propulsion engine was operated in California for fewer than 1,000 miles and less than 100 hours during the preceding year. Such vehicles must have a properly functioning odometer and hour meter installed at all times.

O. Are there special provisions for vehicles used for emergency operation?

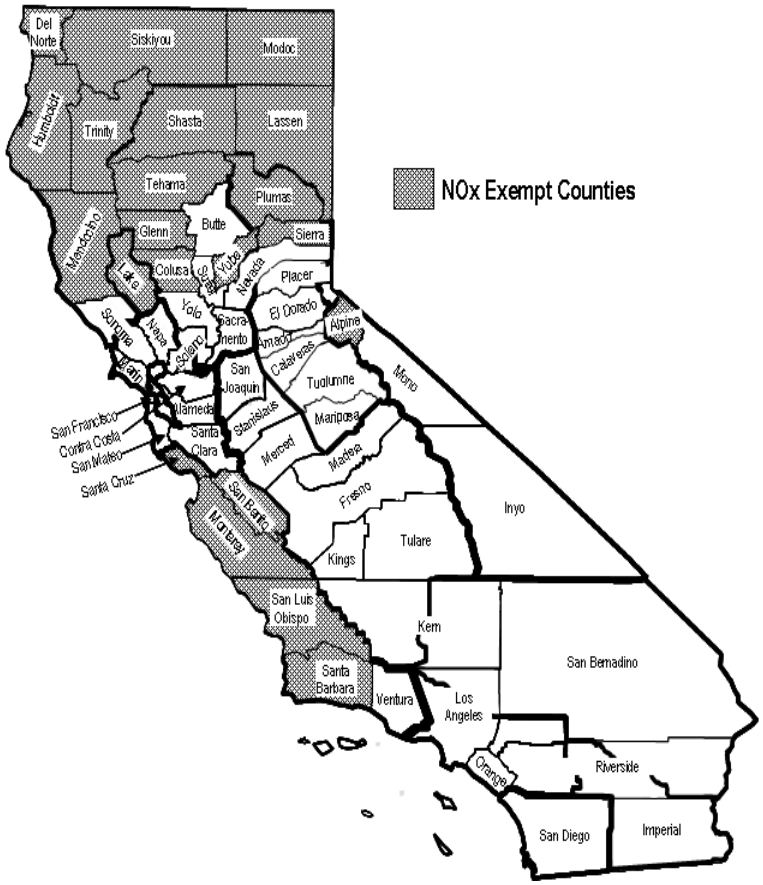
Vehicles used solely for emergency operations would be exempt from the NOx and PM performance requirements. For vehicles used both for emergency operations and for other purposes, hours of operation accrued when the vehicle is used for emergency operations would not need to be included when determining low-use status. However, the owner must keep records documenting dispatch by a governmental emergency management agency for travel to and from an emergency event.

P. Would an owner have to replace a vehicle that is operated in less polluted areas of the state?

Fleets that operate exclusively in counties that attain all the NAAQS and that do not contribute to downwind violations of the federal ozone standard would be exempt, until January 1, 2021, from the NOx requirements of the proposed regulation. The counties are Alpine, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Monterey, Plumas, San Benito, San Luis Obispo, Santa Cruz, Shasta, Sierra, Siskiyou, Trinity, Tehama, and Yuba. These NOx-exempt areas are shown in Figure IV-3.

Fleets that operate in these areas would still have to meet the PM performance requirements. They would also be subject to the reporting requirements, and would have to comply with the electronic tracking system requirements.

Figure IV-3: ARB Staff Proposed NOx Exempt Areas in California



Q. How does the regulation apply to rental and lease companies?

The proposed regulation would treat rental and lease companies just like any other fleet. In other words, the rental vehicles are the responsibility of the rental company rather than the user. However, for vehicles leased for a period of a year or more, if a rental or leasing company and the lessee agree in the lease agreement that the vehicle will be the responsibility of the lessee, it may be excluded from the rental or leasing company's fleet that year and included in the fleet of the lessee. If rental and leasing companies are selling vehicles which were formerly part of their rental fleet and the rental vehicle was operated less than 1,000 miles and 100 hours during the past year, such vehicles may be treated like other vehicles being held for sale, as described in more detail below.

Also, vehicles under a long-term lease of a period of a year or more that was in place before the regulation takes effect would be the responsibility of the lessee rather than the leasing company.

R. What are the special provisions for agricultural vehicles?

The proposed agricultural vehicle provisions provide additional time, up to specified dates, for certain vehicles used in agricultural operations to be cleaned up. However, by

January 1, 2023, all agricultural vehicles must meet the 2010 model year engine emissions requirements.

Agricultural vehicles that operate below specified mileage thresholds would be exempt from the proposed PM and NOx performance requirements until the dates shown in Table IV-4. Such vehicles are defined as either Low-Mileage or Limited-Mileage Agricultural vehicles, based on their annual mileage. The proposed regulation limits the number of these vehicles that may utilize this provision; this means that agricultural vehicles newly added to a fleet cannot take advantage of this provision, and would have to meet the same requirements as any other vehicle subject to the proposed regulation. Also, vehicles that operate above these thresholds would have to meet the same requirements as any other vehicle subject to the proposed regulation.

Table IV-4: Agricultural Vehicle Mileage Thresholds

Type of Exempt Vehicle	Model Year Engine	Mileage Threshold (Less Than)	Expiration Date of January 1
Low-Mileage Ag	Any	10,000	2023
Limited-Mileage Ag	1995 and older	15,000	2017
	1996 to 2005	20,000	
	2006 and newer	25,000	

In addition, a certain limited number of additional vehicles qualifying as specialty agricultural vehicles would be exempt from the PM and NOx performance requirements until January 1, 2023. Specialty agricultural vehicles include a specific subset of agricultural vehicles, including nurse rigs, cotton module trucks, feed trucks used by cattle and calf feed lots, and water trucks owned and operated by farmers for dust control and irrigation. However, under these provisions, the number of specialty agricultural vehicles operating in the San Joaquin Valley cannot exceed 1,100 trucks, and the total number operating statewide cannot exceed 2,200, as reported to the ARB. Once these thresholds are reached, vehicles that would otherwise meet the definition of specialty vehicle are not eligible to be considered as specialty agricultural vehicles, and would have to meet the other provisions of the proposed regulation.

S. Are there any other special provisions?

The proposed regulation would delay the vehicle NOx performance requirements for certain vehicles operated below certain mileage thresholds (that is, they would not need to be replaced); however, these vehicles would remain subject to the PM requirements. For truck tractors and vehicles with a GVWR greater than 33,000 lbs, the mileage threshold would be 7,500 miles per year. Such vehicles that use power take off to perform work while stationary and yard trucks must also demonstrate they operate less than 250 hours per year. All other vehicles would be eligible for the delay if operated less than 5,000 miles per year. Such vehicles that use power take off to perform work while stationary must also operate less than 175 hours per year. This delay would expire on January 1, 2021.

Unique vehicles, such as certain single engine, twin-steer, triple-frame cranes, would not be subject to the NOx performance requirements until January 1, 2021, provided all other vehicles in the fleet operator's fleet meet the BACT performance requirements. However, these unique vehicles would remain subject to the PM performance requirements. The proposed regulation provides specific requirements that must be demonstrated for a unique vehicle to be eligible for a delay in NOx performance requirements. These requirements are:

- demonstrating that a cleaner used vehicle (having a 2007 and later model year engine) is not available; and
- a suitable cab and chassis upon which the truck bad could be mounted is not available, and
- demonstrating that the vehicle cannot be retrofit with a verified NOx DECS, and;
- installing the highest level verified PM DECS.

Cab-over engine truck tractors that exclusively pull 57 foot trailers would also be eligible to delay the NOx performance requirements until January 1, 2018, provided the engine is a 2004 model year engine and the highest level verified PM DECS is installed. All other vehicles in the fleet would need to meet the BACT performance requirements.

T. How does the regulation apply to sellers and dealers of vehicles

The requirement for sellers applies to sellers such as vehicle dealers and auction houses or financing companies who do not operate the vehicles. Their only obligation is to disclose to the buyer that the buyer may be subject to the proposed regulation.

Vehicles that are temporarily owned by dealerships or are incidentally owned by financing companies and are awaiting sale would not be subject to the recordkeeping, reporting, or performance requirements of the regulation provided the vehicles are not being operated (other than operation for sales demonstration or maintenance). Thus, dealers and financing companies that do not operate vehicles and that do not offer them for rent would not need to report their vehicles and need not comply with any performance requirements of the regulation. Dealers that hold vehicles for sale and also rent them out or lease them would be responsible for compliance as previously described for rental and lease companies.

U. What are the special provisions for two-engine sweepers?

The auxiliary engine of a private two-engine sweeper would be removed from the requirements of the portable engine ATCM and would be treated the same as the propulsion engine of any other vehicle subject to the proposed regulation. In doing so, the auxiliary engine in these vehicles would be required to meet the PM performance requirements on the same schedule as the propulsion engine.

However, to provide more time for certain sweepers that are used infrequently to be cleaned up, private two-engine sweepers that have an uncertified Tier 0 off-road auxiliary

engine would not be allowed to operate more than 250 hours per year until January 1, 2014, and up to 100 hours per year thereafter.

V. What if retrofits are not available?

If a vehicle (including school buses) cannot be equipped with the highest level verified PM DECS, the fleet owner may request a one-year extension of the compliance deadline for the PM BACT requirement. The fleet owner would have to apply to the Executive Officer for an extension each year that the retrofit is unavailable from January 1, 2011, through January 1, 2017, or until the vehicle must meet the NOx performance requirements. Provided all other vehicles in the fleet are in compliance with the PM BACT requirements of the compliance year, the Executive Officer may grant a one-year extension of the compliance deadline based on evaluation of information submitted by the fleet owner to support the application. There will be no extensions granted after January 1, 2018. By that date, any vehicle that is not equipped with the highest level verified PM DECS must be replaced or have its engine replaced with one that can be equipped with the highest level verified DECS for PM. During the period that these extensions are granted, the fleet must still comply with the appropriate NOx requirements of the regulation.

W. What if there are delays in the availability of verified DECS or new vehicles?

A fleet owner would not be penalized for manufacturer delays in the availability of retrofits, or replacement engines or vehicles, as long as the owner has purchased the required equipment or vehicle at least four months prior to the required compliance date or within 60 days of verified DECS failure. The fleet owner would have to identify the vehicles to be equipped with the verified DECS or repowered or replaced and immediately place them into operation upon receipt of the equipment or vehicles. The owner would also be required to keep records of purchase such as a purchase order or signed contract for the sale, including engine specifications for each applicable piece of equipment or vehicle,.

X. What if a verified DECS is not safe for a particular vehicle or vehicle application?

If a fleet owner believes that the highest level verified DECS for a vehicle impairs the safe operation of the vehicle, the owner would be able to request that the ARB find that the verified DECS should not be considered the highest level available. The requesting party would have to provide documentation to support its claims. ARB's Executive Officer may determine that there is no highest level verified DECS available.

Y. What are the reporting, labeling and recordkeeping requirements?

All fleets are required to maintain the records specified in the regulation. Fleet owners who chose the BACT compliance schedule option would not be required to report on their fleets. Fleets that chose to comply with the BACT percent limits option, fleet averaging option or any of the special provisions and compliance extensions would be required to report their affected vehicles and associated engine and retrofit data annually to ARB

starting in 2010. This is to ensure that the compliance status of an individual truck can be verified. These fleets would also be required to keep records of all data reported for 3 years after it is retired or January 1, 2025, whichever is earlier. The owner is required to provide these records to an agent or employee of the ARB within five business days upon request. The proposed regulation would also include requirements for the application of labels on certain agricultural vehicles and two-engine sweepers.

Z. How does the regulation apply to motor carriers, brokers, and dispatchers?

In an effort to ensure that all vehicle owners comply with the proposed regulation, in-state or out-of-state motor carriers, California-based brokers, or California residents that operate or direct the operation of any vehicle subject to the proposed regulation would be responsible for hiring fleets with compliant trucks. Both motor carriers and brokers direct the operation of their drivers, and as such, are in a unique position to verify compliance with the proposed regulation. Such a requirement is already in place for other aspects of motor vehicle compliance, such as requiring proof of vehicle insurance, proper drivers licensing, and proof of compliance with various drug testing, vehicle safety, and worker compensation requirements.

The proposed regulation would require these motor carriers and brokers to retain records documenting that the drivers they hire or dispatch are in compliance with the proposed regulation, but would have an affirmative defense for violations by a vehicle operator they dispatched if they can demonstrate that they verified the compliance status of the operator at the time they were hired or dispatched.

To assist these motor carriers and brokers, the proposed regulation includes the development of a system to allow them to easily determine the compliance status of any business or vehicle operator. Under such a system, vehicle owners would electronically report to ARB the information regarding their vehicles and their compliance mechanism. Upon completion, an Internet based system would generate a Certification of Reported Compliance that would be available for printing and would be available on-line. The system would allow motor carriers and brokers to determine which of their drivers have reported compliance with the proposed regulation to ARB.

V. DESCRIPTION OF PROPOSED CHANGES TO OTHER EXISTING REGULATIONS

This chapter outlines the proposed modifications to other existing ARB regulations. The language of the proposed amendments to these regulations is provided in Appendix B. A more detailed plain English summary of the proposed amendments are available in the TSD.

A. Why are amendments to other regulations being proposed?

A number of existing ARB diesel regulations are proposed to be amended to ensure that these existing regulations and the proposed regulation do not create overlapping requirements for the same vehicles, as well as to clarify a number of issues with the existing regulations, to provide additional compliance flexibility, and to generally improve enforceability of the existing regulations.

B. What other existing regulations are proposed to be amended?

The other existing regulations proposed to be amended are the:

- Public Agency or Utility On-road Heavy-Duty Diesel-fueled Vehicles Regulation;
- In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks Regulation;
- In-Use Off-Road Diesel-Fueled Fleets Regulation;
- Statewide Portable Equipment Registration Program (PERP) Regulation;
- Mobile Cargo Handling Equipment at Ports and Intermodal Rail Yards Regulation;
- ATCM to Limit Diesel-Fueled Commercial Motor Vehicle Idling;
- Exhaust Emissions Standards and Test Procedures – 1985 and Subsequent Model Year Heavy-Duty Engines and Vehicles, and;
- ATCM for Diesel Particulate Matter from Portable Engines Rated at 50 Horsepower and Greater.

C. What are the proposed requirements for two-engine cranes?

To establish a better regulatory structure that would reduce emissions from two-engine cranes more effectively and at a lower cost, both engines of two-engine cranes would be added to the off-road vehicle regulation (the drive engine would be included regardless of whether it is certified as an on-road engine or as an off-road engine). Also, the upper engine of a two-engine crane would be removed from the scope of the Portable Equipment ATCM and excluded from most performance requirements in the PERP. However, the proposal would not remove the registration and inspection requirements of PERP. In addition, all cranes (excluding rubber tire gantry cranes) would be removed from the scope of the Cargo Handling Equipment regulation, thereby placing the control of two-engine and off-road cranes used at ports and intermodal rail yards in the in-use off-road regulation, and single engine cranes in the proposed regulation.

D. What changes to existing regulations will be made for two-engine sweepers?

As discussed in the last chapter, special provisions are included in the proposed regulation to address two-engine sweepers. The rational for this is similar to that for providing special provisions for two-engine cranes.

To accommodate these provisions, a number of changes to existing regulations are also being proposed. This includes removing the upper engine of a privately owned two-engine sweeper from the scope of the Portable Equipment ATCM, and excluding the same engine from most performance requirements in the PERP. However, the proposal would not remove the registration and inspection requirements of PERP. The Public Agency and Utility Fleet regulation would be amended to allow public agencies to receive retirement credit for the sale of used two-engine sweepers having 2004-2006 model year propulsion engine to businesses in California. However, two engine sweepers owned by public agencies are not proposed to be included in the proposed regulation, and would need to continue to meet all other current regulatory requirements. This will allow for cleaner, used public fleet sweepers to be used by private sweeping companies instead of these cleaner vehicles being shipped out-of-state. Also, all sweepers would be removed from the scope of the Cargo Handling Equipment regulation, making them subject to the proposed regulation.

E. What changes are proposed for the Public Agency and Utility Regulation?

The proposed changes would expand the scope and applicability of the regulation to include light heavy-duty engines that were inadvertently omitted from the original scope of the regulation, as well as include PM BACT requirements for vehicles newer vehicles that were not equipped with a diesel particulate filter from the engine manufacturer. In conjunction with the expanded scope, a new provision would allow public agencies and utilities to apply for a one-year extension of the intermediate 2009 compliance deadline for light heavy-duty engines. The proposed changes would also clarify that federal fleets, and tribal (Indian) reservations and rancherias will be excluded in the definition of “municipality”.

The proposed amendments would clarify how affected fleets receive credit toward their BACT requirement by retiring a vehicle according to the provisions of the rule, and would establish a process for qualifying a vehicle for retirement through out-of-state sales.

For privately-owned utilities, staff is proposing an optional two-year delay of the intermediate and final BACT PM requirement deadlines, accompanied with a requirement that by December 31, 2013, 30 percent of their total fleet vehicles meet a 2010 engine emission performance standard, and that an additional 20 percent of their total fleet vehicles meet a 2007 or newer engine emission standard.

F. What other changes are being proposed to the PERP?

In addition to the changes described above pertaining to two-engine sweepers and cranes, the PERP would be modified to allow unregulated Tier 0 secondary off-road engines on cranes and sweepers to be newly registered under PERP. These engines

would then only be subject to the inspection requirements and fees listed in the PERP regulation. Currently, non-registered Tier 0 secondary engines on cranes and sweepers are not allowed to be registered through PERP.

G. What changes to the idling regulations are proposed?

Changes to the commercial vehicle idling and new engine standards are proposed to exempt armored cars and workover rigs from the vehicle idling limits. These changes are being proposed because when an armored car is at a pick-up location, at least one guard must stay inside the vehicle. Since the environment inside of an enclosed armored car can become extremely uncomfortable, idling of the engine for climate control is essential to the health and safety of the onboard guard. The idling requirements for workover rigs are also proposed to be amended to exempt workover rigs from the motor vehicle idling limit while they are performing the work for which the vehicle was specially designed. This proposal would allow a workover rig to carry out its specialized function when the vehicle is stationary and the engine is working.

H. What changes to the in-use off-road diesel vehicle regulation are proposed?

Just as other on-road vehicles are required to have on-road engines when sold new and if operated on the road, on-road vehicles subject to the in-use off-road diesel-fueled regulation (such as workover rigs and on-road two-engine cranes) must have on-road engines in them when sold new. New language is proposed in the regulation that would clarify the repower requirements for workover rigs and other on-road vehicles subject to the regulation. The proposed amendments would require that any replacement engine must be an on-road engine if the workover rig or other on-road vehicle is to be registered and driven on public roadways.

Staff is also proposing to clarify the exemption provision for low-use vehicles. The current regulatory language in the section exempts low-use vehicles from all of the performance requirements in the regulation. The proposed modifications would require that low-use vehicles comply with the requirements for adding vehicles to the fleet and with the idling requirement, which is consistent with staff's original intent in proposing the regulation.

VI. REGULATORY AUTHORITY

ARB has been granted both general and specific authority under the Health and Safety Code (HSC) to adopt the proposed regulation. HSC sections 39600 (General Powers) and 39601 (Standards, Definitions, Rules and Measures) confer on ARB, the general authority and obligation to adopt rules and measures necessary to execute the Board's powers and duties imposed by State law. HSC sections 43013 and 43018(a) provide broad authority to achieve the maximum feasible and cost-effective emission reductions from all mobile source categories, including both on-road and off-road diesel engines. Regarding in-use motor vehicles, HSC sections 43600 and 43701(b) respectively grant ARB authority to adopt emission standards and emission control equipment requirements.

Additionally, California's Air Toxics Program, established under California law by AB 1807 (stats. 1983, ch. 1047, the Tanner Act) and set forth in the Health and Safety Code (HSC) sections 39650 through 39675, mandates that ARB identify and control air toxics emissions in California. The identification phase of the Air Toxics Program requires the ARB, with participation of other state agencies, such as the Office of Environmental Health Hazard Assessment, to evaluate the health impacts of, and exposure to, substances and to identify those substances that pose the greatest health threat as TACs. ARB's evaluation is then made available to the public and is formally reviewed by the Scientific Review Panel (SRP) established under HSC section 39670. Following the ARB's evaluation and the SRP's review, the Board may formally identify a TAC at a public hearing. Following the identification of a substance as a TAC, HSC section 39665 requires ARB, with the participation of the air pollution control and air quality management districts (districts), and in consultation with affected sources and interested parties, to prepare a report on the need and appropriate degree of regulation for that substance. Based upon the findings of the report, ARB is vested with authority under sections 39666 and 39667 to adopt and enforce ATCMs that will respectively achieve emission reductions using best available control technology for nonvehicular and vehicular sources, the latter of which includes in-use heavy-duty vehicles.

ARB is proposing amendments to the PERP pursuant to authority granted in HSC sections 41750-41755.

1. Preemption under the Clean Air Act

The proposed regulatory actions would not be preempted by the federal Clean Air Act (CAA) section 209. Section 209(a) preempts states from adopting emission standards relating to the control of emissions from new motor vehicles or new motor vehicle engines. Section 209(b) provides that the Administrator of U.S. EPA shall grant California a waiver of preemption, unless those challenging the waiver can show that certain specified criteria for denying the waiver have been met. Section 209(e)(1) preempts all states from adopting emission standards for new nonroad engines under 175 horsepower used in farm and construction equipment and vehicles and new

locomotives and locomotive engines.[5] Section 209(e)(2) impliedly preempts all states other than California from adopting new and in-use emission standards and other requirements relating to the control of emissions of all nonroad not otherwise expressly preempted under section 209(e)(1). California can adopt and enforce regulations for these other nonroad engines upon receiving authorization from the Administrator of U.S. EPA. As with a section 209(b) waiver, the Administrator must grant authorization unless those challenging the authorization can demonstrate that certain specified criteria for denying the authorization have been satisfied.

The proposed in-use on-road diesel vehicle regulation would not be preempted under CAA section 209(a). The proposed regulation would not establish emission standards for new motor vehicles or engines; rather the proposed regulation would establish in-use performance requirements that must be met by in-use vehicles. To the extent that fleets elect to meet those performance standards by replacing in-use vehicles and engines with new vehicles and engines, those emission standards have previously been adopted and granted waivers under section 209(b).

The proposed amendments to ARB's previously adopted heavy-duty vehicle idling requirements are also not preempted by section 209. The idling requirements are in-use operational control measures that are specifically permitted under section 209(d), which provides that states have the right "to control, regulate, or restrict the use, operation, or movement of registered or licensed motor vehicles." The right to adopt in-use operational controls has been extended to nonroad engines. See *Engine Manufacturers Association v. EPA*, (D.C. Cir. 1996) 88 F.3d 1075.

The proposed amendments to California's off-road regulations are not preempted under section 209(e)(1) in that they do not apply to new off-road engines under 175 hp used in farm and construction vehicles or to new locomotives and locomotive engines. To the extent that ARB is proposing amendments to its in-use off-road programs, ARB has pending authorization requests before U.S. EPA for its previously adopted off-road regulations. Upon adoption of the proposed amendments, ARB intends to file a request with U.S. EPA that it confirm that the amendments fall within the scope of the previously submitted authorization requests.

2. Interstate Commerce Clause

The Commerce Clause of the United States Constitution (U.S. Const., Art. I, §8, cl. 3) grants Congress the power "[t]o regulate Commerce with foreign Nations, and among the several States. . . ." In addition to granting Congress an affirmative grant of authority, courts have found that the clause creates an implied restraint on state authority to enact legislation that imposes significant burdens on interstate commerce. (See *United Haulers Ass'n, Inc. v. Oneida-Herkimer Solid Waste Management Authority* (2007) 127 S.Ct. 1786; *Healy v. The Beer Institute* (1989) 491 U.S. 324, 326, fn.1.) The proposed regulation of in-use on-road diesel vehicles would not be in violation of this so-called

[5] The federal term "nonroad" and California term "off-road" refer to the same types of engines and are used interchangeably.

Dormant Commerce Clause. The proposed regulation would not be *per se* unlawful in that it would not expressly discriminate against out-of-state heavy-duty vehicle fleets, have the practical effect or purpose of protecting California economic interests at the expense of out-of-state interests, or have an impermissible extraterritorial effect on other states.

When a state statute or regulation is neutral on its face, has only indirect or incidental effects on interstate commerce, and regulates evenhandedly, the courts have applied a balancing test that weighs the state's legitimate interests in adopting the regulation against the burden that the regulation may have on interstate commerce. (*Pike v. Bruce Church, Inc.* (1970) 397 U.S. 137.). Here, the proposed regulation, which achieves significant reductions in diesel PM, an identified TAC, and NOx, with concomitant reductions in health risks to the public (i.e., resulting in fewer fatalities, hospitalization, lost school and work days) would provide great health and welfare benefits to the public. The benefits of the regulation, which would be adopted under the police powers granted to the State, clearly outweigh any burdens that the regulation would impose on interstate commerce.

3. Regulatory Takings

Some stakeholders have commented during the course of this regulation's development that the proposed regulation would result in a regulatory taking. Specifically, they argue that the proposed regulation forces the replacement of older, dirtier vehicles, and would significantly devalue the resale market for these vehicles. ARB staff does not agree that the regulation would result in an unconstitutional taking. The "Takings Clause" of the Fifth Amendment to the United States Constitution provides that the federal government shall not take private property for public use, without just compensation.[6] The prohibition was extended to the states by the Fourteenth Amendment.[7]

Generally, in real property regulatory takings claims, courts have found a compensable taking if a regulation does not substantially advance legitimate state interests or has permanently deprived an owner of "all economically beneficial or productive use" of the land. (*Lucas v. South Carolina Coastal Council (1992)* 505 U.S. 1003, 1015; *Tahoe-Sierra Preservation Council, Inc. v. Tahoe Regional Planning Agency* (2002) 535 U.S. 302) In determining whether a state may avoid compensation when it has used its police powers for public health and welfare purposes, and the action has resulted in depriving

[6] The Fifth Amendment provides in full:

> No person shall be held to answer for a capital, or otherwise infamous crime, unless on a presentment or indictment of a Grand Jury, except in cases arising in the land or naval forces, or in the Militia, when in actual service in time of War or public danger; nor shall any person be subject for the same offence to be twice put in jeopardy of life or limb; nor shall be compelled in any criminal case to be a witness against himself, nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use, without just compensation.

[7] The Fourteenth Amendment provides in relevant part that "[no State shall] deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws."

an owner of all beneficial or productive use of his land, the courts have looked to see if the proscriptions of the regulation were, in fact, covered by preexisting implied limitations on the property owner's title. (*Lucas v. South Carolina Coastal Council*, *supra,* 505 U.S. at 1027.) In *Lucas*, the Court acknowledged that where such implied limitations exist, "the property owner necessarily expects the uses of his property to be restricted, from time to time, by various measures newly enacted by the State in legitimate exercise of its police powers." (*Id.)*

Of significance to the instant proposed regulation, the Court went on to clarify that implied limitations on ownership rights almost always exist with regard to the commercial value of personal property. The Court stated:

> [I]n the case of personal property, by reason of the State's traditionally high degree of control over commercial dealings, [the personal property owner] ought to be aware of the possibility that new regulation might even render his property economically worthless. (*Id.*, at 1027-1028.)

In line with the Supreme Court's decisions with regulatory takings, the proposed regulation cannot be considered as unconstitutional. First, the regulation will not deprive the stakeholder of all beneficial value of the regulated engines and vehicles. Even those engines and vehicles that must be retired under the proposed regulation will continue to retain fair market value in domestic and international markets outside of California. Second, consistent with *Lucas,* even in the unlikely event the regulated engines and vehicles lost all of their beneficial value, ARB is exercising its vested police power authority to regulate in-use on-road fleets. Over the past 40 years, ARB has adopted a panoply of air quality regulations affecting nearly every vehicular source category. Given the extreme air quality problems confronting most areas of the state, owners of in-use on-road vehicles should be well aware that regulation of their fleets was likely to occur, especially given the high level of emissions associated with the operation of such vehicles.

VII. EMISSION IMPACTS

The proposed regulation is projected to provide significant diesel PM and NOx emissions reductions. This chapter will discuss the projected benefits of those reductions to public health and the environment.

A. What are the emission benefits of the regulation?

The proposed regulation would provide substantial diesel PM and NOx emissions reductions that would have a substantial positive air quality impact throughout California. By reducing emissions of pollutants that contribute to elevated ambient levels of PM2.5 and ozone, the proposed regulation would help achieve attainment of the NAAQS for these pollutants, and would meet previous emission reduction commitments in the South Coast and San Joaquin Valley SIPs. In addition, significant additional health benefits would also be obtained with the reductions of ambient levels of diesel PM.

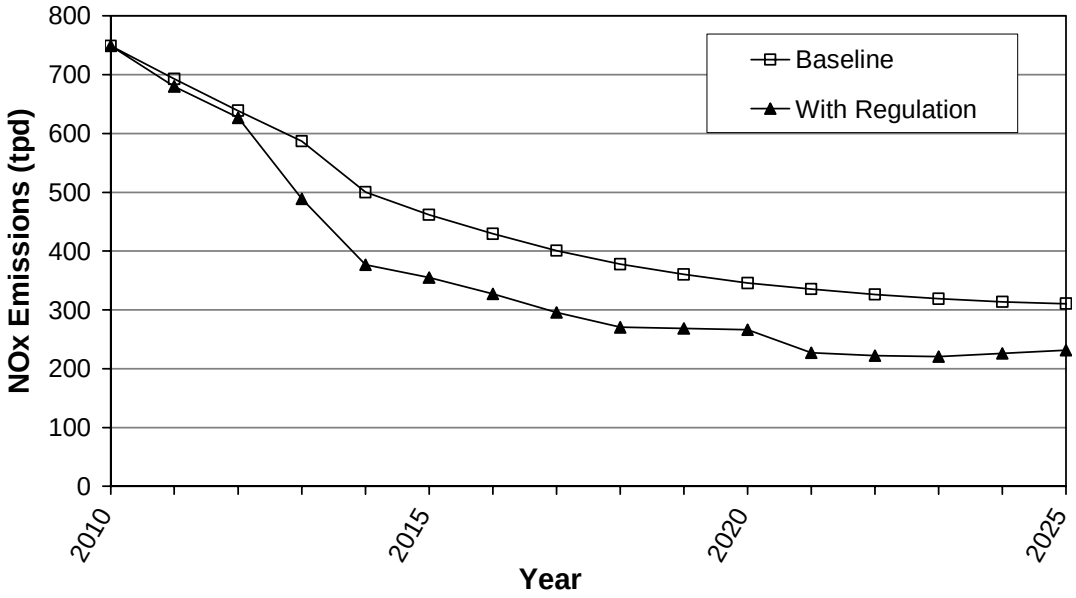
The proposed regulation is projected to reduce diesel PM emissions from the 2000 baseline by 80 percent in 2020. While this falls somewhat short of the 2020 goal set forth in the Diesel RRP for reducing diesel PM by 85 percent from 2000 baseline levels, the proposed regulation does achieve the maximum achievable reductions of diesel PM emissions from in-use on-road diesel vehicles.

The proposed regulation will provide significant near-term and long-term NOx benefits. The projected NOx emissions reductions from the proposed regulation are 124 tons per day (tpd) and 98 tpd, for 2014 and 2023, respectively. As shown in Table VII-1and Figure VII-1, NOx emissions would be 25 percent lower in 2014, and 31 percent lower in 2023 than they would be in the absence of the proposed regulation.

Table VII-1: Statewide NOx Emissions Reductions from the Proposed Regulation

Emission Reductions	2010	2014	2017	2020	2023
NOx without Regulation (tons per day)	749	500	401	346	319
NOx with Regulation (tons per day)	749	377	296	266	221
Benefits (tons per day)	--	124	105	79	98
Percent Reduction	--	25%	26%	23%	31%

Figure VII-1: Projected NOx Emissions With and Without the Regulation

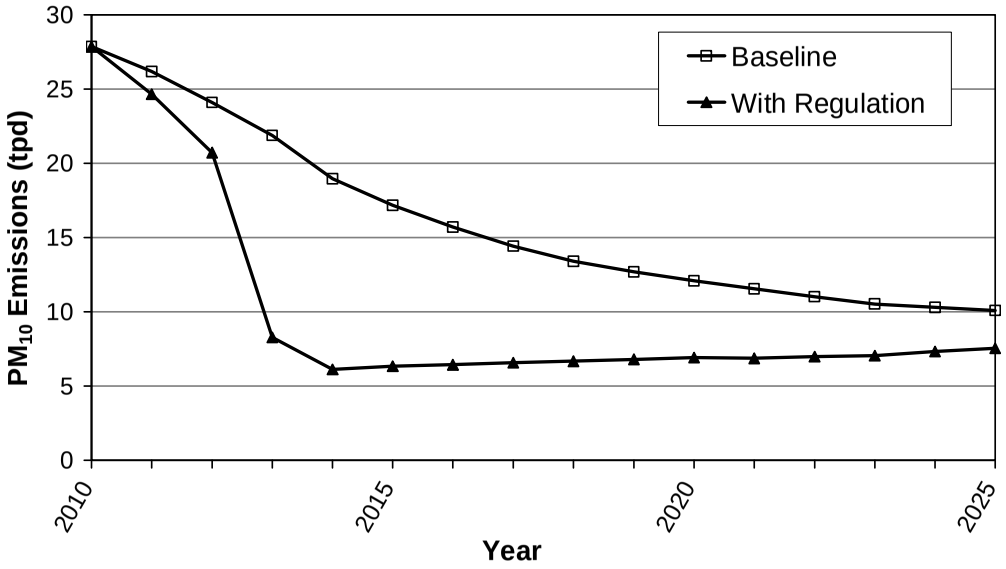


Similar to NOx, the proposed regulation will provide significant PM emission reductions. With the proposed regulation, PM emissions are projected to be reduced by about 13 tpd in 2014 and 3.5 tpd in 2023 relative to baseline levels. As can be seen in Table VII-2 and is shown in Figure VII-2, these reductions represent a 68 percent decrease in PM emissions in 2014 and a 33 percent decrease in 2023.

Table VII-2: Statewide PM Emissions Reductions from the Proposed Regulation

Emission Reductions	2010	2014	2017	2020	2023
PM without Regulation (tons per day)	27.9	19.0	14.4	12.1	10.5
PM with Regulation (tons per day)	27.9	6.1	6.6	6.9	7.1
Benefits (tons per day)	--	12.8	7.8	5.2	3.5
Percent Reduction	--	68%	54%	43%	33%

Figure VII-2: Projected PM Emissions With and Without the Regulation



B. Does the proposed regulation meet California's SIP commitments?

The 2007 SIP (ARB, 2007a) was based on the applicable version of ARB's on-road motor vehicle emissions model, EMFAC2007. Staff, in support of this rulemaking, has undertaken comprehensive efforts to update and improve the truck inventory since the SIP was adopted. New data not available at the time of SIP development was used in assessing the costs and benefits of this statewide rulemaking. However, assessing the rule benefits in terms of meeting the regional SIP targets must be done with the SIP inventory, since the SIP inventory is the official inventory for judging SIP compliance.

The 2007 SIP truck measure envisioned modernizing truck fleets operating in California to the equivalent of the cleanest adopted new engine (2010) standards. The proposed regulation meets that goal on the pace necessary to meet all the SIP target dates. While the quantification of benefits with the new inventory is different than with the SIP inventory, the difference is in accounting not rule effectiveness. A primary reason for the difference is that new data shows there is more travel by newer, cleaner out of state trucks than previously estimated in EMFAC2007. As a result, fewer benefits can be attributed to the proposed regulation for out of state trucks because they will already employ 2010 compliant engines. The rule benefits are primarily attributed to the modernization of in state fleets that are older and dirtier. In short, the proposed regulation accomplishes the modernization of truck fleets as envisioned in the SIP.

Table VII-3 and Table VII-4 show, using the regional SIP inventories, the benefits of the proposed regulation compared to the expected reductions. The SIP targets in these tables refer to the fleet modernization portion of the truck SIP measure. The second part of the SIP measure for trucks, a program to address excess emissions, will be developed separately. The proposed regulation meets or exceeds the combined NOx and PM2.5 SIP fleet rule targets in both the South Coast and San Joaquin Valley for all years. In 2014, in the South Coast, the SIP target is met with slightly more PM2.5 reductions and

slightly less NOx than expected. The PM2.5 modeling used in the South Coast Air District SIP shows that direct PM2.5 emission reductions are relatively more effective in reducing ambient particulate levels than are NOx reductions. As shown in Table VII-3, the rule achieves 60 tons per day of NOx in 2014 and the equivalent of six tons per day of NOx with the extra PM2.5 reductions. The SIP also included reductions in 2020 to support attainment in regions downwind of South Coast and the San Joaquin Valley. These 2020 goals are met for both regions.

Table VII-3: South Coast SIP Emission Reduction Targets for Trucks

Year	NOx (tpd in SIP inventory)		PM2.5 (tpd in SIP inventory)	
	SIP Target for Rule[1]	Rule	SIP Target for Rule[1]	Rule
2014	66[2]	60[3] plus 6 equivalent tons	2.3	3.5[3]
2020	23	27	--	--
2023	15	22	--	--

[1] The truck measure reductions estimated in the SIP include the benefits of programs to reduce excess emissions. The numbers presented here are the SIP goals for the modernization rule only.
[2] This target represents expected benefits from the enhanced truck measure designed to provide additional reductions in 2014 for South Coast $PM_{2.5}$ attainment and to accelerate ozone attainment in the San Joaquin Valley.
[3] SIP compliance assessment includes agricultural truck compliance option.

Table VII-4: San Joaquin SIP Emission Reduction Targets for Trucks

Year	NOx (tpd in SIP inventory)		PM2.5 (tpd in SIP inventory)	
	SIP Target for Rule[1]	Rule	SIP Target for Rule[1]	Rule
2014	48	66	2.5	4.3
2017	49[2]	49[3]	--	--
2020	17	29	--	--
2023	8	23	--	--

[1] The truck measure reductions estimated in the SIP include the benefits of programs to reduce excess emissions. The numbers presented here are the SIP goals for the modernization rule only.
[2] This target represents expected benefits from the enhanced truck measure designed to provide additional reductions in 2014 for South Coast $PM_{2.5}$ attainment and to accelerate ozone attainment in the San Joaquin Valley.
[3] SIP compliance assessment includes agricultural truck compliance option.

C. What effect would the regulation have on the health of Californians?

Between 2010 and 2025, staff estimates that the proposed regulation will provide emission reductions of approximately 34,600 tons of PM2.5 and 480,000 tons of NOx. These emission reductions would result in lower ambient PM2.5 levels and reduced exposure to diesel PM. Staff estimates that statewide, approximately 9,400 premature deaths (2,800 – 17,000, 95 percent confidence interval (95% CI)) statewide would be

avoided by the year 2025 from the implementation of the proposed regulation. Estimates of other health effects avoided statewide include:

- 1,100 hospital admissions due to respiratory causes (600 to 1,600, 95% CI)
- 1,200 hospital admissions due to cardiovascular causes (730 to 1,800, 95%CI)
- 150,000 cases of asthma-related and other lower respiratory symptoms (59,000 to 230,000, 95% CI)
- 12,000 cases of acute bronchitis (0 to 25,000, 95% CI)
- 950,000 work loss days (800,000 to 1,100,000, 95% CI)
- 5,500,000 minor restricted activity days (4,500,000 to 6,500,000, 95% CI)

Benefits from the proposed regulation are substantial. Staff estimates the benefits to be $69 billion using a 3 percent discount rate or $48 billion using a 7 percent discount rate. (ARB follows U.S. EPA practice in reporting results using both 3 percent and 7 percent discount rates.) A large portion of the monetized benefits result from avoiding premature death. The estimated benefits from avoided morbidity are approximately $510 million with a 3 percent discount rate and less than $350 million with a 7 percent discount rate. Approximately 68 percent of the benefits are associated with reduced PM from NOx emissions, and the remaining 32 percent from direct PM emissions.

On a local level, as part of the Commerce Study, staff also estimated these same health benefits between 2010 through 2020. Such benefits would be a subset of the statewide numbers reported above. The anticipated benefits in and around the City of Commerce are:

- 78 avoided premature deaths (20 to 130, 95% CI)
- 60 avoided hospital admissions – respiratory and cardiovascular (24 to 90, 95% CI)
- 2,600 avoided asthma attacks (1,000 to 4,000, 95% CI)
- 220 avoided acute bronchitis (0 to 48, 95% CI)
- 14,700 avoided work loss days (11,500 to 16,500, 95% CI)
- 80,000 avoided minor restricted activity days (70,000 to 93,000, 95% CI)

D. What is the impact of the proposed regulation on potential cancer risk reduction

Overall, diesel PM emissions from on-road diesel vehicles are forecast to decrease in future years due both to the implementation of several regulations already adopted by the ARB, as well as from the proposed regulation. As noted previously, the proposed regulation will provide an 80 percent reduction in diesel PM emissions relative to the 2000 baseline. As diesel PM emissions decrease, so will the potential cancer risks associated with exposure to diesel PM.

On a local level, using the results from the Commerce study, staff's analysis estimates that risk levels in and around the city of Commerce will be reduced by over 80 percent, to

less than 70 in a million, by 2015. However, localized cancer risks will begin to increase as growth begins to surpass the reductions realized by the regulations, with the predicted remaining cancer risk in the 2020 timeframe rising to about 75 in a million in and around the city of Commerce. As vehicle miles traveled in the future continues, this increase in cancer risk will continue, albeit at a significantly lower rate of increase than would occur in the absence of the proposed regulation.

E. Are there potential risks associated with low-use and limited use agricultural vehicles?

To evaluate the potential impacts on risk from staff's proposed agricultural vehicle provisions, staff performed a screening health risk assessment of two "generic" agricultural processing facilities that might receive vehicles that do not meet the PM performance standards of the proposed regulation.

For its analysis, staff modeled two generic facilities, one in the Bakersfield area, and one in the city of Commerce. In its analysis, staff assumed that only vehicles that do not meet the PM performance standards (i.e., do not have diesel particulate filters) visited the facility. As such, to the extent that vehicles meeting the PM performance standards visit these facilities, the estimated risk impacts are a worst case. In other words, the potential risk impact of the proposed agricultural vehicle provisions depends not on the total number of trucks that visit a facility, but rather on the number of trucks that visit a facility and do not have PM controls installed. In addition, because this effort was designed as a screening evaluation, actual risk levels for a specific facility will vary due to site specific parameters, including the number of uncontrolled trucks and associated emission rates, operating schedules, routes traveled to the location, site configuration, site meteorology, and distance to receptors.

To investigate the potential risks associated with low-use and limited use agricultural vehicles used to transport agricultural commodities from the field to a processing facility, staff developed general assumptions bracketing a range of possible operating scenarios and estimated potential cancer risks. Using this approach, cancer risk was estimated as a function of the number of "uncontrolled" truck trips and the distance from the roadway or processing facility. Since the activity at any given processing facility can vary based on its throughput, staff's analysis provides an initial assessment of potential impacts of staff's proposal. However, unless an actual facility is modeled, using data specific to that facility, the actual risk from staff's proposal cannot be determined.

Table VII-5 below provides the results of staff's analysis for Bakersfield, and shows the distances from the facility or roadway boundary wherein the risk is above 10 in a million for different uncontrolled agricultural vehicle volumes. For example, a facility that has 28,800 roundtrip truck trips per year, the risk level of 10 in a million could extend to a downwind distance of about 1100 feet from the facility or roadway boundary.

Table VII-5: Distances from a Facility Boundary in Bakersfield wherein the Risk is 10 in a Million for Different Agricultural Truck Volumes

Truck Trips/Year	Distance to Risk Level of 10 per Million (feet)
11,520	164
17,280	394
23,040	820
28,800	1,148
43,200	1,968
57,600	2,789

Because of the uncertainty with staff's analysis, it is unclear as to the actual impact of staff's proposal on sensitive receptors near agricultural processing facilities and along the roadways leading to them. While many of these facilities are located in rural areas, away from population centers, not all of them are. In addition, even for those that are located in rural areas, it is necessary in some instances for these vehicles to travel through more urban areas. Finally, while staff's analysis looked at individual facilities, it was not able to understand the cumulative impact of several facilities located in close proximity to one another. While staff does not believe that these findings are sufficient to delay staff's proposal for low-use and limited use agricultural vehicles, staff believes it is necessary to better understand this potential impact by evaluating several actual facilities throughout the state. Staff intends to continue their evaluation of the potential risk impacts of this proposal over the next 12 to 18 months, and, if appropriate, develop recommendations to ensure that the proposal does not result in an unacceptable impact on risk to communities.

F. What effect would the regulation have on global warming and greenhouse gas emissions?

Staff believes the net climate change effect of the proposed regulation would be positive. Staff's analysis of the climate change impact of the proposed regulation assessed only the direct emissions from the affected vehicles. Some actions to comply with the proposed regulation could increase carbon dioxide (CO_2) emissions by increasing fuel consumption, whereas other actions would reduce fuel consumption. For example, a vehicle owner who complies with the regulation by retrofitting the vehicle with a diesel particulate filter could potentially experience a decrease in the vehicle's fuel economy of about 2 percent, thus increasing CO_2 emissions. However, as the fleet is modernized to comply with the proposed regulation, improvements in fuel economy from newer vehicles are expected to offset the potential climate change impacts of the widespread installation of diesel particulate filters on the overall fuel economy of the fleet. In addition, the proposed regulation would also reduce emissions of black carbon – a component of diesel PM and a likely contributor to global warming – which would further reduce climate change impacts attributed to the overall impact on fuel economy.

VIII. COSTS AND ECONOMIC IMPACTS

This chapter discusses the estimated cost of the proposed regulation and the associated economic impacts across various business sectors and industries, on consumers, and on the State's $3.1 trillion dollar economy. The economic impact on school districts and government agencies is also discussed.

A. How much would the proposed regulation cost?

The total regulatory cost of the proposed regulation is estimated to be $5.5 billion, in 2008 equivalent dollars ($2008), and represents the estimated cost of what fleets would have to spend to comply with the proposed regulation above what they normally spend for vehicle replacements. Of these costs, approximately $4.5 billion is attributable to California based vehicles and California fleets, and approximately $1.0 billion is attributable to vehicles registered out-of-state. This cost would be spread over the years 2010 to 2025, with the highest costs occurring in the years 2012 and 2013 and the lowest costs occurring in 2014. These costs represent the cost of early vehicle replacement with newer, cleaner vehicles, costs for PM retrofit devices, and other annual operating and maintenance costs.

Because of the challenges in estimating expected costs savings due to lower vehicle maintenance costs as a result of operating newer engines or vehicles, and because the cost estimate is not optimized for the least cost compliance options for fleets, these costs should be considered conservative. Also, expenditures for new vehicles that would be incurred in the absence of the regulation due to normal vehicle replacement (i.e., money that fleets are already spending on new vehicles) was not attributed to the proposed regulation nor included in these estimates.

To put these regulatory costs in perspective, on an annual basis, the cost to the transportation and warehousing industry, which is the sector that will be most impacted by the proposed regulation, is estimated to be about 0.18 percent of their total gross domestic product; and in 2013, which is the highest capital cost year, the estimated cost is estimated to be about 0.3 percent of their total gross domestic product. It is important to note that while this cost is significant, it is only a small fraction of the overall cost benefits of the proposed regulation (estimated to be between $48 and $69 billion).

B. How much would the proposed regulation cost fleets?

Costs to individual fleet owners would vary depending on the size of the fleet, the vehicle types, vehicle age, and normal vehicle replacement practices. Costs would also vary depending on the compliance strategy chosen by each fleet. Additionally, depending on the compliance strategy selected, there could be ongoing costs for annual reporting and annual maintenance costs for verified PM DECS.

To understand the variability that exists in estimating costs for various fleets, it is important to understand the percentage of vehicles that will have to take actions under the proposed regulation. For interstate carriers, both instate and out-of-state, the costs

are not expected to be significant, as approximately 65 percent of these fleets normally purchase new or newer vehicles that would meet the requirements of the proposed regulation, resulting in no costs for compliance. For instate operators, only 40 percent of fleets regularly purchase vehicles new enough to meet the requirements of the proposed regulation. In both these example, fleets that regularly purchase older used vehicles and keep them for longer periods would experience the highest increased costs. In general, the costs of the proposed regulation will fall predominantly on California based fleets, as these vehicles tend to be significantly older than those operated by out-of-state operators.

C. What would be the impact on an owner/operator?

The cost of the proposed regulation to a small business owner/operator would vary depending on a number of factors, including their normal vehicle purchasing practices, the number of miles traveled per year, and their vocation. For interstate owner/operators, staff estimates that over 60 percent purchase, through normal business practices, vehicles that would meet the requirements of the proposed regulation, resulting in no costs for compliance. For instate operators, this number falls to just over 20 percent.

To minimize costs to owner/operators, the proposed regulation provides that these fleets would be exempt from all the performance requirements of the proposed regulation until January 1, 2013, and then would only have to upgrade to a 2004 model year truck with a diesel particulate filter.

For the estimated 80 percent of the instate owner/operators who would not meet these requirements through normal purchases (because they typically buy older used vehicles and drives fewer annual miles), they would incur costs. As a worst case scenario, in 2012, an owner of a 1993 vehicle would need to replace the engine or the vehicle to comply with the proposed regulation. If the owner chose to buy a 6 year old tractor (which would be a 2007 model year truck having a diesel particulate filter), it would cost about $35,000, where the older vehicle could be traded in for $5,000. To handle these capital costs, the vehicle owner would likely need to obtain a loan of about $30,000 with a payment of about $700 per month (at a 12 percent interest rate). After accounting for higher truck reliability, lower maintenance costs, higher insurance costs, and depreciation, the owner's net cash flow could decrease about $100 to $200 per month for five years until the loan is paid off. Under this scenario, this operator could keep this vehicle until the end of 2020.

In addition, to the extent a small business would qualify for incentive funding (as discussed later), the anticipated compliance costs could be even lower, further reducing the economic impact.

D. What would be the impact of the proposed regulation on school districts?

Staff does not expect the proposed provisions for school buses to have a significant impact on school districts or school transportation providers. Taking into consideration $200 million that are available through the Lower Emission School Bus program for bus

replacement and retrofit, the remaining regulatory costs only total about $27 million over 8 years (2010-2017). Staff believes affected school districts should be able to absorb these costs into their existing transportation budgets.

E. What would be the impact on government agencies?

Because public fleets are already subject to the regulation for public agencies or utility on-road heavy-duty diesel-fueled vehicles, there will be no costs for these vehicles associated with the proposed regulation. However, costs to state government would be incurred primarily for additional staff resources needed by the ARB for outreach, implementation and enforcement. Other state agencies would not be affected. Implementation activities include statewide training workshops and seminars, one-on-one meetings, presentations at trade shows, and providing information at conferences and expositions. The proposed regulation would not affect federal funding to the state.

Because the applicability of the regulation for a public agency or utility on-road heavy-duty diesel-fueled vehicles is proposed to be changed to remove federal government fleets from that regulation to the proposed regulation, federal government fleets will incur costs associated with the proposed regulation. However, the representatives of the federal General Services Administration (GSA indicated they would likely allocate 2007 and newer vehicles in the federal fleet to California to meet the PM requirements from 2011 to 2014 rather than installing verified PM DECS. They also indicated that after 2014 they would resume their normal vehicle replacement cycles and would meet the 2021 PM and NOx requirements without any accelerated replacements. As such, the anticipated costs to the federal government are expected to be negligible.

F. How would the proposed regulation affect different California industries?

The cost impact of the proposed regulation would vary across different California business sectors. As was previously discussed, the anticipated cost of the proposed regulation on California companies is about $4.5 billion, in 2008 dollars. As can be seen in Table VIII-1, the transportation industry has the highest total costs of all the impacted business sectors, with the total increased costs expected to be about $1.4 billion, in 2008 dollars. The construction industry is the second most impacted industry, with estimated costs of about $1 billion.

Table VIII-1: Estimated Regulatory Costs by Business Sector

Business Sector	Increased Capital Costs (millions of $2008)	Annual Costs (millions of $2008)	Total Increased Costs (millions of $2008)
Accommodation or Food Services	$84	$15	$98
Agriculture, Forestry, Fishing, or Hunting	$198	$68	$266
Arts, Entertainment or Recreation Services	$14	$1	$15
Construction	$960	$100	$1,061
For-Hire Transportation or Warehousing	$1,359	$486	$1,845
Manufacturing	$125	$43	$168
Mining	$117	$20	$137
Other Services	$85	$49	$133
Retail & Wholesale Trade	$401	$106	$507
Utilities	$4	$10	$14
Vehicle Leasing or Rental	$208	$71	$279
TOTAL	$3,554	$969	$4,523

To put these costs into context, it is useful to consider these costs relative to the gross domestic product of these industries. The gross domestic product is a relative measure of the revenue each industry generates, and was used by ARB when evaluating the economic impacts, in terms of changes in revenue and employment, of the proposed regulation. Table VIII-2 below provides a summary of the estimated regulatory costs of the proposed regulation as a percentage of each business sector's overall gross domestic product.

Table VIII-2: Estimated Regulatory Costs a Percentage of Estimated Revenue (Gross Domestic Product)

Business Sector	(2010-2025)	(2013)
Accommodation or Food Services	0.007%	0.022%
Agriculture, Forestry, Fishing, or Hunting	0.035%	0.082%
Arts, Entertainment or Recreation Services	0.003%	0.007%
Construction	0.056%	0.116%
Transportation or Warehousing (For-Hire)	0.181%	0.325%
Manufacturing	0.002%	0.005%
Mining	0.053%	0.148%
Other Services	0.054%	0.021%
Retail & Wholesale Trade	0.006%	0.013%
Utilities	0.002%	0.000%
TOTALS	0.018%	0.044%

As can be seen, as an average over the life of the proposed regulation, the estimated impact on gross domestic product for all business sectors is less than 0.02 percent; and in many cases considerably less. Even in the highest capital cost year (2013), the greatest impact is on the transportation and warehousing sector, with an estimated impact of about 0.3 percent of gross domestic product.

However, during this same time, the proposed regulation will likely create new business opportunities in the new and used vehicle sales industry, in the supply and distribution of urea for use in selective catalytic reduction systems, and for the sales, installation, and maintenance of verified PM DECS.

G. How significant would the proposed regulation's costs be to fleets, and how would fleets handle the costs?

Staff expects many, if not most, affected businesses to pass through the regulation's costs to their customers. This could be achieved, for example, through higher shipping rates, or higher costs for manufactured goods, resulting in higher revenue (but not necessarily higher profits) for affected fleets. For example, for many transportation companies, staff has estimated that revenue (on a per mile basis) would need to increase by less than one percent, or less than $0.01 per mile, to offset the costs of the proposed regulation. For many operators, typical per mile revenues can range from $1.00 to $1.50.

Because staff had limited data from fleets to be able to perform a cash flow analysis to evaluate the ability of fleets to absorb the costs of the proposed regulation, staff was unable to perform a detailed assessment. However, based on the estimated gross domestic product impacts of the proposed regulation, staff believes many fleets would be able to absorb the costs of the proposed regulation if they were unable to pass through the costs. In addition, to the extent fleets, and in particular small fleets, pursue available incentive funding, this impact may be mitigated or eliminated.

H. What are the cumulative impacts of the proposed regulation on businesses?

As part of their assessment, staff attempted to evaluate the cumulative impacts of multiple ARB regulations on various business sectors impacted by the proposed regulation. Staff assessment primarily focused on two sectors: transportation and warehousing, and construction, as these two business sectors represent a significant portion of the overall costs of the proposed regulation. Despite a number of public and private requests for financial information to perform a thorough analysis, staff did not receive the information necessary to fully evaluate and assess the cumulative impacts of these regulations on these business sectors. However, staff utilized alternative methods to evaluate the extent to which fleets were impacts to provide a qualitative assessment. The results of staff's evaluation are discussed below.

For transportation and warehousing, staff evaluated the interaction of a number of different existing regulations with the proposed regulation. These included the in-use off-road diesel vehicle regulation and the portable engine ATCM. First, using data obtained from a survey of the transportation sector developed and administered by staff, staff found that only about 14 percent of the fleets were impacted by multiple regulations. In addition, of those that also had to comply with the in-use off-road diesel vehicle regulation, 12 of the14 percent met the definition of a small fleet under that regulation, meaning they did not have to replace any of their off-road vehicles, and did not have to install verified DECS until 2015. Since the regulatory compliance timelines between these regulations for these fleets typically do not overlap, since few fleets are impacted by multiple regulations, and since most of those that are impacted only have to meet lesser requirements in the in-use off-road diesel vehicle regulation, staff does not believe that, overall, many fleets in the transportation sector will have to address the issue of cumulative costs with these regulations; and for those that do, staff does not believe that the costs should be significant.

For the construction sector, staff evaluated the interaction of the proposed regulation with the in-use of-road diesel vehicle regulation. Staff estimates that of the estimated 76,000 on-road construction trucks, only about a third of them are in large, off-road construction fleets, and many of these on-road vehicles are medium heavy-duty vehicles, which are significantly less expensive to replace. Based on data collected as part of the rulemaking for the in-use off-road diesel vehicle regulation, staff estimated that these fleets would incur an additional 6 percent in compliance costs for the proposed regulation above what would be expected from complying with the in-use off-road diesel vehicle regulation. As such, staff does not believe the cumulative costs for these construction fleets will be significant.

I. How would the proposed regulation affect consumers?

In the context of the State's $3.1 trillion economy, the economic impact of the proposed regulation is minor and is not expected to impose a noticeable impact on consumers. However, if all of the regulatory costs were passed through to consumers, staff estimates this could result in a modest increase in the price of consumer goods of about 0.04

percent in the highest cost year (2013), and about 0.014 percent on average over the life of the proposed regulation. To put this into context, this equates to about a 1 to 2 cent increase for a pair of shoes, less than one one-hundredth of a cent increase per pound of produce, or an increase of from $3 to $10 for a new car.

J. How would the proposed regulation impact the value of the existing vehicles?

To meet the requirements, many fleets would need to replace older vehicles with newer ones having cleaner engines. This would tend to decrease the value of older, dirtier vehicles and increase the value of newer, cleaner vehicles. However, even with these requirements, and the inability to operate older vehicles in California, the demand in the United States and around the world for quality used vehicles will remain. Staff expects that the worldwide demand for trucks such that these older vehicles will continue, meaning these vehicles should retain much of their residual value, less increased transportation costs to destinations outside California.

However, staff cannot predict with certainty the decrease in value of older vehicles as a result of the regulation; but for modeling purposes, staff assumed a decrease in value ranging from no cost for out-of-state vehicles, to up to $5,000 per vehicle for in-state, single unit trucks, which represents the estimated shipping costs for transporting a vehicle for sale out-of-state or to make needed modifications for sale out of state.

K. What would be the statewide economic impact of the proposed regulation?

Increased costs of the proposed regulation would affect the California economy through many complex interactions. In addition to an assessment of the regulation's impact on individual fleets, staff in consultation with University of California, Berkeley researchers also conducted an assessment of the economic impacts of the proposed regulation on the California economy. Staff used a computable general equilibrium model of the California economy called E-DRAM to model the many complex interactions of the California economy. The results of the analysis confirmed that in the context of the State's economy, the economic impact of the proposed regulation is minor and is not expected to impose a noticeable impact.

The impact of the proposed regulation on the California economy was evaluated in the year 2013, when the annual costs to the affected industries were the highest. Staff projects the costs of the proposed regulation would reduce California economic output by roughly $1.3 billion (0.04 percent). Personal income projections would also decline by roughly $500 to $600 million (0.03 percent) in 2013. Changes in the overall economy on the order of 0.04 percent are not expected to be noticeable.

The E-DRAM analysis did not include the economic benefit expected from decreased health costs resulting from the proposed regulation. The economic valuation of the health impacts are estimated to range from $48 to $68 billion from 2010 through 2025 and would more than offset the anticipated costs of the proposed regulation.

L. What would be the impact of the proposed regulation on employment?

Because the proposed regulation would impose a cost on the overall economy, staff expects it could reduce overall employment in California by a small amount. In 2013, the highest cost year, employment would be expected to decrease by about 4,600 to 13,600 jobs (less than 0.08 percent) in 2013, out of an estimated 14.3 million jobs statewide. This decrease would be spread throughout the economy, and not just felt by any one business sector directly impacted by the proposed regulation. However, as the California economy continues to grow and add new jobs over the foreseeable future, the proposed regulation would not eliminate the creation of new jobs in California, but it may slow the rate at which new jobs are created.

M. How cost effective would the proposed regulation be and how does this compare to previous measures adopted by ARB?

The cost-effectiveness for the proposed regulation is determined by dividing the total capital costs of the proposed regulation by the total pounds of diesel PM and NOx reduced during the years 2010 to 2025. The expected cost effectiveness of this regulation is $1.76/lb for NOx and $46/lb for PM. All costs are in 2008 equivalent expenditure dollars.

In considering the cost effectiveness of the regulation relative to premature mortality avoided, a PM cost effectiveness of $46/lb of PM is about 5.5 times lower than the U.S. EPA's benchmark for value of avoided death (which equates to about $248/lb). Therefore, this regulation is a cost-effective mechanism to reduce premature deaths that would otherwise be caused by diesel PM emissions without this regulation relative to that benchmark.

Table VIII-3 compares the estimated cost-effectiveness of the proposed regulation to the estimated cost-effectiveness of other recently adopted diesel regulations. For comparison purposes, all cost-effectiveness estimates shown attribute part of the total rule cost to PM reductions and part to NOx reductions. Rules are ranked from lowest $/lb PM cost to highest.

Table VIII-3: Comparison of the Average Cost-Effectiveness of the Proposed Regulation to Average Cost Effectiveness of Recently Adopted Air Toxic Control Measures

Rule	2008 $/lb NOx Cost-effectiveness	2008 $/lb PM Cost-effectiveness	Source of Estimate
Stationary Compression Ignition Engine ATCM	0.92/lb HC+NOx	$7.70/lb PM	(ARB, 2003b)
Portable Engine ATCM	<$2/lb NOx	$8-10/lb PM	(ARB, 2004)
Cargo Handling ATCM	$1/lb NOx	$21/lb diesel PM	(ARB, 2005c)
Solid Waste Collection Vehicle ATCM	1.79/lb HC+NOx	$32/lb PM	(ARB, 2003a)
In-Use Off-Road Diesel Vehicle Rule	$2.1 - 2.5/lb NOx	$37 - 43/lb PM	(ARB, 2007b)
Proposed Regulation	$1.4 – 1.9/lb NOx	$42 – 48/lb PM	See Ch. XIII
Public Fleets Rule	$10.9/lb HC+NOx	$160/lb PM	(ARB, 2005d)

IX. AVAILABILITY OF INCENTIVE FUNDING TO COMPLY WITH THE REGULATION

This chapter discusses the current and future availability of incentive funding programs, and how they may help eligible affected fleets.

A. Are there state incentive funds available to help fleets comply with the regulation?

Yes, but not enough to cover the majority of the costs of the proposed regulation. State incentive funding programs have historically played a complementary role to the state's regulatory emission reduction programs towards meeting the state's SIP requirements and achieving California's air quality goals. California's funding programs typically require participation prior to established regulatory deadlines; thus to qualify, fleets affected by the proposed regulation will need to act quickly if they are interested in pursuing the limited amount of available state incentive funding.

In 2006, California voters approved the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 (Proposition 1B). This measure authorized the California Legislature to appropriate $1 billion for emission reductions in the State's good movement corridors. In approving the Proposition 1B Program, the Board has targeted $360 million to provide incentives to clean-up heavy duty trucks (those not routinely serving seaports or intermodal rail yards). Eligible upgrades include retrofits, repowers, and replacements with funding in the form of grants for purchase or lease-to-own programs. The Proposition 1B ballot language directs ARB to fund emission reductions not otherwise required by law or regulation. Therefore, once the Board adopts a regulation, upgrades eligible for funding must result in early reductions in advance of the BACT compliance date or achieve extra reductions beyond what is required in the BACT requirements.

In addition, created in 1998, the Carl Moyer Program provides incentive grants to encourage the voluntary purchase of cleaner-than-required engines and equipment that provide early or extra emission reductions. Eligible projects include cleaner on-road, off-road, marine, locomotive and stationary agricultural pump engines. The program achieves near-term reductions in emissions of NOx, PM, and HC. Over its first seven years, the Carl Moyer Program provided $170 million to clean up approximately 7,500 engines throughout California. Legislation in 2004 provided the Carl Moyer Program with up to $140 million per year through 2015. Similar to the Proposition 1B funding, State law requires that Carl Moyer Program projects provide emission reductions early or beyond what is required by regulation.

Finally, Assembly Bill (AB) 118 created, among other things the Air Quality Improvement Program (AQIP) to be administered by ARB. The AQIP has about $50 million annually beginning in FY 2008-09 to improve California's air quality by funding vehicle and equipment projects, air quality research, and advanced energy technology workforce training. In the State's fiscal year 2008-09 budget, about $48 million was made available for loans to aid heavy-duty vehicle owners that would be impacted by the proposed

regulation. It is expected that this money, if used to provide government backed loans, can leverage more than $300 million in private sector lending.

Many Federal and State programs are administered by local agencies so vehicle owners should check with their local air quality management district for funding opportunities. In addition, certain vehicles may have their own specially funded programs based on type and use. For example, the Ports of Long Beach and Los Angeles fund the Gateway Cities Clean Air Action Program via a combination of use fees and other matching sources and anticipates upgrading over 16,000 trucks in the next five years (fact sheets). Other agencies and jurisdictions may also have funding available for air quality improvement programs.

B. How will these funding programs change because of the proposed regulation?

Because these programs are intended to achieve early, surplus emission reductions that would not otherwise be realized through regulation, these programs will necessarily need to change in response to the proposed regulation. However, this offers an opportunity to structure these programs to more efficiently utilize these limited amounts of money, and target their use towards those most in need.

Under the Proposition 1B funding, staff is currently evaluating changes to better integrate funding options with the proposed regulation. These potential changes include expanding of the schedule flexibility currently provided for independent owner/operators to also include small fleets of 3 or less trucks and to provide a mechanism to provide an advantage to trucks owned by small fleets of one to three trucks in the competitive process for funding. Staff is also considering an option to allow some medium heavy-duty trucks engaged in goods movement to compete for funding, and providing an alternative calculation of emission reductions based on hours of operation (rather than miles traveled) to allow construction industry trucks to compete for funding. Finally, staff is considering updating the funding amounts to encourage truck replacements with models meeting 2010 emission standards and to recognize the potential availability of more effective combined PM/NOx retrofit devices, as well as the addition of a combined grant/loan guarantee program.

As part of this proposal, a number of changes to the Carl Moyer Program Guidelines are being presented to assist small fleets. Small fleets of up to three vehicles would be eligible for incentive funding through the end of 2010 to comply with the December 31, 2012, compliance deadline. In addition, the first truck in a small fleet would be eligible for incentive funding for a 2010 truck through the end of 2012. Also, limited use agricultural vehicles would be eligible through 2013, and low use or specialty agricultural vehicles would be eligible through 2019. Staff is also proposing a number of other changes, as shown in Table IX-1 below.

Table IX-1: Proposed Carl Moyer Program Guidelines Changes

Guideline Provision	Existing Criteria	Proposed Criteria
On-Road Fleet Modernization		
Eligible engine and chassis model year for old truck	1990 and older	1993 and older
Maximum eligible funding	80 percent of vehicle cost for fleets of 5 or less; 50 percent for fleets of 6 or more	80 percent up to $50,000 per vehicle with engine certified to 1.2 g/bhp-hr standard; 80 percent up to $75,000 per vehicle with engine certified to 0.2 g/bhp-hr standard.
Two vehicles to one option	not available	Replacement of two similar older vehicles with one newer vehicle
Minimum Project life	3 years	2 years for small fleets complying with 2012 deadline
On-Road Retrofit		
Eligible engine model years	no restriction	2004 or later for small fleets; 2005 or later for large fleets (requires highest level retrofit verified for specific engine)
Agricultural Vehicles		
Reporting to ARB	None	Must obtain the agricultural vehicle designation from ARB before applying
All On-Road Carl Moyer Program Funded Projects		
Funding contract restriction on proposed regulation compliance options	None	Applicant must use BACT Compliance Schedule, not BACT Percentage Limits or Fleet Averaging, for compliance during the contract term

Staff believes these changes will expand eligibility for fleet modernization projects, better clarify the funding opportunities under the Carl Moyer Program, and improve the overall effectiveness of the program, especially as it relates to small fleets. However, large fleets with more than three vehicles will have few remaining funding opportunities that are surplus to the proposed regulation.

C. How will these various program be integrated with the proposed regulation?

Absent any State funding through a grant program to provide down payment assistance, a vehicle owner may see interest rates on qualifying bank loans in the range of 12 percent to 15 percent, on average, with terms that may run between 5 and 7 years. This assumes a new dual axle tractor without a sleeper berth costs about $115,000. Monthly payments would average about $2,300 per month, ranging from $2,000 to over $2,700 per month. Under the current economic climate, many qualifying owner/operators

may not have the same access to financing as they did in a more favorable economy. Similar lending trends are occurring in other financing establishments (e.g., dealership financing, etc.) as well.

Grants from either Proposition 1B Program or the Carl Moyer Program as the sole financial assistance source can provide significant financial assistance to the vehicle owner. As an example, an award of $50,000 from the Proposition 1B program for a new 2010 model year truck would provide a down payment that may qualify the vehicle owner for a bank loan with interest rates and terms similar to those referenced above. However, the loan balance would be less due to the grant as down payment assistance. The resulting schedule of payments may equate to approximately $1,300 per month, ranging from about $1,150 to $1,550 per month.

Qualifying owners may also receive grants through the Carl Moyer Program's fleet modernization program. Depending on local requirements, grant awards may be as high as $75,000 for a new 2010 model year truck, with resulting loan payments (for the balance of the vehicle purchase price) of less than $800 per month.

Additional financial assistance through a State loan guarantee program could provide added "bankability" for the profiled owner/operator. By reducing the risk of default by covering a percentage of the principle of the loan and other fees, banks may provide more competitive loans at rates that may range from 8 percent to 10 percent. Terms of the loan may also be extended from the traditional 5-7 year schedule to a 10 year schedule. Such terms are directly tied to the vehicle owner's economic profile. Combining a grant from one of the State's existing programs, combined with the ARB's loan program, could not only enhance the profiled vehicle owner's "bankability," but may also significantly provide a more favorable financing schedule.

D. What special funding is available for upgrading and replacing school buses?

California's Lower-Emission School Bus Program (LESB Program) is administered by ARB and is implemented by the local air districts. The LESB Program supports the retrofit and replacement of public school buses, and the retrofit of school buses operated by private companies contracted by public schools to provide home-to-school transportation.

The LESB Program was appropriated $200 million by the Legislature in 2007, and the LESB Program guidelines were updated in early 2008. Qualifying projects are allowed up to $20,000 for a verified PM DECS, including 10 years of maintenance costs for 1987 and newer buses. Up to $140,000 is also available for replacement of pre-1987 buses. Up to 10 percent of the award amount is also available for infrastructure improvements for alternative-fueled buses. It is anticipated that over 1,100 replacements and 3,500 retrofits could be funded through the LESB Program.

X. TECHNOLOGY AVAILABLE TO MEET REGULATORY REQUIREMENTS

This chapter discusses the availability of technology to meet the requirements of the proposed regulation, with a particular focus on retrofit strategies and their feasibility.

A. What are verified diesel emission control systems and how do we know they really work?

The regulation would only require and give credit for diesel emission control systems that have been verified by ARB. ARB adopted a procedure to verify retrofit diesel emission control systems in 2003. Verification is an approval from ARB, which tells end users that the verified device achieves the advertised emission reductions and is durable. To be verified, retrofit devices must demonstrate the efficacy and durability of their products and provide a warranty. The warranty guarantees the retrofit's efficacy for 5 years or up to 150,000 miles or more, depending on engine size and age, and warrants that the retrofit will not cause engine damage.

ARB's verification procedure is a multi-level verification system consisting of three PM reduction levels and optional NOx reduction levels (see Table X-1) Reductions in NOx are not required for verification, but ARB's procedure recognizes and verifies NOx reductions that are greater than or equal to 15 percent in 5 percent increments. This system has broadened both the spectrum of control technologies available to participate in California's diesel emission control effort and the number and types of vehicles and engines that can be controlled. This multi-level approach to verification is consistent with the goal of achieving the maximum reductions in diesel PM emissions that are economically and technologically feasible. At this time, nearly all the verified emissions control strategies are retrofit exhaust aftertreatment devices.

Table X-1: Diesel Emission Control Strategy Verification Levels (as adopted by the Board in January 2008)

Pollutant	Reduction	Classification
PM	< 25%	Not verified
	≥ 25%	Level 1
	≥ 50%	Level 2
	≥ 85%, or ≤ 0.01g/bhp-hr	Level 3
NOx	< 25%	Not verified
	≥ 25%	Mark 1
	≥ 40%	Mark 2
	≥ 55%	Mark 3
	≥ 70%	Mark 4
	≥ 85%	Mark 5

B. What exhaust retrofits would the regulation require?

Meeting the PM performance requirements of the proposed regulation would, in most cases, require the use of a diesel particulate filter. A diesel particulate filter is a Level 3 DECS that typically consists of a ceramic wall-flow monolith or a silicon carbide substrate that captures PM before it can be released to the atmosphere. The accumulated soot is then burned off (regenerated) either through an active or passive process. In passively regenerated diesel particulate filters, the substrate is coated with a catalyst that burns off the collected PM during "regeneration." In actively regenerated diesel particulate filters, an external source of heat such as an electrical heater or fuel burner is used to oxidize the collected PM. Currently, the only technology that achieves the required NOx performance standard is a 2010 model year engine.

C. What devices have been verified for On-Road vehicles?

Table X-2 shows the Level 3 diesel emission control systems that have been verified by ARB for use in on-road diesel vehicles. There are currently 8 Level 3 PM retrofit devices for on-road use that have been verified by ARB. There are only two Level 3 PM devices that also provide verified NOx reductions. The most current list of verified DECS, applicable engine families, as well as the EO letters may be found on the ARB website, http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm.

Table X-2: Verified Level 3 DECS (as of October 2008)

Product Name	Technology Type	PM Reduction	NOx Reduction	Applicability
Cleaire Horizon	DPF	85%	N/A	Most on-road engines
Cleaire Longview	Catalyst and DPF	85%	25%	1993-2003 model year on-road
Donaldson DPM	DPF	85%	N/A.	1993-2004 on-road
HUSS FS_MK	DPF	85%	N/A	Most on-road engines
International Truck	DPF	85%	N/A.	1994-2003 on-road Navistar engines
Johnson Matthey CRT	DPF	85%	N/A.	1994-2006 on-road engines
Johnson Matthey EGRT	EGR/DPF	85%	40%	International, Cummins & DDC on-road
ECSystem Purifilter	DPF	85%	N/A	1994-2003 on-road engines

D. Have diesel particulate filters been used in on-road applications?

Yes. Throughout the world, hundreds of thousands of diesel particulate filters (DPF) are in use, both in new vehicles and in numerous on-road retrofit applications including transit buses, heavy-duty trucks, medium-duty trucks, school buses, and solid waste collection vehicles. These devices have been installed on both private and public vehicles worldwide.

In California alone, thousands of diesel particulate filters have been funded through the Carl Moyer program, and have been installed in response to existing regulations targeting urban buses, transit fleet vehicles, solid waste collection vehicles, vehicles owned by public agencies, drayage trucks, and others.

E. Are engine repowers really possible?

Repowering a vehicle is defined as replacing an existing engine with a newer cleaner engine. It is an attractive strategy for owners of vehicles whose engines have reached their useful life before the other vehicle components are ready for retirement. It is most cost-effective when newer or new machine replacement costs are much higher than the costs of repowering. Good candidates for repowering include very expensive and specialized equipment or vehicles.

However, repowering projects may not be a viable option due to physical and technological constraints with installing a newer engine in an older chassis. For instance, the engine compartment may be too small to physically fit the new engine or may not allow for proper air circulation. Repowers may require modifications to the cooling system, wiring harness, engine control module, exhaust system, and/or transmission. While some vehicles have been repowered to 2004 to 2006 model year engines through the Carl Moyer program, the feasibility of repowering vehicles to 2007 to 2010 model year engines is unclear, and may be limited due to costs and limited space.

F. Are NOx exhaust retrofits feasible?

Today, for widespread use, only one NOx retrofit is verified for use with a significant number of on-road diesel engines. The Cleaire Longview integrates a NOx reduction catalyst and catalyzed wall-flow silicon carbide diesel particulate filter to provide simultaneous reduction of NOx, PM, hydrocarbons (HC), and carbon monoxide (CO). The Longview system injects diesel fuel (as the reductant) over the NOx reduction catalyst to achieve NOx reductions. For engines that operate within the temperature parameters of this system (the engine must spend more than 40 percent of its time with an exhaust temperature over 260 degrees Celsius (^{o}C), this system has been verified to provide a 25 percent reduction of NOx emissions.

While higher level NOx emission control strategies that combine Level 3 PM control are not yet verified, one technology, selective catalytic reduction (SCR), is quickly approaching widespread commercial readiness for retrofit applications. SCR technology is already mature in stationary applications, and is beginning to emerge as a NOx control solution for new on-road diesel vehicles, both in Europe and North America. SCR systems use a reductant, typically urea, to convert NOx to nitrogen and oxygen over a catalyst. A precise amount of reductant is injected into the exhaust upstream of the catalyst. If the reductant is well mixed with the exhaust and the exhaust temperature is adequate, (typically between 250 and 450ºC) an SCR system can achieve NOx reductions on the order of 50 to 90 percent. Urea-SCR systems are expected to be widely used to meet the U.S. EPA 2010 NOx standard of 0.2g/bhp-hr for new engines.

SCR systems are also now emerging as a retrofit option for reducing NOx emissions from existing heavy-duty engines. Many SCR retrofit projects are currently underway in the U.S, with several demonstration programs occurring in California. In 2008, the Sacramento Metropolitan Air Quality Management District and the Sacramento Emergency Clean Air and Transportation program provided a $500,000 grant to retrofit a fleet of 16 class 8 trucks owned by northern California grocery store chain Raley's with Johnson Matthey's SCR retrofit system, the SCRT®. Johnson Matthey is conducting a similar demonstration in southern California in partnership with the South Coast Air Quality Management District and Ralph's Supermarkets.

Johnson Matthey's SCRT is a 4-way emission control technology system which reduces NOx by 70 to 90 percent and PM by over 90 percent. It also reduces CO and HC. The urea-based SCR technology is combined with Johnson Matthey's 2-stage CRT® particulate filter system. A controlled amount of urea is then injected into the exhaust before it enters the SCR catalyst bed providing the necessary chemical conditions for the SCR catalyst to reduce NOx. Preliminary findings in the above studies suggest that the SCRT® system reduced engine-out NOx in the Raley's trucks by an average of 84 percent (compared to pre-retrofit levels) (Johnson Matthey, 2008).

Despite the potentially substantial NOx reductions SCR can provide, exhaust temperatures (or duty cycle limitations) will likely dictate the actual suitability of certain vehicles to use SCR or other NOx-control technologies in exhaust retrofit applications. In general, SCR systems need to operate in temperature regimes similar to those required for passive DPF systems.

XI. AVAILABILITY OF DEVICES AND VEHICLES

This chapter provides staff's assessment of the estimated current and future supply of retrofit devices, as well as cleaner new and used vehicles, which will be needed to meet the anticipated demand created by the proposed regulation.

A. Would enough exhaust retrofits be available to satisfy the requirements of the proposed regulation?

During the first few years of the proposed regulation, the projected increase in demand for verified PM DECS (typically diesel particulate filters) in California is less than 38,000 units per year, which is about 15 percent of the total number of diesel particulate filters sold nationally each year (including those sold with new engines). Staff has contacted several diesel particulate filter manufacturers inquiring about their manufacturing capacities, and they have indicated that their manufacturing facilities are capable of producing over a million diesel particulate filters on an annual basis. However, in the unlikely event that there is an unanticipated disruption in the manufacturing, distribution and supply for diesel particulate filters, the proposed regulation contains a provision to allow for manufacturing delays such that fleets are not penalized for such circumstances.

B. Would enough new and used vehicles be available to help satisfy the regulation's requirements?

Of the approximately 940,000 diesel vehicles subject to the proposed regulation, only a portion of them are going to be replaced because of the proposed regulation. This is because in many cases, fleets naturally replace their vehicles on a regular basis that is faster than what the regulation would require. Staff estimates that between 2010 and 2014, demand for new or near-new vehicles as a result of the proposed regulation will increase to about 20,000 each year. Of this, staff expects that about 7,000 of these vehicles each year will be purchased new, with 2010 and later model year engines. The remaining 13,000 vehicles are expected to be near-new used vehicles, having engines that are 5 years old or newer.

To evaluate whether there are sufficient vehicles available to meet this demand, staff evaluated the availability of both new and used vehicles. In evaluating the availability of new vehicles, staff relied on data that shows that while new class 8 truck production has, as recently as a few years ago, been as high as over 250,000 per year, recent demand has reduced this to about 150,000 annually. Medium heavy-duty truck sales for 2006 were over 200,000 (Wards, 2007). Since the proposed regulation will result in an incremental increase of only about 7,000 new vehicles a year, staff believes there is sufficient engine and vehicle production capacity to meet this increased demand.

Staff also considered the currently available availability of near-new used vehicles. In its evaluation, staff found over 100,000 used trucks for sale on just two popular used vehicle websites (Truckpaper.com, 2008, Commercialtrucktrader.com, 2008), with about 60 percent of the listings being vehicles that were 8 years old or newer. Based on the rate of new vehicle listings that are posted each month, staff estimates that over the

course of year, over 150,000 used truck listings for near-new used vehicles would be made on just these two websites alone. Since staff estimates that the proposed regulation will necessitate the purchase of an additional 13,000 near-new used vehicles each year, and considering that California represents about 10 percent of the vehicle market, staff believes that there will be sufficient used vehicles to meet the demands of fleets to comply with the regulation. When one considers that this assessment didn't include vehicles that are available for sale each day at thousands of dealerships across the country, this assessment is highly conservative.

Beyond 2014, staff expects the incremental demand for replacement vehicles to decrease, reducing pressure on the used and new vehicle market to supply additional vehicles to California.

XII. PUBLIC OUTREACH

This chapter summarizes staff's efforts to ensure participation by all stakeholders in the development of the proposed regulation.

A. What outreach did staff do to inform the public about the regulation and solicit input on its development?

Since April 2006, as part of the public outreach process during the development of the proposed regulation, staff has continually notified affected industry and other interested parties regarding the proposed regulation, and solicited input regarding its development. The discussion below provides further details and Table XII-1 below summarizes the outreach efforts. As part of this process, staff has made significant changes to the proposed regulation at the request of stakeholders to improve clarity, provide flexibility and improve the effectiveness of the proposed regulation.

Table XII-1: Summary of Outreach Efforts for the Proposed Regulation

Outreach Effort	Number	Number and Description
Public Workshops	54	Workshops were held in 12 cities across the state between April 2006 and August 2007. Nine of the workshops were broadcast via the internet so stakeholders could participate remotely. Over 1,000 people attended at least one of the workshops.
Meetings and presentations	Over 100	Staff held over 100 individual meetings with companies and organizations to discuss the proposed regulation.
Individual Meetings	Over 50	Staff met with over 50 individual companies to discuss how the regulation would specifically impact their business operations.
Mailings and Letters	Over 300,000 mailings	Mailing sent to all 300,000 registered diesel vehicle owners in December, 2007.

The first public workshops concerning development of the proposed regulation were held in April 2006. In total, staff hosted 54 public workshops in 12 different cities across the state including: Arvin, Berkeley, El Centro, El Monte, Fresno, Los Angeles, Oakland, Redding, Riverside Sacramento, San Diego, and San Jose. In many locations, both day and evening workshops were held to allow stakeholders to attend at their convenience and several workshops were broadcast via the internet to maximize participation.

Staff also held over 100 meetings with individual companies and organizations to discuss the proposed regulation. The meeting attendees ranged from just one company representative to over 100 attendees. This included over 50 meetings with individual companies to discuss specifically how the proposed regulation would impact their businesses and to gather additional information about their business operations. In

addition staff traveled to out-of-state locations to discuss and present the proposed regulation to fleet owners that travel through California.

In December, 2007, a mailing was sent to nearly 300,000 owners of registered diesel vehicles in California notifying them of the proposed regulation, how to participate in an online survey, and how to obtain additional information about staff's proposal. Staff also sent similar information via letters to diesel vehicle business owners in California, truck stops and repair facilities throughout the Western United States. This information also included a laminated fact sheet so that they could notify their customers of the proposed regulation. Staff also called and sent emails and letters to as many industry associations as could be identified who might have members affected by the proposed regulation. These included contractors associations, chambers of commerce, and organizations that represent engine manufacturers, equipment manufacturers, and drilling contractors.

To facilitate communication with stakeholders, an electronic listserve was created and regular notices were sent to it concerning regulation development. The email listserve for the regulation grew to over 3,400 members. An existing toll free phone number, 866-6DIESEL, was expanded to allow affected stakeholders to directly contact staff to obtain information about the proposed regulation and to receive assistance in completing the vehicle survey.

B. How Does the Proposed Regulation Address Environmental Justice Concerns?

As a matter of policy, ARB is committed to integrating environmental justice in all of its activities. The proposed regulation would require cleaner fleets of in-use on-road diesel vehicles to be used throughout the state, which would reduce emissions in all communities in California, including those with environmental justice concerns. Staff is currently working to inform those in environmental justice communities of the proposed regulation and how final implementation would reduce exposure to diesel PM and protect public health in their communities.

C. What outreach efforts are planned for implementation of the regulation?

If the proposed regulation is adopted, staff, in cooperation with affected industries, would develop and conduct an extensive outreach campaign to be sure affected parties are aware of their responsibilities under the regulation. Staff will outreach to fleets through current compliance activities for existing regulations, including through inspections at border crossings, California Highway Patrol (CHP) weigh stations, and fleet facilities. This campaign would also build on the outreach staff has already done throughout development of the proposed regulation including mailings to affected stakeholders and continued operation of the toll free 866-6DIESEL information line.

Staff will also continue to work with industry groups to inform their members about the regulation. Also, staff plans to track the implementation of the in-use off-road diesel vehicle regulation and use that effort as a model for outreach efforts for this regulation. This includes development of an electronic reporting system for early reporting and

planning of compliance scenarios. It also includes staff conducting training sessions throughout the state and developing guidance material and fact sheets for affected fleets. Staff also plans to form an advisory group representing fleets of all sizes and types, retrofit manufacturers and installers, consultants, engine manufacturers, and other affected industry groups. The overall mission of the advisory group would be to enhance outreach efforts, training and implementation materials for the regulation, and assist staff in being aware of needs of affected stakeholders and address specific issues.

XIII. IMPLEMENTATION AND ENFORCEMENT

It is ARB's policy to ensure uniform compliance with all its regulations so that no one entity obtains an unfair economic advantage by not complying with appropriate regulatory requirements. This chapter describes staff's planned effort to assist fleets in implementing the proposed regulation, and to uniformly enforce its requirements.

A. How would the regulation be implemented?

For the regulation to be fair to fleets that would spend considerable funds and effort to comply, fleets must be assured that their competitors would also be complying. For this to happen, there must be an effective outreach campaign and the regulation must be vigorously enforced. Staff recognizes that creating a level playing field for all affected fleets is important, and is committed to obtaining the resources necessary to do so.

If the proposed regulation is adopted, staff, in cooperation with affected industries would develop and conduct an extensive outreach campaign to be sure affected parties are aware of their responsibilities under the regulation. As stated above, staff will outreach to fleets through current enforcement activities for existing regulations including through inspections at border crossings, CHP weigh stations, and fleet facilities. This campaign would also build on the outreach staff has already done throughout development of the proposed regulation. First, staff would continue to work with industry groups to inform their members about the regulation. Second, as we have for our existing fleet rules for transit buses, public fleets, and off-road diesel vehicles, staff plans to hold training workshops across the state and invite engine manufacturers and manufacturers of verified diesel emission control systems to share information about their products with affected fleets. Third, staff would provide training and educational materials at the workshops and on our website to help fleets understand the choices they would face with respect to finding the most cost-effective path to compliance. Staff will also operate a toll-free number set up to answer questions about the regulation (866-6DIESEL). Finally, staff would send electronic and hard-copy mailings to affected parties prior to the initial reporting dates in 2010 to inform fleet owners about their responsibility to report vehicles.

Staff also plans to develop and provide electronic tools for compliance planning that would allow fleets to determine what retrofits are available for their vehicles, and to experiment with various possible compliance paths. In addition, staff plans to develop and provide electronic reporting forms that would allow fleets to report their vehicles on-line and demonstrate how they would meet the requirements of the regulation. For fleets that prefer, staff would also be prepared to receive reports in non-electronic format.

B. How would the regulation be enforced?

Staff has the responsibility for enforcing the regulation. Enforcement of the rule will be conducted similarly to enforcement of ARB's commercial vehicle and school bus idling rules. ARB's enforcement staff will use the inspection and audit methods they have developed during their many years of experience enforcing the Heavy-Duty Vehicle Inspection Program (adopted into law in 1988) and the Periodic Smoke Inspection

Program (adopted into law in 1990). Enforcement activities will include inspections at border crossings, CHP weigh stations, fleet facilities, and randomly selected roadside locations, and audits of records. These activities could result in corrective actions and substantial civil penalties for non-compliance with the regulation.

The critical elements to the successful enforcement of the proposed regulation would be the annual reporting, if using the BACT percentage limits or the fleet averaging option, or vehicle inspections if the BACT option is used. Reporting will allow staff to initially determine whether fleets have either met the fleet average targets or complied with the BACT percentage limits requirements. Fleets would report each vehicle, its vehicle identification number (VIN), its engine data, its model year, as well as any actions taken to comply. For vehicles claiming one of the exemptions from the NOx or PM requirements, owners will report the appropriate information such as miles driven, location where miles occurred, hours of use, and date of installation of technology.

ARB inspectors may use a variety of opportunities to find and inspect vehicles that are subject to the regulation. For example, they may conduct audits of fleets at facilities including but not limited to truck stops, weight stations, and temporary roadside inspection facilities. They may also inspect truck terminals at business facilities or at ports and rail stations. A search of California Highway Patrol's Biennial Inspection of Terminals database may provide a way to target inspectors toward larger trucking terminals. They may also inspect vehicles at the border crossings where vehicles are routinely inspected for produce. Finally, inspections may be triggered if ARB receives reports from the public that indicate that certain vehicles has been observed with smoking exhaust or that a fleet is not in compliance with the rule. Complaints from the public via calls to the 1-800-END-SMOG toll-free line or on-line reporting trigger inspections or further enforcement action.

C. What additional resources are needed for implementation and enforcement?

Additional staffing would be required to conduct implementation and outreach activities such as statewide training workshops, seminars, trade show presentations, and to table at conferences and expositions. Staff also anticipates an increase in requests for information and assistance, the development of compliance guidance documents and other tools to assist potential stakeholders with implementation. A web based regulatory tracking system for fleet reporting, enforcement verification purposes, and status reports on the rule's implementation would be required.

To ensure uniform compliance across the industry, guarantee no one entity obtains an unfair economic advantage by not complying with the requirements, and to achieve the emission reductions projected for the proposed regulations, enforcement activity will need to increase significantly. Subsequently, existing staffing levels will need to be increased to meet the increased demand for inspections and other enforcement activities, and ARB will need to augment its existing use of the CHP in its on-road enforcement efforts.

XIV. ALTERNATIVES CONSIDERED

Throughout the regulation development process, staff evaluated a number of suggested alternatives to the proposed regulation. This chapter provides a summary of the alternatives considered and the reasons they were not selected.

A. What alternatives to the regulation were considered, and why were they rejected in favor of the proposed regulation?

The alternatives considered by staff incorporated many recommendations from stakeholders such as special provisions for small fleets (3 or fewer vehicles), low use thresholds, agricultural vehicles, specialty or unique vehicles, vehicles that are operated exclusively in certain areas of the State, school buses, utility fleets, and credit for hybrid and alternative fuel vehicles.

However, staff did not accept all suggestions from stakeholders because in developing the regulation, staff was striving to achieve the following goals:

- Achieve the maximum, fastest possible, reductions in toxic PM emissions;
- Maximize NOx reductions to aid in attainment of federal air quality standards in the South Coast and San Joaquin Valley;
- Meet the State Implementation Plan emission reduction commitments;
- Minimize the costs for fleets and, in particular, minimize the frequency of fleets replacing existing vehicles with new vehicles;
- Achieve cost-effective emission reductions on a dollar per ton basis.

Staff sought to achieve these goals while keeping in mind the technology available today and likely to become available over the next decade. The alternatives considered and reasons they were rejected in favor of the proposed regulation are summarized in Table XIV-1 below

Table XIV-1: Alternatives Considered and Why They Were Rejected

Alternative Proposals	Why Rejected
PM Retrofit Only – Like previous diesel regulations, require fleets to phase-in a certain percent of PM retrofits per year until all vehicles are retrofit.	Would not achieve critically needed NOx reductions, including emission reductions needed to meet the State's SIP commitments in the San Joaquin and South Coast Air Basins.

Alternative Proposals	Why Rejected
August 2007 ARB Staff Proposal – Require BACT on fleets in two phases. Phase 1 required engine to be 2004 model year and later with highest level verified PM DECS by end of 2012. Phase 2 required beginning in 2017, engines had to meet or exceed the emissions standards of a 2007 and later model year engine by the end of 2020. Fleet averaging option applied only to fleets that are registered to only operate in California.	Would not provide the NOx emission reductions needed to meet the State's SIP commitments in the San Joaquin and South Coast Air Basins. Would not minimize costs to fleets, especially owner-operator type fleets or small fleets with three or fewer vehicles. It also did not minimize the need for engine or vehicle replacement.
January 2008 ARB Staff Proposal - Revised NOx and PM BACT requirements, more stringent fleet averaging provisions, and new special provisions for small fleets and specialty vehicles.	While this would have maximized PM and NOx emission reductions in the San Joaquin and South Coast Air Basins, and would have achieved greater NOx emission reductions in 2014 than proposed regulation, it did optimize the rate of vehicle replacement, nor did it minimize the costs.
Street Sweeper Industry Proposal - Schedule for phasing out older sweeper vehicles through 2022. Provisions to exempt certain types of sweepers from existing diesel emission regulations that apply to the auxiliary engine on two-engine sweepers. Exempt sweeper fleet owners with two or fewer sweepers that do not sweep for hire or in a commercial capacity.	Would forgo a substantial percentage of PM and NOx emission reductions from these vehicles. Could also result in substantial loss in the anticipated risk reduction since sweepers frequently operate in urban areas, especially residential neighborhoods. Would also reduce the overall emission reductions needed from the proposed regulation to meet the state's SIP commitments in the San Joaquin Valley and South Coast air basins.
"Driving Toward A Cleaner California" Proposal – More generous mileage exemptions, early incentives, specialty vehicles provisions, a less aggressive compliance schedule for businesses subject to two or more ARB regulations, consideration of safety and compatibility issues, and, more flexible provisions if diesel emission control technology is not available. Would retain the same three compliance options in proposed regulation, but modify the compliance schedule and requirements.	Would result in the loss of significant emission benefits resulting in a failure to meet SIP commitments to reduce NOx and PM in both the South Coast and San Joaquin Valley Air Basins.

The proposed regulation was chosen as the best structure to provide maximum flexibility for fleets to find their own, most cost-effective combination of retrofits, engine repowers, retirements, and accelerated vehicle replacements to comply with requirements of the proposed regulation. It also allows fleets to make decisions concerning which vehicles they plan to keep for a long time versus those that are not worth retrofitting or repowering and should be replaced. It also rewards fleets that comply early or use hybrid or alternative fuel technology. The proposed regulation also has special, less restrictive provisions for small fleets, low mileage and low use vehicles, vehicles operating in certain areas of the State, and agricultural and other specialty vehicles.

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XVI. LIST OF ACRONYMS

AQIP	Air Quality Improvement Program
AQMD	Air Quality Management District
ARB	Air Resources Board
ATCM	Airborne Toxic Control Measure
BACT	Best Available Control Technology
CAA	Clean Air Act
CCR	California Code of Regulations
CHP	California Highway Patrol
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CRT	Continuously Regenerating Trap
DECS	Diesel Emission Control Strategies
DPF	Diesel Particulate Filter
E-DRAM	Environmental-Dynamic Revenue Analysis Model
EMFAC2007	Emission Factors Model 2007
GSA	General Services Administration
GVWR	Gross Vehicle Weight Rating
HC	Hydrocarbon
HHD	Heavy heavy-duty vehicle
HSC	Health and Safety Code
IRP	International Registration Program
ISOR	Initial Statement of Reason (Staff Report)
LESB	Lower Emissions School Bus Program
MHD	Medium heavy-duty vehicle
NAAQS	National Ambient Air Quality Standard
NMHC	Non-Methane Hydrocarbons
NOx	Oxides of Nitrogen
OEHHA	Office of Environmental Health Hazard Assessment
PERP	Portable Equipment Registration Program
PM	Particulate Matter
PM10	Particles with diameter less than or equal to 10 microns
PM2.5	Particles up to 2.5 microns in diameter
RRP	(Diesel) Risk Reduction Program
SB 25	Senate Bill 25
SCR	Selective Catalytic Reduction
SCRT	Selective Catalytic Reduction & Trap
SIP	State Implementation Plans
SRP	Scientific Review Panel
TAC	Toxic Air Contaminants
TPD	Tons Per Day
U.S. EPA	United States Environmental Protection Agency
VIN	Vehicle Identification Number
VIUS	Vehicle Inventory and Use Survey