

# **Appendix I**

## **Costs and Cost Methodology**



## **Cost Methodology**

This Appendix describes the methodology used to determine the annual costs and the total cost of the proposed amendments for the Truck and Bus Regulation and the Drayage Truck regulation. The costs for the Tractor-Trailer GHG regulation are not significant.

### **A. Truck and Bus Regulation Cost Methodology**

Staff used the same methodology in estimating the cost saving of the amended Truck and Bus regulation as was used in estimating the costs attributable to the existing regulation. Staff updated some of the assumptions used in the model and modified the model to reflect the predicted effects of the recession consistent with the updated emissions inventory. Details on the methodology and the inner working of the cost compliance model and results are available in Chapter XIII and Appendix J of October 2008 Technical Support Document for In-Use On-Road Diesel Vehicles (ARB, 2008).

#### ***1. Overview***

To estimate the costs associated with the amended Statewide Truck and Bus Regulation, staff of the Air Resources Board (ARB) developed a compliance model to simulate normal vehicle replacement practices for individual fleets and the costs to that of projected replacement and retrofit strategies a fleet would use to comply with regulation. The compliance model was used to estimate the capital expenditures of normal vehicle replacement compared to the capital expenditures required to comply with the regulation for individual company. Staff also considered the costs of retrofitting a vehicle compared to replacing it in estimating what types of fleet may accelerate vehicle replacements to reduce the number of retrofits otherwise required. The results for each fleet included in the cost compliance model were then scaled up to reflect the estimated costs for the statewide truck population.

#### ***2. Fleet Cost Compliance Model Modification***

To determine the costs of the regulation with proposed amendments, staff made several modifications to the cost compliance model. Staff divided the simulation into three sub-modules: small fleet, lighter trucks, and heavier trucks. Major changes applied to all three modules with minor changes in each module that matched the fleet's requirements as in the proposed amendments. Staff added a method to account for the recession, converted the costs to 2010 dollars and removed the fleet averaging option that is no longer applicable and modified the percentage limit option in the existing regulation to reflect the proposed new optional phase-in provision.

### ***a) Modeling Effects of the Recession***

Due to the recession, many fleets have slowed normal vehicle replacements or stopped replacing vehicles. As a result, the average fleet age for a given fleet in 2009 is older than what it would be under “normal” conditions. The compliance model uses the fleet age to determine normal replacement practices. The simulation needed to slow down predicted vehicle purchases for the near future and to accelerate purchase later as the economy recovers and estimated vehicle sales increase due to pent up demand. To compensate for this faster replacement rate, staff added routines to account for this catch up period and then return to normal after the period. In all, the modifications include defer, catch up and average fleet age change with respect to each period. With the regulation, staff also assumed fleets would begin making normal replacements with 2007 model year engines and newer starting in 2012 and that most fleets would replace their trucks with those having 2010 model year engines and newer starting 2015.

### ***b) Dollar Conversion and Loss In Value***

The cost compliance model developed in the initial rule making was based on 2008 dollars. Staff updated the model to convert the output to 2010 dollars using an interest rate of 5 percent. The formula for computing the net present value (NPV) is  $NPV = Cost / (1+r)^{(CY-2010)}$ , where  $r$  = the annual interest rate and  $CY$  = the calendar year for the cost.

The loss in value due to the regulation has been zeroed out for all fleets. The rationale was that since the proposed amendments do not require replacement for any vehicles younger than 20 years old, and 20 years or older vehicles have practically no value, any replacement done would be based on fleet’s business needs rather than the regulation with proposed amendments.

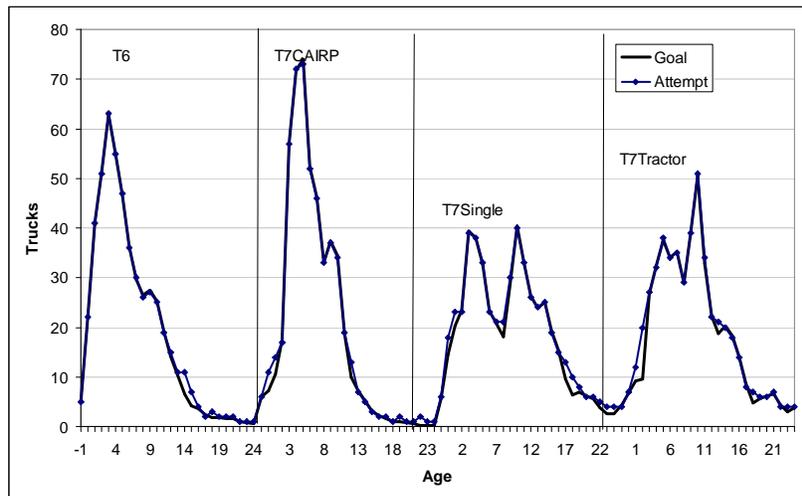
### ***c) Addition and Removal of Options to Align with the Proposed Amendments***

The proposed amendments contain two new BACT schedules: one for heavier trucks and one for lighter trucks. Subroutines were created that matched the new BACT schedules and implemented in each respective modules. The PM portion of the existing routines for the lighter trucks was removed since there is no PM requirement for the lighter trucks under the amendments. The fleet averaging and the NOx percentage limit options were no longer applicable and therefore removed or made inactive. The PM percentage limit option with the percentage matching the amendments remained for the heavier trucks and small fleets. The NOx portion of the BACT schedule routine applicable to heavier trucks was added to small fleet module, allowing small fleet an alternative compliance pathway to lower the costs. Staff also added codes to reflect that in compliance years where fleets would have to replace vehicles more than normal, fleets would replace vehicles with vehicle age older than normal to reduce costs.

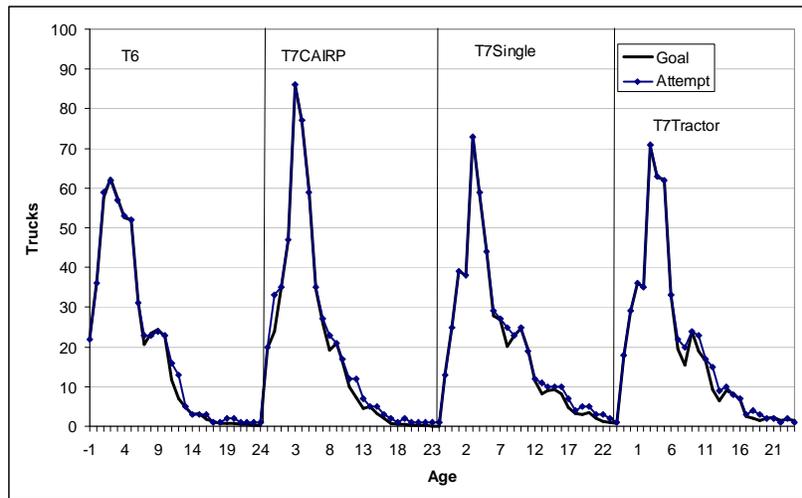
### 3. Fleet Data

Staff used actual fleet data to match the revised emissions inventory model year distribution for various inventory categories. This was done to allow the compliance model results to be compared directly with the emissions inventory. The compliance model predictions of fleet actions was compared with the inventory analysis for consistency and assured that statewide cost estimates would be as comparable as possible. The fleet makeup was primarily from a collection of fleets chosen from ARB fleet survey conducted over the last few years. See Appendix J of October 2008 Technical Support Document and the survey form at the end of the appendix for summary information obtained by the survey regarding reported counts by vehicle body type and by a consistent base year (ARB, 2008). From the survey pool, staff selected fleets that best match the statewide fleet types, weight classes and age distributions compared to the emissions inventory. Where certain engine model year data was missing from the fleets selected, staff supplemented the actual fleet information with created fleets to match the age distributions and vehicle class. Figure 1 and Figure 2 illustrate the matching patterns between the matching fleet data and the emissions inventory data.

**Figure 1 Fleet Pattern Matching for 1 to 20 Fleet Size**



**Figure 2 Fleet Pattern Matching for Fleet Size Over 20**



**4. Capital Cost Inputs and Ongoing Costs for Modeling**

**a) VDECS Cost**

Staff developed VDECS costs in conjunction with internal and external sources for the 2008 Staff Report. The costs for active and passive VDECS are listed in Table 1. These costs include taxes and installation; however annual maintenance would be an additional cost calculated separately. The costs for VDECS on 1994 model year and newer engines were estimated to include a mix of passive and active systems and that higher costs VDECS would be used on pre-1994 model year engines.

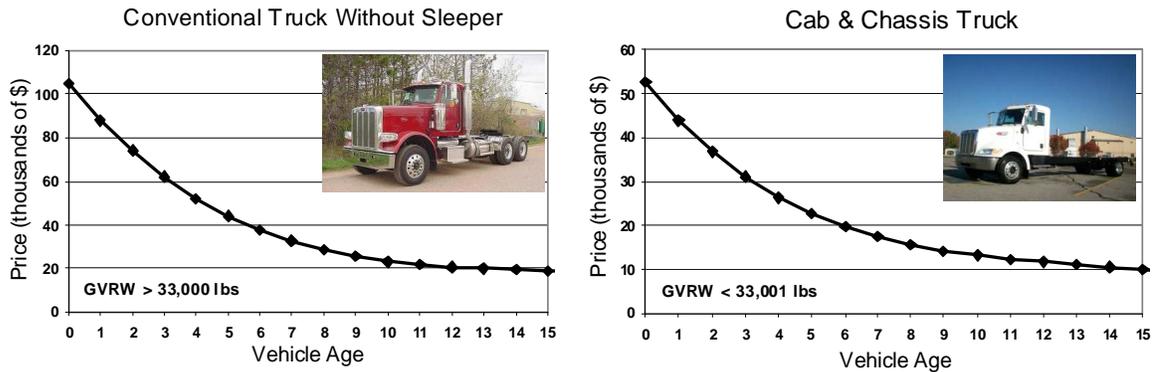
**Table 1: Installed Retrofit PM Filter Costs**

Engine Model Year	PM Filter
1994 to 2006	15,000
Heavy Heavy-Duty	\$19,000

**b) Vehicle Prices and Replacement Cost Curves**

For the current regulation staff developed price curves for over 50 vehicle body types by using for-sale vehicle price data downloaded from Truckpaper.com and other online sources. Staff example price curves are shown in Figure 3.

**Figure 3 Example Vehicle Prices (in thousands of dollars)**

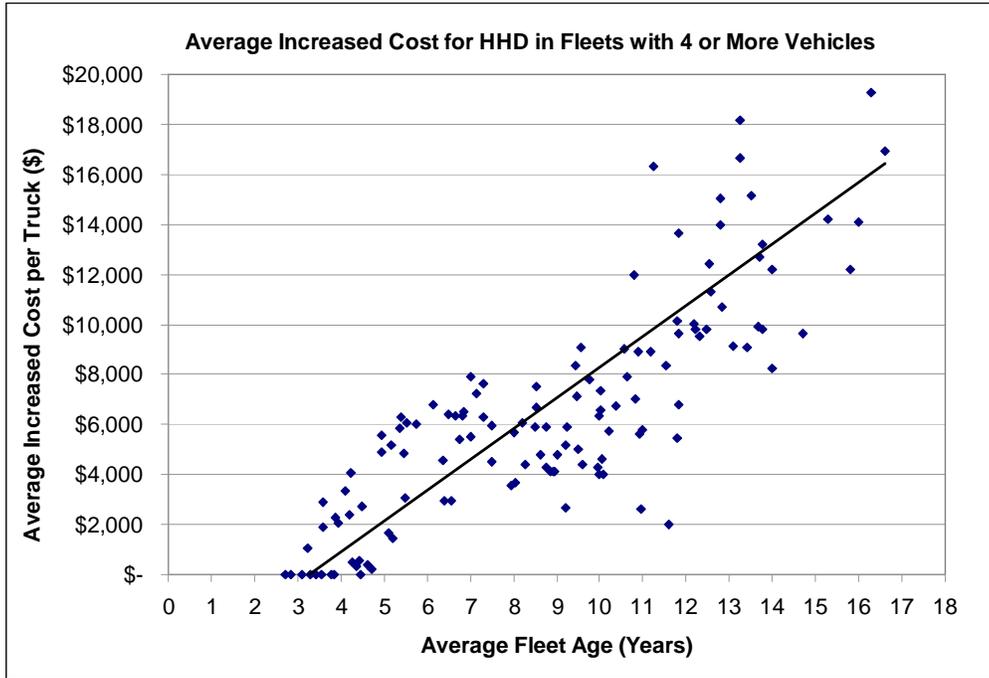


Staff reviewed vehicle prices in August 2010 to confirm that the previously developed price curves from 2008 remained accurate given the shifting vehicle market and recession. Existing price curves by vehicle age was found to be within the range of current data and subsequently no vehicle price modifications were made.

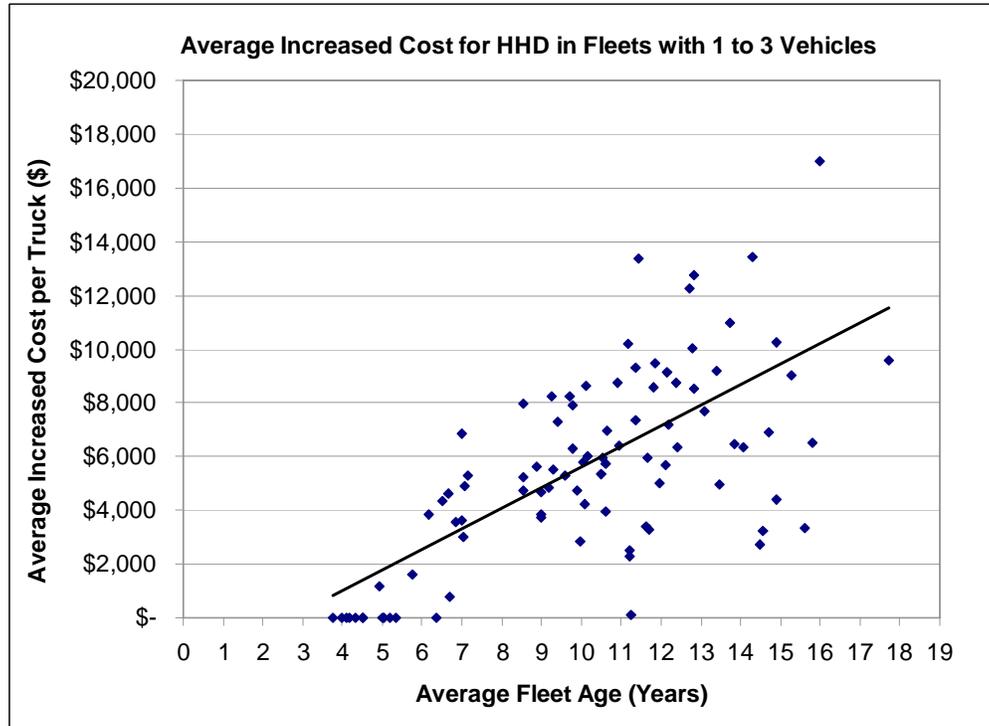
**5. Cost by Fleet Age and Fleet Size**

The cost compliance model was run for each fleet to determine the costs above normal replacements. The costs for each fleet are determined by comparing the modeled costs for normal vehicle replacement with that required by the regulation with proposed amendments. The increased cost is then divided by the number of vehicles to determine the average increased cost per vehicle in each fleet. The average cost per vehicle in the fleet was then plotted by fleet age to determine the average cost. The average increased costs by fleet age and fleet size groups reflect that individual companies with newer fleets will have no increased costs while companies with older fleets will have higher costs compared to normal vehicle replacements. Older fleets are estimated to either normally buy used lower cost vehicles or to buy new vehicles but to keep them longer than newer fleets. Therefore, the average increased cost per vehicle associated with the proposed amendments varies by the average age of the fleet. The analysis was done for large fleets with 4 or more trucks with a GVWR more than 26,000 pounds meeting the full requirements as shown in Figure 4. The results for the small fleet provisions trucks with a GVWR more than 26,000 pounds is shown in Figure 5. Figure 6 shows the results of the proposed requirements for trucks with a GVWR 26,000 or less.

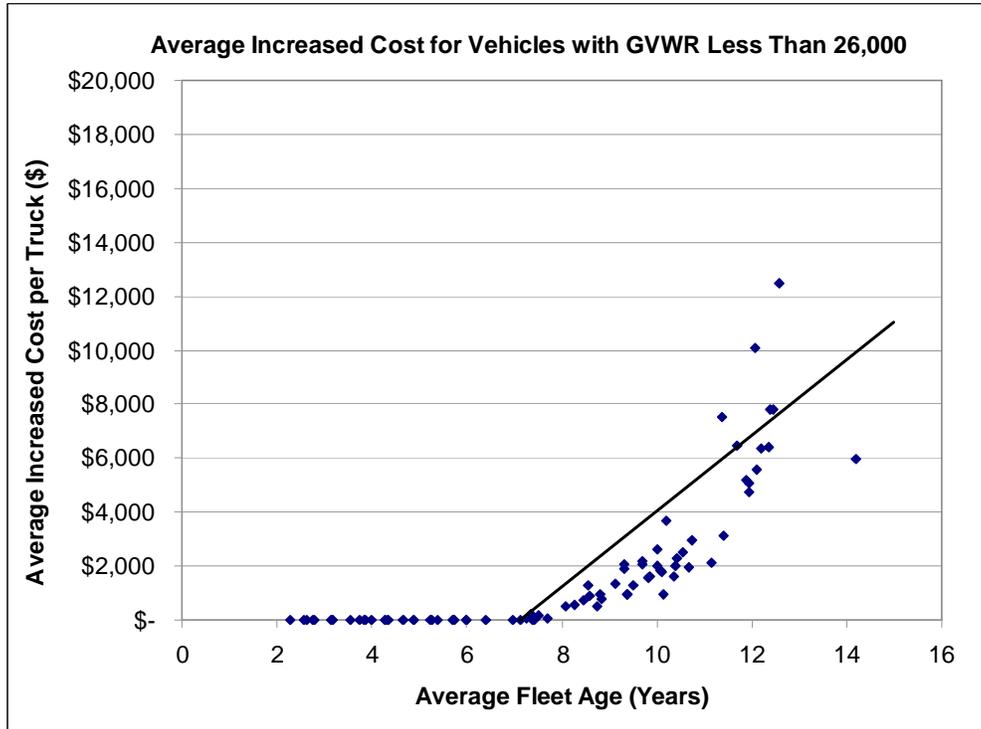
**Figure 4 Average Increased Cost by Fleet Age for Large Fleets**



**Figure 5 Average Increased Cost by Fleet Age for Small Fleets**



**Figure 6 Average Increased Cost For Fleets with Trucks Less Than 26,001 GVWR**



**6. Scaling to Statewide Results**

The cost model output provides the average increased cost per vehicle by fleet age and fleet size for individual company fleets. The statewide total cost was then calculated for each fleet age group by multiplying the increased average cost by fleet age with the fleet age distributions previously used from DMV and IRP data. The average costs by inventory group was scaled to match the current inventory population for each of the inventory categories where fleet age distribution data was available. Table 2 shows sample results for the heavy heavy-duty vehicles subject to the heavy duty fleet requirements for fleets with four or more vehicles and would not qualify for any of the special provisions.

**Table 2 Instate Heavy Heavy-Duty Vehicles by Fleet Age for Fleets with 4 or More Vehicles (excluding special provisions)**

Fleet Age	# Vehicles (Per Updated Emissions Inventory for 2008)	% (per 2006 DMV Data)	\$/Vehicle (Per Model Output)	Statewide \$
<=3	5,775	16.7%	\$-	\$-
>3 & <=6	12,083	35.0%	\$2,150	\$25,972,902
>6 & <=10	12,515	36.2%	\$6,454	\$80,770,463
>10 & <=13	2,604	7.5%	\$10,759	\$28,016,977
>13 & <=16	592	1.7%	\$14,449	\$8,551,982

>16 & <=20	406	1.2%	\$18,138	\$7,363,585
>20	360	1.0%	\$20,598	\$7,416,901
Unknown	212	0.6%	\$10,364	\$2,201,281
	34,547	100.0%		\$160,294,092
Overall Average \$/Vehicle				\$1,263

In the above example, the highest increased costs due to the regulation with amendments are found in the >20 fleet age category with an average \$/vehicle of \$20,598 and the least cost increases due to the regulation are found in the three or fewer fleet age category with no average increased costs. Similar analyses have been done for all the remaining population categories including: California IRP fleets with four or more vehicles, neighboring out of state fleets with four or more vehicles, instate small fleets with heavy duty vehicles, and instate fleets with vehicles less than 26,000 pounds. The results of the analyses as well as the cost model are posted at ARB web site (ARB, 2010).

### **7. School buses**

Adjustments to the original cost estimates, published in Appendix K of the 2008 staff report for the rule, have been calculated to reflect proposed changes to the school bus portion of the regulation which aligning the requirements with the broader truck and bus regulation. Staff estimates that the costs to school districts will be reduced by about 12 percent, or over \$8 million, over the life of the regulation. Approximately \$200 million in Lower-Emission School Bus Program funds have been provided to assist public school districts with this effort. In addition, many local air districts have also provided local and federal funds.

### **8. Annual Costs**

#### **a) Ongoing Maintenance and Regeneration Costs**

In addition to capital costs, there are various annual operational and maintenance costs. Operational and maintenance costs associated with verified DECS include annual filter cleaning expenses, fuel economy losses and costs associated with regeneration of active systems. The methodology and assumptions for calculating the annual costs remain the same, and is available in Appendix J of October 2008 Technical Support Document for In-Use On-Road Diesel Vehicles (ARB, 2010).

In 2012 through 2016, the proposed amendments would require the installation of diesel particulate matter filters (DPFs) on existing vehicles. After 2016 all vehicles would have PM filters and the total number decreases as vehicles are retired. By 2021, aftermarket PM retrofits will be phased out. The estimated maximum number of retrofits and OEM DPFs in the instate vehicles is shown in Table 3 (ARB, 2010). This estimate does not include the effects of the phase-in option or other credits in the regulation.

**Table 3 Total Number of Aftermarket and OEM DPFs Statewide for In-State Vehicles Resulting from Proposed Amendments**

Calendar year	Number of Aftermarket DPFs	Increased Number of Engines with OEM equipped DPF
2012	14,154	0
2013	35,424	0
2014	101,069	0
2015	105,190	16,801
2016	100,413	23,631
2017	93,030	29,241
2018	85,059	24,862
2019	80,048	20,655
2020	59,647	32,661
2021	30,237	50,720
2022	0	68,599
2023	0	56,993
2024	0	47,808
2025	0	40,585

For neighboring out of state fleets, the maximum number of estimated retrofits would be about 12,000. For non-neighboring out of state vehicle, generally long haul fleets that have the newest trucks, staff do not expect there will be a significant number of retrofits because almost all of these vehicles will already be equipped with PM filters. Staff believes that most out of state fleets would send their newer vehicles to California and keep the small percentage of older trucks outside of California. Trucks that come into California infrequently would also be able to utilize the exemption for vehicles operating less than 1,000 miles in the state or could utilize the three day pass to avoid retrofit costs.

Staff used the same maintenance costs for the OEM DPF and the aftermarket VDECS as previously used. The annual DPF maintenance costs resulting from the proposed amendments from 2012 to 2025 was estimated to be approximately \$266 million, as shown in Table 4. The maintenance cost due to the current regulation is \$516 millions in 2008 dollars (ARB, 2008), which is equivalent to \$569 million in 2010 dollars. The reduction results in a savings of \$283 million (ARB, 2010).

**Table 4 Cumulative Increased Retrofit Maintenance Costs**

Per Filter Costs	Cumulative Costs (millions \$)
OEM equipped DPFs	\$ 64
Aftermarket DPFs	\$ 222
TOTAL	\$ 286

For the regeneration cost, staff assumes that considerably fewer vehicles would require a filter that needs active regeneration. This is in part because the proposed amendments only require VDECS on 1998 and newer vehicles that tend to be higher mileage vehicles than lighter trucks, and that with the added flexibility more fleets would be able to use lower cost retrofits first and would likely replace older vehicles in later years. The estimated cost of active regeneration would be much lower than the current regulation.

Assuming that a small percentage of 1998 model year and newer engines will require an active VDECS for a variety of operational reasons, and assuming the changes in the number of regeneration and fuel usage during regeneration are negligible, staff estimates the total cost to the statewide fleet is \$102.1 million at a diesel fuel price of \$3.69 per gallon. Table 5 shows the statewide regeneration costs for various fuel prices. The regeneration cost as a result of the current regulation is \$181.7 million in 2008 dollars, which is equivalent to \$200.3 million in 2010 dollars (ARB, 2008). The amendments to the regulation would result in a savings of \$98 million (ARB, 2010).

**Table 5 Regeneration Costs for Various Fuel Prices**

Fuel Prices/Gallon	Regeneration Costs (millions \$)
\$3.00	\$110.3
\$3.69	\$110.7
\$4.00	\$110.9
\$5.00	\$111.4

The regeneration cost calculation is highly sensitive to the active VDECS population assumed and to vehicle down time but is insensitive to fuel price. Staff assumes that the majority of regenerations will be planned to avoid vehicle downtime during the workday.

***b) Reporting Costs***

Staff anticipates that substantially fewer fleets will be required to report with the proposed amendments, and reporting cost will be lower for most fleets. Vehicles with GVWR 26,000 pounds or less will no longer need to report. These vehicles account for about 150,000 in-state vehicles. Using the same assumptions as in 2008 Technical Support Documents to calculate the reporting cost, the initial reporting costs would be reduced by 40 percent and more fleets would be expected to meet the BACT schedule requirements and would not need to report. The initial reporting for the current regulation is approximately \$16.5 million in 2008 dollars (ARB, 2008). That is an equivalent of \$18 million in 2010 dollars. The estimated savings on the initial reporting costs would be approximately \$13 million (ARB, 2010).

The reporting period over the life of the regulation has also been reduced by several years, one year defer at the beginning for all fleets, three years shorter for small fleets and seven years shorter for large fleets. The total annual reporting cost for the current regulation is \$60 million in 2008 dollars, which is equivalent to \$67 million in 2010 dollar (ARB, 2008). Adjusting the costs by the reporting period and reducing it by the equivalent percentages, the total annual reporting cost is approximately \$10 million, which is a \$57 million savings (ARB, 2010). Table 6 shows the costs and savings as the result of amendments.

**Table 6 Reporting Costs and Savings for In-State Fleets**

Cost	Reporting Cost (million)	Savings Accrues by Amendments (million)
Initial Reporting	\$5	\$13
Annual Reporting	\$10	\$57
Total	\$15	\$70

### 9. Total Costs

The results of multiplying the number of vehicles for each fleet type by the costs per vehicle are shown in Table 7 (ARB, 2010). This table also incorporates reporting costs for company fleets to comply with the regulation with amendments including the initial reporting costs and the total annual reporting costs. It also includes the annual maintenance cost of retrofits. Overall, staff estimates the cost of the regulation to be about \$2.2 billion.

**Table 7 Total Statewide Compliance Costs**

Fleet/Population Type	Total Cost (Millions)	# Vehicles
CA-IRP Vehicles for Fleets >3 Vehicles	\$160	34,547
NEIG-OOS Vehicles for Fleets >3 Vehicles	\$118	25,384
Instate HHD Vehicles for Fleets >3 Vehicles	\$69	54,375
Instate MHD Vehicles for Fleets >3 Vehicles	\$313	97,842
Instate HHD Vehicles for Fleets w/1-3 Vehicles	\$478	76,410
Instate MHD Vehicles for Small Fleets with 1-3Vehicles	\$487	92,307
Far State Vehicles for All Fleets	\$149	344,294
School Buses	\$61	14,629
Reporting Costs	\$15	n/a
Operating Costs	\$397	n/a
Grand Total	\$2,247	734,024

The total compliance cost for the current regulation is approximately \$5.5 billion (ARB, 2008). Comparing to the costs incurred by the amendments, the amendments would result in about \$3.3 billion in savings.

## **10. Cost Sensitivities**

The total compliance cost calculation is sensitive to several factors: how many fleets utilize credits, growth and decline of vehicle population and age groups, fleets buying new replacement vehicles versus the number buying used replacements, the increased cost of new 2010 truck, and how older out of state fleets might change their business practice to conform with the regulation.

Credits would reduce the number of retrofits or OEM DPF in the population for a period of time and would improve fleets ability to make lower cost used vehicle replacements to comply. This, in turn, would affect not only the capital cost but also the operating costs. The end result would be a lower overall compliance cost. The effect of the credits providing economic relief for fleet size reduction is highly dependent on the rate of economic recovery.

Changes in population for in-state vehicles also could have significant impact on cost estimates. First, vehicles that are operated fewer than 1000 miles per year, do not have any cleanup requirements. Staff was conservative in not reducing costs due to low use vehicles. Second, the proposed amendments would provide credit until 2016 if fleets have fewer vehicles operating in the compliance year than they had in the peak year of 2006. Fleets could have substantially lower compliance costs if they retire additional vehicles. The credit encourages fleets to decrease the number of trucks in the fleet and reduces actions required on other trucks at the same time. If the economy continues to recover slower than projected and the population declines more the costs would be lower. On the other hand, if the economy recovers faster then fewer fleets would be able to take advantage of the credits and the costs would be higher.

The population of affected out of state vehicles is more variable than for in-state fleets. Long haul fleets generally have the newest trucks, and most will already comply with the regulation because of normal 3 to 7 year replacement cycles. However, the number of different out of state trucks operating in California is estimated to be about one half million. Staff believes that most out of state fleets would send their newer vehicles to California and keep the small percentage of older trucks outside of California. Staff was conservative in assuming costs attributable to the regulation for many of the out of state trucks because trucks that come into California infrequently would also be able to utilize the exemption for vehicles operating less than 1,000 miles in the state or could utilize the three day pass to be exempt from the clean-up requirements.

Staff considered the impact of using different vehicle replacement costs. The costs attributable to the regulation are subtracted from the costs from normal replacements. Fleets that typically buy used trucks are expected to be older fleets and have lower capital investments than fleets that buy newer trucks on the same schedule. Cost estimates are dependent on whether fleets are expected to buy newer or older vehicles as a result of the regulation. Because per vehicle cost is calculated based on the replacement vehicle costs, buying new or near

new replacement vehicles would result in an increase in per vehicle cost, and its effect ripples through the cost calculation. If fleets were to rely on buying older used vehicles than normal to comply with the regulation, the estimated costs could be decreased substantially.

Staff evaluated the sensitivity to the estimated price premium for new trucks with 2010 model year or newer heavy duty engine and found that the results do not vary significantly. First, no truck that is less than 20 years or 97 percent of all trucks would be required to be replaced early until 2020. Newer fleets are expected to buy new replacement vehicles, but also normally replace their vehicles faster than the regulation would require. Both the baseline cost estimates and the with rule costs would change by an equal amount. Older fleets have higher costs attributable to the regulation but are not modeled as buying new replacement trucks. These fleets typically buy used trucks and would be expected to continue to do so with the regulation in place. Used truck prices were not assumed to be higher because of higher initial costs. The change in the price premium for new engines attributable to the regulation have minimal impact on the cost estimates.

**11. Cost Effectiveness of the Proposed Amendments**

The cost-effectiveness for the proposed amendments is determined by dividing the total capital costs plus the annual costs by the total pounds of diesel PM and NOx reduced during the years 2012 to 2025. The expected cost effectiveness of the amended regulation is \$1.70/lb for NOx and \$44/lb for PM. All costs are in \$2010. Staff used the inventory estimated number of PM filters adjusted the costs attributable to PM reductions down by 15 percent to account for the effects of credits and flexibility options because the total cost calculation had considered BACT schedule and phase-in compliance options and the inventory cost modeling, on the other hand, had not and therefore was conservative on PM filter estimate. The remaining total cost of the regulation was attributed to NOx reductions. Most of the replacement costs are attributed to NOx reductions (ARB, 2010). Table 8 shows the summary of the cost effectiveness ratio estimated for the amended Truck and Bus regulation.

**Table 8 Cost Effectiveness Ratio Comparison**

<b>Emission Reductions</b>	<b>Proposed Amendments</b>	<b>Current Regulation</b>
NOx (\$/lb)	\$1.70	\$1.76
PM (\$/lb)	\$44.20	\$46.00

**B. Truck and Bus Regulation Costs Analysis for Individual Fleets**

Although the overall economy for trucks is down about twenty percent on average, some fleets and sectors are more affected than others. Staff collected survey data from fleets from various industries to better understand their ability to

comply with the existing regulation and the proposed amendments. The Economic Analysis Survey Form can be found in at the end of this appendix.

### **1. *Financial Analysis of Survey Respondents***

The recession has imposed significant downward pressure on most fleets, and fleets have downsized their businesses significantly. Many fleets have sold assets, cut back debt, reduced employment, and improved productivity. This adjustment still continues for some fleets and is expected to continue for some time because the recovery that followed the recession has been slow and it is uncertain when it will accelerate to a more normal growth path. The amended regulation would decrease costs substantially for most fleets, and the additional economic relief in the form of credits for fleets that have downsized would further reduce capital investments required until 2016. The credit provision can delay some or all of the compliance costs to later years giving fleets the ability to defer costs and to take advantage of lower used truck prices in later years. To further analyze the savings expected from the proposed amendments, staff evaluated the impact of the amendments on individual fleets.

#### **a) *Moving Company***

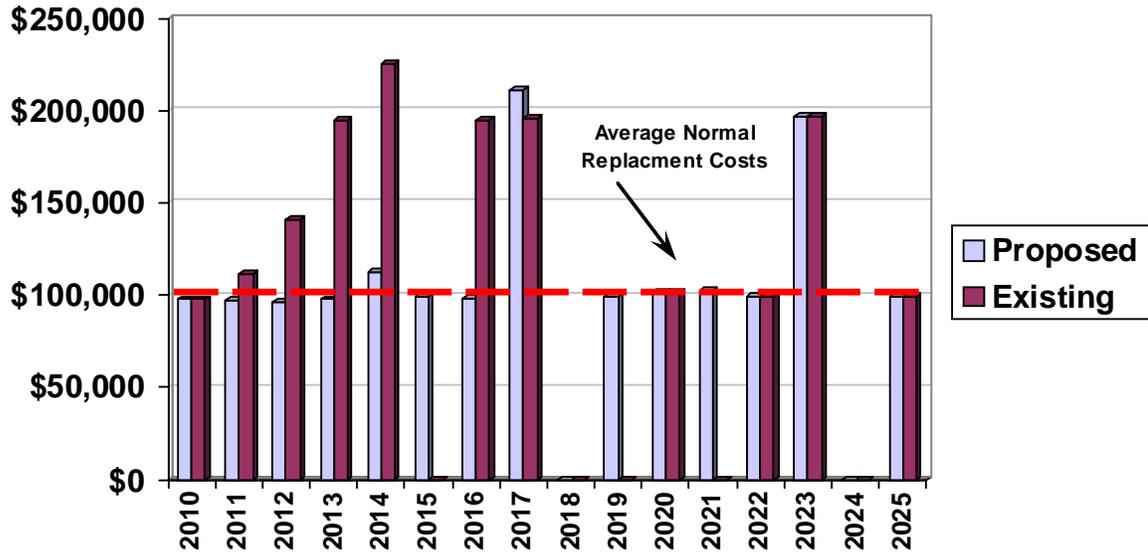
The following company is an actual moving fleet with 14 trucks, seven of which are heavier trucks (more than 26,000 pounds GVWR) and the others are lighter trucks (less than 26,001 pounds GVWR). The engine model years for the trucks range from 1996 to 2007. The fleet has downsized 30 percent since 2006 and typically will replace one truck per year at a cost of about \$94,000 after trade-in. Staff assumed the annual revenue of this company for 2010 would remain the same as in 2009. From 2006 to 2010 the average annual revenue was about \$4.9 million.

The existing regulation would require the fleet to install six retrofit PM filters and to replace eight trucks one to two years earlier than normal. The fleet's total costs with the existing regulation above normal replacement costs from 2010 to 2025 would be \$160,000 (2010 dollars).

With the proposed amendments the fleet would need to install two retrofit PM filters and replace two trucks one year early. Figure -7 shows the annual expenditures the company would make in current dollars under the proposed amendments compared to the existing regulation. The average normal replacement costs are shown by the dashed line. With the proposed amendments, the fleet's total compliance costs would be reduced to about \$74,000 above normal replacement costs, or 55 percent lower than with the current regulation. More importantly the proposed amendment would impose no additional costs other than business as usual for this fleet until 2014, in part, because of the credits for downsizing. By January 1, 2014, the fleet would need to install one PM filter on an existing truck. The cost to comply would represent

about 0.15 percent of annual revenue. The spreadsheet analysis used for this example is available at xxx

**Figure -7: Moving Company Annual Rule Costs vs. Normal Replacement Costs**



**b) Concrete Company**

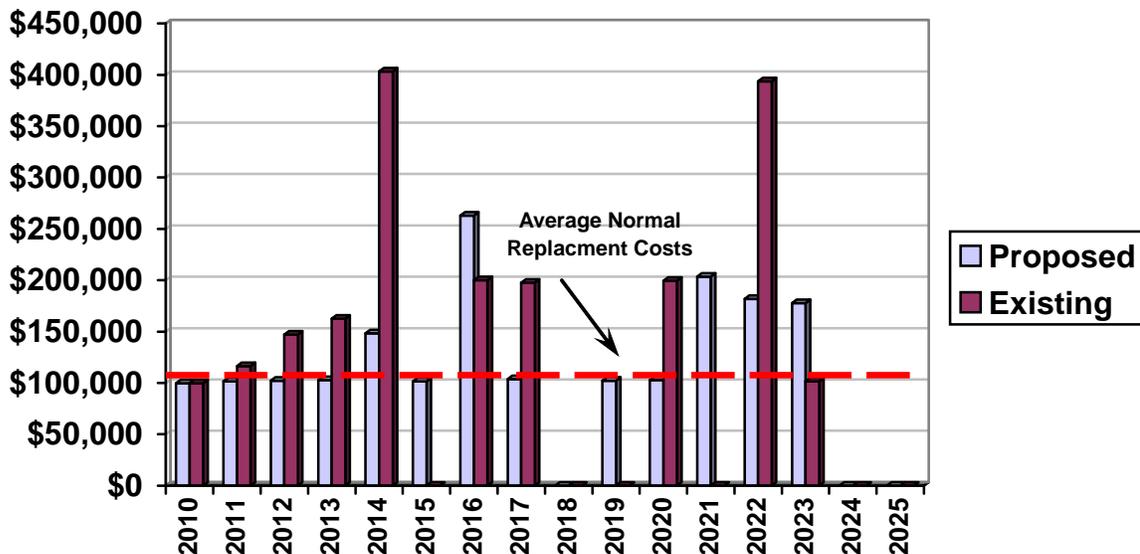
Staff also evaluated the impact of the proposed amendments for an actual concrete company. The concrete company has 18 trucks with engine model years ranging from 1994 to 2007, all of which are heavier trucks with a GVWR greater than 26,000 pounds. The company has annual revenues above \$3,000,000. The fleet has the same number of trucks as it did in 2006, but it has not been operating six of the trucks. Therefore, the fleet could utilize a 33 percent economic relief credit (six out of 18 trucks). The fleet typically replaces one truck per year at a cost of about \$103,000 per year after trade-in. Staff assumed the annual revenue of this company for 2010 would remain the same as in 2009. From 2006 to 2010 the average annual revenue was about \$6.5 million.

The existing regulation would require the fleet to install eight retrofit PM filters and to replace 14 trucks one to six years earlier than normal. With the existing regulation, the fleet’s cumulative compliance costs from 2010 to 2025 are expected to be \$440,000 (2010 dollars) above normal replacement costs.

With the proposed amendments, the fleet would be expected to install seven retrofit PM filters and to replace nine trucks early. Figure -8 shows the annual expenditures the company would make in current dollars under the proposed amendments compared to the existing regulation. One truck is replaced one year

early in 2016 because the fleet would not be expected to install a PM filter on a truck that would normally be replaced in one year. Most of the early replacements occur from 2021 to 2023. With the proposed amendments, the fleet's cumulative compliance costs from 2010 to 2025 would be reduced to about \$230,000 above normal replacement costs or about 50 percent lower than with the current regulation. More importantly the amended regulation would impose no costs for this fleet until 2014 when three PM filters would be required compared to substantially higher costs under the existing regulation. In 2016, one more truck than normal was replaced 2 years early and reflects that a fleet would not be likely to install a retrofit PM filter on a truck that was about to be replaced. The spreadsheet analysis used for this example is available at xxx

**Figure -8: Concrete Company Rule vs Normal Replacement Costs**



**c) Transportation Company**

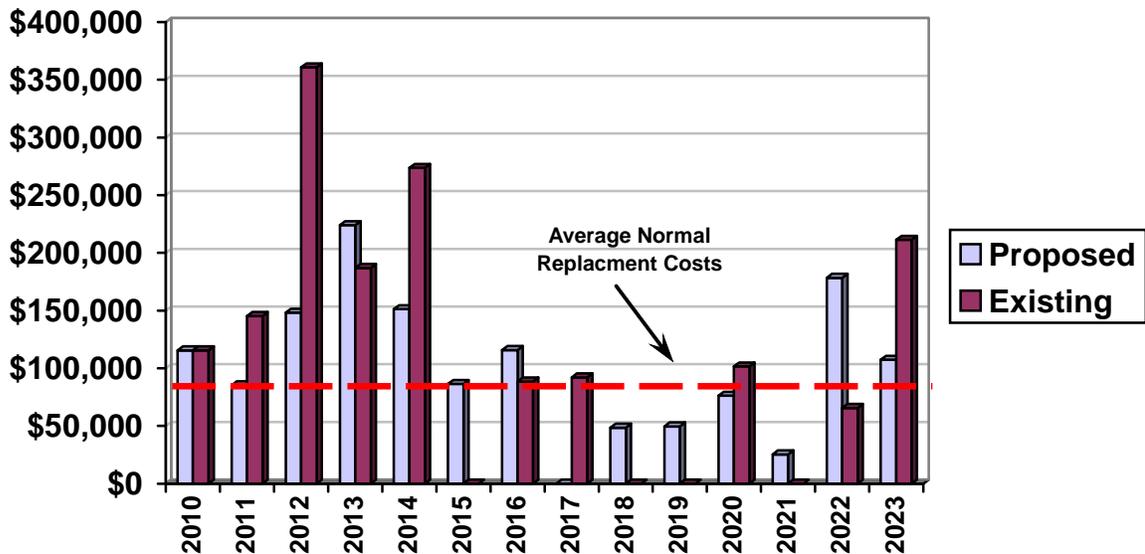
The following company is an actual freight transportation fleet, primarily a truckload carrier, with 33 truck tractors (GVWR greater than 26,000 pounds). The engine model years range from 1990 to 2009. Staff assumed the annual revenue of this company for 2010 would remain the same as in 2009. From 2006 to 2010 the average annual revenue was about \$5.5 million. The fleet did not provide information about the number of trucks in 2006; therefore, staff did not assume the fleet size declined and no economic relief credits for downsizing would apply in this example. The fleet typically replaces two trucks per year with used trucks that are three years old at a cost of less than \$45,000 per truck after trade-in.

The existing regulation would require the fleet to install 14 retrofit PM filters and to replace 27 trucks one to six years earlier than normal. The cost increase in

2010 reflects that the fleet would purchase a newer truck than normal that is originally equipped with a PM filter. The fleet would be expected to replace some trucks early in planning to meet future NOx reduction requirements while reducing the number of retrofit PM filters. The fleet's total costs to comply with the existing regulation from 2010 to 2025 would be \$410,000 (2010 dollars) above normal replacement costs with the highest capital investments required 2012 to 2014.

Under the proposed amendments the fleet would be expected install 16 retrofit PM filters and to change the order in which the older trucks are replaced. Figure 9 shows the annual expenditures the company would make in current dollars with the proposed amendments compared to the existing regulation. The fleet would continue to replace two trucks per year until 2016 when the fleet would need to replace four trucks. In 2022 and 2023 the fleet would need to replace 11 trucks early. With the proposed amendments, the fleet's total compliance costs would be reduced to about \$185,000 above normal replacement costs, or 55 percent lower than with the current regulation. The capital investments required from 2010 to 2015 would be about 50 percent lower. The cost increase in 2010 reflects that the fleet has begun to purchase newer trucks than normal that are originally equipped with a PM filter. The average normal replacement costs are shown by the dashed line. The cost to comply with the proposed amendments would represent about 0.3 percent of annual revenue. The spreadsheet analysis used for this example is available at xxx

**Figure 9: Freight Company Annual Rule Costs vs. Normal Replacement Costs**



## 2. Financial Feasibility for Individual Fleets

Staff is continuing to evaluate the potential impacts on actual individual fleets and industries subject to the regulation. Towards this end, staff plans to present additional economic information regarding cash flow analyses, access to capital, and fleets' "ability to pay" to comply with the revised regulation as part of the December 2010 Board hearing.

### C. Cost Savings for Drayage Truck Amendments

Trucks serving the Ports of Long Beach and the Port of Los Angeles already have 2007 model year engines or newer; therefore, the proposed amendments would not result in any changes except for trucks serving other ports and intermodal rail yards.

As shown in the following table, by 2014, 23 percent of the drayage trucks outside the South Coast are expected to have 2007 and newer engines. 43 percent are expected to have 2004 to 2006 model year engines and 35 percent are expected to have 1994 to 2003 model year engines already retrofit with PM filters.

Trucks Serving the Port of Oakland and other ports outside LA 2014

CY	Population	2007Plus	2004to2006	Pre2004
2014	4224	960	1801	1463
		23%	43%	35%

The 23% with 2007 engines would have no costs with the existing rule and would have no savings with the amendments. Fleets that would be expected to have 2004 to 2006 model year engines would need to upgrade to a 2007 model year or newer truck to comply with the existing drayage regulation by 2014. Staff estimates that it would cost \$35,000 to purchase a 2008 model year truck in 2013 instead of \$20,000 for a 2004 to 2006 model year truck. The net cost would be about \$15,000 which is the roughly the same cost as installing a PM filter on an existing truck. Therefore, these fleets would not experience a significant change in cost with the proposed amendments. Fleets with 1994 to 2003 model year engines represent 35% of the trucks. These trucks have already been retrofit to comply with the regulation and would need to be upgraded to a 2007 model year engine by 2014 if the regulation were not amended. The cost to upgrade to a 2007 model year engine would be about \$35,000 minus the trade-in value of the older truck. The trade-in value would likely range from \$5,000 to \$20,000 depending on the condition of the truck. If the average trade-in value was \$10,000 the average cost would be \$25,000 per truck. The proposed amendments would eliminate the requirement to upgrade to the 2007 engine; therefore, the average cost savings would be  $1,463 \times 25,000 = \$36$  million.

By 2014, the existing Truck and Bus Regulation already requires all trucks to have PM filters and nearly all trucks to have at least a 2004 model year engine or

newer. Fleets with 4 or more trucks can comply with 50 percent 2010 model year engines and the remainder could be any model year with PM filters. Newer trucks are able to comply longer; therefore, there is an incentive for fleets to upgrade to newer trucks. Therefore, the inclusion of Class 7 tractors serving the ports and rail yards would result in no increased costs for fleets with 2004 or newer engines.

With the proposed amendments to the truck and bus regulation, single truck owners with pre-2004 engines could comply with the amended regulation by installing a PM filter and would no longer have to upgrade to a truck with a 2004 model year engine and equip it with a PM filter. Therefore, if the truck costs are similar to the example above, the truck owner would experience a cost saving of \$20,000-\$10,000=\$10,000 for avoiding the truck replacement. The PM filter cost would be unchanged. Thus, the minimum net cost savings for a single truck owner would be \$10,000 per truck.

Reporting cost saving from the Drayage Truck regulation will be about \$13 million. Business owners as well as motor carriers will see a cost savings starting in 2017 when reporting, data collection, and truck monitoring requirements cease after the Drayage Truck Regulation sunsets. The savings is estimated to be approximately \$270 per year (2010 dollars) for an independent drayage truck owner and approximately \$4,700 per year (2010 dollars) for a licensed motor carrier. The total annual costs savings that results from an estimated 18,000 drayage truck owner-operators, and approximately 1,800 licensed motor carrier firms is estimated to be about \$13 million ( $18,000 \times \$270 + 1,800 \times \$4,700$  total cost ~ \$13,000,000).

#### **D. References**

ARB, 2008. California Air Resources Board. Staff Report: Initial Statement of Reasons (ISOR), Technical Support Document. October 2008. Available at: <http://www.arb.ca.gov/regact/2008/truckbus08/truckbus08.htm>

ARB, 2010. California Air Resources Board, Diesel Activities - AB1085 Compliance. October 2010. Available at: <http://www.arb.ca.gov/dieseltruck>

## ECONOMIC ANALYSIS SURVEY

Staff evaluated survey information from 72 fleets that participated in ARB's Economic Analysis Survey below. The purpose of the survey was to gather fleet data and financial information so staff could evaluate the impact of the economy on individual business that need to comply with the Truck and Bus regulation. The survey responses included information on more than 2,500 vehicles. These fleets ranged in size from one vehicle to over 700 vehicles and represented various business sectors such as construction, agriculture, transportation, and government.



## ECONOMIC ANALYSIS SURVEY

*Please feel free to contact the following staff for questions concerning the survey*

**Virginia Humphreys**

Phone: (916) 322-8739

Email: [vhumphre@arb.ca.gov](mailto:vhumphre@arb.ca.gov)

*Please return the completed survey and any additional information by [DATE] and email or mail to:*

**Attention: Virginia Humphreys (MSCD)**

California Air Resources Board

P.O. Box 2815

Sacramento, CA 95812

**Confidential**

### **Company Information**

Company Name:

Contact Person:

Company Address:

Phone Number:

Email Address:

### **ARB Confidentiality**

The California Code of Regulation (CCR) Article 2, sections 91010 requires the state board to give notice to any person from whom it request information that the information proved may be released (1) to the public upon request, except trade secrets which are not emission data or other information which is exempt from disclosure or the disclosure of which is prohibited by law, and (2) to the federal Environmental Protection Agency,

which protects trade secrets as provided in Section 114(c) of the Clean Air Act and Amendments thereto and in federal regulations.

If your responses to any part of this survey contain confidential information, please check the box marked confidential located above on the right side of this page and refer to Attachment C for more detailed information. In addition, please complete the confidentiality form provided in Attachment C.

Confidential

### Economic Analysis Survey Form

The purpose of this form is to gather fleet data and financial information for staff to evaluate the impact of the economy on individual business that need to comply with the Truck and Bus Regulation. Any information that is marked confidential will remain confidential. Please complete and return this form to the Air Resources Board by **[Date]**

**Company Name:** \_\_\_\_\_

**Contact Person:** \_\_\_\_\_

**Physical Address:** \_\_\_\_\_

**Email Address:** \_\_\_\_\_

1. Please provide us with your NAICS or SIC code:
  
2. Please provide audited financial statements, balance sheets and/or profit and loss statements for the past three to five years (Attach information to this form and email to Virginia Humphreys at [vhumphre@arb.ca.gov](mailto:vhumphre@arb.ca.gov) or mail to PO box 2815, Sacramento, CA 95812 Attn: Virginia Humphreys).
  
3. Please tell us about your trucks and buses operated in the calendar years of 2006 to 2009. Specifically, what is the model year(s) and annual miles traveled for each vehicle during each calendar year? If the truck was idle for the entire year, please enter zero for mileage.

Model Year	Vehicle Body Type (see Attachment A)	Gross Vehicle Weight Rating (GVRW)	Year Sold/Retired	Annual Miles Traveled			
				2006	2007	2008	2009

(See attachment B to include additional vehicles)

**Confidential**

4. In addition to vehicles in your fleet that are subject to the Truck and Bus regulation, do you also have vehicles that are subject to the Off-Road regulation? If so, please provide us with your DOORS identification number so we may access information regarding your off-road vehicles.
  
5. Have you or your company applied for and received any incentive funding for vehicle purchases, repowers, or retrofits in the last three to five years? If yes, how much money have you received?
  
6. Do any of your trucks have a PM exhaust retrofit? If so, how many?
  
7. Please tell us how you classify your business. For example, are you a logging, construction, or moving company?
  
8. If your organization is a national organization, is there a California branch or affiliate?
  
9. How many California fleet owners does your organization represent?
  
10. Can you provide us with individual fleets willing to provide data?





Confidential

**Attachment C  
CONFIDENTIAL INFORMATION SUBMITTAL FORM**

If you wish to designate any information contained in your survey data as **CONFIDENTIAL INFORMATION**, please provide the information requested below and return it with your completed Survey form.

In accordance with Title 17, California Code of Regulations (CCR), Sections 91000 to 91022, and the California Public Records Act (Government Code Section 6250 et seq.), the information that a company provides to the Air Resources Board (ARB) may be released (1) to the public upon request, except trade secrets which are not emissions data or other information which is exempt from disclosure or the disclosure of which is prohibited by law, and 2) to the Federal Environmental Protection Agency, which protects trade secrets as provided in Section 114(c) of the Clean Air Act and amendments thereto (42 USC 7401 et seq.) and in federal regulation, and 3) to other public agencies provided that those agencies preserve the protections afforded information which is identified as a trade secret, or otherwise exempt from disclosure by law (Section 39660(e)).

Trade secrets, as defined in Government Code 6254.7, are not public records and therefore will not be released to the public. However, the California Public Records Act states that air pollution emission data are always public records, even if the data comes within the definition of trade secrets. Even so, the information used to calculate air pollution data is not "emission data," and will not be released to the public if it is a trade secret.

If any company believes that any of the information it may provide is a trade secret or otherwise exempt from disclosure under any provision of law, it **must identify the confidential information as such at the time of submission to the ARB and must provide the name, address, and telephone number of the individual to be consulted.** If the ARB receives a request for disclosure or seeks to disclose the data claimed to be confidential, the ARB may ask the company to provide documentation of its claim of trade secret or exemption at a later date. Data identified as confidential will not be disclosed unless the ARB determines, in accordance with the above referenced regulations that the data do not qualify for a legal exemption from disclosure. The regulations establish substantial safeguards before any such disclosure.

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In accordance with the provisions of Title 17, California Code of Regulations, Sections 91000 to 91022, and the California Public Records Act (Government Code Sections 6250 et seq.)

Company Name: \_\_\_\_\_  
declares that only those portions specifically identified (by checking the upper right-hand corner confidentiality box on each form) and submitted in response to the California Air Resources Board's information request on the Survey are confidential "trade secret" information, and requests that it be protected as such from public disclosure. We have designated confidential information by checking (x) in the upper right-hand corner confidentiality box on the first page of the survey.

Printed Name: \_\_\_\_\_ Title: \_\_\_\_\_  
Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
Mailing Address: \_\_\_\_\_  
City/State: \_\_\_\_\_ Zip/Country: \_\_\_\_\_  
Telephone Number: E-mail Address: \_\_\_\_\_

**Division 3, Air Resources Board**  
**Chapter 1, Air Resources Board**  
Subchapter 4. Disclosure of Public Records  
Article 1. General

§91000. Scope and Purpose.

This subchapter shall apply to all requests to the state board under the California Public Records Act (Government Code Sections 6250 et seq.) for the disclosure of public records or for maintaining the confidentiality of data received by the state board. Written guidelines shall govern the internal review of such requests.

NOTE: Authority cited: Sections 39600 and 39601(a), Health and Safety Code.  
Reference: California Public Records Act, Chapter 3.5 (commencing with Section 6250), Division 7, Government Code.

§91001. Disclosure Policy.

It is the policy of the state board that all records not exempted from disclosure by state law shall be open for public inspection with the least possible delay and expense to the requesting party.

NOTE: Authority cited: Sections 39600 and 39601(a), Health and Safety Code. Reference: Section 6253, Government Code; Black Panther Party v. Kehoe (1974) 42 Cal.App.3d 645.

Article 2. Board's Requests for Information

§91010. Request Procedure.

The state board shall give notice to any person from whom it requests information that the information provided may be released (1) to the public upon request, except trade secrets which are not emission data or other information which is exempt from disclosure or the disclosure of which is prohibited by law, and (2) to the federal Environmental Protection Agency, which protects trade secrets as provided in Section 114(c) of the Clean Air Act and amendments thereto (42 USC 7401 et seq.) and in federal regulations.

NOTE: Authority cited: Sections 39600, 39601 and 39602, Health and Safety Code.  
Reference: Sections 39701, 41510, 41511, 41512 and 42705, Health and Safety Code; and Section 6253, Government Code.

§91011. Submissions of Confidential Data.

Any person submitting to the state board any records containing data claimed to be "trade secret" or otherwise exempt from disclosure under Government Code Section 6254 or 6254.7 or under other applicable provisions of law shall, at the time of submission, identify in writing the portions of the records containing such data as "confidential" and shall provide the name, address and telephone number of the individual to be contacted if the state board receives a request for disclosure of or seeks to disclose the data claimed to be confidential. Emission data shall not be identified as confidential. The state board shall not disclose data identified as confidential, except in accordance with the requirements of this subchapter or Section 39660(e) of the Health and Safety Code.

NOTE: Authority cited: Sections 39600 and 39601, Health and Safety Code.  
Reference: Sections 39660, 39701, 41500, 41511, 41512 and 42705, Health and Safety Code;  
Sections 6253, 6254 and 6254.7, Government Code Natural Resources Defense Council v. EPA,  
489 F.2d 390 (5th Cir. 1974) (6 ERC 1248); Northern California Police Practices Project v. Craig  
(1979) 90 Cal.App.3d 116; Uribe; v. Howie (1971) 19 Cal.App.3d 194.

### Article 3. Inspection of Public Records

§91020. Disclosure Policy.  
§91021. Disclosure Procedure.

NOTE: Authority cited: Section 39601, Health and Safety Code.  
Reference: Sections 6253-6257, Government Code.

§91022. Disclosure of Confidential Data.

(a) This section shall apply to all data in the custody of the state board (1) designated "trade secret" prior to the adoption of this subchapter,

(2) considered by the state board or identified by the person who submitted the data as confidential pursuant to this subchapter, or

(3) received from a federal, state or local agency, including an air pollution control district, with a confidential designation, subject to the following exceptions:

(A) Except for the time limits specifically provided in subsection (b), only subsections (c) and (d) of this section shall apply to information submitted pursuant to Health and Safety Code section 39660(e).

(B) Appropriate portions of an application for approval, accreditation, or certification of a motor vehicle emission control device or system shall be kept confidential until such time as the approval, accreditation, or certification is granted, at which time the application (except for trade secret data) shall become a public record, except that estimates of sales volume of new model vehicles contained in an application shall be kept confidential for the model year, and then shall become public records. If an application is denied, it shall continue to be confidential but shall be subject to the provisions of this section.

(C) If disclosure of data obtained after August 9, 1984 from a state or local agency subject to the provisions of the Public Records Act is sought, the state board shall request that the agency which provided the data determine whether it is confidential. The state board shall request that it be notified of the agency's determination within ten days. The state board shall not release the data if the agency determines that it is confidential and so notifies the state board; provided, however, that the data may be released with the consent of the person who submitted it to the agency from which it was obtained by the state board.

(b) Upon receipt of a request from a member of the public that the state board disclose data claimed to be confidential or if the state board itself seeks to disclose such data, the state board shall inform the individual designated pursuant to Section 91011 by telephone and by mail that disclosure of the data is sought. The person claiming confidentiality shall file with the state board documentation in support of the claim of confidentiality. The documentation must be received within five (5) days from the date of the telephone contact or of receipt of the mailed notice, whichever first occurs. In the case of information submitted pursuant to Health and Safety Code section 39660(e), the documentation must be received within 30 days of the date notice was mailed pursuant to that section.

The deadlines for filing the documentation may be extended by the state board upon a showing of good cause made within the deadline specified for receipt of the documentation. © The documentation submitted in support of the claim of confidentiality shall include the following information:

- (1) the statutory provision(s) under which the claim of confidentiality is asserted;
  - (2) a specific description of the data claimed to be entitled to confidential treatment;
  - (3) the period of time for which confidential treatment is requested;
  - (4) the extent to which the data has been disclosed to others and whether its confidentiality has been maintained or its release restricted;
  - (5) confidentiality determinations, if any, made by other public agencies as to all or part of the data and a copy of any such determinations, if available; and
  - (6) whether it is asserted that the data is used to fabricate, produce, or compound an article of trade or to provide a service and that the disclosure of the data would result in harmful effects on the person's competitive position, and, if so, the nature and extent of such anticipated harmful effects.
- (d) Documentation, as specified in subsection ©, in support of a claim of confidentiality may be submitted to the state board prior to the time disclosure is sought.
- (e) The state board shall, within ten (10) days of the date it sought to disclose the data or received the request for disclosure, or within 20 days of that date if the state board determines that there are unusual circumstances as defined in Government Code Section 6256.1, review the request, if any, and supporting documentation, if received within the time limits specified in subsection (b) above, including any extension granted, and determine whether the data is entitled to confidential treatment pursuant to Government Code Section 6254, 6255 or 6254.7 or other applicable provisions of law and shall either:
- (1) decline to disclose the data and, if a request was received, provide to the person making the request and to the person claiming the data is confidential a justification for the determination pursuant to Government Code Section 6255; or
  - (2) provide written notice to the person claiming the data is confidential and, if a request was received, to the person requesting the data that it has determined that the data is subject to disclosure, that it proposes to disclose the data, and that the data shall be released 21 days after receipt of the notice by the person claiming confidentiality, unless the state board is restrained from so doing by a court of competent jurisdiction. The state board shall release the data in accordance with the terms of the notice unless so restrained.
- (f) Should judicial review be sought of a determination issued in accordance with subsection (e), either the person requesting data or the person claiming confidentiality, as appropriate, may be made a party to the litigation to justify the determination.

NOTE: Authority cited: Section 39601, Health and Safety Code.

Reference: Sections 6253, 6254, 6254.7, 6255, 6256, 6256.1, 6258 and 6259, Government Code.

