ARB Emission Reduction Programs in the Transportation Sector

Introduction to the Matrix
(July 15, 2016)

ARB is tasked with three overarching mandates.

1. Achieve the health-based air quality standards for ozone, particulate matter and other air pollutants established by the U.S. Environmental Protection Agency under the federal Clean Air Act. To attain the ozone standard of 75 parts per billion, California must reduce emissions of oxides of nitrogen (NOx) 80 percent from today's levels by 2031.
2. Reduce public exposure to toxic air pollution, such as benzene, lead, and diesel particulate matter. Following requirements to remove lead and reduce other toxic chemicals from fuels, benzene levels measured in the air have declined by 90 percent over the last 25 years. As a result, the critical focus of the State's efforts today is on reducing public exposure to toxic diesel particulate emissions. California's goal is to reduce diesel particulate emission by 85 percent by 2020.
3. Reduce greenhouse gas (GHG) emissions to 1990 levels by 2020, to 40 percent below 1990 levels by 2030, and 80 percent below 1990 levels by 2050.

These mandates represent the overarching goals or policy drivers that each individual regulation or program is designed to achieve. Many of the measures that ARB develops address more than one of these goals. ARB undertakes a public planning process to identify the regulations or programs necessary to achieve these goals. Each individual measure, along with its specific requirements, is then developed through its own unique public process.

ARB tracks overall progress toward these goals at three levels simultaneously:

1. Measurements of actual pollution in the air,
2. Ongoing evaluation of emissions and emissions reductions using the emissions inventory, and
3. Detailed program implementation metrics.

Real-world measurement of air quality and pollution in the air is the most direct measure of the effectiveness of ARB's programs. Since 1990, ozone levels have dropped by 45 percent in the South Coast, the nations' smoggiest region. In the San Joaquin Valley, where fine particulate matter levels are the highest nationwide, fine particulate matter has dropped 20 percent since 2001. In 2004, 15 areas in California measured smog levels above the 8-hour ozone standard. By 2010, only 8 areas, and today only 4 areas. Twenty-five years ago the entire South Coast region violated the ozone standard. Today, 40 percent of the population lives in communities that meet the standard.

The emissions inventory is the second tool used for analyzing progress and the effectiveness of our emission reduction programs. It includes the needed technical detail within each source category or sector to see where, how, and why emissions are changing. Most critically, the emissions inventory reflects the interaction among programs such as how a fuel standard works in concert with an engine standard to achieve emission reductions. This is important because the combined benefits of many programs are not equal to the sum of the program benefits estimated separately. For example, clean diesel engines require clean low sulfur fuel to work properly. Thus, standards needed to be set for both the engines and the fuel, and the emission reductions result from the combination of these actions rather than each standard individually.

Finally, ARB tracks program effectiveness program-by-program by evaluating implementation metrics. The metrics vary for each specific program or regulation since each program is unique in what it is designed to address, how it is enforced, how regulated entities report, and how it interacts with other programs.

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Below is a description of the content included in each of the columns in the matrix. The information in the matrix maps each program to the overarching mandates described above, and documents the program goals, the status of implementation, emission reductions from the inventory for the source category, and program-specific metrics that are used to track progress.

ARB Program

- The plain English name of the program.

Program Authority

- These are the specific California statute(s) that authorize the program or regulation.

Program Function/Requirements

- This is a plain English description of how the program operates. Also included are links to additional documentation available on ARB's website providing more information about the program.

Program Goal

- Descriptions of the "Program Drivers" directly map each program to one or more of the overarching mandates – meeting air quality standards, reducing GHG emissions, or reducing toxics emissions – that the program has been developed to help meet.

- For regulatory programs, specific regulation goals, such as the number of vehicles/equipment covered by the regulation and the reductions by key dates/years are reported. In most cases, the emission reductions and vehicle population numbers are based on the analysis done at the time the regulation was adopted; therefore it reflects the economic forecast, projected technology performance, vehicle and equipment population and activity estimates, etc., available at that time.

- For non-regulatory programs, including incentive programs, program goals identify the source categories the program targets, the technologies the program is designed to advance, and the objective of the program.

Program Status

- The first section in this column reports implementation status: when a program was adopted, whether the program has been fully implemented or future compliance deadlines exist, and any other pertinent information about the status of implementation.

- The second section in the column reports on progress of the program in terms of meeting its goals. This can include the measured effectiveness of engine or fuel standards, populations of vehicles and equipment that have met regulatory requirements, and sector-level (i.e., source category) emission reductions from the emissions inventory.

- The last section in this column identifies the program-specific metrics that are tracked as the program is implemented in order to verify its effectiveness. Each metric is identified along with the source of information that supports the metric.

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- For regulatory programs, emission reductions reported in this section are taken from the most recent emissions inventory and reflect the latest updates available today to economic forecasts, technology performance, vehicle and equipment population estimates, etc. These data are provided at the sector level in order to accurately report the actual reductions achieved given the real-world interactions among multiple regulatory programs that address the same sector.

Funding Sources(s)

- The fund within ARB's budget from which the program is paid.

Resources 2011-2015

- As ARB testified at the Assembly Transportation Committee hearing on February 22, 2016, ARB has begun to implement a detailed timesheet and reporting procedure for tracking program expenditures by staff person at a finer level of detail than we have historically. Information from that system will be available in the future. In the interim, to report program expenditures in the matrix, ARB has estimated a range of staff resources needed to implement each program over the last five years. This information is intended to provide a measure by which to compare ARB's staffing commitment for each program over the last five years. While we have not historically budgeted and accounted for expenditures at the individual program level, staff is by far ARB's largest expenditure for program administration and a good indicator of ARB's costs to implement each program.

- The low end of the range represents the minimum annual staff resources used to implement the program during the last five years. The high end of the range represents the maximum annual staff resources used to implement the program during the last five years. The estimate includes staff that worked directly on each program. The range reflects the fact that demands for some programs can see spikes such as when key implementation dates approach requiring additional support (e.g., assisting regulated sources and air districts with taking advantage of incentive programs that have an upcoming deadline). The estimate does not include staff who undertake general activities that support the development and implementation of measures, such as administrative support, air monitoring, legal counsel, laboratory testing, emissions inventory support, etc. as these activities support multiple programs across the organization.

ARB Emission Reduction Programs in the Transportation Sector

ARB Program	Program Authority	Program Function/Requirements	Program Goal	Program Status	Funding Source(s)	Resources[1] 2011-2015 (Low-High PYs)
Light-Duty Vehicle: Regulations and Other Programs						
Advanced Clean Cars (ACC) Program						
Zero Emission Vehicle (ZEV) Program	California Clean Air Act California Health and Safety Code sections 39600, 39601, 43013, 43018, 43101, 43104, 43105, 38562, 39002, 39003, 39667, 43000, 43009.5, 43108.5, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43205.5, and 43206	The ZEV Regulation sets vehicle credit requirements for clean vehicle technology based on manufacturers' California sales volumes. A manufacturer's credit requirement is expressed as a percentage of their annual total passenger car and light-duty truck sales in California. Manufacturers meet their credit requirement through the production of ZEVs (battery electric and fuel cell electric vehicles) for California drivers. Manufacturers may meet a portion of their requirement with transitional-ZEVs (TZEVs), otherwise known as plug-in electric hybrid vehicles (PHEVs). Within the basic regulatory structure, manufacturers are given compliance flexibility, including the ability to trade credits in order to meet a compliance shortfall. ZEV Regulation: http://www.arb.ca.gov/msprog/zevprog/zevregs/zevregs.htm	**Program Drivers:** Reduce ROG, NOx, CO, PM, and toxics emissions from new light- and medium-duty vehicles to help meet health-based State and federal air quality standards. Reduce GHG emissions to help meet the goals of AB 32, which requires California to reduce its GHG emissions to 1990 levels by 2020 and beyond.	**Implementation Status:** Originally introduced as a part of the Low Emission Vehicle (LEV I) Regulation in 1990. The most recent and comprehensive regulatory revision occurred in 2012 as part of the Advanced Clean Cars Program, which set increasing production requirements through model year 2025. Currently, manufacturers within the program are successfully complying with the regulatory requirements, resulting in a sharp increase in the number and diversity of ZEVs on California's roads. In addition, staff is in the process	Motor Vehicle Account Cost of Implementation Account	17 to 23

[1] The staff resources shown in the program expenditures column represents staff directly working on the development, implementation, and enforcement of individual programs. Staff is by far ARB's largest expenditure for program administration and a good indicator of ARB's costs to implement each program. There are additional resources associated with providing technical, administrative, legal, and executive management support that are not included, including staff resources that provide the technical foundation across all of ARB's programs, such as research, planning, emissions inventory, and air quality monitoring.

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ARB Program	Program Authority	Program Function/Requirements	Program Goal	Program Status	Funding Source(s)	Resources[1] 2011-2015 (Low-High PYs)
		ZEV Program: http://www.arb.ca.gov/msprog/zevprog/zevprog.htm FAQ: http://www.arb.ca.gov/msprog/zevprog/factsheets/zev_tutorial.pdf Non-Regulatory efforts are aimed at supporting market adoption through education and outreach activities, and coordination with state and international partners. Example non-regulatory activities include: • Clean Vehicle Rebate Project (CVRP) – refer to details on this project later in this document. • Develop consumer and dealer education and support materials provided through DriveClean.ca.gov, an ARB created and managed California consumer vehicle buying resource (http://www.driveclean.ca.gov/). • Coordinate with other State agencies and implement ARB actions in the Governor's Office ZEV Action Plan (http://www.opr.ca.gov/s_zero-emissionvehicles.php). • Coordinate with other states and implement ARB actions in the ZEV Multi-State ZEV Action Plan (http://www.zevstates.us/). • Provide best practices and lessons of ZEV activities via coordination with national and subnational jurisdictions through the International ZEV Alliance (http://www.zevalliance.org/). • Support and staffing to manage and implement actions of the Plug-in Electric Vehicle Collaborative (http://www.pevcollaborative.org/). • Support for the deployment of hydrogen and electric	**Regulation Goals:** The ZEV Program is comprised of both regulatory and non-regulatory efforts that are intended to advance commercialization of zero emission vehicles in order to facilitate California's transition to a predominantly zero emission light-duty fleet by 2050. This transition is necessary to achieve the State's long-term GHG targets and air quality standards. Projected annual sales share from minimum compliance with the regulation: • 2.1 percent for the 2015 model year. • 15 percent for the 2025 model year. The ZEV Regulation will help the State meet the goal of reaching 1.5 million ZEVs on	of finalizing the "midterm review" of the adopted regulation, which will evaluate the success and feasibility of the standards and the role of PHEVs in the ZEV Regulation, and will be presented to the Board in December 2016. **Progress Meeting Program Goals**: • Actual California ZEV and TZEV annual sales share in 2015 model year: about 3 percent. Although this is good market progress and exceeds the 2015 requirements, the regulation becomes more stringent in the next few years, and ARB will continue to closely monitor progress. • As of January 2016, approximately 192,000 new ZEVs and TZEVs have been sold in California since 2010. This represents approximately 13 percent of the overall goal of		

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ARB Program	Program Authority	Program Function/Requirements	Program Goal	Program Status	Funding Source(s)	Resources[1] 2011-2015 (Low-High PYs)
		charging infrastructure to enable the use of ZEVs ○ Annually assess the number of anticipated FCEVs and projected hydrogen station needs, in support of CEC's funded hydrogen station network. (AB 8). ○ Jointly develop the annual economic assessments of the hydrogen infrastructure and need for continued public funding. ○ Implement the SB 1505 requirement for hydrogen production to use 33 percent renewable resources and achieve GHG reductions, in partnership with CEC. Hydrogen program: http://www.arb.ca.gov/msprog/zevprog/hydrogen/hydrogen.htm Hydrogen station network: http://cafcp.org/stationmap	California's roads by 2025, which is a critical enabler of meeting the State's emission reduction targets.	1.5 million vehicles on California roads by 2025. **Metrics for Assessing Progress**: • Compliance with the ZEV Regulation is assessed via an online reporting tool, called the Zero Emission Vehicle – Credit Reporting and Data Tracking System (ZEV-CRDTS). Manufacturers submit vehicle sales data on an annual basis in order to demonstrate compliance. • ARB staff also tracks progress (i.e., sales) of the zero emission vehicle market in California by evaluating vehicle registration data through DMV, Polk, and California New Car Dealers Association quarterly reports.		

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ARB Program	Program Authority	Program Function/Requirements	Program Goal	Program Status	Funding Source(s)	Resources[1] 2011-2015 (Low-High PYs)
Light-Duty Vehicles: Incentive Programs						
Clean Vehicle Rebate Project (CVRP)	SB 1275 (de León): Health and Safety Code sections 44258 and 44258.4 SB 535 (de León): Health and Safety Code sections 39711, 39713, 39715, 39721, and 39723 AB 118 (Núñez): Health and Safety Code section 44274 et. seq.	The Clean Vehicle Rebate Project (CVRP) offers vehicle rebates on a first-come, first-served basis for light-duty ZEVs, including plug-in hybrid electric vehicles, zero emission motorcycles, and neighborhood electric vehicles. Rebate amounts are $2,500 for battery electric vehicles (BEVs), $1,500 for plug-in hybrid electric vehicles (PHEVs), $5,000 for fuel cell electric vehicles (FCEVs), and $900 for zero emission motorcycles and neighborhood electric vehicles. Higher rebates for lower-income consumers and an income cap launched March 2016. Program: https://cleanvehiclerebate.org/eng Statistics about Program Participation: https://cleanvehiclerebate.org/eng/rebate-statistics	**Program Drivers:** Reduce GHG emissions to help meet the goals of AB 32, which requires California to reduce its GHG emissions to 1990 levels by 2020 and beyond. Reduce NOx, ROG, CO, and PM emissions to meet health-based State and federal air quality standards. **Program Goals:** Increase deployment of zero emission technologies by incentivizing consumers to purchase light-duty zero emission vehicles. CVRP helps support many State goals for electric vehicle deployment, including: • ZEV regulation projected	**Implementation Status:** CVRP was launched in 2010. Since then, the State has expended $298 million. Rebates will be scaled back and ultimately phased out in future years as market reaches self-sustainability. Long-term CVRP plan under development. **Progress Meeting Program Goals:** • In California, deployment of light-duty PHEVs and BEVs have increased, with sales growing from 2.5 percent of total new car sales in 2013 to about 3 percent in 2015. • As of January 2016, approximately 192,000 new ZEVs and TZEVs have been sold in California since 2010. This represents approximately 13 percent	Greenhouse Gas Reduction Fund Air Quality Improvement Fund	2 to 8

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ARB Program	Program Authority	Program Function/Requirements	Program Goal	Program Status	Funding Source(s)	Resources[1] 2011-2015 (Low-High PYs)
			compliance of 15 percent ZEV market share by 2025. • 1 million ZEVs by 2023 pursuant to SB 1275. • 1.5 million ZEVs by 2025 pursuant to EO-B-16-2012. • 100 percent ZEV sales by 2050 as identified in the 2013 Climate Change Scoping Plan Update and 2015 draft Mobile Source Strategy. Support market sustainability estimated at about 16 percent of vehicle sales, as adopted in the FY 16-17 Funding Plan. Broad ZEV deployment includes low- and moderate-income consumers and residents in and near disadvantaged communities.	of the overall goal of 1.5 million vehicles on California roads by 2025. • To date, ~140,000 rebates totaling ~$298 million have been issued. • 9,000 of the 140,000 rebates totaling ~$18 million have been issued in disadvantaged community census tracts. **Metrics for Assessing Progress:** Increasing deployment of ZEV technologies is measured according to the following metrics: • Vehicle registration data obtained from DMV, Polk, and California New Car Dealers Association quarterly reports. • Number of rebates and funding levels. • Demographics of program participants, including rebates issued in disadvantaged communities, applicant income levels, and		

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ARB Program	Program Authority	Program Function/Requirements	Program Goal	Program Status	Funding Source(s)	Resources[1] 2011-2015 (Low-High PYs)
				geographic distribution of rebates assessed by surveys of grant recipients.		
Enhanced Fleet Modernization Program (EFMP) and EFMP Plus Up (vehicle retire-and-replace)	AB 32 (Núñez) AB 118 (Núñez) and SB 459 (Pavley): Health and Safety Code sections 44125 and 44126 SB 535 (de León): Health and Safety Code sections 39711, 39713, 39715, 39721, and 39723 SB 1275 (de León): Health and Safety Code sections 44258 and 44258.4	EFMP is authorized by AB 118 and includes two components: retirement-only and retire-and-replace. The retirement-only component is administered by the Bureau of Automotive Repair, and provides compensation to vehicle owners to retire their older, high polluting vehicle. The retire-and-replace component is administered by ARB in partnership with local air districts, and it is currently available in the South Coast air district and the San Joaquin Valley. This component of EFMP provides higher incentive amounts to a vehicle owner who retires a vehicle and replaces it with a newer vehicle that meets certain fuel economy requirements. SB 459 directed ARB to amend the program guidelines to maximize participation by low-income consumers and increase the air quality and GHG benefits achieved through the program. To encourage low- and moderate-income persons in disadvantaged communities to retire their older vehicles and purchase new or used advanced technology replacements, ARB augmented EFMP with Cap-and-Trade proceeds in a project referred to as EFMP "Plus Up." Under this project, vehicle owners living in or near disadvantaged communities in the South Coast air district or the San Joaquin Valley get increased funding if they purchase a conventional hybrid vehicle, plug-in hybrid electric vehicle (PHEV), or pure zero	**Program Drivers:** Reduce GHG emissions to help meet the goals of AB 32, which requires California to reduce its GHG emissions to 1990 levels by 2020 and beyond. Reduce NOx, ROG, CO, and PM emissions to meet health-based State and federal air quality standards. **Program Goals:** The goal of EFMP is to retire older, less fuel efficient vehicles and replace them with cleaner models. The goal of EFMP Plus Up is to complement CVRP in order to deepen penetration of	**Implementation Status:** ARB allocated $2.8 million for EFMP from the Enhanced Fleet Modernization Subaccount and $2 million from the Greenhouse Gas Reduction Fund for EFMP Plus Up in FY 14-15. The same amount was allocated for EFMP in FY 15-16, while Plus Up funding increased to $10 million. ARB approved air district EFMP retire-and-replace implementation plans for pilot projects in the South Coast and San Joaquin Valley. Both of these projects launched in Summer 2015. ARB proposes to expand retire-and-replace to other areas of the State in the next few years and will be working with interested air districts to develop implementation plans.	Greenhouse Gas Reduction Fund Enhanced Fleet Modernization Subaccount	3 to 6

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ARB Program	Program Authority	Program Function/Requirements	Program Goal	Program Status	Funding Source(s)	Resources[1] 2011-2015 (Low-High PYs)
		emission vehicle (e.g., BEV). Air districts must report detailed information on each replacement vehicle transaction and overall program progress to ARB on a quarterly basis, based on implementation and consumer surveys. South Coast air district's Replace Your Ride: https://www.replaceyourride.com/ San Joaquin Valley air district implements its EFMP in tandem with their local Tune In/Tune Up program: http://valleyair.org/grants/pass.htm	zero emission technologies among low- and moderate-income consumers living in or near disadvantaged communities by incentivizing consumers to retire conventionally fueled vehicles and purchase new or used zero emission vehicles. The EFMP program priorities are to: • Maximize overall participation in the program. • Maximize participation from low-income consumers. • Emphasize GHG benefits and related fuel economy improvement. The EFMP Plus Up program priorities also include: • Promote the adoption of	**Progress Meeting Program Goals:** • As of April 2016, 840 older vehicles were replaced between the two programs. • Low-income consumers comprise 94 percent of the participants (household incomes less than 225 percent of the federal poverty level). • Advanced technology vehicles comprise 79 percent of the replacement vehicles: 15 percent BEV, 21 percent PHEV, and 43 percent conventional hybrid. • 76 percent of participants received Plus Up funding. • 97 percent of participants live in or near a disadvantaged community. The average fuel economy of replacement vehicles funded by the program was 60 miles		

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			advanced technology replacement vehicles. • Achieve GHG reductions in or near disadvantaged communities.	per gallon, whereas the average fuel economy of retired vehicles was 21 miles per gallon, a significant improvement. This resulted in approximately 5,000 metric tons of GHG emissions reductions. **<u>Metrics for Assessing Progress</u>:** • Overall participation rates. • Participation by low-income consumers and in disadvantaged communities. • Number of conventional, hybrid vehicles, PHEVs, and BEVs funded. • Increase in vehicle fuel economy (i.e., GHG benefits) of vehicle replacements. • Age and mileage of the retired and replaced vehicles.		

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ARB Program	Program Authority	Program Function/Requirements	Program Goal	Program Status	Funding Source(s)	Resources[1] 2011-2015 (Low-High PYs)
Heavy-Duty Vehicles: Regulations and Other Programs						
Truck and Bus Regulation	California Clean Air Act Health and Safety Code sections 39003, 39666, and 39667	At the time the regulation was adopted, heavy-duty trucks were the largest source of NOx and diesel PM emissions in the State. The Regulation requires emission control equipment retrofit for in-use trucks and buses and accelerates the turnover of old trucks and buses to the 2010 engine standards, as a result, reducing emissions from nearly one million heavy-duty diesel trucks and buses operating in California in a given year. The Regulation reduces NOx emissions by requiring in-use trucks to upgrade to the cleanest State and federal heavy-duty engine standards that became effective in 2010. Diesel PM emissions are reduced at the tailpipe through PM filter retrofits or original filters meeting the 2010 model year engine standard. 2010 engines are equipped with Selective Catalytic Reduction systems (SCR) that reduce NOx by 90 percent and PM filters that reduce PM about 98 percent. Requirements and implementation dates are phased in based on vehicle weight, engine model year, area of operation, miles traveled, and size of truck fleet. Beginning in 2012, newer heavier vehicles must meet PM filter retrofit requirements. Beginning in 2015, lighter and older heavier vehicles must begin replacement of their engines with those meeting the 2010 engine standard. By January 2023, nearly all trucks must upgrade to the 2010 engine standard. Program: http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm	**Program Drivers:** Reduce exposure to toxic diesel PM emissions (a component of PM2.5) as part of the Diesel Risk Reduction Plan, which specifies an 85 percent reduction in health risk by 2020. Reduce PM2.5 and NOx emissions to help meet health-based State and federal air quality standards by cleaning up the existing heavy-duty truck fleet. **Program Goals**: The Regulation is designed to achieve the following Statewide deployment of cleaner heavy-duty truck technology: 2014 goals: • 758,000 trucks	**Implementation Status:** The Regulation was adopted in 2008 and amended in 2010 and 2014. The Regulation will be fully implemented by 2023. **Progress Meeting Program Goals:** 2014 status: • 702,000 trucks equipped with diesel PM filters, of which 12,000 are retrofits (2014 compliance was lower than the goal, due in part to a six-month enforcement stay and 2014 amendments not effective until January 1, 2015). • Registration and compliance reporting data shows greater than expected purchase of trucks meeting the cleanest 2010 engine standard to date, providing a larger per vehicle benefit.	Motor Vehicle Account Air Pollution Control Fund	39 to 111

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ARB Program	Program Authority	Program Function/Requirements	Program Goal	Program Status	Funding Source(s)	Resources[1] 2011-2015 (Low-High PYs)
		Regulation: http://www.arb.ca.gov/msprog/onrdiesel/documents/tbfinalreg.pdf Phase-in Schedule and FAQ: http://www.arb.ca.gov/msprog/onrdiesel/documents/fsregsum.pdf	equipped with diesel PM filters, of which 17,000 are retrofits. 2017 goals: • Additional 144,000 trucks equipped with diesel PM filters, of which 15,000 are retrofits. 2020 goals: • Additional 98,000 trucks equipped with diesel PM filters, of which 2,000 are retrofits. 2023 goals: • Nearly all trucks have 2010 engines. This translates into the following statewide emission reductions: 2014: • 52 tpd NOx. • 5.6 tpd PM.	• Overall compliance rate of about 85 percent of in-State trucks has been achieved, while enhanced enforcement and targeted incentive funding efforts are underway to further increase this rate. Nearly all out-of-State long-haul trucks are less than seven years old as a result of normal business practices and have PM filters. By 2014, NOx emissions from the heavy-duty truck sector decreased by 387 tpd, and PM2.5 emissions decreased by 20 tpd from 2008. The Truck and Bus Regulation has been a key contributor to reductions in this sector. **Metrics for Assessing Progress:** • Durability throughout the useful life of the vehicle is assessed by in-use emissions testing. • Performance of PM filter retrofits is verified through ARB's Diesel		

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			2017: • 62 tpd NOx. • 5.0 tpd PM. 2020: • 70 tpd NOx. • 4.2 tpd PM. 2023: • 94 tpd NOx. • 2.9 tpd PM.	Emission Control Strategies Verification Program. • Vehicle population/ engine type is tracked through DMV registration, the International Registration Program, Vehicle Inventory and Use Survey, and the Truck Regulation Upload, Compliance and Reporting System (TRUCRS) reporting database. • Vehicle operation is tracked through DMV registration, transportation planning agencies, and Board of Equalization fuel sales. • Compliance with the Truck and Bus Regulation is enforced by truck inspections throughout the State and at major truck hubs such as ports and border crossings and information reported by truck owners to ARB.		

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ARB Program	Program Authority	Program Function/Requirements	Program Goal	Program Status	Funding Source(s)	Resources[1] 2011-2015 (Low-High PYs)
				• Aggregate emission benefits are tracked via ARB's inventory.		
Fuels: Regulations and Other Programs						
Low Carbon Fuel Standard (LCFS)	AB 32 (Núñez) California Clean Air Act Health and Safety Code sections 38510, 38530, 38560, 38560.5, 38571, 38580, 39600, 39601, 41510, and 41511	The LCFS sets annual carbon intensity (CI) standards, which reduce over time, for gasoline, diesel, and the fuels that replace them such as ethanol, renewable diesel, biodiesel, renewable natural gas, electricity, and hydrogen. CI is expressed in grams of carbon dioxide equivalent per megajoule of energy provided by that fuel. CI takes into account the GHG emissions associated with all of the steps of producing, transporting, and consuming a fuel – also known as a complete life-cycle of that fuel. The LCFS is fuel-neutral, and lets program participants determine which mix of fuels will be used to reach the program targets. High carbon fuel producers, such as oil companies, must meet the fuel standard either through producing or buying the lower-CI fuels, innovating to lower their own fuel's CI, or buying tradeable credits generated by low carbon fuel providers. In 2015 ARB adopted the Alternative Diesel Fuel (ADF) Regulations as a direct complement to LCFS. The ADF ensures that the use of biodiesel and other alternative diesel fuels that may be incented by the LCFS do not increase criteria pollutant or toxic air contaminant	**Program Drivers:** Reduce GHG emissions to help meet the goals of AB 32, which requires California to reduce its GHG emissions to 1990 levels by 2020 and beyond – a reduction of approximately 15 percent below emissions expected under a "business as usual" scenario. **Program Goals:** The primary goal of the LCFS regulation is to reduce the carbon intensity (GHG emissions per unit of fuel energy) of transportation fuels used in California by at least 10 percent by 2020 from	**Implementation Status:** The LCFS regulation was approved in 2009 and the first compliance year was 2011. As the result of a court ruling that found procedural issues related to the original adoption of the LCFS, the CI standard was frozen at 1 percent 2013-2015. ARB addressed the court's concerns, adopted the ADF regulation, and re-adopted the LCFS regulation in September 2015. The changes went into effect on January 1, 2016. **Progress Meeting Program Goals:** The carbon intensity of fuel used in California has declined by 2.1 percent since 2010 as compared to a 2015 target	Cost of Implementation Account	43 to 48

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		emissions from current levels. LCFS Program: http://www.arb.ca.gov/fuels/lcfs/lcfs.htm LCFS Regulation: http://www.arb.ca.gov/regact/2015/lcfs2015/lcfsfinalregorder.pdf ADF Program: http://www.arb.ca.gov/fuels/adf/adf.htm ADF Regulation: http://www.arb.ca.gov/regact/2015/adf2015/adffinalregorder.pdf	a 2010 baseline. The yearly compliance requirements for the reduction in carbon intensity are as follows: • 2011: 0.25 percent • 2012: 0.50 percent • 2013: 1.00 percent. • 2014: 1.00 percent. • 2015: 1.00 percent • 2016: 2.00 percent. • 2017: 3.50 percent. • 2018: 5.00 percent. • 2019: 7.50 percent. • 2020: 10.00 percent. A secondary goal is to transform and diversify the fuel pool to avoid overreliance on any one fuel type.	reduction of 1.0 percent. Regulated parties have over-complied (achieving a greater CI reduction than targeted) in every year of the program so far. Fuel diversity has increased, as measured by the volumes of low carbon fuel use in California. Since 2011: • Renewable diesel has increased from less than 2 million to 165 million gallons per year in 2015. • Biodiesel use has grown from 12.5 million to 126 million gallons in 2015. • Renewable natural gas use in vehicles has increased from 1.6 million to 68 million diesel gallons equivalent. In 2015, renewable natural gas made up over half of all gaseous fuels used in California vehicles.		

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ARB Program	Program Authority	Program Function/Requirements	Program Goal	Program Status	Funding Source(s)	Resources[1] 2011-2015 (Low-High PYs)
				<u>Metrics for Assessing Progress</u>: Average carbon intensity of transportation fuels used in California: Calculated using the life-cycle greenhouse gas emissions of that fuel per unit of fuel energy reported to ARB's electronic LCFS reporting tool. Volumes of low carbon fuel use in California: The gallons of alternative fuels used in California as reported to ARB and confirmed using various external sources (Energy Information Administration, California Energy Commission, etc.).		