

Appendix E

Incentive-Based Strategy



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E. INCENTIVE-BASED STRATEGY

The San Joaquin Valley Air Pollution Control District (District) has increasingly relied on its advocacy efforts to secure state and federal funding sources, and locally generated funding to implement incentive programs that have become a crucial component of the District's overall strategy for achieving the emissions reductions necessary to bring the Valley into attainment. These programs provide an effective way to accelerate emissions reductions and encourage technology advancement, particularly from mobile sources, a sector not directly under the District's regulatory jurisdiction. Given that over 80% of the NOx emissions in the Valley come from mobile sources, these successful voluntary incentive grant programs help the Valley achieve highly cost-effective emissions reductions that are surplus of the regulatory emissions reductions.

This Appendix will review the District's existing longstanding and successful incentive programs and future incentive-based strategies under evaluation for this *2018 PM2.5 Plan*.

Since inception, the District has provided incentive funding to purchase, replace, or retrofit thousands of pieces of equipment, including the following:

- 7,000 agricultural irrigation pump engines
- 4,400 agricultural equipment replacements
- 1,200 off-road equipment repowers
- 6,500 heavy-duty trucks
- 2,300 school bus retrofits
- 590 school bus replacements
- 4,800 lawnmower replacements
- 14,500 fireplace change-outs
- 198,000 commuter subsidies
- 54 locomotive replacements
- 8,400 new alternative-fuel, light-duty vehicles
- 27 bicycle infrastructure projects (bike paths)
- 25,658 light-duty vehicle repairs
- 1,233 high-emitting vehicle replacements
- 26 natural gas fueling infrastructure
- 261 electric vehicle charging infrastructure

The District's incentive programs continue to be a model for other agencies throughout the state. Recent audits noted the District's efficient and effective use of incentive grant funds in reducing air pollution.

E.1 OVERVIEW OF DISTRICT'S INCENTIVE PROGRAM

The District operates one of the largest and most well respected voluntary incentive programs. Through strong advocacy at the state and federal levels, the District has increased its funding levels over the past decade and has appropriated nearly \$500 million in incentive funding in the 2018-2019 District Budget. Since the District's inception in 1992, considerable funding has been invested into thousands of clean-air projects throughout the Valley. These projects have achieved significant emissions reductions with corresponding air quality and health benefits.

The District typically requires match funding of 30% to 70% from grant recipients. To date, grant recipients have provided \$1 billion in matching funds, with a combined District and grant recipient funding investment of more than \$2.2 billion.

Table E-1 Summary of Grant Expenditures and Results

District Incentive Funding (\$)	Grant Recipient Match Funding (\$)	Emissions Reductions (tons)	Cost-Effectiveness (\$/ton)
\$1,080,000,000	\$1,140,000,000	145,800	\$7,407

E.1.1 SIP CREDITABILITY FOR INCENTIVE-BASED EMISSIONS REDUCTIONS

When provided SIP credit, incentive-based emissions reductions can be used alongside regulatory-based emissions reductions to meet federal Clean Air Act (CAA) requirements, such as demonstrating attainment with federal air quality standards at a future date. Given the substantial investment from the public and private sectors in replacing equipment under these voluntary incentives, establishing a general framework to receive SIP credit for these emissions reductions was critical. Recognizing the importance of this issue, the U.S. Environmental Protection Agency (EPA), California Air Resources Board (CARB), and the United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) worked together with the District to create a Statement of Principles (MOU). Signed in December 2010, this MOU established a general framework for ensuring that reductions in air emissions resulting from voluntary incentives to replace off-road agricultural equipment received credit in the SIP. The MOU states that the District, USDA-NRCS, CARB and EPA would work collaboratively to develop a mechanism to provide SIP credit for emissions from incentive programs that are surplus, quantifiable, enforceable, and permanent. Continuing these efforts, in July 2012, EPA and USDA agreed to implement this concept to ensure that emissions reductions from incentive programs were given proper credit in the SIP context.

As a result of these collaborative efforts, the District adopted Rule 9610 (State Implementation Plan Credit for Emission Reductions Generated Through Incentive Programs) on June 20, 2013. District Rule 9610 establishes the administrative mechanism through which SIP credit may be quantified for emissions reduced in the Valley through incentives. EPA approved District Rule 9610 on April 9, 2015.

As with prohibitory rules, EPA guidance requires that emissions reductions achieved through voluntary incentive programs be surplus, quantifiable, permanent, and enforceable in order for those reductions to receive SIP credit. Additionally, EPA guidance requires extensive documentation of emissions reductions proposed for SIP credit with ongoing follow-up and tracking of the emissions reductions.

District incentive programs are generally designed to meet SIP-credibility criteria. In order to be surplus, emissions reductions from voluntary incentive programs must provide emission reductions ahead or beyond any local, state, or federal regulations. Quantifiable emissions reductions are calculated using publically developed methodologies. To ensure enforceable and permanent emissions reductions, programs require mechanisms such as legally binding agreements with program participants and physical inspections to verify the completion of projects.

E.1.2 INCENTIVE FUNDING

The District derives its incentive funding from a variety of local, state, and federal sources. Local sources include motor vehicle fees, fees from the District's Indirect Source Review rule program, and fees from the District's Voluntary Emission Reduction Agreements (VERA), and fees from District Rule 4320 (Advanced Emission Reduction Option for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr). The District's Governing Board recently extended the use of DMV surcharge fees under AB 2522 to support commitments for further reductions in emissions necessary to attain federal health-based standards.¹ In addition to locally-sourced funding, the District has aggressively advocated for state funding for the Valley, including funding from the Carl Moyer Program, Proposition 1B Goods Movement Emission Reduction Program, Greenhouse Gas Reduction Funds (Cap and "Trade), AB 118, Lower Emission School Bus, and, more recently, AB 134 and Funding Agricultural Replacement Measures for Emission Reductions (FARMER) funding. Federal support for emission reductions in the Valley is also critical for the region to reach attainment. Federal funding sources have included Diesel Emission Reduction Act (DERA) and Targeted Air Shed Grant funding.

As the District derives its current incentive funding from a range of local, state, and federal funding sources, each of the funding sources administered by the District includes different guidelines and statutory requirements for using the funds. These funding sources contain restrictions on the types of projects that may be funded, funding limitations, expenditure deadlines, and the administrative approach for funding distribution. These requirements vary significantly from one funding source to another, resulting in a complex matrix of funding categories and program requirements.

Beyond the specific guidelines of each funding source, the District considers the following common factors when deciding how and where to spend incentive funds:

¹ SJVAPCD. (2017). *Suspension of Section 185 Nonattainment Penalties and Use of Existing DMV Revenues to Fulfill Federal Clean Air Act Mandates*. SJVUAPCD Governing Board Meeting April 20, 2017. http://www.valleyair.org/Board_meetings/GB/agenda_minutes/Agenda/2017/April/final/13.pdf

- **Cost Effectiveness:** An important factor when considering where to invest District funds is determining which types of projects and programs will give the District the greatest return on its investment. This is typically represented in dollars per ton of emissions reduced. While cost-effectiveness is a primary factor, the District also considers projects that may not have the highest cost-effectiveness, but that provide other benefits, such as the advancement of new technology or community involvement.
- **Inventory of Available Projects:** This factor is critical in all District incentive programs. To date, the District has been extremely successful in designing incentive programs that have broad appeal and applicability across multiple industries. Over the past 10 years, this level of interest has resulted in a substantial number of projects waiting for funding. The District will continue to work with applicants to ensure expeditious funding of eligible projects.
- **Required Expenditure Timeframes:** Each funding source that the District administers generally requires obligation and expenditure by certain deadlines. These deadlines greatly impact funding priorities and choice of projects. The District may prioritize a funding category over others because of the timeframe associated with a particular funding source. For instance, priority may be given to certain projects that can reasonably be expected to finish prior to the deadline for that specific fund over other projects of equal relevance or cost-effectiveness, but with longer expected completion times. Again, the flexibility of this option works in concert with the dynamic nature of the incentive programs, projects, expenditure deadlines.
- **Upcoming Regulatory Deadlines:** To ensure that incentive programs obtain the maximum SIP-creditable emissions reductions, the District performs a thorough analysis of all local, state, and federal regulations relating to the target categories. In addition, the District works proactively with the regulating agencies during the rule development process to understand the potential impacts of that rule on incentive projects and to ensure that opportunities for early incentive funding are maximized. These analyses determine which types of projects can be funded, for how long projects can be funded, which also impacts the potential cost-effectiveness of certain projects.
- **Health Benefits:** In addition to emissions reductions needed to attain air quality standards, the District also seeks incentive projects that provide direct health benefits to Valley residents. For instance, the District's Lower-Emission School Bus Program focuses primarily on the localized toxic risk involved in children's exposure to diesel particulates. While not the largest source of regional particulate pollution, replacing or retrofitting aging school buses has an enormous impact on the toxic risk of school transportation.
- **Environmental Justice:** The District places a strong emphasis in providing funding in a manner that benefits environmental justice communities. The District has worked cooperatively with the Environmental Justice Advisory Group to understand

the Valley's environmental justice issues and to craft programs that reduce emissions in these areas.

- **Community Involvement and Benefits:** The District develops and administers programs with an emphasis on community involvement. Some examples of these are the Clean-Green-Yard-Machine program, Drive Clean! Rebate program, Burn Cleaner program, Transit Pass Subsidy program, and the Polluting-Automobile Scrap and Salvage program.

E.2 CURRENT INCENTIVE PROGRAMS

E.2.1 HEAVY DUTY TRUCKS

The heavy-duty trucks category is composed of light-heavy-duty to heavy-heavy-duty diesel trucks with a gross vehicle weight rating (GVWR) of 14,001 and greater. Light-heavy-duty trucks have a GVWR of 14,001 to 19,500, medium-heavy-duty trucks have a GVWR of 19,501 to 33,000 and heavy-heavy-duty trucks have a GVWR greater than 33,001. Emission reductions in the heavy-duty truck fleet must be achieved through accelerated fleet turnover to the cleanest engines meeting ultra-low NOx emissions levels, which are 90% cleaner than engines currently required.

While CARB rulemaking efforts like CARB's Truck and Bus Regulation, and current funding programs like Prop 1B, are helping transition California fleets to clean engines meeting the 2010 0.2 g/bhp-hr NOx standard, these efforts are not enough to bring the Valley into attainment with the federal PM2.5 standards by the mandated deadlines. In an effort to encourage the transition to near-zero technologies and achieve reductions faster, CARB established optional ultra-low NOx standards of 0.1, 0.05, and 0.02 g/bhp-hr, which are up to 90% lower than the current heavy-duty truck standard. These optional standards have pushed progressive engine manufacturers to explore and develop new engine technologies. As such, engines that meet the optional ultra-low NOx standards for various classes of heavy-duty trucks are already available or are currently undergoing the certification process.

Cummins Westport has commercially released both an 8.9-liter and an 11.9-liter natural gas engine certified to the optional 0.02 g/bhp-hr standard and a 6.7-liter natural gas engine certified to the optional 0.10 g/bhp-hr NOx standard. Additionally, Cummins and other engine manufacturers are continuing to develop engines in various other sizes that meet the ultra-low NOx levels in the coming years.

The zero emission technologies for heavy-duty trucks, such as battery electric vehicles, have limited range and are only currently available for short-range duty cycles, such as last-mile delivery trucks. However, development and demonstration are beginning for longer-range zero emissions options, including hydrogen fuel cells as range-extendors for battery electric vehicles, with some remaining uncertainty as to their technological achievability, economic feasibility upon commercialization, and ultimate pace of adoption.

Aside from battery electric or fuel cell electric vehicles, natural gas and propane engines are currently the only fuel-type certified or undergoing the certification process to meet the 0.02 g/bhp-hr ultra-low NOx emissions standards. While the timing of availability of low-NOx engines across multiple weight classes is still evolving, natural gas is currently the only available option for long-range heavy-duty applications. As such, the District must work with EPA, CARB, and industry to establish the appropriate natural gas fueling network to support the proposed fleet turnover.

Despite lack of direct regulatory authority, the District has helped increase the effectiveness of state and federal heavy-duty on-road emissions regulations through the administration of established state incentives programs and the adoption of local programs. Continuing to transition the heavy-duty truck fleet over to zero and near-zero emissions technologies is a critical component of District's control strategy. The District aims to accelerate the turnover of trucks to newer, cleaner vehicles, primarily focusing on the ultra-low NOx engines certified to 0.02 g/bhp-hr.

The District has administered numerous incentive programs over the years, using federal, state, and locally generated funds to replace older on-road heavy-duty trucks with the cleanest available technologies.

Proposition 1B (Prop 1B): The Prop 1B Goods Movement Emission Reduction Program was the single largest source of funding for the District's heavy-duty on-road incentive program. Prop 1B used bond funds for a variety of state transportation priorities, including the replacement of heavy-duty trucks, transportation refrigeration units, and locomotives used in the goods movement corridors. The District aggressively pursued its share of Proposition 1B funding, and the Valley has received over \$250 million over the life of the program, replacing 2,900 trucks.

Truck Voucher Program (TVP): The District's Truck Voucher Program (TVP) was designed to provide an alternative source of incentive funding for heavy-duty truck operators that were unable to obtain funding through the proposition 1B program. The District contracts with Valley dealerships and makes the review and approval process efficient and streamlined to provide vouchers to truck owners. The District provides up to 35% of the cost of a new truck that meets or exceeds the 2010 emission standard for heavy-duty trucks. The District has replaced over 1,600 heavy-duty trucks, funded by grants from EPA and locally generated incentive funds totaling over \$73 million in funding.

A typical TVP project can take as little as a month to complete, which is from the time a complete application is received by the District to the time the applicant is driving the new truck off of the lot. The program can operate at this pace because the contracted dealers that partner with the District reduce the voucher amount from the overall cost of the truck, which lowers the applicants' loan amount for the truck. After the truck is purchased the District validates the voucher with the dealer and mails a check to the dealer for the voucher amount.

E.2.2 PASSENGER CARS, LIGHT-DUTY VEHICLES, MEDIUM-DUTY VEHICLES

This category includes classes of vehicles used primarily for personal transportation. When the light-duty truck and medium-duty vehicle categories were first established, the majority of vehicles in the medium-duty vehicle category were primarily used for work purposes. The popularity and high sales volumes of full size pick-up trucks and SUVs have altered the light- and medium-duty truck use patterns. It is now common for trucks and SUVs to be used primarily for personal transportation.²

Passenger cars are vehicles designed primarily for transportation of persons and having a capacity of twelve or less. Light-duty trucks are trucks with a gross vehicle weight rating (GVWR) less than 5,750 lbs. Medium-duty vehicles have a GVWR between 5,751 lbs. and 8,500 lbs.

California has the Nation's longest history of passenger car emissions standards and an accompanying inspection and maintenance program. Continued reductions in emissions from this category while the overall size of the fleet is increasing relies on vehicle turn-over, proper maintenance of legacy vehicles, and continual improvement of new vehicle emissions. The District has operated programs to address each of these needs.

Despite lack of direct regulatory authority, the District has helped increase the effectiveness of state and federal light-duty on-road vehicle regulations through the administration of established state incentives programs and state leading innovation in the adoption of local programs.

Tune In Tune Up: Since 2010, the District has partnered with Valley Clean Air Now (Valley CAN) to administer the Tune In Tune Up vehicle repair program. Initial funding for Tune In Tune Up came from the state's Reformulated Gasoline Settlement Fund and resulted in the repair of more than 2,900 vehicles. Because of the success of this initial effort and benefits to the residents of the Valley, the District has budgeted additional funding for the program hosting 132 events, repairing 25,000 vehicles, using \$31,500,000 of locally generated incentive funds.

With a focus on outreach to low income communities, this award-winning program provides Valley residents with the opportunity and necessary funding to make emissions-related repairs to their vehicles, significantly reducing emissions throughout the Valley, particularly in disadvantaged communities. In partnership with Valley CAN, this program has grown to become the most effective, targeted vehicle repair program in the state. In addition to the significant emissions benefits of the program, the Tune In Tune Up program has produced extremely valuable data regarding the true nature and extent of high-polluting, largely unregistered vehicles in the Valley, particularly amongst the Valley's low income population.

² California Air Resources Board [CARB]. (1999). "Lev II" And "Cap 2000" Amendments To The California Exhaust And Evaporative Emission Standards And Test Procedures For Passenger Cars, Light-Duty Trucks And Medium-Duty Vehicles, And To The Evaporative Emission Requirements For Heavy-Duty Vehicles: Final Statement Of Reasons. Retrieved from <http://www.arb.ca.gov/msprog/levprog/levii/pstfrpt.pdf>

Through this partnership with Valley CAN, the District has provided much-needed funding for vehicle repairs with the vast majority of these vehicles operating within the Valley's disadvantaged communities. An additional benefit of this program is follow-up with owners of vehicles that are unregistered due to smog-related issues to help ensure that their vehicles are re-registered after repair. In fact, 98% owners of previously unregistered vehicles have registered their vehicles after completing repairs through the program.

Enhanced Fleet Modernization Program (EFMP) and EFMP Plus UP: In recognition that not all vehicles that participate in the Tune In Tune Up weekend events are good candidates for repair, the District developed a first-of-its-kind vehicle replacement pilot program, implemented in partnership with Valley CAN. This program identified vehicles at weekend events which were not good candidates for repair and provided additional funding to retire and replace those vehicles with cleaner, more efficient vehicles. Based on the initial success, this pilot program served as a model for developing the statewide EFMP and EFMP Plus Up programs.

Since 2015, the District has incorporated a vehicle replacement component into the Tune In Tune Up weekend events. The EFMP program provides between \$4,500 to a maximum of \$9,500 per vehicle to replace high emitting vehicles identified at Tune In Tune Up events. The incentive amount is based on the type of replacement vehicle purchased, the income level of the participant and whether or not they reside in a disadvantaged community. The highest incentive is given to applicants with the lowest income (less than 225% of the federal poverty level) that choose the cleanest available vehicles (generally battery-electric).

These programs are funded through CARB's AB 118 program and Greenhouse Gas Reduction Fund (GGRF), more commonly referred to as the Cap and Trade Program. To date, the District and Valley CAN have replaced more than 1,256 vehicles with newer, cleaner vehicles with approximately 96% of the participants meeting the program's definition of low income and 99% of the vehicles residing within the Valley's disadvantaged communities.

Drive Clean! Rebate Program: Today's market provides consumers with a wide variety of clean-air vehicle options. This program provides rebates to Valley residents and businesses for the purchase or lease of new, clean-air vehicles. The Valley has traditionally lagged other areas of the state in electric vehicle use and ownership. This is evidenced by the low participation of Valley residents in statewide incentive programs for electric and other advanced passenger vehicle technology. Only about 3% of participants in the statewide Clean Vehicle Rebate Program have been from the San Joaquin Valley. This program has further encouraged Valley residents to drive these cleaner alternatives. Since the launch of the Drive Clean! Rebate Program in March 2012, the District has issued almost 7,000 rebates, totaling more than \$19 million in grant funding.

Public Benefits Grants Program, New Alternative Fuel Vehicle Purchase

component: The Public Benefit Grant Program was developed to help address the needs and challenges faced by Valley public agencies in their efforts to secure funding for clean-air projects. The program was designed to provide necessary flexibility and leveraging to ensure the success of these projects. The New Alternative Fuel Vehicle Purchase component provides funding for the purchase of new, light duty alternative fuel vehicles including natural gas, electric and plug-in hybrids. Since the launch of the program in 2011, \$24 million has been awarded for the purchase of clean alternative fuel vehicles such as zero-emission motorcycles, full battery-electric and plug-in hybrid electric vehicles.

Vanpool Voucher Incentive Program: The Valley is an expansive region and many of its residents make long commutes for work on a daily basis. To offset some of these miles traveled, the Vanpool Voucher Incentive program provides incentives to Valley residents to participate in vanpools in lieu of using single occupant vehicle commutes to work. The program encourages commuter rideshare practices among frequent long distance riders (greater than 20 miles) in the Valley. The District has issued a total of 198,654 vouchers to Valley commuters for \$5.9 million.

E.2.3 MOBILE AGRICULTURAL EQUIPMENT

This category includes off-road agricultural equipment such as tractors, backhoes, wheel loaders, and other off-road farming vehicles that are widely used in the Valley. Off-road agricultural equipment replacements and repowers play a crucial role in reducing emissions, and significant emission reductions have already been achieved through accelerated fleet turnover to the cleanest available Tier 4 technologies.

Although the increasingly stringent new engine standards for off-road equipment will reduce emissions from mobile agricultural equipment over time, most existing off-road agricultural equipment operates for several decades before being retired due to their durability and relatively low cost to maintain. Furthermore, the useful life of a tractor in the Valley is much longer than other parts of the country due to the Valley's hot, dry summers and mild, wet winters.

While most of the equipment in this category are tractors, a significant portion consists of harvesters, loaders, sprayers, conditioners, balers, cotton pickers and other specialized equipment types. Some types of non-tractor mobile agricultural equipment have unique and specific roles within an operation based on the commodity produced and usually require specialized functions of the equipment. Non-tractors often have specialized roles that are specific to certain functions and limit their usefulness for multiple operations, causing non-tractors to be significantly more expensive than tractors. The large cost deters operators from replacing and purchasing specialized equipment which leads to less turnover of older, more polluting equipment within the specialized mobile agricultural equipment population.

In 2012, CARB staff began to develop the framework for mobile agricultural equipment to become eligible to receive SIP credit. That process included in-depth research of the

unique economical and operational characteristics of mobile agricultural equipment in the agricultural industry, which included reviewing and analyzing the cost and availability of Tier 4 technologies for mobile agricultural equipment. It was determined that a two-step regulatory process that ensures SIP credit for voluntary incentive program mobile agricultural projects in the near-term and a longer-term effort to accelerate use of Tier 4 equipment would better serve to maximize the air quality benefits over time while also meeting SIP goals. As a result, in October 2013 CARB adopted their Regulation for State Implementation Plan Credit from Mobile Agricultural Equipment that relies on voluntary incentive measures to achieve reductions from this essential category.

Despite lack of direct regulatory authority over mobile agricultural equipment, the District has helped accelerate emission reductions from this category ahead of state regulation through the administration of established state incentives programs and the adoption of local programs. The District's successes in its partnerships with Valley growers, USDA-NRCS and CARB to replace tractors through voluntary incentives is a great example of how effective incentive-based strategies can lead to more emission reductions in an expeditious fashion.

Tractor Replacement Program: Since 2009, the District and the USDA-NRCS have implemented and provided funding for a voluntary incentive program that has replaced more than 6,600 agricultural tractors for San Joaquin Valley farmers. To date, approximately \$500 million in public/private investment has reduced over 17 tons per day of NOx emissions in the Valley. Funding for this program includes Federal AQIP, Federal Targeted Airshed Grants, Diesel Emissions Reduction Act, motor vehicle fees, ISR fees, Voluntary Emission Reduction Agreements, and the Carl Moyer Program.

Tractor Trade-Up Pilot Program: There are still many old, high polluting tractors used in the San Joaquin Valley by small farmers for whom the cost of the new tractor is not feasible even with the District's current incentive program. The District launched the first-of-its-kind Agricultural Tractor Trade-Up Pilot Program in the spring of 2016. When coupled with an expanded agricultural equipment replacement program, the trade-up program has the potential to achieve significant additional cost-effective emissions reductions.

Electrified Dairy Feed Mixing Program: The District completed a highly successful demonstration of an electrified feed mixing system as a part of the Technology Advancement Program. Informed by that project's success, the District developed this new pilot incentive program to target the installation of electric feed mixing equipment and further reduce diesel emissions from tractors and other mobile equipment and vehicles at Valley dairies and other confined animal feeding operations (CAFOs). The primary emission reductions from this program derive from the elimination of existing agricultural tractors that mix and deliver feed, the elimination or reduction in usage of on-road trucks used to deliver feed, and reduction in usage of any remaining off-road equipment used in the feeding process. Further emission reductions and cost-savings to Valley dairies and CAFO's will be achieved through increased efficiencies of the new systems that result in an overall reduction in feed mixing equipment usage. Since

launching the program in January 2018, the program has received over \$23 million in incentive funding application requests from Valley dairies pursuing transition to electrification and much cleaner feed systems.

E.2.4 LOCOMOTIVES

The emissions from goods movement are a significant source of diesel particulate matter (PM) in the Valley and the state, and many of the larger cities in the Valley are home to locomotive rail yards. Locomotives, in particular, present a considerable health risk from diesel PM emissions. Residential areas located near rail yards have shown a significant increase in cancer risk and can equal or exceed the regional background or regional health risk levels.

Locomotives are divided into three groups: interstate line-haul locomotives, medium-horsepower locomotives that are used primarily in California or regional service, and switcher locomotives. This component also includes emissions from other off-road equipment used at rail yards, including cranes, yard tractors, and material handling equipment such as forklifts.

Interstate line-haul locomotives are generally newer (built 1995 and later), higher horsepower (greater than 4,000 hp) locomotives that operate over long distances and in many states. Medium Horsepower (MHP) Locomotives are typically older locomotives that may have once served in interstate line haul service but are now used in regional service. Switcher (Yard) Locomotives are typically used to push railcars together to form trains within rail yards, but can also be used to power local and regional service trains.³

Heavy-Duty Engine Program, Locomotive Component: This program component awards up to 85% grant funding for newer, cleaner diesel locomotive engines and locomotive replacements. The locomotive component of the Proposition 1B Program funded up to 80% for the replacement of an uncontrolled, Tier 0 through Tier 2 locomotive with a new locomotive that meets or exceeds Tier 4 standards (1.30 g/bhp-hr NO_x and 0.03 g/bhp-hr PM). Eligible projects are funded with local, state, and federal sources, including but not limited to the Carl Moyer Program, the Federal Diesel Air Shed Grant, and DERA funding.

The District has funded idle reduction technology, repower and replacement of 41 locomotives, with more projects currently in the queue. One of the major benefits of the locomotive repower and replacement program is increased efficiency and longevity as a result of the revolutionary GenSet engine technology. The GenSet system uses multiple smaller off-road tier-4 emission level engines mounted on a single chassis. This system allows for each of the engines to be used independently so as little as one of the engines can be used during non-peak conditions, helping to reduce unnecessary emissions. In addition, this system comes equipped with idle reduction technology that will shut down the engine during periods of inactivity.

³ California Air Resources Board [CARB]. (2009). Recommendations to Implement Further Locomotive and Railyard Emission Reductions. Retrieved from <http://www.arb.ca.gov/railyard/ted/drftrec090909.pdf>

The District funds locomotive repower or replacement projects through an RFP procurement process, and reviews and selects recipients based on established scoring criteria. During the pre-inspections, all necessary locomotive engine information is verified by District inspectors and documented in digital photographs. Upon verification of all information, the District enters into an agreement with the recipient for the project. Once the replacement switcher locomotive engine has been purchased and the original engine has been dismantled, the recipient will complete and return the claim-for-payment packet, and a post-inspection is performed, prior to payment, to verify the new information. Monitoring and reporting continue for the duration of the agreement to ensure the emissions reductions from the project are real and quantifiable.

Proposition 1B Locomotive: The District has funded the replacement of 13 locomotives totaling \$25.2 million in funding through the Proposition 1B program. These projects achieve 77 tons of PM and 1,413 tons of NO_x emissions over the life of the projects.

E.2.5 SCHOOL BUS REPLACEMENT AND RETROFIT

This category includes diesel-fueled buses, including those from public school districts and other qualifying agencies that service public schools, with a gross vehicle weight rating (GVWR) over 14,000 pounds. The number of buses that are in this source category is relatively small (less than 4,000 in 2011, EMFAC2011) compared to the number of heavy-duty trucks also meeting the 14,000 GVWR limit and covered by the State Truck and Bus Regulation. School bus replacements and retrofits play a vital role in reducing school children's exposure to both cancer-causing and smog-forming pollution.

The School Bus Replacement and Retrofit programs provide grant funding for new, safer school buses and air pollution control equipment (retrofit devices) on buses that are already on the road. Public school districts in California that own their buses are eligible to receive funding. Eligible projects are funded with local, state, and federal funds including DERA funding and state and local mitigation fees.

The District has provided funding to retrofit 2,254 school buses and replace 503 school buses. New buses purchased to replace older buses may be fueled with diesel or an alternative fuel, such as compressed natural gas (CNG) or electricity, provided that the required emissions standards specified in the current guidelines for the Lower-Emission School Bus Program are met. Funds are also available for replacing on-board CNG tanks on older school buses and for updating deteriorating natural gas fueling infrastructure. Commercially available zero-emission electric school buses are eligible for additional funding through the state's Hybrid Voucher Incentive Program (HVIP).

Eligible school buses are selected based on specific program requirements, including replacing the oldest models first. After determining eligibility, school districts are awarded contracts that provide a reasonable time period for project completion. A claim must also be submitted before funds can be reimbursed.

E.2.6 ALTERNATIVE FUEL INFRASTRUCTURE

The impact of emissions generated from cars and trucks on the Valley's air quality is significant. More than 85% of the NOx emissions inventory in the Valley is attributed to mobile sources. The Valley's topography, climate, geography and the presence of two major transportation corridors connecting northern and southern California all contribute to the region's problem. Due to the significant source of vehicle emissions, the District has developed and implemented a broad, multi-faceted portfolio of innovative strategies and policies to reduce emissions from cars, trucks, buses and other heavy-duty vehicles. As part of its strategy, the District has created several successful programs incentivizing clean vehicles. However, the District also recognizes that clean vehicle technology cannot be viable without the necessary fueling infrastructure that would not only allow such technology to be accepted by Valley residents and businesses, but also thrive in the region. For this reason, the District has developed incentive programs for the purchase and installation of alternative fueling infrastructure to support clean vehicle technology.

Although utilizing zero-emission technology would yield the greatest reductions in emissions, the rural and expansive nature of the Valley limits its use for various and current real-world applications. Other alternative fuel technology, such as ultra-low NOx natural gas vehicles, help address some of these shortcomings of all-electric and hydrogen-fuel vehicles. In addition, the cost of a zero-emission vehicle is typically and substantially greater than a comparable natural gas option. Even though ownership of a zero-emission vehicle may have longer-term economic benefits, the high upfront cost is fiscally impractical for many Valley businesses and agencies. Until the further advancement of zero-emission technology and the costs of the vehicles become more competitive, the District is supportive of both types of technologies and has created infrastructure incentive programs that would help each. The District fully supports zero-emission technology and recognizes the long-term air quality gains from the large-scale deployment of such vehicles and equipment. However, short-term emission reduction benefits can be achieved with near-zero emission technology until zero-emission technology becomes a more feasible option Valley-wide.

Charge Up! Program: This program provides funding for the purchase and installation of electric vehicle (EV) chargers. Although EV charging infrastructure has steadily improved in the San Joaquin Valley, the continued deployment of such infrastructure is still needed as an increasing number of residents have adopted EV technology. The Charge Up program was recently enhanced to adapt to ever changing trends in the market and needs of current and potential EV owners. Workplace charging was incorporated as many consumers considered purchasing an EV because of the ability to charge at their place of employment. In addition, changing the program to a voucher-based system has helped streamline the process for Valley agencies and businesses to leverage additional funding provided by the state and utility companies. With the ability to stack incentive funds from multiple sources, many program participants have significantly reduced out-of-pocket costs and found the investment of installing EV chargers worthwhile. Since the launch of the program in June 2015, the District has

awarded more than \$1.4 million in incentives for the siting and installation of 260 level 2 and level 3 electric vehicle chargers.

Public Benefit Grants Program, Alternative Fuel Infrastructure Component: The Alternative Fuel Infrastructure component funds projects from Valley public agencies for the expansion of an existing in-use infrastructure facility, or the development of a new one. The District implements this program to provide much needed funding to local public agencies towards infrastructure projects to supplement the growth and advancement of clean-air, alternative fuel vehicles. Under the Alternative Fuel Infrastructure component, \$8 million has been awarded to support large-scale compressed natural gas infrastructure and heavy-duty electric vehicle charging projects.

E.2.7 COMMUNITY-BASED INCENTIVE PROGRAMS

The District offers several programs that provide incentives for specific projects that focus getting the community involved in achieving emissions reductions through clean air projects and practices. These programs fall into two major categories: programs that reduce local vehicle miles traveled and programs that reduce residential-generated emissions. For programs that reduce vehicle emissions, funds are allocated to support cost-effective projects that have the greatest motor vehicle emissions reductions, resulting in long-term impacts on air pollution problems in the Valley. In addition to vehicle emissions, the District recognizes that focus should also be placed on reducing emissions that are generated from sources at the residential level that directly affect neighborhoods as much as vehicles. All projects under these programs must have a direct air quality benefit in the Valley.

These programs provide funding to help reduce emissions generated at the community level. The importance of these community-based programs cannot be underestimated as they help change the nature of how individuals within each community commutes, conducts business, and resides in the Valley. These programs succeed in incentivizing and supporting changes in individual behavior in ways that help reduce air pollution with the prospects that shifting behavior and habits will transform the community at-large.

Bicycle Infrastructure: This program provides funding for bicycle infrastructure projects, including Class I (Bicycle Path Construction), Class II (Bicycle Lane Striping), and Class III (Bicycle Route) projects. The program provides funding to assist with the development or expansion of a comprehensive bicycle-transportation network which will provide a viable transportation option for travel to school, work and commercial sites. Almost 1.5 million dollars has been awarded for bicycle infrastructure projects throughout the San Joaquin Valley.

Alternative-Fuel Mechanics Training: This program provides funding to develop and advance the education of personnel from qualifying agencies that are using alternative fuel or are transitioning to alternative fuels on the mechanics, safe operation and maintenance of alternative fuel vehicles and infrastructure. As clean new vehicle technology adoption has been dramatically increasing, there has been a reciprocal need for personnel training. The District has awarded over \$85,000 towards these projects.

E-Mobility: This program provides funding for the development or expansion of telecommunications services and electronic technology applications to directly replace vehicle travel by the general public. Funding is available for eligible projects such as video teleconferencing, internet business transactions, and telework sites. The District has awarded almost \$1 million towards these projects.

Public Transportation Subsidy and Park & Ride: This program provides funding for the construction of Park & Ride lots to promote ridesharing and public transportation subsidies to encourage new ridership. Over \$1.1 million dollars has been awarded to subsidize and encourage the growth of these ridesharing activities.

Clean Green Yard Machines Program: This rebate program provides incentives for Valley residents to replace their old gas lawn mowers in favor of nonpolluting electric lawn mowers. Participants can receive up to \$250 for the purchase of an electric lawnmower. Since the program requires the replacement of an existing lawn mower, participants are required to take their old units to a dismantler to be recycled or permanently dismantled. Under this program, the District has awarded over \$1.1 million and replaced over 4,800 gas-powered lawn mowers.

Public Benefits Grants Program, Enhanced Transportation Strategies

Component: This component provides funding to Valley public agencies to fund projects that achieve quantifiable emission reductions through the deployment of clean alternative fuels and commute strategies that reduce vehicle miles traveled and emissions. Under the program, 13 projects have been awarded for a total funding amount of \$2,008,730.

Public Benefits Grants Program, Community Improvement Projects that Reduce Vehicle Use and Emissions Component: This component provides funding for specific land use and community development projects that are eligible under the Cap and Trade funded Affordable Housing and Sustainable Communities Program and other state and federal funding opportunities. Projects awarded from this program promote a reduction in vehicle miles travelled and associated emissions through enhanced walkability and increased use of zero emission transportation alternatives. The funding provided under this component is intended to be used as match to give Valley projects a competitive advantage, especially in statewide and national solicitations. Projects submitted through this program are awarded on a first-come, first-serve basis pending eligibility.

The District continuously reviews areas where emission reductions can be achieved, especially on the community level where poor air quality has a direct impact on the residents of the San Joaquin Valley.

E.2.8 AGRICULTURAL IRRIGATION PUMP ENGINE REPLACEMENT INCENTIVE MEASURE

Substantial emission reductions from internal combustion agricultural irrigation pump engines in the Valley have been achieved through a combination of regulatory efforts and incentive actions. District Rule 4702 has effectively reduced emissions from agricultural irrigation pump engines by 84% since the 2005 amendments to the rule, with substantial investments being made by the affected sources to comply. Rule 4702 applies to any internal combustion (IC) engine rated at 25 brake horsepower (bhp) or greater. The purpose of this rule is to limit NO_x, carbon monoxide (CO), volatile organic compounds (VOC), and SO_x emissions from units rated at or greater than 50 bhp that are subject to this rule. In the continuous effort to improve air quality in the Valley, the District has adopted numerous amendments to Rule 4702 that have resulted in significant reductions of NO_x and PM emissions. The rule was further strengthened in August 2011 when rule amendments implemented more stringent NO_x limits, as low as 11 ppmv, for non-agricultural operation spark-ignited engines. Despite the significant reductions to date, meeting the attainment standards of the PM2.5 Plan requires further emissions reductions in the Valley.

The District currently provides up to \$150 per HP (not to exceed 85% of the total project cost) in funding for farmers looking to replace older, dirtier diesel engines with low-emission Tier 4 engines or zero-emission electric motors. Agriculture accounts for a majority of the local economy, and this program not only provides for significant emissions reductions from agricultural operations, but provides economic relief to Valley farmers, ranchers, and dairy operators. Eligible projects are funded with local, state, and federal sources, including but not limited to District Indirect Source Review mitigation fees, Carl Moyer Program funding, AB 923 funding, Federal Designated Funding, and Federal Diesel Air Shed Grant funding. In the past, collaboration with the California Public Utilities Commission (PUC) and local utilities has allowed for additional incentives on electric line extensions and special rate schedules, enhancing participation in the District's replacement program.

Over the past fifteen years, the District has funded the replacement of over 7,000 agricultural pump engines, with more projects currently in the queue. Over 3,000 of these replacements involved replacing older diesel engines with electric motors.

E.2.9 RESIDENTIAL WOOD COMBUSTION

The San Joaquin Valley Air Pollution Control District currently operates the Burn Cleaner Fireplace and Woodstove Change-out Program to reduce emissions from residential wood burning. The Burn Cleaner Program helps Valley residents upgrade their current high-polluting wood-burning devices and open hearth fireplaces to cleaner alternatives such as natural gas fired devices, and EPA certified wood and pellet stoves. Through this program, residents reduce directly emitted PM2.5 emissions in areas and times where those reductions are most needed. The District continues to encourage Valley residents to reduce wood smoke emissions generated from residential burning by providing financial incentives through the Burn Cleaner Program for the purchase of new and cleaner burning devices. Given the potentially high cost of these new devices,

this program provides increased incentives to low-income qualified applicants to encourage their participation. As discussed earlier in this Chapter, staffing support is available from a variety of existing District departments for this program. Outreach and public education form a critical part of the District's strategy for reducing pollution from wood smoke in the Valley. In 2018, the District Governing Board approved the continuation of an aggressive multi-faceted advertising and outreach campaign to support the Burn Cleaner Program.

The District's Burn Cleaner program has replaced over 14,000 uncertified wood stoves with EPA-certified devices and clean-burning natural gas inserts to date. The District encourages Valley residents to transition from older more polluting wood burning heaters and wood burning fireplaces (also known as open-hearth fireplaces) to cleaner alternatives, by decreasing the number of allowable burn days for high polluting wood burning heaters and fireplaces while also increasing the number of burn days allowed for registered clean wood burning heaters through the District Rule 4901 tiered episodic wood burning curtailment program.

E.2.10 COMMERCIAL CHARBROILING

There are two types of commercial charbroilers: chain-driven and underfired. A chain-driven charbroiler is a semi-enclosed broiler that moves food mechanically through the device on a grated grill to cook the food for a specific amount of time. An underfired charbroiler has a metal "grid," a heavy-duty grill similar to that of a home barbecue, with gas burners, electric heating elements, or solid fuel (wood or charcoal) located under the grill to provide heat to cook the food. The smoke and vapors generated by cooking on either type of charbroiler contain water, VOCs, and PM. The grease filter of the ventilation hood typically captures larger particles and grease. The remaining VOCs and small particulates are exhausted outside the restaurant unless a secondary control is installed.

Underfired charbroilers have been exempt from rule requirements due to the lack of available control technology that has been tested in real-life applications. The District has been working with restaurants and control technology manufacturers to test and demonstrate control technologies through the District's Restaurant Charbroiler Technology Partnership (RCTP). Participating restaurants are provided funding for the full cost of purchasing, installing, and maintaining installed systems during a demonstration period covering two years of operation. Despite the District's efforts in promoting available funding under the RCTP program, the District has faced difficulty in finding restaurants willing to partner with the District to demonstrate new technologies. To date, only one restaurant, the Habit Burger Grill, has successfully completed two years of demonstration of a Molitron wet scrubber in their Stockton restaurant. Initially, the project experienced hood fan sizing issues, resulting in the restaurant being filled with smoke and forced to close temporarily. This issue was addressed, and the restaurant has now been successfully operating for over two years with this control device. The Habit Burger Grill has now installed these control devices on seven other new restaurants, with five of these installations in the Valley. The District also recently

entered into contract with another new restaurant in Bakersfield, Baja Fresh, with installation anticipated in the near future.

These demonstration projects, while limited, have helped to show that installing pollution control devices is technologically feasible for some Valley restaurants with underfired charbroilers. However, these control devices are extremely expensive and may not be economically feasible for the average Valley restaurant to install and maintain without incentive funding. The proposed incentive program for underfired charbroilers is discussed below in Section E.4.

E.3 EMISSION REDUCTIONS AND INCENTIVE FUNDING NEEDS FOR 2018 PM2.5 PLAN

The District's 2018 PM2.5 Plan relies on a combination of mobile and stationary source incentives programs for attainment. Given the severity of the Valley's air quality challenges and the need for ongoing emission reductions, the CARB and the District have worked together to implement the most stringent mobile source emissions control program in the nation. Together, the two agencies have replaced hundreds of older, high-polluting vehicles and agricultural equipment with the cleanest available technologies. Despite these efforts, the District and CARB acknowledge the need for additional mobile source emissions reductions beyond those achieved through the current suite of programs. As such, CARB has committed to achieving an additional 32 tpd of NOx in the Valley through a combination of regulatory and incentive-based control measures beyond what is already in place. Table E-2 indicates CARB's aggregate commitment for NOx and PM2.5 emission reductions along with their estimations by project type of emission reductions to meet that aggregate commitment.

Table E-2 CARB Incentive Based Emission Reduction Commitments

Proposed CARB Incentive Measure	2024 Emission Reductions		2025 Emission Reductions	
	NOx (tpd)	PM2.5 (tpd)	NOx (tpd)	PM2.5 (tpd)
Accelerated Turnover of Trucks and Buses	10	—	10	—
Accelerated Turnover of Agricultural Tractors				
Existing Incentive Projects	3	0.2	3	0.2
New Incentive Projects	8	0.6	8	0.6
Cleaner In-Use Agricultural Tractors	—	—	—	—
Accelerated Turnover of Off-Road Equipment	2	—	2	—
Aggregate CARB Incentive Emission Reductions	23	0.8	23	0.8

“—” denotes emission reductions have not been estimated by CARB

The District has a long history of effective collaboration with CARB in ensuring funding allocated to the Valley in their statewide programs is obligated and expended expeditiously and in accordance with strict guidelines assuring surplus, quantifiable, permanent, and enforceable emissions reductions. This collaboration will continue in

these programs. CARB's proposed mobile measure commitments are discussed in further detail in the *San Joaquin Valley Supplement to the 2016 State Strategy for the State Implementation Plan*, attached to this Plan.

The District will also achieve incentive based emission reductions from programs targeting stationary sources of emissions. Table E-3 indicates the aggregated emission reduction commitments from stationary incentive programs, along with estimations by project type of emission reductions to meet that aggregate commitment.

Table E-3 District Incentive Based Emission Reduction Measures

Proposed Incentive Based Measures	2025 Emission Reductions	
	NOx (tpd)	PM2.5 (tpd)
Woodstove and Fireplace Change-out	-	0.42*
Underfired Charbroiler Incentive Measure	-	0.53*
Agricultural Engine Replacement	1.07*	-
Total Projected Incentive-based Emission Reductions	1.07*	0.95*

*This is an aggregate combination of both regulatory and incentive based reductions

These emission reductions are based on full implementation and best available information as of the adoption of this plan. A more thorough evaluation of control techniques and feasibility will be conducted at the time of program guideline development and adoption. These emission reduction projections represent only a portion of the total emission reductions that will be achieved by the District's incentive programs. Many of the programs the District operates are not included in the emission reductions quantified above and will achieve additional emission reductions beyond these projections.

The proposed aggressive incentive-based control measures that achieve the massive emissions reductions needed to bring the Valley into attainment will require significant funding estimated at \$5 billion (table E-4). Dollars needed are well in excess of current or prospectively scheduled future appropriations. While the District has been able to generate significant local funding and successfully advocate for additional state and federal funding, the reductions needed to attain the PM2.5 federal standards require a significant increase in public incentive funding from the state that can only be secured through sustained action and commitment by the state.

Table E-4 Incentive Funding Needed for Expeditious Attainment

Incentive Measures	Incentive Funding Need (\$)
Accelerated Turnover of Trucks and Buses	\$3,300,000,000
Accelerated Turnover of Agricultural Equipment	\$1,400,000,000
Accelerated Turnover of Off-Road Equipment	\$170,000,000
Commercial Under-fired Charbroiling Controls	\$45,000,000
Replacement of Residential Wood Burning Devices	\$75,000,000
Replacement of Internal Combustion Engines used at Agricultural Operations	\$14,000,000

Total	\$5,004,000,000
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E.4 PROPOSED INCENTIVE-BASED MEASURES

Building on the program successes outlined above, the District and CARB are proposing a suite of voluntary incentive measure that, in combination with stringent regulatory requirements, will continue to move the Valley towards attainment of the federal PM2.5 standards.

Within the District's expansive suite of incentive programs, the District's attainment strategy includes emission reductions from the implementation of three specific programs. These incentive measures include enhancements to the woodstove change-out program to reduce pollution from residential wood combustion, a program to incentivize the installation of pollution control equipment to reduce emissions from commercial underfired charbroilers, and the replacement of agricultural engines with electric motors or Tier-4 equivalent engine technologies.

In addition to these three programs, CARB is committing to achieve emission reductions from mobile sources through incentive-based measures, as identified in the *San Joaquin Valley Supplement to the 2016 State Strategy for the State Implementation Plan*. Proposed measures include:

- **Accelerated Turnover of Trucks and Buses:** This measure will provide incentive funding to accelerate the penetration of near-zero and zero-emission engines beyond the rate of natural turnover achieved through implementation of the other measures identified for on-road heavy-duty trucks and buses.
- **Accelerated Turnover of Agricultural Equipment:** This measure will provide incentives to accelerate, beyond the rate of natural turnover, the penetration of cleaner engines used in agricultural equipment.
- **Accelerated Turnover of Off-Road Equipment:** This measure will provide incentive funding to accelerate the penetration of near-zero and zero-emission engines beyond the rate of natural turnover achieved through implementation of the other measures identified for off-road equipment.

E.4.1 ENHANCEMENT OF THE BURN CLEANER PROGRAM

Reductions in emissions from residential wood combustion are a critical part of the District's attainment strategy. The District is proposing the following measures to reduce emissions from this source category:

- Offer enhanced levels of incentives in hot-spot areas to fund the full replacement of wood burning devices
 - Incentive will only be provided for transition to natural gas devices in areas where natural gas services are available

- Incentives will be provided for EPA-certified wood burning or pellet fueled devices in areas with no access to natural gas services are available
- Continue to offer current level of incentives in rest of Valley

E.4.2 COMMERCIAL UNDERFIRED CHARBROILER INCENTIVE PROGRAM

Due to the high cost of installing and maintaining effective control equipment to reduce underfired charbroiling emissions, incentive funding will be a critical part of the District's control strategy for this source category. The District will pursue reductions in commercial underfired charbroiler emissions through an incentive-based approach to fund the installation of controls for commercial underfired charbroilers within urban boundaries in hot-spot areas of Fresno, Kern, and Madera counties, with a future year regulatory requirement to encourage participation by Valley businesses.

E.4.3 AGRICULTURAL INTERNAL COMBUSTION ENGINE INCENTIVE PROGRAM

Building on past success in electrifying agricultural irrigation pumps through the AG-ICE (Agricultural Internal Combustion Engine Conversion Incentive) program, the District will work with agricultural sources to further reduce NOx emissions through an incentive-based/regulatory approach as technologically and economically feasible. While the analysis in Appendix C demonstrates that the various control technologies are generally not cost-effective without financial assistance, and may not be technologically feasible for remote agricultural installations, potential emission reduction opportunities for further evaluation include:

- Replacement of spark-ignited agricultural engines with electric motors where access to electricity is available, or Tier 4-equivalent engine technologies through incentive-based approach coupled with regulatory backstop to encourage participation.
- Replacement of Tier 3 compression-ignited agricultural engines with electric motors where access to electricity is available, or Tier 4-equivalent engine technologies through incentive-based approach to achieve additional emissions reductions where cost-effective.

E.5 OTHER DISTRICT INCENTIVE PROGRAM ENHANCEMENTS

Even though the District's highly successful incentive programs continue to reduce a significant amount of emissions, the District will continue to enhance its incentive programs to further improve air quality in the Valley as described below.

E.5.1 HEAVY-DUTY TRUCK INCENTIVE PROGRAM ENHANCEMENTS

As a part of the effort to continue to accelerate fleet transition to the cleanest available engines, the District submitted a petition on June 22, 2016, with CARB support, urging EPA to establish a national tailpipe point-of-sale 0.02 g/bhp-hr NOx emissions standard for heavy-duty trucks, 90% lower than the 2010 emissions limit required by current regulations. Despite these efforts, the District and CARB will need to continue to incentivize the turnover of trucks to ultra-low NOx engines certified to 0.02 g/bhp-hr. Additionally, CARB has committed to taking state action on an ultra-low NOx engine

standard. As noted above, engine manufacturers are beginning commercialization of these ultra-low NOx engines, and the District's incentive programs aim to accelerate the penetration of this technology into the Valley's truck fleets.

The District's award-winning incentive program strives for constant improvement in ease of access, streamlining, and stakeholder engagement growing the capacity for accelerating adoption of cleaner trucks. The program has been successful in implementing its truck replacement programs and navigating applicants through complicated eligibility requirements for various funding sources. Successful collaboration with CARB to engage the Valley's truck owners and ensure all interested applicants are guided through the process and identifying the most appropriate funding sources for their projects will be essential to meeting CARB's emission reduction commitments in the Valley.

Expansion of Funding for Transition to Zero/Near-Zero Heavy-Duty Trucks: CARB has proposed a measure to use new and existing incentive programs for on-road, heavy-duty vehicles to increase the penetration of near-zero and zero-emission vehicles and engines. Through this proposal, CARB expects to achieve 10 tpd NOx reductions from heavy-duty trucks by 2024 towards its aggregate emission reduction commitment. As such, the District has committed to redesigning its truck replacement programs into a single, streamlined program that will provide additional incentives to zero/near zero heavy-duty trucks. The District's current appropriations for the heavy-duty trucks category through 2025 includes a total of \$442,353,700 from various federal, state, and local funds including Cap and Trade, Federal DERA, Moyer funds, AB 2522 and AB 923 fees, AB 617 funding, and ISR rule fees.

Provide higher incentives for truck technologies that meet zero and ultra-low NOx emissions standards: Under the District's new Truck Replacement Program, the District will provide additional incentive for lower emissions technologies. Project participants retiring an eligible old truck will receive enhanced funding based on the type of clean truck technology powering the replacement, as described in Table E-5 below.

Table E-5 Truck Replacement Program Incentive Schedule

Clean Truck Technology	Potential Incentive
0.02 g/bhp-hr certified engine	\$100,000
Hybrid truck capable of zero emission miles	\$150,000
Zero emission truck	\$200,000

Provide new incentives for fleet expansions with new clean trucks: Historically, truck funding was limited to replacement projects where an older vehicle is scrapped and a new vehicle is purchased. The District supports clean heavy-duty vehicle fleet expansion in which incentives are provided for new vehicle purchases without the requirement to scrap an existing vehicle. As part of the new Truck Replacement Program, a fleet expansion option has been added to provide up to \$20,000 towards the

purchase of a hybrid, ultra-low NOx, or zero emission truck without the requirement to scrap an older truck.

Provide new incentives for heavy-duty vehicle repair: Current heavy-duty vehicle funding is limited to replacement and fleet expansion projects. The Districts new Heavy-Duty Vehicle Repair Program (HDVRP) will provide financial assistance to small fleet owners (fleets with fewer than 20 heavy-duty vehicles), to provide durable repairs for failed emission components or emission control systems on heavy-duty vehicles. Failed emission control systems result in elevated NOx emissions. CARB has awarded the District \$1,000,000 to administer the HDVRP pilot project.

E.5.2 PASSENGER CAR, LIGHT-, AND MEDIUM-DUTY INCENTIVE PROGRAM IMPROVEMENTS

With the success by the Valley in advocating for a ten-fold increase in state funding towards vehicle retirement and replacement programs, the District has developed an enhanced program that facilitates broader participation beyond the traditional weekend event based model. To accommodate significantly increased funding, the District is implementing numerous enhancements to its light-duty vehicle programs to increase efficiency and broaden access to the program. This includes rebranding the program for mass consumption, new and enhanced outreach strategies, innovative technology solutions for easier access by Valley residents and more efficient program administration.

Drive Clean in the San Joaquin!: The District is integrating its Drive Clean! Rebate Program with the vehicle repair and replacement programs. Creating a new branding for the combined effort as part of an enhanced outreach strategy. The new branding will go along with further growth of existing strong community partnerships, targeted marketing, one or more kick-off media events, an expanded auto dealership network, and an online application process designed to increase program participation rates. Integral to this update to the programs, the District will maintain the high level of accountability and strict fiscal controls to which this and all District programs adhere.

The state legislature recently approved funding for the Enhanced Fleet Modernization Program up to \$60 million statewide and has allocated up to \$25 million to the District. The District has received an initial allocation of \$18.5 million in EFMP funding for FY 2018-19, with the likelihood of sustained funding at or near these levels for the foreseeable future. Furthermore, the District expects another significant increase in state funding for this program as a result of the recently enacted legislation to extend the Cap and Trade program (AB 398 and AB 617).

E.5.3 AGRICULTURAL EQUIPMENT INCENTIVE PROGRAM ENHANCEMENTS

Expanded Funding for Transition to Tier 4 Agricultural Equipment: CARB has proposed a measure to use new and existing incentive programs for agricultural equipment to increase the penetration of Tier 4 vehicles. Through this proposal, CARB expects to achieve 11 tpd NOx reductions from agricultural equipment by 2024 towards its aggregate emission reduction commitment. A portion of these SIP-creditable

reductions would come from the quantification of reductions from projects already funded and executed to date that will continue to provide SIP-creditable reductions through 2024. The remaining reductions correspond to accelerated turnover of additional tier 0 and 1 tractors using existing and innovative incentive funding programs.

Agricultural Material Technology Demonstration and Deployment Efforts: The San Joaquin Valley, in adherence with applicable state laws instituted under SB705 (2003 Florez), has the toughest restrictions on agricultural burning in the state. The District regulations no longer allow the burning of all field crops (with the exception of rice), almost all prunings and almost all orchard removals. The District also operates a comprehensive Smoke Management System, which only allows the limited amount of burning that is still permissible to take place on days with favorable meteorology and in amounts that will not cause a significant impact on air quality.

The exceptional drought conditions that the Valley has experienced in recent years and the demise of the biomass power industry has resulted in an increase in the open burning of wood waste and threatens the District's ability to continue to maintain broad restrictions on open burning of agricultural waste into the future. Despite the insignificant effect of this source category on attainment of the applicable PM2.5 standards, the District intends to maintain the restrictions currently contained within the rule while continuing to undertake efforts aimed at the development and deployment of feasible alternative technologies and practices to reduce open agricultural burning in the Valley. The District's efforts will be conducted in close coordination with USDA-NRCS, agricultural sources, and researchers through established processes such as the Agricultural Technical Subcommittee. These efforts include development of new incentive programs to promote the development and deployment of emerging cleaner alternatives to the open burning of agricultural waste. In designing these programs, priority will be given to on-the-farm and scalable technologies including soil incorporation, advanced gasification technologies, and other alternatives, considering the full life-cycle of criteria pollutant emissions and associated impacts on air quality when assessing the feasibility of alternatives to open burning.

Almond Harvester Incentive Program: While District modeling indicates that reducing almond harvester emissions in rural areas has negligible impact on the Valley's peak urban sites that drive the Valley's federal attainment mandates, District staff are working to develop strategies to reduce localized community impacts from this source category. In partnership with USDA-NRCS and agricultural stakeholders, the District supported the development of a new USDA-NRCS incentive program for the deployment of low-dust harvesters, which is now in operation. Additionally, given limitations in the USDA program, the District is evaluating the feasibility and effectiveness of implementing a new District incentive program to promote the use of low-emission nut harvester technologies.

In partnership with agricultural stakeholders and Texas A&M University, the San Joaquin Valleywide Air Pollution Study Agency recently funded a study of the effectiveness of low-dust technology harvesters. This research, combined with data obtained from a recent survey conducted of almond and walnut harvesting operations

Valleywide, will be used to inform the evaluation of a potential incentive program to advance the deployment of low-dust harvester equipment in the Valley.

Expanded Tractor Trade-Up: Due to the success of the Tractor Trade-Up Pilot Program, the District was awarded an additional \$3,000,000 in Cap and Trade funds for an expanded Agricultural Tractor Trade-Up Program in the Valley. The \$3,000,000 award from CARB will be matched with \$3,258,750 in funds from the District and approximately \$1,303,500 from the grant recipients. This funding will enable the District to replace approximately 50 Tier 2/3 tractors with Tier 4 tractors, which are 80% cleaner. Then, through the trade-up process, the District will replace approximately 50 older Tier 0 or Tier 1 tractors with Tier 2/3 tractors, which are also 80% cleaner. Specifically, the program proceeds as follows:

1. District solicits farmers that currently operate old, high-polluting (Tier 0/1) tractors, and catalogs needs for replacement tractors.
2. District utilizes the contracted dealership(s) to identify and catalog late model midrange (Tier 2/3) tractors that appear to be good candidates for the trade-up program.
3. Using information from both parties, District matches needs of Tier 0/1 operator with available Tier 2/3 tractors and notifies Tier 0/1 operator.
4. District and contracted equipment dealer evaluate Tier 2/3 tractors and generate estimates and approved funding amounts for refurbishment to pre-determined usable condition.
5. Equipment dealer performs prescribed tractor refurbishment using project funding and delivers refurbished Tier 2/3 tractor to Tier 0/1 operator.
6. Equipment dealer takes possession of the Tier 0/1 tractor and delivers it to a dismantler under contract with the District.
7. Original operator of Tier 2/3 tractor purchases and places into service a new Tier 4 tractor using trade-up Awardee incentive.

E.5.4 ALTERNATIVE FUEL INFRASTRUCTURE PROGRAM IMPROVEMENTS

As a direct result of the District's advocacy efforts at the state level and working closely with Valley stakeholders, the District has received significant monies to implement various incentive programs that will greatly assist in achieving enormous emission reductions from both passenger and commercial fleets. One of the components that the District is currently developing is a new grant solicitation for alternative fuel infrastructure that will support the burgeoning zero- and near-zero emission medium and heavy-duty vehicle private fleet market.

The medium and heavy-duty vehicle private fleet market has seen a rapid growth with new types and models of vehicles coming to market on a consist basis. For these new advanced commercial fleet vehicles to succeed and proliferate in the market, there must be an equivalent investment towards the alternative fuel infrastructure to power these fleets. To support this expanding and critical vehicle market, the District is in the process of launching a new alternative fuel infrastructure program that will provide

critical funding for both public and private fleets to develop new fueling stations so that they can replace their existing vehicles to a more advanced clean-air fleet.

E.5.5 COMMERCIAL ZERO EMISSION LAWN AND GARDEN EQUIPMENT INCENTIVES

In addition to replacing old residential lawn mowers with cleaner options with the *Clean Green Yard Machines* program, as further discussed in Appendix C, the District intends to focus on achieving emission reductions from equipment used in commercial applications. To encourage the use of cleaner, electric options, the District will consider the adoption of a new program that provides funding incentives for replacement of lawn and garden equipment used by commercial services. This new program would be designed to assist public agencies and private businesses purchase zero emission equipment to perform their services. Zero emission lawn and garden equipment have advanced in the past few years, not only in the area of durability, but also dependability with longer battery lives that can be used in commercial settings where the equipment is typically used for long durations. In addition to lawn mowers, the expanded category can include additional equipment that are often used in commercial applications such as edgers, blowers, chainsaws, polesaws, vacuums trimmers, and additional battery and charging equipment.

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