

# Appendix E

## Incentive and Other Non-Regulatory Strategies

*2015 Plan for the 1997 PM<sub>2.5</sub> Standard*  
SJVUAPCD

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## Appendix E: Incentive and Other Non-Regulatory Strategies

Reduction of emissions through regulatory efforts alone will not bring the San Joaquin Valley Air Basin (Valley) into attainment of the national ambient air quality standards. 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. In addition to incentive programs, the District has also implemented a number of other non-regulatory measures to reduce emissions, including implementation of a technology advancement program, establishing legislative priorities, and implementing an extensive community outreach and education program.

### E.1 DISTRICT INCENTIVE PROGRAMS

Incentive programs are an integral part of the District's efforts to reduce emissions. 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 85% of the NO<sub>x</sub> emissions in the Valley come from mobile sources, these successful voluntary incentive grant programs help the Valley achieve highly cost-effective emissions reductions beyond the District's regulatory bounds that are surplus of the reductions required by regulations.

The District operates one of the largest and most well-respected voluntary incentive programs in the state. Through strong advocacy at the state and federal levels, the District has appropriated \$156 million in incentive funding in the 2014–2015 District Budget. Since the District's inception in 1992, considerable funding has been expended in support of clean-air projects in 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 \$526,600,794 in matching funds, with a combined District and grant recipient funding investment of \$1.2 Billion. These investments have been made to purchase, replace, or retrofit thousands of pieces of equipment, including:

- 6,667 Agricultural Engine Repowers
- 2,296 Tractor Replacement Program
- 6,388 Wood Stove Replacements
- 56 Agricultural Utility Vehicles
- 3 Advanced Transit & Transportation Projects
- 6 Alternative-Fuel Infrastructure Projects
- 18 Bicycle Infrastructure Projects
- 177 Commercial Lawn and Garden Projects
- 2,234 New Alternative-Fuel Light Duty Vehicles (Public & Private)
- 12 E-Mobility Projects
- 50 Electric Forklifts
- 15 Alternative Fuel Fueling Stations
- 57 Hybrid and Zero-Emission Truck and Bus Voucher Incentive Projects

- 3,910 Lawn Mower Replacements
- 41 Locomotives
- 1 Marine Vessel
- 1,473 Off-Road Engine Repower/Retrofits
- 5,082 Heavy-Duty On-Road Truck Repowers, Retrofits, Purchases and Replacements
- 2,563 School Bus Retrofits and Replacements
- 78 School Bus Tank Replacement
- 15 Technology Advancement Program
- 12 Transit Pass Projects
- 87,512 Van Pool Subsidy Projects

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. The District has collaborated extensively with the U.S. Environmental Protection Agency (EPA), California Air Resources Board (ARB) and the United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) to develop the mechanism to take credit in state implementation plans (SIP) for emission reductions generated through incentive programs that satisfy the four federal criteria for SIP creditability – surplus, quantifiable, enforceable and permanent.

### **E.1.1 Incentive Funding**

The District is engaged at every level of state and federal government to craft policy and funding targets that account for the Valley's unique challenges and need to accelerate emissions reductions, particularly from sources not under the District's regulatory authority. Toward that end, the District is working closely with the Valley's legislative delegation to ensure that the Valley's needs are well represented in discussions of where to focus funding throughout the state and the region as a whole. In addition, the District is focused on how to effectively allocate the limited funding received for its incentive programs.

#### **E.1.1.1 Funding Sources**

The District continues to dedicate significant effort to ensure that the Valley receives its share of state and federal incentive funds through a variety of sources. In addition to aggressively pursuing funding from state funding sources such as the Carl Moyer Program and Lower-Emission School Bus Program, the District has been very successful in securing grants from the highly-competitive federal Diesel Emissions reductions Act (DERA) and the state Assembly Bill (AB) 118 Air Quality Improvement Program (AQIP). Currently, the District is actively engaged with ARB and the California Energy Commission (CEC) to ensure that the Valley is well represented in projects selections from the Greenhouse Gas Reduction Fund totaling over \$1 billion per year.

The District derives its current incentive funding from a range of local, state and federal funding sources. These funding sources contain restrictions on the types of projects that may be funded, funding limitations, expenditure deadlines, and administrative approach

for distribution. These requirements vary significantly from one funding source to another, resulting in a complex matrix of funding categories and program requirements. Some of the key funding sources currently available to the District include:

**Carl Moyer Funding** - The Carl Moyer program has been an on-going and reliable source of funding since 1998. The Carl Moyer program was established in 2004 with the adoption of AB 923 and Senate Bill (SB) 1107; the latter provided increased and continued funding through 2014 and expanded the program to include light-duty vehicle projects and agricultural sources of air pollution. In total, the District receives approximately \$9 million per year in Carl Moyer funding. Recent legislation extended Carl Moyer funding until 2024.

**State AB 118 Funding** - In 2007, the California legislature approved AB 118: the California Alternative and Renewable Fuel, Vehicle Technology, Clean Air, and Carbon Reduction Act of 2007. AB 118 provides approximately \$200 million annually through 2015 for three new programs to fund air quality improvement projects and develop and deploy technology and alternative and renewable fuels. The bill creates a dedicated revenue stream for the programs through increases to the smog abatement, vehicle registration, and vessel registration fees. AB 118 is designed to reduce emissions of criteria pollutants and greenhouse gas emissions and to deploy advanced technology. Most AB 118 programs are administered on a statewide basis. While the District has administered some of the AB 118 programs for the state, these programs have not been a significant portion of the District's incentive program revenue. However, in the future, these funds may be more important, particularly as the District becomes more involved in technology advancement projects. Recent legislation extended AB 118 funding until 2024.

**Proposition 1B Goods Movement Emission Reduction Program** - The single largest source of funding for the District's incentive programs is the Proposition 1B program, which uses bond funds for a variety of state transportation priorities. The District aggressively pursued its share of Proposition 1B funding, and the Valley will receive approximately \$250 million over the life of the program. The District will receive its last allocation of Proposition 1B funding in fiscal year 2015-2016.

**Local Motor Vehicle Surcharge Fees** – Through the passage of Assembly Bill 2522 in 2008 and in recognition of the need for additional funding to assist the Valley attain federal ambient air quality standards, the District was provided with the authority to generate grant revenues through the adoption of motor vehicle surcharges for the purpose of funding emission reduction projects. In October 2010, the District acted on this authority and adopted a \$12 per motor vehicle surcharge. This revenue source was then targeted to address the Valley's unmatched challenges in meeting ever-tightening federal standards as well as providing a more equitable manner to satisfy the federal mandates for ozone nonattainment penalties under section 185. These revenues have been reinvested in the Valley to reduce emissions through a variety of incentive grant programs that have replaced or retrofitted trucks, passenger vehicles, school buses, transit buses, and other mobile sources of emissions.

The District has now had two consecutive years of no violations of the 1-hour ozone standard, and has requested that EPA find the Valley in attainment and lift the section 185 penalties. If successful, this would return local control over the decision relating to the need and quantity of motor vehicle surcharges under AB 2522. Given the identified need for continued incentive funding as a means for expediting attainment of the 1997 federal PM<sub>2.5</sub> standard and garnering the needed attainment extension, the District is proposing to use a portion of these motor vehicle surcharge revenues to fund an emission reduction commitment in the proposed plan. Therefore, it is recommended that the AB 2522 motor vehicle surcharge be discontinued if and when the Governing Board makes a decision that such revenues are no longer necessary to meet the federal mandates for attaining the national ambient air quality standards.

#### **E.1.1.2 Incentive Strategy**

Each of the funding sources administered by the District includes different guidelines and statutory requirements for using the funds. Beyond the specific guidelines of each funding source, the District considers the following common factors when deciding how and where to spend incentive funds:

**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 programs that have broad appeal and applicability across multiple industries. Over the past 10 years, this level of interest has resulted in a substantial backlog of eligible projects waiting for funding. Unfortunately, many of those on waiting lists have since moved into a regulated class, making them ineligible for funding, in most cases. As a result, the District must continue to not only work within the existing regulations to find cost-effective, surplus project categories, but also to focus future funding in areas where a significant inventory of eligible projects still exists.

**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 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 those 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 reduces exposure to children from toxic diesel particulates, even though this source is not one of the largest sources of regional particulate pollution.

**Promoting technology advancement** – Funding projects that demonstrate and advance new emission reduction technologies will be essential for meeting increasingly stringent air quality standards given the Valley's existing challenges. The District's adoption of the Technology Advancement Program emphasizes the priority given to this area.

**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/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.1.1.3 *Statutory Constraints on Incentive Funding***

The District's current incentive funding comes from a range of local, state, and federal funding sources. Each funding source places restrictions on the types of projects that may be funded, the funding limits, expenditure deadlines, and the administrative approach for distribution. These requirements vary significantly from one funding source to another, resulting in a complex matrix of funding categories and program requirements. Some key examples are listed below:

**Proposition 1B Goods Movement** – Funding for this program must be dedicated to heavy duty trucks and locomotives. The program procedures require that a Request-for-Proposals (RFP) process is used and that the most cost-effective projects are funded first.

**Lower-Emission School Bus** – Funding for this program must be allocated to school bus replacements or retrofits. The program requires that all retrofits be prioritized and that the oldest buses are replaced first.

**Carl Moyer** – Funding is predominately used for heavy-duty diesel equipment projects. The program has strict funding caps and cost-effectiveness requirements.

**DMV Funds** – Funding must be used primarily for on-road and off-road mobile sources. Portions of funds must follow state Carl Moyer and Lower-Emission School Bus guidelines.

**Advanced Emission Reduction Option Funds** – Funding is for emission reduction incentive projects. The District's Governing Board has discretion as to where to apply these funds using the District's annual budget process to allocate this funding.

**Indirect Source Review (ISR) Funds** – Funding preference is given to emissions reductions opportunities near development projects.

#### **E.1.1.4 SIP Creditability of Incentive Programs (Rule 9610)**

Historically, states and local air agencies have not been able to obtain SIP credit for incentive-based emissions reductions. When given 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 or demonstrating that emissions reductions meet federal SIP reasonable further progress requirements. Given the heavy 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 for ensuring the continued success of these programs. Working together with EPA, ARB, and the USDA-NRCS, the District adopted Rule 9610 (State Implementation Credit for Emission Reductions Generated Through Incentive Programs) on June 20, 2013. District Rule 9610 establishes the administrative mechanism through which the District and ARB take SIP credit for emissions reduced through incentives. EPA proposed to approve Rule 9610 in May 2014.<sup>1</sup>

#### **E.1.2 Incentive Programs**

The District offers numerous incentives programs to reduce emissions from a variety of equipment types such as heavy duty engines, school buses, and lawn and garden equipment. The District places particular emphasis on providing incentives to environmental justice communities. District staff will continue to expand on the success of its current programs and craft new incentive programs for additional emissions

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<sup>1</sup> Revision to the California State Implementation Plan; San Joaquin Valley Unified Air Pollution Control District; Quantification of Emission Reductions from Incentives. 70 Fed. Reg. 96 pp. 25650-28658. (2014, May 19) <http://www.gpo.gov/fdsys/pkg/FR-2014-05-19/pdf/2014-11481.pdf>

reductions from Valley sources. The following summarizes incentive programs the District currently implements:

### **E.1.2.1 Heavy-Duty Trucks**

The District has administered numerous incentive programs targeted at on-road heavy-duty trucks, one of the biggest sources of NO<sub>x</sub> emissions in the Valley. Through the state's Proposition 1B Goods Movement Emission Reduction Program, Carl Moyer Voucher Incentive Program (VIP), and other District-operated voucher incentive programs funded by grants from EPA and locally generated incentive funds, the District has replaced hundreds of older, high-polluting trucks with cleaner trucks certified to meet the latest ARB emissions standards.

The District's truck voucher programs have been designed to provide an alternative source of incentive funding for small businesses that do not qualify for funding under 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 operators.

### **E.1.2.2 Agricultural Pumping Engines**

The District provides up to 85% 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 ISR 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 6,600 agricultural pump engines, with more projects currently in the queue. Over 2,000 of these replacements involved replacing older diesel engines with electric motors. The District has seen an increased demand for emissions-compliant diesel-engine repowers to electric motors in recent years. This option is ideal for both parties, since the District achieves the maximum emissions reductions with electric motor repowers and farmers lower their operating costs by switching to electricity, a more affordable fuel source. The District will consider pursuing a renewed public/private collaborative partnership similar to the previously mentioned partnership to provide further incentives for replacing remaining agricultural internal combustion engines with electric motors, potentially including assistance for line extensions for remotely located wells.

For a typical irrigation pump project, the District will verify that the old engine is operational and eligible. If so, the engine owner is offered the incentive and has the new engine or motor installed, making sure that the old engine is sufficiently disabled.

The District conducts a post-inspection prior to payment to document the new engine or motor's specifications and to ensure the emissions reductions are accurate. Ongoing monitoring and reporting ensures the projects meet contracted emissions reductions targets.

### **E.1.2.3 *Agricultural Equipment***

Off-road agricultural equipment replacements and repowers play a crucial role in reducing emissions. These equipment units, including tractors, backhoes, wheel loaders, and other off-road farming vehicles are widely used in the Valley, and are essentially uncontrolled and unregulated. Eligible projects are funded with local, state, and federal sources, including but not limited to ISR, Carl Moyer funding, AB923 funding, Federal Designated funding, and Federal Diesel Air-Shed Grant.

The District has funded the repower and replacement of over 3,500 off-road agricultural vehicles, with more projects currently in the queue. It is estimated that a large inventory of vehicles that qualify for repower or replacement still exists, and the program has the potential for significant and very cost-effective emissions reductions. Whether a farmer wishes to repower the current equipment with a cleaner engine or replace the equipment altogether, this program allows the District to achieve surplus emissions reductions while also facilitating the early equipment retirement and fleet turnover, both of which result in more efficient farming operations with less overall hours of operation.

In both repower and replacement projects, the farmer enters into an agreement with the District to replace the old, dirty engine or vehicle with newer, cleaner technology. The District first performs a pre-inspection to determine that the equipment and engine are operational. Then a final inspection is performed to verify the new equipment, as well as witness the old equipment and engine's destruction at a District-approved recycling or scrapping facility, ensuring the old equipment and engine will never be put back into service. Ongoing monitoring and reporting ensure the expected emissions reductions and operation of the equipment meet the grant agreement requirements.

### **E.1.2.4 *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 close to rail yards have shown a significant increase in cancer risk and can equal or exceed the regional background or regional health risk levels. The locomotive component of the Heavy-Duty Engine Program awards up to 85% grant funding for newer, cleaner diesel locomotive engines and locomotive replacements. 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 the repower or replacement of 41 locomotives, with more projects currently in the queue. One of the major benefits to 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 fired up individually so that in low-power demand situations only one of the engines can be used, 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

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 expected from the project occur.

#### **E.1.2.5 Forklifts**

The District funds the replacement and retrofit of forklifts through its Large Spark-Ignited (LSI) forklift retrofit program and its Electric Forklift New-Purchase program. Because emission standards for new engines in this source category have only been in effect for the past few years, a significant number of high-emitting units are still in operation and available for retrofit. Operators can meet the proposed in-use fleet-average emission standards by purchasing low- and zero-emission equipment and by retrofitting uncontrolled equipment in their fleets. The use of new controlled engines and the retrofit of existing engines can reduce fuel use and improve engine life, thus creating cost savings that offset a portion of the additional equipment cost. Eligible projects are funded with federal, state, and local sources, including Carl Moyer Program funds and motor vehicle surcharge fees.

The District has funded 50 forklift projects. The installation of a LSI retrofit system will improve engine operation and reduce fuel use. Closed-loop fuel systems generally improve the engine's overall efficiency. There is an estimated 10% to 20% reduction in fuel consumption with engines using closed-loop systems. An electric forklift has an obvious advantage as an emission-free vehicle, but can typically cost \$1,500 to \$5,000 more than a comparable LSI forklift. However, since an electric forklift has a longer useful life and reduced fuel and maintenance costs, the electric forklift can reduce life-cycle costs compared to a LSI forklift.

The forklift program is an over-the-counter program, in that applications are continually accepted on a first-come-first-served basis. Contrary to many of the off-road or agricultural components in the Heavy-Duty Engine Program, a pre-inspection is not required for the new electric forklift component (LSI retrofits are pre-inspected to ensure emissions are real and quantifiable). After contracts are awarded and the new equipment is purchased and installed, post-inspections are performed to ensure

emissions reductions are accurately recorded and ongoing monitoring and reporting are required to ensure the emissions reductions occur.

#### **E.1.2.6 School Bus Replacement and Retrofit**

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 the Lower-Emission School Bus Program (Proposition 1B), DERA funding, and the American Reinvestment and Recovery Act (ARRA).

The District has provided funding to retrofit 2,216 school buses and replace 494 school buses. New buses purchased to replace older buses may be fueled with diesel or an alternative fuel, such as compressed natural gas (CNG), 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 hybrid-electric school buses may be eligible for partial funding.

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-for-payment form must also be submitted before funds can be awarded.

#### **E.1.2.7 Community Incentives**

While all of the District's incentive programs are open to residents of the Valley, there are a number of programs, such as the Heavy-Duty Engine Program and the Proposition 1B Goods Movement Emission Reduction Incentive Program, that are specifically designed for Valley businesses. These programs focus on replacing or retrofitting large diesel-powered equipment such as trucks, tractors, and agricultural irrigation pump engines. These programs are highly efficient and extremely cost-effective. Of equal importance, the District currently operates several incentive programs designed for the general public. These programs give the general public the opportunity to contribute to the goal of cleaner air for all Valley residents. The District's community incentives include a wide range of project types and source categories. Current community incentive programs include the following:

**Burn Cleaner Program** – 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. In 2014 the District implemented additional upgrades to the Burn Cleaner Program to make it more accessible and to increase the incentive amounts with great success. Through this program, the District offers a financial incentive to Valley residents with an increased incentive amount available to low-income qualified applicants through a

streamlined voucher program that involves partnering with interested retailers. The program has upgraded over 6,380 wood-burning devices, and continues to receive a steady stream of applicants.

**Polluting Automobile Scrap and Salvage (PASS)** – The PASS program currently offers financial incentives for participants to repair or replace their high emitting vehicle and formerly provided funding for a vehicle retirement option. To date the program has replaced 310 high-emitting vehicles with newer, cleaner vehicles, retired 504 additional vehicles, and repaired 13,931 vehicles. The PASS program has primarily been supported with locally generated incentive funds; however, a portion of the funding for vehicle repairs was funded through the Reformulated Gasoline Settlement Fund created as a result of an antitrust class action. The District expects funding for additional vehicle replacement projects to be provided through the State’s Enhanced Fleet Modernization Program.

**Clean-Green-Yard-Machine (CGYM)** – The CGYM program helps clean the Valley’s air through incentives for residents to retire their old high-polluting gas mowers in favor of nonpolluting, electric mowers. The program has used locally generated incentive funds as well as funding from the State’s AQIP. The CGYM program has successfully replaced over 3,910 gas lawn mowers with clean electric models.

**Drive Clean! Rebate Program – Drive Clean! Rebate Program** – This grant program encourages Valley residents to drive advanced, clean vehicles, including electric and other alternative-fueled vehicles. Since the launch of the Drive Clean! Rebate Program in March 2012, the District has issued 1,322 rebates, totaling more than \$3.5 million in grant funding.

**Alternatives to Professionally Managed Pyrotechnic Firework Displays** – In 2012, the District provided incentive funding for a pilot program to demonstrate clean laser-light shows as an alternative to pyrotechnics for July 4<sup>th</sup> celebrations.

**Public Benefit Grants Program** – The Public Benefit Grants Program is one of the District’s newest incentive programs and provides funding to Valley cities, counties, and other public agencies for a wide variety of clean-air, public-benefit projects. Eligible applicants are cities, counties, special districts (e.g. water districts and irrigation districts), and public educational institutions (e.g. school districts, community colleges, and state universities) located within the Valley.

**REduce MOtor Vehicle Emissions (REMOVE)** – The REMOVE program provides incentives for specific projects that will reduce the Valley’s motor vehicle emissions, including e-mobility (video-telecommunications), bicycle infrastructure, alternative fuel vehicle mechanics training, and public transportation and commuter vanpool subsidies. The program allocates funds to cost-effective projects that have the greatest motor vehicle emissions reductions resulting in long-term impacts on air pollution problems in the Valley. All projects must have a direct air quality benefit in the Valley.

The current incentive priorities are reflected in the 2014-2015 District Budget's incentive spending plan and include funding for the following incentives:

**Community Incentives**

- Drive Clean! Rebate Program (passenger vehicles)
- Vehicle Scrap and Repair (Tune In Tune Up)
- Burn Cleaner (residential woodburning)
- Lawn Mower Replacement
- REMOVE (vanpools, bikepaths, etc.)

**Goods Movement**

- Proposition 1B Heavy Duty Trucks
- Locomotives

**Heavy Duty Equipment Programs**

- Agricultural Equipment Replacement
- Agricultural Irrigation Pumps
- Truck Voucher and Reuse
- Construction Equipment Replacement
- Refuse Fleet Replacement

**Advanced Transportation/Vehicles**

- Public Benefit Grants
- Hybrid Voucher Program (HVIP "Plus-Up")

**School Bus Replacement and Retrofit**

- School Bus Replacement/Retrofit
- Statewide Retrofit Program

**Regional Assistance**

- Greenhouse Gas Mitigation Assistance

**Technology Advancement**

- Technology Advancement Program
- Zero-Emission Commercial Lawn and Garden

### E.3 TECHNOLOGY ADVANCEMENT

The District Governing Board approved creation of the Technology Advancement Program in March 2010 to accelerate development of technologies that can help reduce air pollutant emissions in the Valley. Meeting EPA's increasingly stringent ozone and PM2.5 air quality standards will require significant advancements in low-emissions technologies from mobile and stationary sources. The Technology Advancement Program provides a strategic and comprehensive means to identify, solicit, and support technology advancement opportunities. Ongoing refinement of the program's technology focus areas targets efforts to achieve the greatest impact on the Valley's attainment and other health-based goals under the District's ozone and PM2.5 attainment plans.

Technology development can benefit regional and state air quality. Strategies for reducing emissions in the Valley can be enhanced through partnerships and collaborations with other air districts and state agencies. The District is currently collaborating with the California Air Resources Board (ARB) and the South Coast Air Quality Management District (SCAQMD) to prepare a document to outline a common vision for attainment of federal air quality standards, as well as greenhouse gas goals and reduced exposure to toxics. The market penetration of transformative technologies will be a critical component of realizing a common vision, and the Technology Advancement Program will help to identify and support upcoming technology opportunities.

#### E.3.1 Technology Focus Areas

The District has structured the Technology Advancement Program to encourage participation within three focus areas:

- I. **Renewable Energy.** Renewable energy projects will focus on overcoming the barriers that prevent the use or adoption of zero-emission renewable energy sources or reduce emissions from renewable energy systems to make them cleaner than comparable non-renewable alternatives.
- II. **Waste Solutions.** Waste solutions will focus on waste systems or technologies that minimize or eliminate emissions from existing waste management systems and processes, including waste-to-fuel systems such as dairy digesters and other bio-fuel applications.
- III. **Mobile Sources.** Mobile source projects will demonstrate zero- or near-zero-emissions solutions to mobile source categories with emphasis on goods and people movement, off-road equipment, or agricultural equipment.

These focus areas represent the current needs of the Valley; they also reflect the types of proposals previously received by the District within this and other programs. Throughout implementation of this PM2.5 plan and future air quality plans, the District

will continue to evaluate and, if necessary, update these technology focus areas to address to the Valley's air quality challenges.

### **E.3.2 Future Demonstration Projects**

In 2014, the District solicited proposals for projects, received 35 proposals, and expects the total funding for selected project to be approximately \$4 million. In addition to directly funding demonstration projects, the District actively seeks opportunities to collaborate with technology innovators in seeking additional funding. An example of this type of funding is the District's administration of the Zero-Emission Commercial Lawn and Garden Technology Demonstration, funded with State Air Quality Improvement Program funds.

Moving forward, District staff will continue to search for opportunities to support projects that build the air quality technology research and demonstration capacity of colleges and universities in the Valley. This emphasis will improve the ability of local institutions to engage in future clean-technology projects that are specifically suited to the Valley's needs. To accomplish this, staff has adapted the Technology Advancement Program scoring criteria so that projects that incorporate local colleges and universities will score higher than those that do not.

### **E.3.3 Demonstration Projects in Process**

The District's Technology Advancement Program has had four rounds of funding and received over 130 proposals for clean technology projects. As of 2013, the District selected 27 of the proposed projects for funding, for over \$7 million in support of clean technology demonstrations. The following 11 projects, out of the 27 selected, are in process and moving forward, or completed with reports posted to the District's web page:

#### ***Engine, Fuel, and Emissions Engineering, Inc. (EF&EE) Renewable Energy and Waste Solutions Technology Focus Areas***

The EF&EE project is demonstrating a compact SCR device on a biogas-powered engine to be installed at Joseph Gallo Farms in Atwater, CA. Source testing has shown the system operating at ultra-low NO<sub>x</sub> levels<sup>2</sup>. The system includes advanced exhaust thermal controls, monitoring, and reductant metering equipment to prevent ammonia slip and reduce or eliminate the need for an ammonia slip catalyst. The slip catalyst is the primary source of NO<sub>x</sub> emissions in other SCR systems, and this new systems thermal control with advanced metering is significantly NO<sub>x</sub> emissions.

This new technology has a low cost relative to the emission reductions, result in good cost-effectiveness. Additionally, EF&EE theorizes that the exhaust thermal management necessary for the advanced catalyst optimization will have the result of making the catalyst resistant to siloxanes in the source gas. Additional demonstration

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<sup>2</sup>Demonstration Of A Compact SCR™ System Meeting 0.07 lb/MWh Nox In A Biogas Engine Final Report. Report from the contract team. (2014, June 24). Funded by and prepared for the San Joaquin Valley Technology Advancement Program. Available at: [http://valleyair.org/grants/documents/technologyadvancement/C-4236\\_EF&EE\\_FinalReport.pdf](http://valleyair.org/grants/documents/technologyadvancement/C-4236_EF&EE_FinalReport.pdf)

will be necessary to determine if this siloxane tolerance will allow for a more cost-effective application of this technology to other waste gas sources such as wastewater treatment plants and landfill gas.

The technology demonstrated has the potential to impact a large number of biogas projects in the Valley, and with statewide efforts being made to increase the number of biogas projects, this project is highly relevant to our planning process and offers additional co-benefits in greenhouse gas reductions.

### ***Association of Compost Producers***

#### ***Mobile Sources and Waste Solutions Technology Focus Area***

The Association of Compost Producers has designed and tested an aerated static pile method of composting for a large-scale composting facility. The system consists of three components: substitution of diesel-powered loaders with electronic conveyor systems to build piles; the use of solar-powered electric blowers to replace diesel-powered windrow turners during the active phase of composting; and the use of finished compost biofilter covers, which reduce VOC emissions.

The prototype aerated static pile method and conventional windrows of the same age and feedstock were maintained for one month, during which time emissions of VOCs, ammonia and greenhouse gases were sampled using flux chambers.<sup>3</sup> Emissions from the prototype method during the active composting phase were significantly reduced for total non-methane, VOCs, ammonia, and NO<sub>x</sub> compared to the control windrows. The project also reduced the amount of fuel, water, and land necessary for active-phase composting.

### ***Sun-Maid Growers of California***

#### ***Waste Solutions Technology Focus Area***

Sun-Maid Growers has modified and tested a mobile prototype device called the Burn Boss® Air Curtain Burner. Sun-Maid tested this device as an alternative to typical open burning practices for paper raisin trays, in order to reduce visible smoke emissions as well as PM<sub>2.5</sub> resulting from the burning of paper raisin trays used during the grape harvest. The technology has been shown to significantly reduce visible smoke and NO<sub>x</sub> emissions compared to open burning<sup>4</sup>. The grape harvest coincides with District's highest ozone levels; reductions of these emissions greatly benefit air quality.

### ***Solar Storage Company***

#### ***Renewable Energy Technology Focus Area***

The Solar Storage Company project will demonstrate a renewable solar-power generation system as an alternative to diesel power for agricultural irrigation pumping systems, especially those systems in remote locations. The demonstration system uses a thermal-solar concentration system with two reciprocating steam engines and a

<sup>3</sup> *Greenwaste Compost Site Emissions Reductions from Solar-Powered Aeration and Biofilter Layer*. Report from the contract team. (2013, May 14). Funded by and prepared for the San Joaquin Valley Technology Advancement Program. Available at: [http://www.valleyair.org/Grant\\_Programs/TAP/documents/C-15636-ACP/C-15636\\_ACP\\_FinalReport.pdf](http://www.valleyair.org/Grant_Programs/TAP/documents/C-15636-ACP/C-15636_ACP_FinalReport.pdf)

<sup>4</sup> *Evaluation of Burner Boss® Air Curtain Burner*. Project Number C-15612-A. Available at: [http://www.valleyair.org/Grant\\_Programs/TAP/documents/C-15612-SunMaid/C-15612\\_Sun-Maid\\_FinalReport.pdf](http://www.valleyair.org/Grant_Programs/TAP/documents/C-15612-SunMaid/C-15612_Sun-Maid_FinalReport.pdf)

pressurized steam storage system. This technology will provide an alternative to electrifying pumping systems, which is not cost-effective in situations where electricity is not close by or infrastructure is not in place. The project will be installed in parallel with a diesel backup-power system to operate the pump at times when there is a need for emergency freeze protection occurring with two cloudy days in a row. Meteorological conditions that prevent the solar use in such cases are rare and only accounts for 1% of the pumping time of a typical agricultural irrigation pump. As a result, the project will result in a 99% reduction in emissions including diesel particulates, NO<sub>x</sub>, and greenhouse gasses.

This project has potential for reducing criteria pollutant emissions, as well as the potential to reduce greenhouse gases, while expanding renewable energy options. Successful demonstration of the technology may prove a low-cost thermal storage alternative for additional applications, thus reducing the barrier to adoption of solar thermal technology.

### ***California Bioenergy***

#### ***Renewable Energy and Waste Solutions Technology Focus Areas***

The California Bioenergy project will optimize and expand the emissions control systems used at the Bidart Dairy digester in Bakersfield, California. The digester gas system currently uses a non-selective catalytic reduction (NSCR) system. The project will tune the NSCR system to achieve very low NO<sub>x</sub> emissions and install a second after-treatment system that uses hydrogen selective catalytic reduction to reach near-zero NO<sub>x</sub> emissions.

The District is interested in the success of clean bioenergy production through the use of biowaste, particularly in terms of developing ultra-low-NO<sub>x</sub> technologies to mitigate the potential impact from the large-scale development of these types of projects. Projects such as this one, if successful, move the Valley closer to that goal. The ability of digester projects like this to reduce greenhouse gas emissions provides co-benefits important for program acceptance.

### ***US Hybrid Corporation***

#### ***Mobile Sources Technology Focus Area***

US Hybrid, in collaboration with CALSTART, will to convert a Terex wheel loader to plug-in hybrid operation for fuel savings and emission reductions. Hybrid-electric technology, which is already available in the light-duty vehicle category, has only recently been applied to off-road vehicles. This project will advance the use of this technology for this off-road category and quantify the emission reductions associated with the system. The wheel loader will be tested at Maddox Farms, a dairy located in Fresno County. The hybridized vehicle includes electric-only operation, idle elimination, and power for electric attachments.

The outcome of this project has the potential to affect a large segment of the off-road vehicle emissions inventory and is very relevant to the attainment planning process. Additionally, the expected fuel savings will also reduce the long-term cost of ownership for the technology.

**Electricore, Inc.****Mobile Sources Technology Focus Area**

Electricore, Inc. will build and demonstrate a zero-emission, completely autonomous agricultural spray vehicle. Electricore will work with Trexa, LLC, who has developed a low-cost, commercial, electric off-road vehicle platform that will be combined with a commercial orchard pull-rig agricultural spray trailer. Electricore will oversee the demonstration at Paramount farms in Kern County. The vehicle will operate autonomously based on robotics developed by the Robotics Institute at Carnegie Mellon University.

Successful implementation of this technology could have an impact on the inventory of emissions from agricultural tractors, which are numerous in the Valley. Likewise, the reduced fuel use and the associated greenhouse gas reductions provide co-benefits beyond criteria pollutant emissions reductions.

**US Hybrid Corporation****Mobile Sources Technology Focus Area**

US Hybrid, in partnership with CALSTART and Roush, will demonstrate a plug-in electric-hybrid propane utility truck using a Ford F-250 truck base. US Hybrid will demonstrate and test the utility truck at Maddox Farms near Riverdale, California. The demonstration and testing will identify NO<sub>x</sub> emission reductions, greenhouse gas reductions, and fuel savings.

The outcome of this project has the potential to affect a large segment of the on-road vehicle emissions inventory in light of the extensive use of utility trucks in agriculture and other industries. Likewise, the reduced fuel usage, use of propane, and the associated greenhouse gas reductions provides co-benefits beyond criteria pollutant emissions reductions. The expected fuel savings will also reduce the long-term cost of ownership for the technology.

**City of Manteca****Mobile Sources Technology Focus Area**

The City of Manteca will demonstrate two new Autocar Xpeditor E3 refuse vehicles fitted with Parker RunWise advanced series hybrid-drive technology to reduce diesel fuel consumption, associated NO<sub>x</sub>, and other emissions, by up to 45%. The City will purchase the trucks from Autocar and subcontract with infoWedge to install monitoring equipment and collect data from the hybrid truck and a conventional diesel truck, for comparison purposes. infoWedge will characterize the drive cycle; monitor a 30-day demonstration of the hybrid truck; monitor and report emissions testing; and monitor long-term (6 months) demonstration to evaluate usage patterns, fuel consumptions, and maintenance needs.

Successful implementation of this project will show the ability to reduce emissions through reduced fuel use in the medium heavy-duty diesel truck off-road category. The reduced diesel fuel use also reduces greenhouse gas emissions and lowers overall, long-term operating costs for end users.

**Capstone Turbine Corporation**

**Mobile Sources Technology Focus Area**

Capstone Turbine Corporation is demonstrating a class 7 CNG-powered turbine range extender electric truck. The truck features an all-electric traction drive system, capable of handling the transient load requirements while the microturbine operates at its optimal modes for range extension. The electrical system will also be capable of operating a truck refrigeration unit eliminating the use of an auxiliary power unit.

Leslie's Floral in Bakersfield will demonstrate the demonstration unit in deliveries ranging from Fresno to Bakersfield. This will demonstrate both the benefit of this level of hybridization as well as the ability for the unit to handle longer over the road driving conditions.

**Biogas & Electric, LLC**

**Renewable Energy and Waste Solutions Technology Focus Areas**

Biogas & Electric is demonstrating its NOxRx engine after-treatment system at the Bakersfield Wastewater Treatment Plant #3. The NOxRx system is based on wet scrubber technology, using fluids from the digester as the scrubbing liquor. Since the technology is not catalyst based it would be resistant to gas impurities that would be expensive to remove as is necessary other competing technologies. The goal of the project is to demonstrate a system with low operational costs capable of meeting ultra-low NOx emissions.

**Transportation Power, Inc.**

**Mobile Sources Technology Focus Area**

Transportation Power, Inc. is demonstrating a zero-emission electric yard tractor for use at IKEA's distribution center in Lebec. The electric yard tractor would replace diesel rigs currently used to move trailers around the facility. Key innovations that will be demonstrated with this project include improved vehicle efficiency and battery charging capability. This will enable the tractors to support the demanding two-shift tractor operations at the regional distribution center, with 8-10 hour shifts and only about 1 1/2 hour between shifts.

**Colony Energy Partners**

**Renewable Energy and Waste Solutions Technology Focus Areas**

Colony Energy Partners is in the process of developing the Tulare Anaerobic Digester Facility and proposes to develop and demonstrate a novel packaged hardware system for gas purification and injection into the natural gas pipeline. The packaged hardware will have a smaller footprint, and enable much simpler future installations. Gas cleaning systems, which are used to upgrade biogas to pipeline quality for export to the utility, prevent emissions from the alternative use of the gas in power production systems. Development of a packaged combination of hardware capable of cost-effective gas purification may provide an option for reducing future emissions from power generation that use gas from digester systems.

***The Greenstation LLC******Mobile Sources Technology Focus Area***

The Greenstation is demonstrating a backpack battery powered leaf blower in Fresno and Visalia using the most advanced battery and blower technology available designed for commercial use. The project will integrate the blower units into the daily institutional grounds maintenance schedules and demonstrate the technology will be capable of replacing high emitting gasoline powered leaf blowers in commercial lawn maintenance operations. Given the neighborhood-level impacts of conventional gas powered lawn maintenance equipment, development of zero emissions alternatives has the potential of providing significant health benefits to Valley residents and lawn care workers.

**E.3.4 Interagency Collaborative Demonstration Projects**

In addition to projects selected through the request-for-proposals process, the District has partnered with other air quality agencies in the state to demonstrate new and emerging technologies.

***Restaurant Charbroiler Technology Partnership******Emission Control Device Manufacturers, Restaurants, and South Coast Air Quality Management District (South Coast)***

A variety of technologies for capturing emissions from under-fired charbroilers have been developed or improved in recent years. To prove these technologies at working restaurants and to ease the transition to these controls, the District is seeking a small group of Valley restaurant partners to participate in a new demonstration program. Participating restaurants will be provided funding for the full cost of purchasing, installing, and maintaining installed systems during a demonstration period covering two years of operation. The District opened a request for qualifications to identify eligible equipment manufacturers on May 7, 2014, and has identified a list of eligible devices and manufacturers. Work is ongoing with partner restaurants to install and demonstrate these systems.

These demonstrations will build upon previous and ongoing laboratory testing focused on control technology for under-fired charbroilers. South Coast released a program opportunity notice for this testing project in October 2011 to solicit proposals from control device manufacturers. District staff assisted in reviewing the submitted proposals and making recommendations on which manufacturers should be allowed to submit their device to the testing protocol at the University of California, Riverside College of Engineering - Center for Environmental Research and Technology test kitchen facility. This technology demonstration effort is testing promising prototype emission control devices, which will support future regulatory efforts at both South Coast and the District.

***Zero-Emission Commercial Lawn and Garden Equipment Demonstration  
California Air Resources Board***

The Cordless Zero-Emission Commercial Lawn and Garden Equipment Demonstration Program will provide eligible cordless zero-emission commercial lawn and garden equipment to commercial landscape professionals (participants) who conduct business

within the Valley. The cordless zero-emission lawn and garden equipment must be designated commercial-grade and used by commercial landscape professionals to complete multiple small to large gardening tasks over an eight-hour workday period. Eligible equipment may include, but is not limited to, lawn mowers, edgers, trimmers/brush cutters, hedge clippers, blowers/vacuums, sweepers, and chainsaws.

The District opened a Request for Applications on August 20, 2012. Participating equipment manufacturers/vendors (technology demonstrators) were responsible for providing the equipment; training to participants on the safe and efficient operation of the equipment and maintenance; and providing materials necessary for daily operation. The participants were to use the equipment in real-world settings to verify equipment durability and performance, battery capacity, and battery charge time. In addition, the participants were responsible for providing monthly data and feedback to the District and technology demonstrators and may have the opportunity to keep the equipment upon submittal of all required data and information for the program. The Cordless Zero-Emission Commercial Lawn and Garden Equipment Demonstration Program successfully ended in June 2013 with a total of 4 technology demonstrators, 60 participants and 445 pieces of equipment for in-use testing. The program demonstrated the performance and durability of electric equipment in non-residential applications to accelerate market acceptance and build upon the progress already made in the residential sector.

***Natural Gas-Fired, Fan-Type Central Furnaces with Reduced NO<sub>x</sub> Emissions  
South Coast Air Quality Management District***

South Coast conducted a demonstration project focused on prototype natural gas-fired fan-type central furnaces with reduced NO<sub>x</sub> emissions. South Coast released a program opportunity notice for this demonstration project in February 2010, which solicited a number of proposals from furnace manufacturers and gas industry technology developers in partnership with furnace manufacturers. This technology assessment of reduced NO<sub>x</sub> central furnaces was initiated with the November 2009 amendment of South Coast Rule 1111 (NO<sub>x</sub> Emissions from Natural Gas-fired, Fan type Central Furnaces). The District co-funded this technology assessment with the SCAQMD and Southern California Gas Company (SoCal Gas). The District provided \$50,000, SCAQMD provided \$1 million, and SoCal Gas provided \$450,000 in funding. The technology assessment project was completed in the first quarter of 2014.

The goal of this technology assessment was to demonstrate reduced NO<sub>x</sub> furnaces capable of meeting an emissions goal of 14 nanograms NO<sub>x</sub> per joule of useful heat. Based on the results of the furnace demonstration project, the technology required to meet new NO<sub>x</sub> standards will be available by 2015. As a result of the study findings, the District amended Rule 4905 in January 2015 and incorporated more stringent NO<sub>x</sub> emissions limits for units subject to the rule and expanded applicability to include units installed on commercial buildings and on manufactured homes.

***Vision for Clean Air: A Framework for Air Quality and Climate Planning  
South Coast Air Quality Management District and California Air Resources Board***

While the District's air quality challenges are significant, many aspects of those challenges are not unique, and they are not isolated to the boundaries of the Valley air basin. Strategies for reducing emissions in the Valley are enhanced through partnerships and collaborations with other air districts and state agencies. The District seeks out opportunities for such collaborations to build strong relationships and even stronger attainment strategies.

In 2011, ARB, with the assistance of the District and South Coast AQMD, developed the *Vision for Clean Air: A Framework for Air Quality and Climate Planning*. The goal of this collaboration is to draft a common vision for mobile and stationary source strategies that integrate the need to meet federal air quality standards for PM<sub>2.5</sub> and ozone, the need to reach California's greenhouse gas goals, and the need to reduce public exposure to toxics (e.g. diesel particulates). This collaborative effort will take advantage of the efficiencies inherent in dealing with these three issues as inter-dependent problems with inter-dependent solutions.

Through the *Vision for Clean Air* effort, the three agencies have been evaluating pollutant reductions needed to meet overlapping air quality requirements for 2019, 2023, 2035, and 2050. These reductions will depend on the integration of transformative measures and emerging technologies (including zero- and near-zero emission goods movement) with long-range planning and control strategies. Critical to the attainment of targets will be the evaluation of the potential policies, legislation, infrastructure, and efficiencies that will ensure that South Coast, the Valley, and California are prepared to meet the long-term goals.

**E.4 LEGISLATIVE STRATEGY**

Each year the District Governing Board adopts a legislative platform to guide District advocacy and policy efforts. Through state and federal lobbying efforts and delegation visits to Washington D.C., the District informs elected officials about Valley needs and concerns based on the priorities established in the legislative platform. With persistence, the District has secured support and additional incentive funding for programs critical to emissions reductions in the Valley. The legislative platform includes both legislative priorities and positions on anticipated federal legislation. The following is a summary of the legislative priorities and District positions on anticipated federal legislation. For complete details refer to the District's legislative strategy, adopted in January 2015.<sup>5</sup>

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<sup>5</sup> SJVAPCD. *Item Number 10: Approve the District's 2015 Legislative Platform and take positions on anticipated federal air quality legislative proposals.* (22, January 2015). Available at: [http://www.valleyair.org/Board\\_meetings/GB/agenda\\_minutes/Agenda/2015/January/final/10.pdf](http://www.valleyair.org/Board_meetings/GB/agenda_minutes/Agenda/2015/January/final/10.pdf)

#### **E.4.1 Streamline Implementation of the Clean Air Act**

Since its adoption, the Clean Air Act has led to significant improvements in air quality and public health benefits throughout the nation. However, as an area in the nation with mature local air quality management programs, the Valley has reached the point of diminishing returns. After more than 20 years since the last amendments to the CAA in 1990, experience shows that many well-intentioned provisions are leading to unintended adverse consequences. The antiquated provisions of the Clean Air Act are now leading to confusion, and lack of updated congressional directive has rendered courts as policy makers.

The District supports the well-intentioned concepts in the CAA that call for routine review of health-based air quality standards, clean air objectives that are technology-forcing, and clean-air deadlines that ensure expeditious clean-up and timely action. The District recommends the CAA be amended to allow for consideration of the following critical factors in establishing attainment deadlines and implementation milestones for new standards:

- Upcoming health standards and associated deadlines are impossible to meet.
- The current five year review of standards is too short and has led to overlapping requirements and chaotic transitions between standards.
- Requiring contingency measures in extreme nonattainment areas is irrational and unnecessary.
- Section 185 of the CAA, which requires businesses in “Severe” and “Extreme” non-attainment areas to pay non-attainment penalty fees, is unfair and ineffective.
- The CAA requirements for Severe and Extreme ozone nonattainment areas to address vehicle-related emissions growth must be clarified.
- Transition to health risk-based approach in lieu of the current mass based approach.

#### **E.4.2 Increase State Subvention Funding to Provide More Support for Unfunded Mandates**

Local air pollution control and air quality management districts receive subvention funds to support important local air program activities. These funds are allocated from the Motor Vehicle Account through the budget of the California Environmental Protection Agency, under the Air Resources Board section. Local subvention funds were initially provided in 1972, and were increased several times to address the costs of inflation. Despite a significant increase in unfunded mandates, for over twenty years there have been no adjustments for inflation, or added responsibilities. The District, therefore, supports an increase in subvention funds to help offset increases in costs and responsibility. The District currently receives \$900,000 per year which is less than 2% of the District’s annual operating budget.

### E.4.3 Policies/Guidelines for the Carl Moyer Program

The Carl Moyer Program has been a valuable source of incentive funds to obtain voluntary emissions reductions from mobile sources of emissions. Assembly Bill 8 was recently adopted to extend funding for the Carl Moyer program through 2023. The following policies should guide the state as new guidelines/requirements are developed for the program through the new sunset date:

- The focus of the Carl Moyer Program should continue to be the reduction of criteria pollutants. Efforts to include greenhouse gas emissions projects should only be considered as co-benefits to projects that are principally designed for the reduction of criteria pollutant emissions.
- Regional funding formulas should continue to utilize a region's non-attainment status, and the severity of the air quality problem, as the primary factor in determining the regional breakdown of statewide Carl Moyer funding.
- With respect to regulatory deadlines, incentive funding should be decoupled from regulatory enforcement. Projects that provide cost-effective and surplus emission reductions should be eligible for funding regardless of compliance status with respect to regulatory deadlines.

### E.4.4 Cap and Trade Revenues

The cap and trade program implemented by ARB sets up a mechanism by which affected sources can procure allowances or offsets to meet specified and declining caps on their greenhouse gas emissions. This scenario can potentially lead to adverse impacts in areas that are already disproportionately impacted by criteria pollutant emissions. The Cap and Trade Program generates in excess of \$1 billion annually. The state allocates these funds to programs across a number of state agencies. The following overarching policies should be applied as the state considers funding projects and programs from the Greenhouse Gas Reduction Fund:

- Projects funded with Cap and Trade revenues should achieve greenhouse gas reductions, with priority given to projects that achieve reductions in criteria pollutants as well.
- A portion of Cap and Trade revenues should be directed to projects in areas that are already disproportionately impacted by air pollution.
- Policies should be put in place to ensure that programs funded with Cap and Trade revenues meet or exceed the provisions of Senate Bill 535 that require a minimum of 25% of the Cap and Trade revenue be spent to benefit disadvantaged communities and that 10% of the revenue be spent in those communities. In determining what communities are disadvantaged, the state is required to prioritize communities that face significant environmental challenges as well as economic challenges.

#### **E.4.5 Oppose Climate Change Measures that Result in Public Health Detriment Due to Increases in Criteria or Toxic Air Emissions**

Although climate change measures provide for many co-benefits in reducing both greenhouse gasses and criteria pollutant emissions, there are some measures that may lead to increases in criteria pollutant or toxic emissions. Therefore the District will support reasonable climate protection measures that reduce greenhouse gas emissions as well as toxic and criteria pollutants. The District will oppose climate change measures that are detrimental to public health by leading to increases in toxic or criteria pollutant emissions in already impacted areas.

#### **E.4.6 Disadvantaged Community Policies**

The Valley is home to a number of disadvantaged communities that deserve care and attention. The District will adhere to the following principles in pursuing efforts to identify and address the needs of these communities:

- The District will support measures that improve quality of life and economic welfare. In identifying communities of need, both socioeconomic and environmental impacts should be considered. The District supports CalEPA's California Communities Environmental Health Screening tool (CalEnviroScreen) as the appropriate tool for identifying disadvantaged communities.
- The District considers poverty as a key factor contributing to diminished public health and will oppose efforts that lead to "redlining" these communities and inhibit economic growth.
- The District will support efforts to target additional state and federal resources to mitigate issues faced in disadvantaged communities.
- The District will oppose measures that dilute local control by diverting local revenues or the authority over the expenditure of local resources to the state or federal government. Reduced local control will weaken local enforcement programs. Local agencies are better suited to efficiently and effectively identify and address community needs.

#### **E.4.7 Seek funding and other support from ARB and EPA to install and operate additional air quality monitoring instruments throughout the Valley**

The District operates one of the most extensive air monitoring networks in the nation. Data from these monitors is utilized to measure progress and assess the need for further reductions needed to attain federal air quality standards established by EPA. The District is also committed to providing accurate and timely air quality information to educate and empower the public to protect themselves during poor air quality episodes. This is accomplished utilizing the air monitoring data through the District's first-in-the-nation Real-Time Air Advisory Network (RAAN).

Installation, operation and maintenance of the District's air monitoring network is resource intensive. The District's annual operating appropriation for air monitoring is approximately \$2.9 million. The increase in federal mandates relating to air monitoring

(more monitors and more labor intensive QA/QC and reporting procedures for existing monitors) combined with the need for more monitoring capabilities to satisfy the District's initiative to provide neighborhood by neighborhood air quality information require additional resources.

#### **E.4.8 Support efforts that provide for cost-effective alternatives to open burning of agricultural waste**

In 2003, state law was amended to require the District to the limit open burning of agricultural material in accordance with a phased-in schedule of deadlines. In addition to those requirements, the state law authorizes the District to postpone the burn prohibition dates for specific types of agricultural material if the District makes three specific determinations and the ARB concurs. The determinations are: (1) there are no economically feasible alternatives to open-burning of the specific type of material; (2) open-burning the specific type of material will not cause or substantially contribute to a violation of a federal air quality standard; and (3) there is no long-term federal or state funding commitment for the continued operation of biomass facilities in the Valley or the development of alternatives to burning. Working closely with the stakeholders over the years to identify economically feasible alternatives to open burning of various agricultural materials, the District has achieved an 80% reduction in agricultural burning.

Given current energy policy in California, biomass power facilities, which are one of the primary alternatives to agricultural burning, are in jeopardy. Many biomass plants in the Valley are nearing the end of their long-term contracts with utilities and find themselves in a position where the power that they provide is not the type of power that utilities are seeking and that the prices being offered for new contracts are too low to support their operations.

The District will support efforts to help level the playing field and provide fair competition between biomass plants and other renewable sources of power. The District will also support research and development of alternatives to the open burning of agricultural waste.

#### **E.4.9 Technology Advancement**

The Valley is classified as an Extreme non-attainment area for ozone. This means that that technology does not currently exist to bring the region into attainment of the federal ozone standard. Meeting the newest air quality standards will require transformative measures and technologies to achieve near zero emissions. In order to further develop technology to close the gap in required emissions reductions, the District operates a Technology Advancement Program. Along with its own resources, the District is seeking state and federal assistance to advance technology in the following areas:

- Mobile sources projects that demonstrate zero- or near-zero-emissions solutions to mobile source categories with emphasis on goods and people movement, off-road equipment, or agricultural equipment.

- Renewable energy projects that focus on overcoming the barriers that prevent the use or adoption of zero-emission renewable energy sources or reduce emissions from renewable energy systems to make them cleaner than comparable non-renewable alternatives.
- Waste solutions projects that focus on waste systems or technologies that minimize or eliminate emissions from existing waste management systems and processes, including waste-to-fuel systems, such as dairy digesters and other bio-fuel applications.

#### **E.4.10 Support adequate resources and policies to reduce the impact of wildfires and their attendant public health impact**

Wildfires result in significant loss of life and property. Air pollution generated from wildfires is enormous and well exceeds the total industrial and mobile source emissions in the Valley. These emissions result in significant adverse public health impacts in the Valley and in many regions throughout California. In the summer of 2008, California experienced a record number of wildfires, and the resulting emissions caused serious public health impacts and unprecedented levels of PM<sub>2.5</sub> and ozone in the Valley and other regions throughout the state. Historically clean rural areas throughout the state and in the Valley experienced their worst air quality in decades, and pollutant levels and the number of daily exceedances of the health-based standards were significantly higher than ever before in recorded history.

Reducing wildfires and the resulting air pollutants requires a sustained and multi-faceted approach that employs effective measures to reduce fuel supplies and adequate resources to manage fires when they occur. The District supports policies and initiatives that would encourage rapid disposal of the fuel supply, including the following:

- Additional financial and staffing resources for public and private land managers to conduct prescribed burning as an effective means for reducing fuel supplies that lead to large and uncontrollable wildfires.
- Additional resources to manage wildfires when they occur.
- Lessening or removal of contradictory environmental protection policies that prohibit the use of mechanized methods, or prescribed burning to reduce fuels when those are the only feasible methods available.
- Changes in the federal policies that better incorporate air quality concerns by shifting focus to prescribed burning and employing fire management techniques that reduce air quality impact when wildfires occur.

#### **E.4.11 District Positions on Anticipated Federal Legislation**

It is expected that Congress will attempt to guide clean air policies by influencing EPA actions through its agency oversight and budgetary authorities. A key focus of these efforts is expected to be actions relating to EPA's ability to set new air quality standards and provide more congressional guidance relating to EPA's definition and treatment of exceptional events. The following are three bills expected to be re-introduced in the

coming Congress. The District supported these bills last year and would support them again if they are re-introduced.

**CASE Act:** The Clean Air Strong Economies (CASE) Act by Congressman Olson, Texas. The CASE Act requires that EPA not propose a national primary or secondary ambient air quality standard for ozone that is lower than the existing standard until at least 85 percent of the counties that were nonattainment areas under that standard achieve full compliance with the standard. Additionally, the CASE Act would require that EPA take into consideration feasibility and cost when setting standards and include in the regulatory impact analysis for the proposed and final rule at least one analysis that does not include any calculation of benefits resulting from reducing emissions of any pollutant other than ozone.

**ORDEAL Act:** The Ozone Regulatory Delay and Extension of Assessment Length (ORDEAL) Act by Senator Jeff Flake, Arizona and Congressman Matt Salmon, Arizona. The ORDEAL Act would lengthen the period between when EPA would review and set a new ozone standard from the current five year interval to ten years.

State and local air agencies are mandated to develop measures to meet federal ambient air quality standards that were set without considering the economic costs. The Act also sets attainment deadlines and implementation milestones that do not fully take into account natural environment (climate, geography, topography), magnitude of the needed emission reductions, availability of technology (maturity of existing control program, time needed to develop new technologies), economic feasibility, and pollution transport from other regions and countries.

Continued effort to develop cost-effective measures in areas such as the Valley where businesses are already subject to the toughest air regulations in the nation is extremely difficult. In fact, both the District and the South Coast Air Quality Management District concluded that technology did not exist to meet even the 1997 8-hour ozone standard. Meeting the new standards that approach background pollution concentrations require transformative measures that need sufficient time to be planned and implemented. For instance, meeting the latest ozone standard requires eliminating all emissions associated with fossil fuel combustion. The deployment of necessary technology and massive fueling infrastructure is virtually impossible before the current deadline of 2032. More realistic attainment timelines would allow time for technologies to advance and businesses to develop capital improvement programs to incorporate those technologies in an economically feasible fashion. Additionally, efforts to accurately assess the incremental costs and benefits of new standards would better inform policy makers when reviewing new standards.

Currently, in the Valley, there are six active State Implementation Plans (SIP) in place for ozone and PM, including one for a standard that was revoked. Furthermore, the District is mandate to adopt four additional plans in the next two to three years. There is a great deal of overlap, confusion, and redundancy as multiple plans for the same pollutant are at play.

**CLEER Act:** Commonsense Legislative Exceptional Events Reform (CLEER) Act by Senator Flake, Arizona and Congressman Olson, Texas (Attachment D). These bills were introduced last year and the House bill was cosponsored by Congressman McCarthy and 22 other members of Congress. The bills streamline EPA's exceptional events approval and appeal process. At the District's request, the House bill was amended to include language that clarified that the prolonged and extraordinary drought and related weather conditions similar to those faced by the Valley in 2013/14 should be considered Exceptional Events.

## **E.5 COMMUNITY OUTREACH**

The District's outreach programs are integral to the development, implementation, and success of attaining federal air quality standards. In addition, engaging the public in efforts to reduce emissions is a key element of the District's attainment strategy. Education increases public support for new and controversial regulations. The District's education and information program has expanded and evolved over the years. The following outreach programs are just some of the District's programs related to health-based PM2.5 control measures and strategies.

### **E.5.1 Real-Time Air Advisory Network (RAAN)**

Pollution levels can vary greatly during the day. While the District issues a daily air quality forecast for each county in the air basin, localized air quality often deviates from these generalized, county-wide, daily forecasts. Access to real-time data generated from the air quality monitor closest to a particular location compensates for such deviations and helps ensure that outdoor activity can be limited to periods of the day when air quality is acceptable and healthier.

The District launched the Real-time Air Advisory Network (RAAN) in 2010. This program is the first communication network in the nation to provide automated notification of poor or changing local air quality to the public throughout the air basin. While the District initially developed the program for schools as a tool to determine appropriate levels of outdoor activity for their students, the District expanded the program in 2011, and it is now available to all Valley residents.

The District combines local air quality information with specific, concentration-based health recommendations that allow RAAN subscribers to make informed decisions about when and for whom outdoor activities should be limited. The knowledge that exercise magnifies the health risks of PM2.5 exposure motivated the District to develop the RAAN program. Heavy breathing, as during exercise, allows air pollutants, especially the smallest particles (those less than 0.1 microns (PM0.1), also referred to as ultrafine particles), to more easily penetrate the alveolar region of the lungs. Particles that make it to this region are absorbed directly into the body's bloodstream. A

2003 study<sup>6</sup> found that during moderate exercise, 80% of inhaled PM<sub>0.1</sub> were deposited in the lungs, compared to 60% lung retention while a person is at rest. However, because the volume of air exchanged per minute increased substantially during exercise, overall PM<sub>0.1</sub> deposition increases by as much as 450%.

Anyone can subscribe to RAAN at no charge through the District's website ([www.valleyair.org](http://www.valleyair.org)); all that is required is the subscriber's email address. Once subscribed, the District will send email notifications with a link to the real-time data of the closest monitoring station within the District's extensive monitoring network. The District sends automated notifications on an hourly basis when air quality deteriorates or improves.

### E.5.2 Real-Time Outdoor Activity Risk (ROAR)

To support the expanded RAAN program, the District developed the Real-time Outdoor Activity Risk (ROAR) scale. The levels of this scale provide specific recommendations and limitations for increasing levels of activity, from recess through competitive athletic events. This scale is based on the Air Quality Index system that is used for the daily air quality forecasts, but provides more detailed activity recommendations based on the latest health science. The ROAR system, when used in conjunction with the Air Quality Flag Program and daily air quality forecasts, is part of a comprehensive set of tools available to schools and the public for effective health protection.

### E.5.3 Web-based Archived Air Quality System (WAAQS)

Following-up on the success of the RAAN program, the District develop a system that would provide air quality conditions on a neighborhood by neighborhood scale as opposed to being limited to only the readings from monitors. This project was organized through the following phased approach:

- Phase I Establish Algorithms and/or modeling techniques for Quantifying Neighborhood Level Particulate and Ozone Concentrations
- Phase II Provide Historical Air Quality Trends at the Neighborhood Level
- Phase III Provide Real-time Air Quality Data at the Neighborhood Level

**Phase I:** Phase I of this project was completed in 2014 and established a modeling technique for quantifying neighborhood level ozone and PM<sub>2.5</sub> concentrations. The District has already used this modeling technique to generate neighborhood level ozone and PM<sub>2.5</sub> concentrations for each of the approximately 3,600 grid cells (4 km x 4 km) that make up the San Joaquin Valley dating back to 1990. This data is being used as the foundation for providing historical air quality information under Phase II of this project.

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<sup>6</sup> Daigle, C.C., Chalupa, D.C., Gibb, F.R., Morrow, P.E., Oberdörster, G., Utell, M.J., and Frampton, M.W. (2003). Ultrafine Particle Deposition in Humans During Rest and Exercise. *Inhalation Toxicology*, 15, 539–552. DOI:10.1080/08958370390205065

**Phase II:** Under Phase II, the District committed to provide an online tool to the public that will allow residents to view historical air quality information for their neighborhood by simply entering an address of their choosing. This newly developed system has been named the Web-Based Archived Air Quality System (WAAQS). The neighborhood level air quality statistics that will be provided to the public consist of the following:

- Number of days with Good air quality
- Number of days with Unhealthy air quality
- Days over federal standards for ozone and PM2.5
- Neighborhood air quality compared to trends for the County and San Joaquin Valley

The District released a beta version of the online web page to the public on March 1, 2015. The District will accept and consider comments and recommendations in a continuous effort to improve the information provided on the web page.

**Phase III.** The launch of Phase III in 2016 will give the public access to real-time air quality information on a neighborhood by neighborhood basis and ensure that Valley residents have the most detailed and accurate information with which to make decisions regarding outdoor activity.

#### **E.5.4 Check Before You Burn**

The Check-Before-You-Burn outreach program is critical to the implementation of District Rule 4901—Wood Burning Fireplaces and Wood Burning Heaters. Rule 4901 was adopted in 2003 and, along with the Check-Before-You-Burn program, is credited with reducing levels of PM2.5 emissions during the winter season to historically low levels. The rule and outreach program was amended in 2008 and again in 2014 to reflect more stringent federal health-based standards, and together they have achieved the highest level of public recognition and compliance of any District program, with 80% of Valley residents professing awareness of it based on a 2014 public survey.<sup>7</sup> According to the same survey, 59 percent of the respondents (Valley-wide) with wood-burning devices never used them. These statistics are a testament to heightened public awareness resulting from the District's multilingual, multimedia, targeted public outreach campaigns.

Annual Check-Before-You-Burn outreach campaigns feature District Governing Board members in outdoor, radio, and video media speaking to the public about how to get involved in clean air activities. The District also uses extensive social media posts (Facebook and Twitter) to reach even more segments of the Valley's population. In addition, the District's toll-free information line and website receives thousands of "hits"

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<sup>7</sup> San Joaquin Valley Air Pollution Control District: Memorandum to SJVUAPCD Governing Board, District's Public Opinion Survey Relating to Residential Wood Burning and Other Habits of Valley Residents. Fresno, CA: Public Governing Board Meeting, March 20, 2014. Available at [http://www.valleyair.org/Board\\_meetings/GB/agenda\\_minutes/Agenda/2014/march/final/09.pdf](http://www.valleyair.org/Board_meetings/GB/agenda_minutes/Agenda/2014/march/final/09.pdf)

during the wood-burning season, specifically to access wood-burning forecast information.

### E.5.5 Healthy Air Living

Most of the District's outreach activities and programs are covered by the Health Air Living umbrella. As a year-round message, the Healthy Air Living idea of "make one change" promotes and encourages Valley residents and businesses to implement voluntary measures to reduced emissions and improved air quality. Many of the emission-reduction recommendations address PM<sub>2.5</sub> emissions, either directly emitted or as byproducts of other pollutants (e.g. reducing the number of miles traveled in a car reduces NO<sub>x</sub> and, therefore, particulates).

Components of the Health Air Living message include *Blue Sky, Brown Sky; It's Up To You* kids activity kits aimed at elementary school students and their parents; the *Healthy Air Living Kids Calendar* for kindergarteners through high-school students; and *Healthy Air Living Pledge Cards*, which are customized for residents, businesses, schools, and faith-based organizations. In addition to these specific programs and others, the Healthy Air Living logo and message are incorporated into the District's communications, collateral, incentive materials, and outreach efforts.

## E.6 ADDITIONAL STRATEGIES

Non-regulatory strategies help accelerate attainment and have been an important part of recent District air quality attainment plans. The following strategies are supported by the District as alternative methods to reduce emissions in the Valley.

### E.6.1 Energy Efficiency

California has been on the forefront of developing renewable energy sources, and has implemented regulations to ensure cleaner non-renewable energy. The District's involvement in energy efficiency and renewable energy is guided by its Regional Energy Efficiency Strategy (REES), which was adopted in January 2010.<sup>8</sup> This policy identifies the District's commitment to fostering energy efficiency and clean energy alternatives as opportunities for emissions reductions. The District continues to work with stakeholders and state agencies to expand net metering and feed-in tariffs for use of solar and other renewable energy sources, promote energy efficiency programs for energy end users that will result in lower emissions and a more stable electrical distribution system, and develop measures that incentivize and encourage low-emission technologies for use of waste gas as an alternative to waste-gas venting or flaring.

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<sup>8</sup> San Joaquin Valley Air Pollution Control District. (2010). *Approval of the District's Regional Energy Efficiency Strategy*. Memorandum to the SJVAPCD Governing Board. Public Hearing, January 21, 2010. [http://www.valleyair.org/Board\\_meetings/GB/agenda\\_minutes/Agenda/2010/January/Agenda\\_Item\\_7\\_Jan\\_21\\_2010.pdf](http://www.valleyair.org/Board_meetings/GB/agenda_minutes/Agenda/2010/January/Agenda_Item_7_Jan_21_2010.pdf)

### E.6.2 Eco-driving

Finding ways through education and outreach to reduce emissions from mobile sources in the Valley is critical to attainment of federal air quality standards. One such program in development is Eco-Driving. Eco-Driving refers to everyday techniques that drivers can do to maximize the fuel economy of their vehicles. These include observing good operating maintenance, such as proper tire pressure, wheel alignment, and oil viscosity; improving aerodynamics; traveling at efficient speeds; choosing the appropriate gear for manual transmissions; driving defensively to avoid unnecessary braking; accelerating at a constant pace; and other simple, yet often forgotten, driving techniques. As with other informational activities conducted by the District, an Eco-Driving program could be encompassed under the Healthy Air Living umbrella.

### E.6.3 Green Purchasing and Contracting

Valley businesses and government agencies can get involved in air quality improvements by considering the environmental impacts when making purchasing and contracting decisions. Green purchasing and contracting is the selection of goods, services, and vehicles that have a reduced impact on human health and the environment when compared with other products that serve the same purpose. These efforts can reduce waste, energy consumption and the overall impact of day to day operations. When making purchasing decisions, give preference to environmentally responsible products, materials and supplies; fuel-efficient, low-emission and hybrid vehicles; energy-efficient and water-efficient appliances; service providers who employ greener methods.

The District has created the *Green Purchasing and Contracting: A guide to reducing environmental impacts through the procurement process* guideline and made it available on the District webpage.<sup>9</sup> The District has also set an example for other agencies by adopting and implementing its own Green Procurement & sustainable Practices Policy in January 2012. The District will continue to support Valley organizations in adopting policies and practices to make green purchasing and contracting a routine part of their operations.

### E.6.4 Alternative Energy

The District encourages cleaner ways of generating electricity and mechanical power, and moving vehicles, in addition to overall reductions in energy use. These alternative energy choices include renewable energy, waste-to-energy systems, and alternative fuels and vehicle technologies. The District also encourages the use of alternative energy sources that are clearly cleaner than industry standards in terms of criteria pollutants. The *District's Alternative Energy: On the Fast Track to Clean Air*<sup>10</sup> is a guideline for considering clean energy options in the Valley that discuss, and provide additional resources for, the District's current recommendations regarding the most

<sup>9</sup> SJVAPCD. *Green Purchasing and Contracting: A guide to reducing environmental impacts through the procurement process*. Available at [http://www.valleyair.org/Programs/FastTrack/2011/GreenPurchasingReport4-6-11%20\\_2\\_.pdf](http://www.valleyair.org/Programs/FastTrack/2011/GreenPurchasingReport4-6-11%20_2_.pdf).

<sup>10</sup> SJVAPCD. *Alternative Energy: On the Fast Track to Clean Air. A Guide for Considering Clean Energy Options in the San Joaquin Valley*. Available at <http://www.valleyair.org/Programs/FastTrack/2011/Alternative%20Energy.pdf>

advantageous and viable alternative energy systems. Alternative energy choices include solar energy, wind turbines, biomass, dairy digesters, and electric irrigation pumps, just to name a few.

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