REPORT TO THE LEGISLATURE ON THE REGULATORY ACTIVITIES OF THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Pursuant to
Chapter 1702, Statutes of 1990 (SB 1928)

July 2018

Cleaning the Air that We Breathe…

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EXECUTIVE SUMMARY

Introduction

The South Coast Air Quality Management District (SCAQMD) is subject to internal and external reviews of its air quality programs. These include annual reviews of the District's budget, forecast and proposed operating budget for the upcoming fiscal year, and compliance program audits. In addition, the SCAQMD is required to submit to the California Air Resources Board (CARB) and State Legislature an annual review of its regulatory activities for the preceding calendar year. The attached report satisfies this latter requirement which is mandated pursuant to Chapter 1702, Statutes of 1990 (SB 1928, Presley), Section 40452 of the California Health and Safety Code.

Rule Adoptions and Amendments in 2017 and CEQA Alternatives

This section contains a summary of each major rule adoption or amendment adopted by the SCAQMD Governing Board in the preceding calendar year (e.g., 2017). Each summary contains detailed information about the estimated emission reductions, cost effectiveness, alternatives considered pursuant to the requirements in the California Environmental Quality Act (CEQA), socioeconomic impacts, and sources of funding.

Projects undertaken by public agencies are subject to CEQA, so rules and regulations promulgated by SCAQMD must be reviewed to determine if they are considered to be a "project" as defined by CEQA. If they are not a "project" or they are determined to be exempt from CEQA, no further action is required. If the project has the potential to create significant or less than significant adverse effects on the environment, then an environmental analysis is necessary. New rules or existing rules being amended often require a comprehensive CEQA document that contains an environmental impact analysis which includes the following:

* identification of potentially significant adverse environmental impacts evaluated based on environmental checklist topics;
* identification of feasible measures, if any, to mitigate significant adverse environmental impacts to the greatest extent feasible;
* if necessary, a discussion and comparison of the relative merits of feasible project alternatives that generally achieve the goals of the project, but may generate fewer or less severe adverse environmental impacts; and,
* identification of environmental topics not significantly adversely affected by the project.

If it is concluded in the CEQA document that no significant adverse environmental impacts would be generated by the proposed project, neither the identification of feasible mitigation measures nor an analysis of CEQA alternatives to the project is required. If significant adverse environmental impacts are identified, feasible mitigation measures, if any, and alternatives must be identified and an analysis of the relative merits of each alternative is required.

SCAQMD operates under a regulatory program certified by the Secretary for Resources pursuant to Public Resources Code (PRC) Section 21080.5. Certification means that the SCAQMD can incorporate its environmental analyses into CEQA documents other than environmental impact reports (EIRs), negative declarations (NDs), or mitigated NDs (MNDs). In addition, certified CEQA programs are not subject to a limited number of specific CEQA requirements identified in PRC Section 21080.5. All documents prepared by SCAQMD under its certified regulatory program are called Environmental Assessments (EAs). SCAQMD rules and regulations are subject to SCAQMD's certified CEQA program, while plans (e.g., AQMP) are not. In addition, Supplemental EAs, Addenda, and EAs for projects determined not to have significant environmental impacts often contain a more focused analysis of potential environmental impacts.

In 2017, the SCAQMD adopted four new rules (Rules 415, 1180, 1430, and 1466) and one plan (the 2016 Air Quality Management Plan (AQMP)). Also in 2017, the SCAQMD amended eight rules (Rules 219, 222, 1147, 1118, 1168, 1401, 1420, and 1466) and one regulation (Regulation III). Of these projects, analyses of CEQA alternatives were required and conducted for the 2016 AQMP and Rule 1147. Refer to Chapter 1 for rule adoptions, rule amendments and CEQA Alternatives details.

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CEQA Lead Agency Projects

SCAQMD also acts as the Lead Agency under CEQA for non-SCAQMD projects where SCAQMD typically has primary approval, i.e., discretionary permitting authority. Under CEQA, the Lead Agency is responsible for determining whether an EIR, ND, or other type of CEQA document is necessary for any proposal considered to be a "project" as defined by CEQA. Further, the Lead Agency is responsible for preparing the environmental analysis, complying with all procedural requirements of CEQA, and approving the environmental documents. All documents prepared by SCAQMD for permit projects are subject to the standard CEQA requirements. SCAQMD staff is responsible for preparing or reviewing prepared CEQA documents for stationary source permit projects.

In 2017, the SCAQMD approved three lead agency projects for which two Addenda to Final Mitigated Negative Declarations for two Southern California Edison locations and one Final Environmental Impact Report for the Tesoro Los Angeles Refinery were prepared. Refer to Chapter 1 for CEQA Lead Agency details.

Refer to Chapter 1 for CEQA Lead Agency details.

Socioeconomic Impact Analyses

California Health and Safety Code Section 40440.8 requires that SCAQMD perform socioeconomic impact assessments for its rules and regulations that will significantly affect air quality or emissions limitations. Prior to the requirements of Section 40440.8, SCAQMD staff had been evaluating the socioeconomic impacts of its actions pursuant to a 1989 resolution of its Governing Board. Additionally, SCAQMD staff assesses socioeconomic

impacts of CEQA alternatives to those rules with significant cost and emission reduction impacts.

The elements of socioeconomic impact assessments include direct effects on various types of affected industries in terms of control costs and cost effectiveness as well as public health benefits associated with AQMPs. Additionally, SCAQMD staff uses an economic model developed by Regional Economic Models, Inc. (REMI) to analyze the potential direct and indirect socioeconomic impacts of SCAQMD rules on Los Angeles, Riverside, Orange, and San Bernardino Counties. These impacts include, but are not limited to employment and competitiveness.

In 2017, the SCAQMD identified and analyzed new socioeconomic impacts for four newly adopted rules (Rules 415, 1180, 1430, and 1466), seven amended rules (Rules 219, 222, 1118, 1168, 1401, 1420, and 1466) and one plan (e.g., 2016 AQMP). The SCAQMD also identified and analyzed ongoing socioeconomic impacts for one amended regulation (e.g., Regulation III). No socioeconomic impacts were identified for one amended rule (Rule 1147). Refer to Chapter 1 for Socioeconomic Impact Analyses details.

Refer to Chapter 1 for Socioeconomic Impact Analyses.

Engineering and Permitting

Background

Section 40452 of the California Health and Safety Code requires that the SCAQMD submit an annual report to both the state board and Legislature that summarizes its regulatory activities for the preceding calendar year. Paragraph (b) of Section 40452 requires that the annual report include data on "the number of permits to operate or to construct, by type of industry, that are issued and denied, and the number of permits to operate that are not renewed." Paragraph (c) of section 40452 requires that the annual report also includes data on emission offset transactions and applications during the previous fiscal year, including an accounting of the number of applications for permits for new or modified sources that were denied because of the unavailability of emission offsets. In addition, SCAQMD Rule 2015 requires submittal of the annual Regional Clean Air Incentives Market (RECLAIM) Audit Report for the 2016 Compliance Year to the Legislature.

The following paragraphs provide a brief summary for each report.

Permitting Data – Calendar Year 2017

During calendar year 2017, SCAQMD dispositioned a total of 10,504 applications. The majority of these applications were for Permits to Operate (3,774), Area Sources & Certified/ Registrations (2,927), and Changes of Operators (1,236). Also, 910 permits were not renewed. The total number of dispositioned applications for 2017 is about 6% higher than the total for 2016, mainly attributed to the SCAQMD's continuing Permit Application Backlog Reduction efforts. This data, broken down into nine different categories, is summarized in Table 1 on page 45.

Table 2 contains a breakdown of permits dispositioned (in the nine categories) and permits not renewed, by type of industry. The type of industry was based on North American Industry Classification System (NAICS) codes, which were provided by the applicant at the time of application filing. The top four NAICS codes were 324110 – Petroleum Refineries, 445110 – Supermarkets and Other Grocery (except for Convenience) Stores, 447190 – Other Gasoline Stations, and 811121 – Automotive Body, Paint, and Interior Repair and Maintenance.

Emission Offset Transactions Data – Fiscal Year 2016/2017

During fiscal year 2016-17, a total of 52 emission offset transactions were completed, which include 40 transactions for reactive organic gases (ROG), 9 transactions for oxides of nitrogen (NOx), and 3 transactions for oxides of sulfur (SOx). There were no transactions for carbon monoxide (CO) and particulate matter with an aerodynamic diameter less than 10 microns (PM10). The amount of emissions offsets transferred, by pollutant, include 477 pounds per day of ROG, 18 pounds per day of NOx, and 47 pounds per day of SOx (see Table 5 on page 90). No banking applications resulting in the issuance of new emission offsets for ROG, NOx, SOx, CO or PM10 were processed. Additionally, no applications were denied permits for new or modified sources due to the unavailability of emission offsets. (See page 89 for details).

RECLAIM Audit Report

The REgional CLean Air Incentives Market (RECLAIM) program was adopted in 1993 to provide facilities with flexibility in achieving the same emissions reduction goals as would have been achieved under the traditional command and control approach, while lowering the cost of compliance. To ensure RECLAIM is achieving its goal, SCAQMD Rule 2015 - Backstop Provisions, requires preparation of an annual audit report on the program. This Annual RECLAIM Audit Report assesses emission reductions, availability of RECLAIM Trading Credits (RTCs) and their average annual prices, job impacts, compliance issues, and other measures of performance for the twenty-third year of this program. The results of the annual audit show that RECLAIM continues to meet its aggregate emission goals and all other specified objectives.

As discussed in more detail in the audit report (see Chapter V), a total of 262 facilities were in the RECLAIM program at the end of Compliance Year 2016. Total NOx emissions from RECLAIM facilities were 19% less than the aggregate NOx allocations, and SOx emissions were 29% less than the aggregate SOx allocations for the program. The vast majority of RECLAIM facilities complied with their allocations during the 2016 compliance year (95% of NOx facilities and 97% of SOx facilities).

A total of over $1.48 billion in RTCs has been traded since the adoption of RECLAIM, of which $6.9 million occurred in calendar year 2016 (compared to $118.6 million in calendar year 2015), excluding swaps. The annual average prices of discrete-year NOx and SOx RTCs and infinite-year block (IYB – trades that involve blocks of RTCs with a specified start

year and continuing in perpetuity) NOx and SOx RTCs traded in calendar years 2016 and 2017 were all below the applicable review thresholds for initiating program review.

In Compliance Year 2016, RECLAIM facilities reported a net loss of 982 jobs, representing 0.88% of their total employment. The RECLAIM program also met other applicable requirements including meeting the applicable federal offset ratio under New Source Review and having no significant seasonal fluctuation in emissions. Additionally, there is no evidence that RECLAIM resulted in any increase in health impacts due to emissions of air toxics.

Refer to Chapter V for the 2015 Annual RECLAIM Audit Report.

Budget and Work Program

Refer to Chapter III for the Fiscal Year 2018-2019 Budget Report.

Clean Fuels Program

2017 Annual Report

In CY 2017, the SCAQMD Clean Fuels Program executed 59 new contracts, projects or studies and modified 8 continuing projects adding dollars toward research, development, demonstration and deployment (RDD&D) projects as well as technology assessment and transfer of alternative fuel and clean fuel technologies. An additional 8 revenue agreements totaling $14.3 million were also executed. The SCAQMD Clean Fuels Program contributed nearly $17.9 million in partnership with other governmental organizations, private industry, academia and research institutes, and interested parties, with total project costs of more than $118.7 million. The $17.9 million includes $6.2 million recognized into the Clean Fuels Fund as pass-through funds from project partners to facilitate project administration by the Clean Fuels Program. In addition, in CY 2017, the Clean Fuels Program continued to leverage other outside funding opportunities, securing new awards totaling $20.5 million from federal, state and local funding opportunities. Similar to the prior year, the significant project scope of a few key contracts executed in 2017 resulted in higher than average leveraging of Clean Fuels dollars. Typical leveraging is $3-$4 for every $1 in Clean Fuels funding. In 2016, leveraging was $1:$9; in 2017, SCAQMD continued this upward trend with more than $6 leveraged for every $1 in Clean Fuels funds. Leveraging dollars and aggressively pursuing funding opportunities are more important than ever given the magnitude of additional funding identified in the 2016 AQMP to achieve federal ozone air quality standards.

The projects or studies executed in 2017 included a diverse mix of advanced technologies. The following core areas of technology advancement for 2017 executed contracts (in order of funding percentage) include:

1. Electric and Hybrid Vehicle Technologies and Related Infrastructure (emphasizing electric and hybrid electric trucks and container transport technologies with zero emission operations);

2. Fuels and Emission Studies;
3. Engine Systems/Technologies (emphasizing alternative and renewable fuels for truck and rail applications);
4. Hydrogen and Mobile Fuel Cell Technologies and Infrastructure;
5. Technology Assessment and Transfer/Outreach; and
6. Fueling Infrastructure and Deployment (predominantly natural gas and renewable fuels).

During CY 2017, the SCAQMD supported a variety of projects and technologies, ranging from near- term to long-term RDD&D activities. This "technology portfolio" strategy provides the SCAQMD the ability and flexibility to leverage state and federal funding while also addressing the specific needs of the South Coast Air Basin (Basin). Projects included significant electric and hybrid electric technologies and infrastructure to develop and demonstrate medium- and heavy-duty vehicles in support of transitioning to a zero and near-zero emissions goods movement industry; fuels and emissions studies to conduct in-use testing and fuel characterization and usage profiles as well as evaluating strategies for reducing emissions in the goods movement sector; development, demonstration and deployment of large displacement natural gas engines; and continued demonstration and deployment of electric charging infrastructure; and natural gas and renewable natural gas deployment and support.

In addition to the 67 executed contracts and projects, 19 RDD&D projects or studies and 24 technology assessment and transfer contracts were completed in 2017. As of January 1, 2018, there were 94 open contracts in the Clean Fuels Program.

In accordance with California Health and Safety Code Section 40448.5.1(d), this annual report must be submitted to the state legislature by March 31, 2018, after approval by the SCAQMD Governing Board.

2018 Plan Update

Every year, staff re-evaluates the Clean Fuels Program to develop a Plan Update based on a reassessment of the technology progress and direction for the agency. The Program continually seeks to support the development and deployment of lower-emitting technologies. The design and implementation of the Program Plan must balance the needs in the various technology sectors with technology readiness, emissions reduction potential and cofunding opportunities. As the state has turned a great deal of its attention to climate change and petroleum reduction goals, the SCAQMD has necessarily remained committed to developing, demonstrating and commercializing technologies that reduce criteria pollutants, specifically NOx. Fortunately many, if not the majority, of these technologies that address the Basin's need for NOx reductions also garner reductions in greenhouse gases (GHG) and petroleum use. Due to these "co-benefits," the SCAQMD has been successful in partnering with the state, which allows the Clean Fuels Program to leverage its funding extensively.

To identify technology and project opportunities where funding can make a significant difference in deploying progressively cleaner technologies in the Basin, the SCAQMD

employs a number of outreach and networking activities. These activities range from close involvement with state and federal collaboratives, partnerships and industrial coalitions, to the issuance of Program Opportunity Notices to solicit project ideas and concepts as well as issuance of Requests for Information (RFI) to determine the state of various technologies and the development and commercialization challenges faced by those technologies. For example, in 2016, an RFI was released to solicit information from diesel engine manufacturers and other entities to identify ultra-low NOx emission technology strategies that will result in commercially viable diesel engine technologies, capable of using renewable diesel for on-road heavy-duty vehicles such that they can achieve emission levels 90% below the current 2010 emission standards for NOx and reduce PM emissions to the greatest extent possible. Subsequently, in partnership with CARB and the Port of Los Angeles, staff initiated a project with Southwest Research Institute to develop advanced control systems to lower emissions from large displacement diesel engines, including under low-load and low-temperature conditions. Potential follow-up development, demonstration and certification projects resulting from this RFI are included conceptually within the Draft 2018 Plan Update.

The Plan Update includes projects to develop, demonstrate and commercialize a variety of technologies, from near-term to long-term commercialization, that are intended to provide solutions to the emission control needs identified in the 2016 AQMP. Given the need for significant reductions over the next five to ten years, near-zero and zero emission technologies are emphasized. Areas of focus include:

- reducing emissions from port-related activities, such as cargo handling equipment and container movement technologies, including demonstration and deployment of cargo container movement systems with zero emission range;
- developing and demonstrating ultra-low emission liquid fuel larger displacement engines and zero emission heavy-duty vehicles;
- developing, demonstrating and deploying advanced natural gas engines and zero emission technologies for high horsepower applications;
- mitigating criteria pollutant increases from renewable fuels, such as renewable natural gas, diesel and hydrogen as well as other renewable fuels and waste streams;
- developing and demonstrating electric-drive (fuel cell, battery, plug-in hybrid and hybrid) technologies across light-, medium- and heavy-duty platforms;
- producing transportation fuels and energy from renewable and waste stream sources; and
- establishing large-scale hydrogen refueling and EV charging infrastructures to help accelerate the introduction zero emission vehicles into the market.

These potential projects for 2018 total $16.7 million, with anticipated leveraging of more than $4 for every $1 of Clean Fuels funding for total project costs of nearly $70 million. Some of the proposed projects may also be funded by revenue sources other than the Clean Fuels Program, especially Volatile Organic Compounds (VOCs) and incentive projects.

CHAPTER I
RULE DEVELOPMENT, CEQA, and SOCIOECONOMIC IMPACT ANALYSES

RULE ADOPTIONS AND AMENDMENTS IN 2017 AND CEQA ALTERNATIVES

This section contains a summary of each major rule adoption or amendment adopted by the SCAQMD Governing Board in the preceding calendar year (e.g., 2017). Each summary contains detailed information about the estimated emission reductions, cost effectiveness, alternatives considered pursuant to the requirements in the California Environmental Quality Act (CEQA), socioeconomic impacts, and sources of funding.

Projects undertaken by public agencies are subject to CEQA, so rules and regulations promulgated by SCAQMD must be reviewed to determine if they are considered to be a "project" as defined by CEQA. If they are not a "project" or they are determined to be exempt from CEQA, no further action is required. If the project has the potential to create significant or less than significant adverse effects on the environment, then an environmental analysis is necessary. New rules or existing rules being amended often require a comprehensive CEQA document that contains an environmental impact analysis which includes the following:

- identification of potentially significant adverse environmental impacts evaluated based on environmental checklist topics;
- identification of feasible measures, if any, to mitigate significant adverse environmental impacts to the greatest extent feasible;
- if necessary, a discussion and comparison of the relative merits of feasible project alternatives that generally achieve the goals of the project, but may generate fewer or less severe adverse environmental impacts; and,
- identification of environmental topics not significantly adversely affected by the project.

If it is concluded in the CEQA document that no significant adverse environmental impacts would be generated by the proposed project, neither the identification of feasible mitigation measures nor an analysis of CEQA alternatives to the project is required. If significant adverse environmental impacts are identified, feasible mitigation measures, if any, and alternatives must be identified and an analysis of the relative merits of each alternative is required.

SCAQMD operates under a regulatory program certified by the Secretary for Resources pursuant to Public Resources Code (PRC) Section 21080.5. Certification means that the SCAQMD can incorporate its environmental analyses into CEQA documents other than environmental impact reports (EIRs), negative declarations (NDs), or mitigated NDs (MNDs). In addition, certified CEQA programs are not subject to a limited number of specific CEQA requirements identified in PRC Section 21080.5. All documents prepared by SCAQMD under its certified regulatory program are called Environmental Assessments (EAs). SCAQMD rules and regulations are subject to SCAQMD's certified CEQA program, while plans (e.g., AQMP) are not. In addition, Supplemental EAs, Addenda, and EAs for projects determined not to have significant environmental impacts often contain a more focused analysis of potential environmental impacts.

The following section lists all new and amended rules adopted by the Governing Board in 2017 by month. The type of CEQA document (including projects exempt from CEQA) is described for each new rule or rule amendment project. Alternatives are summarized only for those projects requiring an alternatives analysis pursuant to CEQA.

JANUARY 6, 2017
No rules were adopted or amended in January.

FEBRUARY 3, 2017
No rules were adopted or amended in February.

MARCH 3, 2017
One rule and one plan was adopted in March, as follows:

1. **Adopted Rule 1430 – Control of Emissions From Metal Grinding Operations at Metal Forging Facilities:** Rule 1430 was adopted to reduce particulate matter and toxic emissions and help to reduce odors from metal grinding and cutting operations at forging facilities. Prior to the adoption of Rule 1430, metal grinding and cutting operations were exempt from SCAQMD permits. Based on monitoring, sampling, and site visits, metal grinding at forging facilities was identified as a substantial source of metal particulate emissions, some of which are also toxic air contaminants. Under Rule 1430, forging facilities are: 1) prohibited from conducting grinding and cutting operations in the open air; 2) required to vent metal grinding and cutting operations to emission control devices that meet specified emission standard levels; 3) required to conduct metal grinding and cutting operations in a building enclosure to reduce fugitive emissions; and 4) required to implement a series of housekeeping measures to further minimize fugitive emissions. A Final EA was prepared for the project and the analysis concluded that there would be no significant adverse environmental impacts. Since no significant adverse environmental impacts were identified, no alternatives analysis and no mitigation measures were required by CEQA. Mitigation measures were not made a condition of the approval of this project and a Mitigation Monitoring and Reporting Plan under Public Resources Code Section 21081.6 and CEQA Guidelines Section 15097 was not adopted for this project. Findings, pursuant to CEQA Guidelines Section 15091, and a Statement of Overriding Considerations, pursuant to Public Resources Code Section 21081.6 and CEQA Guidelines Section 15093, were not adopted for this project. The SCAQMD Governing Board certified the Final EA and approved the project.

   Estimated Emission Reductions: Emission reductions in metal toxic air contaminants in hexavalent chromium, nickel, cadmium, and arsenic are expected, but were not quantified. *Cost Effectiveness*: Not applicable. *CEQA Alternatives*: None, not required. *Socioeconomic Impact*: See Socioeconomic Impact Analysis section. *Source(s) of Funding*: Emission Fees, and Annual Operating Fees.

2. **Adopted the 2016 Air Quality Management Plan (AQMP):** The 2016 AQMP identified control measures and strategies to bring the region into attainment with the revoked 1997 8-hour National Ambient Air Quality Standard (standard) (80 ppb) for ozone by 2024; the 2008 8-hour ozone standard (75 ppb) by 2032; the 2012 annual

PM2.5 standard (12 µg/m^3) by 2025; the 2006 24-hour PM2.5 standard (35 µg/m^3) by 2019; and the revoked 1979 1-hour ozone standard (120 ppb) by 2023. The 2016 AQMP Control Strategy consists of three components: 1) the SCAQMD's Stationary, Area, and Mobile Source Control Measures; 2) State and Federal Control Measures provided by the California Air Resources Board; and 3) Regional Transportation Strategy and Control Measures provided by the Southern California Association of Governments. The 2016 AQMP includes emission inventories and control measures for stationary, area and mobile sources, the most current air quality setting, updated growth projections, new modeling techniques, demonstrations of compliance with state and federal Clean Air Act requirements, and an implementation schedule for adoption of the proposed control strategy.

A Final Program Environmental Impact Report was prepared for the project which identified potential adverse impacts that may result from implementing the project for the following environmental topic areas: 1) aesthetics; 2) air quality and greenhouse gases (GHGs); 3) energy; 4) hazards and hazardous materials; 5) hydrology and water quality; 6) noise; 7) solid and hazardous waste; and 8) transportation and traffic. The analysis concluded that significant and unavoidable adverse environmental impacts from the project are expected to occur after implementing mitigation measures for the following environmental topic areas: 1) aesthetics from increased glare and from the construction and operation of catenary lines and use of bonnet technology for ships; 2) construction air quality and GHGs; 3) energy (due to increased electricity demand); 4) hazards and hazardous materials due to: (a) increased flammability of solvents; (b) storage, accidental release and transportation of ammonia; (c) storage and transportation of liquefied natural gas (LNG); and (d) proximity to schools; 5) hydrology (water demand); 6) construction noise and vibration; 7) solid construction waste and operational waste from vehicle and equipment scrapping; and, 8) transportation and traffic during construction and during operation on roadways with catenary lines and at the harbors. Since significant adverse environmental impacts were identified, an alternatives analysis was required by CEQA and prepared that included the following alternatives:

Alternative 1 - No Project Alternative: The project (e.g., adopting the 2016 AQMP) would not be occur. The net effect of not adopting the 2016 AQMP would be a continuation of the 2012 AQMP and the 2007 AQMP. SCAQMD continues to implement the 2012 AQMP, which received a limited approval and limited disapproval by U.S. EPA on April 14, 2016. For the control measures adopted by the SCAQMD over this period, 11.7 tons per day of PM2.5 reductions was achieved by 2014 and 2.4 tons per day of VOC reductions and 19.5 tons per day of NOx reductions will be achieved by 2023. Only a portion of the control measures that have been implemented since 2012 and the ones for which further evaluation is underway would be in effect. The No Project Alternative assumes that these control measures would still be implemented.

SCAQMD and CARB achieved their 2007 AQMP short-term emission reduction targets. Therefore, the 2007 AQMP does not contain any remaining short-term stationary source or mobile source control measures to be adopted. All remaining necessary emission reductions to demonstrate attainment from implementing the 2007

AQMP would be obtained through implementing the federal Clean Air Act (CAA) Section 182(e)(5) measures, which are also referred to as "black box" measures.

Alternative 2 – Mobile Source Reduction Only: Under Alternative 2, no SCAQMD stationary source control measures would be implemented. Only CARB's mobile source and consumer product control measures and the SCAQMD's localized mobile source strategy would be implemented. In order to be a viable alternative to be considered, the shortfall of NOx emission reductions needed to demonstrate attainment the ozone standards would need to be classified as CAA Section 182(e)(5) measures. Attainment of the 2012 annual PM2.5 standards, similar to the conclusions in the 2016 AQMP, would be achieved with implementation of the ozone strategy.

Alternative 3 – CARB or SCAQMD Regulation Only: The 2016 AQMP includes a control strategy constructed from traditional regulatory control measures, co-benefit measures and incentive-based measures that will require adopted guidelines and secured funding, along with federal enforceable commitments pursuant to U.S. EPA. Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. By removing the emission reductions from the incentive-based measures, attainment of the standards is at risk. Alternative 3 would propose the following additional control measures to assist in making up the remaining emission reductions necessary to demonstration attainment of the ozone standards.

- Zero or near-zero emitting space heating technologies in new construction, home additions, and multi-family housing
- Establish a Port backstop rule with commitments to meet certain air pollution reduction milestones
- Adopt new and update existing fleet rules from light duty vehicles to heavy-duty equipment requiring zero emission vehicles or technologies
- Ensure zero emission lawn and garden equipment at new developments
- Develop indirect source rule to control pollution from warehouse operations
- Require solar energy technology in new construction and major remodels

If the emission reductions from the additional proposed control strategies are determined to not be enough to demonstrate attainment the ozone standards, the remaining NOx emission reductions would be classified as CAA Section 182(e)(5) measures. Some of the proposed control measures under Alternative 3 would be implemented through regulation by the SCAQMD while others would be implemented through regulation by CARB.

Alternative 4 – Expanded Incentive Funding: Alternative 4 would expand the incentive funding programs to increase the penetration of cleaner vehicles and technologies, allowing for more emission reductions and possibly earlier attainment of ambient air quality standards. Depending on the method of funding, current

incentive costs are in the range of 4.25 to 15.8 billion dollars. Under this alternative it would be assumed that additional incentive funding sources would be found. This alternative has the opportunity to provide for more emission reductions and ease the need for additional regulatory action. However, the attainment goals would still need to be achieved as expeditiously as practicable.

The Final Program Environmental Impact Report concluded that the project would have significant and unavoidable adverse environmental impacts even after mitigation measures were identified and applied. As such, mitigation measures were made a condition of the approval of this project and a Mitigation Monitoring and Reporting Plan under Public Resources Code Section 21081.6 and CEQA Guidelines Section 15097 was adopted for this project. Findings were made pursuant to CEQA Guidelines Section 15091. A Statement of Overriding Considerations, prepared pursuant to Public Resources Code Section 21081.6 and CEQA Guidelines Section 15093, was also adopted for this project. The SCAQMD Governing Board certified the Final Program Environmental Impact Report and approved the project.

Estimated Emission Reductions: 6.4 tons per day (tpd) VOC and 23 tpd NOx from those control measures that could be quantified. Additional emission reductions are expected, but were not quantified. *Cost Effectiveness*: Control measures for PM2.5: $15,000 - $61,500 per ton; Control measures for ozone: $800 - $53,000 per ton. *CEQA Alternatives*: Four alternatives were analyzed, alternatives described above. *Socioeconomic Impact*: See Socioeconomic Impact Analysis section. *Sources of Funding*: Area Source Fees, CARB Subvention Funding, Emission Fees, Annual Operating Fees, Transportation Fees, and Mobile Source Fees.

APRIL 7, 2017
No rules were adopted or amended in April.

MAY 5, 2017
Two rules comprised as one project were amended in May, as follows:

1. **Amended Rule 219 - Equipment Not Requiring a Written Permit Pursuant to Regulation II; and Amended Rule 222 - Filing Requirements for Specific Emission Sources Not Requiring a Written Permit Pursuant to Regulation II:** Rule 219 was amended to exempt the following equipment and/or processes from the requirement to obtain a SCAQMD permit because they emit very small levels of criteria pollutants and have minimal toxic emission profiles: engines at remote 2-way radio towers fueled with liquefied propane gas or compressed natural gas; sub-slab ventilation systems; passive carbon filter odor control of food waste slurry storage tanks; hand-held plasma-arc cutting and laser cutting equipment; separation/segregation of plastic materials for recycling without cutting, shredding, grinding, or odors; certain coffee roasting equipment; small batch breweries; and equipment used for dehydrated meat manufacturing. In addition, Rule 219 was amended to remove existing exemptions for the following equipment and/or processes because they have the potential to emit criteria pollutants at greater than de minimis levels, emit toxic air contaminants of concern, or create a nuisance: cutting of stainless steel and alloys containing toxics; portable asphalt

recycling equipment; greenwaste shredding or grinding; separation/segregation of plastic materials that involves cutting, shredding, grinding or odors; recycling of expanded polystyrene; equipment used for cleaning of diesel particulate filters; certain surface preparation tanks with toxic emissions; certain plating, stripping or anodizing tanks with toxic emissions; and paper, carpet, and fabric recycling operations. Other amendments to Rule 219 included minor clarifications and editorial corrections for food oven combustion equipment, fuel cells, charbroilers, barbeque grills and other underfired grills, VOC-containing liquid storage and transfer equipment, quench tanks for heat treating operations, pavement striping, and certain printing, coating and drying operations. Rule 222 was amended to add the following equipment to the SCAQMD Rule 222 filing program in lieu of requiring a written SCAQMD permit because they have been identified as small sources of emissions: industrial cooling towers located in a chemical plant, refinery or other industrial facility; natural gas transfer pumps and natural gas repressurization equipment; and engines registered under the statewide Portable Equipment Registration Program (PERP) used in the Outer Continental Shelf (OCS). Storage tanks of aqueous urea solutions and certain natural gas and crude oil production equipment were also exempted from Rule 219 but were included in the Rule 222 filing program. The project was determined to be exempt from CEQA and a Notice of Exemption was filed with the County Clerks of Los Angeles, Orange, Riverside and San Bernardino counties. Since the project was determined to be exempt from CEQA, no alternatives analysis was required. The SCAQMD Governing Board approved the project as proposed.

Estimated Emission Reductions: None. *Cost Effectiveness*: Not applicable. *CEQA Alternatives*: None, not required. *Socioeconomic Impact*: See Socioeconomic Impact Analysis section. *Source of Funding*: Permit Fees and Emission Fees.

JUNE 2, 2017

One regulation was amended in June, as follows:

1. **Amended Regulation III – Fees:** Amendments to Regulation III rules consisted of four components. First, pursuant to Rule 320 – Automatic Adjustment Based on Consumer Price Index for Regulation III - Fees, most fees in Rules 301, 303, 304, 304.1, 306, 307.1, 308, 309, 311, 313, 314, and 315 were updated, effective July 1, 2017 according to the increase in the Calendar Year 2016 California Consumer Price Index (CPI) of 2.5 percent. Second, Rules 301 and 306 were amended to increase the Title V Annual Operating Permit Renewal and Permit Processing Fees by an additional increment of 16 percent above the CPI for each of the next two fiscal years (FYs) in response to the U.S. EPA Title V Operating Permit Program Evaluation Report recommendation to more fully recover Title V program costs. Third, Rules 301, 306, and 309 were amended to increase the Annual Operating Permit Renewal, Permit Processing and Plan Fees for non-Title V facilities by a further additional increment of four percent above the CPI for each of the next two FYs in order to better align program costs with revenues. Fourth, various administrative amendments with no fee impacts were made to Rules 301, 306, 308, and 314. The project was determined to be exempt from CEQA and a Notice of Exemption was filed with the County Clerks of Los Angeles, Orange, Riverside and San Bernardino counties. Since the project was determined to be exempt from CEQA, no alternatives

analysis was required. The SCAQMD Governing Board approved the project as proposed.

Estimated Emission Reductions: None. *Cost Effectiveness*: Not applicable. *CEQA Alternatives*: None, not required. *Socioeconomic Impact*: See Socioeconomic Impact Analysis section. *Source of Funding*: Permit Fees and Emission Fees.

JULY 7, 2017

One rule was adopted and two rules were amended in July, as follows:

1. **Adopted Rule 1466 - Control of Particulate Emissions from Soils with Toxic Air Contaminants:** Rule 1466 was adopted to establish requirements to minimize offsite fugitive particulate matter (PM10) emissions that contain certain toxic air contaminants (TACs) from earth-moving activities at sites within SCAQMD jurisdiction that have been designated by the United States Environmental Protection Agency (U.S. EPA), the California Department of Toxic Substances Control (DTSC), the California Environmental Protection Agency's (CalEPA's) State Water Resources Control Board or Regional Water Quality Control Board. Rule 1466 requirements would also apply to any site conducting earth-moving activities of soil containing certain toxic air contaminants that is identified by the SCAQMD's Executive Officer. Rule 1466 established a PM10 ambient dust limit and dust control measures at Rule 1466 applicable sites, and would require notification to the Executive Officer when earthmoving operations begin or PM10 emission limits are not met. Rule 1466 applicable sites will be required to install and maintain signage to inform the community and discourage unauthorized access. Rule 1466 also includes additional requirements to limit earthmoving activities for sites at schools and early education centers during certain hours when children are present. In situations where additional regulatory flexibility is necessary, Rule 1466 allows alternative dust control measures if approved by the Executive Officer. A Final EA was prepared for the project and the analysis concluded that there would be no significant adverse environmental impacts. Since no significant adverse environmental impacts were identified, no alternatives analysis and no mitigation measures were required by CEQA. Mitigation measures were not made a condition of the approval of this project and a Mitigation Monitoring and Reporting Plan under Public Resources Code Section 21081.6 and CEQA Guidelines Section 15097 was not adopted for this project. Findings, pursuant to CEQA Guidelines Section 15091, and a Statement of Overriding Considerations, pursuant to Public Resources Code Section 21081.6 and CEQA Guidelines Section 15093, were not adopted for this project. The SCAQMD Governing Board certified the Final EA and approved the project.

   Estimated Emission Reductions: Implementation of Rule 1466 will reduce the exposure to certain toxic air contaminants during earthmoving activities. Emission reductions of specific toxic air contaminants could not be quantified. *Cost Effectiveness*: Not applicable. *CEQA Alternatives*: None, not required. *Socioeconomic Impact*: See Socioeconomic Impact Analysis section. *Source(s) of Funding*: Emission Fees, and Annual Operating Fees.

2. **Amended Rule 1118 – Control of Emissions From Refinery Flares:** Rule 1118 was amended to: 1) harmonize Rule 1118 with key updates from US EPA's recent Refinery Sector Rule update regarding flares, including new prohibitions on some types of flaring; 2) require facilities subject to Rule 1118 to prepare a Scoping Document that evaluates the feasibility of minimizing or avoiding planned and unplanned flaring events; 3) remove the $4 million annual cap on mitigation fees that facilities may pay for flaring; 4) update emission factors based on US EPA's updated AP-42 guidance; and 5) update and clarify reporting requirements for facilities. In addition, SCAQMD staff is proposing to allocate up to $100,000 from the Rule 1118 Mitigation Fund to upgrade the web-based Flare Event Notification System. The project was determined to be exempt from CEQA and a Notice of Exemption was filed with the County Clerks of Los Angeles, Orange, Riverside and San Bernardino counties. Since the project was determined to be exempt from CEQA, no alternatives analysis was required. The SCAQMD Governing Board approved the project as proposed.

   Estimated Emission Reductions: Emission reductions were not quantified, but removing the mitigation fee cap is expected to provide a stronger incentive to minimize flaring for those facilities that have exceeded the annual mitigation fee cap in the past. *Cost Effectiveness*: Not applicable. *CEQA Alternatives*: None, not required. *Socioeconomic Impact*: See Socioeconomic Impact Analysis section. *Source(s) of Funding*: Emission Fees, and Annual Operating Fees.

3. **Amended Rule 1147 – NOx Reductions from Miscellaneous Sources:** Rule 1147 was amended to resolve compliance issues that have been raised by stakeholders by: 1) removing the requirement to comply with the NOx emission limit for units with a heat input rating of less than 325,000 British Thermal Units per hour; 2) changing the NOx emission limit for low temperature afterburners, burn-off ovens, incinerators, and related equipment from 30 ppm to 60 ppm; 3) changing the compliance date for small in-use units with NOx emissions of one pound per day or less from a schedule based on a 20-year lifetime to a 35-year lifetime or until the units are replaced or retrofit; 4) changing the compliance date for existing in-use heated process tanks and pressure washers from a schedule based on a 15-year to 20-year lifetime to when the units are replaced or retrofit; 5) adding a testing exemption for ultra-low NOx infrared burners; 6) providing compliance flexibility for low emission units by clarifying options for demonstrating emissions less than one pound per day; 7) adding an exemption for units with NOx emission less than one pound per day when a company relocates a facility and remains under the same ownership; 8) adding an exemption for units that become subject to Rule 1147 upon amendment of Rule 219 on or after May 5, 2017, until the unit is replaced; 9) adding flexibility for demonstrating compliance with emission limits by including an alternative compliance demonstration option based on a manufacturer's performance guarantee; 10) clarifying an exemption for food ovens; and 11) clarifying an exemption for flare type systems. Other minor changes were also made for clarity and consistency throughout the rule. Rule 1147 was estimated to result in NOx emission reductions foregone of up to 0.9 ton per day in 2017. However, while most of the estimated NOx emission reductions foregone will be eventually recaptured because the existing units will be regularly replaced and upgraded over time, approximately 0.03 ton per day of the NOx emission reductions foregone will be permanent. A Final Subsequent EA was prepared

for the project and the analysis concluded that the project would have significant unavoidable air quality impacts during operation because the quantity of emission reductions foregone would exceed the SCAQMD's significance operational threshold for NOx. Without available compliant technology for the affected equipment, the originally projected NOx emission reductions cannot be achieved and no mitigation measures were identified that would eliminate or reduce the significant NOx emissions foregone to less than significant levels. Because no mitigation measures have been identified that would reduce the significant adverse impacts to less than significant levels, mitigation measures were not made a condition of approval of this project. Thus, a Mitigation Monitoring and Reporting Plan under Public Resources Code Section 21081.6 and CEQA Guidelines Section 15097 was not required or adopted for this project. Findings were made pursuant to CEQA Guidelines Section 15091. A Statement of Overriding Considerations, prepared pursuant to Public Resources Code Section 21081.6 and CEQA Guidelines Section 15093, was also adopted for this project.

Since significant adverse environmental impacts were identified, an alternatives analysis was required by CEQA and prepared that included the following alternatives:

Alternative A - No Project: Alternative A, the no project alternative, means that the current version of Rule 1147 that was amended in September 2011 would remain in effect. Under the September 2011 version of Rule 1147, spray booths and small fryers, heated process tanks, evaporators, ovens, dryers, furnaces, afterburners and related devices with emissions less than one pound per day would have to comply with the applicable NOx emission limits from 2017 to 2034. Compliance with these NOx limits would result in NOx emission reductions occurring from 2017 through 2034. Under this alternative, however, suppliers cannot provide equipment that meets the applicable NOx emission limits for source small number of equipment and process types, creating potential compliance issues for some affected facilities, and likely resulting in the originally projected NOx emission reductions not being achieved.

Alternative B - More Stringent Alternative (25 Years Age Requirement): Under Alternative B, the age requirement of 25 years is more stringent than the 30 years that is provided in the project. Spray booths and small fryers, heated process tanks, evaporators, ovens, dryers, furnaces, afterburners and related devices with emissions less than one pound per day would have to comply with emission limit starting in 2017. Recovery of the NOx emission reductions foregone are expected to occur starting in 2017 as older equipment gets replaced or retrofitted over time. The NOx emission reductions foregone are expected to be recovered each year based on approximately 0.9 ton per day from compliance year 2017 to 2039.

Alternative C - Less Stringent Alternative (No Age Requirement, Exempt Pressure Washers and Less Than 325,000 BTU/hour Units): Under Alternative C, there is no age requirement. However, the expected equipment life is 35 years which is less stringent than the 30 years age requirement in the project. Spray booths and small fryers, heated process tanks, evaporators, ovens, dryers, furnaces, afterburners and related devices with emissions less than one pound per day are expected to

comply with applicable NOx emission limits over the time period of 35 years starting in 2017. Recovery of the NOx emission reductions foregone are expected to occur starting in 2017 as older equipment gets replaced or retrofitted over time. Most NOx emission reductions foregone are expected to be recovered each year based on approximately 0.9 ton/day from compliance year 2017 to 2049.

Further, the total additional permanent NOx emission reductions foregone is estimated to be 36 pounds per day from exempting a small number of pressure washers (estimated to be about 10 new units) plus 49 pounds per day from exempting all units (regardless of temperature) with burners less than 325,000 BTU/hour (estimated to be less than 82 new units) when compared to the project.

Alternative D - Least Stringent Alternative (Up To 0.9 ton/day Emission Reductions Foregone, No Age Requirement, Exempt Pressure Washers and Less Than 325,000 BTU/hour Units): Under Alternative D, there is no age requirement and no emission limit requirement. Spray booths and small fryers, heated process tanks, evaporators, ovens, dryers, furnaces, afterburners and related devices with emissions less than one pound per day would not have to comply with any of the applicable NOx emission limits. Under Alternative D, the NOx emission reductions foregone are not expected to be recovered unless the affected equipment units are replaced or retrofitted due to a failure to demonstrate that the affected unit can achieve NOx emissions at the level less than one pound per day. All of the 0.9 ton per day of NOx emission reductions foregone will be permanently foregone under Alternative D.

The SCAQMD Governing Board certified the Final Subsequent EA and approved the project.

Estimated Emission Reductions: 0.9 tpd NOx foregone by 2017 (This amendment delayed a compliance date, so these values represent emission reductions foregone for a previous compliance date). *Cost Effectiveness*: Not applicable. *CEQA Alternatives*: Four alternatives were analyzed, alternatives described above. *Socioeconomic Impact*: None, because this amendment does not result in any additional cost or other socioeconomic impact. *Source of Funding*: Emission Fees, and Annual Operating Fees.

AUGUST 2017

There was no Governing Board meeting in August, so no rules were adopted or amended.

SEPTEMBER 1, 2017

One rule was amended in September, as follows:

1. **Amended Rule 1401 – New Source Review of Toxic Air Contaminants:** Rule 1401 was amended to: remove the exemption of spray booths and gasoline dispensing facilities and require them to begin using the SCAQMD Risk Assessment Procedures (Version 8.1), which incorporates: 1) 2015 Office of Environmental Health Hazard Assessment (OEHHA) Guidelines; 2) revised gasoline dispensing emission factors and speciation profiles; and 3) current air dispersion model (AERMOD) and updated

meteorological data. Additionally, the amendments to Rule 1401 updated the list of toxic air contaminants in Table I of Rule 1401 to be consistent with the current list used by OEHHA. The project was determined to be exempt from CEQA and a Notice of Exemption was filed with the County Clerks of Los Angeles, Orange, Riverside and San Bernardino counties. Since the project was determined to be exempt from CEQA, no alternatives analysis was required. The SCAQMD Governing Board approved the project as proposed.

Estimated Emission Reductions: None. *Cost Effectiveness*: Not applicable. *CEQA Alternatives*: None, not required. *Socioeconomic Impact*: See Socioeconomic Impact Analysis section. *Source(s) of Funding*: Permit Fees, Emission Fees, and Annual Operating Fees.

OCTOBER 6, 2017

One rule was amended in October, as follows:

1. **Amended Rule 1168 - Adhesive and Sealant Applications:** Rule 1168 was amended to reduce emissions of VOCs, toxic air contaminants, and stratospheric ozone-depleting compounds from adhesives, adhesive primers, sealants, and sealant primers. The amendments to Rule 1168 clarified the applicability; revised, deleted, and added various definitions; lowered the VOC limits for certain categories and allowed a three-year sell-through and use-through; added new product categories with corresponding VOC content limits; required products marketed for use under varying categories to be subject to the lowest VOC limit; prohibited the storage of non-compliant products, unless for shipment outside of the SCAQMD; added test methods for analyzing VOC content; added labeling requirements; included reporting requirements for manufacturers, private labelers, big box retailers, distribution centers, and facilities that use a 55 gallon per year exemption; prohibited the use of Rule 102 Group II exempt solvents, except volatile methyl siloxanes; included a technology assessment for certain product categories; removed, modified, or added various exemptions. Rule 1168 was estimated to result in approximately 1.38 tons per day of VOC emission reductions. A Final EA was prepared and the analysis concluded that there would be no significant adverse environmental impacts. Since no significant adverse environmental impacts were identified, no alternatives analysis was required by CEQA and no mitigation measures were required by CEQA. Mitigation measures were not made a condition of the approval of this project and a Mitigation Monitoring and Reporting Plan under Public Resources Code Section 21081.6 and CEQA Guidelines Section 15097 was not adopted for this project. Findings, pursuant to CEQA Guidelines Section 15091, and a Statement of Overriding Considerations, pursuant to Public Resources Code Section 21081.6 and CEQA Guidelines Section 15093, were not adopted for this project. The SCAQMD Governing Board certified the Final EA and approved the project.

   The SCAQMD Governing Board certified the Final EA and approved the project as proposed.

   Estimated Emission Reductions: 1.38 tpd VOC by 2023. *Cost Effectiveness*: $12,400 per ton of VOC reduced. *CEQA Alternatives*: None, not required. *Socioeconomic*

Impact: See Socioeconomic Impact Analysis section. *Source(s) of Funding*: Emission Fees.

NOVEMBER 3, 2017

One rule was adopted in November, as follows:

1. **Adopted Rule 415 - Odors from Rendering Facilities:** Rule 415 was adopted to reduce odors from facilities conducting rendering operations. New Rule 415 was the result of an issue that was identified by the working group for the Clean Communities Plan (CCP) in the pilot study area of Boyle Heights. The prevalence of odors from rendering facilities in Vernon, directly south of Boyle Heights, was of great concern to the working group. Rule 415 requires existing rendering facilities to enclose certain rendering operations, install odor emission control equipment for the enclosures or use alternative standards for a permanent total enclosure for raw material receiving area, and carry out best management practices (BMPs). A Final EA was prepared and the analysis concluded that there would be no significant adverse environmental impacts. Since no significant adverse environmental impacts were identified, no alternatives analysis was required by CEQA and no mitigation measures were required by CEQA. Mitigation measures were not made a condition of the approval of this project and a Mitigation Monitoring and Reporting Plan under Public Resources Code Section 21081.6 and CEQA Guidelines Section 15097 was not adopted for this project. Findings, pursuant to CEQA Guidelines Section 15091, and a Statement of Overriding Considerations, pursuant to Public Resources Code Section 21081.6 and CEQA Guidelines Section 15093, were not adopted for this project. The SCAQMD Governing Board certified the Final EA and approved the project as proposed.

   Estimated Emission Reductions: Implementation is expected to reduce odors from rendering facilities, but odors cannot be quantified. *Cost Effectiveness*: Not applicable. *CEQA Alternatives*: None, not required. *Socioeconomic Impact*: See Socioeconomic Impact Analysis section. . *Source of Funding*: Permit Fees, Emission Fees, and Annual Operating Fees.

DECEMBER 1, 2017

One rule was adopted and two rules were amended in December, as follows:

1. **Adopted Rule 1180 – Refinery Fenceline and Community Air Monitoring and Rule 1180 Refinery Fenceline Air Monitoring Plan Guidelines (Guidelines):** Rule 1180 and the accompanying Guidelines were adopted to implement Health and Safety Code Section 42705.6 by requiring petroleum refineries to collect continuous data of refinery air pollutant emissions, at or near their property boundaries, and to provide that data as quickly as possible to the public. In particular, Rule 1180 contains requirements for petroleum refineries to install and operate continuous, fenceline air monitoring systems to monitor a comprehensive list of criteria pollutants and toxic air contaminants in real-time. Rule 1180 also establishes a fee schedule, to be paid by the petroleum refineries, for the cost of designing, developing, installing, operating and maintaining refinery-related community air monitoring systems. Rule 1180 exempts petroleum refineries that have a maximum capacity to process less than 40,000 barrels per day of crude oil. The project

was determined to be exempt from CEQA and a Notice of Exemption was filed with the County Clerks of Los Angeles, Orange, Riverside and San Bernardino counties. Since the project was determined to be exempt from CEQA, no alternatives analysis was required. The SCAQMD Governing Board approved the project as proposed.

Estimated Emission Reductions: None. *Cost Effectiveness*: Not applicable. *CEQA Alternatives*: None, not required. *Socioeconomic Impact*: See Socioeconomic Impact Analysis section. *Source(s) of Funding*: Emission Fees, and Annual Operating Fees.

2. **Amended Rule 1466 - Control of Particulate Emissions from Soils with Toxic Air Contaminants:** Rule 1466 was amended to address the Governing Board's Resolution directing staff to expand the list of applicable toxic air contaminants. The amendments to Rule 1466: 1) expanded the list of applicable toxic air contaminants to include pesticides, herbicides, and persistent bio-accumulative toxics; 2) expanded applicability to other government designated sites; and 3) included language to clarify existing provisions. The sites that may be affected by Rule 1466 have been designated as cleanup sites on lists compiled by the United States Environmental Protection Agency, the California Department of Toxic Substances Control (DTSC), the California Environmental Protection Agency's State Water Resources Control Board or Regional Water Quality Control Board, and other county, local, or state regulatory agencies. A Final Subsequent EA was prepared for the project and the analysis concluded that there would be no significant adverse environmental impacts. Since no significant adverse environmental impacts were identified, no alternatives analysis was required by CEQA and no mitigation measures were required by CEQA. Mitigation measures were not made a condition of the approval of this project and a Mitigation Monitoring and Reporting Plan under Public Resources Code Section 21081.6 and CEQA Guidelines Section 15097 was not adopted for this project. Findings, pursuant to CEQA Guidelines Section 15091, and a Statement of Overriding Considerations, pursuant to Public Resources Code Section 21081.6 and CEQA Guidelines Section 15093, were not adopted for this project. The SCAQMD Governing Board certified the Final EA and approved the project as proposed

   Estimated Emission Reductions: Implementation of Rule 1466 will reduce the exposure to the additional toxic air contaminants added during this amendment for earthmoving activities. Emission reductions of specific toxic air contaminants could not be quantified. *Cost Effectiveness*: Not applicable. *CEQA Alternatives*: None, not required. *Socioeconomic Impact*: See Socioeconomic Impact Analysis section. *Source(s) of Funding*: Emission Fees.

3. **Amended Rule 1420 – Emissions Standard for Lead:** Rule 1420 was amended to reduce public health impacts from point and fugitive lead emissions from metal melting or lead processing facilities by reducing the exposure to lead, and to ensure and maintain attainment of the National Ambient Air Quality Standard (NAAQS) for lead within the South Coast Air Basin. The amendments to Rule 1420 include an initial ambient air lead concentration limit of 0.150 micrograms per cubic meter ($\mu g/m^3$) averaged over 30 consecutive days and will be lowered to a final limit of 0.100 $\mu g/m^3$ by January 1, 2021. The amendments to Rule 1420 also added new requirements for point source lead

emission controls, along with periodic source testing, emission control device monitoring, conditional ambient air monitoring, and reporting and recordkeeping requirements to ensure continuous compliance. To prevent fugitive lead emissions, Rule 1420 also added new requirements to conduct housekeeping and maintenance activities and to install total enclosures in areas where lead processing operations and associated processes are being conducted. Any facility that exceeds the limits in Rule 1420 will be subject to additional mitigation requirements. A Final EA was prepared and the analysis concluded that there would be no significant adverse environmental impacts. Since no significant adverse environmental impacts were identified, no alternatives analysis was required by CEQA and no mitigation measures were required by CEQA. Mitigation measures were not made a condition of the approval of this project and a Mitigation Monitoring and Reporting Plan under Public Resources Code Section 21081.6 and CEQA Guidelines Section 15097 was not adopted for this project. Findings, pursuant to CEQA Guidelines Section 15091, and a Statement of Overriding Considerations, pursuant to Public Resources Code Section 21081.6 and CEQA Guidelines Section 15093, were not adopted for this project. The SCAQMD Governing Board certified the Final EA and approved the project.

Estimated Emission Reductions: Although emission reduction of lead point and fugitive emissions cannot be quantified, lowering the ambient concentration limit and implementing provisions in Rule 1420 will result in reductions of lead emissions and exposure to lead from Rule 1420 facilities. *Cost Effectiveness*: Not applicable. *CEQA Alternatives*: None, not required. *Socioeconomic Impact*: See Socioeconomic Impact Analysis section. *Source(s) of Funding*: Permit Fees, Emission Fees, and Annual Operating Fees.

CEQA LEAD AGENCY PROJECTS

SCAQMD also acts as the Lead Agency under CEQA for non-SCAQMD projects where SCAQMD typically has primary approval, i.e., discretionary permitting authority. Under CEQA, the Lead Agency is responsible for determining whether an EIR, ND, or other type of CEQA document is necessary for any proposal considered to be a "project" as defined by CEQA. Further, the Lead Agency is responsible for preparing the environmental analysis, complying with all procedural requirements of CEQA, and approving the environmental documents. All documents prepared by SCAQMD for permit projects are subject to the standard CEQA requirements. SCAQMD staff is responsible for preparing or reviewing prepared CEQA documents for stationary source permit projects. In 2017, three lead agency projects with corresponding CEQA documents were approved by the SCAQMD's Executive Officer, as summarized below.

1. **Addendum to the March 2007 Final Mitigated Negative Declaration for Southern California Edison: Grapeland (formerly named Etiwanda) Peaker Project, Rancho Cucamonga (project approved January 27, 2017)**
   Southern California Edison operators proposed additional changes to their project previously evaluated and adopted in the Final Mitigated Negative Declaration (MND) for

the Southern California Edison Grapeland (formerly named Etiwanda) Peaker Project in Rancho Cucamonga on March 1, 2007, herein referred to as the March 2007 Final MND. The project evaluated in the March 2007 Final MND was for the installation of a General Electric natural gas-fired turbine generator, also referred to as a "peaker" unit, plus an air pollution control system comprised of a selective catalytic reduction (SCR) unit and oxidation catalyst to reduce emissions to levels that meet or exceed all applicable local air quality emission standards. The peaker is capable of producing up to 45 megawatts (MW) of electricity on short notice during periods when the local electrical system needs power and local voltage support.

Subsequent to the adoption of the March 2007 Final MND, Southern California Edison operators proposed to modify the peaker turbine's air pollution control system to: 1) decrease the water-injection rate into the turbine's combustor by up to 42 percent; 2) replace the oxidation catalyst; 3) replace the SCR catalyst and increase the overall size of the SCR catalyst beds without increasing the size (outside dimensions) of the enclosure of the SCR air pollution control system; 4) replace the ammonia injection grid (AIG) to improve the deliverability of ammonia to the catalyst; and, 5) increase the concentration of the aqueous ammonia that is delivered to the facility, stored on-site, and injected into the SCR from 19 percent to 29 percent. In addition, to increase the operating flexibility of the peaker so that it can provide reliable power to the grid when dispatched by the California Independent System Operator (CAISO) during peak times when renewable energy resources are not available, Southern California Edison operators proposed to revise its SCAQMD Title V Operating Permit to allow the turbine to generate power over its full operating range, from less than one MW to full load, while continuing to meet the emission limits in the current permit without increasing: 1) utilization of the Grapeland Peaker for power generation; 2) fuel-input limits, generation capacity, or the heat rate of the turbine; and, 3) the potential to emit of criteria pollutants, greenhouse gases (GHGs), or toxic air contaminants (TACs).

The Addendum to the March 2007 Final MND concluded that the proposed modifications to the original project previously analyzed in the March 2007 Final MND would not create any new significant adverse environmental impacts or substantially increase the severity of significant effects previously identified. The mitigation measures that were made a condition of approval of the original project analyzed in the March 2007 Final MND and the corresponding Mitigation Monitoring and Reporting Plan that was adopted at that time will remain in effect. No new or modified mitigation measures were made a condition of the approval of this project. Findings and a Statement of Overriding Considerations were not made a condition of approval of the original project analyzed in the March 2007 Final MND since no significant adverse impacts were identified that could not be mitigated to less than significant.

2. **Addendum to the April 2007 Final Mitigated Negative Declaration for Southern California Edison: Center Peaker Project, Norwalk (project approved February 9, 2017)**

   Southern California Edison operators proposed additional changes to their project previously evaluated and adopted in the Final Mitigated Negative Declaration (MND) for the Southern California Edison Center Peaker Project in Norwalk on April 3, 2007,

herein referred to as the April 2007 Final MND. The project evaluated in the April 2007 Final MND was for the installation of a General Electric natural gas-fired turbine generator, also referred to as a "peaker" unit, plus an air pollution control system comprised of a selective catalytic reduction (SCR) unit and oxidation catalyst to reduce emissions to levels that meet or exceed all applicable local air quality emission standards. The peaker is capable of producing up to 45 MW of electricity on short notice during periods when the local electrical system needs power and local voltage support.

Subsequent to the adoption of the April 2007 Final MND, Southern California Edison operators proposed to modify the peaker turbine's air pollution control system to: 1) decrease the water-injection rate into the turbine's combustor by up to 48 percent; 2) replace the oxidation catalyst; 3) replace the SCR catalyst and increase the overall size of the SCR catalyst beds without increasing the size (outside dimensions) of the enclosure of the SCR air pollution control system; 4) replace the ammonia injection grid (AIG) to improve the deliverability of ammonia to the catalyst; and, 5) increase the concentration of the aqueous ammonia that is delivered to the facility, stored on-site, and injected into the SCR from 19 percent to 29 percent. In addition, to increase the operating flexibility of the peaker so that it can provide reliable power to the grid when dispatched by the California Independent System Operator (CAISO) during peak times when renewable energy resources are not available, Southern California Edison operators proposed to revise its SCAQMD Title V Operating Permit to allow the turbine to generate power over its full operating range, from less than one MW to full load, while continuing to meet the emission limits in the current permit without increasing: 1) utilization of the Center Peaker for power generation; 2) fuel-input limits, generation capacity, or the heat rate of the turbine; and, 3) the potential to emit of criteria pollutants, greenhouse gases (GHGs), or toxic air contaminants (TACs).

The Addendum to the April 2007 Final MND concluded that the proposed modifications to the original project previously analyzed in the April 2007 Final MND would not create any new significant adverse environmental impacts or substantially increase the severity of significant effects previously identified. The mitigation measures that were made a condition of approval of the original project analyzed in the April 2007 Final MND and the corresponding Mitigation Monitoring and Reporting Plan that was adopted at that time will remain in effect. No new or modified mitigation measures were made a condition of the approval of this project. Findings and a Statement of Overriding Considerations were not made a condition of approval of the original project analyzed in the April 2007 Final MND since no significant adverse impacts were identified that could not be mitigated to less than significant.

3. **Final Environmental Impact Report for the Tesoro Los Angeles Refinery Integration and Compliance Project (certified on May 12, 2017)**

The Tesoro Refining and Marketing Company LLC proposed the Los Angeles Refinery Integration and Compliance Project. The Final Environmental Impact Report (EIR) evaluated the proposed modifications necessary to more fully integrate the Tesoro Los Angeles Refinery - Carson and Wilmington Operations which operate as the Tesoro Los Angeles Refinery (Refinery). The Refinery includes: 1) the Wilmington Operations located at 2101 East Pacific Coast Highway in the Wilmington District of the City of Los

Angeles; and 2) the Carson Operations, which is the former BP Carson Refinery located at 2350 East 223rd Street in the City of Carson.

In addition to further Refinery integration, the project was designed to comply with the federally-mandated Tier 3 gasoline specifications and with State and local regulations mandating emission reductions. The Los Angeles Refinery Integration and Compliance Project was estimated to substantially reduce greenhouse gas (GHG), sulfur oxides (SOx), nitrogen oxides (NOx), carbon monoxide (CO), and particulate matter (PM) emissions at the Refinery by accomplishing the following: 1) reconfiguring the combined Refinery complex to enable shutting down the Fluid Catalytic Cracking Unit (FCCU) at the Wilmington Operations; 2) installing interconnecting pipelines; 3) reconfiguring the combined Refinery complex to improve the gasoline to distillate production ratio from the integrated Refinery in order to expeditiously respond and adjust to ongoing changes in market demand for various types of petroleum products; and 4) optimizing the ability to recover heat by installing new heat exchangers and modifying specified units to further minimize criteria pollutant and GHG emissions. All new and modified stationary sources with emission increases were required to comply with Best Available Control Technology (BACT) requirements in South Coast Air Quality Management District (SCAQMD) Rule 1303. Additionally, marine vessel emissions were shown to be reduced due to the construction of six new 500,000 barrel tanks at the Carson Crude Terminal and replacing two existing 80,000 barrel tanks with 300,000 barrel tanks at the Wilmington Operations.

The Final EIR concluded that the project would have significant unavoidable adverse impacts on the environment related to construction emissions on air quality and hazards and hazardous materials impacts during operation. Mitigation measures were made a condition of the approval of this project and a Mitigation Monitoring and Reporting Plan under Public Resources Code Section 21081.6 and CEQA Guidelines Section 15097 was adopted for this project. Findings were made pursuant to CEQA Guidelines Section 15091. A Statement of Overriding Considerations, prepared pursuant to Public Resources Code Section 21081.6 and CEQA Guidelines Section 15093, was also adopted for this project.

SOCIOECONOMIC IMPACT ANALYSES

California Health and Safety Code Section 40440.8 requires that SCAQMD perform socioeconomic impact assessments for its rules and regulations that will significantly affect air quality or emissions. Prior to the requirements of Section 40440.8, SCAQMD staff had been evaluating the socioeconomic impacts of its actions pursuant to a 1989 resolution of its Governing Board. Additionally, SCAQMD staff assesses socioeconomic impacts of CEQA alternatives to those rules with significant cost and emission reduction impacts.

The elements of socioeconomic impact assessments include direct effects on various types of affected industries in terms of control costs and cost effectiveness as well as public health benefits associated with Air Quality Management Plans (AQMPs). Additionally, SCAQMD staff uses an economic model developed by Regional Economic Models, Inc. (REMI) to analyze the potential direct and indirect socioeconomic impacts of SCAQMD rules on Los

Angeles, Riverside, Orange, and San Bernardino Counties. These impacts include, but are not limited to employment and competitiveness.

In 2017, four new rules were adopted, and eight rules and one regulation were amended. Out of these, nine had socioeconomic impacts. Additionally, one rule, Rule 320, did not undergo any amendments that were brought to the SCAQMD Governing Board, but because it contains a requirement for an automatic annual California Consumer Price Index (CPI) adjustment that has associated socioeconomic impacts, this rule has also been included in this summary.

Lastly, the 2016 AQMP was adopted at the March 3, 2017 Governing Board Meeting. In 2016, staff prepared a Draft Socioeconomic Assessment (along with an assessment methodology) in order to inform decision-makers and stakeholders about the potential costs and benefits of the 2016 AQMP and how the associated socioeconomic impacts would affect communities within the region. In 2017, staff prepared the Final Socioeconomic Assessment of the 2016 AQMP which included three final documents: 1) main report containing final estimates of benefits, costs, and regional economic impacts, 2) appendices, and 3) responses to comments.

Rule Adoptions and Amendments with Socioeconomic Impacts

Adopted Rule 1430 – Control of Emissions from Metal Grinding Operations at Metal Forging Facilities (March 2017)

Rule 1430 was adopted to reduce particulate matter and toxic emissions and help to reduce odors from metal grinding and cutting operations at forging facilities. Prior to the adoption of Rule 1430, metal grinding and cutting operations were exempt from SCAQMD permits. Based on monitoring, sampling, and site visits, metal grinding at forging facilities were identified as a substantial source of metal particulate emissions, some of which are also toxic air contaminants. Under Rule 1430, forging facilities are: 1) prohibited from conducting grinding and cutting operations in the open air; 2) required to vent metal grinding and cutting operations to emission control devices that meet specified emission standard levels; 3) required to conduct metal grinding and cutting operations in a building enclosure to reduce fugitive emissions; and 4) required to implement a series of housekeeping measures to further minimize fugitive emissions.

The main requirements in Rule 1430 that were concluded to have cost impacts for affected facilities were the installation of baghouses with HEPA filters (point-source controls on existing and new enclosures) and the upgrading of an existing building to a total enclosure or construction of a new total enclosure. Some facilities will be required to add negative air to a total enclosure by venting it to pollution controls depending on a facility's proximity to sensitive receptors, schools and early education schools. The annual compliance costs of Rule 1430 were estimated to range from $6.0 to $6.2 million, depending on the real interest assumed (one to four percent). Press Forge, a metal forging facility located in the City of Paramount, California, would bear the largest share of annual compliance costs (14 percent or approximately $875 K annually based on a four percent real interest) due to the

installation of a total enclosure with negative air that is necessary based on the facility's proximity to a sensitive receptor, school and early education school.

SCAQMD does not conduct a dollar per ton cost effectiveness for toxics regulations since many other factors besides the amount of pollution affects the health impacts such as the toxic potency and the location of receptors. Rule 1430 regulates toxics and as such the cost effectiveness analysis is not applicable here. Implementation of Rule 1430 is expected to result in approximately 46 jobs foregone annually between 2017 and 2035 when a four percent interest rate is assumed (approximately 44 jobs with a one percent real interest rate). The projected job impacts represent about 0.001 percent of the total employment in the four-county region.

Amended Rule 219 – Equipment Not Requiring a Written Permit Pursuant to Regulation II; and Amended Rule 222 – Filing Requirements for Specific Emission Sources Not Requiring a Written Permit Pursuant to Regulation II (May 2017)

Unless exempted under Rule 219, any affected equipment requiring a written permit is subject to a one-time permit processing fee when applying for a permit, and annual operating and flat emissions fees thereafter. Rule 219 was amended to exempt the following additional equipment and/or processes from the requirement to obtain a SCAQMD permit because they emit very small levels of criteria pollutants and have minimal toxic emission profiles: engines at remote 2-way radio towers fueled with liquefied propane gas or compressed natural gas; sub-slab ventilation systems; passive carbon filter odor control of food waste slurry storage tanks; hand-held plasma-arc cutting and laser cutting equipment; separation/segregation of plastic materials for recycling without cutting, shredding, grinding, or odors; certain coffee roasting equipment; small batch breweries; and equipment used for dehydrated meat manufacturing. In addition, Rule 219 was amended to remove existing exemptions for the following equipment and/or processes because they have the potential to emit criteria pollutants at greater than de minimis levels, emit toxic air contaminants of concern, or create a nuisance: cutting of stainless steel and alloys containing toxics; portable asphalt recycling equipment; greenwaste shredding or grinding; separation/segregation of plastic materials that involves cutting, shredding, grinding or odors; recycling of expanded polystyrene; equipment used for cleaning of diesel particulate filters; certain surface preparation tanks with toxic emissions; certain plating, stripping or anodizing tanks with toxic emissions; and paper, carpet, and fabric recycling operations. Other amendments to Rule 219 included minor clarifications and editorial corrections for food oven combustion equipment, fuel cells, charbroilers, barbeque grills and other underfired grills, VOC-containing liquid storage and transfer equipment, quench tanks for heat treating operations, pavement striping, and certain printing, coating and drying operations.

Rule 222 was amended to add the following equipment to the SCAQMD Rule 222 filing program in lieu of requiring a written SCAQMD permit because they have been identified as small sources of emissions: industrial cooling towers located in a chemical plant, refinery or other industrial facility; natural gas transfer pumps and natural gas repressurization equipment; and engines registered under the statewide Portable Equipment Registration Program (PERP) used in the Outer Continental Shelf (OCS). Storage tanks of aqueous urea

solutions and certain natural gas and crude oil production equipment were also exempted from Rule 219 but were included in the Rule 222 filing program.

Implementation of amended Rule 219 was concluded to increase costs for some facilities and decrease costs for other facilities. Using a very conservative methodology, the analysis concluded that up to 174 pieces of equipment may need to obtain a written permit due to the loss of a current exemption, and 89 pieces of equipment would qualify for an exemption from future permitting and annual operating fees. In addition, approximately 300 pieces of equipment would require to be registered under amended Rule 222. The total annualized cost associated with amended Rules 219 and 222 are $38,125 and $69,197, respectively. The majority of costs (~85 percent) are associated with permitting sources of toxics emissions under amended Rule 219, and the majority of costs (~64 percent) are associated with industrial cooling towers (in conjunction with the 2016 AQMP) under amended Rule 222.

It has been a standard socioeconomic practice that, when the annual compliance cost is less than one million current U.S. dollars, the Regional Economic Impact Model (REMI) is not used to simulate jobs and macroeconomic impacts, because the resultant impacts would be diminutive relative to the baseline regional economy. Since the estimated annualized costs were $38,125 and $69,197, a REMI analysis was not conducted.

Adopted Rule 1466 – Control of Particulate Emissions from Soils with Toxic Air Contaminants (July 2017)

Rule 1466 was adopted to establish requirements to minimize offsite fugitive particulate matter (PM10) emissions that contain certain toxic air contaminants (TACs) from earth-moving activities at sites within SCAQMD jurisdiction that have been designated by the United States Environmental Protection Agency (U.S. EPA), the California Department of Toxic Substances Control (DTSC), the California Environmental Protection Agency's (CalEPA's) State Water Resources Control Board or Regional Water Quality Control Board. Rule 1466 requirements would also apply to any site conducting earth-moving activities that is identified by the SCAQMD's Executive Officer. Rule 1466 established a PM10 ambient dust limit and dust control measures at Rule 1466 applicable sites, and would require notification to the Executive Officer when cleanup operations begin or PM10 emission limits are not met. Rule 1466 applicable sites will be required to install and maintain signage to inform the community and discourage unauthorized access. Rule 1466 also includes additional requirements to limit cleanup activities for sites at schools and early education centers. In situations where additional regulatory flexibility is necessary, Rule 1466 allows alternative dust control measures if approved by the Executive Officer.

For the purpose of conducting a socioeconomic analysis for Rule 1466, it was assumed that an average of eight toxic cleanup sites (25 sites ÷ 3 years ≈ 8 sites), with an average size of eight acres per site (198 acres ÷ 25 sites ≈ 8 acres) would be potentially subject to Rule 1466 on an annual basis. Based on time spent on earthmoving activities from a sample of sites staff assumed an average period of three months for earth-moving activities for this scenario. Additionally, this scenario also takes into account the fact that many sites may have already employed some of the dust control measures contained in Rule 1466 in accordance with existing SCAQMD rules and requirements from other agencies. For example, many sites have already put fencing and windscreens in place or PM10 monitors in accordance with the

California Department of Toxics Substances Control (DTSC) requirements or vehicle egress measures and on-site compliance supervisor in accordance with SCAQMD Rule 403. Staff calculated the percentage of sites which already use particular dust control measures, monitoring equipment, or undertake required activities in order to estimate the portion of Rule1466 requirements which are incremental to this baseline.

Based on this scenario, the estimated total regional annual compliance cost was found to be about $731,000. A range of cost per average-sized site was also calculated to provide further information about what cost of this proposed rule for a single site would be. A low cost site, which already has employed an on-site dust control supervisor, and equipment like PM10 monitors and fencing with windscreens, would have cost of about $31,000. While a high cost site, which has not already employed any of the required measures would have a cost of about $161,000.

It has been standard practice for SCAQMD socioeconomic analysis that when the annual compliance cost is less than one million current U.S. dollars, REMI is not used to simulate jobs and macroeconomic impacts. This is because the resultant impacts would be diminutive relative to the baseline regional economy. Since the estimated annualized cost of compliance with Rule 1466 was $730,670, a REMI analysis was not conducted.

Amended Rule 1118 – Control of Emissions from Refinery Flares (July 2017)

Rule 1118 was amended to: 1) harmonize Rule 1118 with key updates from US EPA's recent Refinery Sector Rule update regarding flares, including new prohibitions on some types of flaring; 2) require facilities subject to Rule 1118 to prepare a Scoping Document that evaluates the feasibility of minimizing or avoiding planned and unplanned flaring events; 3) remove the $4 million annual cap on mitigation fees that facilities may pay for flaring; 4) update emission factors based on US EPA's updated AP-42 guidance; and 5) update and clarify reporting requirements for facilities. In addition, SCAQMD staff is proposing to allocate up to $100,000 from the Rule 1118 Mitigation Fund to upgrade the web-based Flare Event Notification System.

Amended Rule 1118 lowered flaring emissions and affected 12 facilities operating a total of 31 flares. Eight out of 12 facilities belong to the sector of petroleum refineries; of the remaining four, one sulfur recovery plant and three hydrogen production plants belong to the sector of industrial gas manufacturing. All the affected facilities are located in Los Angeles County and none are small businesses.

Two key amendments were identified as having potential cost impacts. First, preparation of a scoping document to evaluate the feasibility of emissions reductions from planned and unplanned flaring events could potentially cost $50,000 for a non-refinery facility and $250,000 for a refinery facility. These costs are one-time in nature and would add up to about $2.2 million for all affected facilities. These Scoping Documents are necessary to identify feasible measures to further reduce emissions from flaring in a second phase of rulemaking. Second, the removal of the $4 million annual cap on mitigation fees could potentially impose additional costs on affected facilities if their SOx emissions substantially exceed the performance target. Past performance records (2012-2016) for the 12 facilities

show that only one facility in 2015 would have exceeded the $4 million cap ($7.7 million) due to an explosion which caused a shutdown and subsequent atypical operations for the remainder of the year. Another occasion when the annual cap was exceeded was from an unmonitored bypass valve; this bypass valve has since been removed from service. Therefore, it is unlikely that the affected facilities would exceed the annual cap and pay more than $4 million of mitigation fees.

It has been a standard socioeconomic practice that, when the annual compliance cost is less than one million current U.S. dollars, REMI is not used to simulate jobs and macroeconomic impacts. This is because the resultant impacts would be diminutive relative to the baseline regional economy. Since the overall annualized cost impacts of amended Rule 1118 were estimated at $270,600, a REMI analysis was not conducted.

Amended Rule 1401 – New Source Review of Toxic Air Contaminants (September 2017)

Rule 1401 was amended to: remove the exemption of spray booths and gasoline dispensing facilities and require them to begin using the SCAQMD Risk Assessment Procedures (Version 8.1), which incorporates: 1) 2015 Office of Environmental Health Hazard Assessment (OEHHA) Guidelines; 2) revised gasoline dispensing emission factors and speciation profiles; and 3) current air dispersion model (AERMOD) and updated meteorological data. Additionally, the amendments to Rule 1401 updated the list of toxic air contaminants in Table I of Rule 1401 to be consistent with the current list used by OEHHA.

A socioeconomic analysis was conducted for amended Rule 1401. Based on staff's analysis of SCAQMD permits, two spray booths and one gasoline dispensing facility per year could potentially incur costs to comply with Rule 1401. Spray booths belong to various sectors of the economy such as manufacturing, wholesale, retail, services, and the affected gasoline dispensing facilities belong to the sector of retail services. The potentially affected facilities are likely to be small businesses.

Based on review of spray booths permitted between 2009 and 2014, an average of two spray booths per year are expected to need to install ultra-low particulate air (ULPA) filters instead of high efficiency particulate air (HEPA) filters to obtain new or modified permits pursuant to PAR 1401 While the filter costs are similar, ULPA filters require the use of a higher horsepower blower that is more expensive and uses more electricity. The resultant incremental costs for a total of two affected spray booths is estimated at $7,450 over a five-year period. An average of one gasoline dispensing facility per year is expected to need to choose from various compliance options to obtain new permits pursuant to amended Rule 1401. It is assumed in this analysis that the affected facility would proceed to a Tier 4 Health Risk Assessment and incur a one-time cost of dispersion modeling of $15,000. Other compliance options for permitting a new gasoline dispensing facility include lowering the requested throughput or reorienting equipment or siting the gasoline dispensing sources further from sensitive receptors. Therefore, the overall compliance cost is estimated at $22,450 per year. Since the overall annualized cost of compliance with amended Rule 1401 is estimated at $22,450, a REMI analysis was not conducted.

Amended Rule 1168 – Adhesive and Sealant Applications (October 2017)

Rule 1168 was amended to reduce emissions of VOCs, toxic air contaminants, and stratospheric ozone-depleting compounds from adhesives, adhesive primers, sealants, and sealant primers. The amendments to Rule 1168 clarified the applicability; revised, deleted, and added various definitions; lowered the VOC limits for certain categories and allowed a three-year sell-through and use-through; added new product categories with corresponding VOC content limits; required products marketed for use under varying categories to be subject to the lowest VOC limit; prohibited the storage of non-compliant products, unless for shipment outside of the SCAQMD; added test methods for analyzing VOC content; added labeling requirements; included reporting requirements for manufacturers, private labelers, big box retailers, distribution centers, and facilities that use a 55 gallon per year exemption; prohibited the use of Rule 102 Group II exempt solvents, except volatile methyl siloxanes; included a technology assessment for certain product categories; removed, modified, or added various exemptions. Rule 1168 was estimated to result in approximately 1.38 tons per day of VOC emission reductions.

Amended Rule 1168 would affect approximately 60 adhesive and sealant materials manufacturers of which eight are manufacturing products within the South Coast Air Basin (SCAB). Amended Rule 1168 would also affect six Big Box retailers, and approximately 40 distributors located in and outside of the SCAB. These affected facilities belong to the industries of asphalt shingle and coating materials and adhesive manufacturing, and the sectors of retail and merchant wholesalers. Amended Rule 1168 would also affect intermediate industrial users and end-users (general public) using products that are applicable to Rule 1168 and not regulated by CARB's Consumer Products Regulation.

None of the adhesive and sealant manufacturers and Big Box retailers that would be subject to Rule 1168 are considered small businesses under SCAQMD's definition of a small business. Most of the distributors and other industrial and commercial users that would be subject to Rule 1168 are likely to be small businesses.

It was assumed that Rule 1168 compliance costs are mainly for reformulation. The reformulation cost is estimated to range from $2 to $4 per gallon for the majority of affected product categories. The average total annual cost of the proposed amendments, which would be incurred by the affected facilities located in and outside of the SCAB, is estimated to be $6.34 million, of which $6.30 million is estimated for reformulation costs and the remaining $0.04 is estimated for reporting costs. The cost-effectiveness of Rule 1168 is estimated at $12,400 per ton of VOC reduced with an emission reduction of 1.4 tons of VOC per day by 2023. The amendments were projected to result in minimal job impacts across all major sectors of the regional economy.

Adopted Rule 415 – Odors from Rendering Facilities (November 2017)

Rule 415 was adopted to reduce odors from facilities conducting rendering operations. New Rule 415 was the result of an issue that was identified by the working group for the Clean Communities Plan (CCP) in the pilot study area of Boyle Heights. The prevalence of odors from rendering facilities in Vernon, directly south of Boyle Heights, was of great concern to

the working group. Rule 415 requires existing rendering facilities to enclose certain rendering operations, install odor emission control equipment for the enclosures or use alternative standards for a permanent total enclosure for raw material receiving area, and carry out best management practices (BMPs).

Rule 415 potentially affects five facilities with rendering operations, all classified under the industry of Rendering and Meat Byproduct Processing (NAICS 311613). All five facilities are clustered in close proximity in the urban portion of Los Angeles County, with four located in the heavily industrialized city of Vernon and one in the city of Los Angeles bordering the city of Vernon. Although the city of Vernon has just over 100 inhabitants, it is surrounded by many socioeconomically disadvantaged communities with high unemployment rates and disproportionately more children living in poverty than the county average.

The total annualized costs for the five affected facilities to comply with Rule 415 were estimated to range from $405,000 to $527,000 per year. One facility operated by a large company is expected to incur about two-thirds of the total estimated costs (annualized at $256,000 to $353,000), followed by a facility that is a small business, which would incur the remaining one-third (annualized at $138,000 to $160,000). The other three facilities, including another small business, together would incur less than three percent of the total estimated compliance costs. The estimated total compliance costs would result in a minimal jobs impact in the regional economy.

Adopted Rule 1180 – Refinery Fenceline and Community Air Monitoring and Rule 1180 Refinery Fenceline Air Monitoring Plan Guidelines (Guidelines) (December 2017)

Rule 1180 and the accompanying Guidelines were adopted to implement Health and Safety Code Section 42705.6 by requiring petroleum refineries to collect continuous data of refinery air pollutant emissions, at or near their property boundaries, and to provide that data as quickly as possible to the public. In particular, Rule 1180 contains requirements for petroleum refineries to install and operate continuous, fenceline air monitoring systems to monitor a comprehensive list of criteria pollutants and toxic air contaminants in real-time. Rule 1180 also establishes a fee schedule, to be paid by the petroleum refineries, for the cost of designing, developing, installing, operating and maintaining refinery-related community air monitoring systems. Rule 1180 exempts petroleum refineries that have a maximum capacity to process less than 40,000 barrels per day of crude oil.

Eight petroleum refineries located in Los Angeles County would be potentially affected by Rule 1180 and as such, incur compliance costs. None of the eight affected refineries are classified as small businesses. They all have a maximum capacity to process 40,000 or more barrels per day of crude oil and therefore would not qualify for the exemption provided in Rule 1180.

The fenceline air monitoring requirements were estimated to have an average annual cost of approximately $3.6 million, while the community air monitoring fees were estimated to have an average annual cost of $3.5 million, resulting in a total estimated annual compliance cost

of $7.1 million. The facility-specific annual compliance cost was estimated to range from $489,000 to $1.5 million depending on the refinery's size and their specific fee schedule.

Implementation of Rule 1180 is projected to result in a net positive job impact of 35 jobs per year on average in the four-county region over the 2018-2028 time period, due to an increase in jobs in industries.

Amended Rule 1420 – Emissions Standard for Lead (December 2017)

Rule 1420 was amended to reduce public health impacts from point and fugitive lead emissions from metal melting or lead processing facilities by reducing the exposure to lead, and to ensure and maintain attainment of the National Ambient Air Quality Standard (NAAQS) for lead within the South Coast Air Basin. The amendments to Rule 1420 include an initial ambient air lead concentration limit of 0.150 micrograms per cubic meter ($\mu g/m^3$) averaged over 30 consecutive days and will be lowered to a final limit of 0.100 $\mu g/m^3$ by January 1, 2021. The amendments to Rule 1420 also added new requirements for point source lead emission controls, along with periodic source testing, capture efficiency testing, conditional ambient air monitoring, and reporting and recordkeeping requirements to ensure continuous compliance. To prevent fugitive lead emissions, Rule 1420 also added new requirements to conduct housekeeping and maintenance activities and to install total enclosures in areas where lead processing operations and associated processes are being conducted. Any facility that exceeds the limits in Rule 1420 will be subject to additional mitigation requirements.

Rule 1420 would affect 107 facilities out of which one is classified as a Recyclable Material Merchant Wholesaler, with the remaining 106 facilities classified under the Manufacturing sector. Among all affected facilities, 43 are in Los Angeles, 57 in Orange, four in Riverside, and three are located in San Bernardino County. Only 15 out of the 107 affected facilities would incur cost impacts related to periodic source testing, capture efficiency testing, and building enclosure, and rooftop cleaning requirements. The remaining 92 facilities would only be subject to the housekeeping and recordkeeping requirements at nominal costs. Based on SCAQMD permit data and available information on employees and sales, 11 of the 107 facilities are small businesses as defined under Rule 102. These 11 facilities are only subject to the housekeeping and recordkeeping requirements.

The annual compliance costs of Rule 1420 were estimated to range from $273,000 to $280,000, depending on the real interest rate assumed (one to four percent). The source testing requirement would contribute to about 80 percent of the total annual cost. On a per facility basis, it was estimated that each of the 15 affected facilities referenced above could incur an annual cost of $4,800 to $43,000 depending on the number of lead point sources at the facility and the level of construction necessary to enclose the buildings housing their lead processing areas. Since the overall annualized cost of compliance with Rule 1420 was estimated at $4,800 to $43,000, a REMI analysis was not conducted, because the estimated overall compliance costs would result in minimal job impacts in the regional economy.

Amended Rule 1466 – Control of Particulate Emissions from Soils with Toxic Air Contaminants (December 2017)

Rule 1466 was amended to address the Governing Board's Resolution directing staff to expand the list of applicable toxic air contaminants. The amendments to Rule 1466: 1) expanded the list of applicable toxic air contaminants to include pesticides, herbicides, and persistent bio-cumulative toxics; 2) expanded applicability to other government designated sites; and 3) included language to clarify existing provisions. The sites that may be affected by Rule 1466 have been designated as cleanup sites on lists compiled by the United States Environmental Protection Agency, the California Department of Toxic Substances Control (DTSC), the California Environmental Protection Agency's State Water Resources Control Board or Regional Water Quality Control Board, and other county, local, or state regulatory agencies.

These amendments would result in an increased number of potentially affected sites and industries than previously estimated for the current rule. Based on data collected for sites with soil containing one or more of the additional applicable toxic air contaminant(s), approximately two additional sites per year would be potentially impacted. The current owners or responsible parties of these additional impacted sites, which may differ from the previous industrial operations that resulted in contamination at these sites, may belong to: Lessors of Residential Buildings and Dwellings (NAICS 531100), Line-Haul Railroads (NAICS 482111), Solid Waste Landfill (NAICS 562212), Administration of Air and Water Resource and Solid Waste Management Programs (NAICS 924110), Administration of Conservation Programs (NAICS 924120), and National Security (NAICS 928110).

> The incremental cost related to compliance with the additional monitoring and fugitive dust control requirements was estimated at about $182,000 per year, which would bring the total estimated cost of compliance to $913,000. The estimated total compliance costs would result in a minimal impact on jobs in the regional economy.

Rule Amendments without Socioeconomic Impacts

Amended Rule 1147 - NOx Reductions from Miscellaneous Sources (July 2017)

Rule 1147 was amended to resolve compliance issues that have been raised by stakeholders by: 1) removing the requirement to comply with the NOx emission limit for units with a heat input rating of less than 325,000 British Thermal Units per hour; 2) changing the NOx emission limit for low temperature afterburners, burn-off ovens, incinerators, and related equipment from 30 ppm to 60 ppm; 3) changing the compliance date for small in-use units with NOx emissions of one pound per day or less from a schedule based on a 20-year lifetime to a 35-year lifetime or until the units are replaced or retrofit; 4) changing the compliance date for existing in-use heated process tanks and pressure washers from a schedule based on a 15-year to 20-year lifetime to when the units are replaced or retrofit; 5) adding a testing exemption for ultra-low NOx infrared burners; 6) providing compliance flexibility for low emission units by clarifying options for demonstrating emissions less than one pound per day; 7) adding an exemption for units with NOx emission less than one pound per day when a company relocates a facility and remains under the same ownership; 8) adding an exemption for units that become subject to Rule 1147 upon amendment of Rule

219 on or after May 5, 2017, until the unit is replaced; 9) adding flexibility for demonstrating compliance with emission limits by including an alternative compliance demonstration option based on a manufacturer's performance guarantee; 10) clarifying an exemption for food ovens; and 11) clarifying an exemption for flare type systems. Other minor changes were also made for clarity and consistency throughout the rule. Rule 1147 was estimated to result in NOx emission reductions foregone of up to 0.9 ton per day in 2017. However, while most of the estimated NOx emission reductions foregone will be eventually recaptured because the existing units will be regularly replaced and upgraded over time, approximately 0.03 ton per day of the NOx emission reductions foregone will be permanent. Amended Rule 1147 would delay and/or reduce implementation costs to affected businesses and facilitate compliance, thus resulting in overall cost-savings.

Four CEQA alternatives were analyzed. Alternative A, the no project alternative, means that the version of Rule 1147 that was amended in September 2011 would remain in effect. Alternative B considered a more stringent age requirement for compliance demonstration (25 years). At the same time, Alternative B did not contain a relocation exemption and was as stringent as the September 2011 version of Rule 1147. However, Alternative B considered additionally requiring compliance with emission limits when multiple similar process units at a facility have combined NOx emissions greater than one pound per day—a requirement more stringent than the existing rule. Alternative C considered exempting all pressure washers from complying with any emission limit without including an age requirement, so it was considered less stringent than both the September 2011 and July 2017 amendments to Rule 1147. Similar to Alternative C, Alternative D considered exempting all pressure washers from complying with any emission limit without including an age requirement plus it considered exempting all units with NOx emissions less than one pound per day (to be demonstrated through recordkeeping), making it the least stringent CEQA alternative.

The July 2017 amendments to Rule 1147 and CEQA Alternatives C and D were concluded to result in delayed (due to a less stringent compliance schedule) and avoided (due to additional exemptions) incurrence of compliance costs and overall cost-savings. CEQA Alternative A was concluded to not result in any cost impact as the status quo would be maintained. CEQA Alternative B was concluded to delay the compliance schedule by up to five years due to its less stringent age requirement than what is in the existing rule, thereby resulting in maximally five years of compliance cost avoided. Alternative B also considered an additional compliance requirement for facilities with combined NOx emissions greater than one pound per day from multiple similar process units. Therefore, under Alternative B, some compliance costs were shown to potentially occur sooner and offset some of the avoided compliance costs related to the delayed compliance schedule. However, based on the profiles of currently permitted equipment, this additional requirement as considered in Alternative B would be potentially applicable to only a small number of facilities, if any. Therefore, on the net, Alternative B was concluded to not result in additional compliance costs beyond what was expected to be incurred by the affected facilities for compliance with the September 2011 and July 2017 amendments to Rule 1147.

Existing Rules/Regulation with Ongoing Socioeconomic Impacts

Amended Regulation III – Fees and Rule 320—Automatic Adjustment Based on Consumer Price Index (CPI) for Regulation III Fees (June 2017)

Amendments to Regulation III rules consisted of four components. First, pursuant to Rule 320 – Automatic Adjustment Based on Consumer Price Index for Regulation III - Fees, most fees in Rules 301, 303, 304, 304.1, 306, 307.1, 308, 309, 311, 313, 314, and 315 were updated on July 1, 2017 according to the increase in the Calendar Year 2016 California Consumer Price Index (CPI) of 2.5 percent[1]. Second, Rules 301 and 306 were amended to increase the Title V Annual Operating Permit Renewal and Permit Processing Fees by an additional increment of 16 percent above the CPI for each of the next two fiscal years (FYs) in response to the U.S. EPA Title V Operating Permit Program Evaluation Report recommendation to more fully recover Title V program costs. Third, Rules 301, 306, and 309 were amended to increase the Annual Operating Permit Renewal, Permit Processing and Plan Fees for non-Title V facilities by a further additional increment of four percent above the CPI for each of the next two FYs in order to better align program costs with revenues. Fourth, various administrative amendments with no fee impacts were made to Rules 301, 306, 308, and 314.

The October 29, 2010 SCAQMD Governing Board Resolution annually requires, by March 15, an assessment of the increase in fee rates based on the previous year's CPI. Pursuant to Rule 320, an across-the-board 2.5-percent increase in fee rates (equivalent to the change in the California CPI from December 2015 to December 2016) occurred on July 1, 2017. A socioeconomic assessment was conducted to assess the cost impacts of these fee increases. In addition, the analysis provides background information, such as historical trends of SCAQMD revenues from various fees and sectoral distributions of these fees.

Based on the fee categories examined in this analysis and last year's activity levels, the overall Regulation III fee increases, which include the 2.5 percent across-the-board CPI-based fee rate increase for FY 17-18, the 16 percent per year permit-related fee rate increases for Title V facilities over the next two FYs, and the four percent per year permit-related fee rate increases for non-Title V facilities over the next two FYs, are projected to bring additional revenues totaling $6.1 million for FY 17-18 and $10.5 million for FY 18-19.

Nearly all the facilities regulated by SCAQMD would be affected by the proposed fee increases and these facilities belong to every sector of the economy. The fees examined included emissions fees, permit processing fees, annual permit renewal fees, toxic hot spot fees, source testing fees, and a portion of fees under Rule 2202 – On-Road Motor Vehicle Mitigation Options.

The manufacturing sector is estimated to experience the largest fee increase, with an increase of $2.8 million in FY 17-18 and $4.9 million FY 18-19, incurred by about 4,000 permitted facilities. This is followed by the services sector which is estimated to experience an

[1] Pursuant to the SCAQMD Governing Board Resolution for Rule 320, a Draft Socioeconomic Assessment of the Automatic CPI Adjustment was made publicly available on March 15, 2017. The report is available online at: http://www.aqmd.gov/home/about/finance

increase in fees by about $1.0 million in FY 17-18 and $1.7 million in FY 18-19, incurred by about 11,000 permitted facilities. Within the manufacturing sector, the petroleum and coal products manufacturing industry, mostly comprised of refineries, would experience an increase in fees by approximately $1.1 million in FY 17-18 and $2.0 million in FY 18-19.

A macroeconomic job impact analysis was conducted based on the estimated increases in fees paid by various industry sectors. This analysis projects an average annual increase of 58 jobs in the four-county region over a five-year period (2018-2022). The positive job impact is a net result of projected increases in jobs in local government, professional, scientific, and technical services, and administrative and waste management services, combined with smaller decreases in the manufacturing and retail trade sectors.

Plan Adoption with Socioeconomic Impacts

Adopted 2016 Air Quality Management Plan (March 2017)

The adopted 2016 AQMP identified control measures and strategies to bring the region into attainment with the revoked 1997 8-hour National Ambient Air Quality Standard (standard) (80 ppb) for ozone by 2024; the 2008 8-hour ozone standard (75 ppb) by 2032; the 2012 annual PM2.5 standard (12 $\mu g/m^3$) by 2025; the 2006 24-hour PM2.5 standard (35 $\mu g/m^3$) by 2019; and the revoked 1979 1-hour ozone standard (120 ppb) by 2023. The 2016 AQMP consists of three components: 1) the SCAQMD's Stationary, Area, and Mobile Source Control Measures; 2) State and Federal Control Measures provided by the California Air Resources Board; and 3) Regional Transportation Strategy and Control Measures provided by the Southern California Association of Governments. The 2016 AQMP includes emission inventories and control measures for stationary, area and mobile sources, the most current air quality setting, updated growth projections, new modeling techniques, demonstrations of compliance with state and federal Clean Air Act requirements, and an implementation schedule for adoption of the proposed control strategy.

In 2017, staff prepared the Final Socioeconomic Assessment of the 2016 AQMP which included three final documents: 1) main report containing final estimates of benefits, costs, and regional economic impacts, 2) appendices, and 3) responses to comments. The 2016 AQMP control strategy will seek emission reductions from stationary and mobile sources through command-and-control regulations and incentives to help accelerate the deployment of cleaner equipment for the purpose of achieving federal and state air quality standards.

Incremental Costs and Public Health Benefits

The incremental costs and public health benefits of the 2016 AQMP are expected to alter, to various degrees, the economic decisions made by households, businesses, and other economic actors. Some businesses would see production costs go up while other businesses would benefit from a greater demand for their services and technologies. For consumers who consider purchasing or replacing vehicles or certain household appliances, the proposed control strategies would also change or widen the range of product choices that differ in fuel types, energy efficiencies, effective unit prices, and thus potential payback periods. Improved public health would contribute to higher labor productivity and reduce healthcare-related expenditures, while also increasing the region’s attractiveness to economic migrants.

All of these direct effects would then cascade through the regional economy and would produce indirect and induced macroeconomic impacts.

The total incremental cost of the 2016 AQMP was estimated to be $15.7 billion in present worth value (expressed in 2015 dollars) over the life of all equipment and fleets that are expected to be put into operation. Between 2017 and 2031, the amortized annual average incremental cost would be $848 million, which is less than one tenth of a percent (0.07 percent) of the $1.3 trillion worth of annual gross domestic output in the region.

About 60 percent or $9.3 billion of the total incremental cost is related to CARB mobile source control strategies affecting the Basin. About 36 percent or $5.7 billion is associated with SCAQMD control measures for stationary sources, and the remaining four percent or $0.6 billion represents SCAQMD's local mobile source measures. The proposed incentives, in the amount of $14.6 billion, would be distributed to eligible industries and consumers and offset more than 90 percent of the total incremental cost estimated for the 2016 AQMP.

The region will also experience benefits from the implementation of the 2016 AQMP. Air pollution continues to be linked to increases in death rates (mortality) and increases in illness and other health effects (morbidity). It was estimated that, as a result of implementing the 2016 AQMP, an average of 1,600 premature deaths would be avoided per year. Numerous other non-fatal health conditions were also estimated to be avoided annually, including about 2,500 asthma-related emergency department visits, about 700 hospital admissions related to asthma, cardiovascular, or respiratory conditions, and more than 200,000 person-days of work and school absences. Due to these lowered mortality and morbidity risks, an estimated $173 billion worth of public health benefits are expected to accrue in the four-county region, cumulatively from 2017 to 2031. This represents an average of $16.5 billion in public health benefits per year. Over 95 percent of the estimated public health benefits are associated with avoided premature deaths from reduced long-term exposure to PM2.5. Although not quantified in this report, there exist additional public welfare benefits related to clean air from preventing damage to agriculture, ecology, visibility, buildings, and materials.

Regional Economic and Job Impacts

As a result of incremental costs and health benefits associated with the 2016 AQMP, the overall job impact on the four-county region of Los Angeles, Orange, Riverside, and San Bernardino is projected to range from 9,000 jobs foregone to 29,000 jobs gained per year from 2017 to 2031, relative to the baseline job forecast where the 2016 AQMP control strategies are not implemented. In an economy with nearly 18 million people and more than 10 million jobs, the projected changes in the total number of regional jobs are expected to have a minimal impact on the region's long-term job growth. The region's projected annualized job growth rate between 2016 and 2031 will remain at slightly above one percent (1.01 to 1.04 percent) under all 2016 AQMP scenarios examined with macroeconomic impact modeling.

Under the main scenario (i.e., incentives funded by existing state revenue sources and full air-related public health benefits for regional amenity adjustments), the region is expected to gain an average of about 14,000 jobs per year from 2017 to 2031. The annualized job growth

rate would increase slightly to 1.04 percent from the baseline rate of 1.02 percent between 2016 and 2031. In the beginning years, however, large amounts of incentives would directly result in funds diverted from local spending and thus jobs foregone in many sectors of the regional economy, among which state and local governments would be most adversely impacted, followed by construction, retail trade, and healthcare and social assistance sectors. Over time, as the control strategies are implemented and public health benefits are realized, increased regional amenity is expected to attract more economic migrants and enlarge the pie of the regional economy, thereby creating more jobs.

To provide stakeholders with more information about how the 2016 AQMP would potentially impact different sub-county communities within the region, sub-regional distributions for incremental costs, public health benefits, and net job impacts were also provided. The average annualized incremental costs between 2017 and 2031, if spread among the region's population, would range from approximately $21 million in Orange North, a sub-region of Orange County to $61 million in the San Fernando sub-region of Los Angeles County. The average annual public health benefits range from $122 million in Other San Bernardino, the northern sub-region of San Bernardino County, to $2.1 billion in the Central sub-region of Los Angeles County. Of the 14,000 jobs expected to be gained on average each year during the period of 2017-2031, the Central Los Angeles sub-region of Los Angeles County is expected to see the largest gain of jobs, with nearly 2,000 jobs being added on average each year to the baseline forecast levels, while the Riverside sub-region of Riverside Other will see about 40 jobs foregone on average each year during the same period.

Environmental Justice Impacts

The SCAQMD defines Environmental Justice (EJ) as "equitable environmental policymaking and enforcement to protect the health of all residents, regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location, from the health effects of air pollution." It is akin to the U.S. EPA's definition: "Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[2] California state law similarly defines EJ as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies."[3]

For the 2016 AQMP, the EJ analysis was significantly enhanced and expanded compared to previous AQMPs by investigating the distributional impact of the 2016 AQMP based on multiple alternative definitions of EJ communities. Specifically, staff examined whether estimated reductions in health risks associated with air pollution would reduce or exacerbate baseline inequality in the Basin. Inequality between EJ and non-EJ communities was also analyzed to identify any potential differences. First, as a result of implementing the 2016 AQMP, greater per-capita monetized public health benefits are anticipated to accrue in EJ communities than non-EJ communities. Next, in terms of the distribution of health risk related to air pollution exposure, inequality in mortality-related risk more likely to affect the

[2] See http://www3.epa.gov/environmentaljustice/.
[3] California Senate Bill 115, Solis, 1999; California Government Code Section 65040.12(c).

elderly population was found to decrease overall, which is also true between the EJ and non-EJ communities. This finding is consistent for both mortality-related risk associated with long-term exposure to PM2.5 and short-term exposure to ozone. However, the inequality of morbidity risk for asthma-related emergency room visits among children that is associated with short-term exposure to ozone are expected to increase slightly between EJ and non-EJ communities, despite a decrease in overall inequality. These general results do not change based on the different EJ definitions analyzed.

CEQA Alternatives

The 2016 AQMP also examined the potential socioeconomic impacts of CEQA alternatives to the proposed 2016 AQMP. The Final Program Environmental Impact Report included four alternatives: Alternative 1 - No Project; Alternative 2 - Mobile Source Emission Reductions Only; Alternative 3 - CARB and SCAQMD Regulations Only; and Alternative 4 - Expanded Incentive Funding. All the alternatives above, except the No Project Alternative, are required to be realistic and provide a viable path to attainment of NAAQS, thus achieving similar or greater public health benefits. Therefore, for Alternatives 2, 3, and 4, only incremental costs and the associated job impacts were analyzed and compared to the corresponding impacts of the proposed 2016 AQMP. For purposes of the socioeconomic assessment, Alternatives 2 and 3 were analyzed based on the assumption that they would lead to NAAQS attainment with CAA Section 182(e)(5) measures (i.e., "black box" measures). Alternative 4 assumes additional or accelerated emission reductions achievable by expanded incentive funding. Incremental costs of both Alternatives 2 and 3 are projected to result in fewer jobs foregone than the proposed 2016 AQMP; whereas, incremental costs for Alternative 4 are projected to result in more jobs foregone, mainly due to higher incentive amounts assumed to be provided by existing sources of state funds for local spending. Alternative 4 would result in more emission reductions, however, which would also likely increase public health benefits above the 2016 AQMP. Caution should be exercised, however, as the projected cost estimates and job impacts are highly dependent on the assumptions made for each alternative.

Future Enhancements

Staff will continue working to update the technical aspects of its analyses which includes updating methodologies to quantify visibility, material, and agricultural benefits, developing methods to properly normalize the magnitude of adjustment to the amenity coefficient in REMI, evaluating the use of other modeling tools such as partial equilibrium modeling to supplement REMI for small scale impacts, updating best practices for estimating small business impacts, and closely monitoring the U.S. EPA Science Advisory Board's Economy-Wide Modeling Panel discussions and recommendations, particularly on the macroeconomic modeling of non-market benefits. Retrospective studies, when feasible, will be considered as part of the implementation plan to enhance the uncertainty analysis.

CHAPTER II
ENGINEERING AND PERMITTING ACTIVITIES

ENGINEERING AND PERMITTING

As shown in Table 1, during calendar year 2017, SCAQMD dispositioned a total of 10,504 applications. The majority of these applications were for Permits to Operate (3,774), Area Sources & Certified/ Registrations (2,927), and Changes of Operators (1,236). Also, 910 permits were not renewed. The total number of dispositioned applications for 2017 is about 6% higher than the total for 2016, mainly attributed to the SCAQMD's continuing Permit Application Backlog Reduction efforts.

TABLE - 1
Permit Applications Completed During Calendar Year 2017

Type	Count
Permits to Construct	451
Permits to Operate	3774*
Changes of Operator	1236
Denials	42
Cancellations	864
ERCs	71
Plans	857
TV/RECLAIM	282
Area Sources & Certified/Registrations	2927
Total	**10,504**
Permits Not Renewed	910

*This includes 2,414 applications for Permit to Construct that were issued as Permits to Construct/Operate

Table 2 - Permits Dispositioned by NAICS Code

Table 2 contains a breakdown of permits dispositioned (in the nine categories) and permits not renewed, by type of industry. The type of industry was based on North American Industry Classification System (NAICS) codes, which were provided by the applicant at the time of application filing. The top four NAICS codes were 324110 – Petroleum Refineries, 445110 – Supermarkets and Other Grocery (except for Convenience) Stores, 447190 – Other Gasoline Stations, and 811121 – Automotive Body, Paint, and Interior Repair and Maintenance.

	Total Applications:	451	3774	1236	42	864	71	857	282	2927	910
NAICS code	NAICS Code Description	Permit to Construct	Permit to Operate	Change of Operator	Denied	Cancelled	ERC	Plans	RECLAIM/TV	Area Source/Cert & Registration	Permit Not Renewed
111219	Other Vegetable (except Potato) and Melon Farming									1	
111320	Citrus (except Orange) Groves		2								
111332	Grape Vineyards									10	
111421	Nursery and Tree Production										2
111920	Cotton Farming									3	
111998	All Other Miscellaneous Crop Farming		6	5				1		1	
112120	Dairy Cattle and Milk Production		1	1				1		2	
112511	Finfish Farming and Fish Hatcheries									1	
112990	All Other Animal Production		1							2	
115112	Soil Preparation, Planting, and Cultivating		1								
115114	Postharvest Crop Activities (except Cotton Ginning)									1	
115115	Farm Labor Contractors and Crew Leaders									3	
115210	Support Activities for Animal Production	1	4								
115310	Support Activities for Forestry		1								
211110	Oil and Gas Extraction									5	
211111	Crude Petroleum and Natural Gas Extraction	6	26	66		20	1	2	6	16	4
211112	Natural Gas Liquid Extraction		2	2		1			1	9	

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NAICS code	NAICS Code Description	Permit to Construct	Permit to Operate	Change of Operator	Denied	Cancelled	ERC	Plans	RECLAIM/TV	Area Source/Cert & Registration	Permit Not Renewed
212311	Dimension Stone Mining and Quarrying										2
212312	Crushed and Broken Limestone Mining and Quarrying		2								
212319	Other Crushed and Broken Stone Mining and Quarrying	2	1			1			1		
212321	Construction Sand and Gravel Mining		8			4					1
212322	Industrial Sand Mining		6			1			3		
212391	Potash, Soda, and Borate Mineral Mining		1								
212399	All Other Nonmetallic Mineral Mining		4							5	
213111	Drilling Oil and Gas Wells		1							5	
213112	Support Activities for Oil and Gas Operations		4	19						9	4
221111	Hydroelectric Power Generation							3		1	
221112	Fossil Fuel Electric Power Generation	5	61			21	1	7	18	37	2
221118	Other Electric Power Generation	35	4	18		19		4	7	13	1
221121	Electric Bulk Power Transmission and Control									1	
221122	Electric Power Distribution		3							1	
221210	Natural Gas Distribution		6					5	2	3	
221310	Water Supply and Irrigation Systems	1	55	1		3		4		25	3

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221320	Sewage Treatment Facilities	1	54			11		26		6	
221330	Steam and Air-Conditioning Supply									1	
236115	New Single-Family Housing Construction (except For-Sale Builders)		25	2	1	4		1		74	4
236116	New Multifamily Housing Construction (except For-Sale Builders)		2					4			1
236117	New Housing For-Sale Builders										3
236118	Residential Remodelers		1							12	
236210	Industrial Building Construction		9								
236220	Commercial and Institutional Building Construction		6	11				7		27	1
237110	Water and Sewer Line and Related Structures Construction		1	25	1	2	1	2		1	
237120	Oil and Gas Pipeline and Related Structures Construction	1	1		1	2				1	1
237210	Land Subdivision		3	1				13		10	4
237310	Highway, Street, and Bridge Construction		15			1		3		1	3
237990	Other Heavy and Civil Engineering Construction							1		1	6
238110	Poured Concrete Foundation and Structure Contractors		16	4	3			3		6	
238130	Framing Contractors		1	1							3

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NAICS code	NAICS Code Description	Permit to Construct	Permit to Operate	Change of Operator	Denied	Cancelled	ERC	Plans	RECLAIM/TV	Area Source/Cert & Registration	Permit Not Renewed
238140	Masonry Contractors		3								
238160	Roofing Contractors		1							16	4
238190	Other Foundation, Structure, and Building Exterior Contractors			1							
238210	Electrical Contractors and Other Wiring Installation Contractors		9							2	4
238220	Plumbing, Heating, and Air-Conditioning Contractors		3	1		1				8	
238290	Other Building Equipment Contractors				1						
238310	Drywall and Insulation Contractors					1				2	
238320	Painting and Wall Covering Contractors	1	6	1						12	8
238330	Flooring Contractors		1								
238340	Tile and Terrazzo Contractors		9			3					
238350	Finish Carpentry Contractors		2								
238910	Site Preparation Contractors		3					4		123	2
238990	All Other Specialty Trade Contractors		15	1				1		81	5
311111	Dog and Cat Food Manufacturing		4			9					
311119	Other Animal Food Manufacturing		1								
311211	Flour Milling		8								
311340	Nonchocolate Confectionery Manufacturing										1

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311411	Frozen Fruit, Juice, and Vegetable Manufacturing		1							1	
311412	Frozen Specialty Food Manufacturing	2	2								
311511	Fluid Milk Manufacturing		11			4	1			2	
311513	Cheese Manufacturing							1			
311514	Dry, Condensed, and Evaporated Dairy Product Manufacturing			1				2			
311520	Ice Cream and Frozen Dessert Manufacturing									1	
311611	Animal (except Poultry) Slaughtering			11						2	
311612	Meat Processed from Carcasses		4			7		2			
311613	Rendering and Meat Byproduct Processing	4	5			1			4		
311710	Seafood Product Preparation and Packaging		1								
311811	Retail Bakeries			1						1	3
311812	Commercial Bakeries	3	7	1		20		3	1	29	
311821	Cookie and Cracker Manufacturing		4			2				2	
311824	Dry Pasta, Dough, and Flour Mixes Manufacturing from Purchased Flour		4			3		2	1		
311830	Tortilla Manufacturing		1			14					

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311911	Roasted Nuts and Peanut Butter Manufacturing	3	4			3		1			
311919	Other Snack Food Manufacturing		12			7		2	1	1	
311920	Coffee and Tea Manufacturing		7			3					
311930	Flavoring Syrup and Concentrate Manufacturing		11					1			
311941	Mayonnaise, Dressing, and Other Prepared Sauce Manufacturing		1					1			
311942	Spice and Extract Manufacturing		3								
311991	Perishable Prepared Food Manufacturing		1								
311999	All Other Miscellaneous Food Manufacturing		15			4		1			
312111	Soft Drink Manufacturing		8	9		1					
312112	Bottled Water Manufacturing		3			2					
312120	Breweries	2	11			3			2		
312130	Wineries									1	
313210	Broadwoven Fabric Mills		3	6					1		
313310	Textile and Fabric Finishing Mills	5	7	2		6			3		
313320	Fabric Coating Mills	2	2						1		2
314110	Carpet and Rug Mills		2			4			1		
314120	Curtain and Linen Mills									3	
314999	All Other Miscellaneous Textile Product Mills		1	1							

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315240	Women's, Girls', and Infants' Cut and Sew Apparel Manufacturing										1
316210	Footwear Manufacturing		1								
316998	All Other Leather Good and Allied Product Manufacturing		7			1					
321114	Wood Preservation		4	4							
321211	Hardwood Veneer and Plywood Manufacturing										6
321911	Wood Window and Door Manufacturing										1
321918	Other Millwork (including Flooring)		2								
321920	Wood Container and Pallet Manufacturing		1								
321999	All Other Miscellaneous Wood Product Manufacturing			1							2
322110	Pulp Mills		4								
322121	Paper (except Newsprint) Mills		1							6	
322211	Corrugated and Solid Fiber Box Manufacturing	1	14	12		2			1		
322212	Folding Paperboard Box Manufacturing		1							1	
322219	Other Paperboard Container Manufacturing		3								
322220	Paper Bag and Coated and Treated Paper Manufacturing	3	4			1			1	1	6

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323111	Commercial Printing (except Screen and Books)	4	22	11		9		1	6	3	8
323113	Commercial Screen Printing			1						1	
324110	Petroleum Refineries	32	157	7		97	2	64	41	50	2
324121	Asphalt Paving Mixture and Block Manufacturing	9	21	4	1	7			11		4
324122	Asphalt Shingle and Coating Materials Manufacturing	5	28			9	3		4	1	
324191	Petroleum Lubricating Oil and Grease Manufacturing		15			1		2	4	3	
324199	All Other Petroleum and Coal Products Manufacturing									1	
325110	Petrochemical Manufacturing	3	11	3							
325120	Industrial Gas Manufacturing		3			2			1	1	
325130	Synthetic Dye and Pigment Manufacturing	3	3			3					17
325180	Other Basic Inorganic Chemical Manufacturing		28			19				2	
325193	Ethyl Alcohol Manufacturing		1								
325211	Plastics Material and Resin Manufacturing	4	42			4	1	4	1	2	
325212	Synthetic Rubber Manufacturing	1	6	2		4		3			
325311	Nitrogenous Fertilizer Manufacturing					1					
325314	Fertilizer (Mixing Only)		5								

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	Manufacturing										
325320	Pesticide and Other Agricultural Chemical Manufacturing		4							2	
325411	Medicinal and Botanical Manufacturing		3							3	
325412	Pharmaceutical Preparation Manufacturing		40	20		28		6	3	9	2
325414	Biological Product (except Diagnostic) Manufacturing		3			1			1	2	
325510	Paint and Coating Manufacturing	1	11	11		12		2	1	1	
325520	Adhesive Manufacturing		1	7				2		1	
325611	Soap and Other Detergent Manufacturing		2								
325612	Polish and Other Sanitation Good Manufacturing		7			1				1	3
325620	Toilet Preparation Manufacturing		32			14				4	
325910	Printing Ink Manufacturing		2			1			1		
325991	Custom Compounding of Purchased Resins					1					
325998	All Other Miscellaneous Chemical Product and Preparation Manufacturing		13	54		3		1		2	
326111	Plastics Bag and Pouch Manufacturing	1	2								
326112	Plastics Packaging Film and Sheet (including Laminated) Manufacturing		6			2					

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326121	Unlaminated Plastics Profile Shape Manufacturing		1								9
326122	Plastics Pipe and Pipe Fitting Manufacturing		5								
326130	Laminated Plastics Plate, Sheet (except Packaging), and Shape Manufacturing			16	1			1			
326140	Polystyrene Foam Product Manufacturing		9						4	1	
326150	Urethane and Other Foam Product (except Polystyrene) Manufacturing		18								
326160	Plastics Bottle Manufacturing		5							1	
326191	Plastics Plumbing Fixture Manufacturing		3			2		1	1		
326199	All Other Plastics Product Manufacturing	20	102	1		16		3	5		2
326211	Tire Manufacturing (except Retreading)		1	1							
326291	Rubber Product Manufacturing for Mechanical Use		3								
326299	All Other Rubber Product Manufacturing		12	8							
327110	Pottery, Ceramics, and Plumbing Fixture Manufacturing		3			1					2
327120	Clay Building Material and Refractories Manufacturing		1						3		
327211	Flat Glass Manufacturing		2	5					2		

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327212	Other Pressed and Blown Glass and Glassware Manufacturing							1		1	
327213	Glass Container Manufacturing	4								1	
327215	Glass Product Manufacturing Made of Purchased Glass		2						1		
327310	Cement Manufacturing		9			7					
327320	Ready-Mix Concrete Manufacturing		10	10							1
327331	Concrete Block and Brick Manufacturing		1			2					
327332	Concrete Pipe Manufacturing		3							1	
327390	Other Concrete Product Manufacturing		12			1		1			3
327410	Lime Manufacturing					1					
327420	Gypsum Product Manufacturing		5	1							
327991	Cut Stone and Stone Product Manufacturing			2							
327992	Ground or Treated Mineral and Earth Manufacturing		11						1		
327999	All Other Miscellaneous Nonmetallic Mineral Product Manufacturing		7							1	
331110	Iron and Steel Mills and Ferroalloy Manufacturing		4							1	
331210	Iron and Steel Pipe and Tube Manufacturing from Purchased Steel	9	10			1		5	1	6	

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331221	Rolled Steel Shape Manufacturing	3	2			18	9			2	1
331222	Steel Wire Drawing		6								
331313	Alumina Refining and Primary Aluminum Production	2	1						2		
331315	Aluminum Sheet, Plate, and Foil Manufacturing					1			1		
331318	Other Aluminum Rolling, Drawing, and Extruding		16			2			2		
331410	Nonferrous Metal (except Aluminum) Smelting and Refining		5			1					
331491	Nonferrous Metal (except Copper and Aluminum) Rolling, Drawing, and Extruding		10			2		1			
331492	Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)		17			2		1	2		
331512	Steel Investment Foundries					1				1	
331513	Steel Foundries (except Investment)		8	12							
331523	Nonferrous Metal Die-Casting Foundries		8								
331524	Aluminum Foundries (except Die-Casting)		7			1			2		
332111	Iron and Steel Forging		1	2					1		
332112	Nonferrous Forging	28	8			22			4	8	

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332119	Metal Crown, Closure, and Other Metal Stamping (except Automotive)		5								2
332215	Metal Kitchen Cookware, Utensil, Cutlery, and Flatware (except Precious) Manufacturing										1
332216	Saw Blade and Handtool Manufacturing		4								
332311	Prefabricated Metal Building and Component Manufacturing		2								
332312	Fabricated Structural Metal Manufacturing		3	3							
332313	Plate Work Manufacturing		2								4
332321	Metal Window and Door Manufacturing	1				1					
332322	Sheet Metal Work Manufacturing	3	7	6							3
332323	Ornamental and Architectural Metal Work Manufacturing					1					
332431	Metal Can Manufacturing		14						4		
332439	Other Metal Container Manufacturing		2			2		1	1		
332510	Hardware Manufacturing		2					1		1	1
332613	Spring Manufacturing					1					
332710	Machine Shops	1	1	10		2					2
332721	Precision Turned Product Manufacturing		1								

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332722	Bolt, Nut, Screw, Rivet, and Washer Manufacturing	10	29	2		4		2	2	18	
332811	Metal Heat Treating	5		4					2		
332812	Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers	6	25	21		5		3	3		16
332813	Electroplating, Plating, Polishing, Anodizing, and Coloring	12	74		1	17		8	1	1	23
332912	Fluid Power Valve and Hose Fitting Manufacturing									1	
332913	Plumbing Fixture Fitting and Trim Manufacturing	10	1								
332919	Other Metal Valve and Pipe Fitting Manufacturing		1							4	
332991	Ball and Roller Bearing Manufacturing		1								
332996	Fabricated Pipe and Pipe Fitting Manufacturing		3						1	3	
332999	All Other Miscellaneous Fabricated Metal Product Manufacturing	2	7								
333111	Farm Machinery and Equipment Manufacturing		1								
333131	Mining Machinery and Equipment Manufacturing		1								

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333241	Food Product Machinery Manufacturing		2			4					
333249	Other Industrial Machinery Manufacturing		1								8
333314	Optical Instrument and Lens Manufacturing		4								
333316	Photographic and Photocopying Equipment Manufacturing									2	
333318	Other Commercial and Service Industry Machinery Manufacturing		6	5		1					
333413	Industrial and Commercial Fan and Blower and Air Purification Equipment Manufacturing										2
333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipme	3				1				24	
333514	Special Die and Tool, Die Set, Jig, and Fixture Manufacturing	1				3					
333519	Rolling Mill and Other Metalworking Machinery Manufacturing		2								
333613	Mechanical Power Transmission Equipment Manufacturing		1								
333912	Air and Gas Compressor Manufacturing		11								

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333921	Elevator and Moving Stairway Manufacturing		1								
333923	Overhead Traveling Crane, Hoist, and Monorail System Manufacturing		2								
333924	Industrial Truck, Tractor, Trailer, and Stacker Machinery Manufacturing							1	1		
333992	Welding and Soldering Equipment Manufacturing										1
333993	Packaging Machinery Manufacturing		2								
333999	All Other Miscellaneous General Purpose Machinery Manufacturing	1	2							3	
334112	Computer Storage Device Manufacturing		1			1					
334118	Computer Terminal and Other Computer Peripheral Equipment Manufacturing		5							5	
334220	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	3	3						4	3	
334290	Other Communications Equipment Manufacturing		7			1					1
334310	Audio and Video Equipment Manufacturing		2								
334412	Bare Printed Circuit Board								1		

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	Manufacturing										
334413	Semiconductor and Related Device Manufacturing	2	17			8		3	5	13	1
334416	Capacitor, Resistor, Coil, Transformer, and Other Inductor Manufacturing							1	1		
334417	Electronic Connector Manufacturing									2	
334418	Printed Circuit Assembly (Electronic Assembly) Manufacturing		27	1			3	1	1	1	4
334419	Other Electronic Component Manufacturing		4					1		1	6
334510	Electromedical and Electrotherapeutic Apparatus Manufacturing		3					2		7	
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufactu									1	
334513	Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industria		2								
334515	Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals		1							1	1
334519	Other Measuring and Controlling Device Manufacturing		5			3					1

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335110	Electric Lamp Bulb and Part Manufacturing		1	1							
335121	Residential Electric Lighting Fixture Manufacturing		3								
335122	Commercial, Industrial, and Institutional Electric Lighting Fixture Manufacturing	1	2								
335129	Other Lighting Equipment Manufacturing		1								
335221	Household Cooking Appliance Manufacturing		3								
335311	Power, Distribution, and Specialty Transformer Manufacturing					1				1	
335312	Motor and Generator Manufacturing		1								
335314	Relay and Industrial Control Manufacturing									2	
335911	Storage Battery Manufacturing	6	29			7		7		2	
335931	Current-Carrying Wiring Device Manufacturing		3								
335991	Carbon and Graphite Product Manufacturing		14			5		3	3		
336111	Automobile Manufacturing	1									
336211	Motor Vehicle Body Manufacturing								1		1
336213	Motor Home Manufacturing	5									
336214	Travel Trailer and Camper			15				2	2		1

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	Manufacturing										
336320	Motor Vehicle Electrical and Electronic Equipment Manufacturing		1								
336390	Other Motor Vehicle Parts Manufacturing	6	6					1	4	9	
336411	Aircraft Manufacturing	15	22			3		7	6	27	
336412	Aircraft Engine and Engine Parts Manufacturing	19	14			5			7	8	
336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing	9	13	13		3		7	2	11	1
336414	Guided Missile and Space Vehicle Manufacturing		3			3				2	
336419	Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment Manufacturing		3			1			2	9	
336611	Ship Building and Repairing		1								
336612	Boat Building										5
337110	Wood Kitchen Cabinet and Countertop Manufacturing		3			1					1
337122	Nonupholstered Wood Household Furniture Manufacturing		1			1			1	1	1
337127	Institutional Furniture Manufacturing		6			1		1		1	
337211	Wood Office Furniture Manufacturing		1						2		4

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337214	Office Furniture (except Wood) Manufacturing		1								
337215	Showcase, Partition, Shelving, and Locker Manufacturing		1								
337910	Mattress Manufacturing									1	4
339112	Surgical and Medical Instrument Manufacturing		5	2		7		3		7	
339113	Surgical Appliance and Supplies Manufacturing			1						1	
339114	Dental Equipment and Supplies Manufacturing		4								
339115	Ophthalmic Goods Manufacturing		2			3				1	
339910	Jewelry and Silverware Manufacturing			2						1	
339930	Doll, Toy, and Game Manufacturing									3	
339940	Office Supplies (except Paper) Manufacturing										1
339950	Sign Manufacturing	1	1					2			
339991	Gasket, Packing, and Sealing Device Manufacturing								1		
339992	Musical Instrument Manufacturing	1	1								
339999	All Other Miscellaneous Manufacturing		16	1		2					19

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423110	Automobile and Other Motor Vehicle Merchant Wholesalers	1	4			1				1	
423120	Motor Vehicle Supplies and New Parts Merchant Wholesalers		2	4						1	3
423130	Tire and Tube Merchant Wholesalers			1							
423140	Motor Vehicle Parts (Used) Merchant Wholesalers		3					2			
423210	Furniture Merchant Wholesalers		2	1		1				1	1
423220	Home Furnishing Merchant Wholesalers		2					1			
423310	Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers			1						1	1
423320	Brick, Stone, and Related Construction Material Merchant Wholesalers		6	5						1	
423410	Photographic Equipment and Supplies Merchant Wholesalers							8		1	
423420	Office Equipment Merchant Wholesalers									1	
423430	Computer and Computer Peripheral Equipment and Software Merchant Wholesalers	5	6					1		1	
423440	Other Commercial Equipment Merchant Wholesalers									1	

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423450	Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers		2					3		2	1
423490	Other Professional Equipment and Supplies Merchant Wholesalers					1					
423510	Metal Service Centers and Other Metal Merchant Wholesalers		7			2		1			
423520	Coal and Other Mineral and Ore Merchant Wholesalers									1	
423610	Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers		3								1
423690	Other Electronic Parts and Equipment Merchant Wholesalers		3	6						2	
423710	Hardware Merchant Wholesalers		1	1							
423730	Warm Air Heating and Air-Conditioning Equipment and Supplies Merchant Wholesalers									2	
423740	Refrigeration Equipment and Supplies Merchant Wholesalers					1					
423810	Construction and Mining (except Oil Well) Machinery and Equipment Merchant Wholesalers		3	2						6	

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423820	Farm and Garden Machinery and Equipment Merchant Wholesalers		1								2
423830	Industrial Machinery and Equipment Merchant Wholesalers	2	6			3					2
423840	Industrial Supplies Merchant Wholesalers		2			1		1		4	
423850	Service Establishment Equipment and Supplies Merchant Wholesalers		2	1						1	
423860	Transportation Equipment and Supplies (except Motor Vehicle) Merchant Wholesalers									1	
423910	Sporting and Recreational Goods and Supplies Merchant Wholesalers		6								1
423920	Toy and Hobby Goods and Supplies Merchant Wholesalers			2							
423930	Recyclable Material Merchant Wholesalers	1	9			2		1	2		
423990	Other Miscellaneous Durable Goods Merchant Wholesalers		1			2				2	4
424110	Printing and Writing Paper Merchant Wholesalers	2	1			1				1	
424120	Stationery and Office Supplies Merchant Wholesalers									1	1

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424130	Industrial and Personal Service Paper Merchant Wholesalers		1								
424210	Drugs and Druggists' Sundries Merchant Wholesalers		9					1		2	1
424310	Piece Goods, Notions, and Other Dry Goods Merchant Wholesalers									1	
424320	Men's and Boys' Clothing and Furnishings Merchant Wholesalers										1
424330	Women's, Children's, and Infants' Clothing and Accessories Merchant Wholesalers		1	1							
424410	General Line Grocery Merchant Wholesalers			1						7	
424430	Dairy Product (except Dried or Canned) Merchant Wholesalers		1			2					
424440	Poultry and Poultry Product Merchant Wholesalers									10	
424450	Confectionery Merchant Wholesalers		2							1	
424470	Meat and Meat Product Merchant Wholesalers		4					1		1	1
424480	Fresh Fruit and Vegetable Merchant Wholesalers		2								1
424490	Other Grocery and Related Products Merchant Wholesalers		5			3		6		1	

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424590	Other Farm Product Raw Material Merchant Wholesalers	3									
424610	Plastics Materials and Basic Forms and Shapes Merchant Wholesalers									1	
424690	Other Chemical and Allied Products Merchant Wholesalers		14	1		6					10
424710	Petroleum Bulk Stations and Terminals		43	1		7	2	4	1		
424720	Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals)		24	10		3		1		8	
424820	Wine and Distilled Alcoholic Beverage Merchant Wholesalers		3								
424910	Farm Supplies Merchant Wholesalers		2							1	
424950	Paint, Varnish, and Supplies Merchant Wholesalers		2	2							1
424990	Other Miscellaneous Nondurable Goods Merchant Wholesalers		1					1		3	4
441110	New Car Dealers		16	9		3		1		2	
441120	Used Car Dealers		1	1		1					
441210	Recreational Vehicle Dealers		1								
441228	Motorcycle, ATV, and All Other Motor Vehicle Dealers		2	2						1	1

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441310	Automotive Parts and Accessories Stores		10	2		4				1	1
441320	Tire Dealers		5	1				1		2	2
442110	Furniture Stores		3	1				1		1	4
442210	Floor Covering Stores			1							1
442299	All Other Home Furnishings Stores	1	1							1	1
443141	Household Appliance Stores									1	
443142	Electronics Stores		3							2	
444110	Home Centers		8	17				1	1	1	3
444120	Paint and Wallpaper Stores		1	6							
444130	Hardware Stores		4					1		1	
444190	Other Building Material Dealers		9	2		6					1
444220	Nursery, Garden Center, and Farm Supply Stores	2	11								
445110	Supermarkets and Other Grocery (except Convenience) Stores	3	39	7		6	1			343	13
445120	Convenience Stores	4	55	16	1	3				3	
445291	Baked Goods Stores	1						1		1	
445292	Confectionery and Nut Stores									1	
445299	All Other Specialty Food Stores		6			2		1		2	1
446110	Pharmacies and Drug Stores		5							41	
446120	Cosmetics, Beauty Supplies, and Perfume Stores									1	

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446191	Food (Health) Supplement Stores			2							
447100	Gasoline Stations		1								
447110	Gasoline Stations with Convenience Stores	10	30	31		1	2			1	1
447190	Other Gasoline Stations	7	203	44		3	1	8		1	10
448120	Women's Clothing Stores										1
448140	Family Clothing Stores		1							15	
448150	Clothing Accessories Stores									2	
448190	Other Clothing Stores		1	4							3
448210	Shoe Stores		1								1
448310	Jewelry Stores									1	
448320	Luggage and Leather Goods Stores		12								
451110	Sporting Goods Stores		1					3		1	
451120	Hobby, Toy, and Game Stores									2	1
451130	Sewing, Needlework, and Piece Goods Stores										3
451140	Musical Instrument and Supplies Stores		1							1	
451211	Book Stores		1							2	
452111	Department Stores (except Discount Department Stores)			1						27	
452112	Discount Department Stores									31	
452910	Warehouse Clubs and Supercenters		17			3	20			10	

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452990	All Other General Merchandise Stores		2							19	
453110	Florists		2					1		2	
453220	Gift, Novelty, and Souvenir Stores		1								
453310	Used Merchandise Stores		2								
453998	All Other Miscellaneous Store Retailers (except Tobacco Stores)		10	2	3	1		6		9	
454110	Electronic Shopping and Mail-Order Houses			2							
454113	Mail-Order Houses			1				1			
454310	Fuel Dealers	1	10	1							
454390	Other Direct Selling Establishments		2		1					1	
481111	Scheduled Passenger Air Transportation	3							1		
481112	Scheduled Freight Air Transportation		2			3				1	
481211	Nonscheduled Chartered Passenger Air Transportation		1								
482111	Line-Haul Railroads		1					1			1
483212	Inland Water Passenger Transportation		1								
484110	General Freight Trucking, Local		4	5		3				1	1
484121	General Freight Trucking, Long-Distance, Truckload		2					1		2	

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484220	Specialized Freight (except Used Goods) Trucking, Local							1			
485111	Mixed Mode Transit Systems		2							4	
485113	Bus and Other Motor Vehicle Transit Systems		2							2	
485310	Taxi Service				1					1	
485410	School and Employee Bus Transportation		1								
486110	Pipeline Transportation of Crude Oil		7						1		
486210	Pipeline Transportation of Natural Gas		2						2	8	
487990	Scenic and Sightseeing Transportation, Other									2	
488111	Air Traffic Control	4	4				1		5	1	
488119	Other Airport Operations	3	4	19		5				2	1
488190	Other Support Activities for Air Transportation		3							1	
488210	Support Activities for Rail Transportation					1					
488310	Port and Harbor Operations		3						3	2	
488320	Marine Cargo Handling		2	2							
488490	Other Support Activities for Road Transportation		1							1	
488510	Freight Transportation Arrangement		2	4				1		4	

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488999	All Other Support Activities for Transportation		5			1		7	2	2	
491110	Postal Service									2	
492110	Couriers and Express Delivery Services		2								
493110	General Warehousing and Storage		10	5		3		3		5	10
493120	Refrigerated Warehousing and Storage		1			2					
493130	Farm Product Warehousing and Storage		5								
511110	Newspaper Publishers		2						1		1
511130	Book Publishers		15								
511199	All Other Publishers									2	
511210	Software Publishers		1	2							2
512110	Motion Picture and Video Production	1	9	2	2	3		15		16	2
512120	Motion Picture and Video Distribution		1							1	
512191	Teleproduction and Other Postproduction Services		7	2		1					
512199	Other Motion Picture and Video Industries									2	1
515111	Radio Networks			1							
515120	Television Broadcasting		1							2	1
515210	Cable and Other Subscription Programming		3								1
517110	Wired Telecommunications		2	2						9	1

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	Carriers										
517210	Wireless Telecommunications Carriers (except Satellite)		6					1		6	
517410	Satellite Telecommunications									1	
517911	Telecommunications Resellers		7	1		1				23	
517919	All Other Telecommunications		3	1						6	
518210	Data Processing, Hosting, and Related Services		1	6				1		1	
519120	Libraries and Archives		2					8		9	
519130	Internet Publishing and Broadcasting and Web Search Portals		1					10			
519190	All Other Information Services		1	1							
522110	Commercial Banking		1	1						6	7
522120	Savings Institutions								1	1	
522130	Credit Unions		8	2		1		1		9	
522220	Sales Financing		1	1				1		1	
522291	Consumer Lending		1								
522292	Real Estate Credit				1						
522298	All Other Nondepository Credit Intermediation		1							2	
522310	Mortgage and Nonmortgage Loan Brokers		1	1						1	
522320	Financial Transactions Processing, Reserve, and		1								1

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	Clearinghouse Activities										
522390	Other Activities Related to Credit Intermediation		1							1	
523110	Investment Banking and Securities Dealing									1	
523910	Miscellaneous Intermediation	1	4	3		1				3	1
523920	Portfolio Management									2	
523930	Investment Advice	1	5	1				1		3	1
523991	Trust, Fiduciary, and Custody Activities									2	
524113	Direct Life Insurance Carriers			4						1	
524114	Direct Health and Medical Insurance Carriers							1		3	4
524126	Direct Property and Casualty Insurance Carriers		1	1				1		5	
524128	Other Direct Insurance (except Life, Health, and Medical) Carriers										1
524210	Insurance Agencies and Brokerages			1						4	2
525110	Pension Funds		2					1			
525910	Open-End Investment Funds									1	
531110	Lessors of Residential Buildings and Dwellings	1	19	4	2			13		23	2

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531120	Lessors of Nonresidential Buildings (except Miniwarehouses)		12	15				12	1	31	2
531190	Lessors of Other Real Estate Property		2					1		2	1
531210	Offices of Real Estate Agents and Brokers		23	30	2	3		28	1	72	24
531311	Residential Property Managers									1	
531312	Nonresidential Property Managers	1	6	1				17		8	
531390	Other Activities Related to Real Estate		1								
532111	Passenger Car Rental		1	1							7
532112	Passenger Car Leasing										1
532120	Truck, Utility Trailer, and RV (Recreational Vehicle) Rental and Leasing		1	1				3			
532220	Formal Wear and Costume Rental		1							1	
532230	Video Tape and Disc Rental	1					1				
532299	All Other Consumer Goods Rental									2	1
532411	Commercial Air, Rail, and Water Transportation Equipment Rental and Leasing	1	1			3		1			1
532412	Construction, Mining, and Forestry Machinery and Equipment Rental and Leasing			1		4				14	3

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532490	Other Commercial and Industrial Machinery and Equipment Rental and Leasing		13	1				4		4	2
541110	Offices of Lawyers		4	1				2		5	
541213	Tax Preparation Services						1				
541219	Other Accounting Services		1	2				1		3	
541310	Architectural Services									4	
541320	Landscape Architectural Services		7			2				3	
541330	Engineering Services		21	2		5		4		3	6
541380	Testing Laboratories		1							9	
541410	Interior Design Services			1							
541430	Graphic Design Services	1	1								
541490	Other Specialized Design Services										2
541511	Custom Computer Programming Services		2	2						1	1
541512	Computer Systems Design Services		1	5						5	
541513	Computer Facilities Management Services			2							
541519	Other Computer Related Services										1
541611	Administrative Management and General Management Consulting Services		12	52		5	9	2	2	12	3
541613	Marketing Consulting Services						2				
541618	Other Management Consulting Services		27	1		3		2		24	

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541620	Environmental Consulting Services	1	15		1	3		5		22	2
541690	Other Scientific and Technical Consulting Services		10	4	1	6		4		1	8
541711	Research and Development in Biotechnology		4			2		2	1	2	11
541712	Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology)		16			1		5		15	4
541720	Research and Development in the Social Sciences and Humanities		1					6		3	
541810	Advertising Agencies	1	2	1						2	4
541820	Public Relations Agencies		1							1	
541850	Outdoor Advertising		2								1
541860	Direct Mail Advertising		2							1	
541890	Other Services Related to Advertising		3								
541910	Marketing Research and Public Opinion Polling							2		2	
541922	Commercial Photography									1	
541930	Translation and Interpretation Services		1								
541940	Veterinary Services		2							1	
541990	All Other Professional, Scientific, and Technical Services		15	2		4	2	3	1	43	28

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551112	Offices of Other Holding Companies		8	6				3			
561110	Office Administrative Services		6	5		9		6	1	15	7
561210	Facilities Support Services		1	1						64	2
561311	Employment Placement Agencies					2					
561320	Temporary Help Services									1	
561440	Collection Agencies									1	2
561499	All Other Business Support Services		24	8		3		3		20	3
561510	Travel Agencies					1				1	
561599	All Other Travel Arrangement and Reservation Services		1					2		1	
561612	Security Guards and Patrol Services		1								
561621	Security Systems Services (except Locksmiths)		1								2
561622	Locksmiths		1								
561710	Exterminating and Pest Control Services									1	
561720	Janitorial Services		6	5		1				2	6
561730	Landscaping Services		9	3				1			
561740	Carpet and Upholstery Cleaning Services					1					
561790	Other Services to Buildings and Dwellings		7	1							3
561910	Packaging and Labeling Services			19							

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561920	Convention and Trade Show Organizers		1								1
561990	All Other Support Services	1	19	11		1		7		9	10
562111	Solid Waste Collection			12		4					
562112	Hazardous Waste Collection		2			1		5	1		
562211	Hazardous Waste Treatment and Disposal	14	5	3		5					
562212	Solid Waste Landfill	1	39	1		21	4	50	9	1	2
562213	Solid Waste Combustors and Incinerators							2	2	1	
562219	Other Nonhazardous Waste Treatment and Disposal	1	26			7		3	1	2	
562910	Remediation Services		11			3		1		54	28
562920	Materials Recovery Facilities		31			7		7	1		1
562991	Septic Tank and Related Services		1					3			
562998	All Other Miscellaneous Waste Management Services		18			16					
611110	Elementary and Secondary Schools		27	7		2		15		152	18
611210	Junior Colleges		20		1	2		35	1	9	
611310	Colleges, Universities, and Professional Schools		49	2	1	1		35	4	36	
611519	Other Technical and Trade Schools									4	
611610	Fine Arts Schools		1								
611620	Sports and Recreation Instruction									1	

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611691	Exam Preparation and Tutoring									1	
611699	All Other Miscellaneous Schools and Instruction		1	1						2	
611710	Educational Support Services		1	1						1	
621111	Offices of Physicians (except Mental Health Specialists)		20	6		1		12		17	1
621112	Offices of Physicians, Mental Health Specialists									1	
621210	Offices of Dentists		1	1				1		5	
621310	Offices of Chiropractors									1	
621340	Offices of Physical, Occupational and Speech Therapists, and Audiologists		1								
621420	Outpatient Mental Health and Substance Abuse Centers		1	1					1	1	
621491	HMO Medical Centers							2		3	
621492	Kidney Dialysis Centers		1								
621493	Freestanding Ambulatory Surgical and Emergency Centers									1	
621511	Medical Laboratories			1				1		4	
621512	Diagnostic Imaging Centers									1	
621610	Home Health Care Services		1	3				5		2	1
621991	Blood and Organ Banks			1						3	

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621999	All Other Miscellaneous Ambulatory Health Care Services		5		1	1		2		7	
622110	General Medical and Surgical Hospitals		32	7	1	3		13	7	31	6
622210	Psychiatric and Substance Abuse Hospitals									4	
622310	Specialty (except Psychiatric and Substance Abuse) Hospitals									3	
623110	Nursing Care Facilities (Skilled Nursing Facilities)		6	1		1		2		8	5
623220	Residential Mental Health and Substance Abuse Facilities									1	
623311	Continuing Care Retirement Communities		2		1					1	
623312	Assisted Living Facilities for the Elderly		1					3		1	
623990	Other Residential Care Facilities		3							2	
624110	Child and Youth Services		1								
624120	Services for the Elderly and Persons with Disabilities									1	
624190	Other Individual and Family Services		11			1		1		2	2
624230	Emergency and Other Relief Services										1
624410	Child Day Care Services		1					4		3	
711211	Sports Teams and Clubs									2	1

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NAICS code	NAICS Code Description	Permit to Construct	Permit to Operate	Change of Operator	Denied	Cancelled	ERC	Plans	RECLAIM/TV	Area Source/Cert & Registration	Permit Not Renewed
711219	Other Spectator Sports		1					1			1
711410	Agents and Managers for Artists, Athletes, Entertainers, and Other Public Figures		2								
711510	Independent Artists, Writers, and Performers		1			1		1		1	
712110	Museums		2					2		5	
712130	Zoos and Botanical Gardens		1								
713110	Amusement and Theme Parks	6	11					5	3	2	
713910	Golf Courses and Country Clubs		7					1		3	
713920	Skiing Facilities			22		4			1		
713940	Fitness and Recreational Sports Centers		3	7				11		54	4
713990	All Other Amusement and Recreation Industries		1								
721110	Hotels (except Casino Hotels) and Motels		11	11	2			28		34	6
721191	Bed-and-Breakfast Inns										5
722000	Food Services and Drinking Places										1
722310	Food Service Contractors		2			2					
722320	Caterers			2				6		4	3
722330	Mobile Food Services									1	
722410	Drinking Places (Alcoholic Beverages)		1					1		4	3
722511	Full-Service Restaurants		11	12		6		6		50	47

Table 2 - Permits Dispositioned by NAICS Code

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NAICS code	NAICS Code Description	Permit to Construct	Permit to Operate	Change of Operator	Denied	Cancelled	ERC	Plans	RECLAIM/TV	Area Source/Cert & Registration	Permit Not Renewed
722513	Limited-Service Restaurants	2	12	3				2		94	31
722514	Cafeterias, Grill Buffets, and Buffets									1	
722515	Snack and Nonalcoholic Beverage Bars		1							1	
811111	General Automotive Repair	2	25	23		2				1	17
811112	Automotive Exhaust System Repair	1	2								
811118	Other Automotive Mechanical and Electrical Repair and Maintenance	1	8							1	2
811121	Automotive Body, Paint, and Interior Repair and Maintenance	8	100	97	1	16					48
811122	Automotive Glass Replacement Shops		1								
811192	Car Washes		7								2
811198	All Other Automotive Repair and Maintenance		6	4						2	1
811211	Consumer Electronics Repair and Maintenance		9	9		1				1	
811212	Computer and Office Machine Repair and Maintenance		1							5	
811213	Communication Equipment Repair and Maintenance										14
811219	Other Electronic and Precision Equipment Repair and Maintenance		3							2	1

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NAICS code	NAICS Code Description	Permit to Construct	Permit to Operate	Change of Operator	Denied	Cancelled	ERC	Plans	RECLAIM/TV	Area Source/Cert & Registration	Permit Not Renewed
811310	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Mai	3	17			1					1
811412	Appliance Repair and Maintenance		4	9						5	2
811420	Reupholstery and Furniture Repair		5								4
811490	Other Personal and Household Goods Repair and Maintenance		2	1							1
812111	Barber Shops									1	
812112	Beauty Salons		4							1	
812113	Nail Salons									1	
812210	Funeral Homes and Funeral Services	1	6	2							
812220	Cemeteries and Crematories	1	4			2		3		2	
812300	Drycleaning and Laundry Services			1							
812310	Coin-Operated Laundries and Drycleaners		2	1		2					1
812320	Drycleaning and Laundry Services (except Coin-Operated)		63	34		1		1		1	43
812331	Linen Supply	1	6	8				3	2		1
812332	Industrial Launderers		1					3			2
812910	Pet Care (except Veterinary) Services		1								

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NAICS code	NAICS Code Description	Permit to Construct	Permit to Operate	Change of Operator	Denied	Cancelled	ERC	Plans	RECLAIM/TV	Area Source/Cert & Registration	Permit Not Renewed
812921	Photofinishing Laboratories (except One-Hour)			1						2	
812930	Parking Lots and Garages									1	
812990	All Other Personal Services		3	2	1					3	
813110	Religious Organizations		6		1			2		12	1
813212	Voluntary Health Organizations		1								
813312	Environment, Conservation and Wildlife Organizations									1	
813410	Civic and Social Organizations		5	1				4		10	2
813910	Business Associations									2	
813920	Professional Organizations		1					1		1	
813990	Other Similar Organizations (except Business, Professional, Labor, and Political Organizations)		1			2				7	3
921110	**Executive Offices**		**24**	**1**	**3**	**1**		**3**		**27**	**6**
921120	Legislative Bodies		1							1	1
921130	Public Finance Activities			1						1	
921190	Other General Government Support		9			1		1		8	5
922110	Courts		4					2		20	1
922120	Police Protection		8	1	1			4		15	5
922130	Legal Counsel and Prosecution									3	1
922140	Correctional Institutions	2	3					2		3	7
922150	Parole Offices and Probation		2							7	

Table 2 - Permits Dispositioned by NAICS Code

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	Total Applications:	451	3774	1236	42	864	71	857	282	2927	910
NAICS code	NAICS Code Description	Permit to Construct	Permit to Operate	Change of Operator	Denied	Cancelled	ERC	Plans	RECLAIM/TV	Area Source/Cert & Registration	Permit Not Renewed
	Offices										
922160	Fire Protection		6					1		6	
922190	Other Justice, Public Order, and Safety Activities		1							2	
923110	Administration of Education Programs									3	
923120	Administration of Public Health Programs		2							4	
923130	Administration of Human Resource Programs (except Education, Public Health, and Veterans' Affairs P		3							4	
923140	Administration of Veterans' Affairs										1
924110	Administration of Air and Water Resource and Solid Waste Management Programs	4	24					13		6	15
924120	Administration of Conservation Programs		9					6		3	
925110	Administration of Housing Programs										2
925120	Administration of Urban Planning and Community and Rural Development							2		1	
926110	Administration of General Economic Programs									1	
926120	Regulation and Administration of Transportation Programs	5	9		1	2		1		4	6

Table 2 - Permits Dispositioned by NAICS Code

Table 2 contains a breakdown of permits dispositioned (in the nine categories) and permits not renewed, by type of industry. The type of industry was based on North American Industry Classification System (NAICS) codes, which were provided by the applicant at the time of application filing. The top four NAICS codes were 324110 – Petroleum Refineries, 445110 – Supermarkets and Other Grocery (except for Convenience) Stores, 447190 – Other Gasoline Stations, and 811121 – Automotive Body, Paint, and Interior Repair and Maintenance.

	Total Applications:	451	3774	1236	42	864	71	857	282	2927	910
NAICS code	NAICS Code Description	Permit to Construct	Permit to Operate	Change of Operator	Denied	Cancelled	ERC	Plans	RECLAIM/TV	Area Source/Cert & Registration	Permit Not Renewed
926130	Regulation and Administration of Communications, Electric, Gas, and Other Utilities		2					1			
927110	Space Research and Technology		2						2		
928110	National Security	2	3					8	1	4	
999990	Unclassified	1	19	12	2	1	3	14		40	14

Emission Reduction Credit (ERC) and Short Term Emission Reduction Credit (STERC) Transactions for Fiscal Year 2016-17[4] (California Health and Safety Code Section 40452)

Pursuant to paragraph (c) of section 40452 of the California Health and Safety Code, this report summarizes data on emission offset transactions and applications, by pollutant, during the previous fiscal year. Note that during Fiscal Year 2016-17, no applications were denied for a permit for a new source for the reason of failure to provide the required emission offsets.

Table 3 summarizes privately held Emission Reduction Credit (ERC) and Short Term Emission Reduction Credit (STERC) transactions for Fiscal Year 2016-17, including totals, by pollutant, of the number of emission offset transactions and the quantity of emission offsets transferred in units of pounds per day and tons per year. Table 4 summarizes ERC banking applications processed during Fiscal Year 2016-17, including the number of newly generated STERCs by pollutant in units of pounds per day and tons per year.

Tables 5 and 6 provide details on the amount of each emission offset transaction and processed ERC banking application respectively.

Table 3: Emission Offset Transactions – Fiscal Year 2016-17

Criteria Pollutant	Number of Emission Offset Transfer Transactions[5]				Quantity of Emission Offsets Transferred[6] (lb/day)				Annualized Quantity of Emission Offsets Transferred[3] (ton/year)			
	ERC	STERC[7]	STERC[8]	TOTAL	ERC	STERC[4]	STERC[5]	TOTAL	ERC	STERC[4]	STERC[5]	TOTAL
ROG	33	7	0	40	395	82	0	477	72.2	14.9	0	87.1
NOX	0	9	0	9	0	18	0	18	0	3.4	0	3.4
SOX	3	0	0	3	47	0	0	47	8.6	0	0	8.6
CO	0	0	0	0	0	0	0	0	0	0	0	0
PM10	0	0	0	0	0	0	0	0	0	0	0	0

Table 4: Emission Offset Applications – Fiscal Year 2016-17

Criteria Pollutant	Number of Banking Applications Resulting in the Issuance of New STERCs[9]	Quantity of Emission Reductions Achieved (STERCs)[10] (lb/day)	Annualized Quantity of Emission Reductions Achieved[7] (ton/year)
ROG	0	0	0
NOX	0	0	0
SOX	0	0	0
CO	0	0	0
PM10	0	0	0

[4] This report does not include RECLAIM Trading Credit (RTC) transactions.
[5] Includes all emission offset certificates that transferred ownership.
[6] Includes the total amount of emission offsets transferred.
[7] STERC transfer transactions including the long term emission offset, those that have an ending year of 9999.
[8] STERC transfer transactions not including the long term emission offset in which the emission offset with the greatest year is treated like a long term emission offset.
[9] Includes all emission offset applications resulting in the generation of new certificates.
[10] Includes the total amount of emission offsets generated.

Table 5: Emission Offset Transaction Summary – Fiscal Year 2016-17
Sorted by Pollutant and Amount

SCAQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
SC1617-001	ROG	4	0.7	ERC	N/A	N/A
SC1617-002	ROG	14	2.6	ERC	N/A	N/A
SC1617-003	ROG	18	3.3	ERC	N/A	N/A
SC1617-004	ROG	0	0	STERC	2016	2016
SC1617-005	ROG	0	0	STERC	2017	2017
SC1617-006	ROG	0	0	STERC	2018	2018
SC1617-007	ROG	12	2.2	STERC	2019	9999
SC1617-008	ROG	0	0	STERC	2016	2016
SC1617-009	ROG	0	0	STERC	2017	2017
SC1617-010	ROG	0	0	STERC	2018	2018
SC1617-011	ROG	0	0	STERC	2019	2019
SC1617-012	ROG	0	0	STERC	2020	2020
SC1617-013	ROG	4	0.7	STERC	2021	9999
SC1617-014	ROG	0	0	STERC	2016	2016
SC1617-015	ROG	0	0	STERC	2017	2017
SC1617-016	ROG	0	0	STERC	2018	2018
SC1617-017	ROG	9	1.6	STERC	2019	9999
SC1617-018	ROG	1	0.2	ERC	N/A	N/A
SC1617-019	ROG	0	0	STERC	2016	2016
SC1617-020	ROG	0	0	STERC	2017	2017
SC1617-021	ROG	0	0	STERC	2018	2018
SC1617-022	ROG	6	1.1	STERC	2019	9999
SC1617-023	ROG	11	2	ERC	N/A	N/A
SC1617-024	ROG	19	3.5	ERC	N/A	N/A
SC1617-025	ROG	4	0.7	ERC	N/A	N/A
SC1617-026	ROG	11	2	ERC	N/A	N/A
SC1617-027	ROG	0	0	STERC	2016	2016
SC1617-028	ROG	0	0	STERC	2017	2017
SC1617-029	ROG	0	0	STERC	2018	2018
SC1617-030	ROG	45	8.2	STERC	2019	9999
SC1617-031	ROG	1	0.2	ERC	N/A	N/A
SC1617-032	ROG	3	0.5	ERC	N/A	N/A
SC1617-033	ROG	4	0.7	ERC	N/A	N/A
SC1617-034	ROG	10	1.8	ERC	N/A	N/A
SC1617-035	ROG	7	1.3	ERC	N/A	N/A
SC1617-036	ROG	1	0.2	ERC	N/A	N/A
SC1617-037	ROG	0	0	STERC	2016	2016
SC1617-038	ROG	0	0	STERC	2017	2017
SC1617-039	ROG	0	0	STERC	2018	2018
SC1617-040	ROG	5	0.9	STERC	2019	9999
SC1617-041	ROG	0	0	STERC	2016	2016
SC1617-042	ROG	0	0	STERC	2017	2017

SCAQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
SC1617-043	ROG	0	0	STERC	2018	2018
SC1617-044	ROG	1	0.2	STERC	2019	9999
SC1617-045	ROG	70	12.8	ERC	N/A	N/A
SC1617-046	ROG	10	1.8	ERC	N/A	N/A
SC1617-047	ROG	6	1.1	ERC	N/A	N/A
SC1617-048	ROG	3	0.5	ERC	N/A	N/A
SC1617-049	ROG	1	0.2	ERC	N/A	N/A
SC1617-050	ROG	20	3.7	ERC	N/A	N/A
SC1617-051	ROG	1	0.2	ERC	N/A	N/A
SC1617-052	ROG	1	0.2	ERC	N/A	N/A
SC1617-053	ROG	5	0.9	ERC	N/A	N/A
SC1617-054	ROG	1	0.2	ERC	N/A	N/A
SC1617-055	ROG	17	3.1	ERC	N/A	N/A
SC1617-056	ROG	35	6.4	ERC	N/A	N/A
SC1617-057	ROG	1	0.2	ERC	N/A	N/A
SC1617-058	ROG	12	2.2	ERC	N/A	N/A
SC1617-059	ROG	4	0.7	ERC	N/A	N/A
SC1617-060	ROG	6	1.1	ERC	N/A	N/A
SC1617-061	ROG	4	0.7	ERC	N/A	N/A
SC1617-062	ROG	19	3.5	ERC	N/A	N/A
SC1617-063	ROG	71	13	ERC	N/A	N/A
Total		**477**	**87.1**	**N/A**		

SCAQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
SC1617-064	NOX	6	1.1	STERC	2016	9999
SC1617-065	NOX	3	0.5	STERC	2016	9999
SC1617-066	NOX	2	0.4	STERC	2016	9999
SC1617-067	NOX	2	0.4	STERC	2016	9999
SC1617-068	NOX	1	0.2	STERC	2016	9999
SC1617-069	NOX	1	0.2	STERC	2016	9999
SC1617-070	NOX	1	0.2	STERC	2016	9999
SC1617-071	NOX	1	0.2	STERC	2016	9999
SC1617-072	NOX	1	0.2	STERC	2016	9999
Total		**18**	**3.4**	**N/A**		

SCAQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
SC1617-073	SOX	1	0.2	ERC	N/A	N/A
SC1617-074	SOX	26	4.7	ERC	N/A	N/A
SC1617-075	SOX	20	3.7	ERC	N/A	N/A
Total		**47**	**8.6**	**N/A**		

SCAQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
N/A	CO	No Records				
Total		**0**	**0**	**N/A**		

SCAQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
N/A	PM10	No Records				
Total		**0**	**0**	**N/A**		

Table 6: Emission Offset Application Summary – Fiscal Year 2016-17
Sorted by Pollutant and Amount

SCAQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
No Banking Application Approved during Fiscal Year 2016-2017						
Total		**N/A**	**N/A**	**N/A**		

CHAPTER III
FISCAL YEAR 2018-2019 BUDGET

[Attached herein as Chapter III]

Due to the bulk of these materials, Chapter III is available online at http://www.aqmd.gov/docs/default-source/LPA-Outreach/sb-1928-report-to-legislature-july-2018.pdf?sfvrsn=8. Anyone who would like to obtain a hard copy may do so by contacting SCAQMD's Public Information Center at (909) 396-2001.

CHAPTER IV
CLEAN FUELS PROGRAM 2017 ANNUAL REPORT AND 2018 PLAN UPDATE

[Attached herein as Chapter IV]

Due to the bulk of these materials, Chapter IV is available online at http://www.aqmd.gov/docs/default-source/LPA-Outreach/sb-1928-report-to-legislature-july-2018.pdf?sfvrsn=8. Anyone who would like to obtain a hard copy may do so by contacting SCAQMD's Public Information Center at (909) 396-2001.

CHAPTER V
ANNUAL RECLAIM AUDIT REPORT
FOR 2016 COMPLIANCE YEAR

[Attached herein as Chapter V]

Due to the bulk of these materials, Chapter V is available online at http://www.aqmd.gov/docs/default-source/LPA-Outreach/sb-1928-report-to-legislature-july-2018.pdf?sfvrsn=8. Anyone who would like to obtain a hard copy may do so by contacting SCAQMD's Public Information Center at (909) 396-2001.

Budget

Fiscal Year 2018-2019

South Coast
Air Quality Management District

BUDGET

FISCAL YEAR 2018-2019

Prepared by Finance
Sujata Jain, Assistant Deputy Executive Officer - Finance

SOUTH COAST
AIR QUALITY MANAGEMENT DISTRICT

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AIR QUALITY MANAGEMENT DISTRICT

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

GOVERNING BOARD

WILLIAM A. BURKE, Ed.D
Chairman
Speaker of the Assembly Appointee

DR. CLARK E. PARKER, SR.
Vice Chair
Senate Rules Committee Appointee

MARION ASHLEY
County of Riverside Representative

BEN BENOIT
Cities of Riverside County Representative

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HILDA L. SOLIS
County of Los Angeles Representative

WAYNE NASTRI
Executive Officer

SOUTH COAST

AIR QUALITY MANAGEMENT DISTRICT

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

June 1, 2018

South Coast Air Quality Management District Board and Stakeholders

Transmittal of the Executive Officer's
Fiscal Year 2018-19 Budget and Work Program

This document represents South Coast Air Quality Management District's (SCAQMD) proposed General Fund Budget and Work Program for FY 2018-19. The budget was developed based on SCAQMD's commitment to clean the air and protect the health of all residents in the South Coast Air District through practical and innovative strategies. The proposed budget for FY 2018-19 is a balanced budget with expenditures and revenues of $162.6 million.

The proposed FY 2018-19 level of expenditures, up 8.5% from the FY 2017-18 adopted budget, includes increased costs for retirement, salaries associated with new positions for the AB 617 Community Air Protection Program, AB 134 and Rule 1180, and the recently approved labor agreements. There is a net increase of 51.15 FTEs from the FY 2017-18 adopted budget. This includes the addition of five positions for Rule 1180 - Refinery Fenceline and Community Air Monitoring and the deletion of one vacant position as well as the already approved mid-year actions adding 36 positions for AB617 and 11 positions for AB134 efforts approved by the Board in January 2018 to provide five months of critical overlap and service continuity before an Assistant Deputy Executive Officer in Science, Technology and Advancement retires.

The FY 2018-19 proposed revenue budget of $162.6 million, up 10.6% from the FY 2017-18 adopted budget, includes a CPI fee adjustment of 3.4% and the second year of the June 2017 Board approved additional fee adjustment to permit processing fees and annual operating permit renewal fees of 10.67% for Title V facilities and 4.0% for non-Title V facilities in order to better align program costs with revenue. At $96.9 million or 59.6% of the projected revenue budget, stationary source revenues account for the largest source of revenue. Over the past two decades, total permit fees (including permit processing, annual operating permit, and annual emissions based fees) collected from stationary sources has increased by about 33.7% from $66.8 million in FY 1991-92 to

$89.3 million (estimated) in FY 2017-18. When adjusted for inflation however, stationary source revenues have decreased by 22% over this same period.

While significant efforts are put forth to develop a detailed budget for the next fiscal year, as well as a five year projection, uncertain political and economic issues create challenges. These challenges may include changes in grant revenue funding levels, fluctuations in the financial market which will determine the performance of SCAQMD's retirement investments and could impact pension liability, increased infrastructure costs due to an aging headquarters building, and onetime Penalties and Settlement revenue that varies annually. SCAQMD is well positioned to address these uncertainties by monitoring funding sources, our retirement plan, and actual financial results on a continuous basis and is prepared to make timely resource allocation adjustments as warranted. Additionally, the proposed budget includes an assigned/unassigned general fund balance of 27% of revenues to provide a reasonable financial safety net.

The public and the business community have multiple opportunities to participate in the budget development process. These include meetings of the Budget Advisory Committee which is made up of representatives from the business and environmental communities, a public consultation meeting to discuss the proposed budget and work program, and two meetings of the Governing Board. The public consultation meeting and Governing Board meetings are noticed to the public through direct mail to permitted facilities, print media, and through the SCAQMD website.

In summary, I am proposing a balanced budget for FY 2018-19 that allows our programs to operate efficiently, transparently, and in a manner sensitive to public agencies, businesses and the public, while providing a continuum of emissions reductions and health benefit improvements. The proposed Fiscal Year 2018-19 Budget and Work Program serves to ensure the continued strength and stability of the District as we make progress toward attaining the federal and state clean air mandates.

Respectfully,

Wayne Nastri,
Executive Officer

SJ:DRP

GOVERNMENT FINANCE OFFICERS ASSOCIATION

Distinguished Budget Presentation Award

PRESENTED TO

South Coast Air Quality Management District

California

For the Fiscal Year Beginning

July 1, 2017

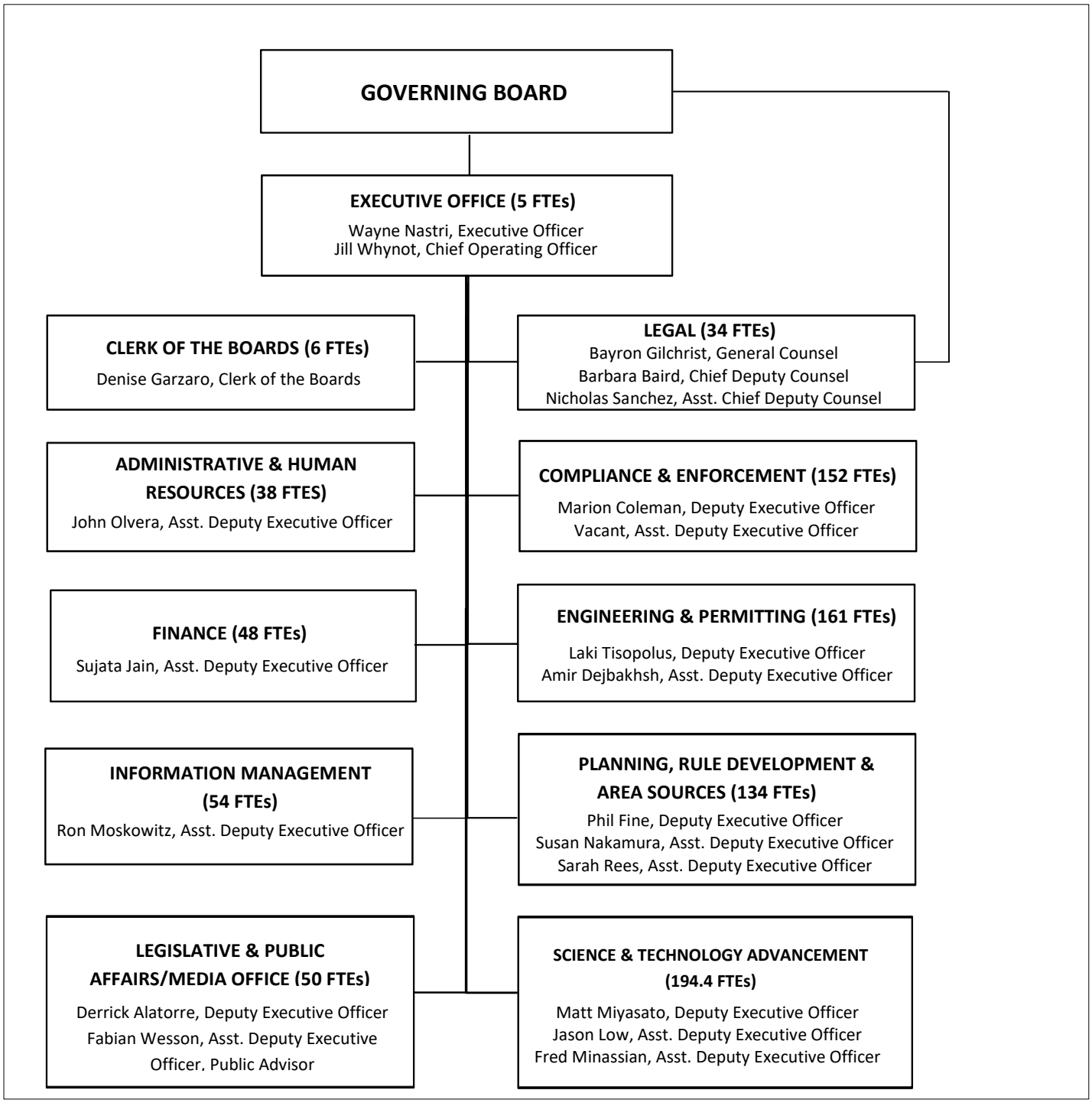
Christopher P. Morrill

Executive Director

The Government Finance Officers Association of the United States and Canada (GFOA) presented a Distinguished Budget Presentation Award to South Coast Air Quality Management District, California for its annual budget for the fiscal year beginning July 1, 2017. In order to receive this award, a governmental unit must publish a budget document that meets program criteria as a policy document, as an operations guide, as a financial plan, and as a communications device.

This award is valid for a period of one year only. We believe our current budget continues to conform to program requirements, and we are submitting it to GFOA to determine its eligibility for another award.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (876.4 FTEs)



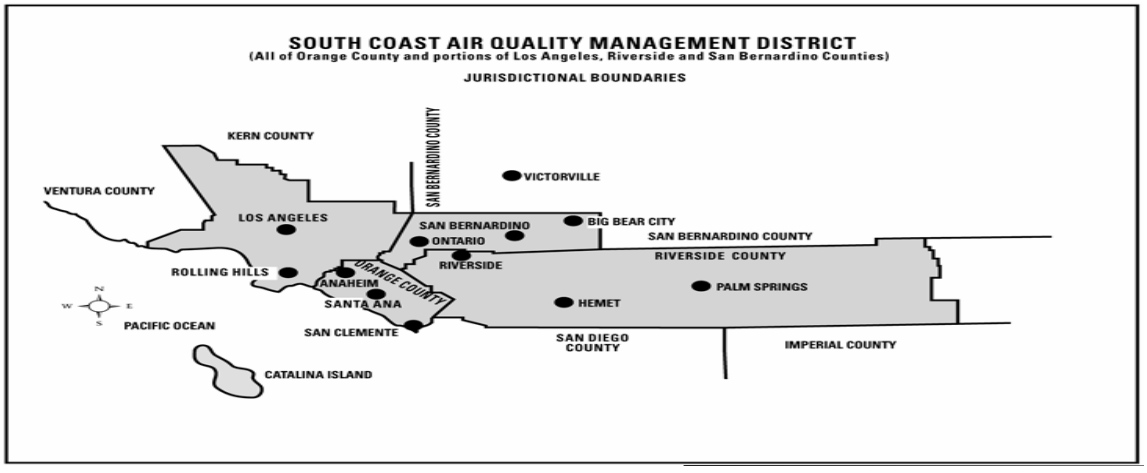
SUMMARY

Preface

This document represents the adopted FY 2018-19 Budget of the South Coast Air Quality Management District (SCAQMD). The proposed budget was available for public review and comment in early April. A public consultation meeting was held to discuss the proposed budget and proposed fees changes on April 10, 2018. In addition, a workshop for the Governing Board was held on April 13, 2018. The proposed budget and proposed Amended Regulation (PAR) III - Fees were presented for adoption at a public hearing on May 4, 2018 and thel proposed budget was discussed at a Governing Board Retreat held on May 10-11, 2018. The final proposed FY 2018-19 Budget was adopted at a public hearing on June 1, 2018.

Introduction

The South Coast Air Quality Management District (SCAQMD) began operation on February 1, 1977 as a regional governmental agency established by the California Legislature pursuant to the Lewis Air Quality Management Act. The SCAQMD encompasses all of Orange County and parts of Los Angeles, San Bernardino and Riverside Counties. It succeeded the Southern California Air Pollution Control District (APCD) and its predecessor four county APCDs, of which the Los Angeles County APCD was the oldest in the nation, having been formed in 1947. The SCAQMD Governing Board is composed of 13 members, including four members appointed by the Boards of Supervisors of the four counties in SCAQMD's jurisdiction, six members appointed by cities in the SCAQMD's jurisdiction and three members appointed by the Governor, the Speaker of the State Assembly and the Rules Committee of the State Senate, respectively. The members appointed by the Boards of Supervisors and cities consist of one member of the Board of Supervisors of Los Angeles, Orange, Riverside, and San Bernardino Counties, respectively, and a mayor or member of the city council of a city within Orange, Riverside, and San Bernardino Counties. Los Angeles County cities have three representatives, one each from the western and eastern portions and one member representing the City of Los Angeles.

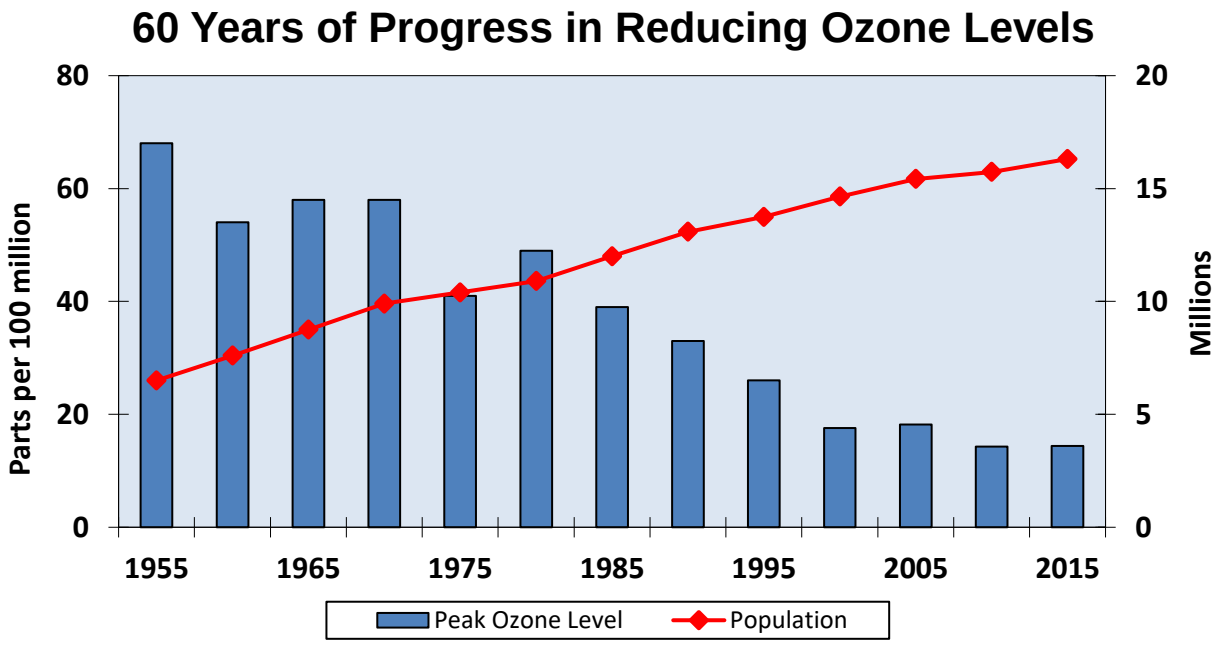


Air Quality History

The South Coast Air Basin has suffered unhealthful air since its rapid population growth and industrialization during World War II. While air quality has improved, the residents of the Basin still breathe some of the most polluted air in the nation.

The 68-year history of the region's air pollution control efforts is, in many ways, one of the world's key environmental success stories. Peak ozone levels have been cut by almost three-fourths since air monitoring began in the 1950s. Population exposure was cut in half during the 1980s alone.

Since the late 1940s when the war on smog began to 2015, the region's population has more than tripled from 4.8 million to 17.0 million; the number of motor vehicles has increased almost six-fold from 2.3 million to 13.7 million; and the area has grown into one of the most prosperous regions of the world. This phenomenal economic growth illustrates that pollution control and strong economic growth can coincide.



Mission

SCAQMD's mission is to clean the air and protect the health of all residents in the South Coast Air District through practical and innovative strategies.

This mission is pursued through a comprehensive program of planning, regulation, education, enforcement, compliance incentives, technical innovation and promoting public understanding of air quality issues. The SCAQMD has implemented a policy of working with regulated businesses to ensure their participation in making the rules which will impact them. This cooperative approach has resulted in greater business support of rulemaking efforts for air that is more healthful to breathe.

To carry out its mission, SCAQMD develops a set of Goals and Priority Objectives which are evaluated and revised annually and presented as part of the budget proposal. The following Goals have been identified as being critical to meeting SCAQMD's Mission for FY 2018-19:

I. Achieve Clean Air Standards.
II. Enhance Public Education and Equitable Treatment for All Communities.
III. Operate Efficiently and Transparently.

These goals are the foundation for SCAQMD's Work Program categories. Each goal is supported by multiple activities, which target specific areas of program performance.

Air Quality

Overview

The four-county Southern California region, designated for air quality purposes as the South Coast Air Basin (Basin), has some of the highest air pollution levels in the United States. The federal government has designated seven pollutants that are pervasive enough across the nation to warrant federal health standards, called National Ambient Air Quality Standards (NAAQS). Known as "criteria pollutants," these are: ozone (O_3); nitrogen dioxide (NO_2); particulates (PM10); fine particulates (PM2.5); carbon monoxide (CO); lead (Pb); and sulfur dioxide (SO_2).

In addition, the State of California through the California Air Resources Board (CARB) sets ambient air quality standards for these same pollutants. California's standards are in some cases tighter than the U.S. Environmental Protection Agency's (U.S. EPA) standards, reflecting the conclusion on CARB's part that some of the federal standards are not adequate to protect public health in this region. Toxic compounds also are a potential problem. More toxic pollution is emitted into the air in the Basin than in any other region in California. The Basin's large number of motor vehicles and small sources, including small businesses and households using ozone-forming consumer products and paints, compound the problem.

Air Quality Trends

While our air quality continues to improve, the Basin remains one of the most unhealthful areas in the nation in terms of air quality. Ozone levels have fallen by more than three-quarters since peaks in the mid-1950s. U.S. EPA revised and strengthened the 8-hour ozone NAAQS, effective December 28, 2015, from concentrations exceeding 75 parts-per-billion (ppb) to concentrations exceeding 70 ppb. In 2017, the new 2015 8-hour ozone NAAQS was exceeded in the Basin on 145 days and the former 2008 ozone NAAQS was exceeded on 122 days based on preliminary data. The 2015 ozone NAAQS was exceeded in the Basin on 132 days in 2016 and 113 days in 2015. The increase in ozone exceedance days in 2016 and 2017 is largely attributed to enhanced photochemical ozone formation through the spring, summer and fall period due to persistent weather patterns that limited vertical mixing and warmed the lower atmosphere. Other potential factors are being assessed; for example, possible changes in relative emissions of VOC or NOx. While the ozone control strategy continued to reduce precursor emissions from sources in the Basin in 2017, ozone-forming emissions transported from several long-term, large wildfires in southern and central California in the summer may have also played a role in the increase of exceedance days. The maximum observed ozone levels also show some year-to-year variability, but have generally been decreasing over the years. The highest 8-hour ozone level in the preliminary 2017 data was 136 ppb, compared to 122 ppb in 2016 and 127 ppb in 2015.

PM2.5 levels have decreased dramatically in the Basin since 1999; however, design value concentrations are still above the current annual 24-hour NAAQS. Effective March 18, 2013, U.S. EPA strengthened the annual average PM2.5 standard from 15 $\mu g/m^3$ to 12 $\mu g/m^3$, while retaining the 24-hour PM2.5 NAAQS of 35 $\mu g/m^3$. In 2017, the 24-hour PM2.5 NAAQS was exceeded on 10 days at the highest station (Metropolitan Riverside County), based on preliminary filter data. In 2016, the same station exceeded the 24-hour NAAQS on only 6 days, the lowest on record, due to improving emissions and the influence of the increase in wintertime storm systems and improved ventilation in the Basin on many days in the winter months when the highest PM2.5 concentrations typically occur. The PM2.5 NAAQS was exceeded on seventeen days in 2015. Both the 2015 and 2017 PM2.5 measurements were strongly influenced by the long-term effects of the drought in California and 2017 was also influenced by large fires in southern and central California. The Basin's peak annual average PM2.5 level in 2017, 14.6 $\mu g/m^3$ (preliminary data) was a little lower than the 2016 value, 14.8 $\mu g/m^3$, which occurred at the same site. In 2017, quarterly PM2.5 averages for the fourth quarter were above normal for recent years, likely due to the impact of smoke transported from the series of wildfires that burned for several days in December. Out of the 29 wildfires across Southern California in December, six were very large fires, including the Thomas Fire which became the largest wildfire in modern California history.

In 2006, U.S. EPA rescinded the annual federal standard for PM10 but retained the 24-hour standard. U.S. EPA re-designated the Basin as attainment of the health based standard for PM10, effective July 26, 2013. Ambient levels of PM10 in the Basin have continued to meet the federal 24-hour PM10 NAAQS through 2017.

In November 2008, U.S. EPA revised the lead NAAQS from a 1.5 $\mu g/m^3$ quarterly average to a rolling 3-month average of 0.15 $\mu g/m^3$ and added new near-source monitoring requirements. The Los Angeles County portion of the Basin has been designated non-attainment for lead due to monitored concentrations near one facility. However, starting with the 3-year 2012-2014 design value, the Basin has met the lead standard. A re-designation request to U.S. EPA is pending.

Nitrogen dioxide, sulfur dioxide, and carbon monoxide levels have improved in the Basin and are in full attainment of the NAAQS. In 2007, U.S. EPA formally re-designated the Basin to attainment of the carbon monoxide NAAQS. Maximum levels of carbon monoxide in the Basin have been consistently less than one-third of the federal standards since 2004. In 2010, U.S. EPA revised the NO_2 1-hour standard to a level of 100 ppb and the SO_2 1-hour standard to a level of 75 ppb. In 2017, all sites in the Basin remained in attainment of these NAAQS.

Mandates

The SCAQMD is governed and directed by several state laws and a comprehensive federal law that provide the regulatory framework for air quality management in the Basin. These laws require SCAQMD to take prescribed steps to improve air quality.

Generally speaking, SCAQMD is responsible for stationary sources such as factories and businesses. CARB and U.S. EPA are primarily responsible for motor vehicles. SCAQMD and CARB share responsibilities with respect to area sources. SCAQMD and the Southern California Association of Governments (SCAG) share some responsibilities with CARB regarding certain aspects of mobile source emissions related to transportation and land use. Control of emissions from sources such as airports, harbors, and trains is shared by U.S. EPA, CARB and SCAQMD. Without adequate efforts by CARB and U.S. EPA to control emission sources under their sole authority, it is impossible for the region to reach federal clean air standards.

Under State law, SCAQMD must periodically develop and submit an Air Quality Management Plan (AQMP or Plan) to the State demonstrating how the region will achieve State and Federal ambient air quality standards, or at a minimum demonstrate that all feasible measures are being carried out to meet state air quality standards. Each iteration of the Plan is an update of the previous version. To date, the SCAQMD's Governing Board has adopted Plans demonstrating attainment in 1989, 1991, 1994, 1997, 1999 (amendments to the plan adopted in 1997), 2003, 2007 and 2012. The 2016 AQMP was approved in March 2017. Earlier plans in 1979 and 1982 did not show attainment and predicted continued unhealthful air well into this century. Revisions to the annual PM2.5 NAAQS, adopted by U.S. EPA in 2012 to further protect public health, lead to the projected attainment of the new annual PM2.5 NAAQS by 2025. The attainment deadline for the 2006 24-hour PM2.5 NAAQS is 2019. The 2008 federal 8-hour ozone NAAQS has an attainment deadline of 2032. Attainment designations for the 2015 ozone NAAQS are expected to be finalized in 2018, with State Implementation Plan (SIP) attainment demonstrations likely due in 2021 or 2022. Attainment deadlines for the new ozone NAAQS are still pending, but for an extreme non-attainment area such as the Basin, the attainment deadline is 20 years from the effective date of the designation, or approximately 2038.

State Laws include:

- California Clean Air Act (AB 2595) requires air districts in California to adopt plans to expeditiously meet state ambient air quality standards. It mandates that SCAQMD's attainment plans meet several specific requirements including:
  - ♦ a 5% per year reduction in emissions (the plan can achieve less than 5% annual reduction if it includes every feasible measure and an expeditious adoption schedule);
  - ♦ Best Available Control Technology (BACT) for new and modified sources;
  - ♦ Best Available Retrofit Control Technology (BARCT) for existing sources.
- Lewis-Presley Air Quality Management Act (SB 151) which specifies additional, more stringent requirements for air quality plans in the Basin. It specifies that SCAQMD has responsibility to prepare the plan in conjunction with SCAG, who must prepare the portions of the plan relating to demographic projections, land use, and transportation programs.
- Air Toxics "Hot Spots" Information & Assessment Act (AB 2588) which requires facilities that emit significant quantities of pollutants to prepare health risk assessments describing the impact of toxic contaminants on neighboring areas. If SCAQMD determines that the toxic emissions create a significant risk, the public must be notified and facilities must reduce emissions to below significant levels.
- Tanner Air Toxics Process (AB 1807) which requires CARB to adopt air toxic control measures to limit emissions of toxic air contaminants from classes of industrial facilities. Local air districts are required to enforce these regulations or adopt equally or more stringent regulations of their own.
- Health & Safety Code §42705.5 which requires air districts to deploy a community air monitoring system in selected locations and Section 42706.5 which requires air districts to design, develop, install, operate and maintain refinery-related community air monitoring systems.

State law also includes the following measures:

- authorizes SCAQMD to adopt market incentives as long as the emitters achieve reductions equivalent to command-and-control regulations;
- requires SCAQMD to establish a program to encourage voluntary participation in projects to increase the use of clean-burning fuels;
- requires SCAQMD to adopt and enforce rules to ensure no net emission increases from stationary sources.

Under the Federal Clean Air Act, SCAQMD must develop and submit to CARB for review, followed by submittal to U.S. EPA, an element of the SIP demonstrating how the Basin will achieve the NAAQS. In the case of ozone, the Plan was required to be submitted by November 15, 1994 and for PM10 particulate matter, the Plan was required to be submitted by February 8, 1997. Plans for other pollutants were submitted in earlier years. In 1997, U.S. EPA adopted new NAAQS for PM2.5 and replaced the 1997 1-hour ozone NAAQS with a new standard based on an 8 hour average. The SIPs to attain these federal standards were submitted to U.S. EPA in November, 2007. The SIP to attain the current 2006 24-hour PM2.5 NAAQS was submitted in early 2013.

The SIP to attain the 2008 8-hour ozone standard was submitted in 2017 following the March 3, 2017 adoption of the 2016 AQMP by the SCAQMD Governing Board, and is currently under U.S. EPA review.

The Federal Clean Air Act mandates that sanctions be imposed on an area if a suitable Plan is not adopted and approved by U.S. EPA. These sanctions can include loss of key federal funds and more stringent requirements on new or expanding industries. Specific requirements for SCAQMD's AQMP include stringent requirements plus Lowest Achievable Emission Rate (LAER) and offsets for major new sources. Federal law also requires an operating permit program for major stationary sources, known as Title V, which must be supported by permit fees. In addition, air toxics regulations adopted by U.S. EPA pursuant to Title III must be implemented by SCAQMD.

Air Quality Control

Developing solutions to the air quality problem involve highly technical processes and a variety of resources and efforts to meet the legal requirements of California and federal laws.

Monitoring: The first step in air quality control is to determine the smog problem by measuring air pollution levels. SCAQMD currently operates 43 monitoring stations in the South Coast Air Basin and a portion of the Salton Sea Air Basin in Coachella Valley. These range from fully equipped stations that measure levels of all criteria pollutants, as well as some air toxic pollutant levels, to those which measure a specific pollutant in critical areas. These measurements provide the basis of our knowledge about the nature of the air pollution problem and the data for planning and compliance efforts to address the problem.

Pollution Sources: The SCAQMD, in cooperation with CARB and SCAG, estimates the sources of emissions causing the air pollution problem. Nature itself causes a portion of the emissions and must be considered. In general, SCAQMD estimates stationary and natural sources of emissions, SCAG develops the information necessary to estimate population and traffic, and CARB develops the information necessary to estimate mobile and area source emissions using the SCAG traffic data. This data is then consolidated in the AQMP for use in developing the necessary control strategies.

Air Quality Modeling: Using air quality, meteorological and emissions models, SCAQMD planners simulate air pollution to demonstrate attainment of the air quality standards and the impacts of sources to local and regional air quality. Due to the nature of air pollution, air quality models can be very complex. Some pollutants are not emitted directly into the air but are products of photochemical reactions in the atmosphere. For example, VOCs mix with nitrogen dioxide (NO_2) and react in sunlight to form ozone; similarly, nitrogen oxide gases from tailpipes and smokestacks can be transformed into nitrates or particulates (PM2.5 and PM10). The planners thus must take into account transport, land use characteristics and chemical reactions of emissions in the atmosphere to evaluate air quality impacts. Using model output, planners can look at different control scenarios to determine the best strategies to reduce air pollution for the lowest cost.

The considerable data required for these analyses is collected on an ongoing basis by SCAQMD staff. Modeling data is prepared and delivered using a geographic information system (GIS). GIS capability is used to prepare and produce data and spatial analysis maps for various needs by SCAQMD including rulemaking and California Environmental Quality Act (CEQA) document development.

Planning: With emissions data and an air quality model in place, planners can develop possible control strategies and scenarios. SCAQMD focuses most of its effort on stationary source controls. As mentioned earlier, strategies to reduce vehicle miles traveled (VMT) are developed primarily by SCAG, while mobile source control standards are developed primarily by CARB.

Once a plan of emission controls to achieve the NAAQS is outlined, SCAQMD is required to hold multiple public meetings to present the proposed control strategies and receive public input. SCAQMD also conducts a socioeconomic analysis of the strategies. SCAQMD maintains an ongoing and independent advisory group of outside experts for both its air quality modeling and socioeconomic assessment methodologies.

To meet federal air quality standards, the AQMPs and SIP submittals, including the 2016 AQMP, called for significant emissions reductions from projected baseline emissions in order to meet the NAAQS by the federal attainment deadlines (2019 for the 2006 24-hour PM2.5 NAAQS, 2025 for the 2012 annual PM2.5 NAAQS, 2023 for the 1979 1-hour ozone NAAQS, 2024 for the 1997 8-hour ozone NAAQS, and 2032 for the 2008 8-hour ozone NAAQS). These combined reductions, while meeting most NAAQS, will still not result in attainment of all California State ambient air quality standards or the revised 2015 8-hour ozone NAAQS. The 2012 AQMP addressed the 24-hour PM2.5 NAAQS. The 2016 AQMP addresses the 2008 8-hour ozone NAAQS and the 2012 annual PM2.5 NAAQS, and demonstrates compliance with the requirements for being a “serious” non-attainment area for the 24-hour PM2.5 NAAQS requirements. SCAQMD will continue to improve the emissions inventories and modeling techniques in order to address the 2015 8-hour NAAQS for the next AQMP revision which has an anticipated adoption in the 2021 or 2022 timeframe.

Rulemaking: The regulatory process, known as rulemaking, takes the concepts of control measures outlined in the AQMP and turns them into proposed rule language. This process involves the following: extensive research on technology; site inspections of affected industries to determine feasibility; typically a year or more of public task force and workshop meetings; in-depth analyses of environmental, social and economic impacts; and thorough review with appropriate Governing Board Committees.

This extensive process of public and policymaker participation encourages consensus in development of rule requirements so that affected sources have an opportunity for input into the rules that will regulate their operations. Once the requirements are developed, the proposed rule, along with an Environmental Assessment and a socioeconomic report, is presented to SCAQMD’s Governing Board at a public hearing. Public testimony is presented and considered by the Board before any rule is adopted. The adopted or amended rules are then submitted to

CARB and U.S. EPA for their approval. It is not uncommon for rulemaking to include follow-up implementation studies. These studies may extend one or more years past rule adoption/amendment and prior to rule implementation. Such studies are typically submitted to the Governing Board or appropriate Governing Board Committee.

Enforcement and Education: SCAQMD issues permits to construct and operate equipment to companies to ensure equipment is operated in compliance with adopted rules. Follow-up inspections are made to ensure that equipment is being operated under permit conditions.

Technical Innovation: In the late 1980s, SCAQMD recognized that technological innovation, as well as rule enforcement, would be necessary to achieve clean air standards. Thus the Technology Advancement Office was created to look for and encourage technical innovation to reduce emissions. The California State Legislature supported this effort by providing a $1 surcharge on every DMV registration fee paid within the Basin. These funds have been matched at a ratio of approximately three-to-one with funds from the private sector to develop new technologies such as low-emission vehicles, low-NO_x burners for boilers and water heaters, zero-pollution paints and solvents, fuel cells and other innovations.

An additional $4 vehicle registration fee was authorized by the state legislature in 1990. These fees are administered through SCAQMD with $1.20 going to SCAQMD for mobile source emissions reductions, $1.60 subvened directly to cities and counties to support their air quality programs, and $1.20 to the Mobile Source Air Pollution Reduction Review Committee (MSRC). The MSRC is an outside panel established by state law whose function is to make the decisions on the actual projects to be funded from that portion of the revenue.

Public Education: SCAQMD's efforts to clean up the air will be successful only to the extent that the public understands air quality issues and supports and participates in cleanup effort. Thus, SCAQMD strives to involve and inform the public through the Legislative and Public Affairs/Media Office, public meetings, publications, the press, public service announcements, and social media.

Budget Synopsis

The SCAQMD's annual budget is adopted for the General Fund for a fiscal year that runs from July 1 through June 30. The period covered by the FY 2018-19 budget is from July 1, 2018 to June 30, 2019. The General Fund budget is the agency's operating budget and is structured by Office and account. The accounts are categorized into three Major Objects: Salaries and Employee Benefits, Services and Supplies, and Capital Outlays. The budget is supplemented with a Work Program containing nine program categories which estimate staff resources and expenditures along program and activity lines. Each category consists of a number of Work Programs, or activities. A Work Program Output Justification form is completed for each Work Program which identifies performance goals, measureable outputs, legal mandates, activity changes and revenue categories.

The annual expenditure and revenue budget for the General Fund is adopted on a modified accrual basis. All annual expenditure appropriations lapse at fiscal year-end if they have not been expended or encumbered. Throughout the year, budget amendments may be necessary to accommodate additional revenues and expenditure needs. Any amendments due to budget increases or transfers between expenditure accounts in different Major Objects must be approved by SCAQMD's Governing Board. They are submitted to the Governing Board for approval at a monthly Board meeting in the format of a board letter which documents the need for the request and the source of funding for the expenditure. Budget amendments resulting from transfers between expenditure accounts within the same Major Object are approved at the Office level.

SCAQMD does not adopt annual budgets for its Special Revenue Funds. Special Revenue Funds are used to record transactions applicable to specific revenue sources that are legally restricted for specific purposes. All transactions in Special Revenue Funds are approved by the Governing Board on an as-needed basis.

Budget Process

The SCAQMD budget process begins with the Assistant Deputy Executive Officer (ADEO) of Finance issuing instructions and guidelines to the Offices. Under the guidance of the Executive Officer, the Chief Operating Officer and the ADEO of Finance, the Offices also begin establishing Goals and Priority Objectives for the fiscal year. The proposed annual budget and multi-year forecast is then developed by the Offices, Finance, Executive Council, Chief Operating Officer and the Executive Officer based on the Goals and Priority Objectives as well as guidelines issued by the Executive Officer. Each Office submits requests for staffing, select Salary accounts, Services and Supplies accounts, and the Capital Outlays account. The remaining salary and benefit costs are developed by Finance. Capital expenditure requests are reviewed by an in-house committee who prioritizes the requests. Revenue projections are developed by Finance based on input received from the appropriate Offices and incorporate any proposed changes to Regulation III - Fees. This information is integrated into an initial budget request, including a multi-year forecast, and then fine-tuned under the direction of the Chief Operating Officer and the Executive Officer to arrive at a proposed budget. The public, business community, and other stakeholders have several opportunities to participate in the budget process, up to and at the budget adoption hearing by the Governing Board, including:

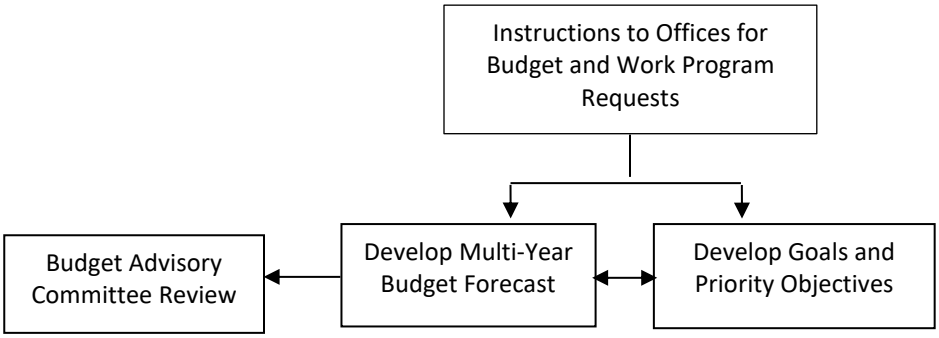
- two meetings of the Budget Advisory Committee whose members include various stakeholder representatives
- a public consultation meeting to discuss the proposed budget and proposed amendments to Regulation III - Fees
- a public hearing on the proposed budget and proposed Amended Regulation (PAR) III – Fees

The proposed budget is presented to SCAQMD's Governing Board at a budget workshop and to SCAQMD's Administrative Committee. Any public comments and Budget Advisory Committee recommendations are submitted to the Governing Board by April 15 of each year. The proposed

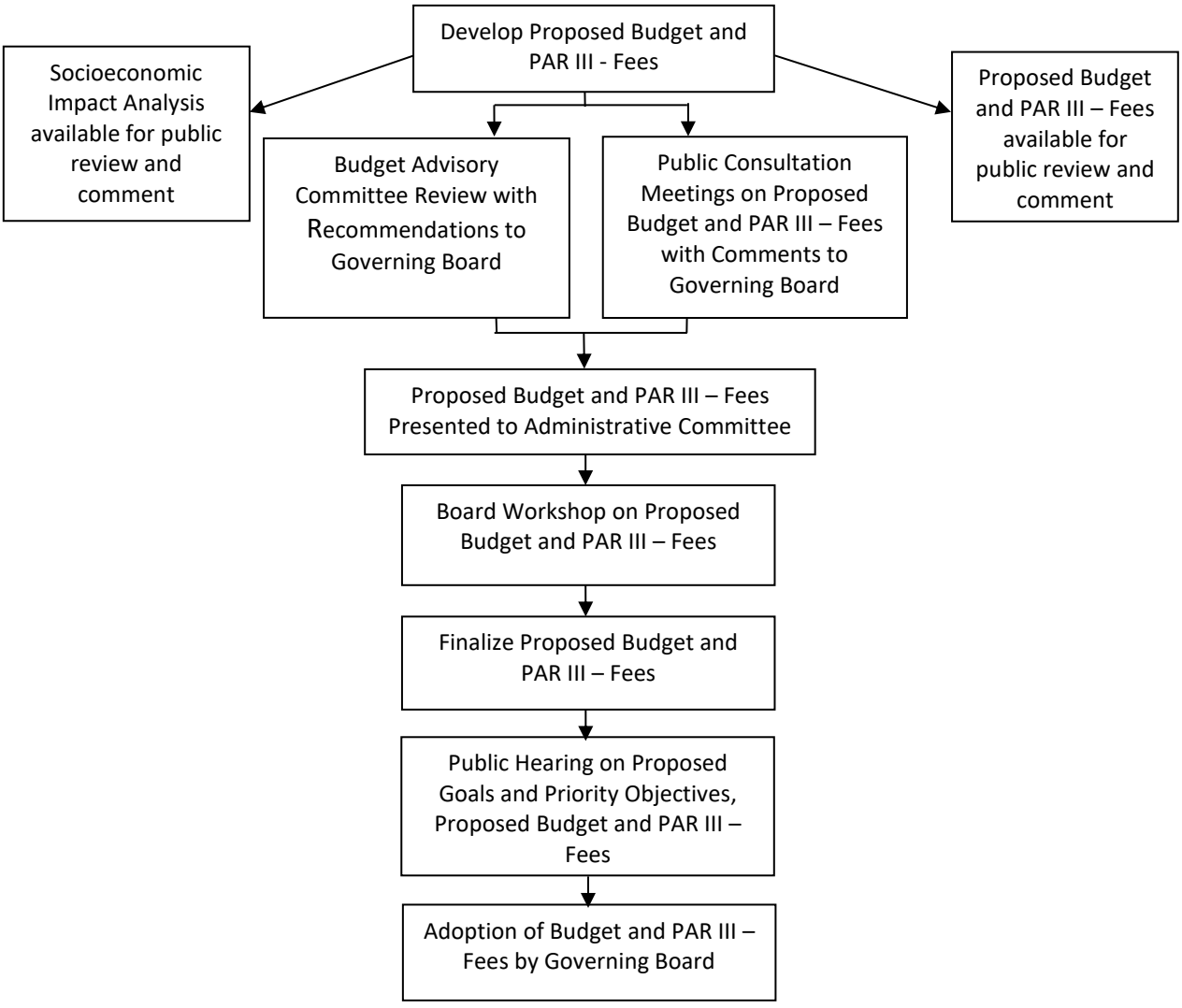
budget, including Regulation III - Fees, is adopted by the Governing Board and is in place on July 1 for the start of the new fiscal year.

The following flow charts represent the major milestones and processes that take place in developing SCAQMD's budget:

Preliminary Budget Process



Annual Budget Process



Budget Timeline	
Budget packages distributed to Offices	Nov 29, 2017
Budget submissions received from Offices	Jan 19, 2018
Budget Advisory Committee meeting	Jan 19, 2018
Proposed budget available for public review	April 3, 2018
Budget Advisory Committee meeting on proposed budget and PAR III – Fees	April 6, 2018
Public Consultation Meetings on proposed budget and PAR III - Fees	April 10, 2018
Public comments and Budget Advisory Committee recommendations submitted to Governing Board	April 13, 2018
Proposed budget and PAR III – Fees presented to Administrative Committee	April 13, 2018
Governing Board Budget Workshop	April 13, 2018
Public Hearing & Governing Board adoption of budget and PAR III – Fees	May 4, 2018
Governing Board Retreat	May 10-11, 2018
Public Hearing & Governing Board adoption of budget	June 1, 2018

FY 2018-19 Adopted Budget

Budget Overview

The budget for FY 2018-19 is a balanced budget with expenditures and revenues of $162.6 million. To compare against prior years, the following table shows SCAQMD's amended budget and actual expenditures for FY 2016-17, adopted and amended budgets for FY 2017-18 and adopted budget for FY 2018-19.

Description	FY 2016-17 Amended	FY 2016-17 Actual	FY 2017-18 Adopted	FY 2017-18 Amended[1]	FY 2018-19 Adopted
Staffing	815	-	825.25	872	876.4
Revenue/Transfers In	$144.2	$148.9	$147.0	$157.7	$162.6
Program Costs/Transfers Out	$151.5	$142.1	$149.9	$162.4	$162.6

[1] Includes Board approved changes through March 2018

The FY 2018-19 adopted budget reflects an increase of $0.2 million in expenditures from the FY 2017-18 amended budget and an increase of $12.7 million in expenditures from the budget adopted for FY 2017-18. The increase in expenditures from the FY 2017-18 adopted budget can be attributed to increases in retirement costs, salaries associated with 52 new positions funded by the AB 617 Community Air Protection Program, the AB 134 Program, and Rule 1180, and recently approved labor agreements. The FY 2018-19 adopted budget includes 876.4 positions, a net increase of 4.4 over the FY 2017-18 amended budget. Changes in the FY 2018-19 adopted budget include the addition of five position for Rule 1180, the deletion of one vacant Investigations Manager position, and the addition of 0.4 FTE to provide five months of critical

overlap and service continuity before an Assistant Deputy Executive Officer in Science & Technology Advancement retires.

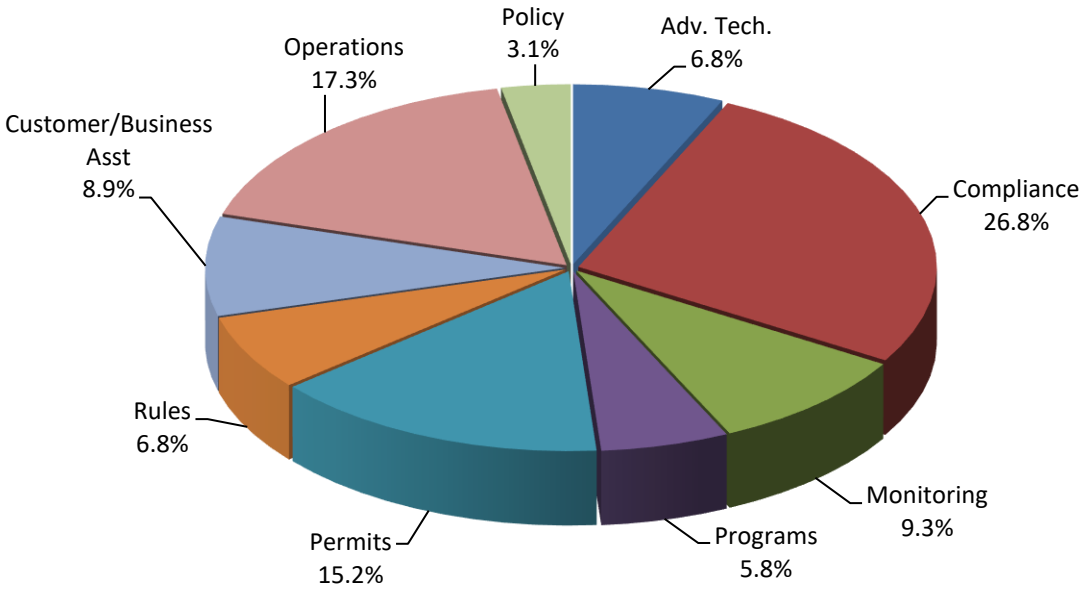
Expenditures

Work Program

SCAQMD expenditures are organized into nine Work Program Categories: Advance Clean Air Technology; Ensure Compliance with Clean Air Rules; Customer Service and Business Assistance; Develop Programs to Achieve Clean Air; Develop Rules to Achieve Clean Air; Monitoring Air Quality; Operational Support; Timely Review of Permits; and Policy Support. Each category consists of a number of Work Programs, or activities, which are classified according to the nature of the activity being performed.

Each Work Program ties to the goals and objectives of the agency and identifies resources, performance measures/outputs and legal mandates. A complete description of each program category along with a detailed work program sort by program is included in the Goals and Priority Objectives and Work Program section. The pie chart that follows represents the budgeted expenditures by Program Category for FY 2018-19.

Work Program Category Expenditures



The following table compares SCAQMD Work Program expenditures by category for the FY 2017-18 adopted budget and FY 2018-19 adopted budget.

Work Program Categories	FY 2017-18 Adopted Budget	FY 2018-19 Adopted Budget
Advance Clean Air Technology	$ 8,661,899	$ 11,108,263
Ensure Compliance with Clean Air Rules	42,802,490	43,655,133
Customer Service and Business Assistance	13,437,515	14,496,926
Develop Programs to Achieve Clean Air	10,184,322	9,387,075
Develop Rules to Achieve Clean Air	7,354,657	10,982,868
Monitoring Air Quality	11,398,567	15,150,150
Operational Support	26,747,503	28,105,108
Timely Review of Permits	24,151,356	24,679,524
Policy Support	5,140,597	5,066,054
Total	$ 149,878,906	$ 162,631,101

Account Categories

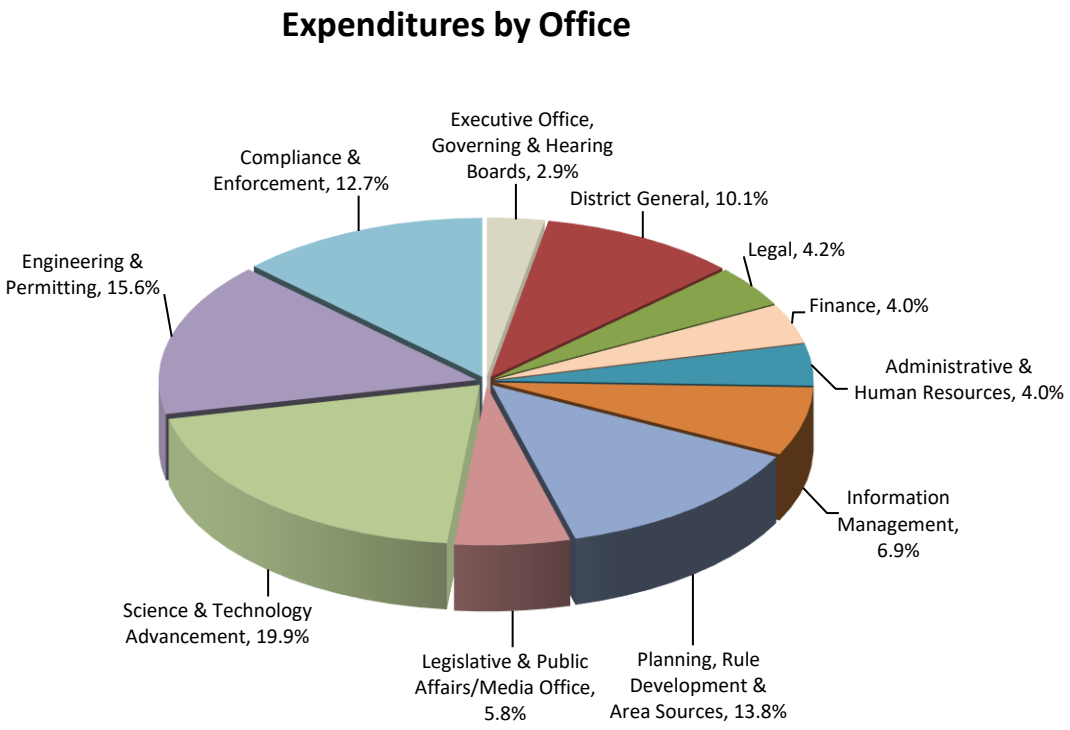
The following table compares the FY 2017-18 adopted budget and the FY 2017-18 amended budget to the adopted budget for FY 2018-19 by account category. The FY 2017-18 amended budget includes the Board-approved mid-year adjustments through March 2018.

Account Description	FY 2017-18 Adopted Budget	FY 2017-18 Amended Budget	FY 2018-19 Adopted Budget
Salaries/Benefits	$ 119,860,494	$ 123,246,774	$ 132,868,320
Insurance	1,317,400	1,357,400	1,317,400
Rents	498,154	576,560	761,071
Supplies	2,777,621	3,535,097	2,510,982
Contracts and Services	10,515,792	12,705,579	10,523,187
Maintenance	1,687,193	2,048,982	2,367,143
Travel/Auto Expense	864,520	998,005	940,445
Utilities	2,213,288	2,098,540	1,959,620
Communications	702,000	740,480	717,800
Capital Outlays	1,950,717	7,506,651	1,088,300
Other	1,302,213	1,441,444	1,386,433
Debt Service	6,189,514	6,189,514	6,190,400
Total	$ 149,878,906	$ 162,445,026	$ 162,631,101

As mentioned previously, the adopted budget for FY 2018-19 represents an approximately $0.2 million increase in expenditures from the FY 2017-18 amended budget. The FY 2017-18 amended budget includes mid-year increases associated with the following: the purchase of air monitoring and laboratory analysis instruments, field platforms, optical gas imaging cameras, and toxic vapor analyzers for toxics activities; updates to the web-based Flare Event Notification system; the development of the online permitting modules; consultant services for SCAQMD environmental justice outreach and initiatives; upgrades to the laboratory PM weighing room; consultant services for specialized legal counsel; the purchase of services and supplies for the fifth Multiple Air Toxics Exposure Study (MATES V); staff, capital outlay expenditures and contractual services for the Community Air Protection Program under AB 617; staff for the AB 134 Program; and grant-related expenditures offset by revenue.

Office Categories

The following pie chart represents budgeted expenditures by Office for FY 2018-19.

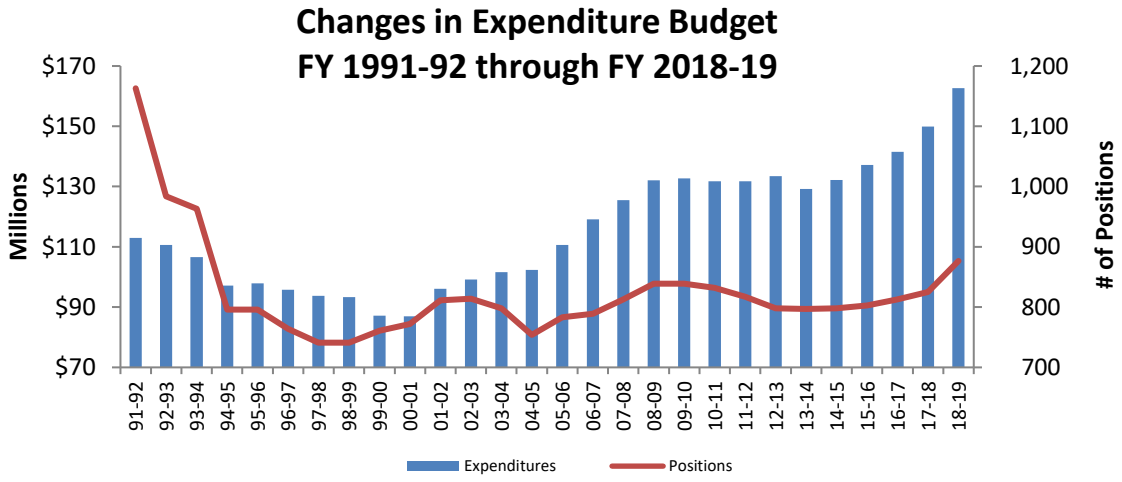


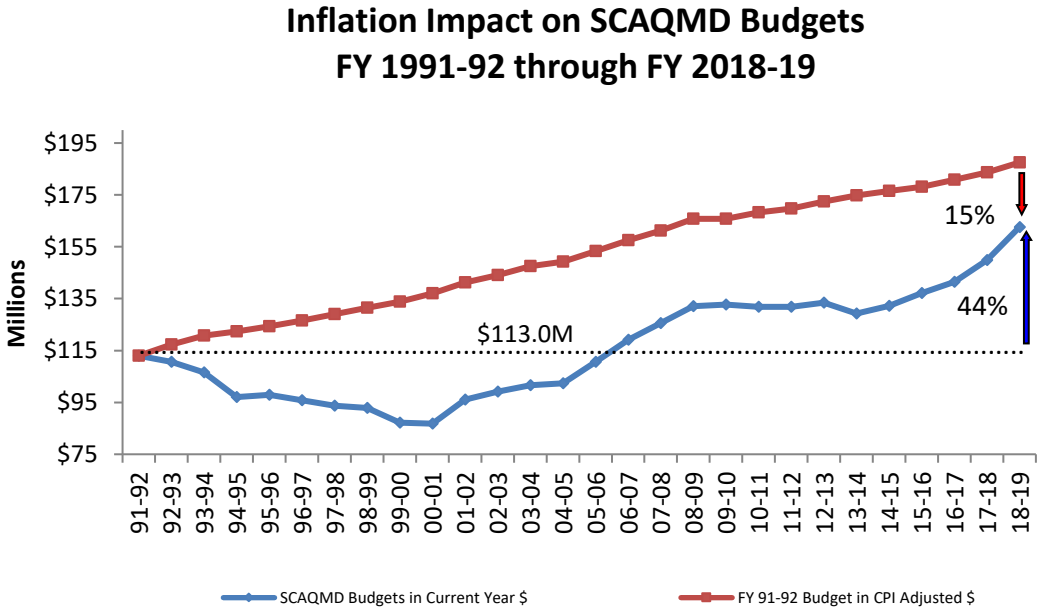
Budget Strategy

Over the years, SCAQMD has focused on streamlining many of its operations while still meeting its program commitments despite new federal and state mandates and increased workload complexity. The focus has been on reducing expenditures in the Major Object of Services and Supplies and maximizing the efficient use of staff resources to enable select vacant positions to remain vacant, be deleted or be unfunded. The budgeted vacancy rate is reviewed and adjusted

if necessary as part of the annual budget process. These efforts have resulted in reduced program costs and is reflected in the following charts showing SCAQMD's staffing and budget levels starting in FY 1991-92 when staffing was at 1,163 FTEs. The proposed budget for FY 2018-19 reflects a staffing level of 876.4 FTEs. This staffing level is 25% (286.6 FTEs) below the FY 1991-92 level.

The FY 2018-19 proposed budget is 44% higher when compared to the FY 1991-92 adopted budget of $113 million. However, after adjusting the FY 1991-92 adopted budget for CPI over the last 26 years, the FY 2018-19 proposal is 15% lower.





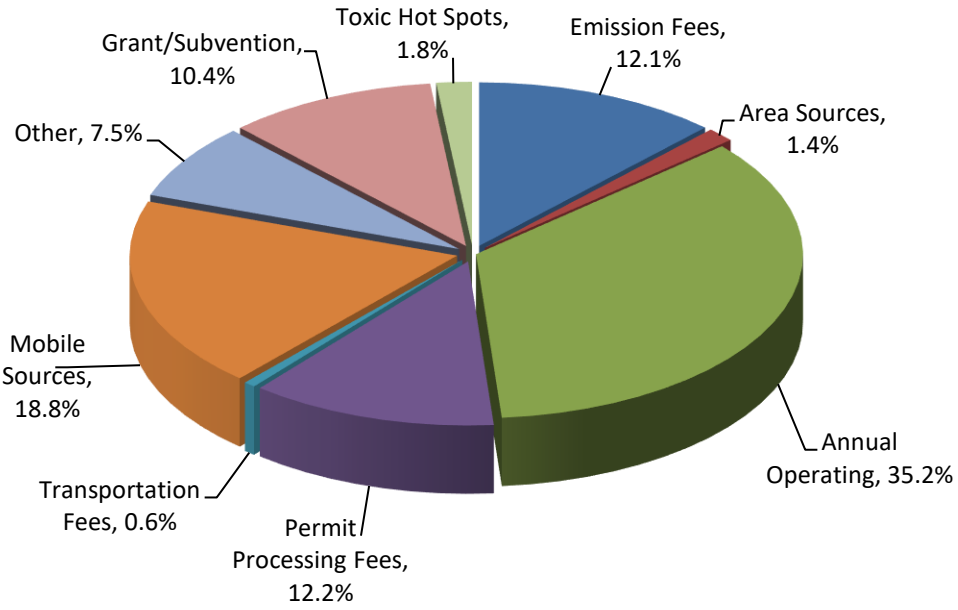
CPI adjustment based on California Consumer Price Index for the preceding Calendar Year

Revenues

Revenue Categories

Each year, in order to meet its financial needs, the SCAQMD Governing Board adopts a budget supported by a system of annual operating and emission fees, permit processing fees, toxic "hot spots" fees, area sources fees, source test/analysis fees, and transportation plan fees. In FY 2018-19, these fees are projected to generate approximately $103.7 million or about 64% of SCAQMD revenues; of this $103.7 million, $96.9 million or 60% of SCAQMD's revenues are from stationary sources. Other sources, which include penalties/settlements, Hearing Board fees, interest, and miscellaneous income, are projected to generate approximately 7% of total revenues in FY 2018-19. The remaining 29% of revenue is projected to be received in the form of federal and state grants, California Air Resource Board (CARB) subvention, and California Clean Air Act motor vehicle fees. Beginning in Fiscal Year 1978-79 Budget, the SCAQMD became a fee supported agency no longer receiving financial support from property taxes. The FY 2018-19 proposed revenue budget includes a proposed CPI fee adjustment of 3.4% and the second year of the June 2017 Board approved additional fee adjustment to permit processing fees and annual operating permit renewal fees of 10.67% for Title V facilities and 4% for non-Title V facilities in order to better align program costs with revenue.

Revenues by Major Category



The following table compares the FY 2017-18 adopted revenue budget and the FY 2017-18 amended revenue budget to the adopted revenue budget for FY 2018-19. The FY 2017-18 amended revenue budget includes Board-approved mid-year changes through March 2018.

Revenue Description	FY 2017-18 Adopted Budget	FY 2017-18 Amended Budget	FY 2018-19 Adopted Budget
Annual Operating Emission Fees	$ 19,480,550	$ 19,480,550	$ 19,729,280
Annual Operating Permit Renewal Fees	53,078,320	53,078,320	57,270,930
Permit Processing Fees	19,595,150	19,595,150	19,856,640
Portable Equipment Registration Program	1,200,000	1,200,000	1,200,000
Area Sources	2,152,500	2,152,500	2,274,800
Grants/Subvention	10,397,650	18,337,872	16,888,530
Mobile Sources	28,199,250	28,199,250	30,625,320
Transportation Programs	861,360	861,360	951,280
Toxic Hot Spots	2,488,380	2,488,380	2,849,590
Other[1]	7,471,470	7,493,484	9,700,141
Transfers In	2,072,190	4,851,074	1,284,590
Total	$ 146,996,820	$ 157,737,940	$ 162,631,101

[1]Includes revenues from Interest, Lease Income, Source Testing, Hearing Board, Penalties/Settlements, Subscriptions, and Other.

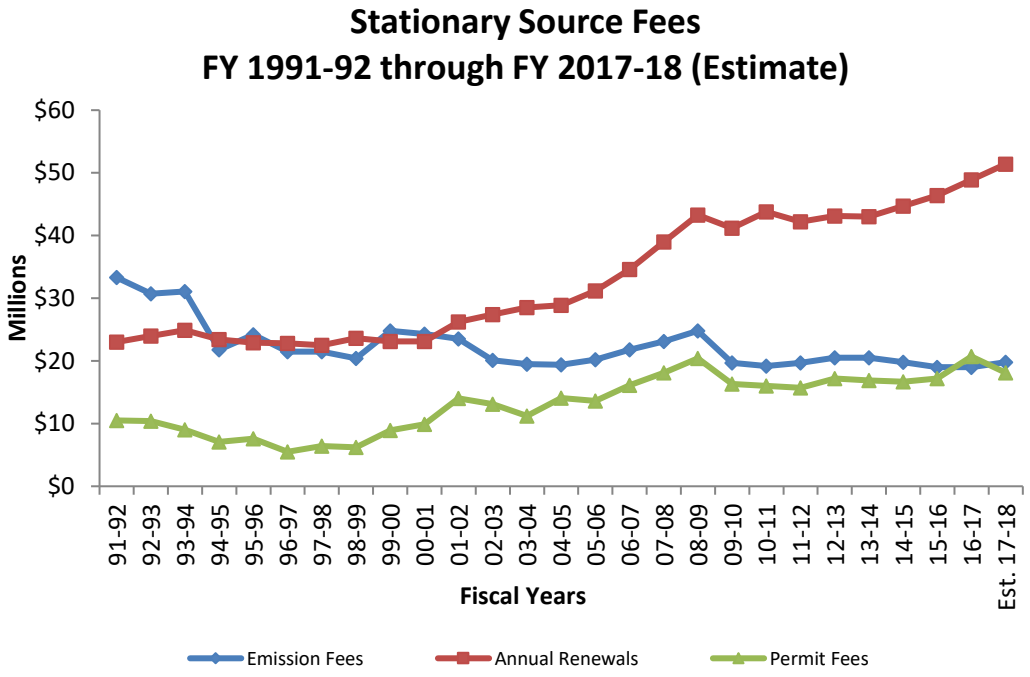
Over the past two decades, total permit fees (including permit processing, annual operating permit, and annual emissions-based fees) collected from stationary sources has increased by about 34% from $66.8 million in FY 1991-92 to $89.3 million (estimated) in FY 2017-18. When adjusted for inflation however, stationary source revenues have decreased by 22% over this same period.

Mobile source revenues that are subvened to the SCAQMD by the Department of Motor Vehicles (DMV) are projected to increase slightly from the FY 2017-18 budgeted amounts based on vehicle registration information from the DMV and recent revenue received. In addition, this category reflects reimbursements of incentive programs (Clean Fuels, Carl Moyer, and Prop 1B) whose contract activities and revenues are recorded in special revenue funds (outside the General Fund). These incentive program costs incurred by the General Fund are reimbursed to the General Fund from the various special revenue funds (subject to any administrative caps) and are reflected under the Mobile Source revenue category.

Revenues from the federal government, (Environmental Protection Agency, Department of Homeland Security, and Department of Energy) are projected to decrease in FY 2018-19 from FY 2017-18 budgeted levels reflecting the anticipated level of federal funding from one-time and on-going grants in support of air quality efforts. State Subvention funding is expected to remain

at the current level (reduced approximately 35% from FY 2001-02) for FY 2018-19. In addition, funding from CARB for the AB 617 Community Air Protection Program is included.

The following graph tracks actual stationary source revenues by type of fee from FY 1991-92 (when CPI limits were placed on SCAQMD fee authority) to estimated revenues for FY 2017-18.



Debt Structure

Pension Obligation Bonds

These bonds were issued jointly by the County of San Bernardino and the SCAQMD in December 1995. In June 2004 the SCAQMD went out separately and issued pension obligation bonds to refinance its respective obligation to the San Bernardino County Employee's Retirement Association (SBCERA) for certain amounts arising as a result of retirement benefits accruing to members of the Association.

The annual payment requirements under these bonds are as follows:

Year Ending June 30	Principal	Interest	Total
2019	$3,553,110	$3,637,290	$7,190,400
2020	3,686,640	3,503,982	7,190,622
2021	3,840,443	3,353,106	7,193,549
2022	4,006,881	3,186,361	7,193,242
2023-2024	7,790,000	467,633	8,257,633
Total	$ 22,877,074	$ 14,148,372	$ 37,025,446

Fund Balance

The SCAQMD is projecting an Unreserved (Unassigned) Fund Balance for June 30, 2019 of $36,939,316 in addition to the following Reserved and Unreserved Designated Fund Balances for FY 2018-19.

Classification	Reserves/Unreserved Designations	Amount
Committed	Reserve for Encumbrances	$ 8,440,000
Nonspendable	Reserve for Inventory of Supplies	80,000
	Unreserved Designations:	
Assigned	For Enhanced Compliance Activities	883,018
Assigned	For Other Post Employment Benefit (OPEB) Obligations	2,952,496
Assigned	For Permit Streamlining	1,313,385
Assigned	For Self-Insurance	2,000,000
Assigned	For Unemployment Claims	80,000
	Total Reserved & Unreserved Designations	$ 15,748,899

Reserves are portions of the fund balance set aside for future use and are therefore not available for appropriation. These funds are made-up of encumbrances which represent the estimated amount of current and prior years' purchase orders and contract commitments at year-end and inventory which represents the value at cost of office, computer, cleaning and laboratory supplies on hand at year-end.

Unreserved Designations in the fund balance indicate plans for use of financial resources in future years. The Designation for Enhanced Compliance Activities provides funding for inspection/compliance efforts. The Designation for Other Post Employment Benefit Obligations (OPEB) provides funding to cover the current actuarial valuation of the inherited OPEB obligation for long-term healthcare costs from the County of Los Angeles resulting from the consolidation of the four county Air Pollution Control Districts (APCDs). The Designation for Permit Streamlining was established to fund program enhancements to increase permitting efficiency and customer service. The SCAQMD is self-insured for general liability, workers' compensation, automobile liability, premises liability, and unemployment.

Long-Term Projection

The SCAQMD continues to face a number of challenges in the upcoming years, including continued higher operating costs, growing program commitments and the need for major information technology and building infrastructure improvement projects while meeting air quality goals and permit processing targets. A primary uncertainty continues to be the degree of fluctuations the financial markets will take over the next few years which will determine the performance of SCAQMD's retirement investments and could impact pension liability. In

addition, any future actions SBCERA may take such as lowering their investment return assumptions could significantly impact retirement costs and pension liability for the District. Another uncertainty is any legislative action that may impact the level of federal and state funding from grant awards and subvention funds. Cost recovery within the constraints of Proposition 26 is an additional uncertainty as SCAQMD strives to balance program operating expenses with revenues collected from fees.

In order to face these challenges, SCAQMD has a five year plan in place that provides for critical infrastructure improvement projects, maintains a stable vacancy rate in order to maximize cost efficiency, better aligns program revenues with costs, and strives to keep the percentage of unreserved fund balance to revenue within the Governing Board policy of 20%.

The following chart, outlining SCAQMD's financial projection over this time period, shows the agency's commitment to meet these challenges and uncertainties while protecting the health of the residents within the SCAQMD boundaries and remaining sensitive to business. Starting in FY 2022-23, SCAQMD will realize a $3.1M savings in Pension Obligation Bond payments.

Fiscal 2017-18 Estimate and Five Year Projection ($ in Millions)

	FY 17-18 Estimate	FY 18-19 Adopted	FY 19-20 Projected	FY 20-21 Projected	FY 21-22 Projected	FY 22-23 Projected
STAFFING		876.4	886	886	886	886
REVENUES/TRANSFERS IN*	$150.4	$162.6	$167.6	$167.2	$166.1	$168.0
EXPENDITURES/TRANSFERS OUT	$151.3	$162.6	$174.6	$173.8	$172.1	$168.4
Change in Fund Balance	-$0.9	-	-$7.0	-$6.6	-$6.0	-$0.4
UNRESERVED FUND BALANCE (at year-end)	$44.2	$44.2	$37.2	$30.6	$24.6	$24.2
% of REVENUE	29%	27%	22%	18%	15%	14%

*Includes projected CPI fee increase of 3.4% for FY 2018-19 and the 2017 Board approved second year of an additional 10.67% for Title V annual operating permit renewal and permit processing fees and an additional 4% for non-Title V annual operating permit renewal and permit processing fees; a CPI of 3.0% for FY 2019-20 and the 2017 Board approved 3rd year of an additional 10.66% for Title V annual operating permit renewal and permit processing fees; a CPI of 2.9% for FY 2020-21 and FY 2021-22 and a CPI of 2.8% for FY 2022-23.

As part of the Five Year Projection, SCAQMD has identified projected building maintenance and capital outlay improvement projects for its headquarters building. These projects are outlined in the following chart. In addition, the Infrastructure Improvement Special Revenue Fund was created with unanticipated one-time revenues from the General Fund for some of the capital outlay building-related improvement projects. The projects proposed from the Infrastructure

Improvement Fund include upgrading the Energy Management System and funding a portion of the air handler fan wall retrofit project.

GENERAL FUND POTENTIAL BUILDING MAINTENANCE and CAPITAL OUTLAY PROJECTS FY 2018-19 through 2022-23
Atrium and Building Expansion Joint Waterproofing
Repair and Reseal Parking Lot
Replace Liebert AC Units - Computer Room (6)
Replace Gaylord Air Scrubbers (2) - Cafeteria
Replace Air Handler Fan Walls
Replace Aging Kitchen Equipment
Covert Pneumatic Controls to Direct Digital Controls
Repair Concrete on Sidewalks and Curbs
Replace Vinyl Wall Covering
Refurbish Restroom and Copy/Coffee Room Sinks and Counter Tops
Repaint Building Interior
Refurbish/Replace Restroom Side Panels
Renovate Child Care Playground
Modernize Elevator Equipment
Upgrade Lighting Controls
Replace & Renovate Landscape/Irrigation
Convert Fluorescent Office Lighting to LED
Rebuild/Recompact Patio Area
Replace Roof - Child Care Center
Upgrade Electric Vehicle Charger and Support System
Convert Parking Lot and Building Lighting to LED
Repaint and Wallpaper Conference Center
Recoat Roofing Surface - District Headquarters
Paint and Wallpaper Conference Center
Replace VCT Tiles (Various Areas)
Renovate Third Floor North
Clean and Recoat Facility Roof Membrane

SUMMARY OF FISCAL YEAR 2018-19 ADOPTED BUDGET				
	FY 2017-18 Adopted Budget	FY 2017-18 Amended Budget [1]	FY 2017-18 Estimate [2]	FY 2018-19 Adopted
Funding Sources				
Revenue	$ 144,924,630	$ 152,886,866	$ 149,535,283	$ 161,346,511
Transfers-In	2,072,190	4,851,074	873,773	1,284,590
Total Funding Sources	$ 146,996,820	$ 157,737,940	$ 150,409,056	$ 162,631,101
Funding Uses				
Salaries & Employee Benefits	$ 119,860,494	$ 123,246,774	$ 115,034,978	$ 132,868,320
Services & Supplies	28,067,695	31,691,601	29,238,848	28,674,481
Capital Outlays	1,950,717	7,506,651	6,754,214	1,088,300
Transfers-Out	-	-	250,000	-
Total Funding Uses	$ 149,878,906	$ 162,445,026	$ 151,278,040	$ 162,631,101

Fund Balances - Reserves & Unreserved Designations	Classification	Projected June 30, 2018	Projected June 30, 2019
Reserve for Encumbrances	Committed	$ 8,405,000	$ 8,440,000
Reserve for Inventory of Supplies	Nonspendable	80,000	80,000
Designated for Enhanced Compliance Activities	Assigned	883,018	883,018
Designated for Other Post Employment Benefit (OPEB) Obligations	Assigned	2,952,496	2,952,496
Designated for Permit Streamlining	Assigned	1,313,385	1,313,385
Designated for Self-Insurance	Assigned	2,000,000	2,000,000
Designated for Unemployment Claims	Assigned	80,000	80,000
Total Reserves & Unreserved Designations		$ 15,713,899	$ 15,748,899
Unassigned Fund Balance	Unassigned	$ 36,931,616	$ 36,939,316
Total Fund Balances		$ 52,645,515	$ 52,688,215

[1] The FY 17-18 Amended Budget includes mid-year changes through March 2018.

[2] Includes estimated encumbrances of $8,091,000 which will be applicable to the fiscal year ending June 30, 2018.

ANALYSIS OF PROJECTED JUNE 30, 2018 FUND BALANCE		
Fund Balances as of June 30, 2017		
Reserves	$ 7,446,141	
Designated	6,303,899	
Unassigned	38,741,459	
Total Fund Balances, June 30, 2017		$ 52,491,499
Add Excess Fiscal Year 2017-18 Revenues over Expenditures		
Revenues	$ 150,409,056	
Expenditures[1]	142,937,040	
Sub-Total		$ 7,472,016
Deduct Decrease in Encumbrances Open on June 30, 2018		(7,068,000)
Deduct Projected FY 2017-18 Transfers Out to Other Funds		(250,000)
Total Projected Fund Balances, June 30, 2018		$ 52,645,515
Fund Balances (Projected) at June 30, 2018		
Reserve for Encumbrances		$ 8,405,000
Reserve for Inventory of Supplies		80,000
Designated for Enhanced Compliance Activities		883,018
Designated for Other Post Employment Benefit (OPEB) Obligations		2,952,496
Designated for Permit Streamlining		1,313,385
Designated for Self-Insurance		2,000,000
Designated for Unemployment Claims		80,000
Unassigned		36,931,616
Total Projected Fund Balances, June 30, 2018		$ 52,645,515
Note: This analysis summarizes the estimated amount of funds that will be carried into FY 2018-19.		
[1] Expenditures do not include estimated $8,091,000 encumbrances for the Fiscal Year ended June 30, 2018.		

SCHEDULE OF AVAILABLE FINANCING AND ADOPTED FISCAL YEAR 2018-19 RESERVES AND DESIGNATIONS		
Fund Balances	$ 52,645,515	
Emission Fees	19,729,280	
Annual Renewal Fees	57,270,930	
Permit Processing Fees	19,856,640	
Portable Equipment Registration Program	1,200,000	
State Subvention	3,939,080	
State Grant	8,075,000	
Federal Grant	4,874,450	
Interest Revenue	1,116,070	
Lease Revenue	166,980	
Source Test/Analysis Fees	781,700	
Hearing Board Fees	258,500	
Penalties and Settlements	5,000,000	
Area Sources	2,274,800	
Transportation Programs	951,280	
Mobile Sources/Clean Fuels	30,625,320	
Air Toxics "Hot Spots"	2,849,590	
Other Revenues/Transfers In	3,661,481	
Total Funds		$ 215,276,616
Less Proposed Fiscal Year 2018-19 Reserves and Designations		
Reserve for Encumbrances	$ 8,440,000	
Reserve for Inventory of Supplies	80,000	
Designated for Enhanced Compliance Activities	883,018	
Designated for Other Post Employment Benefit (OPEB) Obligations	2,952,496	
Designated for Permit Streamlining	1,313,385	
Designated for Self-Insurance	2,000,000	
Designated for Unemployment Claims	80,000	
Total Proposed Reserves and Designations		$ 15,748,899
Available Financing		$ 199,527,717

ANALYSIS OF PROJECTED JUNE 30, 2019 FUND BALANCE		
Fund Balances as of June 30, 2018		
Reserves	$ 8,485,000	
Designated	7,228,899	
Unassigned	36,931,616	
Total Fund Balances, June 30, 2018		$ 52,645,515
Add Excess Fiscal Year 2018-19 Revenues over Expenditures		
Revenues	$ 162,631,101	
Expenditures[1]	154,540,401	
Sub-Total		$ 8,090,700
Deduct Decrease in Encumbrances Open on July 1, 2018		(8,048,000)
Total Projected Fund Balances, June 30, 2019		$ 52,688,215
Fund Balances (Projected) Fiscal Year 2018-19		
Reserve for Encumbrances		$ 8,440,000
Reserve for Inventory of Supplies		80,000
Designated for Enhanced Compliance Activities		883,018
Designated for Other Post Employment Benefit (OPEB) Obligations		2,952,496
Designated for Permit Streamlining		1,313,385
Designated for Self-Insurance		2,000,000
Designated for Unemployment Claims		80,000
Unassigned		36,939,316
Total Projected Fund Balances, June 30, 2019		$ 52,688,215

[1] Expenditures do not include estimated $8,090,700 encumbrances for the Fiscal Year ended June 30, 2019.

Revenue Comparison				
Revenue Account	FY 2016-17 Actual	FY 2017-18 Adopted Budget	FY 2017-18 Estimated	FY 2018-19 Adopted
Emission Fees	$ 18,964,370	$ 19,480,550	$ 19,826,943	$ 19,729,280
Annual renewal Fees	47,560,997	53,078,320	51,395,027	57,270,930
Permit Processing Fees	20,729,207	19,595,150	18,051,244	19,856,640
Portable Equipment Registration Program	1,369,779	1,200,000	1,158,000	1,200,000
State Subvention	3,945,090	3,945,090	3,939,080	3,939,080
State Grant	3,512,633	-	2,725,000	8,075,000
Federal Grant	7,252,241	6,452,560	7,030,553	4,874,450
Interest Revenue	644,574	332,060	664,824	1,116,070
Lease Revenue	156,204	136,540	158,437	166,980
Source Test/Analysis Fees	734,258	774,900	756,000	781,700
Hearing Board Fees	187,733	307,500	316,928	258,500
Penalties and Settlements	11,511,570	5,000,000	10,904,218	5,000,000
Area Sources	2,090,207	2,152,500	2,152,500	2,274,800
Transportation Programs	840,322	861,360	920,000	951,280
Mobile Sources/Clean Fuels	23,792,911	28,199,250	26,177,417	30,625,320
Air Toxics "Hot Spots"	2,642,966	2,488,380	2,465,753	2,849,590
Other Revenues/Transfers In	2,957,593	2,992,660	1,767,133	3,661,481
Total Revenue	$ 148,892,656	$ 146,996,820	$ 150,409,056	$ 162,631,101

Annual Operating Emissions Fees

The Lewis-Presley Air Quality Management Act (Health & Safety Code Section 40400-40540) authorizes the SCAQMD to collect fees for permitted sources to recover the costs of District programs related to these sources. (Health & Safety Code 40410(b)). The SCAQMD initiated an annual operating emissions fees program in January 1978. As the program currently exists, all permitted facilities pay a flat fee for up to four tons of emissions. In addition to the flat fee, facilities that emit four tons or greater (from both permitted and unpermitted equipment) of any organic gases, specific organics, nitrogen oxides, sulfur oxides, or particulate matter, or 100 tons per year or greater of carbon monoxide, also pay fees based on the facility's total emissions. These facilities pay for emissions from permitted equipment as well as emissions from unpermitted equipment and processes which are regulated, but for which permits are not required, such as solvent use. In addition, a fee-per-pound is assessed on the following toxic air contaminants and ozone depleters: ammonia; asbestos; benzene; cadmium; carbon tetrachloride; chlorinated dioxins and dibenzofurans; ethylene dibromide; ethylene dichloride; ethylene oxide; formaldehyde; hexavalent chromium; methylene chloride; nickel; perchloroethylene; 1,3-butadiene; inorganic arsenic; beryllium; polynuclear aromatic hydrocarbons (PAHs); vinyl chloride; lead; 1,4-dioxane; trichloroethylene; chlorofluorocarbons (CFCs); and 1,1,1-trichloroethane. The rates are set forth in SCAQMD Rule 301.

FY 2018-19 Adopted Budget: The non-RECLAIM emissions are based on Annual Emission Report (AER) data for Calendar Year 2016. The RECLAIM NO_X and SO_X emission projection is based on holdings according to the RECLAIM Trading Credit (RTC) listing. The flat emission fees are projected based on the number of active facilities with at least one permit. A 3.4% CPI increase is included.

Annual Operating Permit Renewal

State law authorizes the SCAQMD to have an annual permit renewal program and authorizes fees to recover the costs of the program (Health & Safety Code Section 42300; 40510(b). The annual operating permit renewal program, initiated by the SCAQMD in February 1977, requires that all active permits be renewed on an annual basis upon payment of annual renewal fees. The annual renewal rates are established in SCAQMD Rule 301 and are based on the type of equipment, which is related to the complexity of related compliance activity. For basic equipment (not control equipment) the operating fee schedule also corresponds to some extent to the emission potential of the equipment. Along with annual operating emissions fees, annual operating permit renewal fees are intended to recover the costs of programs such as SCAQMD's compliance program, planning, rule making, monitoring, testing, source education, public outreach, civil enforcement, including the SCAQMD's Hearing Board, and stationary and area source research projects.

FY 2018-19 Adopted Budget: The projection is based on an estimated number of permits at the various equipment fee schedules. A 3.4% CPI increase is included. Also included is the second year of a phased in increase approved by the Governing Board in June 2017 (a 10.67% increase for Title V annual operating permit renewal fees and a 4% increase in non-Title V annual operating permit renewal fees).

Permit Processing Fees

Under the Health & Safety Code 42300, SCAQMD may adopt and implement a program requiring that a permit be obtained from SCAQMD to construct or operate any equipment which emits or controls air pollution in SCAQMD's jurisdictional boundaries before the construction or operation of the equipment. SCAQMD has adopted rules requiring such permits, to ensure that equipment in SCAQMD's jurisdictional boundaries is in compliance with SCAQMD Rules and Regulations but exempts certain equipment which is deemed to have de minimis emissions (Rule 219). Permit fees are authorized by state law to recover the reasonable costs of the permit program involving permitting, planning, enforcement, and monitoring related activities. Permit processing fees support the permit processing program and the fee rate schedules for the different equipment categories are based on the average time it takes to process and issue a permit. Each applicant, at the time of filing, pays a permit processing fee which partially recovers the costs for normal evaluation of the application and issuance of the permit to construct and permit modifications. This category also includes fees charged to partially recover the costs of evaluation of plans, including but not limited to Rule 403 dust control plans, and Rule 1118 flare monitoring plans. The permit processing fees also cover the administrative cost to process Change of Operator applications, applications for Emission Reduction Credits, and Administrative Changes to permits. This category also includes a number of specific fees such as Title V permit processing fees, RECLAIM permit processing fees, CEQA and air quality modeling fees, and public noticing fees. Finally this category includes some fees that are related to specific activity such as asbestos notification and Rule 222 'registration in lieu of permit.'

Included in this year's budget is a new permit fee to recover the cost associated with revising and reissuing permits to facilities exiting RECLAIM program in accordance with the SCAQMD's Governing Board resolution. Currently, RECLAIM facilities, including both Title V and non-Title V facilities, are subject to an SCAQMD-issued facility permit. The facility permit identifies conditions associated with compliance with the RECLAIM program. The process of exiting the RECLAIM program requires a re-evaluation of existing facility permit, with case-by-case analysis of each device (piece of equipment) for Non-RECLAIM regulatory limits, monitoring, recordkeeping and reporting requirements, emission factors, emission limits, and any other applicable RECLAIM requirements. This is a one-time fee for the proposed transition process associated with exiting the RECLAIM program.

FY 2018-19 Adopted Budget: The projection is based on the anticipated number and type of applications that will be processed. A 3.4% CPI increase is included. Also included is the second year of a phased in increase approved by the Governing Board in June 2017 (a 10.67% increase for Title V annual operating permit renewal fees and a 4% increase in non-Title V annual operating permit renewal fees).

Portable Equipment Registration Program (PERP)

The California Air Resources Board (CARB) provides revenues to local air districts to offset the costs of inspecting equipment registered under CARB's Portable Equipment Registration Program (PERP). Fees for inspection of PERP-registered engines by SCAQMD field staff are collected by CARB at the time of registration and passed through to SCAQMD on an annual basis. Fees for inspection of all other PERP-registered equipment are billed at an hourly rate set forth in SCAQMD Rule 301, as determined by CARB and collected by SCAQMD at the time the inspection is conducted.

FY 2018-19 Adopted Budget: The revenue projection is based on the anticipated number of inspections.

Area Sources

Emissions fees and quantity–based fees from architectural coatings revenue covers architectural coatings fair share of emissions supported programs. SCAQMD Rule 314 covers emission-based fees and quantity-based fees. Fees on area sources are authorized by Health & Safety Code §40522.5. Architectural coatings are assessed annually based on quantity (gallons) distributed or sold for use in SCAQMD's jurisdiction. This revenue allows SCAQMD to recover the costs of staff working on compliance, laboratory support, architectural coatings emissions data, rule development, and architectural coatings revenue collection.

FY 2018-19 Adopted Budget: Fees are based on the annual quantity and emissions of architectural coatings distributed or sold into or within the District for use in the District for the previous calendar year. Emissions are decreasing while sales volume is increasing. A 3.4% CPI increase is included.

California Air Resources Board Subvention

Under Health and Safety Code Section 39800-39811, the State appropriates monies each year to CARB to subvene to the air quality districts engaged in the reduction of air contaminants pursuant to the basin wide air pollution control plan and related implementation programs. The SCAQMD has received subvention funds since its inception beginning in 1977.

FY 2018-19 Adopted Budget: The current amount of $3.9 million is included in the FY 2018-19 proposed budget.

State Grant (AB 617)

Under AB 617, recently adopted by the state legislature, CARB is developing the Community Air Protection Program to reduce exposure in neighborhoods most impacted by air pollution.

FY 2018-19 Adopted Budget: The proposed budget includes the anticipated reimbursement from CARB funding for staff time, services and supplies, and equipment needed to implement the program.

Federal Grants/Other Federal Revenue

SCAQMD receives funding from EPA Section 103 and 105 grants to help support the SCAQMD in its administration of active air quality control and monitoring programs where the SCAQMD is required to perform specific agreed-upon activities. Other EPA and Department of Energy (DOE) grants provide funding for various air pollution reduction projects. A Department of Homeland Security (DHS) grant funds a special particulate monitoring program. When stipulated in the grant agreement, the General Fund is reimbursed for administrative costs associated with grant-funded projects. Most federal grants are limited to specific purposes but EPA Section 105 grants are available for the general support of air quality-related programs.

FY 2018-19 Adopted Budget: The revenue projection is based on funding levels from current federal grants and an estimated decrease in the Section 105 grant to reflect potential changes in federal funding priorities.

EXPLANATION OF REVENUE SOURCES

Interest

Revenue from this source is the result of investing the SCAQMD's General Fund cash balances.

FY 2018-19 Adopted Budget: The revenue projection is based on average cash balances and anticipated interest rates.

Leases

Revenue in this category is a result of leasing available space at SCAQMD's Headquarters facility.

FY 2018-19 Adopted Budget: The projection is based on the existing lease agreements

Source Test/Sample Analysis Fees

Revenue in this category includes fees for source tests, test protocol and report reviews, continuous emissions monitoring systems (CEMS) evaluations and certifications, laboratory approval program (LAP) evaluations, and laboratory sample analyses. The revenue recovers a portion of the costs of performing tests, technical evaluations, and laboratory analyses.

FY 2018-19 Adopted Budget: The revenue projection is based on the anticipated numbers of tests and analysis. A 3.4% CPI increase is included.

Hearing Board

Hearing Board revenue is from the filing of petitions for variances and appeals, excess emissions fees, and daily appearance fees. The revenue recovers a portion of the costs associated with these activities. Petitions for Orders for Abatement, which go before the Hearing Board, are filed by the District; therefore, there are no Hearing Board fees/revenue related to these proceedings.

FY 2018-19 Adopted Budget: The estimate is based on the projected number of hearings to be held and cases to be heard. A 3.4% CPI increase is included.

Penalties/Settlements

The revenue from this source is derived from cash settlements for violations of permit conditions, SCAQMD Rules, or state law. This revenue source is available for the general support of the SCAQMD's programs.

FY 2018-19 Adopted Budget: It is anticipated that revenue in this category will be approximately $5.0 million.

Mobile Sources

Mobile Sources revenue is composed of five components: AB2766 revenue and administrative/program cost reimbursements from four programs: Carl Moyer, AB 134, Proposition 1B, and MSRC.

AB2766:
Section 9250.17 of the Vehicle Code gives the Department of Motor Vehicles (DMV) the authority and responsibility to collect and forward to the SCAQMD four dollars for every vehicle registered in SCAQMD's jurisdictional boundaries. Thirty percent of the money ($1.20 per vehicle) collected is recognized in SCAQMD's General Fund as mobile sources revenue and is used for programs to reduce air pollution from motor vehicles and to carry out related planning, monitoring, enforcement, and technical studies authorized by, or necessary to implement, the California Clean Air Act of 1988 or the

SCAQMD Air Quality Management Plan. A proportionate share of programs that are not associated with any individual type of source (e.g., air quality monitoring) is supported by these revenues. The remaining monies are used to pay for projects to reduce air pollution from mobile vehicles: 40% ($1.60 per vehicle) to the Air Quality Improvement Special Revenue Fund to be passed through to local governments and 30% ($1.20 per vehicle) to the Mobile Source Air Pollution Reduction Fund (MSRC) to pay for projects recommended by the MSRC and approved by the SCAQMD Governing Board (see MSRC below).

Carl Moyer Program:
The Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) provides funding from the state of California for the incremental cost of cleaner heavy-duty vehicles, off-road vehicles and equipment, marine, and locomotive engines. The General Fund receives reimbursements from the Carl Moyer Fund for staff time and other program implementation/administration costs up to specified limits.

AB 134:
AB 134 increases funding for the Carl Moyer program. The General Fund will receive reimbursements from the AB 134 Special Revenue Fund (up to 6.25 percent) for administrative costs incurred to implement the program.

Proposition 1B:
The Proposition 1B Program is a $1 billion bond program approved by California voters in November 2006. This incentive program is designed to reduce diesel emissions and public health risks from goods movement activities along California's trade corridors. The General Fund receives reimbursements from the Proposition 1B Funds for staff time and other program implementation/administration costs up to specified limits.

MSRC:
MSRC revenue reflects the reimbursement from the Mobile Source Air Pollution Reduction Special Revenue Fund for the cost of staff support provided to the MSRC in administering a mobile source program. These administrative costs are limited by State law and the MSRC adopts a budget for staff support each year.

FY 2018-19 Adopted Budget: Revenue projections are based on vehicle registration data from the DMV, other state revenue received, and anticipated reimbursable implementation/administration costs for the Carl Moyer, AB 134, Prop 1B, and MSRC programs.

Clean Fuels

The General Fund receives reimbursements from the Clean Fuels Program Special Revenue Fund for staff time and other program implementation/administration costs necessary to implement the Clean Fuels Program.

Section 9250.11 of the Vehicle Code gives the DMV authority to collect and forward to SCAQMD money for clean fuels technology advancement programs and transportation control measures related to motor vehicles, according to the plan approved pursuant to Health & Safety Code §40448.5. One dollar is collected by the DMV for every vehicle registered in SCAQMD's jurisdictional boundaries, forwarded to SCAQMD, and deposited in the Clean Fuels Program Special Revenue Fund.

Clean fuels fees from stationary sources are recorded in a separate revenue account within the Clean Fuels Program Special Revenue Fund. Fees authorized by Health & Safety Code §40512 are collected from sources that emit 250 tons or more per year of Nitrogen Oxides (NOx), Sulfur Oxides (SOx), Reactive Organic Compounds (ROC), or Particulate Matter (PM). The fees collected are used to develop and implement activities that promote the use of clean-burning fuels. These activities include assessing the cost effectiveness of emission reductions associated with clean fuels

development and use of new clean fuels technologies, and other clean fuels related projects. The General Fund receives reimbursements from the Clean Fuels Program Fund for staff time and other program implementation/administration costs necessary to implement a Clean Fuels Program.

FY 2018-19 Adopted Budget: Revenue projections are based on anticipated reimbursable staff and other program costs to implement the Clean Fuels Program.

Transportation Programs

In accordance with federal and state Clean Air Act requirements, SCAQMD's Rule 2202 – On-Road Vehicle Mitigation Options provides employers with various options to either reduce mobile source emissions generated from employee commutes or implement mobile source emission reduction programs. Employers with 250 or more employees at a worksite are subject to Rule 2202 and are required to submit an annual registration to implement an emission reduction program that will obtain emission reductions equivalent to a worksite specific emission reduction target. The revenue from this category is used to recover a portion of the costs associated with filing, processing, reviewing, and auditing the registrations and the ridesharing programs. Fees for indirect sources, which are sources that attract mobile sources, such as the large employers covered by Rule 2202, are authorized by Health & Safety Code §40522.5.

FY 2018-19 Adopted Budget: The projection is based on the anticipated number of registrations. A 3.4% CPI increase is included.

Toxic "Hot Spots"

Health and Safety Code Section 44380 requires the SCAQMD to assess and collect fees from facilities that emit toxic compounds. Fees collected are used to recover state and SCAQMD costs to collect and analyze data regarding air toxics and their effect on the public. Costs recovered include a portion of the administrative, outreach, plan processing, and enforcement costs to implement this program. The amendments to Rule 307.1 will include cost recovery for "Potentially High Risk Level Facilities", which was a new designation included in the Rule 1402 amendments in October 2016. Staff has also noticed a large number of Air Toxics Inventory Reports (ATIR) and Health Risk Assessments (HRA) which require substantial modifications or revisions that the facility is unable to perform without errors or delays. Therefore, the amendments to Rule 307.1 also include cost recovery for these efforts.

FY 2018-19 Adopted Budget: The revenue projection is based on estimated General Fund reimbursements from the Air Toxics Fund for staff time and other program and administrative expenditures.

Other

Miscellaneous revenue includes revenue attributable to professional services the SCAQMD renders to other agencies, reimbursements from special revenue funds (non-mobile source), vanpool revenue, fees from fitness center memberships, and Public Records Act requests. This revenue category also includes Rule 1180 payments from petroleum refineries for refinery-related community air monitoring.

FY 2018-19 Adopted Budget: The revenue projections are based on historical trend information and anticipated receipts.

SOUTH COAST

AIR QUALITY MANAGEMENT DISTRICT

SCAQMD Line Item Expenditure						
Major Object / Account # **/** Account Description		**FY 2016-17 Actuals**	**FY 2017-18 Adopted Budget**	**FY 2017-18 Amended Budget**	**FY 2017-18 Estimate ***	**FY 2018-19 Adopted Budget**
Salary & Employee Benefits						
51000-52000	Salaries	$ 72,521,870	$ 78,307,837	$ 81,678,228	$ 75,939,135	$ 84,908,295
53000-55000	Employee Benefits	37,556,119	41,552,657	41,568,546	39,095,843	47,960,025
Sub-total Salary & Employee Benefits		$ 110,077,989	$ 119,860,494	$ 123,246,774	$ 115,034,978	$ 132,868,320
Services & Supplies						
67250	Insurance	$ 1,132,280	$ 1,317,400	$ 1,357,400	$ 1,254,921	$ 1,317,400
67300	Rents & Leases Equipment	222,773	201,363	245,259	221,168	214,280
67350	Rents & Leases Structure	336,269	296,791	331,301	313,169	546,791
67400	Household	606,374	761,366	759,116	755,866	763,800
67450	Professional & Special Services	8,844,686	8,313,336	10,002,284	9,408,972	8,256,242
67460	Temporary Agency Services	1,195,181	910,060	1,349,460	924,137	862,049
67500	Public Notice & Advertising	353,387	469,100	470,280	430,286	479,666
67550	Demurrage	87,380	61,930	124,439	103,095	161,430
67600	Maintenance of Equipment	610,299	684,714	1,001,353	967,840	864,664
67650	Building Maintenance	569,616	1,002,479	1,047,629	1,011,044	1,502,479
67700	Auto Mileage	142,830	82,147	177,338	134,856	130,627
67750	Auto Service	466,435	471,000	471,000	470,199	471,000
67800	Travel	267,872	311,373	349,667	316,437	338,818
67850	Utilities	1,679,503	2,213,288	2,098,540	1,658,229	1,959,620
67900	Communications	601,792	702,000	740,480	611,566	717,800
67950	Interest Expense	3,863,482	3,756,716	3,756,716	3,756,716	3,637,290
68000	Clothing	54,973	39,578	42,933	38,936	51,623
68050	Laboratory Supplies	409,047	304,000	523,093	523,093	332,000
68060	Postage	367,997	445,087	430,282	322,214	448,826
68100	Office Expense	1,480,895	1,113,975	1,514,842	1,378,582	1,068,950
68200	Office Furniture	71,198	105,425	147,800	123,219	4,000
68250	Subscriptions & Books	166,132	175,517	249,902	242,265	178,517
68300	Small Tools, Instruments, Equipment	350,131	222,039	254,245	234,404	135,045
68400	Gas and Oil	178,020	372,000	372,000	333,840	292,021
69500	Training/Conference/Tuition/ Board Exp.	716,321	926,337	870,118	812,277	975,257
69550	Memberships	168,086	68,128	220,628	187,737	68,428
69600	Taxes	23,110	74,000	54,000	21,227	59,000
69650	Awards	70,209	77,023	77,023	68,688	79,023
69700	Miscellaneous Expenses	200,631	156,725	219,675	181,070	204,725
69750	Prior Year Expense	(14,903)	-	-	-	-
69800	Uncollectable Accounts Receivable	399,092	-	-	-	-
89100	Principal Repayment	2,331,010	2,432,798	2,432,798	2,432,798	2,553,110
Sub-total Services & Supplies		$ 27,952,106	$ 28,067,695	$ 31,691,601	$ 29,238,848	$ 28,674,481
77000	**Capital Outlays**	$ 4,037,890	$ 1,950,717	$ 7,506,651	$ 6,754,214	$ 1,088,300
79050	**Building Remodeling**	$ -	$ -	$ -	$ -	$ -
Total Expenditures		$ 142,067,984	$ 149,878,906	$ 162,445,026	$ 151,028,040	$ 162,631,101

* Estimates based on July 2017 through February 2018 actual expenditures and budget amendment, excluding Transfers Out.

Acct. #	Account Description	FY 2017-18 Adopted Budget	FY 2017-18 Amended Budget	FY 2017-18 Estimate	FY 2018-19 Adopted Budget	Increase/ (Decrease)[(a)]
51000-52000	**SALARIES**	**$ 78,307,837**	**$ 81,678,228**	**$ 75,939,135**	**$ 84,908,295**	**$ 6,600,458**
These accounts include salaries and special pays such as: Call-Back, Hazard, Night Shift, Rideshare, Skill-Based, Stand-By and Overtime. Also, the FY 2018-19 Proposed Budget includes the subtraction of a net of .60 positions and proposes to maintain vacant positions at 8%. The FY 2018-19 Proposed Budget does not include overtime amounts for federal grant work that is not expected to be awarded until mid-year and will not be appropriated until the grants are awarded. The increase from the FY 2017-18 Adopted Budget is due to adding 47 positions in January 2018 for the AB 617 and AB 134 programs and the costs associated with the three year labor agreement that went into effect in the third quarter of FY 2017-18.						
53000	**EMPLOYEE BENEFITS**	**$ 3,365,307**	**$ 3,365,307**	**$ 3,596,204**	**$ 3,620,875**	**$ 255,568**
This account includes the costs associated with State Disability Insurance, employer share of unemployment insurance, Social Security and Medicare. In addition, this account includes individual memberships and/or management physicals.						
54000	**RETIREMENT**	**$ 28,166,843**	**$ 28,166,843**	**$ 25,080,001**	**$ 34,350,829**	**$ 6,183,986**
This account includes the employer's share of the employee retirement system contributions. The increase from the FY 2018-19 Adopted Budget is based on the contribution rates provided from the San Bernardino County Retirement Association (SBCERA) and adding 47 positions in January 2018.						
55000	**INSURANCE**	**$ 10,020,506**	**$ 10,036,396**	**$ 10,419,638**	**$ 9,988,321**	**($ 32,185)**
This account includes employer's share of health, life, dental, vision care and accident insurance.						

[(a)] FY 2018-19 Proposed Budget vs. FY 2017-18 Adopted Budget.

SCAQMD Personnel Summary – Authorized/Funded Positions						
Positions as of	**Mid-Year Adjustments**		**Positions as of**	**FY 2018-19**		**Positions as of**
June 30, 2017	Add	Delete	June 30, 2018	Add	Delete	July 1, 2018
825.25	61	(14.25)	872	19.4	(15)	876.4

Fiscal Year 2017-18 Mid-Year Changes in Authorized/Funded Positions				
Office	**Position**	**Add**	**Delete**	**Total**
Administrative and Human Resources	Human Resource Analyst	1	-	1
Administrative and Human Resources	Human Resource Technician	1	-	1
Compliance & Enforcement	Office Assistant	-	(1)	(1)
Compliance & Enforcement	Staff Assistant	1	-	1
Finance	Contracts Assistant	1	-	1
Finance	Fiscal Assistant	1	-	1
Finance	Payroll Technician	1	-	1
Information Management	Assistant Deputy Executive Officer	-	(0.25)	(.025)
Information Management	Assistant Information Technology Specialist	2	-	2
Information Management	Assistant Telecommunications Technician	-	(1)	(1)
Information Management	Audio-Visual Specialist	-	(1)	(1)
Information Management	Computer Operations Supervisor	-	(1)	(1)
Information Management	Computer Operator	-	(3)	(3)
Information Management	Information Technology Specialist I	2	-	2
Information Management	Information Technology Specialist II	2	-	2
Information Management	Information Technology Supervisor	3	-	3
Information Management	Senior Information Technology Specialist	4	-	4
Information Management	Systems & Programming Supervisor	1	-	1
Information Management	Systems Analyst	4	-	4
Information Management	Telecommunications Supervisor	-	(2)	(2)
Information Management	Telecommunications Technician II	-	(5)	(5)
Legal	Office Assistant	1	-	1
Legal	Paralegal	1	-	1
Legal	Senior Deputy District Counsel	1	-	1
Legislative & Public Affairs/Media Office	Senior Public Information Specialist	2	-	2
Planning, Rule Development, & Area Sources	Air Quality Specialist	10	-	10
Planning, Rule Development, & Area Sources	Planning & Rules Manager	1	-	1
Planning, Rule Development, & Area Sources	Program Supervisor	2	-	2
Planning, Rule Development, & Area Sources	Secretary	1	-	1
Science & Technology Advancement	Air Quality Inspector II	1	-	1
Science & Technology Advancement	Air Quality Instrument Specialist II	1	-	1
Science & Technology Advancement	Air Quality Specialist	7	-	7
Science & Technology Advancement	Atmospheric Measurement Manager	1	-	1
Science & Technology Advancement	Contracts Assistant	2	-	2
Science & Technology Advancement	Office Assistant	1	-	1
Science & Technology Advancement	Program Supervisor	2	-	2
Science & Technology Advancement	Secretary	1	-	1
Science & Technology Advancement	Senior Air Quality Chemist	2	-	2
Total Mid-Year Changes		**61**	**(14.25)**	**46.75**

Fiscal Year 2018-19 Adopted Personnel Actions				
Office	**Position**	**Add**	**Delete**	**Total**
Administrative and Human Resources	General Maintenance Worker	1	-	1
Administrative and Human Resources	Mail/Subscription Services Clerk	-	(1)	(1)
Compliance & Enforcement	Senior Administrative Secretary	1	-	1
Engineering & Permitting	Air Quality Specialist	-	(1)	(1)
Engineering & Permitting	Senior AQ Engineering Manager	1	-	1
Executive Office	Staff Specialist	-	(1)	(1)
Finance	Contracts Assistant	-	(1)	(1)
Finance	Purchasing Assistant	1	-	1
Finance	Senior Administrative Secretary	-	(1)	(1)
Legal	Investigations Manager	-	(1)	(1)
Legal	Paralegal	-	(1)	(1)
Legal	Staff Specialist	1	-	1
Legislative & Public Affairs/Media Office	Community Relations Manager	-	(1)	(1)
Legislative & Public Affairs/Media Office	Program Supervisor	-	(1)	(1)
Legislative & Public Affairs/Media Office	Public Affairs Manager	2	-	2
Legislative & Public Affairs/Media Office	Senior Public Info Specialist	1	-	1
Planning, Rule Development, & Area Sources	Air Quality Specialist	2	-	2
Planning, Rule Development, & Area Sources	Contracts Assistant	1	-	1
Planning, Rule Development, & Area Sources	Office Assistant	-	(2)	(2)
Planning, Rule Development, & Area Sources	Senior Office Assistant	1	-	1
Planning, Rule Development, & Area Sources	Transportation Plan Reviewer	-	(2)	(2)
Science & Technology Advancement	Air Quality Instrument Specialist II	1	-	1
Science & Technology Advancement	Air Quality Specialist	2	-	2
Science & Technology Advancement	Assistant Deputy Executive Officer[(b)]	0.4	-	0.4
Science & Technology Advancement	Program Supervisor	2	-	2
Science & Technology Advancement	Senior Air Quality Chemist	1	-	1
Science & Technology Advancement	Senior Air Quality Engineer	-	(1)	(1)
Science & Technology Advancement	Source Test Manager	1	-	1
Science & Technology Advancement	Staff Specialist	-	(1)	(1)
Total Fiscal Year 2018-19 Adopted Personnel Actions		19.4	(15)	4.4

[(b)] Only budgeted for five months.

Acct. #	Account Description	FY 2017-18 Adopted Budget	FY 2017-18 Amended Budget	FY 2017-18 Estimate	FY 2018-19 Adopted Budget	Increase/ (Decrease)[a]
67250	**INSURANCE**	**$1,317,400**	**$1,357,400**	**$1,254,921**	**$1,317,400**	**$ 0**
This account is for insurance coverage for the following: commercial property (real and personal) with earthquake and flood coverage, boiler and machinery, public official liability, excess workers' compensation, and excess general liability. The SCAQMD is self-insured for workers' compensation, general liability, and automobile liability. The amount requested reflects anticipated workers' compensation claims, insurance policy premiums, property losses above SCAQMD's insurance deductibles, and liability claim payments.						
67300	**RENTS & LEASES EQUIPMENT**	**$201,363**	**$245,259**	**$221,168**	**$214,280**	**$12,917**
This account is for lease agreements and/or rental of office equipment such as communication devices for emergency response inspectors, laboratory and atmospheric measurement equipment for special projects, audio visual equipment for outside meetings, printing equipment, and photocopiers. The increase from the FY 2017-18 Adopted Budget reflects increased cost for the walk-up copiers.						
67350	**RENTS & LEASES STRUCTURE**	**$296,791**	**$331,301**	**$313,169**	**$546,791**	**$250,000**
This account is for expenditures associated with structures and lot leases, and off-site storage rentals: Long Beach field office - $106,791; Conference and meeting rooms - $9,000; Air monitoring sites/Wind Stations - $421,000; and Public Meetings - $10,000 Free and low-cost public facilities are used whenever possible for public workshops and informational meetings. The increase in FY 2018-19 is for the implementation of the Rule 1180 air monitoring program. The FY 2018-19 Adopted Budget does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.						
67400	**HOUSEHOLD**	**$761,366**	**$759,116**	**$755,866**	**$763,800**	**$ 2,434**
This account is used for trash disposal, landscape maintenance, parking lot maintenance, janitorial supplies, and janitorial contracts. This account is also used for expenses associated with the Diamond Bar facility, such as specialized cleaning supplies and services required in the computer room. The change from the FY 2017-18 Adopted Budget is due to an increase in the janitorial contract.						
67450	**PROFESSIONAL & SPECIAL SERVICES**	**$8,313,336**	**$10,002,284**	**$9,408,972**	**$8,256,242**	**($57,094)**
This account is for services rendered to the SCAQMD by outside contractors. The FY 2018-19 Professional & Special Services supporting detail is located at the end of this section. The FY 2018-19 Adopted Budget does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.						

[a]FY 2018-19 Adopted Budget vs. FY 2017-18 Adopted Budget.

Acct. #	Account Description	FY 2017-18 Adopted Budget	FY 2017-18 Amended Budget	FY 2017-18 Estimate	FY 2018-19 Adopted Budget	Increase/ (Decrease)[(a)]
67460	**TEMPORARY AGENCY SERVICES**	**$910,060**	**$1,349,460**	**$924,137**	**$862,049**	**($48,011)**
Funds budgeted in this account are used for specialized temporary services that supplement staff in support of SCAQMD programs. Amounts are budgeted as a contingency for long-term absences and retirements/resignations. Also budgeted in this account is the student internship program that provides college students with the opportunity to gain experience in the workplace. The FY 2018-19 Adopted Budget does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.						
67500	**PUBLIC NOTICE & ADVERTISING**	**$469,100**	**$470,280**	**$430,286**	**$479,666**	**$10,566**
This account is used for legally required publications such as Requests for Proposals, Requests for Quotations, personnel recruitment, public outreach, advertisement of SCAQMD Governing Board and Hearing Board meetings, and public notification of SCAQMD rulemaking activities. The increase from the FY 2017-18 Adopted Budget is due to an anticipated increase in legally required publications.						
67550	**DEMURRAGE**	**$61,930**	**$124,439**	**$103,095**	**$161,430**	**$99,500**
This account is for various freight and cylinder charges as well as workspace reconfigurations and personnel moves. The increase from the FY 2017-18 Adopted Budget is based on anticipated needs due to increased staff. The FY 2018-19 Adopted Budget does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.						
67600	**MAINTENANCE OF EQUIPMENT**	**$684,714**	**$1,001,353**	**$967,840**	**$864,664**	**$179,950**
This account is for maintenance costs of SCAQMD equipment such as the following: mainframe computer hardware, phone switch, air monitoring equipment, print shop equipment, copiers, and audio visual equipment. The FY 2018-19 Adopted Budget reflects the increased cost of maintenance for the IP network as well for printers, server hardware and network hardware, as well as air monitoring equipment, but does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.						
67650	**BUILDING MAINTENANCE**	**$1,002,479**	**$1,047,629**	**$1,011,044**	**$1,502,479**	**$500,000**
This account reflects expenditures for maintaining SCAQMD offices and air monitoring stations. Also included are: a contingency amount for unplanned repairs; Gateway Association dues; elevator maintenance; energy management; and compressor services. The increase from the FY 2017-18 Adopted Budget is for the implementation of the Rule 1180 air monitoring program and a project to recoat the parking structure at the Diamond Bar Headquarters. The FY 2018-19 Adopted Budget does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.						

[(a)]FY 2018-19 Adopted Budget vs. FY 2017-18 Adopted Budget.

Acct. #	Account Description	FY 2017-18 Adopted Budget	FY 2017-18 Amended Budget	FY 2017-18 Estimate	FY 2018-19 Adopted Budget	Increase/ (Decrease)[(a)]
67700	**AUTO MILEAGE**	**$82,147**	**$177,338**	**$134,856**	**$130,627**	**$48,480**
This account is used to reimburse employees for the cost of using personal vehicles while on SCAQMD business. The requests include the mileage incurred for staff who are required to work on their scheduled days off and for employees who use their personal vehicles on SCAQMD-related business, conferences, and seminars and to attend various community, business and intergovernmental events. The increase from the FY 2017-18 Adopted Budget for the implementation of the Rule 1180 air monitoring program. The FY 2018-19 Adopted Budget does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.						
67750	**AUTO SERVICE**	**$471,000**	**$471,000**	**$470,199**	**$471,000**	**$0**
This account is used for the maintenance, towing, repair, and expired CNG tank replacement of SCAQMD fleet vehicles.						
67800	**TRAVEL**	**$311,373**	**$349,667**	**$316,437**	**$338,818**	**$ 27,445**
This account is for business travel, including lodging and meals paid pursuant to the Administrative Code, for participation in legislative hearings and meetings involving state, federal, and inter-agency issues that affect air quality in the South Coast Air Basin. The increase from the FY 2017-18 Adopted Budget is for the Executive Officer's travel as a Board Member to the National Association of Clean Air Agencies. The FY 2018-19 Adopted Budget reflects anticipated needs but does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.						
67850	**UTILITIES**	**$2,213,288**	**$2,098,540**	**$1,658,229**	**$1,959,620**	**($253,668)**
This account is used to pay gas, water, and electricity costs at the SCAQMD's headquarters building, the Long Beach field office, and air monitoring stations.						
67900	**COMMUNICATIONS**	**$702,000**	**$740,480**	**$611,566**	**$717,800**	**$15,800**
This account includes telephone and fax service, leased computer lines, video conferencing, wireless internet access for inspectors in the field, radio, and microwave services. The increase from the FY 2017-18 Adopted Budget reflects anticipated needs. The FY 2018-19 Adopted Budget does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.						
67950	**INTEREST EXPENSE**	**$3,756,716**	**$3,756,716**	**$3,756,716**	**$3,637,290**	**($119,426)**
This account is for the interest due on the 1995 and 2004 Pension Obligation Bonds. The decrease from the FY 2017-18 Adopted Budget reflects scheduled payments for FY 2018-19.						

[(a)]FY 2018-19 Adopted Budget vs. FY 2017-18 Adopted Budget.

Acct. #	Account Description	FY 2017-18 Adopted Budget	FY 2017-18 Amended Budget	FY 2017-18 Estimate	FY 2018-19 Adopted Budget	Increase/ (Decrease)[(a)]
68000	**CLOTHING**	**$39,578**	**$42,933**	**$38,936**	**$51,623**	**$12,045**
This account is for the purchase of safety equipment and protective clothing used by source testing, laboratory, compliance, and stockroom personnel. The increase from the FY 2017-18 Adopted Budget reflects the anticipated level of expenditures for FY 2018-19.						
68050	**LABORATORY SUPPLIES**	**$304,000**	**$523,093**	**$523,093**	**$332,000**	**$28,000**
This account is used to purchase various supplies such as chemicals, calibration gases and glassware for laboratory services. The FY 2018-19 Adopted Budget reflects anticipated needs but does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.						
68060	**POSTAGE**	**$445,087**	**$430,282**	**$322,214**	**$448,826**	**$ 3,739**
This account covers the cost of mailing out annual billings, permits, notifications to the Governing Board and Advisory groups, monthly newsletters, warrants, outreach materials to local governments, and Rule 2202 notifications. The FY 2018-19 Adopted Budget reflects mailings based on current activity.						
68100	**OFFICE EXPENSE**	**$1,113,975**	**$1,514,842**	**$1,378,582**	**$1,068,950**	**($45,025)**
This account is used for the purchase of office supplies, computer hardware and software under $5,000, photocopier supplies, print shop and artist supplies, and stationery and forms. The FY 2018-19 Adopted Budget reflects anticipated needs but does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.						
68200	**OFFICE FURNITURE**	**$105,425**	**$147,800**	**$123,219**	**$4,000**	**($ 101,425)**
This account is for office furniture under $5,000. The decrease in the FY 2018-19 Adopted Budget reflects anticipated needs.						
68250	**SUBSCRIPTIONS & BOOKS**	**$175,517**	**$249,902**	**$242,265**	**$178,517**	**$3,000**
This account is used to purchase reference materials, magazine subscriptions, books, and on-line database legal research services. The FY 2018-19 Adopted Budget reflects anticipated cost increases.						
68300	**SMALL TOOLS, INSTRUMENTS, EQUIPMENT**	**$222,039**	**$254,245**	**$234,404**	**$135,045**	**($86,994)**
This account covers the purchase of small tools and equipment for air monitoring stations, laboratory, and headquarters building maintenance. The FY 2018-19 Adopted Budget does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.						

[(a)]FY 2018-19 Adopted Budget vs. FY 2017-18 Adopted Budget.

Acct. #	Account Description	FY 2017-18 Adopted Budget	FY 2017-18 Amended Budget	FY 2017-18 Estimate	FY 2018-19 Adopted Budget	Increase/ (Decrease)[(a)]
68400	**GAS & OIL**	**$372,000**	**$372,000**	**$333,840**	**$292,021**	**($79,979)**
This account is for the purchase of gasoline, oil, and alternative fuels for the SCAQMD fleet. The FY 2018-19 Adopted Budget reflects anticipated needs.						
69500	**TRAINING/CONF/ TUITION/BOARD EXP**	**$926,337**	**$870,118**	**$812,277**	**$975,257**	**$48,920**
This account is used for tuition reimbursement, conference and training registrations, certain costs associated with the SCAQMD's Governing and Hearing Boards and advisory groups, and training-related travel expenditures. The FY 2018-19 Adopted Budget reflects anticipated needs and includes increases in Governing and Hearing Board costs.						
69550	**MEMBERSHIPS**	**$68,128**	**$220,628**	**$187,737**	**$68,428**	**$300**
This account provides for SCAQMD membership in in scientific, clean fuels, advanced technology, and related environmental business/policy organizations. The FY 2018-19 Adopted Budget reflects anticipated needs.						
69600	**TAXES**	**$74,000**	**$54,000**	**$21,227**	**$59,000**	**($15,000)**
This account is for unsecured property and use taxes, fuel taxes, and sales taxes. The decrease in the FY 2018-19 Adopted Budget reflects a decrease in anticipated needs.						
69650	**AWARDS**	**$77,023**	**$77,023**	**$68,688**	**$79,023**	**$2,000**
This account covers employee service awards for continuous service, employee recognition programs, plaques/awards the SCAQMD may present to individuals/businesses/community groups for outstanding contributions towards air quality goals, and promotional items for community events. The cost is anticipated to increase from the FY 2017-18 Adopted Budget.						
69700	**MISCELLANEOUS EXPENSES**	**$156,725**	**$219,675**	**$181,070**	**$204,725**	**$48,000**
This account is to record expenditures that do not fall in any other account such as SCAQMD advisory group per diems, meeting and event expenses, and sponsorships. The increase from the FY 2017-18 Adopted Budget reflects the anticipated level of expenditures for FY 2018-19.						
69750	**PRIOR YEAR EXPENSE**	**$0**	**$0**	**$0**	**$0**	**$0**
This account is used to record actual expenditures attributable to prior year budgets. No amount is budgeted for this account due to the nature of the account.						

[(a)]FY 2018-19 Adopted Budget vs. FY 2017-18 Adopted Budget.

	Account Description	FY 2017-18 Adopted Budget	FY 2017-18 Amended Budget	FY 2017-18 Estimate	FY 2018-19 Adopted Budget	Increase/ (Decrease)[a]
69800	**UNCOLLECTIBLE ACCOUNTS RECEIVABLE**	**$0**	**$0**	**$0**	**$0**	**$0**
No amount is budgeted for this account due to the nature of the account.						
89100	**PRINCIPAL REPAYMENT**	**$2,432,798**	**$2,432,798**	**$2,432,798**	**$2,553,110**	**$120,312**
This account reflects the principal due on pension obligation bonds. The increase from the FY 2017-18 Adopted Budget reflects scheduled payments for FY 2018-19.						

[a]FY 2018-19 Adopted Budget vs. FY 2017-18 Adopted Budget.

Adopted Fiscal Year 2018-19 Professional & Special Services Detail by Office			
Office	**Program**	**Contract Description**	**Amount**
District General	Dist. General Overhead	Administrative Fees for 1995 & 2004 Pension Obligation Bonds (POBs)	$1,500
	Dist. General Overhead	Arbitration/Hearing Officer	9,400
	Dist. General Overhead	Benefits Administrator	13,000
	Dist. General Overhead	COBRA Administration Services	6,000
	Dist. General Overhead	Custodial Fees for 1995 & 2004 POBs	800
	Dist. General Overhead	Employee Assistance Program	13,995
	Dist. General Overhead	Employee Relations Litigation	250,000
	Dist. General Overhead	Health Reimbursement Arrangement Plan Administration	5,000
	Dist. General Overhead	Modular Furniture Maintenance, Setup, and Moving Services	15,000
	Dist. General Overhead	Oracle Software Support	30,400
	Dist. General Overhead	PeopleSoft Maintenance	208,400
	Dist. General Overhead	Plans and Design Consulting Services	95,000
	Dist. General Overhead	Security Alarm Monitoring	1,980
	Dist. General Overhead	Security Guard Services	528,000
	Dist. General Overhead	Wellness Program	37,500
	Sub-total District General		**$1,215,975**
Governing Board	Operational Support	Board Member Assistant/Consultants	$771,284
	Sub-total Governing Board		**$771,284**
Executive Office	Develop Programs	Professional & Special Services	$75,000
	Sub-total Executive Office		**$75,000**
Finance	Operational Support	AB 2766 Audit of DMV Fee Recipients	$10,000
	Operational Support	Bank Service Charges/Los Angeles County Treasurer Office	60,000
	Ensure Compliance	Bank Services Fund 15, Hot Spots Lockbox	15,000
	Operational Support	Financial Audit	53,910
	Operational Support	Financial Consultant for Treasury Management	23,000
	Operational Support	LA County Treasurer Office - PGP Maintenance	1,650
	Sub-total Finance		**$163,560**
Legal	Ensure Compliance	Experts/Court Reporters/Attorney Services	$30,000
	Ensure Compliance	Litigation Counsel	141,201
	Ensure Compliance	Software Maintenance & Licensing	30,000
	Operational Support	Specialized Legal Services	50,000
	Sub-total Legal		**$251,201**

Adopted Fiscal Year 2018-19 Professional & Special Services Detail by Office (cont.)			
Office	**Program**	**Contract Description**	**Amount**
Administrative & Human Resources	Operational Support	Architectural, Engineering and Surveyor Consultants	$10,000
	Operational Support	In-house Training Classes	2,000
	Operational Support	Locksmith	2,000
	Operational Support	Medical Services Provider	30,000
	Operational Support	NEOGOV Subscription License	10,000
	Operational Support	Occupational Health Services	25,000
	Customer Service & Business Assistance	Outside Binding Services	6,000
	Customer Service & Business Assistance	Outside Printing Services	31,750
	Operational Support	Test Development	15,000
	Operational Support	Third-Party Claims Administrator for Workers Compensation	20,000
	Sub-total Administrative & Human Resources		**$151,750**
Clerk of the Boards	Ensure Compliance	Court Reporting, Audio-visual, and/or Security Services	$63,800
	Ensure Compliance	Outside Legal Contract	15,000
	Ensure Compliance	Professional Interpreter Services	6,400
	Sub-total Clerk of the Boards		**$85,200**
Information Management	Operational Support	Action Works Metro System Software Support	$20,000
	Operational Support	Adobe Creative Cloud Software Support	2,500
	Operational Support	AER & R1113/314 Upgrade & Maintenance	15,000
	Operational Support	AIS (Address Information System) Five Digit Subscription	1,200
	Operational Support	Anti-Spam Maintenance/Support	15,000
	Operational Support	ArcGIS Online Annual Subscription	1,000
	Operational Support	Backup Software	50,000
	Operational Support	Backup Utility Maintenance	11,500
	Operational Support	CLASS System Maintenance	88,000
	Operational Support	Component One Software Support	1,200
	Operational Support	Computer-Based Training Software Support	1,800
	Operational Support	CourtView System Maintenance	10,000

Adopted Fiscal Year 2018-19 Professional & Special Services Detail by Office (cont.)			
Office	**Program**	**Contract Description**	**Amount**
Information Management (cont.)	Operational Support	Crystal Reports Software Support	$22,000
	Operational Support	Disaster Recovery Software	60,000
	Operational Support	Dundas Chart Software Support	700
	Operational Support	Dynamic Web Twain License Renewal	5,700
	Operational Support	Email Recovery Software (PowerControls) Maint/Support	2,750
	Operational Support	Email Reporting	4,000
	Operational Support	ERwin ERX & BPwin SW Support	26,000
	Operational Support	Faxcom FaxServer Support	15,000
	Operational Support	Imaging Software Support	145,000
	Operational Support	Infragistics Pro Software Support	1,000
	Operational Support	Ingres/OpenIngres Additional Licensing	72,000
	Operational Support	Ingres/OpenIngres Advanced Success Pack	140,000
	Operational Support	Installshield Software Support	3,800
	Operational Support	Internet Filtering Maintenance/Support	70,000
	Operational Support	Kronos Time Keeper	2,000
	Operational Support	Microsoft Developer Network CD - Application Development	15,196
	Operational Support	Microsoft Developer Network Premium Renewal	4,000
	Operational Support	Microsoft Technical Software Support (Server Applications)	15,000
	Operational Support	Microsoft Virtual Earth Maintenance/Support	15,000
	Operational Support	Network Analyzer (Sniffer) Maintenance/Support	4,500
	Operational Support	Network Backbone Support	15,000
	Operational Support	NT Software Support - Proactive	62,000
	Operational Support	Off-site Document Destruction Services	24,000
	Operational Support	Off-site Storage Nightly Computer Backup	22,000
	Operational Support	Online Filing Infrastructure	25,000
	Operational Support	PowerBuilder Software Support	24,000
	Operational Support	PreEmptive Analytics Software Support	7,000
	Operational Support	Proxy Reporting Support	3,250
	Operational Support	PVCS Software Support	4,900
	Operational Support	ScaleOut StateServer Maintenance	8,500

Adopted Fiscal Year 2018-19 Professional & Special Services Detail by Office (cont.)			
Office	**Program**	**Contract Description**	**Amount**
Information Management (cont.)	Operational Support	SCAQMD Web Application Modifications	$20,000
	Operational Support	Secure Service Digital ID Services	2,000
	Operational Support	Secure Service Digital ID DEC Internet Server	850
	Operational Support	Sitefinity CMS Software Support	9,500
	Operational Support	Software Support for EOS.Web Enterprise	6,300
	Operational Support	Software Support for On-Line Catalog	2,050
	Operational Support	Swiftview Software Support	950
	Operational Support	Telephone Switchview Software Support	9,500
	Operational Support	Terminal Emulation (Reflection) Maintenance/Support	1,175
	Operational Support	Videoteleconferencing Maintenance & Support	20,000
	Operational Support	Virus Scan Support	15,000
	Operational Support	Visual Expert Software Support	6,000
	Operational Support	Web Consulting Support	64,300
	Operational Support	Web Core Technology Upgrade (.NET Upgrade)	10,000
	Operational Support	Website Evaluation & Improvement	200,000
	Sub-total Information Management		**$1,404,121**
Planning, Rule Development, & Area Sources	Ensure Compliance	AER Printing	$5,000
	Monitoring Air Quality	Air Quality Forecast and Alert Notification Support	50,000
	Develop Programs	California Emissions Estimator Model (CalEEMod) Upgrades/Support	25,000
	Develop Programs	CEQA for AQMD Projects	125,000
	Develop Programs	CEQA Special Studies	50,000
	Timely Review of Permits	Dispersion Modeling Support	50,000
	Develop Programs	Implementation of Abts Recommendations	111,300
	Monitoring Air Quality	Maintain Wind Stations and Analyze Data	60,000
	Monitoring Air Quality	MATES V	50,000
	Monitoring Air Quality	Meteorological Data Services	7,500
	Develop Rules	PM and Ozone Model Consulting	90,000
	Develop Programs	Rule 2202 Computer System Maintenance	15,000
	Customer Service & Business Assistance	Rule 2202 ETC On-Line Training	20,000

Adopted Fiscal Year 2018-19 Professional & Special Services Detail by Office (cont.)			
Office	**Program**	**Contract Description**	**Amount**
Planning, Rule Development, & Area Sources (cont.)	Develop Programs	SIP, AQMP and Rule Printing	$8,000
	Develop Rules	Software renewal, upgrades and purchase in support of economic modeling	150,000
	Develop Rules	Technical Assessment in of Regional Modeling	50,000
	Ensure Compliance	Technology Assessment Studies	100,000
	Monitoring Air Quality	Weather Data Services Communications	7,500
	Sub-total Planning, Rule Development & Area Sources		**$974,300**
Legislative & Public Affairs/Media Office	Policy Support	After-hours Call Center Service	$3,500
	Customer Service & Business Assistance	Clean Air Awards	12,600
	Customer Service & Business Assistance	Community Outreach	277,005
	Policy Support	Graphics & Printing	33,616
	Policy Support	Graphics, Printing & Outreach Materials	4,000
	Policy Support	Legislative Advocacy - Sacramento	365,000
	Policy Support	Legislative Advocacy - Washington DC	665,130
	Policy Support	Legislative Computer Services	10,000
	Customer Service & Business Assistance	Multi-Lingual Translation - Public Participation	20,000
	Policy Support	News Release Services	9,000
	Policy Support	Photographic and Video Services - MO	55,000
	Customer Service & Business Assistance	Promotion Marketing of Smart Phone Tools	50,000
	Policy Support	Radio/Television Monitoring	11,000
	Sub-total Legislative & Public Affairs/Media Office		**$1,515,851**
Science & Technology Advancement	Ensure Compliance	Laboratory Analytical Services	$15,000
	Monitoring Air Quality	Rule 1180 Support	175,000
	Advanced Clean Air Technology	Technical Assistance, Expert Consultation, Outreach/Education – Clean Fuels	1,000,000
	Advanced Clean Air Technology	Technical Assistance, Expert Consultation, Outreach/Education – CMP, AB923	75,000
	Develop Programs	Technical Assistance, Expert Consultation, Outreach/Education – Prop 1B	300,000
	Ensure Compliance	Source Testing Services	30,000
	Ensure Compliance	Technical Support for Air Monitoring and Community Complaint Resolution	35,000
	Sub-total Science & Technology Advancement		**$1,630,000**

Adopted Fiscal Year 2018-19 Professional & Special Services Detail by Office (cont.)			
Office	**Program**	**Contract Description**	**Amount**
Engineering & Permitting	Operational Support	Workspace Reconfiguration	$2,500
	Sub-total Engineering & Permitting		**$2,500**
Compliance & Enforcement	Ensure Compliance	Compliance Notice Printing	$3,000
	Ensure Compliance	Lab Analysis Services for R1176 and other air samples	8,000
	Operational Support	Workspace Reconfiguration	4,500
	Sub-total Compliance & Enforcement		**$15,500**
		Total Professional & Special Services	**$8,256,242**

Acct. #	Account Description	FY 2017-18 Adopted Budget	FY 2017-18 Amended Budget	FY 2017-18 Estimate	FY 2018-19 Adopted Budget	Increase/ (Decrease)[(a)]
77000	**CAPITAL OUTLAYS**	**$1,950,717**	**$7,506,651**	**$6,754,214**	**$1,088,300**	**($862,417)**

This account is for tangible asset expenditures with a value of at least $5,000 and a useful life of at least three years and intangible asset expenditures with a value of at least $5,000 and a useful life of at least one year. The increase from the FY 2017-18 Adopted Budget reflects anticipated needs. The FY 2018-19 Adopted Budget does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.

A listing by office of the adopted Capital Outlays for FY 2018-19 is provided at the end of this section.

[(a)]FY 2018-19 Adopted Budget vs. FY 2017-18 Adopted Budget.

Acct. #	Account Description	FY 2017-18 Adopted Budget	FY 2017-18 Amended Budget	FY 2017-18 Estimate	FY 2018-19 Adopted Budget	Increase/ (Decrease)[(a)]
79050	**BUILDING REMODELING**	**$0**	**$0**	**$0**	**$0**	**$0**

This account is used for minor remodeling projects which become necessary as a result of reorganizations or for safety reasons. No projects are anticipated in Fiscal Year 2018-19.

[(a)]FY 2018-19 Adopted Budget vs. FY 2017-18 Adopted Budget.

Fiscal Year 2018-19 Capital Outlays Detail				
Office	**Program**	**Category**	**Description**	**Amount**
District General	Operational Support	N/A	Unbudgeted Capital Outlay - This amount is set aside for unanticipated needs or emergency situations to avoid interruption of operations.	$75,000
	Operational Support	Replacement	System Support and Programming (PeopleSoft/CLASS) - For functional and technical support and special reporting needs for the CLean Air Support System (CLASS)-Finance automated billing and the PeopleSoft Human Capital Management and Financial Accounting systems.	75,000
	Operational Support	Replacement	Maintenance Truck - To replace a 1991 pickup truck that is used to pick up or carry parts, materials, and equipment as well as to travel to air monitoring stations for repairs or new installations.	60,000
	Sub-total District General			**$210,000**
Finance	Operational Support	New	PeopleSoft Online Requisition and Work Flow Project – To develop an electronic requisition system to provide internal users and approvers with a streamlined ordering process.	$75,800
	Sub-total Finance			**$75,800**
Planning, Rule Development & Area sources	Ensure Compliance	New	Rule 1415 Online Reporting System - To make necessary enhancements and correct deficiencies to the web application for Rule 1415 – Reduction of Refrigerant Emissions from Stationary Air Conditioning Systems.	$10,000
	Develop Rules	New	Regional Modeling Computer Upgrades – To provide sufficient CPUs and data storage capacity to the Regional Air Quality Modeling Program's computer server clusters.	100,000
	Sub-total Planning, Rule Development & Area Sources			**$110,000**
Information Management	Operational Support	New	Miscellaneous Telecommunication Upgrade/Enhancement – To enable Telecommunications to meet unforeseen network needs/changes required to support SCAQMD staff.	$35,000
	Sub-total Information Management			**$35,000**
Science & Technology Advancement	Monitoring Air Quality	Replacement	Replacement Instrument for Gaseous Measurements – To replace 15+ year old ozone monitors (10) and NOx Monitors (10) and upgrade the calibration dilution systems (10) due to more stringent U.S. EPA requirements.	$222,500
	Advance Clean Air Technology	New	Annual July Board Letter Clean Fuels: Advanced Tech Vehicles/Infrastructure – For advanced technology vehicles.	285,000
	Sub-total Science & Technology Advancement			**$507,500**

Fiscal Year 2018-19 Capital Outlays Detail (cont.)				
Office	**Program**	**Category**	**Description**	**Amount**
Engineering & Permitting	Timely Review of Permits	Replacement	NSR Program Enhancement – To provide continuing enhancements to the New Source Review (NSR) software.	$50,000
	Timely Review of Permits	Replacement	PAATS & Permit Processing System – To provide enhancements to the PAATS software.	20,000
	Sub-total Engineering & Permitting			**$70,000**
Compliance & Enforcement	Ensure Compliance	New	Programmatic Updates to Rule 1403 Notification Web Application – To enhance and update the web application due to rule changes.	$80,000
	Sub-total Compliance & Enforcement			**$80,000**
			Total Capital Outlays	**$1,088,300**

SOUTH COAST

AIR QUALITY MANAGEMENT DISTRICT

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT DRAFT
GOALS AND PRIORITY OBJECTIVES FOR FY 2018-2019

MISSION STATEMENT

"To clean the air and protect the health of all residents in the South Coast Air District through practical and innovative strategies."

GOALS AND PRIORITY OBJECTIVES

The following Goals and Priority Objectives have been identified as being critical to meeting SCAQMD's Mission in Fiscal Year 2018-19.

GOAL I. Achieve Clean Air Standards.

Priority Objective		Performance Indicator	Performance Measurement
1	Implementation of the 2016 AQMP	Adherence to adoption and implementation schedules for rules, working groups, assessments and programs as adopted in the 2016 AQMP.	Complete 6 rule adoptions and/or actions that result in achievements towards AQMP emissions reductions.
2	Implement the SCAQMD Action Plan for Toxics Facilities	Conduct monitoring and achieve emissions reductions if necessary at previously unknown high risk facilities.	Conduct monitoring of at least 10 facilities and reduce emissions from those found to have high toxics risk to the community.
3	Secure Incentive Funding for Emissions Reduction	Dollar amount of new funding sources for pollution reduction projects.	Secure $400 Million of new funding sources.
4	Ensure Efficient Air Monitoring and Laboratory Operations	Achieve acceptable completion of valid data points out of the scheduled measurements in the SCAQMD air monitoring network for NAAQS pollutant before U.S. EPA deadline.	Achieve acceptable valid data completion submitted to U.S. EPA before deadline.
5	Ensure Timely Inspections of Facilities	Total number of Title V Inspections completed annually.	Complete 378 Title V Inspections.
6	Maintain progress in reducing the permit applications inventory	Number of pending permit applications.	Maintain pending permit applications inventory excluding Permits to Construct issued and RECLAIM transition applications between 2,500 and 3,000.
7	Support Development of Cleaner Advanced Technology	Amount of Clean Fuels Program projects funded.	Fund $10 Million of Clean Fuels program projects with a 1:4 leveraging ratio.
8	Initiate implementation of the fifth Multiple Air Toxics Exposure Study	Conduct monitoring and updates to emissions inventory for the evaluation of air toxics health impacts.	Conduct fixed-site monitoring at 10 sites, begin work on updating the emissions inventory, and deploy 5 different advanced monitoring methods.

GOAL II. Enhance Public Education and Equitable Treatment for All Communities.

Priority Objective		Performance Indicator	Performance Measurement
1	Evaluation of Low Cost Air Quality Sensors	Evaluation and posting of results of low cost air quality sensors that have reached the market.	Evaluate and post results of 75% of sensors that have reached the market.
2	Outreach Events and Media Relations	Number of large community outreach events conducted in each County.	Conduct 4 large community outreach events, including 1 in each County.
3	Timely Investigation of Community Complaints	Initiate complaint investigation within 2 hours of complaint receipt.	During normal SCAQMD business hours, contact 90% of complainants within 2 hours of complaint receipt.
4	Social Media Efforts	Percentage increase in number of social media followers.	30% increase in social media followers.
5	Engage Young Persons	Conduct meetings with the Young Persons advisory group.	Conduct 4 meetings with the Young Persons advisory group.

GOAL III. Operate Efficiently and Transparently.

Priority Objective		Performance Indicator	Performance Measurement
1	Ensure Transparent Governance	Percentage of Committee and Board meeting agendas with materials made available to the public one week prior to the meeting.	100% of Committee and Board meeting agendas with materials made available to the public one week prior to the meeting.
2	Ensure Transparent Governance	Percentage of Stakeholder and Working Group meeting agendas with materials made available to the public one week prior to the meeting.	100% of Stakeholder and Working Group meeting agendas with materials made available to the public 72 hours prior to the meeting.
3	Maintain a Well Informed Staff	Number of all staff information sessions offered and conducted.	Offer and conduct 10 information sessions/training for all staff.
4	Partner with Public Agencies, Stakeholder Groups, & Business	Number of meetings with Permit Streamlining Task Force subcommittee and stakeholders.	Conduct 4 meetings of the Permit Streamlining Task Force subcommittee and stakeholders.
5	IT Systems Improvements	Number of completed Enterprise GIS improvement projects.	Complete the remaining 6 of the 15 Enterprise GIS projects identified in the Enterprise GIS Implementation Plan.
6	Timely Financial Monitoring	Timely budgetary financial reporting.	Submit quarterly budgetary financial reports to the Governing Board within 6 working days of the end of the quarter.
7	Implement Cloud Office Suite	Percentage of staff migrated to a particular cloud office service.	Migrate 100% of staff to cloud office email service.

PROGRAM CATEGORIES

ADVANCE CLEAN AIR TECHNOLOGY

Identify technologies from anywhere in the world that may have application in reducing emissions from mobile and stationary sources in the SCAQMD's jurisdiction. Suggest strategies to overcome any barriers and, when appropriate, implement those strategies.

(A) Identify short-term and long-term technical barriers to the use of low-emission clean fuels and transportation technologies.

(B) Promote development and assess the use of clean fuels and low-emitting technologies.

(C) Work with industry to promote research and development in promising low-emission technologies and clean fuels.

(D) Provide technical and program support to the Mobile Source Air Pollution Reduction Review Committee (MSRC).

(E) Conduct source tests and analysis of samples to assess effectiveness of low-emissions technology.

(F) Implement and administer state-funded programs such as the Carl Moyer program for retrofitting, re-powering, or replacing diesel engines with newer and cleaner engines and the Proposition 1B program that provides funding for projects to reduce air pollution associated with freight movement along California's trade corridors.

ENSURE COMPLIANCE WITH CLEAN AIR RULES

Ensure compliance with SCAQMD rules for existing major and small stationary sources.

(A) Verify compliance with SCAQMD rules through inspections, sample collections, Visible Emissions Evaluations, certification of Continuous Emission Monitoring Systems (CEMS), and emissions audits.

(B) Issue Notices of Violation for major violations when discovered or a Notice to Comply for minor violations or to request records.

(C) Respond to and resolve public complaints concerning air pollution.

(D) Participate in Hearing Board cases, investigate breakdowns and notifications of demolitions or renovations of structures which may contain asbestos, conduct periodic monitoring, and observe source tests.

(E) Respond to industrial and chemical emergencies when requested by other agencies.

(F) Provide training classes for compliance with various SCAQMD rules such as Gasoline Transfer and Dispensing (Rule 461), Asbestos Demolition and Renovation (Rule 1403), Chrome Plating Operations (Rule 1469), Fugitive Dust Plans (Rule 403 & 403.1), Sump and Wastewater Separators (Rule 1176) and Combustion Gas Portable Analyzer Training & Certification (Rules 1146, 1146.1 & 1110.2).

PROGRAM CATEGORIES

CUSTOMER SERVICE AND BUSINESS ASSISTANCE

Support local government, businesses, and the general public.

(A) Provide local government, business and the public with accesses and input into the regulatory and policy processes of the SCAQMD.

(B) Assist cities and others with AB 2766 projects.

(C) Interact with local, state and federal agencies as well as others to share air quality information, resolve jurisdictional questions, and implement joint programs.

(D) Support air pollution reduction through implementation of comprehensive public information, legislative and customer service programs.

(E) Provide small business assistance services and support economic development and business retention activities.

(F) Make presentations to and meet with regulated organizations, individuals, public agencies and the media.

(G) Notify all interested parties of upcoming changes to air quality rules and regulations through public meetings, workshops, and printed and electronic information.

(H) Resolve permit- and fee-related problems and provide technical assistance to industry.

(I) Respond to Public Records Act requests.

(J) Produce brochures, newsletters, television, radio and print media information and materials, and digital information.

(K) Respond to letters and Internet inquiries from the public and to media inquiries and requests.

DEVELOP PROGRAMS TO ACHIEVE CLEAN AIR

Develop a regional Air Quality Management Plan (AQMP) to achieve federal and state ambient air quality standards and to meet all other requirements of the federal and California Clean Air Acts.

(A) Analyze air quality data and provide an estimation of pollutant emissions by source category.

(B) Develop pollutant control strategies and project future air quality using computer models and statistical analysis of alternative control scenarios.

(C) Analyze issues pertaining to air toxics, acid deposition, and potential socioeconomic and environmental impacts (CEQA) of SCAQMD plans and regulations.

(D) Conduct outreach activities to solicit public input on proposed control measures.

(E) Implement Rule 2202 On-Road Motor Vehicle Mitigation Options and process employee commute reduction program submittals and registrations. Provide one-on-one assistance to employers to ensure compliance with the rule.

DEVELOP PROGRAMS TO ACHIEVE CLEAN AIR (Cont.)

(F) Develop and update emissions inventories; conduct in-house auditing of annual emission reports; conduct field audits.

DEVELOP RULES TO ACHIEVE CLEAN AIR

Develop emission reduction regulations for sulfur dioxide, nitrogen dioxide, organic gases, particulate matter, toxics, and other pollutants to implement the regional AQMP, Tanner Air Toxics Process (AB 1807), National Emission Standards for Hazardous Air Pollutants (NESHAPS), and Prevention of Significant Deterioration (PSD) requirements.

(A) Provide an assessment of control technologies, evaluation of control cost, source testing and analysis of samples to determine emissions.

(B) Test and analyze products and processes to demonstrate pollution reduction potential.

(C) Solicit public input through meetings and workshops.

(D) Prepare rules to provide flexibility to industry, ensure an effective permit program and increase rule effectiveness.

(E) Evaluate effectiveness of area source rules, evaluate area source emission inventories, and propose new rules or amendments to improve implementation of area source programs, including the certification/registration of equipment, and as necessary pursuant to statewide regulatory requirements.

(F) Implement the AQMP. Develop feasibility studies and control measures.

(G) Conduct research and analyze health effects of air pollutants and assess the health implications of pollutant reduction strategies.

MONITORING AIR QUALITY

Operate and maintain within SCAQMD's jurisdiction a network of air quality monitoring sites for ozone, nitrogen oxides, sulfur oxides, particulate matter, carbon monoxide and other pollutants to obtain data regarding public exposure to air contaminants.

(A) Analyze, summarize, and report air quality information generated from the monitoring sites.

(B) Provide continuous records for assessment of progress toward meeting federal and state air quality standards.

(C) Develop and prepare meteorological forecasts and models.

(D) Respond to emergency requests by providing technical assistance to first-response public safety agencies.

MONITORING AIR QUALITY (Cont.)

(E) Notify the public, media, schools, regulated industries and others whenever predicted or observed levels exceed the episode levels established under state law.

(F) Conduct special studies such as MATES V, National Air Toxics Trends (NATTS), Near Road NO_2 Monitoring, and Photochemical Assessment Monitoring Stations (PAMS).

(G) Conduct measurement activities to identify and monitor potential sources of all toxics including high-risk facilities under the Community Air Toxics Initiative (CATI).

(H) Evaluate and deploy low-cost sensors to monitor air pollution within communities of the South Coast Air Basin.

(I) Assess the ability of optical remote sensing technology to characterize and quantify emissions from refineries and other sources, and to serve as a useful tool for enhancing existing leak detection and repair programs.

OPERATIONAL SUPPORT

Provide operational support to facilitate overall air quality improvement programs.

(A) Provide services that enable SCAQMD offices to function properly. Services include facility administration, human resources and financial services.

(B) Provide information management services in support of all SCAQMD operations, including automation of permitting and compliance records, systems analysis and design, computer programming and operations, records management, and the library.

(C) Provide legal support and representation on all policy and regulatory issues and all associated legal actions.

TIMELY REVIEW OF PERMITS

Ensure timely processing of permits for new sources based on compliance with New Source Review and other applicable local, state and federal air quality rules and regulations.

(A) Process applications for Permits to Construct and/or to Operate for new construction, modification and change of conditions for major and non-major sources.

(B) Process Title V permits (Initial, Renewal, and Revisions) and facility permits for RECLAIM sources.

(C) Process applications for Administrative Changes, Change of Operator, Plans, Emission Reductions Credits (ERCs) and RECLAIM Trading Credits (RTCs).

TIMELY REVIEW OF PERMITS (Cont.)

(D) Continue efforts to streamline and expedite permit issuance through:

(1) Equipment certification/registration programs
(2) Streamlined standard permits
(3) Enhancement of permitting systems (including electronic permitting)
(4) Expedited Permit Processing Program
(5) Maintaining adequate staff resources
(6) Improved training
(7) Revisiting policies and rules

POLICY SUPPORT

Monitor, analyze and attempt to influence the outcome of state/federal legislation.

(A) Track changes to the state/federal budgets that may affect SCAQMD.

(B) Respond to Congressional and Senatorial inquiries regarding SCAQMD programs, policies or initiatives.

(C) Assist SCAQMD consultants in identifying potential funding sources and securing funding for SCAQMD programs.

(D) Provide support staff to the Governing Board, Board committees, and various advisory and other groups including but not limited to: the Air Quality Management Plan Advisory Group, the Environmental Justice Advisory Group, the Home Rule Advisory Group, the Local Government and Small Business Assistance Advisory Group, the Mobile Source Air Pollution Reduction Review Committee (MSRC) and MSRC Technical Advisory Committee, the Scientific, Technical and Modeling Peer Review Advisory Group, the Technology Advancement Advisory Group, as well as ad hoc committees established from time to time and various Rule working groups.

REVENUE CATEGORIES

I. **Allocatable**

A portion of SCAQMD revenue offsets operational support costs of the SCAQMD.

1a Allocatable SCAQMD: District-wide administrative and support services (e.g., Human Resources, Payroll, Information Management).
1b Allocatable Office: Administrative activities specific to a division/office.

II. **Annual Operating Emissions Fees**

III. **Permit Processing Fees**

IV. **Annual Operating Permit Renewal Fees**

V. **Federal Grants/Other Federal Revenue**

VI. **Source Test/Sample Analysis Fees**

VII. **Hearing Board Fees**

VIII. **Clean Fuels Fees**

IX. **Mobile Sources**

X. **Air Toxics AB 2588**

XI. **Transportation Programs**

XII - XIV. These revenue categories are no longer used.

XV. **California Air Resources Board Subvention/State Grants**

XVI. This revenue category is no longer used.

XVII. **Other Revenue**

XVIII. **Area Sources**

XIX. **Portable Equipment Registration Program (PERP)**

For a description of the revenue categories listed above, please refer to the corresponding revenue account in the FUND BALANCE & REVENUES section, "Explanation of Revenue Sources" within this document.

WORK PROGRAM OVERVIEW

The Work Program is a management tool that allocates resources by Office, Program Category, and project. It is developed from Program Output Justification forms prepared during the budget process by each Office. Work Programs for each Office can be found in the "OFFICE BUDGETS" section of this document. Work Programs by Program Category are within the following pages. A glossary of terms and acronyms used in the Work Programs are at the end of this section.

Professional & Special Services, Temporary Agency Services, and Capital Outlays expenditures are assigned to specific Work Program Codes associated with the project the expenditures support. All other expenditures (Salaries and Benefits and most Services and Supplies line items) are distributed within an Office by Full-Time Equivalent (FTE). A prorated share of the District General Budget has been allocated to each line in the work program based on the number of FTEs reflected on the line.

The following is a brief description of each column in the Work Program:

The **#** column identifies each line in the Work Program in numerical order.

The **Program Code** is a five-digit code assigned to each program. The first two digits represent the Office. The last three digits are the Program.

The **Goal** column identifies which of the three Program Goals (defined in the Draft Goals and Priority Objectives) applies to that output. The Goals are:

GOAL I **Achieve Clean Air Standards.**

GOAL II **Enhance Public Education and Equitable Treatment for All Communities.**

GOAL III **Operate Efficiently and Transparently.**

The **Office** column, which appears on the Work Program by Category document, identifies the Office responsible for performing the work.

The **Program Category** column, which appears on the Work Program by Office document, identifies one of the nine Program Categories associated with an activity.

The **Program** column identifies the Program associated with the work.

The **Activities** column provides a brief description of the work.

The **FTEs** column identifies the number of Full Time Equivalent staff positions in the current-year adopted budget, mid-year and proposed changes (+/-), and the proposed budget for the next fiscal year. An FTE position represents one person-year.

The **Expenditures** column, found in the Work Program by Category document, identifies the expenditures in the current-year adopted budget, proposed changes (+/-) and the proposed budget for the next fiscal year.

The **Revenue Category** column identifies the revenue that supports the work. Revenue Category titles can be found within this section and revenue descriptions are in the FUND BALANCE & REVENUES section, "Explanation of Revenue Sources" within this document.

Advance Clean Air Technology
Work Program by Category

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Expenditures FY 2017-18	+/-	Expenditures FY 2018-19	Revenue Categories
1	08 001	I	LEG	AB2766/Mob Src/Legal Advice	AB2766 Leg Adv: Trans/Mob Source	0.05	0.00	0.05	$ 10,603	$ 17	$ 10,620	IX
2	04 003	III	FIN	AB2766/MSRC	MSRC Program Administration	0.35	0.00	0.35	52,494	(115)	52,379	IX
3	08 003	I	LEG	AB2766/MSRC	Legal Advice: MSRC Prog Admin	0.15	-0.05	0.10	31,809	(10,569)	21,239	IX
4	44 003	I	STA	Advisory Group/Small Business	Mob Src Review Comm Prog Admin	0.50	0.00	0.50	82,134	4,501	86,636	IX
5	44 004	I	STA	AB2766/MSRC/Contract Admin	AB2766 Admin Discretionary Prog	3.00	0.00	3.00	492,806	27,008	519,814	IX
6	44 012	I	STA	AQMP/Control Tech Assessment	Tech Supp: Quantify Cost Effec	0.10	0.90	1.00	16,427	156,844	173,271	VIII
7	04 030	I	FIN	AB 134	AB 134	0.00	2.00	2.00	-	299,306	299,306	IX
8	08 030	I	LEG	AB 134	AB 134	0.00	2.00	2.00	-	424,788	424,788	IX
9	44 030	I	STA	AB 134	AB 134	0.00	6.00	6.00	-	1,039,628	1,039,628	IX
10	44 039	I	STA	Admin/Office Mgt/Tech Adv	Admin Support/Coordination	0.77	0.00	0.77	126,487	6,932	133,419	VIII
11	44 048	I	STA	Admin/Prog Mgmt/Tech Advance	Overall TA Program Mgmt/Coord	1.55	0.00	1.55	254,617	13,954	268,570	VIII
12	44 066	I	STA	AQIP Marine SCR DPF	AQIP Marine SCR DPF/Admin/Impl	0.15	-0.15	0.00	24,640	(24,640)	-	IX
13	44 095	I	STA	CA Natural Gas Veh Partnership	CA Natural Gas Veh Partnership	0.05	0.05	0.10	8,213	9,114	17,327	VIII
14	04 130	III	FIN	Clean Fuels/Contract Admin	Clean Fuels Contract Admin/Monitor	0.15	0.00	0.15	22,497	(49)	22,448	VIII
15	44 130	I	STA	Clean Fuels/Contract Admin	Admin/Project Supp for TA Cont	3.40	1.00	4.40	558,514	203,880	762,394	VIII
16	08 131	I	LEG	Clean Fuels/Legal Advice	Legal Advice: Clean Fuels	0.05	0.10	0.15	10,603	21,256	31,859	VIII
17	44 132	I	STA	Clean Fuels/Mobile Sources	Dev/Impl Mobile Src Proj/Demo	6.00	-4.50	1.50	2,270,613	(725,706)	1,544,907	VIII
18	44 134	I	STA	Clean Fuels/Stationary Combust	Dev/Demo Clean Combustion Tech	0.50	-0.20	0.30	82,134	(30,153)	51,981	VIII
19	44 135	I	STA	Clean Fuels/Stationary Energy	Dev/Demo Alt Clean Energy	0.55	0.00	0.55	90,348	4,951	95,299	VIII
20	44 136	I	STA	Clean Fuels/Tech Transfer	Disseminate Low Emiss CF Tech	1.25	1.06	2.31	205,336	194,921	400,257	VIII
21	44 187	I	STA	DERA Sch Bus Repl	DERA Sch Bus Repl Admin/Impl	0.03	0.00	0.03	4,928	270	5,198	V
22	44 188	I	STA	DERA FY 13 Veh Repl	DERA Vehicle Repl Admin/Impl	0.20	-0.10	0.10	32,854	(15,527)	17,327	XVII
23	44 190	I	STA	Diesel Projects EPA	Diesel Projects EPA/Admin/Impl	0.11	0.00	0.11	18,070	990	19,060	V
24	44 203	I	STA	EFMP Program Support	EFMP Program Support	1.19	3.81	5.00	195,480	670,876	866,356	XVII
25	44 356	I	STA	GGRF ZEDT Demo	GGRF ZEDT Demo Admin	1.10	-0.10	1.00	180,696	(7,424)	173,271	XVII
26	44 361	I	STA	HD Trucks DOE ARRA	DOE HD Trucks Admin (ARRA)	2.00	-2.00	0.00	328,538	(328,538)	-	V,XVII
27	44 453	I	STA	Mob Src: Emiss Inven Method	Rvw CARB/US EPA emissions inven methodology	1.50	0.00	1.50	246,403	13,504	259,907	VIII,IX
28	04 457	III	FIN	Mobile Source/Moyer Adm	Carl Moyer: Contract/Fin Admin	1.02	0.00	1.02	152,982	(336)	152,646	IX
29	08 457	I	LEG	Mob Src/C Moyer/Leg Advice	Moyer/Implem/Program Dev	0.10	0.00	0.10	21,206	33	21,239	IX
30	16 457	I	AHR	MS/Carl Moyer Admin	C Moyer/Contractor Compliance	0.10	0.00	0.10	18,663	(209)	18,454	IX
31	44 457	I	STA	Mob Src/C Moyer Adm/Outreach	Carl Moyer: Impl/Admin Grant	11.15	1.00	12.15	1,906,597	273,649	2,180,246	IX
32	44 459	I	STA	Mob Src/C Moyer/Impl/Prg Dev	Moyer/Implem/Program Dev	2.80	0.20	3.00	459,952	59,861	519,814	IX
33	44 460	I	STA	VIP Admin	VIP Admin/Outreach/Impl	0.80	-0.30	0.50	131,415	(44,779)	86,636	IX
34	44 497	I	STA	Plug-in Hybrid EV DOE ARRA	DOE Plug-in Hybrid EV Admin (ARRA)	0.75	-0.75	0.00	123,202	(123,202)	-	V
35	44 533	I	STA	POLB AMECS Demo	POLB AMECS Demo-Admin/Impl	0.47	0.00	0.47	77,206	4,231	81,437	XVII
36	04 542	I	FIN	Prop 1B:Goods Movement	Contracts/Finance Admin	0.50	0.00	0.50	74,991	(165)	74,827	IX
37	16 542	I	AHR	Prop 1B:Goods Movement	Prop 1B: Goods Movement	0.10	0.00	0.10	18,663	(209)	18,454	IX
38	04 544	I	FIN	Prop 1B:Low Emiss Sch Bus	Grants/Finance Admin	0.05	0.00	0.05	7,499	(16)	7,483	IX
39	44 677	I	STA	School Bus/Lower Emission Prog	School Bus Program Oversight	0.70	0.80	1.50	114,988	144,919	259,907	IX
40	26 738	I	PRA	Target Air Shed EPA	Targeted Air Shed Admin/Impl	0.25	-0.25	0.00	43,023	(43,023)	-	V,XVII
41	44 738	I	STA	Target Air Shed EPA	Targeted Air Shed Admin/Impl	0.15	0.35	0.50	24,640	61,995	86,636	V,XVII
42	44 740	I	STA	Tech Adv/Commercialization	Assess CFs/Adv Tech Potential	0.25	0.00	0.25	41,067	2,251	43,318	VIII
43	44 741	I	STA	Tech Adv/Non-Combustion	Dev/Demo Non-Combustion Tech	0.10	0.90	1.00	16,427	156,844	173,271	VIII
44	44 816	I	STA	Transportation Research	Transport Research/Adv Systems	0.50	0.00	0.50	82,134	4,501	86,636	VIII
					Total Advance Clean Air Technology	44.49	11.77	56.26	$ 8,661,899	$ 2,446,364	$ 11,108,263	

A prorated share of the District General Budget has been allocated to each line in the work program based on the number of FTEs reflected on the line.

Customer Service and Business Assistance
Work Program by Category

#	Program Code		Goal	Office	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Expenditures FY 2017-18	+/-	Expenditures FY 2018-19	Revenue Categories
1	04	002	III	FIN	AB2766/Mobile Source	Prog Admin: Monitor/Dist/Audit	0.10	0.00	0.10	$ 14,998	$ 9,967	$ 24,965	IX
2	26	007	I	PRA	AB2766/MSRC	AB2766 Prov Tech Asst to Cities	1.22	-0.02	1.20	209,951	2,649	212,601	IX
3	35	037	I	LPA	AB 617-Outreach	AB 617-Outreach	0.00	2.00	2.00	-	352,644	352,644	XV
4	50	038	I	EP	Admin/Office Management	Dev/Coord Goals/Policies/Overs	1.00	2.00	3.00	176,160	352,189	528,349	Ib
5	60	038	III	CE	Admin/Office Budget	Dev/Coord Goals/Policies/Overs	6.00	1.00	7.00	890,304	191,621	1,081,925	Ib
6	35	046	III	LPA	Admin/Prog Mgmt	Admin Office/Units/SuppCoord Staff	4.02	0.00	4.02	693,948	14,867	708,815	Ib
7	50	047	I	EP	Admin/Operations Support	Budget/Contracts/Reports/Projects	2.00	1.00	3.00	342,820	188,029	530,849	Ib
8	60	047	I	CE	Admin/Operations Support	Budget/Contracts/Reports/Projects	6.00	-1.10	4.90	892,804	(132,357)	760,447	Ib
9	35	126	II	LPA	Clean Air Connections	Coord of region-wide community group	1.00	0.00	1.00	172,624	3,698	176,322	II,IX
10	04	170	I	FIN	Billing Services	Answer/Resp/Resolv Prob & Inq	8.00	0.00	8.00	1,215,360	(2,635)	1,212,725	II,III,IV
11	50	200	I	EP	Economic Dev/Bus Retention	Perm Proc/Public Participation	0.10	0.00	0.10	17,016	596	17,612	III
12	35	205	II	LPA	Environmental Education	Curriculum Dev/Project Coord	0.25	0.00	0.25	43,156	925	44,081	II,IX,XV
13	26	216	I	PRA	AER Public Assistance	AER Design/Impl/Monitor Emiss	2.00	-2.00	0.00	344,183	(344,183)	-	II
14	35	240	I	LPA	Environmental Justice	Impl Board's EJ Pgrms/Policies	2.00	0.00	2.00	345,248	7,397	352,644	II,IV
15	04	260	III	FIN	Fee Review	Cmte Mtg/Fee-Related Complaint	0.10	0.00	0.10	14,998	(33)	14,965	II,III,IV,XV
16	35	260	III	LPA	Fee Review	Cmte Mtg/Fee-Related Complaint	0.50	0.00	0.50	86,312	1,849	88,161	II,III,IV,XV
17	50	260	III	EP	Fee Review	Fee Review Committee	0.45	0.00	0.45	76,572	2,680	79,252	II,III,IV
18	04	355	III	FIN	Grants Management	Grant Anlyz/Eval/Negot/Acc/Rpt	1.00	0.00	1.00	149,982	(329)	149,653	IV,V,XV
19	35	381	III	LPA	Interagency Liaison	Interact Gov Agns/Promote SCAQMD	0.15	0.00	0.15	25,894	555	26,448	Ia,XV
20	35	390	I	LPA	Intergov/Geographic Deployment	Dev/Impl Local Govt Outreach	9.50	1.00	10.50	1,677,928	211,456	1,889,383	II,IX
21	08	404	I	LEG	Legal Rep/Legislation	Draft Legis/SCAQMD Position/Mtgs	0.25	0.00	0.25	53,015	84	53,098	II,IX
22	50	425	I	EP	Lobby Permit Services	Supp Perm Proc/Customer Svc	1.00	0.00	1.00	170,160	5,956	176,116	III
23	27	481	III	IM	New System Development	Dev sys in supp of Dist-wide	1.75	0.00	1.75	357,792	13,852	371,644	Ia,III
24	03	490	II	EO	Outreach	Publ Awareness Clean Air Prog	0.97	0.00	0.97	313,039	(11,104)	301,935	Ia
25	35	491	II	LPA	Outreach/Business	Chambers/Business Meetings	1.00	0.00	1.00	172,624	3,698	176,322	II,IV
26	35	492	II	LPA	Public Education/Public Events	Pub Events/Conf/Rideshare Fair	1.00	0.00	1.00	582,624	(129,297)	453,327	II,V,IX,XV
27	60	492	II	CE	Outreach/Business	Pub Events/Conf/Rideshare Fair	0.20	0.00	0.20	29,610	1,245	30,855	IX
28	35	496	II	LPA	Outreach/Visiting Dignitary	Tours/Briefings-Dignitary	0.25	0.00	0.25	43,156	925	44,081	Ia
29	35	514	I	LPA	Permit: Expired Permit Program	Assist w Permit Reinstatement	0.30	0.00	0.30	51,787	1,109	52,897	IV
30	50	520	I	EP	Perm Proc/Pre-Appl Mtg Outreac	Pre-App Mtgs/Genl Prescreening	1.00	0.00	1.00	170,160	5,956	176,116	III
31	16	540	III	AHR	Print Shop	Printing/Collating/Binding	4.00	0.00	4.00	757,526	18,371	775,897	Ia
32	35	555	II	LPA	Public Information Center	Inform public of unhealthy air	1.00	0.00	1.00	262,624	3,698	266,322	II,V,IX
33	03	565	III	EO	Public Records Act	Comply w/ Public Req for Info	0.01	0.00	0.01	3,227	(114)	3,113	Ia
34	04	565	I	FIN	Public Records Act	Comply w/ Public Rec Requests	0.02	0.00	0.02	3,000	(7)	2,993	Ia
35	08	565	III	LEG	Public Records Act	Comply w/ Public Rec Requests	1.50	0.00	1.50	318,088	502	318,591	Ia
36	16	565	III	AHR	Public Records Act	Comply w/ Public Rec Requests	0.05	0.00	0.05	9,332	(105)	9,227	Ia
37	17	565	III	CB	Public Records Act	Comply w/ Public Rec Requests	0.02	0.00	0.02	4,477	319	4,796	Ia
38	26	565	III	PRA	Public Records Act	Comply w/ Public Rec Requests	0.57	0.25	0.82	98,092	47,185	145,277	Ia
39	27	565	III	IM	Public Records Act	Comply w/ Public Req for Info	4.75	0.00	4.75	887,550	37,597	925,147	Ia
40	35	565	III	LPA	Public Records Act	Comply w/ Public Req for Info	0.10	0.00	0.10	17,262	370	17,632	Ia

A prorated share of the District General Budget has been allocated to each line in the work program based on the number of FTEs reflected on the line.

Customer Service and Business Assistance (Cont.)
Work Program by Category

#	Program Code		Goal	Office	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Expenditures FY 2017-18	+/-	Expenditures FY 2018-19	Revenue Categories
41	44	565	III	STA	Public Records Act	Comply w/ Public Req for Info	0.17	0.00	0.17	$ 27,926	$ 1,530	$ 29,456	Ia
42	50	565	III	EP	Public Records Act	Comply w/ Public Req for Info	0.25	0.00	0.25	42,540	1,489	44,029	Ia
43	60	565	III	CE	Public Records Act	Comply w/ Public Req for Info	2.00	1.00	3.00	296,101	166,724	462,825	Ia
44	04	631	III	FIN	Cash Mgmt/Refunds	Research/Doc/Prep/Proc Refunds	0.30	0.00	0.30	44,995	(99)	44,896	III,IV,XI
45	35	679	III	LPA	Small Business Assistance	Small Business/Financial Assistance	1.00	0.00	1.00	172,624	3,698	176,322	III
46	08	681	III	LEG	Small Business/Legal Advice	Legal Advice: SB/Fee Review	0.05	0.00	0.05	10,603	17	10,620	II,III
47	50	690	I	EP	Source Education	Prov Tech Asst To Industries	2.80	0.00	2.80	476,448	16,677	493,125	III,IV,V,XV
48	60	690	I	CE	Source Education	Prov Tech Asst To Industries	0.40	0.00	0.40	59,220	2,490	61,710	III,IV,V,XV
49	44	701	I	STA	Source Testing/Customer Svc	Conduct ST/Prov Data/Cust Svc	0.05	0.00	0.05	8,213	450	8,664	VI
50	44	709	I	STA	VOC Sample Analysis/SBA/Other	VOC Analysis & Reptg/Cust Svc	0.50	0.00	0.50	82,134	4,501	86,636	VI
51	35	710	I	LPA	Speakers Bureau	Coordinate/conduct speeches	0.10	0.00	0.10	17,262	370	17,632	Ia
52	16	720	I	AHR	Subscription Services	Rule & Gov Board Materials	1.70	0.00	1.70	317,274	(3,561)	313,712	IV,XVII
53	35	791	I	LPA	Toxics/AB2588	Outreach/AB 2588 Air Toxics	0.01	0.00	0.01	1,726	37	1,763	X
54	26	833	II	PRA	Rule 2202 ETC Training	Rule 2202 ETC Training	0.93	0.02	0.95	185,045	3,264	188,309	XI
						Total Customer Service & Business Assistance	75.39	5.15	80.54	$ 13,437,515	$ 1,059,411	$ 14,496,926	

A prorated share of the District General Budget has been allocated to each line in the work program based on the number of FTEs reflected on the line.

Develop Programs
Work Program by Category

#	Program Code		Goal	Office	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Expenditures FY 2017-18	+/-	Expenditures FY 2018-19	Revenue Categories
1	26	002	I	PRA	AB2766/Mobile Source	AB2766 Mobile Source Outreach	1.04	0.01	1.05	$ 178,975	$ 7,051	$ 186,026	IX
2	04	009	I	FIN	AB 1318 Mitigation	AB 1318 Projects Admn/Impl	0.13	0.00	0.13	19,498	(43)	19,455	XVII
3	08	009	I	LEG	AB 1318 Mitigation	AB 1318 Projects Admn/Impl	0.05	-0.05	0.00	10,603	(10,603)	-	XVII
4	26	009	I	PRA	AB 1318 Mitigation	AB 1318 Projects Admn/Impl	0.30	-0.30	0.00	51,627	(51,627)	-	XVII
5	44	009	I	STA	AB 1318 Mitigation	AB 1318 Projects Admn/Impl	0.75	0.00	0.75	123,202	6,752	129,953	XVII
6	03	010	I	EO	AQMP	Develop/Implement AQMP	0.05	0.00	0.05	16,136	(572)	15,564	II,IX
7	08	010	I	LEG	AQMP	AQMP Revision/CEQA Review	0.20	-0.10	0.10	42,412	(21,172)	21,239	II,IV,IX
8	26	010	I	PRA	AQMP	AQMP Special Studies	2.00	-1.90	0.10	352,183	(326,466)	25,717	IV,V,IX,XV
9	03	028	I	EO	Admin/SCAQMD Policy	Dev/Coord Goals/Policies/Overs	0.44	0.00	0.44	291,997	(80,037)	211,960	Ia
10	26	033	I	PRA	AB 617-Em Inventory	AB 617-Em Inventory	0.00	0.50	0.50	-	88,584	88,584	XV
11	26	034	I	PRA	AB 617-Em Reduc Plns	AB 617-Em Reduc Plns	0.00	0.50	0.50	-	88,584	88,584	XV
12	26	038	I	PRA	Admin/Office Management	Coordinate Off/Admin Activities	4.55	0.00	4.55	783,016	23,095	806,111	Ib
13	26	068	II	PRA	SCAQMD Projects	Prepare Environmental Assessments	3.35	0.00	3.35	766,506	2,004	768,510	II,IV,IX
14	44	069	I	STA	AQIP Evaluation	AQIP Contract Admin/Evaluation	0.65	-0.15	0.50	106,775	(20,139)	86,636	IX
15	26	102	II	PRA	CEQA Document Projects	Review/Prepare CEQA Comments	3.50	0.25	3.75	602,320	62,057	664,377	II,IX
16	26	104	I	PRA	CEQA Policy Development	ID/Develop/Impl CEQA Policy	1.20	-0.70	0.50	216,510	(102,926)	113,584	IV,IX
17	26	128	I	PRA	Cln Communities Pln	Cln Communities Plan Admn/Impl	0.25	0.00	0.25	43,023	1,269	44,292	II,IX
18	26	217	I	PRA	Emissions Inventory Studies	Dev Emiss DB/Dev/Update Emiss	0.70	-0.20	0.50	120,464	(31,880)	88,584	II,V,IX,XV
19	26	218	I	PRA	AQMP/Emissions Inventory	Dev Emiss Inv: Forecasts/RFPs	1.30	-0.56	0.74	223,719	(92,615)	131,104	II,IX
20	26	219	I	PRA	Emissions Field Audit	Emissions Field Audit	0.50	-0.50	0.00	86,046	(86,046)	-	II
21	44	396	I	STA	Lawnmower Exchange	Lawn Mower Admin/Impl/Outreach	0.30	0.00	0.30	49,281	2,701	51,981	XVII
22	26	397	II	PRA	Lead Agency Projects	Prep Envrnmt Assmts/Perm Proj	1.75	0.75	2.50	301,160	141,758	442,918	III
23	26	448	I	PRA	Mobile Src Strategies-Off Road	CARB Off-Road Mob Src ctrl strategy for SIP	1.00	-1.00	0.00	172,091	(172,091)	-	XVII
24	26	451	I	PRA	Mob Src/CARB/EPA Monitoring	CARB/US EPA Mob Src Fuel Policies	1.50	-1.00	0.50	258,137	(169,553)	88,584	IX
25	26	452	I	PRA	Mob Src/CEC/US DOE Monitoring	CEC/US DOE Mob Src rulemaking proposals	1.00	-0.50	0.50	172,091	(83,508)	88,584	IX,XVII
26	44	458	I	STA	Mobile Source Strategies	Implement Fleet Rules	1.00	0.00	1.00	164,269	9,003	173,271	VIII
27	26	503	I	PRA	PM Strategies	PM10 Plan/Analyze/Strategy Dev	3.40	0.00	3.40	585,111	17,258	602,368	II,V,XV
28	44	542	I	STA	Prop 1B:Goods Movement	Prop 1B:Goods Movement	9.70	-0.70	9.00	1,893,407	(33,965)	1,859,441	IX
29	35	560	I	LPA	Public Notification	Public notif of rules/hearings	0.50	0.00	0.50	106,312	1,849	108,161	II,IV,IX
30	26	685	I	PRA	Socio-Economic	Apply econ models/Socio-econ	4.10	0.40	4.50	1,185,575	(127,022)	1,058,552	II,IV
31	44	702	I	STA	ST Methods Development	Eval ST Methods/Validate	0.95	0.00	0.95	156,055	8,552	164,608	II
32	44	705	I	STA	ST Sample Analysis/Air Program	Analyze ST Samples/Air Prgms	0.25	0.00	0.25	41,067	2,251	43,318	II
33	26	745	I	PRA	Rideshare	Dist Rideshare/Telecommute Prog	0.61	0.07	0.68	104,976	15,498	120,474	IX
34	26	816	I	PRA	Transportation Regional Progs	Dev AQMP Meas/Coord w/Reg Agn	0.35	0.00	0.35	60,232	76,777	137,009	V,IX
35	26	834	I	PRA	Rule 2202 Implement	Rule 2202 Proc/Sub Plans/Tech Eval	2.55	0.12	2.67	438,833	34,203	473,036	XI
36	26	836	I	PRA	Rule 2202 Support	R2202 Supt/CmptrMaint/WebSubmt	2.59	0.06	2.65	460,717	23,776	484,493	V,XI
						Total Develop Programs	52.51	(5.00)	47.51	$ 10,184,322	$ (797,247)	$ 9,387,075	

A prorated share of the District General Budget has been allocated to each line in the work program based on the number of FTEs reflected on the line.

Develop Rules
Work Program by Category

#	Program Code		Goal	Office	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Expenditures FY 2017-18	+/-	Expenditures FY 2018-19	Revenue Categories
1	26	031	I	PRA	AB 617-BARCT Rules	AB 617-BARCT Rules	0.00	11.40	11.40	$ -	$ 2,019,706	$ 2,019,706	XV
2	26	035	I	PRA	AB 617-General	AB 617-General	0.00	1.60	1.60	-	283,467	283,467	XV
3	44	043	I	STA	Admin/Office Mgmt/Rules	Rules: Assign/Manage/Supp	0.15	0.00	0.15	24,640	1,350	25,991	Ib
4	26	050	I	PRA	Admin/Rule Dev/PRA	Admin: Rule Development	0.60	0.50	1.10	103,255	91,629	194,884	Ib
5	26	071	I	PRA	Arch Ctgs - Admin	Rdev/Aud/DB/TA/SCAQMD/Rpts/AER	1.10	-0.10	1.00	189,301	(12,133)	177,167	XVIII
6	26	077	I	PRA	Area Sources/Rulemaking	Dev/Eval/Impl Area Source Prog	2.05	-0.05	2.00	352,787	1,547	354,334	II,IX
7	26	165	I	PRA	Conformity	Monitor Transp. Conformity	0.25	0.00	0.25	43,023	1,269	44,292	V,IX
8	26	257	I	PRA	Fac Based Mob Src	Facility Based Mobile Src Meas	0.00	5.00	5.00	-	885,836	885,836	IX
9	26	362	II	PRA	Health Effects	Study Health Effect/Toxicology	2.25	0.00	2.25	387,206	11,421	398,626	II,III,IX
10	26	385	I	PRA	Criteria Pollutants/Mob Srcs	Dev/Impl Intercredit Trading	0.75	0.00	0.75	129,069	3,807	132,875	IV,IX
11	26	449	I	PRA	Mob Src/SCAQMD Rulemaking	Prepare SCAQMD Mob Src rulemaking proposals	0.81	1.49	2.30	139,394	268,090	407,484	IX
12	44	456	I	STA	MS & AQMP Control Strategies	AQMP Control Strategies	0.30	0.00	0.30	49,281	2,701	51,981	VIII
13	26	460	I	PRA	Regional Modeling	Rule Impact/Analyses/Model Dev	5.30	-0.90	4.40	1,052,084	(32,549)	1,019,536	II,V,IX
14	50	650	I	EP	Rulemaking	Dev/Amend/Impl Rules	0.25	0.00	0.25	42,540	1,489	44,029	II,XV
15	08	651	I	LEG	Rules/Legal Advice	Legal Advice: Rules/Draft Regs	1.00	0.20	1.20	212,059	42,814	254,873	II
16	44	653	I	STA	Rulemaking/BACT	Dev/Amend BACT Guidelines	2.00	0.00	2.00	328,538	18,005	346,543	II
17	26	654	I	PRA	Rulemaking/NOX	Rulemaking/NOx	2.50	0.00	2.50	430,228	12,690	442,918	II,IV,XV
18	26	655	I	PRA	NSR/Adm Rulemaking	Amend/Develop NSR & Admin Rules	2.50	0.00	2.50	430,228	12,690	442,918	II,IV,V,XV
19	26	656	I	PRA	Rulemaking/VOC	Dev/Amend VOC Rules	5.70	-2.45	3.25	1,030,921	(455,127)	575,793	II,IV,XV
20	44	657	I	STA	Rulemaking/Support PRA	Assist PRA w/ Rulemaking	0.05	0.00	0.05	8,213	450	8,664	II
21	50	657	I	EP	Rulemaking/Support PRA	Provide Rule Development Supp	0.25	0.00	0.25	42,540	1,489	44,029	II,XV
22	60	657	I	CE	Rulemaking/Support PRA	Provide Rule Development Supp	0.50	0.50	1.00	74,025	80,250	154,275	IV,XV
23	26	659	I	PRA	Rulemaking/Toxics	Develop/Amend Air Toxic Rules	9.50	1.50	11.00	1,634,868	313,971	1,948,839	II,XV
24	08	661	I	LEG	Rulemaking/RECLAIM	RECLAIM Legal Adv/Related Iss	0.25	0.25	0.50	53,015	53,182	106,197	II
25	26	661	I	PRA	Rulemaking/RECLAIM	RECLAIM Amend Rules/Related Is	2.50	0.00	2.50	430,228	12,690	442,918	II
26	44	706	I	STA	ST Sample Analysis/Air Program	Analyze ST Samples/Rules	0.25	0.00	0.25	41,067	2,251	43,318	II
27	44	708	I	STA	VOC Sample Analysis/Rules	VOC Analysis & Rptg/Rules	0.25	0.00	0.25	41,067	2,251	43,318	II,XV
28	50	752	I	EP	Title III Rulemaking	Title III Dev/Implement Rules	0.25	0.00	0.25	42,540	1,489	44,029	II,V,XV
29	50	773	I	EP	Title V & NSR Rulemaking-Supp	Title V Rules Dev/Amend/Impl	0.25	0.00	0.25	42,540	1,489	44,029	II
						Total Develop Rules	41.56	18.94	60.50	$ 7,354,657	$ 3,628,211	$ 10,982,868	

A prorated share of the District General Budget has been allocated to each line in the work program based on the number of FTEs reflected on the line.

Ensure Compliance
Work Program by Category

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Expenditures FY 2017-18	+/-	Expenditures FY 2018-19	Revenue Categories
1	44 015	I	STA	Acid Rain Program	Acid Rain CEMS Eval/Cert	0.50	0.00	0.50	$ 82,134	$ 4,501	$ 86,636	II,IV
2	44 042	I	STA	Admin/Office Mgmt/Compliance	Compliance: Assign/Manage/Supp	0.37	0.00	0.37	60,779	3,331	64,110	Ib
3	60 070	I	CE	CARB PERP Program	CARB Audits/Statewide Equip Reg	5.00	1.00	6.00	740,253	185,396	925,650	XIX
4	08 072	I	LEG	Arch Ctgs - End User	Case Dispo/Rvw, Track, Prep NOVs	0.05	0.00	0.05	10,603	17	10,620	XVIII
5	26 072	I	PRA	Arch Ctgs - End User	Compliance/Rpts/Rule Implementation	0.80	0.00	0.80	137,673	4,061	141,734	XVIII
6	44 072	I	STA	Arch Ctgs - End User	Sample Analysis/Rpts	2.00	0.00	2.00	328,538	18,005	346,543	XVIII
7	08 073	I	LEG	Arch Ctgs - Other	Case Dispo/Rvw, Track, Prep NOVs	0.05	0.00	0.05	10,603	17	10,620	XVIII
8	26 073	I	PRA	Arch Ctgs - Other	Compliance/Rpts/Rule Implementation	0.80	0.00	0.80	137,673	4,061	141,734	XVIII
9	26 076	I	PRA	Area Sources/Compliance	Area Source Compliance	4.70	-0.20	4.50	913,829	(16,577)	897,252	III,IV,V,IX,XV
10	16 080	III	AHR	Auto Services	Vehicle/Radio Repair & Maint	3.00	0.00	3.00	559,895	(6,284)	553,610	Ia
11	44 105	I	STA	CEMS Certification	CEMS Review/Approval	6.15	0.00	6.15	1,010,253	55,365	1,065,618	II,III,VI
12	35 111	II	LPA	Call Center/CUT SMOG	Smoking Vehicle Complaints	8.00	0.00	8.00	1,380,992	29,586	1,410,578	IX,XV
13	08 115	I	LEG	Case Disposition	Trial/Dispo-Civil Case/Injunct	5.00	-0.25	4.75	1,060,295	(51,424)	1,008,871	II,IV,V,VII,XV
14	60 152	III	CE	Compliance/IM Related Activiti	Assist IM: Design/Review/Test	0.50	0.00	0.50	274,025	(193,888)	80,137	IV
15	08 154	I	LEG	Compliance/NOV Administration	Review/Track/Prep NOVs/MSAs	1.00	-0.25	0.75	212,059	(52,764)	159,295	IV
16	60 155	I	CE	Compliance Guidelines	Procedures/Memos/Manuals	2.50	-1.00	1.50	370,127	(138,714)	231,412	IV
17	50 156	I	EP	Perm Proc/Info to Compliance	Prov Permit Info to Compliance	3.00	0.00	3.00	510,480	17,869	528,349	III,IV,XV
18	60 157	I	CE	Compliance/Special Projects	Prog Audits/Data Req/Brd Supp	5.00	-2.00	3.00	740,253	(277,428)	462,825	II
19	60 158	I	CE	Compliance Testing	R461/Combustion Equip Testing	0.50	0.50	1.00	240,025	(77,750)	162,275	IV
20	44 175	I	STA	DB/Computerization	Develop Systems/Database	0.44	0.00	0.44	72,278	3,961	76,239	II,IV,VI
21	08 185	I	LEG	Database Management	Support IM/Dev Tracking System	0.75	0.25	1.00	214,044	28,350	242,394	IV
22	26 215	I	PRA	Annual Emission Reporting	Annl Des/Impl/Emiss Monitor Sys	8.00	3.00	11.00	1,481,731	472,108	1,953,839	II,V
23	08 235	I	LEG	Enforcement Litigation	Maj Prosecutions/Civil Actions	2.00	0.00	2.00	424,118	670	424,788	IV
24	50 240	I	EP	Environmental Justice	R461/Combustion Equip Testing	0.50	0.00	0.50	85,080	2,978	88,058	II,IV,XV
25	26 358	I	PRA	GHG Rules-Compl	Green House Gas Rules-Compliance	1.05	-0.35	0.70	180,696	(46,679)	134,017	IV
26	17 364	I	CB	Hearing Board/Abatement Orders	Attnd/Recrd/Monitr Mtgs	0.10	0.00	0.10	22,384	1,596	23,979	IV
27	17 365	I	CB	Hearing Board/Variances/Appeal	Attend/Record/Monitor HB Mtgs	3.20	0.00	3.20	801,778	50,758	852,536	IV,V,VII
28	50 365	I	EP	Hearing Bd/Variances	Variances/Orders of Abatement	0.75	0.00	0.75	127,620	4,467	132,087	VII
29	60 365	I	CE	Hearing Bd/Variances	Variances/Orders of Abatement	2.00	0.00	2.00	296,101	12,449	308,550	VII
30	08 366	I	LEG	Hearing Board/Legal	Hear/Disp-Varian/Appeal/Rev	3.00	0.00	3.00	636,177	1,005	637,182	IV,V,XV
31	60 375	I	CE	Inspections	Compliance/Inspection/Follow-up	83.10	4.90	88.00	12,303,011	1,273,186	13,576,198	II,V,XV
32	50 377	I	EP	Inspections/RECLAIM Audits	Audit/Compliance Assurance	6.00	0.00	6.00	1,020,960	35,737	1,056,697	II,IV
33	60 377	I	CE	Inspections/RECLAIM Audits	Audit/Compliance Assurance	15.00	-1.00	14.00	2,220,760	(60,911)	2,159,850	II,IV
34	08 380	I	LEG	Interagency Coordination	Coordinate with Other Agencies	0.20	0.00	0.20	42,412	67	42,479	II,V
35	08 403	III	LEG	Legal Rep/Litigation	Prep/Hearing/Disposition	3.50	0.00	3.50	941,706	(27,127)	914,580	Ia,II
36	44 450	I	STA	Microscopic Analysis	Asbestos/PM/Metals Analysis	2.00	0.00	2.00	328,538	18,005	346,543	VI
37	08 465	I	LEG	Mutual Settlement	Mutual Settlement Program	3.00	-1.50	1.50	636,177	(317,586)	318,591	IV
38	50 492	I	EP	Customer Service	Compliance/Inspection/Follow-up	0.50	0.00	0.50	85,080	2,978	88,058	II,V,IX,XV
39	44 500	I	STA	PM2.5 Program	Est/Operate/Maint PM2.5 Network	11.30	0.00	11.30	1,856,237	101,728	1,957,965	II,V,IX
40	60 539	I	CE	Procedure 5 Review	Evaluate Proc 5 Asbestos Plans	0.40	0.00	0.40	59,220	2,490	61,710	XVII

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Ensure Compliance (Cont.)
Work Program by Category

#	Program Code		Goal	Office	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Expenditures FY 2017-18	+/-	Expenditures FY 2018-19	Revenue Categories
41	60	550	II	CE	Public Complaints/Breakdowns	Compltresp/Invflwup/Resolutn	10.00	0.00	10.00	$ 1,480,507	$ 62,243	$ 1,542,750	II,IV,V,XV
42	50	605	I	EP	RECLAIM/Admin Support	Admin/Policy/Guidelines	6.50	0.00	6.50	1,106,040	38,715	1,144,755	II,III,IV,XV
43	60	605	I	CE	RECLAIM/Admin Support	Admin/Policy/Guidelines	5.00	-4.50	0.50	740,253	(663,116)	77,137	II,III,IV,XV
44	26	620	I	PRA	Refinery Pilot Project	Refinery Pilot Project	0.25	-0.25	0.00	43,023	(43,023)	-	II
45	26	645	I	PRA	Rule 1610 Plan Verification	Rule 1610 Plan Verification	0.75	0.00	0.75	129,069	3,807	132,875	V,IX
46	50	678	I	EP	School Siting	Identify Haz. Emission Sources near Schools	0.25	0.00	0.25	42,540	1,489	44,029	II
47	60	678	I	CE	School Siting	Identify Haz. Emission Sources near Schools	0.05	-0.05	0.00	7,403	(7,403)	-	IV
48	50	680	I	EP	Small Business Assistance	Asst sm bus w/ Permit Process	0.50	0.00	0.50	85,080	2,978	88,058	III,IV
49	44	700	I	STA	Source Testing/Compliance	Conduct ST/Prov Data/Compl	2.25	0.00	2.25	399,605	20,256	419,860	VI
50	44	704	I	STA	ST/Sample Analysis/Compliance	Analyze ST Samples/Compliance	4.00	0.00	4.00	732,075	(38,990)	693,085	VI
51	44	707	I	STA	VOC Sample Analysis/Compliance	VOC Analysis & Rptg/Compliance	7.00	0.00	7.00	1,186,881	63,018	1,249,899	IV,XV
52	44	716	I	STA	Special Monitoring	Rule 403 Compliance Monitoring	2.20	0.00	2.20	396,391	19,806	416,197	III,IV,IX,XV
53	60	751	I	CE	Title III Inspections	Title III Comp/Insp/Follow Up	0.10	-0.10	0.00	14,805	(14,805)	-	IV
54	60	771	I	CE	Title V	Title V Compl/Inspect/Follow Up	3.50	1.00	4.50	518,177	176,060	694,237	II,IV
55	04	791	III	FIN	Toxics/AB2588	AB2588 Toxics HS Fee Collection	0.15	0.00	0.15	37,497	(49)	37,448	X
56	08	791	I	LEG	Toxics/AB2588	AB2588 Legal Advice: Plan & Impl	0.05	0.00	0.05	10,603	17	10,620	X
57	27	791	III	IM	Toxics/AB2588	AB2588 Database Software Supp	0.50	0.00	0.50	149,026	3,958	152,984	X
58	50	791	I	EP	Toxics/AB2588	AB2588 Rev Rprts/Risk Redplans	0.25	0.00	0.25	42,540	1,489	44,029	X
59	60	791	I	CE	Toxics/AB2588	Risk Reduct Plan Rvw/Comm Mtgs	0.10	0.00	0.10	14,805	622	15,427	X
60	26	794	I	PRA	Toxics/AB2588	AB2588 Core, Tracking, IWS	13.00	0.00	13.00	2,237,188	65,985	2,303,173	X
61	44	794	I	STA	Toxics/AB2588	Eval Protocols/Methods/ST	4.25	0.00	4.25	698,142	38,261	736,403	X
62	44	795	I	STA	Toxics/Engineering	R1401 Toxics/HRA Prot/Rpt Eval	0.05	0.00	0.05	8,213	450	8,664	VI,X
63	08	805	III	LEG	Training	Continuing Education/Training	0.50	0.25	0.75	106,029	53,266	159,295	Ib
						Total Ensure Compliance	256.91	(0.55)	256.36	$ 42,802,491	$ 852,642	$ 43,655,133	

A prorated share of the District General Budget has been allocated to each line in the work program based on the number of FTEs reflected on the line.

Monitoring Air Quality
Work Program by Category

#	Program Code		Goal	Office	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Expenditures FY 2017-18	+/-	Expenditures FY 2018-19	Revenue Categories
1	44	036	I	STA	AB 617-Monitoring	AB 617-Monitoring	0.00	12.00	12.00	$ -	$ 2,079,255	$ 2,079,255	XV
2	44	038	I	STA	Admin/Office Mgmt/Monitoring	Overall Program Mgmt/Coord	1.40	0.00	1.40	229,976	12,604	242,580	Ib
3	44	046	I	STA	Admin/Program Management	STA Program Administration	2.00	0.00	2.00	340,538	18,005	358,543	Ib
4	26	061	I	PRA	Air Quality Evaluation	Air Quality Evaluation	2.25	0.00	2.25	387,206	11,421	398,626	IX
5	44	063	I	STA	Ambient Air Analysis	Analyze Criteria/Tox/Pollutants	8.91	5.00	13.91	1,463,635	1,034,993	2,498,628	II,V,IX
6	44	064	I	STA	Ambient Network	Air Monitoring/Toxics Network	19.85	-0.80	19.05	3,368,335	262,583	3,630,917	II,IV,V,IX
7	44	065	I	STA	Air Quality Data Management	AM Audit/Validation/Reporting	1.00	0.00	1.00	164,269	9,003	173,271	II,V,IX
8	44	067	II	STA	Ambient Lead Monitoring	Lead Monitoring/Analysis/Reporting	0.50	0.00	0.50	82,134	4,501	86,636	IV
9	44	073	I	STA	Arch Ctgs - Other	Sample Analysis/Rpts	2.00	0.00	2.00	328,538	18,005	346,543	XVIII
10	44	079	II	STA	AQ SPEC	AQ SPEC	3.00	0.00	3.00	492,806	27,008	519,814	XVII
11	44	081	I	STA	Air Filtration EPA	Air Filtration EPA/Admn/Impl	0.15	-0.05	0.10	24,640	(7,313)	17,327	V
12	44	082	I	STA	Air Fltration Other	Air Filtration Other/Admn/Impl	0.15	0.33	0.48	24,640	58,530	83,170	XVII
13	44	084	I	STA	Blk Carbon Stdy EPA	EPA Blck Carbon Climate Study	0.20	-0.20	0.00	32,854	(32,854)	-	XVII
14	44	161	I	STA	Comm Air Tox Init	Community Air Toxics Initiative	0.00	2.19	2.19	-	379,464	379,464	XVII
15	60	210	II	CE	Emergency Response	Emerg Tech Asst to Public Saf	0.10	0.00	0.10	14,805	622	15,427	IV,XV
16	44	240	I	STA	Environmental Justice	Implement Environmental Justice	0.45	0.00	0.45	73,921	4,051	77,972	II,IX
17	44	248	I	STA	EPA Community Scale AQ-SPEC	EPA Community Scale AQ-SPEC	1.00	0.00	1.00	164,269	9,003	173,271	V,XVII
18	26	443	I	PRA	MATES V	MATES V	0.30	0.00	0.30	101,627	1,523	103,150	II,IX
19	26	445	I	PRA	Meteorology	ModelDev/Data Analysis/Forecast	2.05	0.40	2.45	477,787	106,272	584,060	II,V,IX
20	44	468	I	STA	NATTS(Natl Air Tox Trends Sta)	NATTS (Natl Air Tox Trends)	1.50	0.00	1.50	246,403	13,504	259,907	II,V,IX
21	44	469	I	STA	Near Roadway Mon	Near Roadway Monitoring	1.50	0.00	1.50	246,403	13,504	259,907	IV,V,IX
22	44	505	I	STA	PM Sampling Program (EPA)	PM Sampling Program - Addition	10.60	-2.19	8.41	1,741,249	(284,038)	1,457,211	V
23	44	507	I	STA	PM Sampling Spec	PM Sampling Special Events	0.10	0.00	0.10	16,427	900	17,327	V
24	26	530	I	PRA	Photochemical Assessment	Photochemical Assessment	0.25	0.00	0.25	43,023	1,269	44,292	II,V
25	44	530	I	STA	Photochemical Assessment	Photochemical Assess & Monitor	3.00	0.00	3.00	492,806	27,008	519,814	V,IX
26	44	585	I	STA	Quality Assurance	Quality Assurance Branch	3.00	1.00	4.00	552,806	140,279	693,085	II,V,IX
27	44	663	I	STA	Salton Sea Monit	Mon/Analyze Hydrogen Sulfide	0.25	0.00	0.25	41,067	2,251	43,318	XVII
28	44	715	II	STA	Spec Monitoring/Emerg Response	Emergency Response	0.50	0.00	0.50	82,134	4,501	86,636	II
29	44	821	II	STA	TraPac Air Filt Prg	Admin/Tech Suppt/Reptg/Monitor	1.00	-1.00	0.00	164,269	(164,269)	-	XVII
						Total Monitoring Air Quality	67.01	16.68	83.69	$ 11,398,567	$ 3,751,583	$ 15,150,150	

A prorated share of the District General Budget has been allocated to each line in the work program based on the number of FTEs reflected on the line.

Operational Support
Work Program by Category

#	Program Code		Goal	Office	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Expenditures FY 2017-18	+/-	Expenditures FY 2018-19	Revenue Categories
1	04	020	III	FIN	Admin/SCAQMD Budget	Analyze/Prepare/Impl/Track WP	2.65	0.00	2.65	$ 397,454	$ (873)	$ 396,581	Ia
2	04	021	III	FIN	Admin/SCAQMD Contracts	Contract Admin/Monitor/Process	3.20	0.00	3.20	479,944	(1,054)	478,890	Ia
3	04	023	III	FIN	Admin/SCAQMD Capital Assets	FA Rep/Reconcile/Inv/Acct	0.70	0.00	0.70	104,988	(231)	104,757	Ia
4	17	024	III	CB	Admin/SCAQMD/GB/HB Mgmt	Admin Governing/Hearing Brds	1.25	0.00	1.25	279,796	19,944	299,741	Ia,VII,XV
5	08	025	III	LEG	Admin/SCAQMD-Legal Research	Legal Research/Staff/Exec Mgmt	1.10	0.10	1.20	233,265	21,608	254,873	Ia
6	16	026	III	AHR	SCAQMD Mail	Posting/Mailing/Delivery	2.30	0.00	2.30	429,252	(4,818)	424,434	Ia
7	04	035	I	FIN	AB 617-General	AB 617-General	0.00	0.50	0.50	-	74,827	74,827	XV
8	08	035	I	LEG	AB 617-General	AB 617-General	0.00	1.00	1.00	-	212,394	212,394	XV
9	16	035	I	AHR	AB 617-General	AB 617-General	0.00	2.00	2.00	-	369,073	369,073	XV
10	27	035	I	IM	AB 617-General	AB 617-General	0.00	5.00	5.00	-	973,839	973,839	XV
11	03	038	III	EO	Admin/Office Management	Budget/Program Management	2.00	-1.00	1.00	322,721	(11,447)	311,274	Ib
12	04	038	III	FIN	Admin/Office Management	Fin Mgmt/Oversee Activities	4.75	-1.00	3.75	712,417	(151,218)	561,199	Ib
13	08	038	III	LEG	Admin/Office Management	Attorney Timekeeping/Perf Eval	3.50	0.00	3.50	749,706	922	750,629	Ib
14	16	038	III	AHR	Admin/Office Management	Reports/Proj/Budget/Contracts	3.85	0.00	3.85	723,531	3,935	727,466	Ib
15	27	038	III	IM	Admin/Office Management	Overall Direction/Coord of IM	2.25	-0.25	2.00	607,271	(217,735)	389,535	Ib
16	04	045	III	FIN	Admin/Office Budget	Office Budget/Prep/Impl/Track	0.05	0.00	0.05	7,499	(16)	7,483	Ib
17	16	060	III	AHR	Equal Employment Opportunity	Program Dev/Monitor/Reporting	0.10	0.00	0.10	18,663	(209)	18,454	Ia
18	04	071	I	FIN	Arch Ctgs - Admin	Cost Analysis/Payments	0.04	0.00	0.04	5,999	(13)	5,986	XVIII
19	08	071	I	LEG	Arch Ctgs - Admin	Rule Dev/TA/Reinterpretations	0.05	0.00	0.05	10,603	17	10,620	XVIII
20	27	071	I	IM	Arch Ctgs - Admin	Database Dev/Maintenance	0.25	0.00	0.25	46,713	1,979	48,692	XVIII
21	04	085	III	FIN	Building Corporation	Building Corp Acct/Fin Reports	0.02	0.00	0.02	3,000	(7)	2,993	Ia
22	16	090	III	AHR	Building Maintenance	Repairs & Preventative Maint	7.00	0.00	7.00	1,309,671	(7,914)	1,301,757	Ia
23	16	092	III	AHR	Business Services	Building Services Admin/Contracts	2.55	0.00	2.55	475,910	(5,342)	470,569	Ia
24	08	102	II	LEG	CEQA Document Projects	CEQA Review	0.50	0.25	0.75	106,029	53,266	159,295	II,III,IX
25	27	160	III	IM	Computer Operations	Oper/Manage Host Computer Sys	5.25	0.00	5.25	1,389,926	41,555	1,431,481	Ia
26	27	184	III	IM	Database Information Support	Ad Hoc Reports/Bulk Data Update	1.00	0.00	1.00	206,853	7,915	214,768	Ia
27	27	185	III	IM	Database Management	Dev/Maintain Central Database	2.25	0.00	2.25	420,418	17,809	438,227	Ia
28	27	215	I	IM	Annual Emission Reporting	System Enhancements for GHG	0.50	0.00	0.50	93,426	3,958	97,384	II,XVII
29	16	225	III	AHR	Employee Benefits	Benefits Analysis/Orient/Records	1.50	0.00	1.50	279,947	(3,142)	276,805	Ia
30	16	226	III	AHR	Classification & Pay	Class & Salary Studies	0.30	0.00	0.30	55,989	(628)	55,361	Ia
31	08	227	III	LEG	Employee/Employment Law	Legal Advice: Employment Law	0.50	0.00	0.50	106,029	167	106,197	Ia
32	16	228	III	AHR	Recruitment & Selection	Recruit Candidates for SCAQMD	3.25	0.00	3.25	630,052	(3,308)	626,744	Ia
33	16	232	III	AHR	Position Control	Track Positions/Workforce Analys	0.55	0.00	0.55	102,647	(1,152)	101,495	Ia
34	04	233	III	FIN	Employee Relations	Assist HR/Interpret Salary Res	0.10	0.00	0.10	14,998	(33)	14,965	Ia
35	16	233	III	AHR	Employee Relations	Meet/Confer/Labor-Mgmt/Grievance	2.20	0.00	2.20	410,589	(4,609)	405,981	Ia
36	16	255	III	AHR	Facilities Services	Phones/Space/Keys/Audio-Visual	1.00	0.00	1.00	188,632	(2,095)	186,537	Ia
37	04	265	III	FIN	Financial Mgmt/Accounting	Record Accts Rec & Pay/Rpts	6.20	0.00	6.20	974,891	6,868	981,759	Ia
38	04	266	III	FIN	Financial Mgmt/Fin Analysis	Fin/SCAQMD Stat Analysis & Audit	0.80	0.00	0.80	119,986	(264)	119,722	Ia
39	04	267	III	FIN	Financial Mgmt/Treasury Mgmt	Treas Mgt Anlyz/Trk/Proj/Invst	1.00	0.00	1.00	234,632	(329)	234,303	Ia
40	04	268	III	FIN	Financial Systems	CLASS/Rev/Acct/PR/Sys Analyze	0.10	0.00	0.10	14,998	(33)	14,965	Ia
41	02	275	II	GB	Governing Board	Rep of Dist Meet/Conf/Testimony	0.00	0.00	0.00	1,711,896	71,791	1,783,687	Ia
42	08	275	III	LEG	Governing Board	Legal Advice:Attend Board/Cmte Mtgs	1.00	0.00	1.00	212,059	335	212,394	Ia
43	17	275	III	CB	Governing Board	Attend/Record/Monitor Meetings	1.40	0.00	1.40	313,372	22,338	335,709	Ia
44	35	350	III	LPA	Graphic Arts	Graphic Arts	2.00	0.00	2.00	364,648	(12,003)	352,644	Ia

A prorated share of the District General Budget has been allocated to each line in the work program based on the number of FTEs reflected on the line.

Operational Support (Cont.)
Work Program by Category

#	Program Code		Goal	Office	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Expenditures FY 2017-18	+/-	Expenditures FY 2018-19	Revenue Categories
45	27	370	III	IM	Information Technology Svcs	Enhance Oper Effic/Productivity	2.75	0.00	2.75	$ 536,595	$ 21,767	$ 558,361	Ia
46	08	401	III	LEG	Legal Advice/SCAQMD Programs	General Advice: Contracts	2.00	0.00	2.00	474,118	670	474,788	Ia
47	27	420	III	IM	Library	General Library Svcs/Archives	0.25	0.00	0.25	55,063	1,979	57,042	Ia
48	04	447	I	FIN	Mobile Sources/Accounting	Record Acct Rec & Pay/Special Funds	0.65	0.00	0.65	97,489	(214)	97,274	IX
49	27	470	III	IM	Network Operations/Telecomm	Operate/Maintain/Implem SCAQMD	9.25	0.00	9.25	2,054,047	(1,785)	2,052,263	Ia
50	27	480	III	IM	New System Development	Dev sys for special oper needs	2.50	0.00	2.50	559,327	(5,212)	554,115	II,IV
51	04	493	II	FIN	Outreach/SB/MB/DVBE	Outreach/Incr SB/DVBE Partic	0.05	0.00	0.05	7,499	(16)	7,483	Ia
52	04	510	III	FIN	Payroll	Ded/Ret Rpts/PR/St & Fed Rpts	3.60	0.50	4.10	587,437	73,641	661,078	Ia
53	04	570	III	FIN	Purchasing	Purch/Track Svcs & Supplies	2.50	0.00	2.50	374,956	74,976	449,933	Ia
54	04	571	III	FIN	Purchasing/Receiving	Receive/Record SCAQMD Purchases	1.20	0.00	1.20	179,979	(395)	179,584	Ia
55	04	572	III	FIN	Purchasing-Receiving/Stockroom	Track/Monitor SCAQMD Supplies	1.00	0.00	1.00	149,982	(329)	149,653	Ia
56	27	615	III	IM	Records Information Mgmt Plan	Plan/Impl/Dir/Records Mgmt plan	1.25	0.00	1.25	285,566	9,894	295,460	Ia
57	27	616	III	IM	Records Services	Records/Documents processing	3.75	0.00	3.75	838,297	23,082	861,379	Ia,III,IV
58	04	630	III	FIN	Cash Mgmt/Revenue Receiving	Receive/Post Pymts/Reconcile	5.25	0.00	5.25	787,408	(1,729)	785,679	II,III,IV,XI
59	16	640	III	AHR	Risk Management	Liabl/Property/Wk Comp/Selflns	2.25	0.00	2.25	531,921	(41,713)	490,208	Ia
60	27	735	III	IM	Systems Maintenance	Maintain Existing Software Prog	4.50	0.00	4.50	1,351,177	(21,509)	1,329,668	II,III,IV
61	27	736	III	IM	Systems Implementation/PeopleS	Fin/HR PeopleSoft Systems Impl	1.50	0.00	1.50	530,279	(238,127)	292,152	Ia
62	04	805	III	FIN	Training	Continuing Education/Training	0.20	0.00	0.20	29,996	(66)	29,931	Ib
63	26	805	III	PRA	Training	Training	0.25	0.00	0.25	43,023	1,269	44,292	Ib
64	50	805	III	EP	Training	Dist/Org Unit Training	3.10	0.00	3.10	527,496	18,464	545,960	Ib
65	60	805	III	CE	Training	Dist/Org Unit Training	4.00	-2.00	2.00	592,203	(283,653)	308,550	Ib
66	04	825	III	FIN	Union Negotiations	Official Labor/Mgmt Negotiate	0.02	0.00	0.02	3,000	(7)	2,993	Ia
67	08	825	III	LEG	Union Negotiations	Legal Adv: Union Negotiations	0.05	-0.05	0.00	10,603	(10,603)	-	Ia
68	26	825	III	PRA	Union Negotiations	Official Labor/Mgmt Negotiate	0.02	0.00	0.02	3,442	102	3,543	Ia
69	35	825	III	LPA	Union Negotiations	Official Labor/Mgmt Negotiate	0.01	0.00	0.01	1,726	37	1,763	Ia
70	44	825	III	STA	Union Negotiations	Labor/Mgmt Negotiations	0.05	0.00	0.05	8,213	450	8,664	Ia
71	50	825	III	EP	Union Negotiations	Official Labor/Mgmt Negotiate	0.05	0.00	0.05	8,508	298	8,806	Ia
72	60	825	III	CE	Union Negotiations	Official Labor/Mgmt Negotiate	0.10	0.00	0.10	14,805	622	15,427	Ia
73	04	826	III	FIN	Union Steward Activities	Rep Employees in Grievance Act	0.01	0.00	0.01	1,500	(3)	1,497	Ia
74	08	826	III	LEG	Union Steward Activities	Rep Employees in Grievance Act	0.05	-0.05	0.00	10,603	(10,603)	-	Ia
75	26	826	III	PRA	Union Steward Activities	Rep Employees in Grievance Act	0.02	0.00	0.02	3,442	102	3,543	Ia
76	35	826	III	LPA	Union Steward Activities	Union Steward Activities	0.01	0.00	0.01	1,726	37	1,763	Ia
77	44	826	III	STA	Union Steward Activities	Rep Employees in Grievance Act	0.05	0.00	0.05	8,213	450	8,664	Ia
78	50	826	III	EP	Union Steward Activities	Rep Employees in Grievance Act	0.05	0.00	0.05	8,508	298	8,806	Ia
79	60	826	III	CE	Union Steward Activities	Rep Employees in Grievance Act	0.10	0.00	0.10	14,805	622	15,427	Ia
80	03	855	II	EO	Web Tasks	Create/edit/review web content	0.03	0.00	0.03	9,682	(343)	9,338	Ia
81	04	855	II	FIN	Web Tasks	Create/edit/review web content	0.02	0.00	0.02	3,000	(7)	2,993	Ia
82	17	855	II	CB	Web Tasks	Create/edit/review web content	0.03	0.00	0.03	6,715	479	7,194	Ia
83	26	855	II	PRA	Web Tasks	Create/edit/review web content	0.50	0.00	0.50	86,046	2,538	88,584	Ia
84	27	855	II	IM	Web Tasks	Create/edit/review web content	3.25	0.00	3.25	893,071	25,724	918,795	Ia
85	35	855	II	LPA	Web Tasks	Create/edit/review web content	0.40	0.00	0.40	69,050	1,479	70,529	Ia
86	50	855	II	EP	Web Tasks	Creation/Update of Web Content	0.25	0.00	0.25	42,540	1,489	44,029	Ia
87	60	855	II	CE	Web Tasks	Creation/Update of Web Conten	0.50	1.00	1.50	74,025	237,387	311,412	Ia
						Total Operational Support	126.38	6.00	132.38	$ 26,747,503	$ 1,357,605	$ 28,105,108	

A prorated share of the District General Budget has been allocated to each line in the work program based on the number of FTEs reflected on the line.

Policy Support
Work Program by Category

#	Program Code		Goal	Office	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Expenditures FY 2017-18	+/-	Expenditures FY 2018-19	Revenue Categories
1	44	041	I	STA	Admin/Office Mgmt/Policy Supp	Overall Policy Supp/Mgmt/Coord	0.49	0.00	0.49	$ 80,492	$ 4,411	$ 84,903	Ib
2	03	083	II	EO	Hlth Effects Air Pollution Fou	Health Effects Air Poll Foundation Support	0.01	0.00	0.01	3,227	(114)	3,113	Ia
3	04	083	II	FIN	Hlth Effects Air Pollution Fou	Health Effects Air Poll Foundation Support	0.02	0.00	0.02	3,000	(7)	2,993	Ia
4	26	083	II	PRA	Hlth Effects Air Pollution Fou	Health Effects Air Poll Foundation Support	0.10	0.00	0.10	17,209	508	17,717	Ia,II,IV
5	26	148	I	PRA	Climate Change	GHG/Climate Change Policy Development	3.10	0.25	3.35	533,483	60,027	593,510	IV,XVII
6	50	148	I	EP	Climate Change	GHG/Climate Change Support	0.50	0.00	0.50	85,080	2,978	88,058	II,IX
7	60	148	I	CE	Climate Change	GHG/Climate Chg Support	0.10	-0.10	0.00	14,805	(14,805)	-	IV,IX
8	26	240	I	PRA	EJ-AQ Guidance Document	AQ Guidance Document	0.05	0.05	0.10	8,605	9,112	17,717	II,IX
9	03	275	I	EO	Governing Board	Board/Committee Support	1.72	0.00	1.72	555,079	(19,689)	535,391	Ia
10	26	276	I	PRA	Advisory Group/Home Rule	Governing Board Advisory Group	0.30	0.00	0.30	51,627	1,523	53,150	Ia
11	44	276	I	STA	Advisory Group/Technology Adva	Tech Adv Advisory Group Supp	0.10	0.00	0.10	16,427	900	17,327	VIII
12	50	276	I	EP	Board Committees	Admin/Stationary Source Committees	0.25	0.00	0.25	42,540	1,489	44,029	Ia
13	60	276	I	CE	Board Committees	Admin/Stationary Source Committee	0.15	0.00	0.15	22,208	934	23,141	Ia
14	26	277	I	PRA	Advisory Group/AQMP	Governing Board AQMP Advisory Group	0.05	0.00	0.05	8,605	254	8,858	II,IX
15	26	278	I	PRA	Advisory Group/Sci,Tech,Model	Scientific/Tech/Model Peer Rev	0.15	0.00	0.15	25,814	761	26,575	II,IX
16	35	280	I	LPA	Advisory Group/Ethnic Comm	GB Ethnic Comm Advisory Group	0.40	0.00	0.40	69,050	1,479	70,529	II,IX
17	35	281	I	LPA	Advisory Group/Small Business	SBA Advisory Group Staff Support	0.50	0.00	0.50	86,312	1,849	88,161	IV,IX
18	35	283	I	LPA	Governing Board Policy	Brd sup/Respond to GB req	0.55	0.00	0.55	94,943	2,034	96,977	Ia
19	35	345	II	LPA	Goods Mvmt&Financial Incentive	Goods Movement & Financial Incentives Progr	1.00	0.00	1.00	172,624	3,698	176,322	IX
20	03	381	I	EO	Interagency Liaison	Local/State/Fed Coord/Interact	0.71	0.00	0.71	229,132	(8,127)	221,004	Ia,IX
21	03	410	I	EO	Legislation	Testimony/Mtgs:New/Current Leg	0.03	0.00	0.03	9,682	(343)	9,338	Ia,IX
22	44	410	I	STA	Legislation	Support Pollution Reduction thru Legislatio	0.50	0.00	0.50	82,134	4,501	86,636	IX
23	35	412	I	LPA	Legislation/Federal	Lobbying/Analyses/Tracking/Out	0.25	0.00	0.25	708,286	925	709,211	Ia
24	35	413	I	LPA	Legislation/Exec Office Suppor	Coord Legis w/ EO, EC, Mgmt	0.25	0.00	0.25	43,156	925	44,081	Ia
25	35	414	I	LPA	Legislation-Effects	Lobbying/Analyses/Tracking/Out	0.80	0.00	0.80	148,099	2,959	151,058	Ia,IX
26	03	416	I	EO	Legislative Activities	Supp/Promote/Influence Legis/Adm	0.03	0.00	0.03	9,682	(343)	9,338	Ia
27	08	416	I	LEG	Legislative Activities	Lobbying: Supp/Promote/Influence legis/Adm	0.10	0.00	0.10	21,206	33	21,239	Ia
28	26	416	I	PRA	Legislative Activities	Supp/Promote/Influence Legis/Adm	0.50	0.00	0.50	86,046	2,538	88,584	Ia
29	35	416	I	LPA	Legislative Activities	Supp/Promote/Influence Legis/Adm	0.50	0.00	0.50	451,312	1,849	453,161	Ia
30	50	416	I	EP	Legislative Activities	Legislative Activities	0.25	0.00	0.25	42,540	1,489	44,029	Ia
31	60	416	I	CE	Legislative Activities	Legislative Activities	0.05	-0.05	0.00	7,403	(7,403)	-	Ia
32	26	454	I	PRA	Mob Src:Greenhs Gas Reduc Meas	Provide comments on mob src portion of AB32	0.89	-0.89	0.00	153,161	(153,161)	-	XVII
33	35	494	I	LPA	Outreach/Collateral/Media	Edits,Brds,Talk shows,Commercl	5.60	0.00	5.60	1,131,410	20,710	1,152,120	Ia
34	08	717	II	LEG	Student Interns	Gov Board/Student Intern Program	0.10	0.00	0.10	21,206	33	21,239	Ia
35	16	717	II	AHR	Student Interns	Gov Board/Student Intern Program	0.20	0.00	0.20	37,326	(419)	36,907	Ia
36	26	717	II	PRA	Student Interns	Gov Bd/Student Intern Program	0.25	0.00	0.25	43,023	1,269	44,292	Ia
37	35	717	II	LPA	Student Interns	Student Interns	0.10	0.00	0.10	17,262	370	17,632	Ia
38	60	717	II	CE	Student Interns	Gov Board/Student Intern Program	0.05	0.00	0.05	7,403	311	7,714	Ia
						Total Policy Support	20.70	(0.74)	19.96	$ 5,140,597	$ (74,542)	$ 5,066,054	

A prorated share of the District General Budget has been allocated to each line in the work program based on the number of FTEs reflected on the line.

Timely Review of Permits
Work Program by Category

#	Program Code		Goal	Office	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Expenditures FY 2017-18	+/-	Expenditures FY 2018-19	Revenue Categories
1	50	120	I	EP	Certification/Registration Pro	Certification/Registration Prog	2.00	-1.00	1.00	$ 340,320	$ (164,204)	$ 176,116	III
2	50	253	I	EP	ERC Appl Processing	Process ERC Applications	3.50	0.00	3.50	595,560	20,847	616,407	III
3	50	367	I	EP	Hearing Board/Appeals	Appeals: Permits & Denials	0.25	0.00	0.25	42,540	1,489	44,029	III
4	26	461	I	PRA	Permit & CEQA Modeling Review	Review Model Permit/Risk Assmt	1.30	0.00	1.30	273,719	6,599	280,317	III
5	50	475	I	EP	NSR Implementation	Implement NSR/Allocate ERCs	2.50	0.00	2.50	425,400	14,890	440,290	II,III,V,XV
6	50	476	I	EP	NSR Data Clean Up	Edit/Update NSR Data	0.50	0.00	0.50	85,080	2,978	88,058	II
7	50	515	I	EP	Perm Proc/Non TV/Non RECLAIM	PP: Non TitIV/TitIII/RECLAIM	51.75	-1.00	50.75	8,831,779	196,117	9,027,895	III,XV
8	08	516	I	LEG	Permit Processing/Legal	Legal Advice: Permit Processing	0.20	-0.10	0.10	42,412	(21,172)	21,239	III
9	50	517	I	EP	Permit Services	Facility Data-Create/Edit	12.50	0.00	12.50	2,127,000	74,452	2,201,452	III,XV
10	50	518	I	EP	RECLAIM Non-Title V	Process RECLAIM Only Permits	4.50	0.00	4.50	765,720	26,803	792,523	III,IV,XV
11	50	519	I	EP	Perm Proc/Title III (Non TV)	Process Title III Permits	1.00	0.00	1.00	170,160	5,956	176,116	III
12	50	521	I	EP	Perm Proc/Expedited Permit	Proc Expedited Permits (301OT)	4.00	0.00	4.00	680,640	23,825	704,465	III
13	27	523	III	IM	Permit Streamlining	Permit Streamlining	0.25	0.00	0.25	46,713	1,979	48,692	III
14	50	523	I	EP	Permit Streamlining	Permit Streamlining	3.75	1.00	4.75	638,100	198,452	836,552	III
15	44	545	I	STA	Protocols/Reports/Plans	Eval Test Protocols/Cust Svc	0.10	0.00	0.10	16,427	900	17,327	III,IV
16	44	546	I	STA	Protocols/Reports/Plans	Eval Test Protocols/Compliance	6.15	0.00	6.15	1,010,253	55,365	1,065,618	IV,VI
17	50	607	I	EP	RECLAIM & Title V	Process RECLAIM & TV Permits	18.40	0.00	18.40	3,150,944	89,594	3,240,537	III
18	26	643		PRA	Rule 222 Filing Program	Rule 222 Filing Program	0.00	0.00	0.00	50,000	(50,000)	-	IV
19	50	643	I	EP	Rule 222 Filing Program	Rule 222 Filing Program	0.50	0.00	0.50	85,080	2,978	88,058	IV
20	35	680	I	LPA	Small Business/Permit Streamln	Asst sm bus to comply/SCAQMD req	3.95	0.00	3.95	681,865	14,608	696,473	II,III,IV,V,XV
21	44	725	I	STA	Permit Processing/Support E&C	Assist EAC w/ Permit Process	0.05	0.00	0.05	8,213	450	8,664	III
22	50	728	I	EP	Perm Proc/IM Programming	Assist IM: Design/Review/Test	2.55	0.00	2.55	433,908	15,188	449,096	II,III,IV
23	08	770	I	LEG	Title V	Leg Advice: Title V Prog/Perm Dev	0.05	0.00	0.05	10,603	17	10,620	II,IV
24	27	770	I	IM	Title V	Dev/Maintain Title V Program	1.50	0.00	1.50	395,279	(103,127)	292,152	III
25	08	772	I	LEG	Title V Permits	Leg Advice: New Source Title V Permit	0.05	0.00	0.05	10,603	17	10,620	III
26	50	774	I	EP	TV/Non-RECLAIM	Process Title V Only Permits	18.00	0.00	18.00	3,062,880	107,211	3,170,091	III
27	50	775	I	EP	Title V – Admin	Title V Administration	1.00	0.00	1.00	170,160	5,956	176,116	III
						Total Timely Review of Permits	140.30	(1.10)	139.20	$ 24,151,356	$ 528,168	$ 24,679,523	
						Total SCAQMD	825.25	51.15	876.40	$ 149,878,906	$ 12,752,195	$ 162,631,101	

A prorated share of the District General Budget has been allocated to each line in the work program based on the number of FTEs reflected on the line.

WORK PROGRAM GLOSSARY

Below are descriptions of the activities related to the Work Program.

AB 134 – Community Air Protection Program adds funding to the Carl Moyer Program (See Carl Moyer Program).

AB 617 – Community Air Protection Program to improve air quality in disadvantaged communities with high cumulative exposure through monitoring and emission reduction plans.

AB 1318 Mitigation - an eligible electrical generating facility shall pay mitigation fees for the transfer of emission credits from SCAQMD's internal emission credit accounts. Mitigation fees shall be used to finance emission reduction projects, pursuant to the requirements of AB 1318.

AB 2766 (Mobile Sources, MSRC) - programs funded from motor vehicle registration revenues. The activities include: evaluation, monitoring, technical assistance, and tracking of AB2766 Subvention Fund Program progress reports including cost-effectiveness and emissions reductions achieved; supporting programs implemented by the Mobile Source Review Committee (MSRC); disbursing and accounting for revenues subvened to local governments; and performing SCAQMD activities related to reduction of emissions from mobile sources.

Acid Rain Program - developing and implementing the Continuous Emissions Monitoring (CEMS) Program in compliance with 40 CFR Part 75 of the Clean Air Act.

Administration/SCAQMD - supporting the administration of the SCAQMD. Examples are tracking fixed assets, operating the mailroom, preparing and reviewing contracts, conducting oversight of SCAQMD activities, developing District-wide policies and procedures, preparing the SCAQMD budget, providing legal advice on SCAQMD programs and other activities, and performing activities in support of the SCAQMD as a whole.

Admin/SCAQMD Capital Assets (Asset Management) – tracking of acquisitions, disposals/retirements and reconciliation of capital assets to the Capital Outlay account, and conducting annual lab and biennial asset inventories.

Administration/Office Management - supporting the administration of an organizational unit or a unit within an Office. This includes such items as preparing Office budgets, tracking programs, providing overall direction and coordination, providing program management and integration, preparing policies and procedures manuals, and preparing special studies and projects.

Advisory Group – providing support to various groups such as: AQMP (Air Quality Management Plan), Environmental Justice, Home Rule, Local Government and Small Business Assistance, Technology Advancement, and Permit Streamlining Task Force.

Air Filtration - installation of high-efficiency air filtration devices in schools with the goal of reducing children's exposure to particulate matter in the classroom.

WORK PROGRAM GLOSSARY

Air Quality Evaluation - analyzing air quality trends and preparing the Reasonable Further Progress (RFP) report.

Ambient Air Analysis/Ambient Network (Audit, Data Reporting, Special Monitoring) – complying with Federal regulations to monitor air quality for criteria pollutants at air monitoring stations to determine progress toward meeting the federal ambient air quality standards. This includes operating the SCAQMD's air monitoring network and localized monitoring at landfill sites as well as conducting specialized monitoring in response to public nuisance situations. SCAQMD monitoring stations also collect samples which are analyzed by SCAQMD's laboratory. Also see Special Monitoring.

Ambient Lead Monitoring – maintain the current ambient lead monitoring network to meet federal monitoring requirements.

Annual Emission Reporting (AER) – implementing the AER Program and tracking actual emissions reported by facilities, conducting audits of data, handling refunds, and preparing inventories and various reports.

Annual Emission Reporting Program Public Assistance - providing public assistance in implementing SCAQMD's AER program by conducting workshops, resolving fee-related issues, and responding to questions.

AQIP Evaluation – provides incentive funding for projects to meet VOC, NOx, and CO emission targets with funds generated from companies who pay fees in lieu of carpool programs. Projects are funded through a semi-annual solicitation process.

AQMP (Air Quality Management Plan) – Management Plan for the South Coast Air Basin and the Interagency AQMP Implementation Committee.

Air Quality Sensor Performance Evaluation Center (AQ-SPEC) - program to test commercially available, low-cost air quality sensors.

Architectural Coatings – Rule 314 requires architectural coatings manufacturers which distribute into and/or sell their manufactured architectural coatings within the SCAQMD for use in the SCAQMD to submit an Annual Quantity and Emissions Report. To recover the cost of the program, a fee is assessed to these manufacturers. The fee is based on the quantity of coatings sold as well as the cumulative emissions from the quantity of coatings distributed or sold for use in the SCAQMD.

Area Sources/Compliance – developing rules and compliance programs, as well as alternatives to traditional permitting for smaller sources of emissions of VOCs and NOx.

Auto Services - maintaining the SCAQMD's fleet of automobiles, trucks, and vans as well as providing messenger services as needed.

WORK PROGRAM GLOSSARY

Billing Services - administering the SCAQMD's permit billing system, responding to inquiries, and resolving issues related to fees billed.

Black Carbon Study – analyzing black carbon emissions in the Basin to determine climate implications that may be used within the AB 32 climate programs and in other air districts.

Board Committees - participation in Governing Board committees by preparing materials, presenting information on significant or new programs and providing technical expertise.

Building Corporation - managing the South Coast Air Quality Management District Building Corporation. The Building Corporation issued Installment Sale Revenue Bonds in conjunction with the construction of the SCAQMD's Diamond Bar headquarters facility.

Building Maintenance - maintaining and repairing the Diamond Bar Headquarters facility and SCAQMD air monitoring sites.

Business Services – overseeing operation of Facilities Services, Automotive Services, Print Shop and Mail/Subscriptions Services; negotiating and administering leases for the Diamond Bar facility, Long Beach Office, and air monitoring stations.

California Natural Gas Vehicle Partnership – strategic, non-binding partnership formed to work together in developing and deploying natural gas vehicles and implementing a statewide natural gas infrastructure.

Call Center - operates the 24-hour radio communication system via telephone between SCAQMD headquarters and the public/field staff.

CARB PERP (Portable Equipment Registration Program) – a program established by CARB allowing the operation of portable equipment in any air district throughout the state without individual local district permits. Amended to enhance enforceability and expand CARB's requirements for portable engines and equipment units, creating a more comprehensive and inclusive statewide registration program that now provides for triennial inspection and renewal of PERP registration.

Carl Moyer Program – provides incentive funding for the repower, replacement, or purchase of new heavy-duty vehicles and equipment beyond the emission limits mandated by regulations. Awards are granted through an annual solicitation process. Separate program announcements are also issued for pre-1990 diesel Class 7 or 8 truck fleet and ports truck fleet modernization programs. Also see Mobile Sources.

Case Disposition - resolving Notices of Violation (NOV) issued by SCAQMD inspectors. This includes preparing both civil and criminal cases and administering SCAQMD's Mutual Settlement Agreement Program.

WORK PROGRAM GLOSSARY

Cash Management – receiving revenue, posting of payments, processing of refunds associated with SCAQMD programs, and bank and preparing cash reconciliations.

CEMS Certification (Continuous Emissions Monitoring System) - evaluating, approving, and certifying the continuous emissions monitoring systems installed on emissions sources to ensure compliance with SCAQMD rules and permit conditions.

CEQA Document Projects/Special Projects (California Environmental Quality Act) - reviewing, preparing, assessing, and commenting on projects which have potential air quality impacts.

Certification/Registration Program – manufacturers can voluntarily apply to have standard, off-the-shelf equipment certified by SCAQMD to ensure that it meets all applicable requirements.

Classification and Pay – maintaining the classification plan and conducting job analyses to ensure SCAQMD positions are allocated to the proper class, and conducting compensation studies to ensure classes are appropriately compensated and salaries remain competitive in the workforce.

Clean Air Connections – increase awareness of air quality issues and SCAQMD's programs and goals by developing and nurturing a region-wide group of community members with an interest in air quality issues.

Clean Communities Plan (CCP) – an update to the 2000 Air Toxics Control Plan (ATCP) and the 2004 Addendum. The objective of the 2010 CCP is to reduce the exposure to air toxics and air-related nuisances throughout the District, with emphasis on cumulative impacts.

Clean Fuels Program – accelerate the development and deployment of advanced, low emission technologies, including, but not limited to electric, hydrogen, and plug-in hybrid electric vehicles, low emission heavy-duty engines, after treatment for off-road construction equipment and identification of tailpipe emissions from biofuels.

Climate Change – developing and evaluating policy and strategy related to local, state, federal and international efforts on climate change. Seek to maximize synergies for criteria and toxic reduction and minimize and negative impacts.

Compliance – ensuring compliance of clean air rules and regulations through regular inspection of equipment and facilities, as well as responding to air quality complaints made by the general public.

Compliance/Notice of Violation (NOV) Administration – NOV processing and review for preparation for assignment to Mutual Settlement Agreement (MSA), civil, or criminal handling.

Computer Operations - operating and managing the SCAQMD's computer resources. These resources support the SCAQMD's business processes, air quality data, and modeling activities and the air monitoring telemetry system. Also see Systems Maintenance.

Conformity - reviewing of federal guidance and providing input on conformity analysis for the Regional Transportation Improvement Program (RTIP). Staff also participates in various Southern California Association of Governments (SCAG) meetings, the Statewide Conformity Working group, and other meetings to address conformity implementation issues. Staff participates in the federal Conformity Rule revision process, and monitors and updates Rule 1902, Transportation Conformity, as needed.

Credit Generation Programs (Intercredit Trading) – rulemaking and developing and implementing a program that expands emission credit trading by linking the SCAQMD's stationary and mobile source credit markets.

Criteria Pollutants/Mobile Sources – coordinating the implementation of the AQMP and conducting feasibility studies for mobile source categories; developing control measures and amended rules as warranted.

1-800-CUT-SMOG - The Call Center handles (1-800-CUT-SMOG) calls from drivers who identify a vehicle emitting excessive amounts of exhaust smoke.

Database Information Support – day-to-day support of ad hoc reports and bulk data updates required from SCAQMD's enterprise databases.

Database Management - developing and supporting the data architecture framework, data modeling, database services, and the ongoing administration of SCAQMD's central information repository.

DB/Computerization – developing laboratory instrument computer systems for data handling and control, evaluating the quality of the stored information. Further develop and maintain the Source Test Information Management System (STIMS).

DERA (Diesel Emission Reduction Act) School Bus Replacement – a U.S. EPA funded project to replace diesel school buses with Compressed Natural Gas (CNG) and electric buses.

DERA (Diesel Emission Reduction Act) FY 13 Vehicle Replacement – a U.S. EPA funded project to replace on-road medium-duty diesel trucks with battery electric trucks.

Economic Development/Business Retention – meeting with various governmental agencies to assist company expansion or retention in the Basin.

EJ-AQ Guidance Document (Environmental Justice-Air Quality Guidance Document) – providing outreach to local governments as they update their general plans and make land use

decisions. Providing updates to the reference document titled "Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning."

Emergency Response - responding to emergency air pollution (toxic) incidents, providing air quality monitoring support to local authorities.

Emission Reduction Credit Application Processing – processing applications for Emission Reduction Credits (ERC).

Emissions Field Audit – conducting field audits at facilities that have reported through Annual Emissions Reporting (AER) to ensure accurate emission reporting and to improve the program.

Emissions Inventory Studies – developing major point source emissions data and area source emissions inventory, updating emissions factors, developing and updating control factors, performing special studies to improve emission data, and responding to public inquiries regarding emission data.

Employee Benefits – administering SCAQMD's benefit plans, including medical, dental, vision, and life insurance, as well as State Disability Insurance, Section 125 cafeteria plan, Long Term Care and Long Term Disability plans, Section 457 Deferred Compensation Plan, and Consolidated Omnibus Budget Reconciliation Act (COBRA) program.

Employee Relations – managing the collective bargaining process, administering MOU's, preparing disciplinary documents, and administering SCAQMD's performance appraisal program, Family and Medical Leave Act (FMLA) requests, tuition reimbursement, and outside training requests.

Employee/Employment Law – handling legal issues dealing with employment law in coordination with outside counsel.

Enforcement Litigation – staff attorneys pursue enforcement litigation including actions for civil penalties or injunctions when violations have not been settled or circumstances otherwise dictate.

Environmental Education - informing and educating the public about air pollution and their role in bringing clean air to the basin.

Environmental Justice (EJ) **-** a strategy for equitable environmental policymaking and enforcement to protect the health of all persons who live or work in the South Coast District from the health effects of air pollution regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location. The Environmental Justice Initiatives help to identify and address potential areas where citizens may be disproportionately impacted by air pollutants and ensure clean air benefits are afforded to all citizens and communities of the region.

Equal Employment Opportunity – ensuring non-discrimination and equal employment for employees and applicants through broad-based, targeted advertising; training interviewers to ensure fairness in evaluating candidates; ensuring that selection processes and testing instruments are appropriate and job-related; coaching supervisors and managers regarding hiring processes; and gathering data and preparing related staffing reports.

Facilities Services – monitoring service contracts, supporting tenants, overseeing conference center use, administering identification badges, overseeing building access control, maintaining key/lock systems, and configuring workspaces.

Facility-Based Mobile Source Measures (FBMSMs) – effort to begin implementation of the five FBMSMs (Warehouse Distribution Centers, Commercial Airports, New or Redevelopment Projects, Commercial Marine Ports, and Railyard & Intermodal Facilities) adopted in the 2016 AQMP to reduce emissions from facilities and ensure that these reductions are counted towards the region's emissions budget.

Fee Review – activities relating to conducting Fee Review Committee hearings for businesses that contest SCAQMD fees (Rule 313).

Financial Management - managing the financial aspects of the SCAQMD. This includes cash management, treasury/investment, accounting, and program and financial audits. It also includes maintaining SCAQMD's permit-related financial and accounting records as well as maintaining and enhancing SCAQMD's payroll and accounting systems.

Goods Movement and Financial Incentives – programs to evaluate the air quality issues associated with goods movement and traffic congestion, and for the identification of financial incentives for expedited facility modernization and diesel engine conversion.

Governing Board – supporting the operation of the Governing Board and advisory groups of the SCAQMD. These activities range from preparing the agenda and minutes to providing support services, legal advice, speeches, letters, and conference coordination.

Grants Management - coordinating, negotiating, monitoring, accounting, and reporting of the SCAQMD's air pollution program and financial activities relating to grants, including U.S. EPA, DOE, CEC, DHS grants, and CARB Subvention.

Graphics Arts - designing and producing presentation materials and SCAQMD publications.

Green House Gas Reporting (GHG) - many of the businesses and facilities within SCAQMD's jurisdiction are required to report their GHG emissions to CARB under the regulation for Mandatory Reporting of Greenhouse Gases (state) and, beginning in 2011, to the U.S. EPA under their Mandatory Reporting Rule (federal).

Green House Gas Reduction Fund – CARB's Low Carbon Transportation Greenhouse Gas Reduction Fund (GGRF) Investment Program funds a project to demonstrate zero emission drayage trucks.

Health Effects – conducting research and analyzing the health effects of air pollutants and assessing the health implications of pollutant reduction strategies; working with industry, trade associations, environmental groups, CARB and U.S. EPA and providing information to concerned citizens.

Hearing Board – supporting operation of the SCAQMD's Hearing Board. These activities include accepting petitions filed; preparing and distributing notices; preparing minute orders, findings, and decisions of the Board; collecting fees; and general clerical support for the Board.

Information Technology Services - implementing new information technologies to enhance operational efficiency and productivity. Examples include developing workflow applications, training and supporting computer end users, and migrating network operating systems.

Inspections - inspecting facilities and equipment that emit or have the potential to emit air pollutants.

Inspections/RECLAIM Audits – conducting RECLAIM inspections and audits at facilities subject to Regulation XX (RECLAIM).

Interagency Coordination/Liaison - interacting with state, local, and federal control agencies and governmental entities.

Intergovernmental/Geographic Deployment - influencing local policy development and implementing a local government clean air program.

Lawnmower Exchange – residents of the South Coast Air Basin may trade in their gas-powered lawnmower and purchase a new zero-emission, battery electric lawnmower at a significant discount.

Lead Agency Projects – SCAQMD permitting and rule development projects where a CEQA document is prepared and the SCAQMD is the lead agency.

Legal - providing legal support to SCAQMD in the areas of liability defense, writs of mandate, injunctions, and public hearings. This activity also includes reviewing contracts, and advising staff on rules, fees and other governmental issues.

Legislation - drafting new legislation, analyzing and tracking proposed legislation, and developing position recommendations on legislation which impacts air quality.

Library - acquiring and maintaining reference materials and documentation that support the SCAQMD's programs.

Lobby Permit Services – providing information and support to applicants to expedite permit processing. Includes consolidating forms, prescreening review for completeness of applications, providing internet access of certain forms, and providing "over-the-counter" permits in the lobby of the SCAQMD's Diamond Bar headquarters.

Meteorology - modeling, characterizing, and analyzing both meteorological and air quality data to produce the SCAQMD's daily air quality forecast.

Microscopic Analysis - analyzing, identifying, and quantifying asbestos for compliance with SCAQMD, state, and federal regulations.

Mobile Sources - transportation monitoring, strategies, control measures, demonstration projects, the Mobile Source Air Pollution Reduction Review Committee (MSRC), implementation of Fleet Rules, High Emitter Repair & Scrappage Program, and locomotive remote sensing.

Mobile Source and AQMP (Air Quality Management Plan) Control Strategies – provide technical assistance on the mobile source element of the AQMP.

Moyer Program – see Carl Moyer Program

Mutual Settlement Program - resolving civil penalties without court intervention; this program is a mechanism to resolve violations and avoid criminal proceedings.

National Air Toxics Trends Stations (NATTS) – through U.S. EPA funding, two sites in the monitoring network are utilized to collect ambient VOC and particulate samples. Samples are analyzed by the SCAQMD lab and reported to U.S. EPA where the data is used to determine toxic trends.

Near Roadway (NO_2) Monitoring – federal monitoring requirement that calls for state and local air monitoring agencies to install near-road NO_2 monitoring stations at locations where peak hourly NO_2 concentrations are expected to occur within the near-road environment in larger urban areas.

Network Operations/Telecommunications – installing, maintaining, and providing operational support of the SCAQMD's PC, voice, data, image, and radio networks; planning, designing, and implementing new network systems or services in response to the SCAQMD's communications and business needs; and providing training, support, and application development services for end-users of voice and PC systems.

New Systems Development – providing support for major computer systems development efforts.

New Source Review (NSR) - developing and implementing New Source Review rules; designing, implementing, and maintaining the Emission Reduction Credits and the New Source Review programs. These programs streamline the evaluation of permit renewal and emissions reporting.

Outreach - increasing public awareness of the SCAQMD's programs, goals, permit requirements, and employment opportunities; interacting, providing technical assistance, and acting as liaison between SCAQMD staff and various sectors of private industry, local governments, small businesses, and visiting dignitaries.

Outreach Media/Communications - monitoring local and national press accounts, both print and broadcast media, to assess SCAQMD's outreach and public opinion on SCAQMD rules and activities. This also includes responding to media calls for informational background material on SCAQMD news stories.

Payroll - paying salaries and benefits to SCAQMD employees, withholding and remitting applicable taxes, and issuing W2s.

Permit Processing - inspecting, evaluating, auditing, analyzing, reviewing and preparing final approval or denial to operate equipment which may emit or control air contaminants.

Permit Streamlining – activities relating to reducing organizational costs and streamlining regulatory and permit requirements on businesses.

Photochemical Assessment Monitoring Systems (PAMS) - promulgating PAMS (a federal regulation), which requires continuous ambient monitoring of speciated hydrocarbons during smog season. Through U.S. EPA funding, ozone precursors are measured at seven stations and samples are collected.

PM Sampling Program (U.S. EPA) – daily collection of particulate samples

Port of Long Beach (POLB) Advanced Maritime Emission Control System (AMECS) Demo – funded by the Port of Long Beach, the proposed project will assess the performance and effectiveness of a barge-mounted emission control system to capture and treat hoteling emissions from ocean-going vessels (OGV) at berth at the Port of Long Beach.

Portable Equipment Registration Program (PERP) – see CARB PERP Program.

Position Control – tracking Board-authorized positions and SCAQMD workforce utilization, processing personnel transactions for use by Payroll, and preparing reports regarding employee status, personnel transactions, and vacant positions.

Print Shop – performing in-house printing jobs and contracting outside printing/binding services when necessary.

Proposition 1B - providing incentive funding for goods movement and lower emission school bus projects with funds approved by voters in November 2006.

Protocols/Reports/Plans/LAP - evaluating and approving protocols, source testing plans and reports submitted by regulated facilities as required by SCAQMD rules and permit conditions, New Source Review, state and federal regulations; and evaluating the capabilities of source test laboratories under the Laboratory Approval Program (LAP).

Public Complaints/Breakdowns - responding to air pollution complaints about odors, smoke, dust, paint overspray, or companies operating out of compliance; responding to industry notifications of equipment breakdowns, possibly resulting in emission exceedances.

Public Education/Public Events – implementing community events and programs to increase the public's understanding of air pollution and their role in improving air quality.

Public Information Center - notifying schools and large employers of predicted and current air quality conditions on a daily basis and providing the public with printed SCAQMD information materials.

Public Notification – providing timely and adequate notification to the public of SCAQMD rulemaking workshops and public hearings, proposed rules, upcoming compliance dates, and projects of interest to the public.

Public Records Act - providing information to the public as requested and as required by Government Code, Section 6254.

Purchasing (Receiving, Stockroom) - procuring services and supplies necessary to carry out SCAQMD programs.

Quality Assurance – assuring the data quality from the Monitoring and Analysis Division meets or exceeds state and federal standards and also assuring the appropriateness of the data for supporting SCAQMD regulatory, scientific and administrative decisions.

RECLAIM/Admin Support – developing and implementing rules, and monitoring of emissions of the REgional CLean Air Incentives Market (RECLAIM) program, a market incentives trading program designed to help achieve federal and state ambient air quality standards in a cost-effective manner with minimal impacts to jobs or public health.

RECLAIM and Title V – permit processing of applications from facilities that are both RECLAIM and Title V.

RECLAIM Non-Title V – permit processing of applications from RECLAIM facilities only.

Records Information Management Plan – providing the process to comply with internal and external requirements for the retention and retrieval of information pertinent to the mission and operation of the SCAQMD.

Records Services – maintaining SCAQMD's central records and files, converting paper files to images, and operating the network image management system; providing for all off-site long-term storage of records and for developing and monitoring the SCAQMD's Records Retention Policy.

Recruitment and Selection – assisting SCAQMD management in meeting staffing needs by conducting fair and non-discriminatory recruitment and selection processes that result in qualified, diverse applicants for SCAQMD jobs; overseeing promotional and transfer processes, and reviewing proposed staff reassignments.

Refinery Pilot Project – pursuant to the AQMP, a working group was formed to examine the efficacy of an alternative regulatory approach to reducing refinery emissions beyond the current requirements by establishing a targeted emission reduction commitment for each refinery for a set period of time and allow the use of on-site or off-site reduction strategies with acceptable environmental justice attributes.

Regional Modeling – designing, performing, and reviewing modeling and risk assessment analysis to assess the air quality impacts of new or modified sources of air pollution. Also see Meteorology.

Ridesharing - implementing the SCAQMD's Rule 2202 Trip Reduction Plan.

Risk Management - developing and administering SCAQMD's liability, property, and workers' compensation and safety programs.

Rule 1610 – ensuring compliance with Rule 1610, Old-Vehicle Scrapping.

Rule 2202 ETC Training – administering and conducting monthly Rule 2202 implementation training classes, workshops and/or forums for the regulated public and other interested individuals.

Rule 222 Implement/Support/Filing Program – ensuring compliance with Rule 222 for equipment subject to a filing requirement with the SCAQMD.

Rulemaking/Rules – developing new rules and evaluating existing SCAQMD and CARB rules and compliance information to assure timely implementation of the AQMP and its control measures.

Salton Sea Monitoring – maintaining the monitoring network for expected nuisance pollutants, primarily hydrogen sulfide, which are released from the Salton Sea area.

School Bus Lower Emission Program – funding to replace pre-1987 diesel school buses with new alternative fuel buses owned and operated by public school districts.

SCAQMD Mail – processing and delivering all incoming and outgoing mail.

SCAQMD Projects – SCAQMD permitting and rule development projects where a California Environmental Quality Act (CEQA) document is prepared and the SCAQMD is the lead agency.

School Siting – identifying any hazardous emission sources within one-quarter mile of a new school site as required by AB3205. District activities include reporting of criteria and toxic pollutant information and conducting inspections of permitted facilities within a quarter-mile radius of proposed schools.

Small Business Assistance - providing technical and financial assistance to facilitate the permit process for small businesses.

Socio-Economic - developing an economic database to forecast economic activity, analyzing economic benefits of air pollution control, and analyzing the social impact of economic activity resulting from air quality regulations and plans.

Source Education - providing classes to facility owners and operators to ensure compliance with applicable SCAQMD's rules and regulations.

Source Testing (ST) – conducting source tests as needed in support of permitting functions and to determine compliance with permit conditions and SCAQMD Rules. Additionally, data submitted by facilities is reviewed for protocol approval, CEMS certification, or test data acceptance.

Speaker's Bureau - training SCAQMD staff for advising local government and private industry on air quality issues.

Special Monitoring – performing special ambient air sampling at locations where public health, nuisance concern, or Rule 403 violations may exist; determining the impacts from sources emitting toxics on receptor areas; and performing special monitoring in support of the emergency response program and public complaints response. Also see Emergency Response.

Sample Analyses – analyzing samples submitted by inspectors to determine compliance with SCAQMD Rules. Samples are also analyzed in support of rule development activities.

Student Interns – providing mutually beneficial educational hands-on experience for high school and college students by providing them with the opportunity to engage in day-to-day work with mentoring professionals within SCAQMD.

Subscription Services - maintaining SCAQMD's rule subscription mailing list and coordinating the mailing of SCAQMD publications.

Systems Implementation PeopleSoft – implementing activities required to maintain an integrated Financial and Human Resources system, including additional features and functions introduced with scheduled software upgrades.

Systems Maintenance - routinely maintaining installed production data systems that support SCAQMD's business fluctuations, including minor modifications, special requests, fixes, and general maintenance.

Targeted Air Shed – funding from U.S. EPA to reduce air pollution in the nation's areas with the highest levels of ozone or particulate matter 2.5 ($PM_{2.5}$) exposure.

Technology Advancement - supporting the development of innovative controls for mobile and stationary sources, reviewing promising control technologies, and identifying those most deserving of SCAQMD developmental support.

Title III - permitting equipment that emits hazardous air pollutants in compliance with the federal Clean Air Act.

Title V - developing and implementing a permit program in compliance with the federal Clean Air Act.

Toxics/AB 2588 – evaluation of toxic inventories, risk assessments and risk reduction plans, with public notification as required. Analyzing, evaluating, reviewing, and making recommendations regarding toxic substances and processes and contributing input to District toxic rules and programs.

Training (Education, Organizational and Human Resources Development, Staff) - providing increased training in the areas of personnel education, computers, safety procedures, new programs, hazardous materials, and new technologies.

Transportation Regional Programs/Research – actively participating in Advisory Groups and Policy Committees involving the development and monitoring of the District's AQMP, Congestion Mitigation Air Quality Improvement Program (CMAQ), Safe Accountable Flexible Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Transportation Control Measures (TCMs) and regional alternative commute mode programs.

TraPac Air Filtration Program – implementing/administering the installation and maintenance of air filtration systems at Wilmington area schools.

Union Negotiations/Union Steward Activities – Union-related activities of union stewards including labor management negotiations and assisting in the filing of employee grievances.

VOC Sample Analysis - providing data and technical input for VOC rule development, performing analytical testing for compliance with SCAQMD rules regulating VOC content in coatings, inks, plastic foam, paint, adhesives, and solvents, and providing assistance and technical input to small businesses and other regulatory agencies, industry and the public.

Voucher Incentive Program (VIP) - incentive program designed to reduce emissions by replacing old, high-polluting vehicles with newer, lower-emission vehicles, or by installing a Verified Diesel Emission Control Strategy (VDECS).

Web Tasks – preparing and reviewing materials for posting to SCAQMD's internet and/or intranet website.

WORK PROGRAM ACRONYMS

ORGANIZATIONAL UNITS

AHR	Administrative & Human Resources
CB	Clerk of the Boards
CE	Compliance & Enforcement
DG	District General
EP	Engineering & Permitting
EO	Executive Office
FIN	Finance
GB	Governing Board
IM	Information Management
LEG	Legal
LPAM	Legislative & Public Affairs/Media Office
PRA	Planning, Rule Development & Area Sources
STA	Science & Technology Advancement

PROGRAMS

AB 134	Community Air Protection Program (Carl Moyer)
AB 617	Community Air Protection Program
AB 1318	Offsets-Electrical Generating Facilities
AB 2588	Air Toxics ("Hot Spots")
AB 2766	Motor Vehicle Subvention Program
APEP	Annual Permit Emissions Program
AQIP	Air Quality Investment Program
AQMP	Air Quality Management Plan
BACT	Best Available Control Technology
CEMS	Continuous Emissions Monitoring Systems
CEQA	California Environmental Quality Act
CF	Clean Fuels Program
CMP	Carol Moyer Program
DERA	Diesel Emission Reduction Act
ERC	Emission Reduction Credit
GGRF	Greenhouse Gas Reduction Fund
MS	Mobile Sources Program
NSR	New Source Review
PERP	Portable Equipment Registration Program
PR	Public Records Act
QA	Quality Assurance
RFP	Reasonable Further Progress
RECLAIM	REgional CLean Air Incentives Market
ST	Source Test
Title III	Federally Mandated Toxics Program
Title V	Federally Mandated Permit Program
VIP	Voucher Incentive Program

POLLUTANTS

CO	Carbon Monoxide
NO_x	Oxides of Nitrogen
O_3	Ozone
$PM_{2.5}$	Particulate Matter <2.5 microns
PM_{10}	Particulate Matter $\leq$ 10 microns
ROG	Reactive Organic Gases
SO_x	Oxides of Sulfur
VOC	Volatile Organic Compound

GOVERNMENT AGENCIES

APCD	Air Pollution Control District (Generic)
CARB	California Air Resources Board
CEC	California Energy Commission
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
NACAA	National Association of Clean Air Agencies
SCAG	Southern California Association of Governments

GENERAL

AA	Affirmative Action
AER	Annual Emissions Reporting
AM	Air Monitoring
AQSCR	Air Quality Standards Compliance Report
AQ-SPEC	Air Quality Sensor Performance Evaluation Center
ATIP	Air Toxics Inventory Plan
AVR	Average Vehicle Ridership
BARCT	Best Available Retrofit Control Technology
CE-CERT	College of Engineering-Center for Environmental Research and Technology
CLASS	Clean Air Support System
CNG	Compressed Natural Gas
CTC	County Transportation Commission
CTG	Control Techniques Guideline
DB	Database
DPF	Diesel Particulate Filter
EIR	Environmental Impact Report
EJ	Environmental Justice
ERC	Emission Reduction Credit
ETC	Employee Transportation Coordinator
EV	Electric Vehicle
FBMSMs	Facility-Based Mobile Source Measures
FY	Fiscal Year
GHG	Greenhouse Gas
HR	Human Resources
HRA	Health Risk Assessment
IAIC	Interagency AQMP Implementation Committee
IGA	Intergovernmental Affairs
ISR	Indirect Source Rules
LAER	Lowest Achievable Emissions Rate
LEV	Low Emission Vehicle
LNG	Liquefied Natural Gas
LS	Laboratory Services
MOU	Memorandum of Understanding
MSERCs	Mobile Source Emission Reduction Credits
MSRC	Mobile Source (Air Pollution Reduction) Review Committee
NATTS	National Air Toxics Trends Stations
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NGV	Natural Gas Vehicle
NOV	Notice of Violation
NSR	New Source Review
ODC	Ozone Depleter Compounds
PAMS	Photochemical Assessment Monitoring System
PAR	Proposed Amended Rule
PE	Program Evaluations
PR	Proposed Rule
RFP	Request for Proposal
RFQ	Request for Quotations
RTC	RECLAIM Trading Credit
SBA	Small Business Assistance
SIP	State Implementation Plan
SCR	Selective Catalytic Reduction
STE	Source Testing Evaluations
SULEV	Super Ultra Low-Emission Vehicle
TCM	Transportation Control Measure
ULEV	Ultra- Low-Emissions Vehicle
VMT	Vehicle Miles Traveled
ZECT	Zero Emission Cargo Transport
ZEV	Zero-Emission Vehicle

SOUTH COAST

AIR QUALITY MANAGEMENT DISTRICT

GOVERNING BOARD

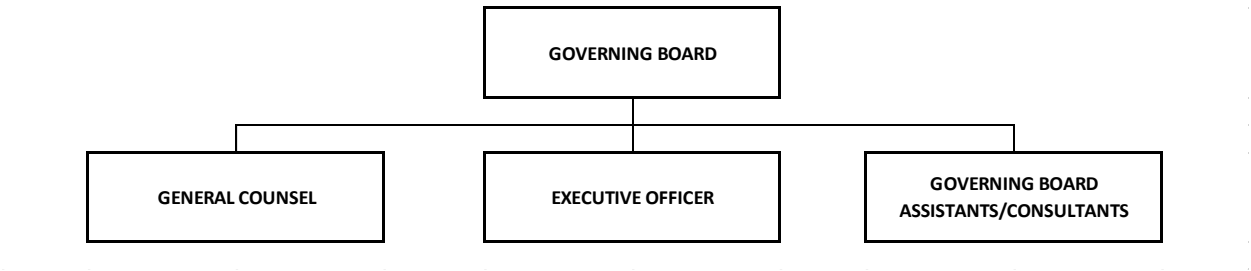
At a Glance:	
FY 2017-18 Adopted	$1.7M
FY 2018-19 Adopted	$1.8M
% of SCAQMD FY 2018-19 Adopted	1.1%
Total Adopted FTEs	n/a

DESCRIPTION OF MAJOR SERVICES:

The Governing Board is made up of 13 officials who meet monthly to establish policy and review new or amended rules for approval. The Governing Board appoints the SCAQMD Executive Officer and General Counsel, and members of the Hearing Board. Each Governing Board member is allocated funds to retain the services of Board Consultants and/or Assistants to provide support in their duties as Governing Board members.

Governing Board members include:

- One county Board of Supervisor's representative each from the counties of Los Angeles, Orange, Riverside, and San Bernardino;
- One representative each from cities within Orange, Riverside, and San Bernardino counties, two representatives from cities within Los Angeles County, and one city representative from the City of Los Angeles;
- One representative appointed by the Governor, one by the Assembly Speaker, and one by the Senate Rules Committee.



Governing Board Line Item Expenditure						
Major Object / Account # **/** Account Description		**FY 2016-17 Actuals**	**FY 2017-18 Adopted Budget**	**FY 2017-18 Amended Budget**	**FY 2017-18 Estimate ***	**FY 2018-19 Adopted Budget**
Salary & Employee Benefits						
51000-52000	Salaries	$ 255,514	$ 449,322	$ 449,322	$ 220,136	$ 462,913
53000-55000	Employee Benefits	18,618	260,646	260,646	18,926	261,190
Sub-total Salary & Employee Benefits		$ 274,132	$ 709,968	$ 709,968	$ 239,062	$ 724,103
Services & Supplies						
67250	Insurance	$ -	$ -	$ -	$ -	$ -
67300	Rents & Leases Equipment	-	-	-	-	-
67350	Rents & Leases Structure	-	-	-	-	-
67400	Household	-	-	-	-	-
67450	Professional & Special Services	664,366	713,628	713,628	713,628	771,284
67460	Temporary Agency Services	-	-	-	-	-
67500	Public Notice & Advertising	40,791	52,000	52,000	52,000	52,000
67550	Demurrage	-	-	-	-	-
67600	Maintenance of Equipment	-	-	-	-	-
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	13,887	10,000	10,000	10,000	10,000
67750	Auto Service	-	-	-	-	-
67800	Travel	34,950	64,800	64,800	64,800	64,800
67850	Utilities	-	-	-	-	-
67900	Communications	11,321	20,000	20,000	20,000	20,000
67950	Interest Expense	-	-	-	-	-
68000	Clothing	-	-	-	-	-
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	1,120	10,000	10,000	2,103	10,000
68100	Office Expense	1,026	4,000	4,000	2,352	4,000
68200	Office Furniture	-	-	-	-	-
68250	Subscriptions & Books	-	-	-	-	-
68300	Small Tools, Instruments, Equipment	-	-	-	-	-
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	141,097	112,500	112,500	112,500	112,500
69550	Memberships	-	-	-	-	-
69600	Taxes	-	-	-	-	-
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	8,029	15,000	15,000	14,019	15,000
69750	Prior Year Expense	-	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		$ 916,587	$ 1,001,928	$ 1,001,928	$ 991,403	$ 1,059,584
77000	**Capital Outlays**	$ -	$ -	$ -	$ -	$ -
79050	**Building Remodeling**	$ -	$ -	$ -	$ -	$ -
Total Expenditures		$ 1,190,719	$ 1,711,896	$ 1,711,896	$ 1,230,465	$ 1,783,687
* Estimates based on July 2017 through February 2018 actual expenditures and budget amendments.						

EXECUTIVE OFFICE

WAYNE NASTRI
EXECUTIVE OFFICER

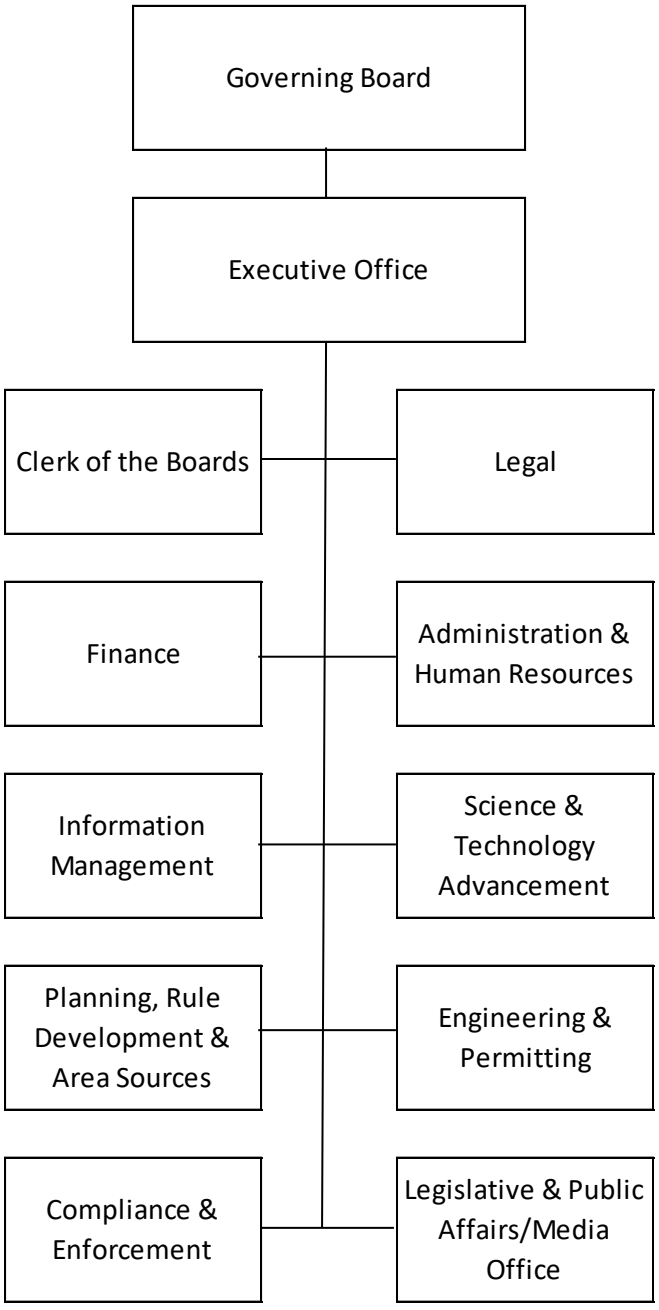
At a Glance:	
FY 2017-18 Adopted	$1.7M
FY 2018-19 Adopted	$1.5M
% of SCAQMD FY 2018-19 Adopted	0.9%
Total Adopted FTEs	5

DESCRIPTION OF MAJOR SERVICES:

The Executive Office is responsible for the comprehensive management of the SCAQMD and the development and implementation of near-term and long-term strategies to attain ambient air quality standards. The Executive Office also translates set goals and objectives into effective programs and enforceable regulations that meet federal and state statutory requirements, while being sensitive to potential socioeconomic and environmental justice impacts in the South Coast Air Basin.

The Executive Office currently consists of the Executive Officer, Chief Operating Officer, and three support staff. The Executive Officer serves as Chief of Operations in implementing policy directed by the agency's 13-member Governing Board and in working proactively with state and federal regulatory officials. The Executive Officer also oversees all of the day-to-day administrative functions of staff and the annual operating budget.

ORGANIZATIONAL CHART:



POSITION SUMMARY: 5 FTEs

Executive Office Unit	Amended FY 2017-18	Change	Adopted FY 2018-19
Administration	6	-1	5

STAFFING DETAIL:

2018-19 Adopted Staffing

Position	Title
1	Chief Operating Officer
1	Executive Officer
3	Executive Secretary
5	Total Adopted Positions

Executive Office Work Program by Office									
#	Program Code		Program Categories	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Revenue Categories
1	03	010	Develop Programs	AQMP	Develop/Implement AQMP	0.05	0.00	0.05	II,IX
2	03	028	Develop Programs	Admin/SCAQMD Policy	Dev/Coord Goals/Policies/Overs	0.44	0.00	0.44	Ia
3	03	038	Operational Support	Admin/Office Management	Budget/Program Management	2.00	-1.00	1.00	Ib
4	03	083	Policy Support	Hlth Effects Air Pollution Fou	Health Effects Air Poll Foundation Support	0.01	0.00	0.01	Ia
5	03	275	Policy Support	Governing Board	Board/Committee Support	1.72	0.00	1.72	Ia
6	03	381	Policy Support	Interagency Liaison	Local/State/Fed Coord/Interact	0.71	0.00	0.71	Ia,IX
7	03	410	Policy Support	Legislation	Testimony/Mtgs:New/Current Leg	0.03	0.00	0.03	Ia,IX
8	03	416	Policy Support	Legislative Activities	Supp/Promote/Influence Legis/Adm	0.03	0.00	0.03	Ia
9	03	490	Customer Service and Business Assistance	Outreach	Publ Awareness Clean Air Prog	0.97	0.00	0.97	Ia
10	03	565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Req for Info	0.01	0.00	0.01	Ia
11	03	855	Operational Support	Web Tasks	Create/edit/review web content	0.03	0.00	0.03	Ia
					Total Executive Office	6.00	(1.00)	5.00	

Executive Office Line Item Expenditure						
Major Object / Account # **/** Account Description		**FY 2016-17 Actuals**	**FY 2017-18 Adopted Budget**	**FY 2017-18 Amended Budget**	**FY 2017-18 Estimate ***	**FY 2018-19 Adopted Budget**
Salary & Employee Benefits						
51000-52000	Salaries	$ 913,577	$ 928,153	$ 912,262	$ 929,982	$ 847,771
53000-55000	Employee Benefits	533,913	455,978	471,869	468,404	452,281
Sub-total Salary & Employee Benefits		$ 1,447,490	$ 1,384,131	$ 1,384,131	$ 1,398,386	$ 1,300,052
Services & Supplies						
67250	Insurance	$ -	$ -	$ -	$ -	$ -
67300	Rents & Leases Equipment	-	-	-	-	-
67350	Rents & Leases Structure	-	-	-	-	-
67400	Household	-	-	-	-	-
67450	Professional & Special Services	80,656	150,000	148,000	79,580	75,000
67460	Temporary Agency Services	-	-	-	-	-
67500	Public Notice & Advertising	-	7,500	7,500	-	7,500
67550	Demurrage	-	-	-	-	-
67600	Maintenance of Equipment	-	400	400	-	400
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	794	800	800	794	800
67750	Auto Service	-	-	-	-	-
67800	Travel	30,921	52,000	52,000	52,000	77,000
67850	Utilities	-	-	-	-	-
67900	Communications	3,548	6,500	6,500	5,465	6,500
67950	Interest Expense	-	-	-	-	-
68000	Clothing	157	-	-	-	-
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	158	7,000	7,000	158	7,000
68100	Office Expense	6,972	6,300	6,300	5,292	6,300
68200	Office Furniture	-	-	-	-	-
68250	Subscriptions & Bools	-	5,000	4,914	-	5,000
68300	Small Tools, Instruments, Equipment	-	-	-	-	-
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	3,361	1,000	3,000	2,801	1,000
69550	Memberships	38,000	26,000	26,000	26,000	26,000
69600	Taxes	-	-	-	-	-
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	2,554	25,000	25,000	3,130	25,000
69750	Prior Year Expense	-	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		$ 167,120	$ 287,500	$ 287,414	$ 175,219	$ 237,500
77000	**Capital Outlays**	$ -	$ -	$ -	$ -	$ -
79050	**Building Remodeling**	$ -	$ -	$ -	$ -	$ -
Total Expenditures		$ 1,614,610	$ 1,671,631	$ 1,671,545	$ 1,573,605	$ 1,537,552
* Estimates based on July 2017 through February 2018 actual expenditures and budget amendments.						

SOUTH COAST

AIR QUALITY MANAGEMENT DISTRICT

DISTRICT GENERAL

At a Glance:	
FY 2017-18 Adopted	$15.2M
FY 2018-19 Adopted	$16.4M
% of SCAQMD FY 2018-19 Adopted	10.1%
Total Adopted FTEs	n/a

Accounts associated with general operations of the SCAQMD are budgeted and tracked in District General. Included are such items as retirement payouts, principal and interest payments, insurance, utilities, taxes, housekeeping, security, and building maintenance and improvements.

District General Line Item Expenditure						
Major Object / Account # **/** Account Description		**FY 2016-17 Actuals**	**FY 2017-18 Adopted Budget**	**FY 2017-18 Amended Budget**	**FY 2017-18 Estimate ***	**FY 2018-19 Adopted Budget**
Salary & Employee Benefits						
51000-52000	Salaries	$ -	$ 990,000	$ 902,769	$ 902,769	$ 1,785,964
53000-55000	Employee Benefits	250,359	380,000	380,000	382,884	480,000
Sub-total Salary & Employee Benefits		$ 250,359	$ 1,370,000	$ 1,282,769	$ 1,285,653	$ 2,265,964
Services & Supplies						
67250	Insurance	$ 1,101,642	$ 1,317,400	$ 1,317,400	$ 1,254,921	$ 1,317,400
67300	Rents & Leases Equipment	35,966	28,143	28,143	28,143	117,000
67350	Rents & Leases Structure	-	-	-	-	-
67400	Household	606,374	755,866	755,866	755,866	755,866
67450	Professional & Special Services	1,071,613	1,185,975	1,201,161	1,201,161	1,215,975
67460	Temporary Agency Services	-	-	-	-	-
67500	Public Notice & Advertising	14,013	25,000	25,000	18,783	25,000
67550	Demurrage	-	-	-	-	100,000
67600	Maintenance of Equipment	43,498	259,400	270,630	270,630	403,654
67650	Building Maintenance	536,964	831,479	829,329	829,329	1,231,479
67700	Auto Mileage	-	-	-	-	-
67750	Auto Service	-	-	-	-	-
67800	Travel	-	-	-	-	-
67850	Utilities	1,679,503	2,213,288	2,096,640	1,656,329	1,959,620
67900	Communications	137,358	150,900	150,900	137,237	150,900
67950	Interest Expense	3,863,482	3,756,716	3,756,716	3,756,716	3,637,290
68000	Clothing	-	-	-	-	-
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	12,597	30,000	30,000	15,117	17,083
68100	Office Expense	242,682	287,550	277,835	245,050	288,200
68200	Office Furniture	3,749	4,000	4,000	3,749	4,000
68250	Subscriptions & Books	-	-	-	-	-
68300	Small Tools, Instruments, Equipment	-	-	5,000	530	-
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	-	-	-	-	-
69550	Memberships	-	-	-	-	-
69600	Taxes	14,983	71,000	51,000	20,471	56,000
69650	Awards	19,007	27,342	27,342	19,007	27,342
69700	Miscellaneous Expenses	14,784	14,375	14,375	13,723	14,375
69750	Prior Year Expense	(5,441)	-	-	-	-
69800	Uncollectable Accounts Receivable	399,092	-	-	-	-
89100	Principal Repayment	2,331,010	2,432,798	2,432,798	2,432,798	2,553,110
Sub-total Services & Supplies		$ 12,122,878	$ 13,391,232	$ 13,274,135	$ 12,659,560	$ 13,874,294
77000	**Capital Outlays**	$ -	$ 418,717	$ 343,717	$ 274,974	$ 210,000
79050	**Building Remodeling**	$ -	$ -	$ -	$ -	$ -
Total Expenditures		$ 12,373,237	$ 15,179,949	$ 14,900,621	$ 14,220,186	$ 16,350,258

* Estimates based on July 2017 through February 2018 actual expenditures and budget amendments. Does not include Transfers Out.

ADMINISTRATIVE & HUMAN RESOURCES

A. JOHN OLVERA
ASSISTANT DEPUTY EXECUTIVE OFFICER

At a Glance:	
FY 2017-18 Adopted	$6.2M
FY 2018-19 Adopted	$6.5M
Percent of SCAQMD FY 2018-19 Adopted	4.0%
Total Adopted FTEs	38

DESCRIPTION OF MAJOR SERVICES:

Administrative & Human Resources is comprised of several units: Employment & Labor Relations/Benefits & Records, Classification & Pay/Recruitment & Selection, Risk Management, Business Services, and Building Services. Human Resources units are responsible for planning and administering the personnel and employee relations programs to maximize hiring, retention, and development of highly-qualified employees necessary to meet SCAQMD's air quality goals. Risk Management is responsible for programs aimed at ensuring a healthful and safe work environment, as well as to reduce liability and accident-related costs. Business Services oversees the administration of the SCAQMD headquarters facility services, its leases, the maintenance of fleet vehicles, and the management of Print Shop and Mail/Subscription services. Building Services is responsible for the maintenance and repair of the SCAQMD headquarters building, childcare center, field offices, air monitoring stations, and meteorological stations.

ACCOMPLISHMENTS:

RECENT:

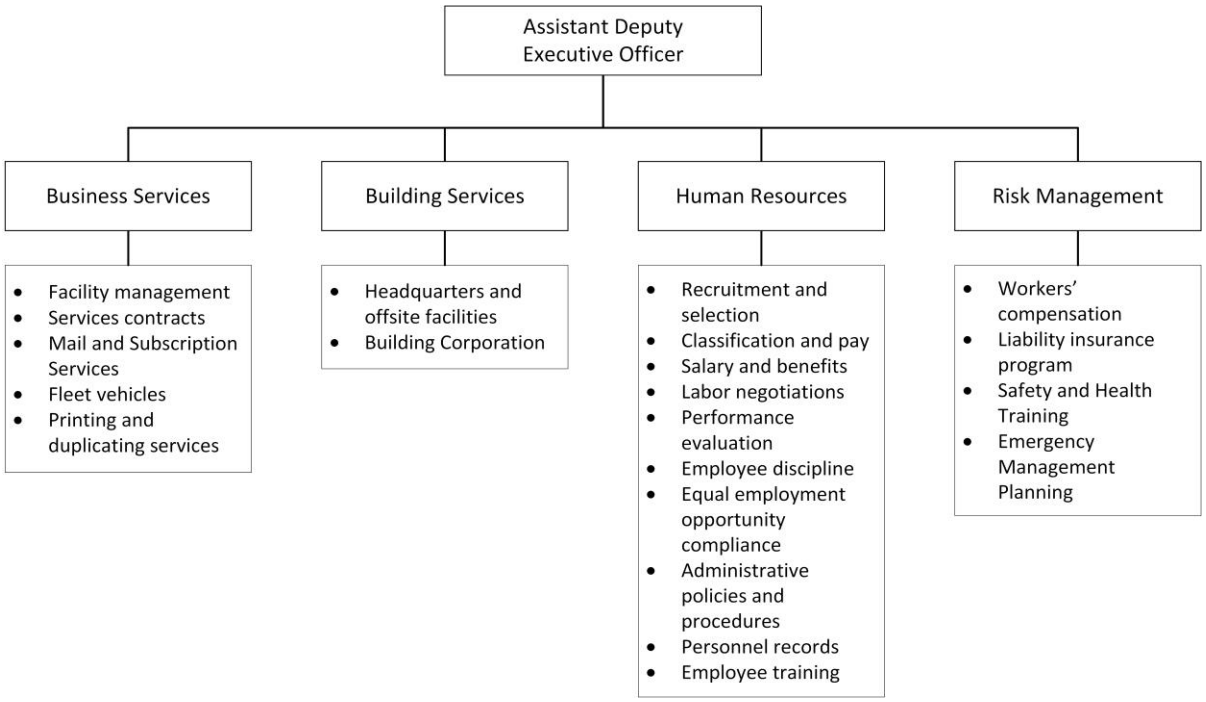
- Reached agreement with three bargaining units for a new three-year labor agreement and amended Salary Resolution and Administrative Code for unrepresented employees.
- Administered employee benefits programs, including the transition to a public agency joint powers authority to maximize cost effectiveness of the health insurance program.
- Conducted successful recruitment efforts for promotional opportunities and new hires.
- Completed reclassification studies; received Board approval for the reclassification of 14 positions.
- Provided support and direction to management and staff with respect to adherence to relevant state and federal laws and SCAQMD policies, procedures and Memos of Understanding.
- Supported SCAQMD's Succession Planning program through the Executive Office.

- Implemented an electronic on-boarding process for newly hired employees to complete their paperwork on-line.
- Administered the Governing Board Summer Intern Program.
- Conducted ergonomic workspace evaluations and other safety training programs.
- Implemented a Teleworking Pilot Program for employees.
- Conducted Active Assailant Training for all employees.
- Held training on sexual harassment prevention and anti-bullying policies, as well as other programs for career development and workforce education.
- Completed new office construction and conference room updates.
- Completed work space design and reconfiguration on several floors.

ANTICIPATED:

- Continue to provide support and direction to management and staff with respect to adherence to relevant state and federal laws and SCAQMD policies, procedures and memoranda of understanding.
- Continue recruitment and selection efforts, and conduct classification studies.
- Provide training workshops for supervisors and managers.
- Complete the preparation of a Continuity of Operations Plan and program.
- Implement a mentorship program.
- Continue updates and implementation of SCAQMD's Succession Planning program.
- Evaluate and plan for significant turnover of vehicle fleet due to CNG tank expiration.
- Install two 770-ton chillers at Diamond Bar headquarters.
- Install two 800-ton cooling towers at Diamond Bar headquarters.

ORGANIZATIONAL CHART:



POSITION SUMMARY: 38 FTEs

Administrative & Human Resources Units	Amended FY 17-18	Change	Adopted FY 18-19
Office Administration	4	-	4
Business Services	15	(1)	14
Building Services	7	1	8
Classification & Pay/Recruitment & Selection	6	-	6
Employee & Labor Relations/Benefits & Records	4	-	4
Risk Management	2	-	2
Total	38	-	38

STAFFING DETAIL:

2018-19 Adopted Staffing

Position	Title
1	Assistant Deputy Executive Officer/Administrative & Human Resources
1	Building Maintenance Manager
1	Building Supervisor
1	Business Services Manager
2	Career Development Intern
1	Facilities Services Technician
1	Fleet Services Supervisor
2	Fleet Services Worker II
5	General Maintenance Worker
5	Human Resources Analyst
2	Human Resources Manager
2	Human Resources Technician
2	Mail Subscription Services Clerk
1	Mail Subscription Services Supervisor
2	Office Assistant
1	Offset Press Operator
2	Print Shop Duplicator
1	Print Shop Supervisor
1	Risk Manager
2	Secretary
1	Senior Administrative Secretary
1	Staff Specialist
38	Total Adopted Positions

Administrative & Human Resrouces
Work Program by Office

#	Program Code		Program Categories	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Revenue Categories
1	16	026	Operational Support	SCAQMD Mail	Posting/Mailing/Delivery	2.30	0.00	2.30	Ia
2	16	035	Operational Support	AB 617-General	AB 617-General	0.00	2.00	2.00	XV
3	16	038	Operational Support	Admin/Office Management	Reports/Proj/Budget/Contracts	3.85	0.00	3.85	Ib
4	16	060	Operational Support	Equal Employment Opportunity	Program Dev/Monitor/Reporting	0.10	0.00	0.10	Ia
5	16	080	Ensure Compliance	Auto Services	Vehicle/Radio Repair & Maint	3.00	0.00	3.00	Ia
6	16	090	Operational Support	Building Maintenance	Repairs & Preventative Maint	7.00	0.00	7.00	Ia
7	16	092	Operational Support	Business Services	Building Services Admin/Contracts	2.55	0.00	2.55	Ia
8	16	225	Operational Support	Employee Benefits	Benefits Analysis/Orient/Records	1.50	0.00	1.50	Ia
9	16	226	Operational Support	Classification & Pay	Class & Salary Studies	0.30	0.00	0.30	Ia
10	16	228	Operational Support	Recruitment & Selection	Recruit Candidates for SCAQMD	3.25	0.00	3.25	Ia
11	16	232	Operational Support	Position Control	Track Positions/Workforce Analys	0.55	0.00	0.55	Ia
12	16	233	Operational Support	Employee Relations	Meet/Confer/Labor-Mgmt/Grievance	2.20	0.00	2.20	Ia
13	16	255	Operational Support	Facilities Services	Phones/Space/Keys/Audio-Visual	1.00	0.00	1.00	Ia
14	16	457	Advance Clean Air Technology	MS/Carl Moyer Admin	C Moyer/Contractor Compliance	0.10	0.00	0.10	IX
15	16	540	Customer Service and Business Assistance	Print Shop	Printing/Collating/Binding	4.00	0.00	4.00	Ia
16	16	542	Advance Clean Air Technology	Prop 1B:Goods Movement	Prop 1B: Goods Movement	0.10	0.00	0.10	IX
17	16	565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Rec Requests	0.05	0.00	0.05	Ia
18	16	640	Operational Support	Risk Management	Liabl/Property/Wk Comp/Selflns	2.25	0.00	2.25	Ia
19	16	717	Policy Support	Student Interns	Gov Board/Student Intern Program	0.20	0.00	0.20	Ia
20	16	720	Customer Service and Business Assistance	Subscription Services	Rule & Gov Board Materials	1.70	0.00	1.70	IV,XVII
					Total Administrative & Human Resources	36.00	2.00	38.00	

Administrative & Human Resources Line Item Expenditure						
Major Object / Account # **/** Account Description		**FY 2016-17 Actuals**	**FY 2017-18 Adopted Budget**	**FY 2017-18 Amended Budget**	**FY 2017-18 Estimate ***	**FY 2018-19 Adopted Budget**
Salary & Employee Benefits						
51000-52000	Salaries	$ 2,912,814	$ 2,997,925	$ 3,141,849	$ 2,969,326	$ 3,291,547
53000-55000	Employee Benefits	1,662,132	1,705,914	1,705,914	1,711,976	1,987,321
Sub-total Salary & Employee Benefits		$ 4,574,946	$ 4,703,839	$ 4,847,763	$ 4,681,302	$ 5,278,868
Services & Supplies						
67250	Insurance	$ -	$ -	$ -	$ -	$ -
67300	Rents & Leases Equipment	113,323	117,540	106,310	106,310	41,600
67350	Rents & Leases Structure	-	-	-	-	-
67400	Household	-	2,850	1,350	-	5,284
67450	Professional & Special Services	308,976	151,750	151,750	151,750	151,750
67460	Temporary Agency Services	-	5,000	22,000	22,000	17,000
67500	Public Notice & Advertising	10,312	26,500	24,530	24,530	12,066
67550	Demurrage	40	-	-	-	-
67600	Maintenance of Equipment	65,923	79,754	79,754	73,264	5,500
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	5,774	4,200	4,700	4,700	4,200
67750	Auto Service	466,402	470,000	470,000	470,000	470,000
67800	Travel	3,868	2,500	3,500	3,500	2,500
67850	Utilities	-	-	-	-	-
67900	Communications	18,173	21,900	21,900	19,212	21,900
67950	Interest Expense	-	-	-	-	-
68000	Clothing	23,833	10,808	10,808	10,808	10,808
68050	Laboratory Supplies	-	-	1,300	1,300	-
68060	Postage	5,057	11,469	5,414	4,318	5,469
68100	Office Expense	144,788	105,300	125,300	125,300	111,300
68200	Office Furniture	41,184	90,000	90,000	74,286	-
68250	Subscriptions & Books	3,131	2,520	2,520	2,520	2,520
68300	Small Tools, Instruments, Equipment	5,202	5,030	5,030	5,030	5,030
68400	Gas and Oil	178,020	372,000	372,000	333,840	292,021
69500	Training/Conference/Tuition/ Board Exp.	21,994	15,062	22,787	22,787	15,062
69550	Memberships	3,604	3,265	3,265	-	3,265
69600	Taxes	-	-	-	-	-
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	3,371	12,000	12,000	12,000	12,000
69750	Prior Year Expense	(1,282)	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		$ 1,421,691	$ 1,509,448	$ 1,536,218	$ 1,467,455	$ 1,189,275
77000	**Capital Outlays**	$ -	$ -	$ -	$ -	$ -
79050	**Building Remodeling**	$ -	$ -	$ -	$ -	$ -
Total Expenditures		$ 5,996,638	$ 6,213,287	$ 6,383,981	$ 6,148,757	$ 6,468,143
* Estimates based on July 2017 through February 2018 actual expenditures and budget amendments.						

CLERK OF THE BOARDS

DENISE GARZARO
CLERK OF THE BOARDS

At a Glance:	
FY 2017-18 Adopted	$1.3M
FY 2018-19 Adopted	$1.4M
% of SCAQMD FY 2018-19 Adopted	0.9%
Total Adopted FTEs	6

DESCRIPTION OF MAJOR SERVICES:

Clerk of the Boards coordinates the activities, provides operational support, and maintains the official records for both the Governing Board and the Hearing Board. The Office is responsible for preparing the legal notices for hearings and meetings, and ensuring that such notices are published as required. Clerk of the Boards' staff assist petitioners and attorneys in the filing of petitions before the Hearing Board and explain the Hearing Board's functions and procedures. Staff prepares Minute Orders, Findings and Decisions of the Hearing Board, and Summary Minutes of Governing Board meetings. The Clerk acts as communication liaison for the Boards with SCAQMD staff and state and federal agencies.

ACCOMPLISHMENTS:

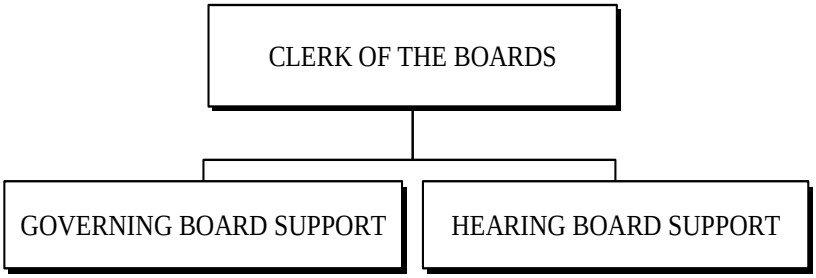
RECENT

- Received and processed 70 subpoenas, public/administrative records requests, and claims against the District.
- Provided support for 11 Governing Board meetings, including: preparing an agenda and minutes for each meeting; preparation, distribution, and publication of 30 meeting and public hearing notices; preparation of 18 Board Resolutions.
- Provided support for 85 hearings, pre-hearing conferences, and general meetings held by the Hearing Board, including: processing 118 petitions; preparation, distribution, and publication of 85 meeting and public hearing notices; preparation of 125 Minute Orders, Findings & Decisions, Pre-hearing Memoranda, and General Meeting Reports of Actions; and preparation and distribution of 130 daily agendas and monthly case calendars.
- Planned/coordinated efforts and provided clerical support for special offsite meetings, including: Governing Board – Mobile Board Meeting 10/7/2016 in Riverside, Board Retreat 3/9/17 in Irvine; Hearing Board – off-site hearings held on the following Saturdays – 7/9/2016, 8/6/2016 and 9/17/2016 in Northridge and Woodland Hills.

ANTICIPATED:

- Provide support for approximately 80 hearings, pre-hearing conferences, and general meetings held by the Hearing Board, including: processing approximately 100 petitions; preparation, distribution, and publication of 110-120 meeting and public hearing notices; preparation of over 100 Minute Orders, Findings and Decisions, Pre-hearing Memoranda, and General Meeting Reports of Actions; and preparing and distributing more than 140 daily agendas and monthly case calendars. Provide support for 11 Governing Board meetings, including preparation of meeting agendas, minutes and Board Resolutions.

ORGANIZATIONAL CHART:



POSITION SUMMARY: 6 FTEs

Clerk of the Boards Unit	Amended FY 2017-18	Change	Adopted FY 2018-19
Governing/Hearing Board Support	6	-	6

STAFFING DETAIL:

2018-19 Adopted Staffing

Position	Title
1	Clerk of the Board
3	Deputy Clerk/Transcriber
1	Office Assistant
1	Senior Deputy Clerk
6	Total Adopted Positions

Clerk of the Boards Work Program by Office									
#	Program Code		Program Categories	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Revenue Categories
1	17	024	Operational Support	Admin/SCAQMD/GB/HB Mgmt	Admin Governing/Hearing Brds	1.25	0.00	1.25	Ia,VII,XV
2	17	275	Operational Support	Governing Board	Attend/Record/Monitor Meetings	1.40	0.00	1.40	Ia
3	17	364	Ensure Compliance	Hearing Board/Abatement Orders	Attnd/Recrd/Monitr Mtgs	0.10	0.00	0.10	IV
4	17	365	Ensure Compliance	Hearing Board/Variances/Appeal	Attend/Record/Monitor HB Mtgs	3.20	0.00	3.20	IV,V,VII
5	17	565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Rec Requests	0.02	0.00	0.02	Ia
6	17	855	Operational Support	Web Tasks	Create/edit/review web content	0.03	0.00	0.03	Ia
					Total Clerk of the Boards	6.00	-	6.00	

Clerk of the Boards Line Item Expenditure						
Major Object / Account # **/** Account Description		**FY 2016-17 Actuals**	**FY 2017-18 Adopted Budget**	**FY 2017-18 Amended Budget**	**FY 2017-18 Estimate ***	**FY 2018-19 Adopted Budget**
Salary & Employee Benefits						
51000-52000	Salaries	$ 410,565	$ 382,381	$ 382,381	$ 406,212	$ 397,406
53000-55000	Employee Benefits	248,659	266,774	266,775	274,738	294,250
Sub-total Salary & Employee Benefits		$ 659,224	$ 649,156	$ 649,156	$ 680,950	$ 691,656
Services & Supplies						
67250	Insurance	$ -	$ -	$ -	$ -	$ -
67300	Rents & Leases Equipment	-	-	-	-	-
67350	Rents & Leases Structure	-	-	-	-	-
67400	Household	-	-	-	-	-
67450	Professional & Special Services	54,648	85,500	85,500	54,680	85,200
67460	Temporary Agency Services	-	-	-	-	-
67500	Public Notice & Advertising	24,057	40,000	40,000	27,278	40,000
67550	Demurrage	-	-	-	-	-
67600	Maintenance of Equipment	-	200	200	-	200
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	151	100	100	33	100
67750	Auto Service	-	-	-	-	-
67800	Travel	-	200	200	30	200
67850	Utilities	-	-	-	-	-
67900	Communications	388	500	500	184	500
67950	Interest Expense	-	-	-	-	-
68000	Clothing	-	-	-	-	-
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	843	1,200	1,200	843	1,200
68100	Office Expense	905	6,600	6,600	1,504	6,600
68200	Office Furniture	-	-	-	-	-
68250	Subscriptions & Books	-	-	-	-	-
68300	Small Tools, Instruments, Equipment	-	-	-	-	-
68400	Gas and Oil	-		-	-	-
69500	Training/Conference/Tuition/ Board Exp.	383,775	534,200	534,200	534,200	584,920
69550	Memberships	300	-	-	-	300
69600	Taxes	-	-	-	-	-
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	47	500	500	-	500
69750	Prior Year Expense	-		-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		$ 465,113	$ 669,000	$ 669,000	$ 618,753	$ 719,720
77000	**Capital Outlays**	$ -	$ -	$ -	$ -	$ -
79050	**Building Remodeling**	$ -	$ -	$ -	$ -	$ -
Total Expenditures		$ 1,124,337	$ 1,318,156	$ 1,318,156	$ 1,299,703	$ 1,411,376
* Estimates based on July 2017 through February 2018 actual expenditures and budget amendments.						

COMPLIANCE & ENFORCEMENT

MARIAN COLEMAN
DEPUTY EXECUTIVE OFFICER

At a Glance:	
FY 2017-18 Adopted	$20.2M
FY 2018-19 Adopted	$20.7M
% of SCAQMD FY 2018-19 Adopted	12.7%
Total Adopted FTEs	152

DESCRIPTION OF MAJOR SERVICES:

Compliance and Enforcement (C&E) ensures public health by conducting unannounced field inspections to verify compliance with SCAQMD, state and federal rules and regulations and investigating air quality complaints and equipment breakdowns. Title V and RECLAIM sources are inspected at least annually, with the exception of select industries targeted for more frequent evaluation (e.g., at least quarterly inspection of chrome plating facilities). All other 24,000 stationary sources and 13,000 PERP engines/equipment are inspected at least once every three years. Notices to Comply are issued when additional information is required of a source to determine compliance, and for minor administrative violations. Notices of Violation are issued for more serious, typically emissions-based violations. Other activities include participation in Emergency Response and joint inspection activities with other agencies, providing expert testimony before the SCAQMD Hearing Board, and conducting training classes for the public and regulated community.

KEY ACCOMPLISHMENTS*:

RECENT:

- Completed 224 inspections of chrome plating facilities (quarterly inspections of 119 facilities)
- Completed 230 Title V facility inspections
- Completed 72 RECLAIM facility audits
- Completed inspections of 4,549 other permitted stationary source facilities
- Completed inspections of 2,926 PERP-registered engines/ equipment
- Completed seven “Blue Sky” team inspections at refineries
- Responded to 6,953 complaints (93% of those received)
- Responded to 414 breakdown notifications (52% of those received)
- Conducted 50 multi-agency targeted inspections to identify and confirm possible sources of excess Cr6 emissions in the City of Compton

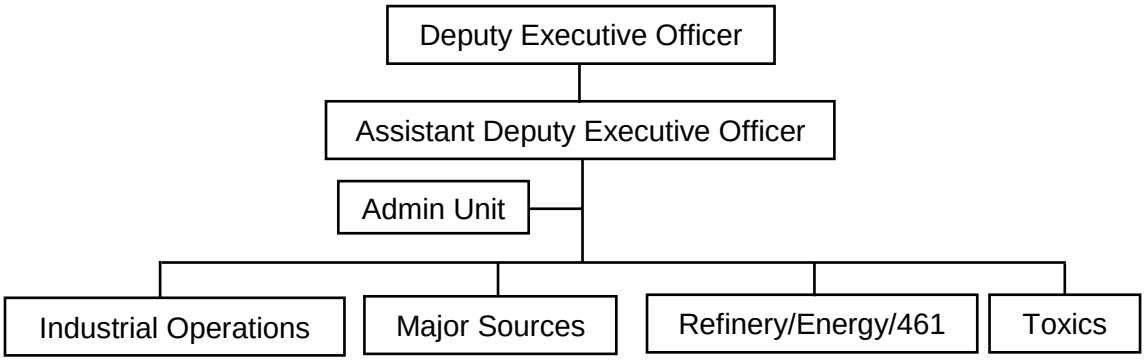
- Issued 2,551 Notices to Comply and 1,289 Notices of Violation
- Conducted 22 training classes for members of the public and the regulated community
- Promoted five AQ Inspectors II to Supervising AQ Inspector

*FY 2017-18, through March 21, 2018

ANTICIPATED:

- Select and train approximately ten candidates to fill Inspector vacancies
- Conduct additional multi-agency inspection sweeps to identify and confirm possible sources of excess Cr6 emissions in other communities
- Reduce paperwork and streamlining report writing process to increase inspection efficiencies
- Improve timeliness of complaint response
- Efficiently providing NOV reports to the General Counsel's office
- Work closely with the General Counsel's office to address significant violations
- Work closely with monitoring and rule-making staff to identify, assess, and address facilities with high emissions
- Update policies and procedures governing enforcement actions

ORGANIZATIONAL CHART:



POSITION SUMMARY: 152 FTEs

Office of Compliance and Enforcement Units	Amended FY 2017-18	Change	Adopted FY 2018-19
Major Sources	20	-	20
Industrial Operations	49	-	49
Refinery/Energy/461	39	-	39
Toxics	36	-	36
Senior Admin/Staff	7	1	8
Total	151	1	152

STAFFING DETAIL:

2018-19 Adopted Staffing

Position	Title
6	AQ Analysis & Compliance Supervisor
89	AQ Inspector II
14	AQ Inspector III
1	Assistant Deputy Executive Officer
1	Deputy Executive Officer
10	Office Assistant
2	Senior Office Assistant
4	Senior Enforcement Manager
1	Staff Assistant
3	Staff Specialist
2	Senior Administrative Secretary
2	Secretary
17	Supervising AQ Inspector
152	Total Adopted Positions

Compliance & Enforcement
Work Program by Office

#	Program Code		Program Categories	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Revenue Categories
1	60	038	Customer Service and Business Assistance	Admin/Office Budget	Dev/Coord Goals/Policies/Overs	6.00	1.00	7.00	Ib
2	60	047	Customer Service and Business Assistance	Admin/Operations Support	Budget/Contracts/Reports/Projects	6.00	-1.10	4.90	Ib
3	60	070	Ensure Compliance	CARB PERP Program	CARB Audits/Statewide Equip Reg	5.00	1.00	6.00	XIX
4	60	148	Policy Support	Climate Change	GHG/Climate Chg Support	0.10	-0.10	0.00	IV,IX
5	60	152	Ensure Compliance	Compliance/IM Related Activiti	Assist IM: Design/Review/Test	0.50	0.00	0.50	IV
6	60	155	Ensure Compliance	Compliance Guidelines	Procedures/Memos/Manuals	2.50	-1.00	1.50	IV
7	60	157	Ensure Compliance	Compliance/Special Projects	Prog Audits/Data Req/Brd Supp	5.00	-2.00	3.00	II
8	60	158	Ensure Compliance	Compliance Testing	R461/Combustion Equip Testing	0.50	0.50	1.00	IV
9	60	210	Monitoring Air Quality	Emergency Response	Emerg Tech Asst to Public Saf	0.10	0.00	0.10	IV,XV
10	60	276	Policy Support	Board Committees	Admin/Stationary Source Committee	0.15	0.00	0.15	Ia
11	60	365	Ensure Compliance	Hearing Bd/Variances	Variances/Orders of Abatement	2.00	0.00	2.00	VII
12	60	375	Ensure Compliance	Inspections	Compliance/Inspection/Follow-up	83.10	4.90	88.00	II,V,XV
13	60	377	Ensure Compliance	Inspections/RECLAIM Audits	Audit/Compliance Assurance	15.00	-1.00	14.00	II,IV
14	60	416	Policy Support	Legislative Activities	Legislative Activities	0.05	-0.05	0.00	Ia
15	60	492	Customer Service and Business Assistance	Outreach/Business	Pub Events/Conf/Rideshare Fair	0.20	0.00	0.20	IX
16	60	539	Ensure Compliance	Procedure 5 Review	Evaluate Proc 5 Asbestos Plans	0.40	0.00	0.40	XVII
17	60	550	Ensure Compliance	Public Complaints/Breakdowns	Compltresp/Invflwup/Resolutn	10.00	0.00	10.00	II,IV,V,XV
18	60	565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Req for Info	2.00	1.00	3.00	Ia
19	60	605	Ensure Compliance	RECLAIM/Admin Support	Admin/Policy/Guidelines	5.00	-4.50	0.50	II,III,IV,XV
20	60	657	Develop Rules	Rulemaking/Support PRA	Provide Rule Development Supp	0.50	0.50	1.00	IV,XV
21	60	678	Ensure Compliance	School Siting	Identify Haz. Emission Sources near Schools	0.05	-0.05	0.00	IV
22	60	690	Customer Service and Business Assistance	Source Education	Prov Tech Asst To Industries	0.40	0.00	0.40	III,IV,V,XV
23	60	717	Policy Support	Student Interns	Gov Board/Student Intern Program	0.05	0.00	0.05	Ia
24	60	751	Ensure Compliance	Title III Inspections	Title III Comp/Insp/Follow Up	0.10	-0.10	0.00	IV
25	60	771	Ensure Compliance	Title V	Title V Compl/Inspect/Follow Up	3.50	1.00	4.50	II,IV
26	60	791	Ensure Compliance	Toxics/AB2588	Risk Reduct Plan Rvw/Comm Mtgs	0.10	0.00	0.10	X
27	60	805	Operational Support	Training	Dist/Org Unit Training	4.00	-2.00	2.00	Ib
28	60	825	Operational Support	Union Negotiations	Official Labor/Mgmt Negotiate	0.10	0.00	0.10	Ia
29	60	826	Operational Support	Union Steward Activities	Rep Employees in Grievance Act	0.10	0.00	0.10	Ia
30	60	855	Operational Support	Web Tasks	Creation/Update of Web Conten	0.50	1.00	1.50	Ia
					Total Compliance & Enforcement	153.00	(1.00)	152.00	

Compliance & Enforcement Line Item Expenditure						
Major Object / Account # **/** Account Description		**FY 2016-17 Actuals**	**FY 2017-18 Adopted Budget**	**FY 2017-18 Amended Budget**	**FY 2017-18 Estimate ***	**FY 2018-19 Adopted Budget**
Salary & Employee Benefits						
51000-52000	Salaries	$ 10,775,652	$ 12,769,476	$ 12,774,832	$ 11,655,083	$ 12,786,732
53000-55000	Employee Benefits	5,410,039	6,684,445	6,684,445	5,921,586	7,439,606
Sub-total Salary & Employee Benefits		$ 16,185,691	$ 19,453,921	$ 19,459,277	$ 17,576,669	$ 20,226,338
Services & Supplies						
67250	Insurance	$ -	$ -	$ -	$ -	$ -
67300	Rents & Leases Equipment	-	-	-	-	-
67350	Rents & Leases Structure	80,895	106,791	106,791	106,791	106,791
67400	Household	-	-	-	-	-
67450	Professional & Special Services	11,263	9,500	11,000	11,000	15,500
67460	Temporary Agency Services	1,394	2,000	10,000	8,416	2,000
67500	Public Notice & Advertising	-	-	-	-	-
67550	Demurrage	-	250	250	-	250
67600	Maintenance of Equipment	6,412	20,500	12,500	3,910	26,000
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	336	1,000	1,000	521	1,000
67750	Auto Service	-	1,000	1,000	-	1,000
67800	Travel	11,403	17,555	13,555	8,439	15,000
67850	Utilities	-	-	-	-	-
67900	Communications	52,334	117,350	117,350	62,536	117,350
67950	Interest Expense	-	-	-	-	-
68000	Clothing	19,463	19,590	15,590	15,590	30,685
68050	Laboratory Supplies	7,480	9,000	9,000	9,000	12,000
68060	Postage	4,971	3,000	11,000	11,000	3,000
68100	Office Expense	137,062	33,800	33,800	33,800	11,005
68200	Office Furniture	9,193	1,250	11,250	11,250	-
68250	Subscriptions & Books	-	400	214	214	400
68300	Small Tools, Instruments, Equipment	2,177	20,009	11,009	4,580	15,769
68350	Film				-	
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	39,294	26,250	17,750	17,750	25,450
69550	Memberships	-	750	750	-	750
69600	Taxes	-	-	-	-	-
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	2,757	5,000	5,000	3,608	5,000
69750	Prior Year Expense	-	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		$ 386,433	$ 394,995	$ 388,809	$ 308,405	$ 388,950
77000	**Capital Outlays**	$ -	$ 361,000	$ 787,000	$ 787,000	$ 80,000
79050	**Building Remodeling**	$ -	$ -	$ -	$ -	$ -
Total Expenditures		$ 16,572,124	$ 20,209,916	$ 20,635,086	$ 18,672,074	$ 20,695,288

* Estimates based on July 2017 through February 2018 actual expenditures and budget amendments.

SOUTH COAST

AIR QUALITY MANAGEMENT DISTRICT

ENGINEERING & PERMITTING

LAKI TISOPULOS
DEPUTY EXECUTIVE OFFICER

At a Glance:	
FY 2017-18 Adopted	$24.2M
FY 2018-19 Adopted	$25.4M
% of SCAQMD FY 2018-19 Adopted	15.6%
Total Adopted FTEs	161

DESCRIPTION OF MAJOR SERVICES:

The office of Engineering & Permitting (E&P) is responsible for processing applications for Permits to Construct & Operate, and special services. The permit processing activities involve nearly 400 major facilities that have been issued Title V Federal Operating permits, almost 300 facilities in the RECLAIM program, and over 27,000 large and small business operations. In addition, staff also participate in activities with other agencies, assist with Economic Development and Business Retention programs, provide engineering support to other divisions, and evaluate and implement permit backlog reduction and permit streamlining activities, including automation and other permit processing modernization efforts.

KEY ACCOMPLISHMENTS

RECENT:

- Continued implementation of the Action Plan to reduce the permit application backlog and total pending permit applications, improve permit processing efficiency and timely issuance of permits.
- Since the commencement of the backlog reduction effort in July 2016, reduced total pending applications by 46%, from more than 7,300 to less than 4,000 pending applications by the end of December, 2017.
- Processed 9,321 applications for Permits, Plans, and ERCs in FY 2016-2017. Exceeded Goals and Objectives target for FY 2016-17 by 34%.
- Issued more than 2,180 Permits to Construct (PC) in FY 2016-2017. Exceeded Goals and Objectives target of FY 2016-17 by 21%.
- Issued more than 200 Title V renewal and modification permits in Calendar Year 2017.
- Initiated a program to recognize top performing individuals and teams to help maintain high morale and acknowledge good performance.
- Initiated development of Online Permit Processing tools and other automation efforts. Deployed online permitting tool for dry cleaning equipment and issued SCAQMD's first online permit.

- Met Division's Permit Streamlining goal of application delivery to Permitting Teams within 4 business days.
- Developed an end of the fiscal year summary report highlighting key accomplishments of the backlog reduction effort (uploaded to the District website).
- Refined the Online Permit Dashboard tool on SCAQMD's website to display quarterly as well as monthly progress in reducing pending applications inventory, inclusive and exclusive of Permits to Construct issued, in an effort to more accurately communicate to the public the true pending applications inventory,.
- Developed and deployed plan to address EPA Title V Program Audit Findings.
- Participated in public meetings to address public concerns regarding high toxic risks and emissions.
- Participated in multi-agency neighborhood sweeps in the cities of Paramount and Compton to investigate hexavalent chromium and other toxic air contaminant-emitting sources.
- Provided technical guidance regarding grinding operations at metal forging and metal finishing operations and lead emitting facilities to other District Offices.
- Assisted in developing and amending SCAQMD Rules and Regulations such as Rule 219/222, Reg. III, Reg. XI, Reg. XIV, including Rule 1420.1, and Reg. XX.
- Provided Pre- and Post-application conferences to help permit applicants.
- Participated, reviewed and provided permit remedies to permit holders throughout Calendar Year 2017 from Fee Review cases.
- Provided technical support to IM to test and troubleshoot CLASS programs issues, including working to test and verify assessment of fees for rapidly-deployed 2017-2018 new Title V fee schedules under the Regulation III amendment.
- Successfully provided engineering support and/or expert testimony in hearing board cases throughout calendar year 2017.
- Organized and administered the annual Certified Permit Processing Professional exam for 26 participants. Certified 11 new CPP holders as well as provided support to 170 existing CPP holders.
- Prepared Federal NSR Equivalency Determination Reports pursuant to Rule 1315.
- Prepared annual report on the NOx and SOx RECLAIM Program in accordance with Rule 2015.
- Provided an in-depth overview of District's permitting process and refinery operations to Hearing Board members.

ANTICIPATED:

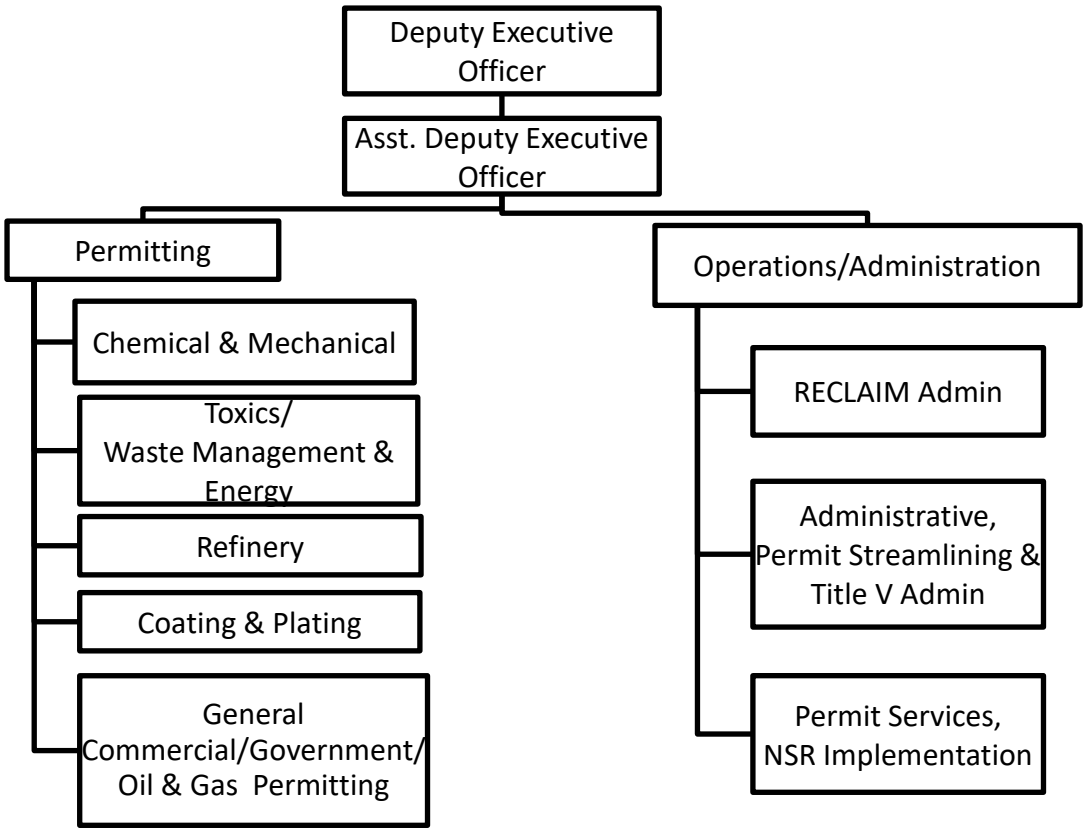
- Continue implementing all elements of the Action Plan developed to reduce permit backlog.
- Complete permit backlog reduction effort:
    a) Reduce pending applications to less than 3,800 by end of FY 2017/2018 and less than 3,600 by October 2018;

b) Seek to process more than 1,800 Permit to Construct and a total of 7,500 applications for Permits, Plans, and ERCs during FY 2018/19;
c) Focus on reducing last remaining aged permit applications to the extent possible; and,
d) Seek to reduce pending applications beyond targets established in Action Plan in an effort to establish a cushion to help address additional incoming permit applications anticipated from RECLAIM program phase-out during the next one to three years.

- Complete timely renewal of Title V permits.
- Implement action plan to further improve Title V program pursuant to U.S. EPA's recommendations:
  a) Prepare expanded Statement of Basis (SOB) for all initial Title V permits, at least 10% of Title V renewals, and all De-Minimus and Significant Title V revisions;
  b) Develop capability to publish Title V permits online;
  c) Provide more detailed account of applicable federal requirement in Title V permits,
  d) Provide public with online access to Title V permits; and,
  e) Develop formal policy that will allow a source to be reclassified as a synthetic minor and exit the Title V program.
- Continue efforts to streamline and expedite permit issuance and reduce permit application backlog through:
  a) Equipment certification/registration programs;
  b) Streamlined standard permits;
  c) Enhancement of permitting systems; and,
  d) Expedited Permit Processing Program
- Continue certification of Permit Processing professionals.
- Complete the development of and deploy online permitting and permit automation tools for gasoline dispensing facilities and automotive spray booths, and initiate the process to identify additional candidate equipment/processes suitable for online permitting.
- Initiate the development and deployment of Phase II Online Permitting efforts:
  a) On-line Dash Board tool for Permit Application Status Tracking that will allow public to track the status of individual permit applications;
  b) Rule 222 Filing & Registration Forms;
  c) Registration/Certification for Emergency Generators and Soil Vapor Extraction Systems;
  d) 400-E-xx Permit Application Forms; and
  e) Enhancements to Dry Cleaning, Gasoline Dispensing and Automotive Spray Booth modules.
- Continue permit processing modernization efforts by initiating the development of a plan and business model that will facilitate transition to electronic permit application submittal and processing and can be deployed as soon as the development of electronic smart permit applications forms is complete.
- Continue implementation of the staff recognition program, recognizing top performing individuals and teams to help maintain high morale and acknowledge good performance.

- Continue to improve and monitor the operational and permitting efficiency of permitting teams by:
    a) Streamlining workflow;
    b) Enhancing permitting tools;
    c) Standardizing permit conditions;
    d) Reviewing and updating outdated Permitting Policies and Procedures; and,
    e) Tracking and developing time metrics for processing permit applications.
- Continue soliciting stakeholder input on permit application backlog reduction and permit streamlining efforts through quarterly Permit Streamlining Task Force subcommittee meetings.
- Provide quarterly status reports on permit backlog reduction efforts to Stationary Source Committee and semi-annual reports to the Governing Board until permit backlog reduction goals are fully accomplished.
- Continue to improve customer services and public outreach by:
    a) Providing public education by attending public meetings and addressing public concerns;
    b) Providing assistance to permit applicants through pre- and post-conferences; and,
    c) Providing permitting information for Public Record requests.
- Review and comment on Rule 1402 Risk Reduction Plans.
- Continue to provide critical input in developing and amending SCAQMD Rules.
- Continue to provide critical input in enforcing SCAQMD Rules.
- Continue to provide support in Fee Review cases and Hearing Board cases.
- Conduct a thorough evaluation of the Expedited Permitting Program and propose improvements as warranted.
- Continue to prepare Federal NSR Equivalency Determination Reports pursuant to Rule 1315.
- Continue to prepare annual report on the NOx and SOx RECLAIM Program in accordance with Rule 2015.
- Initiate the process to update and expand the SCAQMD's Permit Processing Handbook.

ORGANIZATIONAL CHART:



POSITION SUMMARY: 161 FTEs

Engineering & Permitting	Amended FY 2017-18	Change	Adopted FY 2018-19
Administration	4	-	4
Engineering	130	-	130
Operations	27	-	27
Total	161	-	161

STAFFING DETAIL:

2018-19 Adopted Staffing

Position	Title
92	Air Quality Engineer II
1	Air Quality Specialist
1	Assistant Deputy Executive Officer
2	Data Technician
1	Deputy Executive Officer
1	Office Assistant
1	Principal Office Assistant
1	Program Supervisor
5	Secretary
2	Senior Administrative Secretary
20	Senior Air Quality Engineer
6	Senior Air Quality Engineering Manager
17	Senior Office Assistant
2	Staff Specialist
8	Supervising Air Quality Engineer
1	Supervising Office Assistant
161	Total Adopted Positions

Engineering & Permitting
Work Program by Office

#	Program Code		Program Categories	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Revenue Categories
1	50	038	Customer Service and Business Assistance	Admin/Office Management	Dev/Coord Goals/Policies/Overs	1.00	2.00	3.00	Ib
2	50	047	Customer Service and Business Assistance	Admin/Operations Support	Budget/Contracts/Reports/Projects	2.00	1.00	3.00	Ib
3	50	120	Timely Review of Permits	Certification/Registration Pro	Certification/Registration Prog	2.00	-1.00	1.00	III
4	50	148	Policy Support	Climate Change	GHG/Climate Change Support	0.50	0.00	0.50	II,IX
5	50	156	Ensure Compliance	Perm Proc/Info to Compliance	Prov Permit Info to Compliance	3.00	0.00	3.00	III,IV,XV
6	50	200	Customer Service and Business Assistance	Economic Dev/Bus Retention	Perm Proc/Public Participation	0.10	0.00	0.10	III
7	50	240	Ensure Compliance	Environmental Justice	R461/Combustion Equip Testing	0.50	0.00	0.50	II,IV,XV
8	50	253	Timely Review of Permits	ERC Appl Processing	Process ERC Applications	3.50	0.00	3.50	III
9	50	260	Customer Service and Business Assistance	Fee Review	Fee Review Committee	0.45	0.00	0.45	II,III,IV
10	50	276	Policy Support	Board Committees	Admin/Stationary Source Committees	0.25	0.00	0.25	Ia
11	50	365	Ensure Compliance	Hearing Bd/Variances	Variances/Orders of Abatement	0.75	0.00	0.75	VII
12	50	367	Timely Review of Permits	Hearing Board/Appeals	Appeals: Permits & Denials	0.25	0.00	0.25	III
13	50	377	Ensure Compliance	Inspections/RECLAIM Audits	Audit/Compliance Assurance	6.00	0.00	6.00	II,IV
14	50	416	Policy Support	Legislative Activities	Legislative Activities	0.25	0.00	0.25	Ia
15	50	425	Customer Service and Business Assistance	Lobby Permit Services	Supp Perm Proc/Customer Svc	1.00	0.00	1.00	III
16	50	475	Timely Review of Permits	NSR Implementation	Implement NSR/Allocate ERCs	2.50	0.00	2.50	II,III,V,XV
17	50	476	Timely Review of Permits	NSR Data Clean Up	Edit/Update NSR Data	0.50	0.00	0.50	II
18	50	492	Ensure Compliance	Customer Service	Compliance/Inspection/Follow-up	0.50	0.00	0.50	II,V,IX,XV
19	50	515	Timely Review of Permits	Perm Proc/Non TV/Non RECLAIM	PP: Non TitlV/TitlIII/RECLAIM	51.75	-1.00	50.75	III,XV
20	50	517	Timely Review of Permits	Permit Services	Facility Data-Create/Edit	12.50	0.00	12.50	III,XV
21	50	518	Timely Review of Permits	RECLAIM Non-Title V	Process RECLAIM Only Permits	4.50	0.00	4.50	III,IV,XV
22	50	519	Timely Review of Permits	Perm Proc/Title III (Non TV)	Process Title III Permits	1.00	0.00	1.00	III
23	50	520	Customer Service and Business Assistance	Perm Proc/Pre-Appl Mtg Outreac	Pre-App Mtgs/Genl Prescreening	1.00	0.00	1.00	III
24	50	521	Timely Review of Permits	Perm Proc/Expedited Permit	Proc Expedited Permits (301OT)	4.00	0.00	4.00	III
25	50	523	Timely Review of Permits	Permit Streamlining	Permit Streamlining	3.75	1.00	4.75	III
26	50	565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Req for Info	0.25	0.00	0.25	Ia
27	50	605	Ensure Compliance	RECLAIM/Admin Support	Admin/Policy/Guidelines	6.50	0.00	6.50	II,III,IV,XV
28	50	607	Timely Review of Permits	RECLAIM & Title V	Process RECLAIM & TV Permits	18.40	0.00	18.40	III
29	50	643	Timely Review of Permits	Rule 222 Filing Program	Rule 222 Filing Program	0.50	0.00	0.50	IV
30	50	650	Develop Rules	Rulemaking	Dev/Amend/Impl Rules	0.25	0.00	0.25	II,XV
31	50	657	Develop Rules	Rulemaking/Support PRA	Provide Rule Development Supp	0.25	0.00	0.25	II,XV
32	50	678	Ensure Compliance	School Siting	Identify Haz. Emission Sources near Schools	0.25	0.00	0.25	II
33	50	680	Ensure Compliance	Small Business Assistance	Asst sm bus w/ Permit Process	0.50	0.00	0.50	III,IV
34	50	690	Customer Service and Business Assistance	Source Education	Prov Tech Asst To Industries	2.80	0.00	2.80	III,IV,V,XV
35	50	728	Timely Review of Permits	Perm Proc/IM Programming	Assist IM: Design/Review/Test	2.55	0.00	2.55	II,III,IV
36	50	752	Develop Rules	Title III Rulemaking	Title III Dev/Implement Rules	0.25	0.00	0.25	II,V,XV
37	50	773	Develop Rules	Title V & NSR Rulemaking-Supp	Title V Rules Dev/Amend/Impl	0.25	0.00	0.25	II
38	50	774	Timely Review of Permits	TV/Non-RECLAIM	Process Title V Only Permits	18.00	0.00	18.00	III
39	50	775	Timely Review of Permits	Title V – Admin	Title V Administration	1.00	0.00	1.00	III
40	50	791	Ensure Compliance	Toxics/AB2588	AB2588 Rev Rprts/Risk Redplans	0.25	0.00	0.25	X
41	50	805	Operational Support	Training	Dist/Org Unit Training	3.10	0.00	3.10	Ib
42	50	825	Operational Support	Union Negotiations	Official Labor/Mgmt Negotiate	0.05	0.00	0.05	Ia
43	50	826	Operational Support	Union Steward Activities	Rep Employees in Grievance Act	0.05	0.00	0.05	Ia
44	50	855	Operational Support	Web Tasks	Creation/Update of Web Content	0.25	0.00	0.25	Ia
					Total Engineering & Permitting	159.00	2.00	161.00	

Engineering & Permitting Line Item Expenditure						
Major Objept / Appount # / Appount Despription		FY 2016-17 Actuals	FY 2017-18 Adopted Budget	FY 2017-18 Amended Budget	FY 2017-18 Estimate *	FY 2018-19 Adopted Budget
Salary & Employee Benefits						
51000-52000	Salaries	$ 15,518,030	$ 15,902,868	$ 15,931,282	$ 16,081,625	$ 16,235,607
53000-55000	Employee Benefits	7,419,991	7,882,580	7,882,580	7,651,468	8,750,049
Sub-total Salary & Employee Benefits		$ 22,938,021	$ 23,785,448	$ 23,813,862	$ 23,733,093	$ 24,985,656
Services & Supplies						
67250	Insurance	$ -	$ -	$ -	$ -	$ -
67300	Rents & Leases Equipment	-	10,000	10,000	4,477	10,000
67350	Rents & Leases Structure	15,963	10,000	10,000	-	10,000
67400	Household	-	-	-	-	-
67450	Professional & Special Services	351	2,500	6,725	6,725	2,500
67460	Temporary Agency Services	24,257	32,000	32,000	29,855	20,000
67500	Public Notice & Advertising	140,066	160,000	160,000	160,000	160,000
67550	Demurrage	-	250	250	-	250
67600	Maintenance of Equipment	(0)	-	-	-	-
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	27,018	26,500	26,500	26,500	35,000
67750	Auto Service	-	-	-	-	-
67800	Travel	9,592	17,555	17,555	11,597	17,555
67850	Utilities	-	-	-	-	-
67900	Communications	11,913	10,650	10,650	10,650	6,450
67950	Interest Expense	-	-	-	-	-
68000	Clothing	970	2,930	2,930	2,930	2,930
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	28,589	37,000	37,000	28,589	37,000
68100	Office Expense	57,248	57,700	57,700	57,700	56,336
68200	Office Furniture	1,396	3,050	3,050	1,558	-
68250	Subscriptions & Books	-	400	344	344	400
68300	Small Tools, Instruments, Equipment	-	-	-	-	-
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	3,045	3,500	3,500	3,500	4,500
69550	Memberships	520	750	750	520	750
69600	Taxes	-	-	-	-	-
69650	Awards	-	-	-	-	2,000
69700	Miscellaneous Expenses	1,111	5,000	5,000	2,222	5,000
69750	Prior Year Expense	(85)	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		$ 321,953	$ 379,785	$ 383,954	$ 347,167	$ 370,671
77000	**Capital Outlays**	$ -	$ 20,000	$ 20,000	$ 20,000	$ 70,000
79050	**Building Remodeling**	$ -	$ -	$ -	$ -	$ -
Total Expenditures		$ 23,259,974	$ 24,185,233	$ 24,217,816	$ 24,100,260	$ 25,426,327

* Estimates based on July 2017 through February 2018 actual expenditures and budget amendments.

FINANCE

SUJATA JAIN
ASSISTANT DEPUTY EXECUTIVE OFFICER

At a Glance:	
FY 2017-18 Adopted	$6.3M
FY 2018-19 Adopted	$6.6M
% of SCAQMD FY 2018-19 Adopted	4.0%
Total Adopted FTEs	48

DESCRIPTION OF MAJOR SERVICES:

Finance provides services to internal and external customers and stakeholders, including fee payers, internal divisions, employees, the Mobile Source Air Pollution Reduction Review Committee, the Building Corporation, and the Health Effects of Air Pollution Foundation. These services are provided through three distinct units: Controller, Financial Services, and Procurement. The Controller is responsible for accounting, financial reporting, accounts payable, payroll, state and federal tax reporting, revenue posting, and asset management. The Financial Services Manager is responsible for budget preparation, budgetary reporting, forecasting, grants management, billing services, and ad-hoc internal financial support. The Procurement Manager is responsible for the procurement of goods and services, contracting, proposal/bid solicitations and advertising, processing supplier deliveries, and controlling/dispensing/reconciling inventory.

ACCOMPLISHMENTS:

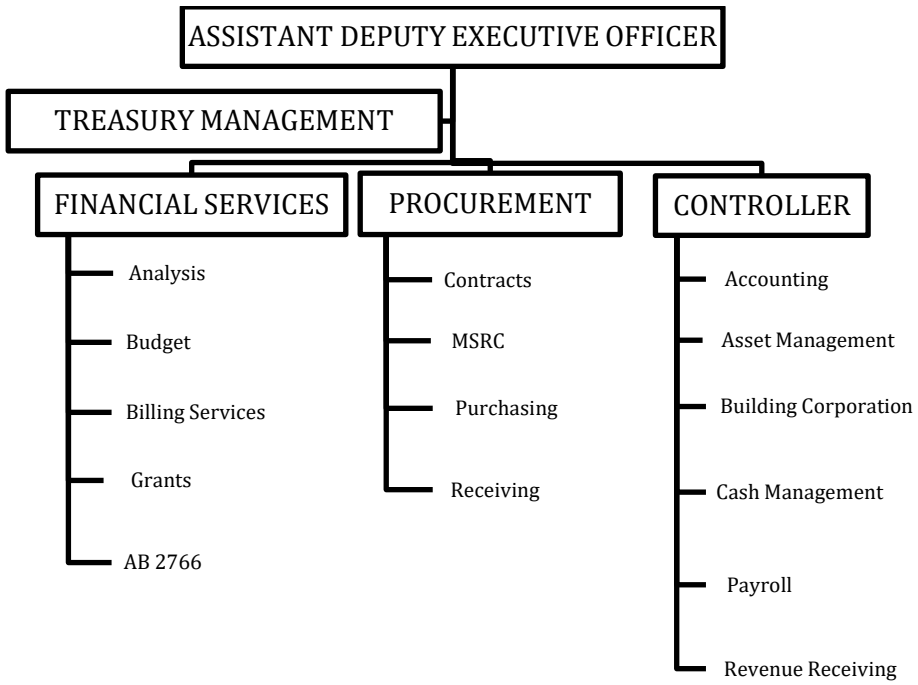
RECENT:

- Continued to expand electronic payment options to include Permit Processing Fee payments for asbestos and dry cleaners.
- Processed 685 contracts and modifications, issued 37 Request for Proposals/Quotes, and processed 309 proposals/quotations. Processed 1,462 purchase orders and 463 CalCard payments.
- Implemented new Internal Revenue Service tax reporting requirements under the Affordable Care Act (ACA).
- Received the Government Finance Officer's Association's (GFOA) awards for the Annual Budget, Comprehensive Annual Financial Report (CAFR), and Popular Annual Financial Report (PAFR) for the most recent fiscal year.

ANTICIPATED:

- Continue to identify and implement additional opportunities for electronic payments.
- Implement the new financial reporting requirements, as required by Governmental Accounting Standards Board (GASB) Statement Number 75 "Accounting and Financial Reporting for Postemployment Benefit Plans Other than Pension Plans," through coordination with Los Angeles County Employees' Retirement Association (LACERA), and external auditors.
- Continue to receive GFOA Awards for the Annual Budget, CAFR, and PAFR to ensure SCAQMD's financial reports meet the highest professional standards.
- Ensure compliance with all AB 617and AB 134 guidelines for financial reporting and tracking of revenue and expenditures.

ORGANIZATIONAL CHART:



POSITION SUMMARY: 48 FTEs

Finance Units	Amended FY 2017-18	Change	Adopted FY 2018-19
Office Administration	5	(1)	4
Financial Services	14	-	14
Procurement	10	-	10
Controller	20	-	20
Total	49	(1)	48

STAFFING DETAIL:

2018-19 Adopted Staffing

Position	Title
2	Accounting Technician
1	Assistant Deputy Executive Officer
1	Chief Administrative Officer*
2	Contracts Assistant
1	Controller
1	District Storekeeper
3	Financial Analyst
1	Financial Services Manager
7	Fiscal Assistant
3	Payroll Technician
1	Procurement Manager
2	Purchasing Assistant
1	Purchasing Supervisor
2	Secretary
3	Senior Accountant
1	Senior Administrative Secretary
2	Senior Fiscal Assistant
9	Senior Office Assistant
1	Staff Assistant
1	Staff Specialist
1	Stock Clerk
1	Supervising Office Assistant
1	Supervising Payroll Technician
48	Total Adopted Positions

* Not reflected in Finance's Organizational Chart

Finance Work Program by Office									
#	Program Code		Program Categories	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Revenue Categories
1	04	002	Customer Service and Business Assistance	AB2766/Mobile Source	Prog Admin: Monitor/Dist/Audit	0.10	0.00	0.10	IX
2	04	003	Advance Clean Air Technology	AB2766/MSRC	MSRC Program Administration	0.35	0.00	0.35	IX
3	04	009	Develop Programs	AB 1318 Mitigation	AB 1318 Projects Admn/Impl	0.13	0.00	0.13	XVII
4	04	020	Operational Support	Admin/SCAQMD Budget	Analyze/Prepare/Impl/Track WP	2.65	0.00	2.65	Ia
5	04	021	Operational Support	Admin/SCAQMD Contracts	Contract Admin/Monitor/Process	3.20	0.00	3.20	Ia
6	04	023	Operational Support	Admin/SCAQMD Capital Assets	FA Rep/Reconcile/Inv/Acct	0.70	0.00	0.70	Ia
7	04	030	Advance Clean Air Technology	AB 134	AB 134	0.00	2.00	2.00	IX
8	04	035	Operational Support	AB 617-General	AB 617-General	0.00	0.50	0.50	XV
9	04	038	Operational Support	Admin/Office Management	Fin Mgmt/Oversee Activities	4.75	-1.00	3.75	Ib
10	04	045	Operational Support	Admin/Office Budget	Office Budget/Prep/Impl/Track	0.05	0.00	0.05	Ib
11	04	071	Operational Support	Arch Ctgs - Admin	Cost Analysis/Payments	0.04	0.00	0.04	XVIII
12	04	083	Policy Support	Hlth Effects Air Pollution Fou	Health Effects Air Poll Foundation Support	0.02	0.00	0.02	Ia
13	04	085	Operational Support	Building Corporation	Building Corp Acct/Fin Reports	0.02	0.00	0.02	Ia
14	04	130	Advance Clean Air Technology	Clean Fuels/Contract Admin	Clean Fuels Contract Admin/Monitor	0.15	0.00	0.15	VIII
15	04	170	Customer Service and Business Assistance	Billing Services	Answer/Resp/Resolv Prob & Inq	8.00	0.00	8.00	II,III,IV
16	04	233	Operational Support	Employee Relations	Assist HR/Interpret Salary Res	0.10	0.00	0.10	Ia
17	04	260	Customer Service and Business Assistance	Fee Review	Cmte Mtg/Fee-Related Complaint	0.10	0.00	0.10	II,III,IV,XV
18	04	265	Operational Support	Financial Mgmt/Accounting	Record Accts Rec & Pay/Rpts	6.20	0.00	6.20	Ia
19	04	266	Operational Support	Financial Mgmt/Fin Analysis	Fin/SCAQMD Stat Analysis & Audit	0.80	0.00	0.80	Ia
20	04	267	Operational Support	Financial Mgmt/Treasury Mgmt	Treas Mgt Anlyz/Trk/Proj/Invst	1.00	0.00	1.00	Ia
21	04	268	Operational Support	Financial Systems	CLASS/Rev/Acct/PR/Sys Analyze	0.10	0.00	0.10	Ia
22	04	355	Customer Service and Business Assistance	Grants Management	Grant Anlyz/Eval/Negot/Acc/Rpt	1.00	0.00	1.00	IV,V,XV
23	04	447	Operational Support	Mobile Sources/Accounting	Record Acct Rec & Pay/Special Funds	0.65	0.00	0.65	IX
24	04	457	Advance Clean Air Technology	Mobile Source/Moyer Adm	Carl Moyer: Contract/Fin Admin	1.02	0.00	1.02	IX
25	04	493	Operational Support	Outreach/SB/MB/DVBE	Outreach/Incr SB/DVBE Partic	0.05	0.00	0.05	Ia
26	04	510	Operational Support	Payroll	Ded/Ret Rpts/PR/St & Fed Rpts	3.60	0.50	4.10	Ia
27	04	542	Advance Clean Air Technology	Prop 1B:Goods Movement	Contracts/Finance Admin	0.50	0.00	0.50	IX
28	04	544	Advance Clean Air Technology	Prop 1B:Low Emiss Sch Bus	Grants/Finance Admin	0.05	0.00	0.05	IX
29	04	565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Rec Requests	0.02	0.00	0.02	Ia
30	04	570	Operational Support	Purchasing	Purch/Track Svcs & Supplies	2.50	0.00	2.50	Ia
31	04	571	Operational Support	Purchasing/Receiving	Receive/Record SCAQMD Purchases	1.20	0.00	1.20	Ia
32	04	572	Operational Support	Purchasing-Receiving/Stockroom	Track/Monitor SCAQMD Supplies	1.00	0.00	1.00	Ia
33	04	630	Operational Support	Cash Mgmt/Revenue Receiving	Receive/Post Pymts/Reconcile	5.25	0.00	5.25	II,III,IV,XI
34	04	631	Customer Service and Business Assistance	Cash Mgmt/Refunds	Research/Doc/Prep/Proc Refunds	0.30	0.00	0.30	III,IV,XI
35	04	791	Ensure Compliance	Toxics/AB2588	AB2588 Toxics HS Fee Collection	0.15	0.00	0.15	X
36	04	805	Operational Support	Training	Continuing Education/Training	0.20	0.00	0.20	Ib
37	04	825	Operational Support	Union Negotiations	Official Labor/Mgmt Negotiate	0.02	0.00	0.02	Ia
38	04	826	Operational Support	Union Steward Activities	Rep Employees in Grievance Act	0.01	0.00	0.01	Ia
39	04	855	Operational Support	Web Tasks	Create/edit/review web content	0.02	0.00	0.02	Ia
					Total Finance	46.00	2.00	48.00	

Finance Line Item Expenditure						
Major Object / Account # **/** Account Description		**FY 2016-17 Actuals**	**FY 2017-18 Adopted Budget**	**FY 2017-18 Amended Budget**	**FY 2017-18 Estimate ***	**FY 2018-19 Adopted Budget**
Salary & Employee Benefits						
51000-52000	Salaries	$ 3,371,871	$ 3,601,840	$ 3,738,952	$ 3,673,783	$ 3,683,948
53000-55000	Employee Benefits	2,049,567	2,213,027	2,213,027	2,137,716	2,390,069
Sub-total Salary & Employee Benefits		$ 5,421,438	$ 5,814,867	$ 5,951,979	$ 5,811,499	$ 6,074,016
Services & Supplies						
67250	Insurance	$ -	$ -	$ -	$ -	$ -
67300	Rents & Leases Equipment	-	-	-	-	-
67350	Rents & Leases Structure	-	-	-	-	-
67400	Household	-	900	900	-	900
67450	Professional & Special Services	126,712	144,650	144,650	120,863	163,560
67460	Temporary Agency Services	62,047	63,000	63,000	59,262	63,000
67500	Public Notice & Advertising	11,778	7,000	7,000	7,000	7,000
67550	Demurrage	-	780	780	-	780
67600	Maintenance of Equipment	1,219	1,860	1,860	1,718	1,860
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	2,359	4,488	4,488	2,501	4,468
67750	Auto Service	-	-	-	-	-
67800	Travel	3,339	6,000	6,000	2,827	6,000
67850	Utilities	-	-	-	-	-
67900	Communications	1,355	9,000	9,000	1,355	9,000
67950	Interest Expense	-	-	-	-	-
68000	Clothing	857	1,200	1,200	-	1,200
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	141,246	130,050	130,050	111,300	102,706
68100	Office Expense	22,334	36,120	41,120	39,933	36,120
68200	Office Furniture	-	2,125	2,125	-	-
68250	Subscriptions & Books	2,538	3,470	3,384	2,622	3,470
68300	Small Tools, Instruments, Equipment	-	-	-	-	-
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	6,441	27,250	27,250	8,516	27,250
69550	Memberships	1,095	2,793	2,793	2,385	2,793
69600	Taxes	-	-	-	-	-
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	3,035	5,150	5,150	3,789	5,150
69750	Prior Year Expense	-	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		$ 386,356	$ 445,836	$ 450,750	$ 364,072	$ 435,257
77000	**Capital Outlays**	$ -	$ -	$ -	$ -	$ 75,800
79050	**Building Remodeling**	$ -	$ -	$ -	$ -	$ -
Total Expenditures		$ 5,807,794	$ 6,260,703	$ 6,402,729	$ 6,175,570	$ 6,585,073
* Estimates based on July 2017 through February 2018 actual expenditures and budget amendments.						

SOUTH COAST

AIR QUALITY MANAGEMENT DISTRICT

INFORMATION MANAGEMENT

RON MOSKOWITZ
ASSISTANT DEPUTY EXECUTIVE OFFICER

At a Glance:	
FY 2017-18 Adopted	$10.8M
FY 2018-19 Adopted	$11.3M
% of SCAQMD FY 2018-19 Adopted	6.9%
Total Adopted FTEs	54

DESCRIPTION OF MAJOR SERVICES:

Information Management (IM) provides a wide range of information management systems and services in support of all SCAQMD operations. In addition to IM's administrative unit which provides for overall planning, administration and coordination of all IM activities, IM is comprised of two Information Technology (IT) units, and a Special Projects unit. The two IT units are distinguished from each other in that one is primarily concerned with hardware and network issues (while acquiring and applying software to integrate systems and functions), whereas the other focuses on system development (while integrating communication functions and the latest computer technologies). Due to the increasing convergence between hardware, software and digital technologies, the work performed by the two IT units often overlaps and requires close coordination. Areas where the two units overlap include workflow automation, imaging, and automatic system messaging (e.g., through email). The Special Projects unit processes all of the public records requests and handles day-to-day updates and additions to the SCAQMD website along with other projects as they arise.

ACCOMPLISHMENTS:

RECENT:

- Information Technology Review: Evaluated the information technologies and processes in place and those needed to support the District's goals and objectives.
- New Website, Website Facelift
- CLASS Database Upgrade
- OnBase Version Upgrade
- E-Forms with Workflow: Lawn mower rebate, EV charger voucher, wireless equipment, policies, contact information, Rule 1466
- Enterprise GIS Infrastructure on-line and on-premise
- Network Core Switch Upgrade
- Wi-Fi Deployment

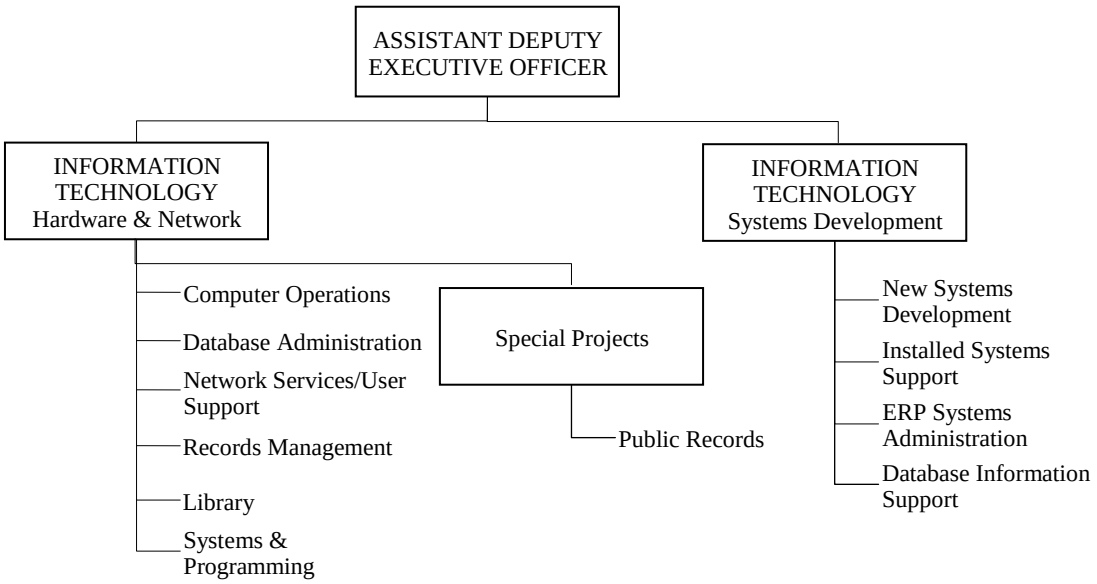
- Virus Scan Upgrade
- Desktop Upgrades
- Permitting Automation New System Development: Automated 400A form filing and permit processing of dry cleaner, gas station and spray booth operations and online Facility ID generation.
- Security Portal Lite Registration Implementation: Core infrastructure for all web applications including login and registration, user and application management, reporting copy of record, and application administration
- "Replace Your Ride" (RYR) New System Development: Developed web-based application that supports the implementation of a program providing monetary incentives to eligible individuals to retire their older vehicle and purchase a cleaner burning, more fuel efficient vehicle.
- Financial Services Web Services Upgrade: Converted all major financial subsidiary functions to 64-bit web services including Finance daily report, refunds sweep, Bank of America Link Reporting Services, on-line payment processing, and PeopleSoft to CLASS link.
- GIS Services Implementation and Migration to ESRI: Map layer conversion and spatial query/web services for 400A and RYR system support
- On-line training system implementation: Support registration for on-line and leader-lead classes and on-line training
- PeopleSoft Financials 9.1 upgrade and e-Benefits Self Service Module implementation for open enrollment

ANTICIPATED:

- Implementation of selected recommendations from IT Review
- Website Upgrade
- Database Administration: CLASS database high availability
- Records: Agenda Tracking System Application Upgrade, E-Discovery implementation
- IT Services and Operations: Enterprise GIS applications implementation (web mapping), HF Monitoring System replacement, and RECLAIM Electronic Reporting System replacement (electronic reporting systems)
- Network and Hardware: Cloud based email and file sharing (Office 365), internet bandwidth upgrade, vertical network fiber upgrade, Wi-Fi deployment continued, virtualization and storage upgrades, server migration to the Cloud, Windows 10 Version upgrade, laptop disk encryption, and Desktop upgrades
- Permitting Automation Phase II New System Development: 400 E Series form filing, on-line permits IC engine/vapor recovery, equipment registration form processing, permit status dashboard, internal workflow automation, and paperless permit equipment evaluation

- Geographic Information Systems Implementation: Open Data Portal, FIND Map replacement, and GEO coding services and tooling
- Annual Emission Reporting (AER) System Migration: Evaluation and upgrade and/or replacement of the existing AER system for better support and integration with the District's enterprise database and programs.
- Legal Division New System Development: Replacement of existing Courtview Case Management Solution with a more robust solution that integrates with the CLASS system.
- Flare Notification New System Development: Replacement of existing Flare Notification System with a more robust solution that integrates with the CLASS system and supports recent rule changes.
- Title V Compliance Form Filing: New web-based outward facing application to support the filing of Title V Compliance forms
- FIND System Replacement: Replacement of the existing Facility INformation Detail system to provide updated user interface, responsive design, and better search and reporting capabilities for staff and users in the public sector.
- Mobile Health Smartphone Application: Mobile application to engage the public and to provide relevant air quality information, support a more user-friendly interface, expand existing capabilities, and provide more relevant and critical health information to users via their cell phones and tablets
- Compliance System Replacement: New web-based application to replace the aging client/server desktop application for the tracking and processing of complaints, inspections, notifications, breakdowns, Notices of Violation, and Notices to Comply
- Transportation Plan Form Filing on the Web: New outward-facing web application to allow the online filing of Transportation Plans
- PeopleSoft Upgrades, Customizations and Module Implementations: Benefits Administration BCC Module implementation and labor negotiation customization and implementation

ORGANIZATIONAL CHART:



POSITION SUMMARY: 54 FTEs

Information Management Units	Amended FY 2017-18	Change	Adopted FY 2018-19
Office Administration	2.25	- 0.25	2
Hardware & Network	27	-	27
Systems Development	19		19
Special Projects	2		2
Public Records	4		4
Total	54.25	-0.25	54

STAFFING DETAIL:

2018-19 Adopted Staffing

Position	Title
1	Assistant Database Administrator
1	Assistant Deputy Executive Officer/Information Management
3	Assistant Information Technology Specialist
1	Database Administrator
1	Information Technology Specialist I
2	Information Technology Specialist II
3	Information Technology Supervisor
4	Office Assistant
1	Principal Office Assistant
1	Public Affairs Specialist
2	Secretary
1	Senior Administrative Secretary
4	Senior Information Technology Specialist
4	Senior Office Assistant
1	Supervising Office Assistant
13	Systems Analyst
9	Systems and Programming Supervisor
2	Technology Implementation Manager
54	Total Adopted Positions

Information Management Work Program by Office									
#	Program Code		Program Categories	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Revenue Categories
1	27	035	Operational Support	AB 617-General	AB 617-General	0.00	5.00	5.00	XV
2	27	038	Operational Support	Admin/Office Management	Overall Direction/Coord of IM	2.25	-0.25	2.00	Ib
3	27	071	Operational Support	Arch Ctgs - Admin	Database Dev/Maintenance	0.25	0.00	0.25	XVIII
4	27	160	Operational Support	Computer Operations	Oper/Manage Host Computer Sys	5.25	0.00	5.25	Ia
5	27	184	Operational Support	Database Information Support	Ad Hoc Reports/Bulk Data Update	1.00	0.00	1.00	Ia
6	27	185	Operational Support	Database Management	Dev/Maintain Central Database	2.25	0.00	2.25	Ia
7	27	215	Operational Support	Annual Emission Reporting	System Enhancements for GHG	0.50	0.00	0.50	II,XVII
8	27	370	Operational Support	Information Technology Svcs	Enhance Oper Effic/Productivity	2.75	0.00	2.75	Ia
9	27	420	Operational Support	Library	General Library Svcs/Archives	0.25	0.00	0.25	Ia
10	27	470	Operational Support	Network Operations/Telecomm	Operate/Maintain/Implem SCAQMD	9.25	0.00	9.25	Ia
11	27	480	Operational Support	New System Development	Dev sys for special oper needs	2.50	0.00	2.50	II,IV
12	27	481	Customer Service and Business Assistance	New System Development	Dev sys in supp of Dist-wide	1.75	0.00	1.75	Ia,III
13	27	523	Timely Review of Permits	Permit Streamlining	Permit Streamlining	0.25	0.00	0.25	III
14	27	565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Req for Info	4.75	0.00	4.75	Ia
15	27	615	Operational Support	Records Information Mgmt Plan	Plan/Impl/Dir/Records Mgmt plan	1.25	0.00	1.25	Ia
16	27	616	Operational Support	Records Services	Records/Documents processing	3.75	0.00	3.75	Ia,III,IV
17	27	735	Operational Support	Systems Maintenance	Maintain Existing Software Prog	4.50	0.00	4.50	II,III,IV
18	27	736	Operational Support	Systems Implementation/PeopleS	Fin/HR PeopleSoft Systems Impl	1.50	0.00	1.50	Ia
19	27	770	Timely Review of Permits	Title V	Dev/Maintain Title V Program	1.50	0.00	1.50	III
20	27	791	Ensure Compliance	Toxics/AB2588	AB2588 Database Software Supp	0.50	0.00	0.50	X
21	27	855	Operational Support	Web Tasks	Create/edit/review web content	3.25	0.00	3.25	Ia
					Total Information Management	49.25	4.75	54.00	

Information Management Line Item Expenditure						
Major Object / Account # **/** Account Description		**FY 2016-17 Actuals**	**FY 2017-18 Adopted Budget**	**FY 2017-18 Amended Budget**	**FY 2017-18 Estimate ***	**FY 2018-19 Adopted Budget**
Salary & Employee Benefits						
51000-52000	Salaries	$ 4,998,805	$ 5,007,929	$ 5,483,569	$ 5,282,761	$ 5,458,597
53000-55000	Employee Benefits	2,886,709	2,899,399	2,899,398	3,042,587	3,433,500
Sub-total Salary & Employee Benefits		$ 7,885,514	$ 7,907,328	$ 8,382,967	$ 8,325,347	$ 8,892,097
Services & Supplies						
67250	Insurance	$ -	$ -	$ -	$ -	$ -
67300	Rents & Leases Equipment	-	1,880	-	-	1,880
67350	Rents & Leases Structure	-	-	-	-	-
67400	Household	-	1,250	500	-	1,250
67450	Professional & Special Services	1,203,713	1,313,487	1,145,787	1,710,787	1,404,121
67460	Temporary Agency Services	308,297	494,960	536,460	172,786	347,199
67500	Public Notice & Advertising	-	-	-	-	-
67550	Demurrage	90	650	650	90	650
67600	Maintenance of Equipment	71,665	103,300	144,972	144,972	157,750
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	3,099	1,250	3,130	3,130	1,250
67750	Auto Service	-	-	-	-	-
67800	Travel	11,171	2,160	8,364	8,364	2,160
67850	Utilities	-	-	-	-	-
67900	Communications	9,511	36,900	36,900	11,289	36,900
67950	Interest Expense	-	-	-	-	-
68000	Clothing	-	-	-	-	-
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	1,000	5,500	5,500	1,147	5,500
68100	Office Expense	594,673	323,912	440,084	440,084	323,912
68200	Office Furniture	-	-	8,875	8,875	-
68250	Subscriptions & Books	16,120	30,000	90,500	90,500	30,000
68300	Small Tools, Instruments, Equipment	-	2,000	2,000	-	2,000
68350	Film				-	
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	57,906	46,575	40,371	40,371	46,575
69550	Memberships	354	1,320	1,320	354	1,320
69600	Taxes	-	1,000	1,000	-	1,000
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	-	-	-	-	-
69750	Prior Year Expense	-	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		$ 2,277,599	$ 2,366,144	$ 2,466,413	$ 2,632,750	$ 2,363,467
77000	**Capital Outlays**	$ 1,803,916	$ 506,600	$ 2,161,660	$ 1,596,660	$ 35,000
79050	**Building Remodeling**	$ -	$ -	$ -	$ -	$ -
Total Expenditures		$ 11,967,029	$ 10,780,072	$ 13,011,040	$ 12,554,757	$ 11,290,564
* Estimates based on July 2017 through February 2018 actual expenditures and budget amendments.						

SOUTH COAST

AIR QUALITY MANAGEMENT DISTRICT

LEGAL

BAYRON T. GILCHRIST
GENERAL COUNSEL

At a Glance:	
FY 2017-18 Adopted	$6.5M
FY 2018-19 Adopted	$6.8M
% of SCAQMD FY 2018-19 Adopted	4.2%
Total Adopted FTEs	34

DESCRIPTION OF MAJOR SERVICES:

The General Counsel's Office is responsible for advising the SCAQMD Board and staff on all legal matters and enforcing SCAQMD rules and state laws related to air pollution control. Attorneys review and assist in the drafting of SCAQMD rules and regulations to ensure they are within the District's authority, and are written in a clear and enforceable manner. Attorneys ensure that all legal requirements for noticing, public workshop, CEQA analysis, and socioeconomic analysis of proposed rules and air quality management plans are satisfied.

The General Counsel's Office is also responsible for representing the SCAQMD Board and staff in court proceedings and administrative hearings related to matters arising out of staff's performance of official duties as SCAQMD officers and employees.

The Office is responsible for the enforcement of all SCAQMD rules and regulations and applicable state law. In addition, staff attorneys represent the Executive Officer in all matters before the SCAQMD Hearing Board, including variances, permit appeals, and abatement orders. Staff investigators support civil penalty and litigation and settlement efforts, including the minor source penalty program which is handled by investigators.

ACCOMPLISHMENTS:

RECENT:

- The Court of Appeals upheld our win in a CEQA lawsuit challenging the Southern California International Gateway railyard project at the Port of Los Angeles. The Court held that the Environmental Impact Report's analysis of the railyard's localized air pollutant concentrations and the cumulative impacts of those concentrations was inadequate because it did not disclose the air quality concentrations at any point in time or provide the duration of expected exceedances.
- The Court of Appeals upheld the trial court's decision to deny a CEQA challenge to an oil refinery's (Phillips 66) permits for expanded crude oil storage. The petitioners had argued that the permits would allow the refinery to increase their refining capacity. Our

analysis showed that the refinery itself was already operating near capacity so that the storage tanks could not increase the refining capacity.

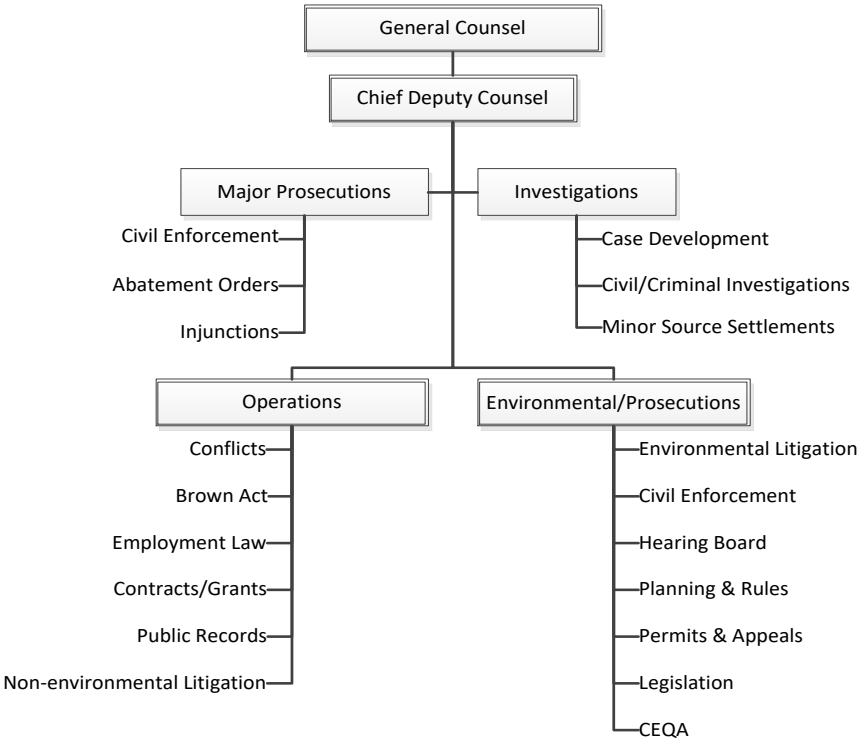
- AB1132/AB1274 – Legal staff played a key role in drafting, testifying, and negotiating with stakeholders in obtaining legislation this year. This includes obtaining authority to issue interim abatement orders in the case of an imminent and substantial endangerment to public health, welfare, or the environment. In addition, staff provided legal support for the constitutionality of the smog abatement fee (AB 1274).
- An Order for Abatement issued against Sunshine Canyon Landfill has resulted in eight consecutive months and counting without issuance of any odor nuisance NOVs. The OA has resulted in successful diversion of food waste from the landfill; increased gas collection efficiency; and odor mitigation at the landfill and transfer stations. A settlement was reached for the recovery of over $1.3 million of the four prior years of odor nuisance NOVs.
- Orders for Abatement issued against Aerocraft Heat Treating Company, Anaplex Corp., and Lubeco required implementation of numerous actions directed at identifying sources of hexavalent chromium emissions from the facilities operations and successfully implemented curtailment procedures when concentrations of hex chrome exceed 1 ng/m^3, based on a three sample average.
- An Order for Abatement issued against Carlton Forge Works required operation of permanent carbon controls and restriction of grinding operations to reduce odors impacting the nearby school and community. Odor complaints from the community have decreased markedly.
- ExxonMobil OA – Obtained an Order for Abatement requiring the Torrance Refinery to upgrade its outdated electrical systems on an expedited basis. Frequent electrical failures have caused the refinery to over-utilize its flares as Air Pollution Control Devices (APCDs), in one instance leading to a shelter-in-place notification from the City of Torrance.
- Community Air Toxics Initiative - Obtained Orders for Abatement in the City of Paramount requiring facilities that had been identified as signification contributors to high hexavalent chrome levels in the community to take immediate steps to reduce emissions. The Legal Department's efforts contributed to a staff effort that caused a significant reduction of hexavalent chrome levels in Paramount and the elimination of a significant threat to public health.
- Provided legal advice for implementation of 2016 AQMP and Funding Incentives Plan, evaluating potential options and relative legal benefits/risks.
- Provided legal advice for all rules and amendments including air toxics and the initiation of amendments to phase-out RECLAIM.

- Settled excessive flaring violations with SoCal Holding, LLC, an oil and gas production facility located on the Huntington Beach shoreline. The settlement provides for $500,000 in civil penalties and a SEP valued at $1 million for the construct and operation of a natural gas pipeline that will connect the facility to the Southern California Gas Company Distribution System to eliminate non-emergency natural gas emissions that had previously been flared by the facility.
- We developed SCAQMD Policy Number 44 to provide guidance to staff on the use of non-SCAQMD devices, accounts, or storage locations, for SCAQMD business. This policy is in response to a recent court decision in *City of San Jose v. Superior Court of Santa Clara County* (2017) 2 Cal.5th 608.

ANTICIPATED:

- Develop high impact enforcement cases to maximize deterrence for air pollution violations.
- Implement training programs to broaden staff knowledge of and ability to handle all types of work handled by the office.
- Provide legal advice concerning the SCAQMD's priority projects such as the 2016 AQMP, and rules to implement the 2012 and 2016 AQMPs and reduce toxic exposure, phase-out RECLAIM, implement BARCT as required by AB 617.
- Provide legal advice for implementation of AB 617, including community emission reduction plans and potential enforcement actions.
- Update key chapters of Rule Development Manual (w/Planning).
- Implement incentive program funding under AB 134, including hiring staff, training new and existing staff and contracting and developing streamlined procedures.
- Implement tracking system for agreements not currently maintained in Procurement tracking (w/Finance).
- Issue Board policy on District Records on Personal Devices.
- Provide training for staff on Public Records Act implementation.
- Enforcement of Idling Rules (Ports, school buses, large vehicles).

ORGANIZATIONAL CHART:



POSITION SUMMARY: 34 FTEs

Legal Units	Amended FY 2017-18	Change	Adopted FY 2018-19
Office Administration	4	-	4
General Counsel	25	-	25
Investigations	6	-1	5
Total	35	-1	34

STAFFING DETAIL:

2018-19 Adopted Staffing

Position	Title
4	Administrative Secretary/Legal
1	Assistant Chief Deputy – Major Prosecutions
1	Chief Deputy Counsel
1	General Counsel
4	Investigator
3	Legal Secretary
1	Office Assistant
2	Paralegal
4	Principal Deputy District Counsel
9	Senior Deputy District Counsel
1	Senior Office Assistant
1	Senior Paralegal
1	Staff Specialist
1	Supervising Investigator
34	Total Adopted Positions

Legal Work Program by Office									
#	Program Code		Program Categories	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Revenue Categories
1	08	001	Advance Clean Air Technology	AB2766/Mob Src/Legal Advice	AB2766 Leg Adv: Trans/Mob Source	0.05	0.00	0.05	IX
2	08	003	Advance Clean Air Technology	AB2766/MSRC	Legal Advice: MSRC Prog Admin	0.15	-0.05	0.10	IX
3	08	009	Develop Programs	AB 1318 Mitigation	AB 1318 Projects Admn/Impl	0.05	-0.05	0.00	XVII
4	08	010	Develop Programs	AQMP	AQMP Revision/CEQA Review	0.20	-0.10	0.10	II,IV,IX
5	08	025	Operational Support	Admin/SCAQMD-Legal Research	Legal Research/Staff/Exec Mgmt	1.10	0.10	1.20	Ia
6	08	030	Advance Clean Air Technology	AB 134	AB 134	0.00	2.00	2.00	IX
7	08	035	Operational Support	AB 617-General	AB 617-General	0.00	1.00	1.00	XV
8	08	038	Operational Support	Admin/Office Management	Attorney Timekeeping/Perf Eval	3.50	0.00	3.50	Ib
9	08	071	Operational Support	Arch Ctgs - Admin	Rule Dev/TA/Reinterpretations	0.05	0.00	0.05	XVIII
10	08	072	Ensure Compliance	Arch Ctgs - End User	Case Dispo/Rvw, Track, Prep NOVs	0.05	0.00	0.05	XVIII
11	08	073	Ensure Compliance	Arch Ctgs - Other	Case Dispo/Rvw, Track, Prep NOVs	0.05	0.00	0.05	XVIII
12	08	102	Operational Support	CEQA Document Projects	CEQA Review	0.50	0.25	0.75	II,III,IX
13	08	115	Ensure Compliance	Case Disposition	Trial/Dispo-Civil Case/Injunct	5.00	-0.25	4.75	II,IV,V,VII,XV
14	08	131	Advance Clean Air Technology	Clean Fuels/Legal Advice	Legal Advice: Clean Fuels	0.05	0.10	0.15	VIII
15	08	154	Ensure Compliance	Compliance/NOV Administration	Review/Track/Prep NOVs/MSAs	1.00	-0.25	0.75	IV
16	08	185	Ensure Compliance	Database Management	Support IM/Dev Tracking System	0.75	0.25	1.00	IV
17	08	227	Operational Support	Employee/Employment Law	Legal Advice: Employment Law	0.50	0.00	0.50	Ia
18	08	235	Ensure Compliance	Enforcement Litigation	Maj Prosecutions/Civil Actions	2.00	0.00	2.00	IV
19	08	275	Operational Support	Governing Board	Legal Advice:Attend Board/Cmte Mtgs	1.00	0.00	1.00	Ia
20	08	366	Ensure Compliance	Hearing Board/Legal	Hear/Disp-Varian/Appeal/Rev	3.00	0.00	3.00	IV,V,XV
21	08	380	Ensure Compliance	Interagency Coordination	Coordinate with Other Agencies	0.20	0.00	0.20	II,V
22	08	401	Operational Support	Legal Advice/SCAQMD Programs	General Advice: Contracts	2.00	0.00	2.00	Ia
23	08	403	Ensure Compliance	Legal Rep/Litigation	Prep/Hearing/Disposition	3.50	0.00	3.50	Ia,II
24	08	404	Customer Service and Business Assistance	Legal Rep/Legislation	Draft Legis/SCAQMD Position/Mtgs	0.25	0.00	0.25	II,IX
25	08	416	Policy Support	Legislative Activities	Lobbying: Supp/Promote/Influence legis/Adm	0.10	0.00	0.10	Ia
26	08	457	Advance Clean Air Technology	Mob Src/C Moyer/Leg Advice	Moyer/Implem/Program Dev	0.10	0.00	0.10	IX
27	08	465	Ensure Compliance	Mutual Settlement	Mutual Settlement Program	3.00	-1.50	1.50	IV
28	08	516	Timely Review of Permits	Permit Processing/Legal	Legal Advice: Permit Processing	0.20	-0.10	0.10	III
29	08	565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Rec Requests	1.50	0.00	1.50	Ia
30	08	651	Develop Rules	Rules/Legal Advice	Legal Advice: Rules/Draft Regs	1.00	0.20	1.20	II
31	08	661	Develop Rules	Rulemaking/RECLAIM	RECLAIM Legal Adv/Related Iss	0.25	0.25	0.50	II
32	08	681	Customer Service and Business Assistance	Small Business/Legal Advice	Legal Advice: SB/Fee Review	0.05	0.00	0.05	II,III
33	08	717	Policy Support	Student Interns	Gov Board/Student Intern Program	0.10	0.00	0.10	Ia
34	08	770	Timely Review of Permits	Title V	Leg Advice: Title V Prog/Perm Dev	0.05	0.00	0.05	II,IV
35	08	772	Timely Review of Permits	Title V Permits	Leg Advice: New Source Title V Permit	0.05	0.00	0.05	III
36	08	791	Ensure Compliance	Toxics/AB2588	AB2588 Legal Advice: Plan & Impl	0.05	0.00	0.05	X
37	08	805	Ensure Compliance	Training	Continuing Education/Training	0.50	0.25	0.75	Ib
38	08	825	Operational Support	Union Negotiations	Legal Adv: Union Negotiations	0.05	-0.05	0.00	Ia
39	08	826	Operational Support	Union Steward Activities	Rep Employees in Grievance Act	0.05	-0.05	0.00	Ia
					Total Legal	32.00	2.00	34.00	

Legal Line Item Expenditure						
Major Object / Account # **/** Account Description		**FY 2016-17 Actuals**	**FY 2017-18 Adopted Budget**	**FY 2017-18 Amended Budget**	**FY 2017-18 Estimate ***	**FY 2018-19 Adopted Budget**
Salary & Employee Benefits						
51000-52000	Salaries	$ 3,671,591	$ 3,867,700	$ 3,888,329	$ 3,794,767	$ 4,032,051
53000-55000	Employee Benefits	1,987,464	2,135,617	2,135,617	2,013,785	2,361,693
Sub-total Salary & Employee Benefits		$ 5,659,055	$ 6,003,317	$ 6,023,946	$ 5,808,551	$ 6,393,744
Services & Supplies						
67250	Insurance	$ -	$ -	$ -	$ -	$ -
67300	Rents & Leases Equipment	-	-	-	-	-
67350	Rents & Leases Structure	-	-	-	-	-
67400	Household	-	-	-	-	-
67450	Professional & Special Services	1,483,018	279,500	629,500	629,500	251,201
67460	Temporary Agency Services	-	7,500	7,500	-	7,250
67500	Public Notice & Advertising	-	2,500	2,500	292	2,500
67550	Demurrage	-	4,000	4,000	210	3,500
67600	Maintenance of Equipment	-	300	300	-	300
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	811	1,600	1,600	811	1,600
67750	Auto Service	-	-	-	-	-
67800	Travel	11,280	15,000	15,000	15,000	15,000
67850	Utilities	-	-	-	-	-
67900	Communications	1,642	10,300	10,300	3,380	10,300
67950	Interest Expense	-	-	-	-	-
68000	Clothing	264	250	250	248	500
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	2,268	4,750	4,750	2,268	4,750
68100	Office Expense	11,810	16,000	21,000	21,000	16,000
68200	Office Furniture	637	5,000	5,000	-	-
68250	Subscriptions & Books	120,800	112,000	111,943	111,943	115,000
68300	Small Tools, Instruments, Equipment	-	-	-	-	-
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	14,239	19,500	19,500	12,340	17,500
69550	Memberships	525	750	750	645	750
69600	Taxes	-	-	-	-	-
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	46,267	2,000	2,000	1,387	2,000
69750	Prior Year Expense	-	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		$ 1,693,561	$ 480,950	$ 835,893	$ 799,024	$ 448,151
77000	**Capital Outlays**	$ -	$ 25,000	$ 25,000	$ 25,000	$ -
79050	**Building Remodeling**	$ -	$ -	$ -	$ -	$ -
Total Expenditures		$ 7,352,616	$ 6,509,267	$ 6,884,839	$ 6,632,575	$ 6,841,895

* Estimates based on July 2017 through February 2018 actual expenditures and budget amendments.

SOUTH COAST

AIR QUALITY MANAGEMENT DISTRICT

LEGISLATIVE, PUBLIC AFFAIRS AND MEDIA OFFICE

DERRICK ALATORRE
DEPUTY EXECUTIVE OFFICER

At a Glance:	
FY 2017-18 Adopted	$9.0M
FY 2018-19 Adopted	$9.5M
% of SCAQMD FY 2018-19 Adopted	5.8%
Total Adopted FTEs	50

DESCRIPTION OF MAJOR SERVICES:

Legislative, Public Affairs and Media Office provides a broad range of services to internal and external stakeholders. These services include:

Legislative/Communications

State and Federal Legislative Program

The State and Federal Legislative Program works with state and federal legislators and legislative staff to support a clean air agenda by promoting SCAQMD's legislative priorities and sponsored legislation, seeking to satisfy funding needs for clean air efforts, and by securing support for the AQMP. This unit also works to defend against legislative activities by others detrimental to the goals and priorities of clean air. Finally, this unit works to foster coalitions of stakeholders at the local, state, and federal levels to work in tandem with these clean air supportive efforts.

Social Media

SCAQMD's Social Media program updates and monitors the District's social media websites. The agency is active on Facebook, Twitter and Instagram on a daily basis.

Communications & Public Information Center

The Communications & Public Information Center serve and assist members of the public who wish to report air quality/air pollution complaints, contact District staff or acquire additional information regarding District programs. The Communications Center and its associated toll-free numbers, along with the District's main telephone line, provide easy access to the public for reporting of a wide variety of air quality related concerns. The Public Information Center (PIC), which is located in the SCAQMD lobby, serves as a walk-up resource for all visitors to the District. The PIC assists with other inquiries made by the public, which can range from requests for available materials to consultations on SCAQMD programs and regulations.

Graphics

The graphics department is responsible for providing all graphic services for the agency, from conceptual design to final design and completion of projects.

Local Government/Community Relations
The Community Relations responsibilities are to provide government and community relations efforts in all four counties in SCAQMD jurisdiction, including 86 cities in Los Angeles County, 34 cities in Orange County, 27 cities in Riverside County and 16 cities in San Bernardino County. Activities include monitoring government actions on all levels (local, state and federal); facilitating a two-way flow of communication between the District and stakeholders; assisting with inquiries from government offices, community members, health and environmental justice organizations, and business organizations; and, promoting and providing information on SCAQMD programs and initiatives.

Environmental Justice
SCAQMD's Environmental Justice initiatives focus on addressing air pollution in disadvantaged communities while giving voice to community stakeholders who historically have not had a voice in the decision-making process.

Media
The Media Relations Office serves as the agency's official liaison with news media in its many forms, including the Internet; newspapers and radio; broadcast, cable and satellite TV; books, magazines and newsletters; digital and social media. The Media Relations Office also supports programs and policies of SCAQMD and its Board with a wide range of proactive media and public relations programs. The Office provides strategic counsel to the Executive Officer, Board members and their staff and Executive Council members on sensitive, high-profile media relations issues as well as building public awareness of air quality issues.

Small Business Assistance
The Small Business Assistance (SBA) program is required under Section 40448 of the California Health and Safety Code to provide administrative, technical services and information to small businesses and the public.

ACCOMPLISHMENTS:

RECENT:
State Legislative
SCAQMD sponsored two bills that passed the state legislature and were signed into law by the Governor:

- AB 1132 (C. Garcia) which authorizes local air pollution control officers to issue a temporary order for abatement requiring a facility to cease operations that cause violations resulting in an imminent and substantial endangerment to the public health, welfare, or the environment, pending a hearing by the local air district's Hearing Board. This bill has created a critical new tool that will help protect disadvantaged communities from serious toxic emission situations; and

- AB 1274 (O'Donnell) which, beginning January 1, 2019, defers a smog check for motor vehicles by 2 years, from the end of model year six to eight. The smog check costs that the vehicle owner would have paid are redirected through annual smog abatement fees to fund the Carl Moyer Program for more effective reductions in diesel particulate matter and nitrogen oxide emissions from heavy duty vehicles. This will double current statewide Carl Moyer Program funding, garnering about $30 million per year for the South Coast region. This bill provides a sustainable source of funding that can help address the ongoing challenge of improving unhealthy, polluted air to meet federal standards in the region.
- SCAQMD secured funding through budget trailer bill AB 134, from Greenhouse Gas Reduction Fund (GGRF) monies, and the District will receive $107.5 million in increased Carl Moyer Program funding for the South Coast region, as part of a larger $250 million funding package; and is eligible to compete for additional statewide GGRF monies, totaling $645 million, made available largely through grant applications, including:
    - $180 million for the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Program, with at least $35 million allocated for zero-emission buses;
    - $140 million for the Clean Vehicle Rebate Program, for rebates for light-duty vehicles;
    - $140 million for equipment and improvements at ports, including projects for ships at berth;
    - $100 million for the Enhanced Fleet Modernization Program; and
    - $85 million for reducing agricultural emissions through agricultural equipment, heavy-duty truck and tractor replacement
- SCAQMD engaged in statewide policy discussions and efforts to address disproportionate air quality burdens faced by disadvantaged communities and to reduce community level health impacts of criteria pollutant and toxic emissions from large stationary sources, which came to fruition through AB 617 (C. Garcia). SCAQMD also helped secure, through budget trailer bill AB 109, $27 million in statewide funding for local air districts to fund initial implementation of the new duties and responsibilities mandated by AB 617, of which SCAQMD will receive $10.8 million.

Federal Legislative

- Provided consistent and focused support for increases in Diesel Emission Reduction Act (DERA) and Targeted Airshed Grant Program (TAGP) funding. Ultimately for Fiscal Year 2017, DERA funding increased from $50 million to $60 million and TAGP funding increased from $20 million to $30 million.
- Traveled to Washington DC five times in 2017, including a May 2017 trip with six Board Members to promote clean air priorities, including protection of the California Waiver, DERA reauthorization and increased funding, and clean air funding through the proposed National Infrastructure bill. SCAQMD staff met with Congressional Members, Congressional, White House, and Agency staff, and various stakeholders, including those representing business interests and air quality and public health advocates.

- In April 2017, U.S. Senate and House staff from five Congressional offices visited the South Coast region and joined SCAQMD staff for presentations and a tour at the District. The visiting staff also toured key areas in the Inland Empire and the Port of Los Angeles to highlight air pollution challenges and technological efforts being developed and implemented to address them.

Social Media

- Established Governing Board Facebook Live streams during the March 2017 Board Meeting allowing Facebook viewers to comment in real time during meetings.
- Continued event coverage (Clean Air Awards, MLK Day of Service, Cesar Chavez Day of Remembrance Day, EJ Conference and other EJ events) utilizing Live Tweets/Quotes + Photo + Video.
- Timely reaction to publishing news/advisories resulting in extended news media + outside government agency exposure.

Communications & Public Information Center

- Assisted the Small Business Assistance Unit by performing nearly 1,300 initial calls to businesses with expired permits to remind them about the expired status of the permits, and to encourage them to bring the permits current.
- Processed 2,650 walk-up inquiries through the PIC in the SCAQMD lobby.
- Assisted in the updating/publishing of about 230 web pages, including specific web pages relating to: 1) the Aliso Canyon Natural Gas Leak; 2) ongoing air monitoring activities in Paramount and Compton; 3) Sunshine Canyon Landfill; 4) Torrance Refinery; and 5) the Exide Lead Battery Recycling facility.

Graphics

- Approximately 500 major graphics projects/assignments completed
- Collateral Brochures and Promotional Items
- Bi-Monthly Advisor Publication
- Quarterly Governing Board Member Newsletters
- Yearly Clean Car Buying Guide
- Program Announcements
- Educational Materials
- Advertisements
- Signage
- Video projects
- Newspaper Advertorials
- Informational materials for Town Hall Meetings, Community Meetings and Events (including the Clean Air Awards, the Martin Luther King Jr. Day event, the Cesar Chavez Day event, the Environmental Justice Conference, multiple environmental justice workshops and senior events).

Local Government/Community Affairs

- Provided educational information on key legislative issues affecting air quality in the region.
- Regular attendance at regional and community meetings throughout the four (4) counties including League of California Cities, the Councils of Governments, and Chambers of Commerce and business organizations.
- Assisted with communications, outreach and issue management for high profile items such as the Special Toxics Investigations in Paramount and Compton, Torrance Refinery (formerly ExxonMobil), SoCalGas Aliso Canyon Storage Facility, Sunshine Canyon Landfill, and several other facilities.
- Produced newsletters for four Governing Board Members.
- Organized logistics, conducted outreach and staffed five (5) Town Hall/Community Meetings; five (5) Rule-related meetings; one (1) Title V Meeting; two (2) Committee on Refineries hearings; and, assisted with one (1) Marine Port Committee meeting.
- Coordinated with, organized logistics and staffed seven (7) Department of Toxic Substances Control (DTSC) & SCAQMD Exide Community Advisory Group meetings throughout the communities in the vicinity of Exide Technologies.
- Worked with Legal Department on a system to identify high profile issues coming before the Hearing Board to conduct community outreach. There were nine instances where community outreach was conducted for high profile cases.
- Participated in and represented SCAQMD throughout the four-county region at 55 community events ranging from health and environmental justice resources fairs, to Council of Government General Assemblies, to air quality related forums and conferences.
- Planned, organized and produced the 2017 “Martin Luther King, Jr. Day of Service Forum” which had more than 400 attendees at the California Science Center in Los Angeles.
- Planned, organized and produced the 2017 “Cesar Chavez Day of Remembrance” which had more than 300 attendees at La Plaza De Culturas y Artes and featured a keynote by Antonio Villaraigosa.
- Planned, organized and produced the 2017 “Clean Air Awards” which honored ten individuals, businesses, and organizations. Over 400 attended the event.
- Coordinated with MSRC staff to promote the Local Government Partnership program and other initiatives.
- Completed 34 Visiting Dignitaries and Speakers Bureau presentations and tours.
- On an Administrative level, the team met on a regular weekly basis to share information on administrative business, rule related activity, high profile topics, and events, programs and initiatives, including specific items of interest in each of the counties. These meetings included the Environmental Justice staff as well to better facilitate programs and share information across the department.

Environmental Justice

- On June 28, 2017, SCAQMD hosted an all-day workshop to help individuals better understand how agencies within Los Angeles County process their environmental complaints, and to discuss ways in which environmental complaints can be processed more collaboratively and efficiently. 100 guests were in attendance.
- On December 2, 2017, SCAQMD hosted a day-long forum on environmental justice, air pollution, and health in which 300 guests attended.
- In 2017, SCAQMD established the Young Leaders Advisory Council (YLAC), which will educate and engage young adults regarding the region's clean air issues.

Media

- Provided media relations services and strategic counsel for high-profile media issues through press releases, media advisories, talking points, in-person and on-camera interviews, and opinion pieces and letters to the editor.
- Handled 1,749 media interactions
- Wrote and issued 45 news releases and translated 11 into Spanish; issued a total of 53 Smoke Advisories, Odor Advisories, and No-burn Alerts
- Wrote more than 50 talking points documents
- Coverage of high-profile topics including Paramount hex-chrome facilities, abatement orders, facility curtailments and air monitoring; Porter Ranch, PBF/Torrance Refining Co. refinery; refinery rules including Rules 1118, 1180 and 1410; Community Air Toxics Initiative including Compton air monitoring; Board adoption of 2016 Air Quality Management Plan; Tesoro refinery integration EIR; Rule 415 (odors from rendering facilities), AB 1132, RECLAIM, coastal odors, cool roof study and air quality during wildfires.

Small Business Assistance

- Conducted 85 on-site consultations
- Provided assistance to businesses relating to 2,702 permit applications
- Approved and processed 938 Air Quality Permit Checklist submittals
- Helped 714 businesses understand SCAQMD rules and regulations
- Provided 25 businesses with recordkeeping training
- Issued nine dry cleaning grants
- Assisted five businesses file variances before the SCAQMD Hearing Board
- Participated in 14 small business related events
- Outreached to 620 facilities as part of the Expired Permit Program

ANTICIPATED:

State Legislative

- Introduce and/or actively support legislation, based on Governing Board direction, to address, among other things:
    - Garnering new and sustainable funding sources for the 2016 AQMP;

  - Garnering sustainable funding for local air districts' continued implementation of the duties and responsibilities mandated by AB 617;
  - Enhancing SCAQMD's fleet rule authority to move public fleets towards accelerated transition to near-zero and zero emission heavy duty vehicles;
  - Modernizing, streamlining, and making more effective local air districts' public notice requirements; and
- Strengthen our state legislative outreach and communication by increased engagement with the Governor's Office and state legislators and Capitol staff (members and committees), to promote SCAQMD's legislative priorities, sponsored legislation, and to support 2016 AQMP efforts.
- Strengthen our legislative outreach, communication, partnership and coalition building efforts by increased engagement with all stakeholders, including, but not limited to, government entities, business, environmental groups and the community, to promote SCAQMD's legislative priorities, sponsored legislation, and to support 2016 AQMP efforts.
- Continue to work with SCAQMD departments to improve efficiency and ease with which existing data can be extracted on a recurring basis for specified, approved purposes for the benefit of public outreach and governmental relations. (CLASS and PeopleSoft.)

Federal Legislative

- Work to ensure that the federal government does its fair share to reduce air pollution by:
  - Providing funding or regulatory authority adequate for nonattainment areas to attain National Ambient Air Quality Standards (NAAQS) by upcoming federal deadlines, and in particular, SCAQMD to implement the 2016 AQMP and attain federal ozone and particulate matter standards by upcoming federal deadlines;
  - Reauthorizing and expanding funding for DERA;
  - Increasing funding for the TASG program;
  - Authorizing and funding new programs which will reduce air pollution through the adoption and deployment of zero and near-zero emission technologies, fuels and recharging/refueling infrastructure;
  - Establishing programs or policies that incentivize the federal government to purchase and use advanced clean technologies and eliminate the use of technologies generating NOx and particulate matter emissions; and
  - Incentivizing individuals, businesses, states, and local governments to purchase and use advanced clean technologies and eliminate the use of technologies generating NOx and particulate matter emissions.
- Actively partner with stakeholders, including, but not limited to, government entities, business, environmental groups and health advocacy groups, on federal legislation (such as the Transportation Infrastructure bill and the Energy bill) to support clean air and engage with regional issues related to clean air.
- Monitor and stay engaged with federal legislation that provides air quality-related incentives or impacts air quality issues.
- Invite key elected officials, Administration representatives and Congressional staff to SCAQMD for tours of the region and discussions on air quality issues.

Social Media

- Continue follower growth (goal of 30% increase for 2018).
- Streamline the Advisory publishing process to ensure the public gets content in a timely manner.
- Utilize more original SCAQMD content, including new up-to-date photos and content from various SCAQMD departments.

Communications Center & Public Information

- Receive and process about 47,000-51,000 main line calls from the public in the form of Cut Smog calls, after hour calls, Spanish line calls, and Clean Air Connection calls. These calls also include air quality complaints, reports of equipment breakdowns, and emergency response requests;
- Assist the Small Business Assistance Unit by contacting about 1,400 businesses with expired permits to remind them about the expired status of the permits, and to encourage them to bring the permits current; and
- Process 2,700-3,200 walk-up inquiries via the PIC in the SCAQMD lobby.
- Assist in updating / publishing about 230 web pages, including specific web pages relating to various key issues/items in 2018, including ongoing air monitoring activities in various communities within the South Coast region.
- Implement TTY software system for the hearing impaired in the Communication Center.

Graphics

- Complete about 750 major graphics projects/assignments, including: 1) collateral brochures and promotional items; 2) Bi-Monthly Advisor publication; 3) Quarterly Governing Board Member Newsletters; 4) Yearly Clean Car Buying Guide; 5) signage, and informational materials for Town Hall Meetings, community meetings and events, etc.; 6) educational materials; 7) advertisements; 8) Program Announcements; and 9) video projects.
- In coordination with a new Director of Communications, redesign and redevelop SCAQMD core collaterals and electronic and social media content to ensure consistent themes and messaging and to create focused and clear branding of SCAQMD throughout all SCAQMD collateral materials and electronic content provided to elected officials, agency staff, stakeholders, impacted communities and the public at large.
- Continue to build, maintain and update our outreach databases and management systems to communicate more effectively with elected officials, agency staff, stakeholders, impacted communities and the public at large.

Local Government/Community Relations

- Continue to improve Internal Communication to facilitate Senior Public Information Specialists' (Field Representatives) ability to serve SCAQMD and the public, including elected officials, city/county entities, environmental, health, businesses and other stakeholders.

- Compilation of a "Hot List" on an on-going basis for Field Representatives including, but not limited to, Governing Board initiatives, Committees, Advisory Group meetings; Permitting and Compliance information for counties and cities; SBA activities to better promote city/county awareness of SCAQMD programs both for their own information and for businesses in their communities; Legislative issues; "Business Opportunities" at SCAQMD to create and maintain an updated list of RFPs, grants and other opportunities; Rules, Title V, AB 2588 and other processes as related to their assigned geographic regions or in general; and, STA projects and programs such as Carl Moyer, Prop 1B, Residential Charging and others.
- Coordinate with the Public Advisor on developing a system to better inform communities/stakeholders throughout the region, including a Crisis Management Plan.
- Enhance email blasts and coordination with social media to provide clear information in a timely fashion.
- Enhance Governing Board Member newsletter team coordination to expedite the process and provide more quality articles.
- Increase relationship building with all levels of government, community, health, environmental, business and other stakeholder groups. A focused subset of this outreach for specific geographic regions will focus on environmental justice.
- Create and implement a schedule by which the assigned geographic outreach staff will meet with targeted individuals and organizations including Chambers of Commerce.
- Build upon Community Partnership concept to develop relationships and shared actions to promote air quality related health issues and other SCAQMD initiatives.
- Enhance database and list management to increase successful communications.
- Work with Small Business Assistance (SBA) to provide information on their programs and services. Support SBA efforts by facilitating relationships with cities/counties, business organizations, and community groups. Improve community access to SBA programs through outreach efforts as directed by Public Advisor and SBA Supervisor.
- Increase working relationship with Legislative staff to ensure that the Local Government and Community Relations staff are well informed and appropriately conversant in state and federal issues. Support Legislative Team to promote key initiatives/goals. Assist with bill analysis and other activities. Provide and facilitate a two-way flow of communication between local, state and federal elected officials and their staff, along with businesses, and community organizations to assist with legislative efforts.
- Collaborate and assist other SCAQMD Departments on major initiatives and projects including, but not limited to, Title V permits and other permits, compliance and enforcement issues, rule making process, AQMP, AB2588 Toxic Hotspots program, AB2766 outreach to cities, incentive programs, "Check Before You Burn", and other projects.
- Partner with environmental education organizations, develop and implement an educational outreach program to reach children and their families. It is possible that SCAQMD can provide technical expertise to an existing educational program that is being implemented.

- Build relationships with organizations to expand air quality awareness among young adults and professionals.
- Increase training opportunities for Senior Public Information Specialists including foreign languages that assist in their geographic areas.

Environmental Justice

- Educational Workshops on AB 617 and AB 134: SCAQMD will support the Science and Technology Advancement Department with hosting a series of educational workshops to inform community members about AB 617, and how funding through AB 134 will help improve air quality and health in disadvantaged neighborhoods.
- Environmental Justice Events: As part of the Environmental Justice Community Partnership, staff will organize four environmental justice events throughout the South Coast Air Basin, to listen to the communities' concerns about air quality, and to recognize outstanding environmental justice leaders.
- Environmental Justice Community Partnership Advisory Council: SCAQMD will host four Environmental Justice Community Partnership Advisory Council meetings to discuss how SCAQMD can better implement environmental justice efforts. Members of this group include community group leaders, scholars, lawyers, activists, residents, business owners, and public health professionals.
- Inter-Agency Workshop: SCAQMD will host one inter-agency workshop on how government agencies can better collaborate on environmental complaints. This will be a follow up to the first Inter-Agency Workshop which took place in 2017, in response to the community's request for government agencies to improve their coordination in responding to environmental complaints.
- Internal Environmental Justice Working Group: SCAQMD staff realized the need to improve collaboration among SCAQMD departments working on environmental justice projects. In an effort to improve communication, efficiency, and effectiveness, SCAQMD will host monthly staff meetings to improve collaboration among departments, hopefully resulting in better use of staff, time, and resources in addressing environmental justice issues.
- Brown Bag Lunch on Environmental Justice: SCAQMD will host a Brown Bag Lunch for employees, regarding environmental justice efforts in the Agency. The Brown Bag Lunch will further augment how SCAQMD addresses environmental justice internally, by better informing staff on how their work helps areas that have been disproportionately affected by air pollution.
- Attendance at Events: Staff will continue participating in community meetings and events throughout the Air Basin, to learn more about the issues in the different neighborhoods, and to network with leaders in the area who may be interested in supporting SCAQMD's environmental justice efforts.
- Presentations on Environmental Justice: Upon request, SCAQMD staff will deliver presentations on environmental justice. The presentations are an opportunity for audiences to learn more about air pollution, public health, and ways they can get involved with the Agency's environmental justice programs.

- Environmental Justice Advisory Group (EJAG): SCAQMD will host four Environmental Justice Advisory Group meetings in 2018 for in-depth discussions of high priority topics as suggested by members and staff.

Media

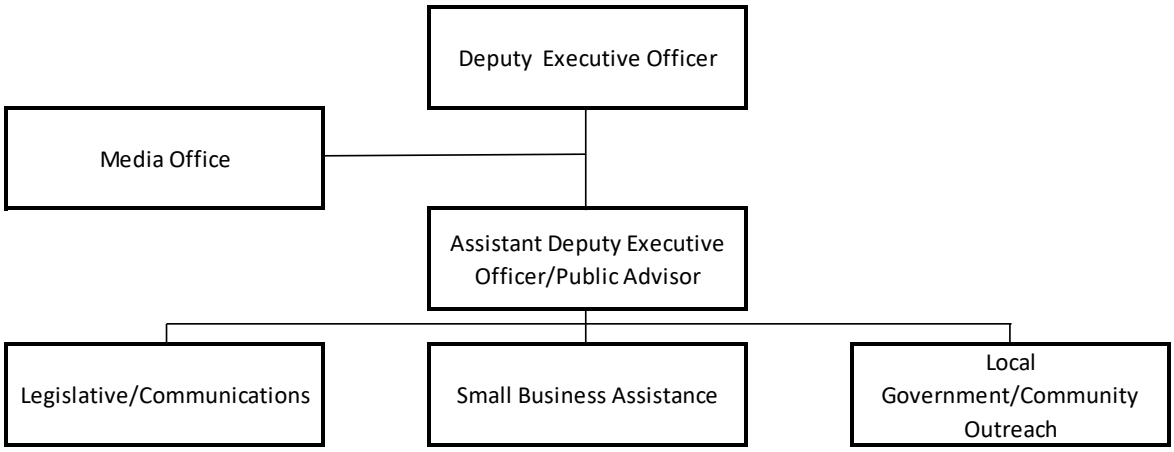
- Hire a Director of Communications by the 2nd Quarter. This position will develop a strategic communications plan for overall agency messaging and critical issues and crisis management communications as they arise; oversees media relations through subordinate managers; and does other work as required.
- Provide media relations services and strategic counsel for high-profile media issues as well as ongoing SCAQMD programs and projects through press releases, media advisories, talking points, in-person and on-camera interviews, opinion pieces and letters to the editor.
- Complete production of update to SCAQMD's signature video, "The Right to Breathe."
- Promote update to The Right to Breathe through dedicated Google AdWords campaign.
- Implement outreach for the 2018-19 "Check Before You Burn" season and mandatory no-burn days.
- Continue to maintain SCAQMD web micro-sites on high-profile issues.
- Continue to help focus/narrow Public Records Requests (PRR) from news media; review PRR documents provided to news media and advise management of potential news stories that could result from them.
- Write advertorials for newspapers as part of SCAQMD sponsorships.
- Review requests from partner agencies, organizations and firms for quotes from SCAQMD officials for articles and press releases.

Small Business Assistance

- Expand the awareness of SCAQMD's Small Business Assistance Program by outreaching to trade organizations, municipalities, and other agencies to inform them about our services.
- Provide timely and accurate information to all persons seeking information from the Small Business Assistance Program.
- Provide easy to understand information about compliance, permit application requirements, and incentive programs offered to small businesses, to business in general and the general public.
- Develop, collect and coordinate information concerning air quality compliance methods and technologies for small businesses by actively participating in SCAQMD rulemaking workshops and hearings.
- Assist small businesses in determining applicable requirements, applying for permits, and petitioning for variances.
- Conduct more "no-fault" inspections to provide compliance audits on the operations of small businesses.

- Assist small businesses with air pollution control and air pollution prevention by providing information concerning alternative technologies, process changes, products, and methods of operation that reduce air pollution.

CURRENT ORGANIZATIONAL CHART:



POSITION SUMMARY: 50 FTEs

Legislative & Public Affairs Units	Amended FY 2017-18	Change	Adopted FY 2018-19
Administration	6	-	6
Legislative & Public Affairs	36	3	39
Media Office	5	-	5
Total	47	3	50

STAFFING DETAIL:

2018-19 Adopted Staffing

Position	Title
2	Air Quality Engineer
2	Air Quality Inspector
1	Assistant Deputy Executive Officer
2	Community Relations Manager
1	Deputy Executive Officer
1	Director of Communications
3	Graphic Illustrator II
2	Public Affairs Manager
1	Office Assistant
1	Public Affairs Specialist
7	Radio Telephone Operator
3	Secretary
2	Senior Administrative Secretary
2	Senior Office Assistant
1	Senior Public Affairs Manager
15	Senior Public Information Specialist
1	Senior Staff Specialist
2	Staff Assistant
1	Supervising Radio Telephone Operator
50	Total Adopted Positions

Legislative & Public Affairs/Media Office
Work Program by Office

#	Program Code		Program Categories	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Revenue Categories
1	35	037	Customer Service and Business Assistance	AB 617-Outreach	AB 617-Outreach	0.00	2.00	2.00	XV
2	35	046	Customer Service and Business Assistance	Admin/Prog Mgmt	Admin Office/Units/SuppCoord Staff	4.02	0.00	4.02	Ib
3	35	111	Ensure Compliance	Call Center/CUT SMOG	Smoking Vehicle Complaints	8.00	0.00	8.00	IX,XV
4	35	126	Customer Service and Business Assistance	Clean Air Connections	Coord of region-wide community group	1.00	0.00	1.00	II,IX
5	35	205	Customer Service and Business Assistance	Environmental Education	Curriculum Dev/Project Coord	0.25	0.00	0.25	II,IX,XV
6	35	240	Customer Service and Business Assistance	Environmental Justice	Impl Board's EJ Pgrms/Policies	2.00	0.00	2.00	II,IV
7	35	260	Customer Service and Business Assistance	Fee Review	Cmte Mtg/Fee-Related Complaint	0.50	0.00	0.50	II,III,IV,XV
8	35	280	Policy Support	Advisory Group/Ethnic Comm	GB Ethnic Comm Advisory Group	0.40	0.00	0.40	II,IX
9	35	281	Policy Support	Advisory Group/Small Business	SBA Advisory Group Staff Support	0.50	0.00	0.50	IV,IX
10	35	283	Policy Support	Governing Board Policy	Brd sup/Respond to GB req	0.55	0.00	0.55	Ia
11	35	345	Policy Support	Goods Mvmt&Financial Incentive	Goods Movement & Financial Incentives Progr	1.00	0.00	1.00	IX
12	35	350	Operational Support	Graphic Arts	Graphic Arts	2.00	0.00	2.00	Ia
13	35	381	Customer Service and Business Assistance	Interagency Liaison	Interact Gov Agns/Promote SCAQMD	0.15	0.00	0.15	Ia,XV
14	35	390	Customer Service and Business Assistance	Intergov/Geographic Deployment	Dev/Impl Local Govt Outreach	9.50	1.00	10.50	II,IX
15	35	412	Policy Support	Legislation/Federal	Lobbying/Analyses/Tracking/Out	0.25	0.00	0.25	Ia
16	35	413	Policy Support	Legislation/Exec Office Suppor	Coord Legis w/ EO, EC, Mgmt	0.25	0.00	0.25	Ia
17	35	414	Policy Support	Legislation-Effects	Lobbying/Analyses/Tracking/Out	0.80	0.00	0.80	Ia,IX
18	35	416	Policy Support	Legislative Activities	Supp/Promote/Influence Legis/Adm	0.50	0.00	0.50	Ia
19	35	491	Customer Service and Business Assistance	Outreach/Business	Chambers/Business Meetings	1.00	0.00	1.00	II,IV
20	35	492	Customer Service and Business Assistance	Public Education/Public Events	Pub Events/Conf/Rideshare Fair	1.00	0.00	1.00	II,V,IX,XV
21	35	494	Policy Support	Outreach/Collateral/Media	Edits,Brds,Talk shows,Commercl	5.60	0.00	5.60	Ia
22	35	496	Customer Service and Business Assistance	Outreach/Visiting Dignitary	Tours/Briefings-Dignitary	0.25	0.00	0.25	Ia
23	35	514	Customer Service and Business Assistance	Permit: Expired Permit Program	Assist w Permit Reinstatement	0.30	0.00	0.30	IV
24	35	555	Customer Service and Business Assistance	Public Information Center	Inform public of unhealthy air	1.00	0.00	1.00	II,V,IX
25	35	560	Develop Programs	Public Notification	Public notif of rules/hearings	0.50	0.00	0.50	II,IV,IX
26	35	565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Req for Info	0.10	0.00	0.10	Ia
27	35	679	Customer Service and Business Assistance	Small Business Assistance	Small Business/Financial Assistance	1.00	0.00	1.00	III
28	35	680	Timely Review of Permits	Small Business/Permit Streamln	Asst sm bus to comply/SCAQMD req	3.95	0.00	3.95	II,III,IV,V,XV
29	35	710	Customer Service and Business Assistance	Speakers Bureau	Coordinate/conduct speeches	0.10	0.00	0.10	Ia
30	35	717	Policy Support	Student Interns	Student Interns	0.10	0.00	0.10	Ia
31	35	791	Customer Service and Business Assistance	Toxics/AB2588	Outreach/AB 2588 Air Toxics	0.01	0.00	0.01	X
32	35	825	Operational Support	Union Negotiations	Official Labor/Mgmt Negotiate	0.01	0.00	0.01	Ia
33	35	826	Operational Support	Union Steward Activities	Union Steward Activities	0.01	0.00	0.01	Ia
34	35	855	Operational Support	Web Tasks	Create/edit/review web content	0.40	0.00	0.40	Ia
					Total Legislative & Public Affairs/Media Office	47.00	3.00	50.00	

Legislative & Public Affairs/Media Office Line Item Expenditure						
Major Object / Account # **/** Account Description		**FY 2016-17 Actuals**	**FY 2017-18 Adopted Budget**	**FY 2017-18 Amended Budget**	**FY 2017-18 Estimate ***	**FY 2018-19 Adopted Budget**
Salary & Employee Benefits						
51000-52000	Salaries	$ 4,178,282	$ 4,320,002	$ 4,664,696	$ 4,155,172	$ 4,535,475
53000-55000	Employee Benefits	2,239,784	2,431,358	2,431,358	2,296,149	2,845,044
Sub-total Salary & Employee Benefits		$ 6,418,066	$ 6,751,360	$ 7,096,054	$ 6,451,322	$ 7,380,520
Services & Supplies						
67250	Insurance	$ -	$ -	$ -	$ -	$ -
67300	Rents & Leases Equipment	15,954	7,000	7,000	590	7,000
67350	Rents & Leases Structure	50,820	9,000	9,000	4,279	9,000
67400	Household	-	-	-	-	-
67450	Professional & Special Services	2,281,361	1,648,846	1,885,945	1,885,945	1,515,851
67460	Temporary Agency Services	47,035	114,000	114,000	107,720	114,000
67500	Public Notice & Advertising	16,485	26,600	26,600	16,485	26,600
67550	Demurrage	-	-	959	959	-
67600	Maintenance of Equipment	-	9,000	9,000	-	9,000
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	14,289	24,800	24,800	14,289	24,800
67750	Auto Service	-	-	-	-	-
67800	Travel	48,426	45,200	45,200	45,200	45,200
67850	Utilities	-	-	-	-	-
67900	Communications	35,793	47,000	47,000	36,085	47,000
67950	Interest Expense	-	-	-	-	-
68000	Clothing	205	-	-	-	-
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	51,397	137,800	77,800	46,826	137,800
68100	Office Expense	48,672	45,300	55,300	55,300	45,300
68200	Office Furniture	-	-	-	-	-
68250	Subscriptions & Books	22,322	18,200	31,926	31,926	18,200
68300	Small Tools, Instruments, Equipment	-	-	-	-	-
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	7,155	8,500	8,500	4,850	8,500
69550	Memberships	22,098	26,250	26,250	26,250	26,250
69600	Taxes	-	-	-	-	-
69650	Awards	51,202	49,681	49,681	49,681	49,681
69700	Miscellaneous Expenses	45,192	43,100	43,100	43,100	43,100
69750	Prior Year Expense	-	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		$ 2,758,406	$ 2,260,277	$ 2,462,061	$ 2,370,075	$ 2,127,282
77000	**Capital Outlays**	$ -	$ 19,400	$ 19,400	$ 15,520	$ -
79050	**Building Remodeling**	$ -	$ -	$ -	$ -	$ -
Total Expenditures		$ 9,176,472	$ 9,031,037	$ 9,577,515	$ 8,836,916	$ 9,507,802

* Estimates based on July 2017 through February 2018 actual expenditures and budget amendments.

PLANNING, RULE DEVELOPMENT & AREA SOURCES

PHILIP FINE
DEPUTY EXECUTIVE OFFICER

At a Glance:	
FY 2017-18 Adopted	$19.8M
FY 2018-19 Adopted	$22.4M
% of SCAQMD FY 2018-19 Adopted	13.8%
Total Adopted FTEs	134

DESCRIPTION OF MAJOR SERVICES:

Planning, Rule Development and Area Sources (PRDAS) is responsible for the majority of SCAQMD's air quality planning functions, including State Implementation Plan (SIP)-related activities, air quality management and maintenance plans, reporting requirements and other state and federal Clean Air Act requirements. PRDAS is also responsible for developing proposals for new rules and amendments to existing rules to implement the SIP obligations, to seek funding for air quality projects through grants, to reduce air toxic emissions/exposures, to conduct socioeconomic and environmental assessments of Air Quality Management Plans (AQMPs) and rulemaking actions. All permit modeling review and California Environmental Quality Act (CEQA) functions are part of this office, including acting as lead agency (for SCAQMD permitting projects and rulemaking projects), responsible agency, and commenting agency under CEQA. In addition, this office is responsible for developing and implementing the SCAQMD's Clean Communities Plan which is an overall plan for air toxics and includes communities that support the agency's overall goals for environmental justice. PRDAS implements AB 2588, the state Toxic "Hot Spots" Program which includes updating the guidelines for estimating health risk for the AB 2588 program and permitting, as well as the Annual Emissions Reporting program (AER), and is responsible for climate change and energy policy. The office also conducts air quality evaluations and forecasting, inventories of area sources, and compliance activities related to area sources. In addition, PRDAS is responsible for overseeing the development of the Multiple Air Toxics Exposure Study and for providing input and guidance on health effects associated with air quality policies and other air quality related issues that arise from individual facilities or communities throughout the air basin. The Transportation Program in PRDAS implements Rule 2202 and provides AB2766 Subvention fund program assistance and training to the regulated community and local governments. Finally, PRDAS develops and implements fleet rules, mobile source policy, and facility-based measures aimed at achieving emission reductions from the indirect mobile sources associated with facilities.

ACCOMPLISHMENTS:

RECENT:

AB 2588

- Implemented the updated Prioritization Procedures.
- Based on the prioritization scores, notified 20 facilities to prepare an Air Toxics Inventory Report (ATIR) or participate in the Voluntary Risk Reduction Program in Rule 1402, if eligible.
- Conducted significant analysis of potential health risks from metal working facilities, particularly from hexavalent chromium in the community of Paramount. Designated an additional 'Potentially High Risk Level Facility' (Lubeco).
- Prioritized approximately 150 facilities for 2016 reporting year.
- Closed out five facility notifications after detailed review.
- Approved one ATIR (Griswold) and two Risk Reduction Plans (RRP; Bowman/Quemetco).
- Two facilities underwent RRP progress report (Hixson/Gerdau).
- Audited priority scores for many facilities for 2015 and 2016 reporting year.
- Reviewed 12 Rule 1420.2 Monitoring Plans.

Air Quality Forecasting

- Transferred all operational forecasts and data to a new data management system.
- Continued working with Sonoma Tech, Inc. to implement the H2S monitoring and public website in the Salton Sea area.
- Provided programmatic support (meteorology), including daily air quality forecasting, issuing no-burn alerts for the Check Before You Burn program (22 days in 2017), issuing Smoke Advisories (82 days in 2017), issuing H2S odor advisories (9 days in 2017) and windblown dust and ash advisories (2 days in 2017).
- Provided programmatic support (point source modeling), including completing 22 permit modeling requests and releasing the updated meteorological data set.

Air Quality Modeling/Emissions Inventory

- Collaborated with NASA and other academic and research agencies to utilize satellite retrieved data in air quality modeling and analysis.
- Continued to improve air quality model's predictability to be the state-of-the-science and appropriate for AQMP attainment demonstrations.
- Continued to refine AQMP/SIP emissions inventory to assist the implementation of AQMP control measures.
- Developing an emissions analysis tool to estimate NOx and GHG emission reductions associated with potential implementation of cleaner energy sources and zero to near-zero emission appliances in residential and commercial sectors.
- Reviewed General Conformity requirements for the projects submitted to SCAQMD to be accommodated in the SIP set aside account.
- Tracked the usage of SIP/SCAQMD General Conformity account.

- Continued assisting inter and intra divisional projects that require Geographical Information System.

Annual Emissions Reporting

- Completed emissions inventories for about 2,400 facilities and collected about $16.1 million in annual emissions fees.
- Updated the Annual Emissions Reporting web tool software.
- Began coordination with CARB in the implementation of new emissions reporting requirements under AB 617.

AQMP/SIP

- Began the implementation of the 2016 AQMP to assist in the attainment of the 8-hour and 1-hour ozone federal standards as well as the 24 hour and annual PM2.5 federal standards for both the South Coast Air Basin and Coachella Valley.
- Pursuant to U.S. EPA Federal Register action, two deficiencies in the SIP have been corrected. A supplemental RACM/RACT analysis was prepared and approved by the Governing Board to demonstrate that NOx allocations in the RECLAIM program are at least equivalent, in the aggregate, to emission levels that would result from direct application of RACT on affected sources in South Coast and Coachella Valley. In addition, staff prepared a compliance demonstration of the nonattainment New Source Review (NSR) plan or plan revision for the 2008 ozone standard certifying that the current SIP-approved nonattainment NSR program meets the requirements for the implementation of the 2008 ozone NAAQS. This compliance demonstration was also approved by the Governing Board before submittal to CARB and U.S. EPA.
- Issued an RFP to solicit stationary and mobile source incentive projects for reducing emission/toxic exposure and technology demonstration and deployment.

CEQA

- Conducted environmental assessments for 14 SCAQMD rule projects and oversaw the preparation of the environmental assessments for seven ongoing permit projects.
- Reviewed and commented on over 1,000 CEQA documents prepared by other lead agencies.
- Provided technical support for the CEQA lawsuit SCAQMD initiated against the Southern California Intermodal Gateway rail yard project.

Clean Communities Plan

- Completed implementation of U.S. EPA's Targeted Air Shed Grant. Approximately $3 million was spent on the following programs: residential lawn mower exchanges, weatherization program in collaboration with the Southern California Gas Company, aqueous brake cleaning systems for auto repair shops, air filtration for several schools, super-compliant coatings for several beautification projects, pilot program to test and demonstrate commercial mowers at municipal agencies, and EV chargers for non-profit organizations. Completed final report for U.S. EPA.

Facility Based Mobile Source Measures

- Conducted 17 working group meetings covering airports, marine ports, new and redevelopment projects, rail yards, and warehouses as part of the implementation of several 2016 AQMP control measures.
- Worked extensively with the ports of Long Beach and Los Angeles before and after adoption of their 2017 Clean Air Action Plan, and with Los Angeles World Airports in the amendment of their Alternative Fuel Policy.

Health Effects

- Provided extensive input and support for the Community Air Toxics Initiative projects in Paramount and Compton, including presenting at public meetings, participating on weekly phone calls with the city, agencies, elected officials and the public, addressing public inquiries, coordinating closely with other agencies to ensure appropriate follow-up, and providing input and support for the investigation and reporting of results.
- Provided critical staff support and leadership for the work related to the Aliso Canyon gas leak, and initiated work to begin the health study that was funded through the settlement agreement.
- Completed four reports and fact sheets for public audiences related to high-profile and/or emergency response situations. These reports and fact sheets are posted on the website.
- Completed three public presentations or panel presentations for the Environmental Justice Community Partnership, and additional public presentations to other academic, professional, and community audiences.
- Developed content for a "Wildfires and Health" webpage to bring together information about air quality impacts of wildfires, and resources pertaining to public health.
- Initiated planning for the MATES V study, including convening two meetings of the Technical Advisory Group. The planning for MATES V also includes an extensive advanced monitoring component.

Rule Development

- Amended Rules 2001 and 2002 to prevent new facilities from entering the program and to establish the framework for facilities exiting the program. Have initiated the process for facilities exiting the program for those currently at BARCT or no RECLAIM equipment without any amendments to existing rules.
- Adopted Rule 1180 (Refinery Fenceline and Community Air Monitoring) that will require real-time fenceline air monitoring system that will provide air quality information at or near the property of petroleum refineries who are also responsible for funding refinery-related community air monitoring systems. A plan to establish and operate the fenceline monitoring is due August 1, 2018.
- Amended Rule 1466 (Control of PM Emissions from Soil with TACs) to expand list of applicable TAC's and clarify provisions.
- Amended Rule 1420 - Emissions Standards for Lead which established new requirements for metal melting and lead processing facilities to reduce point and fugitive source lead emissions and help ensure continued attainment of the National Ambient Air Quality Standard for Lead.

- Adopted Rule 415 (Odors at Rendering Plans) that is designed to reduce odors from facilities conducting inedible rendering operation through the implementation of Best Management Practices and use of permanent total enclosures or a closed system for process areas.
- Amended Rule 1168 (Adhesive and Sealants) to achieve 1.4 tons per day (tpd) reduction in VOC by 2023 and fulfilling the 1.0 tpd VOC reduction commitment in the 2016 AQMP.
- Amended Rule 1401 to require the use of the 2015 Office of Environmental Health Hazard Assessment (OEHHA) Health Risk Assessment (HRA) Guidelines for all permit applications. In the previous amendments to Rule 1401, gas stations and spray booths were allowed to continue to use the previous HRA methodology as staff needed more time to assess impacts to those permitted sources.
- Amended Rule 1118 to place new limits on refinery flaring, require facilities to prepare scoping documents to evaluate the feasibility of significantly reducing or eliminating flaring, removed previous mitigation fee limits for excessive flaring, and improved public notification procedures for flaring events.
- Rule 1147 was amended to relax NOx emission limits for a limited number of units in specific categories and delays compliance dates for small and low emission units with NOx emissions less than 1 pound per day starting July 1, 2017. The amendment achieves equivalent NOx emissions reductions as the original 2008 rule through retrofit of in-use units or replacement with new units over time that comply with emission limits. The amendment also clarified existing requirements and provided additional options for demonstrating compliance with emission limits.
- Continued work to shift regulated facilities under Regulation XX, RECLAIM to command and control rules pursuant to control measure CMB-05 (Further Reductions from RECLAIM) from the 2016 AQMP. Conducted monthly RECLAIM meetings and have held over 50 individual facility-or industry specific meetings.
- Initiated BARCT rulemaking for the Rule 1146 series rules (boilers), Rule 1135 (electricity generating facilities), Rule 1134 (gas turbines), and Rule 1109.1 (refinery equipment).

Socioeconomic Impacts

- Completed ten Socioeconomic Impact Assessments for amendments to Rules 1118, *<previous FY>*, 1168, 1401, 1420, 1466, and 2001 & 2002; and new Rules 415, 1180, and 1466.
- Received the REMI award for the 2016 AQMP Socioeconomic Report, recognizing staff's contributions in economic and demographic analysis.
- Issued two Requests for Proposals (RFP) to implement recommendations by Abt Associates on enhancing the evaluation of public welfare benefits of clean air for future AQMPs. Such benefits include visibility, agriculture, ecology, and materials benefits.
- Supported Legislative & Public Affairs Office and District Counsel with legislative campaigns and petitions to U.S. EPA.

Transportation Programs

- Assisted local governments with the implementation of AB 2766 funds to reduce mobile source emissions. The annual report submitted in 2017 covered FY 2015-16 and reflected 162

eligible cities, and funded 395 projects of which 261 had quantified mobile emission reductions.
- Assisted regulated employers in the development of their Rule 2202 plans. Evaluated and processed over 1,350 Rule 2202 plan submittals.
- Conducted 19 Rule 2202 Employee Transportation Coordinator (ETC) certification classes.

Other
- Finalized guidelines to implement emission reduction funding programs via fees paid for use of offsets by electrical generating facilities (EGFs).
- Completed contract management for three PM control related projects funded by AB 1318.
- Continued working with stakeholders to develop protocols and conduct NOx characterization study of residential and commercial food service equipment (ovens, fryers, griddles, etc.). Completed underfired charbroiler PM control testing at UCR CE-CERT.
- Continued inventory, and implementation and enforcement of rules relative to area sources of emissions.
- Initiated audits relative to approved Rule 1111 alternate compliance plans.
- Reviewed General Conformity requirements for the projects submitted to SCAQMD to be accommodated in the SIP set aside account.
- Tracked the usage of SIP/SCAQMD General Conformity account.
- Began implementation of AB 617 including the technical analysis and outreach for community identification. Participated in all the working groups with CARB staff and staff from other air districts to discuss implementation of AB 617. Held one day summits and various public workshops to collaborate with stakeholders (both industry and environmental groups).

ANTICIPATED:

AB 617
- Conduct public outreach and develop recommendations for the selection and prioritization of communities for AB 617 community emissions reduction plans and/or community air monitoring.
- Conduct public outreach in Year 1 communities, begin developing monitoring plans and community emission reduction plans (as appropriate).
- Participate in working groups and coordinate on the development of a CARB regulation.
- Participate in AB 617 conference calls and meetings with CARB, other air agencies and stakeholders.

AB 2588
- Update the Industry-Wide AB 2588 Health Risk Assessment for gas stations using new health risk guidelines from OEHHA and new emission factors from CARB. Work with consultants to allow quicker approval of ATIRs, HRAs, and RRPs.
- Update the Rule 1402 Guidelines to allow a greater level of transparency.
- Complete the Model/Monitoring Reconciliation Study.

Air Quality Forecasting

- Work with IM to implement NowCast on the AQI map, and other enhancements to better communicate air quality data to the public.
- Continue supporting program functions through air quality forecasting and issuing advisories.

Air Quality Modeling/Emissions Inventory

- Continue collaboration with NASA and other academic and research agencies to utilize satellite retrieved data in air quality modeling and analysis.
- Continue to improve air quality model's predictability to be the state-of-the science and appropriate for AQMP attainment demonstrations.
- Continue to refine AQMP/SIP emissions inventory to assist the implementation of AQMP control measures.
- Developing an emissions analysis tool, Net Emissions Estimation Tool (NEAT) to estimate NOx and GHG emission reductions associated with potential implementation of cleaner energy sources and zero to near-zero emission appliances in residential and commercial sectors.
- Continue to track emissions associated with General Conformity requirements.
- Continue assisting inter and intra divisional projects that require Geographical Information System.

Annual Emissions Reporting

- Continue evaluating emissions inventories and annual emissions fees.
- Improve AER on-line reporting system to facilitate data entry for users and incorporate changes to facilitate emission reporting required under AB 617.

AQMP/SIP

- Adopt and implement the 2016 AQMP SIP obligations through development of new and amended VOC, NOx, and PM2.5 rules, as well as development of incentive programs and guidelines per U.S. EPA requirements. In addition, update as necessary Administrative and NSR rules.
- Continue working on developing funding to implement the incentive control measures in the 2016 AQMP.
- Evaluate proposals, provide recommendations, and issue awards to stationary and mobile source projects that reduce / mitigate emissions / toxic exposure.
- Continue working groups and rule amendments and other initiatives consistent with the 2016 AQMP, including RECLAIM, Facility-based measures, life-cycle emissions assessment, SCAQMD's solar initiative, etc.
- Develop a tracking system for emission reductions achieved as a co-benefit to existing climate change programs.

CEQA

- Initiate working group process to establish guidelines to reflect 2015 Revised OEHHA Guidelines for Estimating Health Risk and current air quality standards.
- Continue developing and reviewing CEQA lead agency projects (rules and permitting projects) and commenting on CEQA documents through the SCAQMD's Intergovernmental Review program.

Clean Communities Plan

- Summarize pilot studies for Clean Communities Plan for San Bernardino and Boyle Heights.

Facility-Based Mobile Source Measures

- Continue work to develop voluntary and potential regulatory approaches for achieving further emission reductions from airports, marine ports, new and redevelopment projects, rail yards, and warehouses.

Health Effects

- Work with Monitoring and Analysis staff to implement MATES V, with deployment of fixed site monitors in January 2018, and the planning and implementation of the Advanced Monitoring and community outreach components.
- Perform regional modeling to estimate long-term cancer risks.

Mobile Source

- Continue working on implementation of existing fleet rules including compliance verification activities, amend existing fleet rules pending new legislative authority, and implement mobile source 2016 AQMP measures, such as facility-based measures and fleet rule amendments.
- Secure SIP credits for mobile source incentive projects working with CARB and U.S. EPA.

Rule Development

- Continue ongoing rulemaking efforts to achieve further reductions of VOC emissions from storage tanks at petroleum facilities (Rule 1178).
- Amend rule to address toxic metal emissions such as metal finishing operations for Rule 1469.
- Amend Rule 408 to clarify applicability to the rule when mitigating odor and prohibit temporary alterations to normal business operations or equipment to dilute, suppress, or conceal detection during monitoring or testing.
- Amend Rules 1146, 1146.1, and 1146.2 to incorporate requirements for facilities that are in RECLAIM that are required to meet BARCT emission control levels.
- Amend Regulation III-Fees to incorporate the CPI adjustment to keep pace with inflation pursuant to Rule 320, and make any other needed adjustments to Regulation III-Fees.
- Amend Regulation XIII to address NSR for facilities that are transitioning from RECLAIM to command and control.
- Adopt flaring rule for non-refinery flares (Rule 1118.1).
- Amend Rule 1403 to include specific requirements when conducting asbestos-emitting demolition/renovation activities at schools, daycare centers, and possibly establishments that have sensitive populations. Amendments may include other provisions to improve the implementation of the rule.
- Rule 1110.2 will be amended to incorporate provisions for facilities that are transitioning from NOx RECLAIM to command and control.
- Continue the work to develop a new rule to address hydrogen fluoride use at refineries (Rule 1410).
- Develop rule for non-ferrous metal melting operations for Rule 1407 and 1407.1.
- Develop rule to address and an ambient air monitoring rule for toxics for Rule 1480.

- Amend Regulations IX and X to incorporate by reference new and amended federal performance standards enacted by U.S. EPA for stationary sources.
- Amend Rule 1134 to update the emission standard to incorporate Best Available Retrofit Control Technology and incorporate provisions for facilities that are transitioning from NOx RECLAIM to command and control.
- Amend Rule 1135 to incorporate requirements for electric power generating facilities that are to transition from NOx RECLAIM to command and control.
- Develop rule for laser cutting operations for Rule 1435.
- Develop Proposed Rule 1109.1 that will establish requirements for refineries that are transitioning from RECLAIM to command and control.
- Develop Rule 1100 that will establish the implementation schedule for specific NOx RECLAIM facilities that are transitioning to command and control.
- Begin work on developing Proposed Rule 1450 to reduce exposure to methylene chloride from furniture stripping, remove potential regulatory loopholes, achieve emission reductions where possible and cost effective, include reporting requirements, and improve consistency with other SCAQMD VOC rules. Amend various Regulation XVI rules, to provide greater opportunity to reduce mobile source emissions and to obtain credit in the State Implementation Plan for these reductions where possible, including addressing the recent U.S. EPA proposed disapproval of Rule 1610.
- Develop Proposed Rules 1147.1 (Large Misc. Combustion Sources), 1147.2 (Metal Melting and Heat Treating Furnaces), and 1147.3 (Aggregate Facilities) that will establish requirements for facility that are transitioning from RECLAIM to command and control.
- Continue monthly RECLAIM Working Group Meetings to discuss the transition of RECLAIM facilities to a command and control regulatory structure consistent with the 2016 AQMP control measure CMB-05 and AB 617.
- Continue working with stakeholders to assess implementation of Rule 1111 and the development of new Rule 1111.1, if necessary.

Socioeconomic Impacts

- Execute a contract to evaluate potential nationwide economic impacts of a Federal Clean Air Investment Fund.
- Begin enhancing small business impact analysis and using an alternative modeling tool to complement REMI analysis when evaluating small scale socioeconomic impacts.
- Issue Requests for Proposal (RFPs) or sole-source contracts to further implement the remaining Abt recommendations including updates to non-health benefits.
- Conduct socioeconomic analyses for rules and other special projects.

Transportation Programs

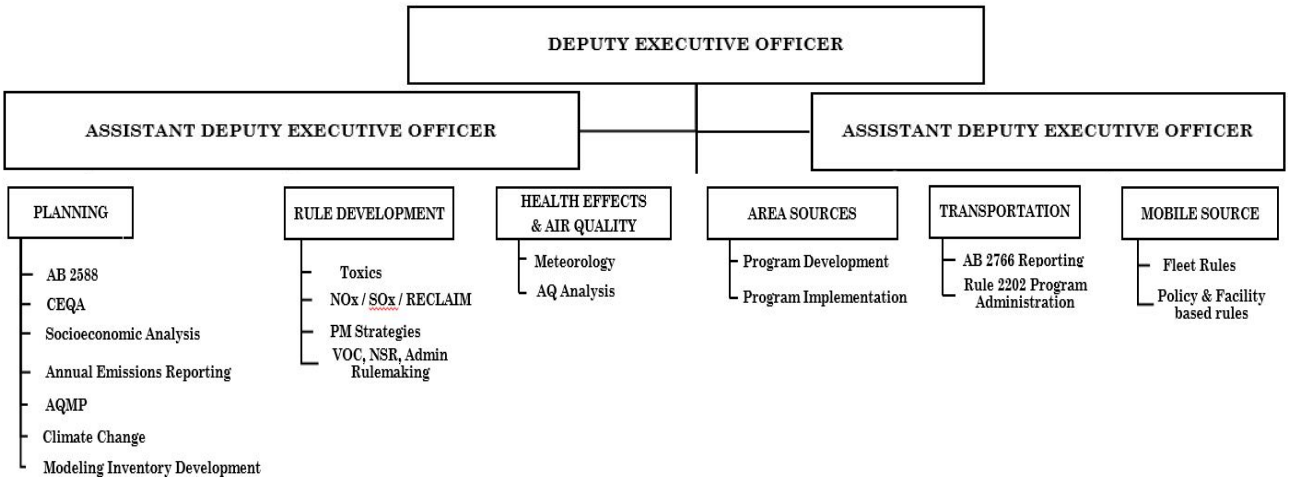
- Continue conducting Employee Transportation Coordinator training sessions and review and analyze Rule 2202 annual program submittals.
- Work towards the development of an on-line Rule 2202 plan submittal process.
- Work towards the development of an on-line Rule 2202 Employee Transportation Coordinator training platform.

- Continue compliance verification activities.

Other

- Continue inventory and implementation of rules in support of rulemaking efforts and compliance verification activities, inclusive of Rule 317 accounting.
- Establish technical assessments and incentive guideline development for rule development, as needed.
- Track the potential need for use of internal offsets by Electricity Generating Facilities (EGFs).
- Complete development and launch on-line Rule 1415 registration.
- Continue compliance verification and rule development assistance for area wide sources of emissions.
- Work with STA to develop process and review Rule 1180 refinery monitoring plans, conduct outreach and develop process for data evaluation.
- Finalize scope and initiate contract for the health study of the Aliso Canyon gas leak.
- Complete AB617 Community identification process and begin development of Community Emission Reduction Plans where appropriate.

ORGANIZATIONAL CHART:



POSITION SUMMARY: 134 FTEs

Planning, Rule Development and Area Sources Units	Amended FY 2017-18	Change	Adopted FY 2018-19
Office Administration	6	-	8
Planning	68	-	60
Rule Development	14	-	21
Area Sources	10	-	8
Transportation Programs	13	-	11
Health Effects	2	-	3
Mobile Source	7	-	9
AB 617	14	-	14
Total	134	-	134

STAFFING DETAIL:

2018-19 Adopted Staffing

Position	Title
2	Administrative Secretary
9	Air Quality Engineer II
4	Air Quality Inspector II
1	Air Quality Inspector III
56	Air Quality Specialist
2	Assistant Deputy Executive Officer
1	Contracts Assistant
1	Deputy Executive Officer - Planning, Rule Development & Area Sources
1	Director of Strategic Initiatives
1	Health Effects Officer
4	Office Assistant
7	Planning and Rules Manager
22	Program Supervisor
9	Secretary
3	Senior Administrative Secretary
3	Senior Air Quality Engineer
1	Senior Meteorologist
4	Senior Office Assistant
3	Senior Staff Specialist
134	Total Adopted Positions

Planning, Rule Development & Area Sources Work Program by Office									
#	Program Code		Program Categories	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Revenue Categories
1	26	002	Develop Programs	AB2766/Mobile Source	AB2766 Mobile Source Outreach	1.04	0.01	1.05	IX
2	26	007	Customer Service and Business Assistance	AB2766/MSRC	AB2766 Prov Tech Asst to Cities	1.22	-0.02	1.20	IX
3	26	009	Develop Programs	AB 1318 Mitigation	AB 1318 Projects Admn/Impl	0.30	-0.30	0.00	XVII
4	26	010	Develop Programs	AQMP	AQMP Special Studies	2.00	-1.90	0.10	IV,V,IX,XV
5	26	031	Develop Rules	AB 617-BARCT Rules	AB 617-BARCT Rules	0.00	11.40	11.40	XV
6	26	033	Develop Programs	AB 617-Em Inventory	AB 617-Em Inventory	0.00	0.50	0.50	XV
7	26	034	Develop Programs	AB 617-Em Reduc Plns	AB 617-Em Reduc Plns	0.00	0.50	0.50	XV
8	26	035	Develop Rules	AB 617-General	AB 617-General	0.00	1.60	1.60	XV
9	26	038	Develop Programs	Admin/Office Management	Coordinate Off/Admin Activities	4.55	0.00	4.55	Ib
10	26	050	Develop Rules	Admin/Rule Dev/PRA	Admin: Rule Development	0.60	0.50	1.10	Ib
11	26	061	Monitoring Air Quality	Air Quality Evaluation	Air Quality Evaluation	2.25	0.00	2.25	IX
12	26	068	Develop Programs	SCAQMD Projects	Prepare Environmental Assessments	3.35	0.00	3.35	II,IV,IX
13	26	071	Develop Rules	Arch Ctgs - Admin	Rdev/Aud/DB/TA/SCAQMD/Rpts/AER	1.10	-0.10	1.00	XVIII
14	26	072	Ensure Compliance	Arch Ctgs - End User	Compliance/Rpts/Rule Implementation	0.80	0.00	0.80	XVIII
15	26	073	Ensure Compliance	Arch Ctgs - Other	Compliance/Rpts/Rule Implementation	0.80	0.00	0.80	XVIII
16	26	076	Ensure Compliance	Area Sources/Compliance	Area Source Compliance	4.70	-0.20	4.50	III,IV,V,IX,XV
17	26	077	Develop Rules	Area Sources/Rulemaking	Dev/Eval/Impl Area Source Prog	2.05	-0.05	2.00	II,IX
18	26	083	Policy Support	Hlth Effects Air Pollution Fou	Health Effects Air Poll Foundation Support	0.10	0.00	0.10	Ia,II,IV
19	26	102	Develop Programs	CEQA Document Projects	Review/Prepare CEQA Comments	3.50	0.25	3.75	II,IX
20	26	104	Develop Programs	CEQA Policy Development	ID/Develop/Impl CEQA Policy	1.20	-0.70	0.50	IV,IX
21	26	128	Develop Programs	Cln Communities Pln	Cln Communities Plan Admn/Impl	0.25	0.00	0.25	II,IX
22	26	148	Policy Support	Climate Change	GHG/Climate Change Policy Development	3.10	0.25	3.35	IV,XVII
23	26	165	Develop Rules	Conformity	Monitor Transp. Conformity	0.25	0.00	0.25	V,IX
24	26	215	Ensure Compliance	Annual Emission Reporting	Annl Des/Impl/Emiss Monitor Sys	8.00	3.00	11.00	II,V
25	26	216	Customer Service and Business Assistance	AER Public Assistance	AER Design/Impl/Monitor Emiss	2.00	-2.00	0.00	II
26	26	217	Develop Programs	Emissions Inventory Studies	Dev Emiss DB/Dev/Update Emiss	0.70	-0.20	0.50	II,V,IX,XV
27	26	218	Develop Programs	AQMP/Emissions Inventory	Dev Emiss Inv: Forecasts/RFPs	1.30	-0.56	0.74	II,IX
28	26	219	Develop Programs	Emissions Field Audit	Emissions Field Audit	0.50	-0.50	0.00	II
29	26	240	Policy Support	EJ-AQ Guidance Document	AQ Guidance Document	0.05	0.05	0.10	II,IX
30	26	257	Develop Rules	Fac Based Mob Src	Facility Based Mobile Src Meas	0.00	5.00	5.00	IX
31	26	276	Policy Support	Advisory Group/Home Rule	Governing Board Advisory Group	0.30	0.00	0.30	Ia
32	26	277	Policy Support	Advisory Group/AQMP	Governing Board AQMP Advisory Group	0.05	0.00	0.05	II,IX
33	26	278	Policy Support	Advisory Group/Sci,Tech,Model	Scientific/Tech/Model Peer Rev	0.15	0.00	0.15	II,IX
34	26	358	Ensure Compliance	GHG Rules-Compl	Green House Gas Rules-Compliance	1.05	-0.35	0.70	IV
35	26	362	Develop Rules	Health Effects	Study Health Effect/Toxicology	2.25	0.00	2.25	II,III,IX
36	26	385	Develop Rules	Criteria Pollutants/Mob Srcs	Dev/Impl Intercredit Trading	0.75	0.00	0.75	IV,IX
37	26	397	Develop Programs	Lead Agency Projects	Prep Envrnmt Assmts/Perm Proj	1.75	0.75	2.50	III
38	26	416	Policy Support	Legislative Activities	Supp/Promote/Influence Legis/Adm	0.50	0.00	0.50	Ia
39	26	443	Monitoring Air Quality	MATES V	MATES V	0.30	0.00	0.30	II,IX
40	26	445	Monitoring Air Quality	Meteorology	ModelDev/Data Analysis/Forecast	2.05	0.40	2.45	II,V,IX
41	26	448	Develop Programs	Mobile Src Strategies-Off Road	CARB Off-Road Mob Src ctrl strategy for SIP	1.00	-1.00	0.00	XVII

Planning, Rule Development & Area Sources (Cont.) Work Program by Office									
#	Program Code		Program Categories	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Revenue Categories
42	26	449	Develop Rules	Mob Src/SCAQMD Rulemaking	Prepare SCAQMD Mob Src rulemaking proposals	0.81	1.49	2.30	IX
43	26	451	Develop Programs	Mob Src/CARB/EPA Monitoring	CARB/US EPA Mob Src Fuel Policies	1.50	-1.00	0.50	IX
44	26	452	Develop Programs	Mob Src/CEC/US DOE Monitoring	CEC/US DOE Mob Src rulemaking proposals	1.00	-0.50	0.50	IX,XVII
45	26	454	Policy Support	Mob Src:Greenhs Gas Reduc Meas	Provide comments on mob src portion of AB32	0.89	-0.89	0.00	XVII
46	26	460	Develop Rules	Regional Modeling	Rule Impact/Analyses/Model Dev	5.30	-0.90	4.40	II,V,IX
47	26	461	Timely Review of Permits	Permit & CEQA Modeling Review	Review Model Permit/Risk Assmt	1.30	0.00	1.30	III
48	26	503	Develop Programs	PM Strategies	PM10 Plan/Analyze/Strategy Dev	3.40	0.00	3.40	II,V,XV
49	26	530	Monitoring Air Quality	Photochemical Assessment	Photochemical Assessment	0.25	0.00	0.25	II,V
50	26	565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Rec Requests	0.57	0.25	0.82	Ia
51	26	620	Ensure Compliance	Refinery Pilot Project	Refinery Pilot Project	0.25	-0.25	0.00	II
52	26	643	Timely Review of Permits	Rule 222 Filing Program	Rule 222 Filing Program	0.00	0.00	0.00	IV
53	26	645	Ensure Compliance	Rule 1610 Plan Verification	Rule 1610 Plan Verification	0.75	0.00	0.75	V,IX
54	26	654	Develop Rules	Rulemaking/NOX	Rulemaking/NOx	2.50	0.00	2.50	II,IV,XV
55	26	655	Develop Rules	NSR/Adm Rulemaking	Amend/Develop NSR & Admin Rules	2.50	0.00	2.50	II,IV,V,XV
56	26	656	Develop Rules	Rulemaking/VOC	Dev/Amend VOC Rules	5.70	-2.45	3.25	II,IV,XV
57	26	659	Develop Rules	Rulemaking/Toxics	Develop/Amend Air Toxic Rules	9.50	1.50	11.00	II,XV
58	26	661	Develop Rules	Rulemaking/RECLAIM	RECLAIM Amend Rules/Related Is	2.50	0.00	2.50	II
59	26	685	Develop Programs	Socio-Economic	Apply econ models/Socio-econ	4.10	0.40	4.50	II,IV
60	26	717	Policy Support	Student Interns	Gov Bd/Student Intern Program	0.25	0.00	0.25	Ia
61	26	738	Advance Clean Air Technology	Target Air Shed EPA	Targeted Air Shed Admin/Impl	0.25	-0.25	0.00	V,XVII
62	26	745	Develop Programs	Rideshare	Dist Rideshare/Telecommute Prog	0.61	0.07	0.68	IX
63	26	794	Ensure Compliance	Toxics/AB2588	AB2588 Core, Tracking, IWS	13.00	0.00	13.00	X
64	26	805	Operational Support	Training	Training	0.25	0.00	0.25	Ib
65	26	816	Develop Programs	Transportation Regional Progs	Dev AQMP Meas/Coord w/Reg Agn	0.35	0.00	0.35	V,IX
66	26	825	Operational Support	Union Negotiations	Official Labor/Mgmt Negotiate	0.02	0.00	0.02	Ia
67	26	826	Operational Support	Union Steward Activities	Rep Employees in Grievance Act	0.02	0.00	0.02	Ia
68	26	833	Customer Service and Business Assistance	Rule 2202 ETC Training	Rule 2202 ETC Training	0.93	0.02	0.95	XI
69	26	834	Develop Programs	Rule 2202 Implement	Rule 2202 Proc/Sub Plans/Tech Eval	2.55	0.12	2.67	XI
70	26	836	Develop Programs	Rule 2202 Support	R2202 Supt/CmptrMaint/WebSubmt	2.59	0.06	2.65	V,XI
71	26	855	Operational Support	Web Tasks	Create/edit/review web content	0.50	0.00	0.50	Ia
					Total Planning, Rule Development, and Area Sources	120.00	14.00	134.00	

Planning, Rule Development & Area Sources Line Item Expenditure						
Major Object / Account # **/** Account Description		**FY 2016-17 Actuals**	**FY 2017-18 Adopted Budget**	**FY 2017-18 Amended Budget**	**FY 2017-18 Estimate ***	**FY 2018-19 Adopted Budget**
Salary & Employee Benefits						
51000-52000	Salaries	$ 9,904,449	$ 11,873,576	$ 13,027,997	$ 10,774,638	$ 13,374,271
53000-55000	Employee Benefits	4,880,945	6,118,764	6,118,763	5,290,888	7,350,375
Sub-total Salary & Employee Benefits		$ 14,785,394	$ 17,992,339	$ 19,146,760	$ 16,065,526	$ 20,724,646
Services & Supplies						
67250	Insurance	$ -	$ -	$ -	$ -	$ -
67300	Rents & Leases Equipment	-	-	-	-	-
67350	Rents & Leases Structure	22,077	2,000	11,000	7,589	2,000
67400	Household	-	-	-	-	-
67450	Professional & Special Services	548,778	1,173,000	2,091,940	1,526,280	974,300
67460	Temporary Agency Services	131,504	50,000	73,000	73,000	100,000
67500	Public Notice & Advertising	65,241	100,000	100,000	100,000	125,000
67550	Demurrage	675	1,000	1,000	735	1,000
67600	Maintenance of Equipment	19,030	5,000	14,000	5,609	5,000
67650	Building Maintenance	5,160	1,000	10,000	5,160	1,000
67700	Auto Mileage	2,634	3,500	5,500	4,280	3,500
67750	Auto Service	-	-	-	-	-
67800	Travel	22,131	40,000	30,000	30,000	45,000
67850	Utilities	-	-	-	-	-
67900	Communications	28,915	40,000	49,000	44,271	50,000
67950	Interest Expense	-	-	-	-	-
68000	Clothing	1,305	800	1,680	1,680	1,500
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	67,388	50,000	65,000	65,000	100,000
68100	Office Expense	84,860	150,000	221,120	175,323	61,484
68200	Office Furniture	-	-	-	-	-
68250	Subscriptions & Books	160	2,000	1,830	1,355	2,000
68300	Small Tools, Instruments, Equipment	-	-	4,000	-	-
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	13,567	25,000	23,000	11,513	25,000
69550	Memberships	5,843	4,000	4,000	3,895	4,000
69600	Taxes	-	-	-	-	-
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	65,750	27,000	47,000	41,177	75,000
69750	Prior Year Expense	(75)	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		$ 1,084,942	$ 1,674,300	$ 2,753,070	$ 2,096,868	$ 1,575,784
77000	**Capital Outlays**	$ 1,960	$ 180,000	$ 180,000	$ 144,000	$ 110,000
79050	**Building Remodeling**	$ -	$ -	$ -	$ -	$ -
Total Expenditures		$ 15,872,296	$ 19,846,639	$ 22,079,830	$ 18,306,394	$ 22,410,430
* Estimates based on July 2017 through February 2018 actual expenditures and budget amendments.						

SOUTH COAST

AIR QUALITY MANAGEMENT DISTRICT

SCIENCE & TECHNOLOGY ADVANCEMENT

MATT MIYASATO
DEPUTY EXECUTIVE OFFICER

At a Glance:	
FY 2017-18 Adopted	$27.0M
FY 2018-19 Adopted	$32.3M
% of SCAQMD FY 2018-19 Adopted	19.9%
Total Adopted FTEs	194.4

DESCRIPTION OF MAJOR SERVICES:

Science & Technology Advancement is responsible for three key areas of operation: monitoring and analysis; technology research and development; and technology implementation. The Monitoring & Analysis Division maintains the SCAQMD's air monitoring network, operates the analytical laboratory and conducts source tests and evaluation, responds to local community monitoring requests, implements quality assurance programs, evaluates low cost sensors, evaluates and implements optical remote sensing (ORS) technologies for emission measurements, and provides meteorological, sampling and analytical support as part of the SCAQMD's emergency response program and special monitoring projects for the agency. The Technology Advancement Office (TAO) implements the Clean Fuels Program to commercialize advanced low- and zero-emission technologies and fund incentive programs such as the Carl Moyer, Lower-Emission School Bus, and Proposition 1B-Goods Movement programs. TAO will also provide support for the Enhanced Fleet Modernization Program (EFMP) and the Mobile Source Air Pollution Reduction Review Committee (MSRC).

ACCOMPLISHMENTS:

RECENT:

- Continued the implementation of the Carl Moyer, Surplus Off-Road Opt-In for NOx (SOON), Lower-emission School Bus, Enhanced Fleet Modernization Program and the Proposition 1B-Goods Movement programs with total funding exceeding $135 million. Implemented the Voucher Incentive Program (VIP) for replacement of on-road trucks on a first-come-first-served basis. Awarded an additional $9 million to Southern California Regional Rail Authority with another $18 million to be considered with the progress of the project, for the replacement of ten Tier 0 locomotives with Tier 4 locomotives. The total SCAQMD contribution to this project after completion will amount to $110 million. Executed contracts totaling $79 million for truck and locomotive replacements, and zero emission transportation refrigeration units and supporting infrastructure under the Proposition 1B-Goods Movement Program.
- Continued the Clean Fuels program, which is the research, development, demonstration and early deployment program for the SCAQMD. Executed over $17 million in contracts with $51 million in total project costs (1:3 leveraging). Projects in key technical areas include heavy-duty electric drive technologies, near-zero emission heavy-duty engines,

in-use emissions testing of heavy-duty trucks, local renewable natural gas production, and refueling infrastructure for alternative fuels (natural gas, electricity and hydrogen).

- Continued implementation of incentive programs for old vehicle scrapping, off-road equipment repowers and replacement of Tier 0 locomotives with Tier 4 locomotives.
- Continued to assess ambient air quality in the Basin, operated and maintained approximately 43 air monitoring sites resulting in 70,000 valid pollutant data points per month, collected and analyzed of 3,800 canisters for ambient Volatile Organic Compounds (VOCs) and toxics and over 15,000 filters for components including mass, ions, carbon and metals. The monitoring network and analysis is in support of federal programs including those for National Air Toxics Trends Stations (NATTS), Photochemical Assessment Monitoring Stations (PAMS), National Core (NCORE) PM2.5 Speciation, and Near-Road Monitoring. Data from this monitoring and analysis provides the basis for the compliance with the national ambient air quality standards (NAAQS) along with verifying emission models and understanding source contributions for future control measures.
- Continued special monitoring efforts to respond to community concerns and better characterize emissions from oil reclamation activities, metal finishing, metal forging and recycling, battery recycling facilities, oil and gas operations, and metals from various forging, grinding, and heat treating operations. Continued PM2.5 monitoring to assess potential impacts from mining operations in the city of Duarte. Also maintained monitoring efforts near the Salton Sea measuring hydrogen sulfide and PM10 to provide information to alert the public of potential dust and/or odor events.
- Supported and verified compliance with current rules and regulations, analyzed over 2,100 samples for asbestos from demolition sites based on complaints and concerns about fallout (deposition), analyzed approximately 500 products for VOC and Hazardous Air Pollutants (HAP) content; and conducted over 1,800 Source Test (ST) protocol and report evaluations, Continuous Emissions Monitoring System (CEMS) certifications, Laboratory Approval Program (LAP) application reviews and ST observations.
- Provided training and support for Rule 1420.2 which requires lead producing facilities to perform on-site sampling.
- Performed audit of laboratory test methods in support of federal programs including those for NATTS, PAMS and PM2.5 Speciation; performed field audits of monitoring stations in support of federal programs including those for NCORE, NATTS, PAMS, Criteria Pollutants, and PM2.5 Speciation; Performed 2016 data certification and review.
- Continued SCAQMD's audit program to improve quality assurance by including "in-house" audits for air toxics, Total Suspended Particulate (TSP), PM10 and PM2.5 performed by SCAQMD staff.
- Approximately 50 "low-cost" air quality sensors have been evaluated in the field and laboratory within the AQ-SPEC program since the July 2014 inception. Substantially enhanced the AQ-SPEC website (www.aqmd.gov/aq-spec) which now includes detailed information about the sensor testing program, technical information on the use of commercially available air quality sensors, reports and tables summarizing all available testing results, and other useful information for people interested in the use and applications of air quality sensors.
- Deployed different particle and gas sensors in small networks for specific applications. A network of nine particle sensors has been deployed at the fenceline of Rainbow Environmental in Huntington Beach to monitor fugitive emissions of PM2.5 and PM10

from this facility in real time. Also, a network of 24 particle sensors has been maintained in the Redlands/Mentone/Highland/Yucaipa region to test the performance and durability of these devices, increase the spatial distribution of PM measurements in that area, and test cloud platform data management service. An additional 25 sensors have been installed throughout the Los Angeles Air Basin for the NASA Citizen Science project. Data collected by these sensors will assist NASA scientists to improve our understanding of relationship between satellite aerosol optical depth (AOD) and surface PM, ultimately leading to better observations of air quality from space.

- As part of the U.S. EPA STAR Grant project, many sensors have already been installed to monitor and measure criteria pollutants at the community level in West Los Angeles, Brawley, Alhambra and Seal Beach. In addition, a network of sensors measuring ozone, nitrogen dioxide, and particulate matter have been installed predominantly in the Inland Empire and Imperial Valley. The community recruitment process is on-going and in collaboration with other CAPCOA (i.e., Bay Area Air Quality Management District) agencies.
- The "Making Sense of Sensors" Conference was held at SCAQMD's headquarters and was an international event with nine countries and 22 U.S. states represented amongst the more than 350 participants. Additionally, webcast participation over the two days included 714 live views from 15 countries. The Conference brought together experts from government, academia, environmental and research organizations, community groups, and the sensor industry. Technical sessions covered the history of air quality sensors, recent advances in sensor technology, data interpretation and mapping, the integration of satellite and low-cost sensor data, and the use and application of this emerging technology by environmental justice communities. The Conference included more than 40 speakers with keynote lectures from Weather Underground and Microsoft, 22 exhibitors displaying sensor technology, data management tools, data visualization software, and networking solutions. The poster session showcased 27 posters on sensor network deployments and sensor evaluations. Over 125 attendees participated in an evening networking event, and more than 220 of the participants were provided exclusive tours of the SCAQMD's AQ-SPEC chamber testing system.
- Three reports from SCAQMD's fenceline monitoring program have been finalized and posted online on a dedicated web-site: http://www.aqmd.gov/fenceline-monitoring. These reports cover three optical remote sensing projects: Quantification of Fugitive Emissions from Large Refineries; Quantification of Gaseous Emissions from Gas Stations, Oil Wells and Other Small Point Sources; and Quantification of Stack Emissions from Marine Vessels.
- Continued quarterly implementation of optical remote sensing technologies for emission measurements and community monitoring, specifically in Carson/Wilmington/Long Beach areas to characterize and quantify emissions from refineries and to access their impact on surrounding communities.
- Continued federal programs efforts to maintain a network of 31 samplers for the Department of Homeland Security operating 7 days a week 24 hours a day. Approximately 12,000 samples were delivered to the LA County Department of Public Health in support of the program.
- Continued to provide sampling, monitoring, and laboratory analyses in support of SCAQMD Incident and Nuisance Response efforts, including recent wildfire smoke

incidents and coastal odor investigations. This involved the use of state-of-the-science conventional sampling and analysis techniques and low-cost sensors, as well as advanced optical remote sensing as part of the coastal odor investigation.

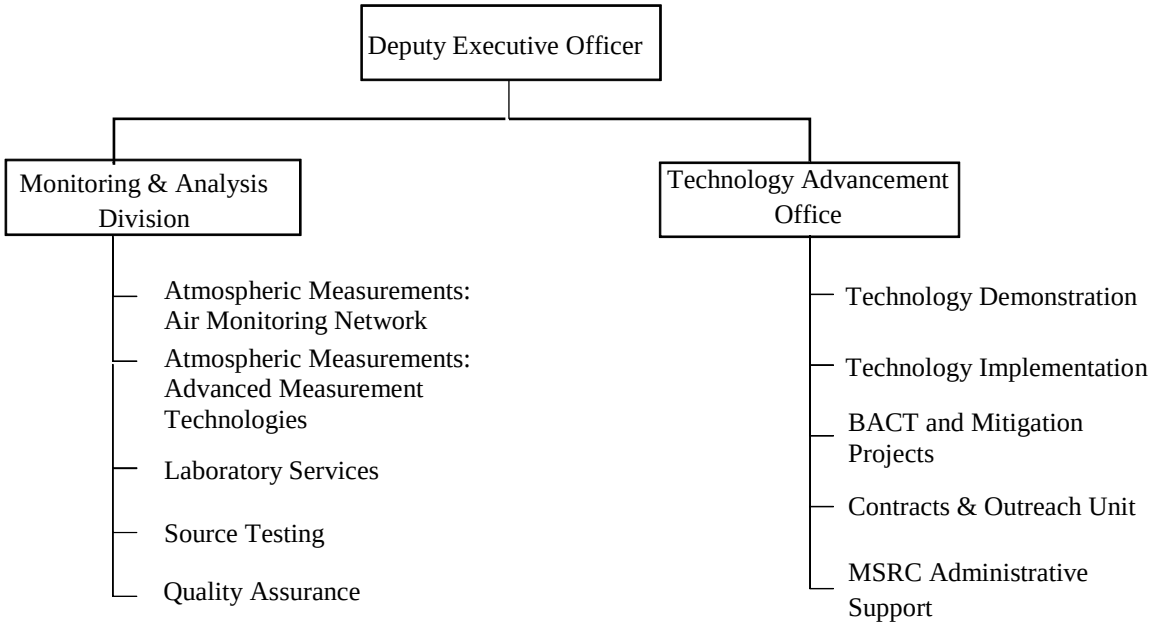
ANTICIPATED:

- Continue the development and demonstration of heavy-duty zero emission cargo transport trucks and off-road equipment, and initiate the development and demonstration of a zero emission goods movement corridors.
- Continue the implementation of the VIP on a first-come-first-served basis; solicit and complete contracting on- and off-road projects, including marine vessel engine repowering projects, under the "Year 20" Carl Moyer Program, identify and obtain community support for eligible projects to be funded by AB134 and initiate contracting for these projects, and obligate all remaining Proposition 1B-Goods Movement Program funds awarded to SCAQMD. Also, issue grants for the replacement of school buses with lower emission buses under the Lower Emission School Bus Program.
- Increase deployment of cleaner construction equipment, locomotives, and on-road heavy-duty vehicles through the continued implementation of funding incentive programs, compliance with SCAQMD Clean Fleet Vehicle Rules, and identification of future mobile source strategies for implementing the 2016 AQMP.
- Provide monitoring, source testing, and analysis for rule development related to upcoming amendments for Rules 1407 and 1420.2.
- Continue source test protocol and report evaluations, CEMS certifications, LAP application reviews and ST observations. Increase throughput on source test evaluations anticipated due to RECLAIM (Regional Clean Air Incentives Market) sunset and permit streamlining efforts.
- Conduct air toxic monitoring for the Multiple Air Toxics Exposure Study (MATES-V) at ten fixed locations to characterize and spatially identify hazardous air pollutant exposure in the Basin. Conduct air monitoring in and around communities neighboring refineries using a combination of standardized, advanced and low cost methods to assess air pollution levels that may be related to refinery emissions.
- Work with CARB on the development of a state-wide air monitoring plan as part of AB 617 and conduct initial air surveys that may provide input to community selection.
- Evaluate refinery fenceline air monitoring plans and develop and implement refinery-related community air monitoring as required under Rule 1180.
- Continue with the implementation of air monitoring network and special monitoring and analysis efforts critical to the SCAQMD operations, including compliance verification efforts and rule development, including the Paramount and Compton. Expand to other areas to assess toxic metal levels in industrialized areas as part of the SCAQMD Community Air Toxics Initiative.
- Implement enhanced ozone monitoring strategy for the U.S. EPA Photochemical Assessment Monitoring Station program as an early adopter to a re-engineering of the program to provide more relevant and robust data sets for VOCs that are ozone precursors.
- Continue to enhance and modernize the laboratory instrumentation, methodologies, and analysis capabilities to help with special monitoring projects, incident and wildfire

response. Continue operational efficiency improvement by investing in latest software, automated instruments and equipment and other workflow streamlining efforts.

- Perform technology demonstration study to conduct real-time mobile monitoring for toxic metals, including Cr (VI) using novel advanced monitoring techniques.
- Continue to enhance and modernize the District's telemetry system and data management system that receives and validates the incoming data from the air monitoring stations and special monitoring locations.
- Continue to assess and oversee operational integrity, efficiency and quality assurance through monthly internal audits of laboratory and field monitoring stations.
- Assist organizing two conferences (UC Davis and American Association for Aerosol Research) focusing on novel sensor technologies for measuring air quality, on current networking capabilities for developing sensor networks, and available cloud-based platforms for storing, validating, analyzing, and visualizing sensor data.
- Continue with full-scale testing of air quality sensors in AQ-SPEC and share testing results with the public. Develop concept for certification program of low-cost particle and gaseous sensors.
- Deploy and pilot several air quality sensor networks for the purposes of developing new low-cost monitoring capabilities for SCAQMD, regulated entities, and the public. Implement the goals and objectives of the U.S. EPA STAR grant to engage, educate, and empower California communities on the use and applications of "low-cost" air monitoring sensors and complete the deployment of sensor networks throughout California in collaboration with CAPCOA agencies and environmental justice groups and communities.
- Continue and expand the operation and development of the PM sensor network around/near Rainbow Environmental to study the correlation between fugitive PM emissions and activity information at the facility (e.g., truck traffic, recycling operations).
- Continue with the implementation of the remote sensing technology projects and experimentation with other next generation monitoring technologies and formulate appropriate recommendations to best integrate into the SCAQMD's current measurement toolbox.

ORGANIZATIONAL CHART:



POSITION SUMMARY: 194.4 FTEs

Science & Technology Advancement Units	Amended FY 2017-18	Change	Adopted FY 2018-19
Office Administration	13	-	13
Monitoring & Analysis	124	5	129
Technology Advancement	52	0.4	52.4
Total	189	5.4	194.4

STAFFING DETAIL:

2018-19 Adopted Staffing

Position	Title
25	Air Quality Chemist
10	Air Quality Engineer II
3	Air Quality Inspector II
18	Air Quality Instrument Specialist I
19	Air Quality Instrument Specialist II
23	Air Quality Specialist
2.4	Assistant Deputy Executive Officer/Science & Technology Advancement (a)
3	Atmospheric Measurement Manager
12	Contracts Assistant
1	Deputy Executive Officer/Science & Technology Advancement
5	Laboratory Technician
1	Meteorologist Technician
8	Office Assistant
2	Planning and Rules Manager
3	Principal Air Quality Chemist
3	Principal Air Quality Instrument Specialist
16	Program Supervisor
6	Secretary
3	Senior Administrative Secretary
10	Senior Air Quality Chemist
2	Senior Air Quality Engineer
8	Senior Air Quality Instrument Specialist
1	Senior Enforcement Manager
1	Senior Public Information Specialist
1	Senior Office Assistant
1	Senior Staff Specialist
1	Source Test Manager
2	Staff Assistant
2	Staff Specialist
1	Supervising Air Quality Engineer
1	Technology Implementation Manager
194.4	Total Adopted Positions

(a) 0.4 FTE budgeted for only 5 months.

Science & Technology Advancement Work Program by Office									
#	Program Code		Program Categories	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Revenue Categories
1	44	003	Advance Clean Air Technology	Advisory Group/Small Business	Mob Src Review Comm Prog Admin	0.50	0.00	0.50	IX
2	44	004	Advance Clean Air Technology	AB2766/MSRC/Contract Admin	AB2766 Admin Discretionary Prog	3.00	0.00	3.00	IX
3	44	009	Develop Programs	AB 1318 Mitigation	AB 1318 Projects Admn/Impl	0.75	0.00	0.75	XVII
4	44	012	Advance Clean Air Technology	AQMP/Control Tech Assessment	Tech Supp: Quantify Cost Effec	0.10	0.90	1.00	VIII
5	44	015	Ensure Compliance	Acid Rain Program	Acid Rain CEMS Eval/Cert	0.50	0.00	0.50	II,IV
6	44	030	Advance Clean Air Technology	AB 134	AB 134	0.00	6.00	6.00	IX
7	44	036	Monitoring Air Quality	AB 617-Monitoring	AB 617-Monitoring	0.00	12.00	12.00	XV
8	44	038	Monitoring Air Quality	Admin/Office Mgmt/Monitoring	Overall Program Mgmt/Coord	1.40	0.00	1.40	Ib
9	44	039	Advance Clean Air Technology	Admin/Office Mgt/Tech Adv	Admin Support/Coordination	0.77	0.00	0.77	VIII
10	44	041	Policy Support	Admin/Office Mgmt/Policy Supp	Overall Policy Supp/Mgmt/Coord	0.49	0.00	0.49	Ib
11	44	042	Ensure Compliance	Admin/Office Mgmt/Compliance	Compliance: Assign/Manage/Supp	0.37	0.00	0.37	Ib
12	44	043	Develop Rules	Admin/Office Mgmt/Rules	Rules: Assign/Manage/Supp	0.15	0.00	0.15	Ib
13	44	046	Monitoring Air Quality	Admin/Program Management	STA Program Administration	2.00	0.00	2.00	Ib
14	44	048	Advance Clean Air Technology	Admin/Prog Mgmt/Tech Advance	Overall TA Program Mgmt/Coord	1.55	0.00	1.55	VIII
15	44	063	Monitoring Air Quality	Ambient Air Analysis	Analyze Criteria/Tox/Pollutants	8.91	5.00	13.91	II,V,IX
16	44	064	Monitoring Air Quality	Ambient Network	Air Monitoring/Toxics Network	19.85	-0.80	19.05	II,IV,V,IX
17	44	065	Monitoring Air Quality	Air Quality Data Management	AM Audit/Validation/Reporting	1.00	0.00	1.00	II,V,IX
18	44	066	Advance Clean Air Technology	AQIP Marine SCR DPF	AQIP Marine SCR DPF/Admin/Impl	0.15	-0.15	0.00	IX
19	44	067	Monitoring Air Quality	Ambient Lead Monitoring	Lead Monitoring/Analysis/Reporting	0.50	0.00	0.50	IV
20	44	069	Develop Programs	AQIP Evaluation	AQIP Contract Admin/Evaluation	0.65	-0.15	0.50	IX
21	44	072	Ensure Compliance	Arch Ctgs - End User	Sample Analysis/Rpts	2.00	0.00	2.00	XVIII
22	44	073	Monitoring Air Quality	Arch Ctgs - Other	Sample Analysis/Rpts	2.00	0.00	2.00	XVIII
23	44	079	Monitoring Air Quality	AQ SPEC	AQ SPEC	3.00	0.00	3.00	XVII
24	44	081	Monitoring Air Quality	Air Filtration EPA	Air Filtration EPA/Admn/Impl	0.15	-0.05	0.10	V
25	44	082	Monitoring Air Quality	Air Fltration Other	Air Filtration Other/Admn/Impl	0.15	0.33	0.48	XVII
26	44	084	Monitoring Air Quality	Blk Carbon Stdy EPA	EPA Blck Carbon Climate Study	0.20	-0.20	0.00	XVII
27	44	095	Advance Clean Air Technology	CA Natural Gas Veh Partnership	CA Natural Gas Veh Partnership	0.05	0.05	0.10	VIII
28	44	105	Ensure Compliance	CEMS Certification	CEMS Review/Approval	6.15	0.00	6.15	II,III,VI
29	44	130	Advance Clean Air Technology	Clean Fuels/Contract Admin	Admin/Project Supp for TA Cont	3.40	1.00	4.40	VIII
30	44	132	Advance Clean Air Technology	Clean Fuels/Mobile Sources	Dev/Impl Mobile Src Proj/Demo	6.00	-4.50	1.50	VIII
31	44	134	Advance Clean Air Technology	Clean Fuels/Stationary Combust	Dev/Demo Clean Combustion Tech	0.50	-0.20	0.30	VIII
32	44	135	Advance Clean Air Technology	Clean Fuels/Stationary Energy	Dev/Demo Alt Clean Energy	0.55	0.00	0.55	VIII
33	44	136	Advance Clean Air Technology	Clean Fuels/Tech Transfer	Disseminate Low Emiss CF Tech	1.25	1.06	2.31	VIII
34	44	161	Monitoring Air Quality	Comm Air Tox Init	Community Air Toxics Initiative	0.00	2.19	2.19	XVII
35	44	175	Ensure Compliance	DB/Computerization	Develop Systems/Database	0.44	0.00	0.44	II,IV,VI
36	44	187	Advance Clean Air Technology	DERA Sch Bus Repl	DERA Sch Bus Repl Admin/Impl	0.03	0.00	0.03	V
37	44	188	Advance Clean Air Technology	DERA FY 13 Veh Repl	DERA Vehicle Repl Admin/Impl	0.20	-0.10	0.10	XVII
38	44	190	Advance Clean Air Technology	Diesel Projects EPA	Diesel Projects EPA/Admin/Impl	0.11	0.00	0.11	V
39	44	203	Advance Clean Air Technology	EFMP Program Support	EFMP Program Support	1.19	3.81	5.00	XVII
40	44	240	Monitoring Air Quality	Environmental Justice	Implement Environmental Justice	0.45	0.00	0.45	II,IX

Science & Technology Advancement (Cont.)
Work Program by Office

#	Program Code		Program Categories	Program	Activities	FTEs FY 2017-18	+/-	FTEs FY 2018-19	Revenue Categories
41	44	248	Monitoring Air Quality	EPA Community Scale AQ-SPEC	EPA Community Scale AQ-SPEC	1.00	0.00	1.00	V,XVII
42	44	276	Policy Support	Advisory Group/Technology Adva	Tech Adv Advisory Group Supp	0.10	0.00	0.10	VIII
43	44	356	Advance Clean Air Technology	GGRF ZEDT Demo	GGRF ZEDT Demo Admin	1.10	-0.10	1.00	XVII
44	44	361	Advance Clean Air Technology	HD Trucks DOE ARRA	DOE HD Trucks Admin (ARRA)	2.00	-2.00	0.00	V,XVII
45	44	396	Develop Programs	Lawnmower Exchange	Lawn Mower Admin/Impl/Outreach	0.30	0.00	0.30	XVII
46	44	410	Policy Support	Legislation	Support Pollution Reduction thru Legislatio	0.50	0.00	0.50	IX
47	44	450	Ensure Compliance	Microscopic Analysis	Asbestos/PM/Metals Analysis	2.00	0.00	2.00	VI
48	44	453	Advance Clean Air Technology	Mob Src: Emiss Inven Method	Rvw CARB/US EPA emissions inven methodology	1.50	0.00	1.50	VIII,IX
49	44	456	Develop Rules	MS & AQMP Control Strategies	AQMP Control Strategies	0.30	0.00	0.30	VIII
50	44	457	Advance Clean Air Technology	Mob Src/C Moyer Adm/Outreach	Carl Moyer: Impl/Admin Grant	11.15	1.00	12.15	IX
51	44	458	Develop Programs	Mobile Source Strategies	Implement Fleet Rules	1.00	0.00	1.00	VIII
52	44	459	Advance Clean Air Technology	Mob Src/C Moyer/Impl/Prg Dev	Moyer/Implem/Program Dev	2.80	0.20	3.00	IX
53	44	460	Advance Clean Air Technology	VIP Admin	VIP Admin/Outreach/Impl	0.80	-0.30	0.50	IX
54	44	468	Monitoring Air Quality	NATTS(Natl Air Tox Trends Sta)	NATTS (Natl Air Tox Trends)	1.50	0.00	1.50	II,V,IX
55	44	469	Monitoring Air Quality	Near Roadway Mon	Near Roadway Monitoring	1.50	0.00	1.50	IV,V,IX
56	44	497	Advance Clean Air Technology	Plug-in Hybrid EV DOE ARRA	DOE Plug-in Hybrid EV Admin (ARRA)	0.75	-0.75	0.00	V
57	44	500	Ensure Compliance	PM2.5 Program	Est/Operate/Maint PM2.5 Network	11.30	0.00	11.30	II,V,IX
58	44	505	Monitoring Air Quality	PM Sampling Program (EPA)	PM Sampling Program - Addition	10.60	-2.19	8.41	V
59	44	507	Monitoring Air Quality	PM Sampling Spec	PM Sampling Special Events	0.10	0.00	0.10	V
60	44	530	Monitoring Air Quality	Photochemical Assessment	Photochemical Assess & Monitor	3.00	0.00	3.00	V,IX
61	44	533	Advance Clean Air Technology	POLB AMECS Demo	POLB AMECS Demo-Admin/Impl	0.47	0.00	0.47	XVII
62	44	542	Develop Programs	Prop 1B:Goods Movement	Prop 1B:Goods Movement	9.70	-0.70	9.00	IX
63	44	545	Timely Review of Permits	Protocols/Reports/Plans	Eval Test Protocols/Cust Svc	0.10	0.00	0.10	III,IV
64	44	546	Timely Review of Permits	Protocols/Reports/Plans	Eval Test Protocols/Compliance	6.15	0.00	6.15	IV,VI
65	44	565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Req for Info	0.17	0.00	0.17	Ia
66	44	585	Monitoring Air Quality	Quality Assurance	Quality Assurance Branch	3.00	1.00	4.00	II,V,IX
67	44	653	Develop Rules	Rulemaking/BACT	Dev/Amend BACT Guidelines	2.00	0.00	2.00	II
68	44	657	Develop Rules	Rulemaking/Support PRA	Assist PRA w/ Rulemaking	0.05	0.00	0.05	II
69	44	663	Monitoring Air Quality	Salton Sea Monit	Mon/Analyze Hydrogen Sulfide	0.25	0.00	0.25	XVII
70	44	677	Advance Clean Air Technology	School Bus/Lower Emission Prog	School Bus Program Oversight	0.70	0.80	1.50	IX
71	44	700	Ensure Compliance	Source Testing/Compliance	Conduct ST/Prov Data/Compl	2.25	0.00	2.25	VI
72	44	701	Customer Service and Business Assistance	Source Testing/Customer Svc	Conduct ST/Prov Data/Cust Svc	0.05	0.00	0.05	VI
73	44	702	Develop Programs	ST Methods Development	Eval ST Methods/Validate	0.95	0.00	0.95	II
74	44	704	Ensure Compliance	ST/Sample Analysis/Compliance	Analyze ST Samples/Compliance	4.00	0.00	4.00	VI
75	44	705	Develop Programs	ST Sample Analysis/Air Program	Analyze ST Samples/Air Prgms	0.25	0.00	0.25	II
76	44	706	Develop Rules	ST Sample Analysis/Air Program	Analyze ST Samples/Rules	0.25	0.00	0.25	II
77	44	707	Ensure Compliance	VOC Sample Analysis/Compliance	VOC Analysis & Rptg/Compliance	7.00	0.00	7.00	IV,XV
78	44	708	Develop Rules	VOC Sample Analysis/Rules	VOC Analysis & Rptg/Rules	0.25	0.00	0.25	II,XV
79	44	709	Customer Service and Business Assistance	VOC Sample Analysis/SBA/Other	VOC Analysis & Reptg/Cust Svc	0.50	0.00	0.50	VI
80	44	715	Monitoring Air Quality	Spec Monitoring/Emerg Response	Emergency Response	0.50	0.00	0.50	II

Science & Technology Advancement (Cont.) Work Program by Office									
#	Program		Program Categories	Program	Activities	FTEs	+/-	FTEs	Revenue
81	44	716	Ensure Compliance	Special Monitoring	Rule 403 Compliance Monitoring	2.20	0.00	2.20	III,IV,IX,XV
82	44	725	Timely Review of Permits	Permit Processing/Support E&C	Assist EAC w/ Permit Process	0.05	0.00	0.05	III
83	44	738	Advance Clean Air Technology	Target Air Shed EPA	Targeted Air Shed Admin/Impl	0.15	0.35	0.50	V,XVII
84	44	740	Advance Clean Air Technology	Tech Adv/Commercialization	Assess CFs/Adv Tech Potential	0.25	0.00	0.25	VIII
85	44	741	Advance Clean Air Technology	Tech Adv/Non-Combustion	Dev/Demo Non-Combustion Tech	0.10	0.90	1.00	VIII
86	44	794	Ensure Compliance	Toxics/AB2588	Eval Protocols/Methods/ST	4.25	0.00	4.25	X
87	44	795	Ensure Compliance	Toxics/Engineering	R1401 Toxics/HRA Prot/Rpt Eval	0.05	0.00	0.05	VI,X
88	44	816	Advance Clean Air Technology	Transportation Research	Transport Research/Adv Systems	0.50	0.00	0.50	VIII
89	44	821	Monitoring Air Quality	TraPac Air Filt Prg	Admin/Tech Suppt/Reptg/Monitor	1.00	-1.00	0.00	XVII
90	44	825	Operational Support	Union Negotiations	Labor/Mgmt Negotiations	0.05	0.00	0.05	Ia
91	44	826	Operational Support	Union Steward Activities	Rep Employees in Grievance Act	0.05	0.00	0.05	Ia
					Total Science & Technology Advancement	171.00	23.40	194.40	

Science & Technology Advancement Line Item Expenditure						
Major Object / Account # **/** Account Description		**FY 2016-17 Actuals**	**FY 2017-18 Adopted Budget**	**FY 2017-18 Amended Budget**	**FY 2017-18 Estimate ***	**FY 2018-19 Adopted Budget**
Salary & Employee Benefits						
51000-52000	Salaries	$ 15,609,525	$ 15,216,665	$ 16,379,988	$ 15,092,882	$ 18,016,014
53000-55000	Employee Benefits	7,967,939	8,118,155	8,118,154	7,884,736	9,914,647
Sub-total Salary & Employee Benefits		$ 23,577,464	$ 23,334,820	$ 24,498,142	$ 22,977,618	$ 27,930,661
Services & Supplies						
67250	Insurance	$ 30,637	$ -	$ 40,000	$ -	$ -
67300	Rents & Leases Equipment	57,529	36,800	$ 93,806	81,649	36,800
67350	Rents & Leases Structure	166,514	169,000	$ 194,510	194,510	419,000
67400	Household	-	500	$ 500	-	500
67450	Professional & Special Services	1,009,232	1,455,000	$ 1,786,698	1,317,073	1,630,000
67460	Temporary Agency Services	620,647	141,600	$ 491,500	451,098	191,600
67500	Public Notice & Advertising	30,644	22,000	$ 25,150	23,919	22,000
67550	Demurrage	86,574	55,000	$ 116,550	101,101	55,000
67600	Maintenance of Equipment	402,553	205,000	$ 467,737	467,737	255,000
67650	Building Maintenance	27,493	170,000	$ 208,300	176,555	270,000
67700	Auto Mileage	71,678	3,909	$ 94,720	67,296	43,909
67750	Auto Service	33	-	$ -	199	-
67800	Travel	80,791	48,403	$ 93,493	74,679	48,403
67850	Utilities	-	-	$ 1,900	1,900	-
67900	Communications	289,540	231,000	$ 260,480	259,901	241,000
67950	Interest Expense	-	-	$ -	-	-
68000	Clothing	7,919	4,000	$ 10,475	7,680	4,000
68050	Laboratory Supplies	401,567	295,000	$ 512,793	512,793	320,000
68060	Postage	51,364	17,318	$ 45,568	33,545	17,318
68100	Office Expense	127,863	41,393	$ 224,683	175,944	102,393
68200	Office Furniture	15,039	-	$ 23,500	23,500	-
68250	Subscriptions & Books	1,061	1,527	$ 2,327	840	1,527
68300	Small Tools, Instruments, Equipment	342,752	195,000	$ 227,206	224,264	112,246
68400	Gas and Oil	-	-	$ -	-	-
69500	Training/Conference/Tuition/ Board Exp.	22,620	107,000	$ 57,760	41,149	107,000
69550	Memberships	95,747	2,250	$ 154,750	127,688	2,250
69600	Taxes	8,126	2,000	$ 2,000	756	2,000
69650	Awards	-	-	$ -	-	-
69700	Miscellaneous Expenses	7,407	2,600	$ 45,550	42,915	2,600
69750	Prior Year Expense	(8,020)	-	$ -	-	-
69800	Uncollectable Accounts Receivable	-	-	$ -	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		$ 3,947,309	$ 3,206,300	$ 5,181,956	$ 4,408,689	$ 3,884,546
77000	**Capital Outlays**	$ 2,232,014	$ 420,000	$ 3,969,874	$ 3,891,061	$ 507,500
79050	**Building Remodeling**	$ -	$ -	$ -	$ -	$ -
Total Expenditures		$ 29,756,787	$ 26,961,120	$ 33,649,972	$ 31,277,368	$ 32,322,707
* Estimates based on July 2017 through February 2018 actual expenditures and budget amendments.						

SOUTH COAST

AIR QUALITY MANAGEMENT DISTRICT

SCAQMD Quick Facts

- Created by the 1977 Lewis Air Quality Management Act; amended by 1988 Lewis-Presley Air Quality Management Act (Health & Safety Code §40400-40540).
    - Regional governmental agency (Special District)
- Jurisdiction for comprehensive air pollution control over all of Orange County, all of Los Angeles County except for the Antelope Valley, the non-desert portion of western San Bernardino County and the western and Coachella Valley portion of Riverside County
    - 10,743 Square Miles; Population of 16,962,478 (2016)
    - Boundaries are Pacific Ocean to the west; San Gabriel, San Bernardino and San Jacinto Mountains to the north and east, and the San Diego County line to the south
    - Vehicle Registrations - 13,686,059 (2016); Average Daily Miles Traveled Per Vehicle – 28 (2016)
    - Two of the world's busiest seaports are within its boundaries, Port of Los Angeles and Port of Long Beach, who combined handle almost 4,000 vessel calls and more than 16 million 20-foot long container units or 20-foot equivalent units (TEUs) annually (2017)
- Responsibilities include:
    - Monitoring air quality - 43 air monitoring stations
    - Planning, implementing, and enforcing programs to attain and maintain state and federal ambient air quality standards
        - Developing air quality rules and regulations that regulate stationary source emissions from such facilities as oil refineries, power plants, paint spray booths, incinerators, manufacturing plants, dry cleaners, and service stations
        - Establishing permitting requirements and issuing permits for stationary sources (26,052 operating locations with 68,205 permits)
- Decision-making body is a 13 member Governing Board
    - Ten elected officials with four appointed by the Board of Supervisors from each of the four counties and six appointed by cities within the District
    - Three members appointed by the Governor, the Speaker of the State Senate, and the Rules Committee of the State Senate

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Operating Indicators by Function
Last Nine Fiscal Years

Program Category	2009	2010	2011	2012	2013	2014	2015	2016	2017
Advance Clean Air Technology									
Contracts awarded	292	530	526	556	938	523	1,047	421	403
Total Funding awarded ($M)	$89.4	$180.7	$131.4	$82.5	$207.2	$216.1	$123.2	$153.9	$137.4
Ensure Compliance with Clean Air Rules									
Inspections	40,558	33,735	33,560	34,191	32,535	29,501	22,871	24,037	21,419
Notices of Violations	1,908	1,530	1,254	1,211	965	956	811	499	632
Hearing Board Orders for Abatement	36	35	47	93	51	46	411	23	27
Hearing Board Appeals	19	20	2	7	3	7	-	3	3
Customer Service									
Public Information Requests	4,962	3,821	3,410	3,543	3,460	4,505	4,012	4,958	5,282
Community/Public Meetings attended	198	202	190	274	294	264	217	239	210
Small Business Assistance Contacts	2,662	2,578	2,497	2,574	2,266	1,850	1,711	1,865	2,834
Develop Programs to Achieve Clean Air									
Transportation Plans processed	1,412	1,372	1,385	1,392	1,371	1,333	1,329	1,337	1,348
Emission Inventory Updates	586	703	521	530	408	460	336	356	244
Develop Rules to Achieve Clean Air									
Rules Developed	32	15	40	8	20	24	24	16	15
Monitoring Air Quality									
Samples Analyzed by the Laboratory	25,400	29,685	28,915	29,520	32,520	29,340	30,824	32,400	38,541
Source Testing Analyses/Evaluations/Review	718	740	1,030	952	1,035	968	996	936	952
Timely Review of Permits									
Applications Processed	11,564	9,627	13,044	12,225	14,153	13,217	9,495	10,116	11,780
Applications Received-Small Business	627	694	798	732	615	514	629	594	535
Applications Received-All Others	10,954	10,941	10,769	11,682	11,709	11,156	9,961	9,894	8,376
Policy Support									
News releases	76	69	64	57	61	62	76	89	86
Media Calls	334	313	252	520	1,131	774	532	1,450	1,201
Media Inquiries Completed	334	313	252	520	1,131	774	532	1,450	1,201

FINANCIAL POLICIES

SCAQMD is required to follow specific sections of the California Health & Safety Code, which guide SCAQMD's overall financial parameters. The Governing Board also provides financial direction to SCAQMD staff through the adoption of various financial-related policies. In addition, the Administrative Policies and Procedures offer further financial guidance. Below is an overview of the guidelines and procedures for the applicable financial-related policies.

California Health & Safety Code (CA H&SC)

- District Budget Adoption – CA H&SC §40130

  The District shall prepare, and make available to the public at least 30 days prior to public hearing, a summary of its budget and any supporting documents, including, but not limited to, a schedule of fees to be imposed by the District to fund its programs. The District shall notify each person who was subject to fees imposed by the district in the preceding year of the availability of information. The District shall notice and hold a public hearing for the exclusive purpose of reviewing the budget and of providing the public with the opportunity to comment upon the proposed District budget.

- Fees Assessed on Stationary Sources – CA H&SC §40500.1

  Fees assessed on stationary sources shall not exceed, for any fiscal year, the actual costs of District programs for the immediately preceding fiscal year with an adjustment not greater than the change in the California Consumer Price Index (CPI), for the preceding calendar year, from January 1 of the prior year to January 1 of the current year. Unless specifically authorized by statute, the total amount of all of the fees collected from stationary sources of emissions in the 1995-96 fiscal year, and in each subsequent fiscal year, shall not exceed the level of expenditure in the 1993-94 fiscal year, except that the total fee amount may be adjusted annually by not more than the percentage increase in the California CPI. Any new state or federal mandate that is applicable to the SCAQMD on and after January 1, 1994 shall not be subject to this section.

- Limitation on Increase in Permit Fees – CA H&SC §40510.5

  Existing permit fees shall not increase by a percentage greater than any percentage increase in the California CPI for the preceding calendar year, unless the board makes a finding, based upon relevant information in a rulemaking record, that the fee increase is necessary and will result in an apportionment of fees that is equitable. Any fee increase above CPI shall be phased in over a period of at least two years.

SCAQMD Governing Board Policy

- Rule 320 - Automatic Fee Adjustment

  Rule 320 provides that all Regulation III fees, with specified exceptions, are automatically adjusted July 1 of each year by the California Consumer Price Index for the preceding calendar year unless the Governing Board decides not to implement a fee adjustment, or to implement a different adjustment for a given year, either for all fees or for a specified fee or fees. The Executive Officer is directed to prepare annually a socioeconomic impact of the effect of the fee adjustment for review by stakeholders and the Governing Board and to hold a public hearing on the automatic fee adjustment to receive any public comments. Public comments and any responses, along with recommendations by the Budget Advisory Committee, are to be forwarded to the Governing Board by April 15 of each year.

- Unreserved Fund Balance Policy

  The Unreserved Fund Balance Policy, originally adopted by the Board in June 2005 and adjusted in June 2014, states that the Unreserved Fund Balance in the General Fund should be maintained at a minimum of 20% of revenues. GFOA Recommended Best Practices prescribe a minimum 17% reserve amount plus an additional amount based on the organization's reliance on revenue over which it has no control. The 20% reserve amount is derived from the minimum 17% plus an additional 3% to account for SCAQMD's reliance on state subvention ($4M), U.S. EPA Section 103/105 grants ($5M), and one-time penalties and settlements ($5M).

- Fund Balance Use

  When both restricted and unrestricted resources are available for use, it is SCAQMD's policy to use restricted resources first and then unrestricted resources as they are needed. When using unrestricted fund balance amounts, SCAQMD's Governing Board approved policy is to use committed amounts first, followed by assigned and then unassigned.

- Annual Investment Policy

  The Annual Investment Policy sets forth the investment guidelines for all general, special revenue, trust, agency and enterprise funds of the South Coast Air Quality Management District (SCAQMD). The purpose of this policy is to ensure all of SCAQMD's funds are prudently invested to preserve principal and provide necessary liquidity, while earning a market average rate of return. The SCAQMD Annual Investment Policy conforms to the California Government Code as well as customary standards of prudent investment management.

The objectives of the policy, in priority order, are Safety of Principal, Liquidity, and Market Rate of Return. The policy establishes and defines investable funds, authorized instruments, credit quality requirements, maximum maturities and concentrations, collateral requirements, and qualifications of brokers, dealers, and financial institutions doing business with or on behalf of the SCAQMD.

The policy provides the Governing Board, the Treasurer, the Assistant Deputy Executive Officer of Finance, and the Investment Oversight Committee with set duties and responsibilities to execute the policy.

- Treasury Operations Contingency Plan and Procedures

  The Treasury Operations Contingency Plan and Procedures states the course of action that may be implemented by the SCAQMD to protect the safety and liquidity of the SCAQMD funds and to protects SCAQMD from disruptions to ongoing operations if: 1) the financial stability of Los Angeles County may jeopardize SCAQMD funds invested through the Los Angeles County Treasurer; and/or 2) the Los Angeles County Treasurer, as Treasurer of SCAQMD, can no longer provide the treasury services currently provided in a satisfactory manner.

  Under authority granted by Resolution 97-32, the Executive Officer can appoint either the Assistant Deputy Executive Officer of Finance or Controller as Acting Treasurer to immediately begin implementing the defined procedures to safeguard SCAQMD funds.

- Budget Advisory Committee

  Established by the SCAQMD Governing Board, the Budget Advisory Committee serves in an advisory capacity to the SCAQMD on budgeting and financial planning matters. The committee, made up of members from the business and environmental community, provides additional insight during the annual budget process by reviewing and commenting on the proposed budget. The Budget Advisory Committee's comments are required to be provided to the Governing Board by April 15th of each year pursuant to SCAQMD Rule 320.

- Administrative Code

  The Administrative Code of Rules and Procedures prescribes the responsibilities, conduct and specified reimbursements of SCAQMD employees and SCAQMD Board members. Sections include, but are not limited to, mileage reimbursement, travel expenses, tuition reimbursement, professional licenses and memberships, and bilingual pay.

- Procurement Policy and Procedure

  The Procurement Policy and Procedure provides the guidelines for the contracting and/or purchasing of services, material, equipment, supplies and fixed assets (i.e. capital outlays) by the SCAQMD under the direction of the Procurement Manager. These guidelines include, but are not limited to, purchasing methods, bidding procedures, signature authorization levels, fixed asset acquisition and disposition, and publication requirements for advertised procurements.

  Procedures are in place to ensure that all businesses including minority business enterprises, women business enterprises, disabled veteran business enterprises and small businesses have a fair and equitable opportunity to compete for and participate in SCAQMD contracts and that SCAQMD utilizes, when necessary, the most highly qualified outside consultants/contractors to carry out the organization's responsibilities. SCAQMD Executive Officer, Deputy/Assistant Deputy Executive Officers, Legal Counsel, the Procurement Section, and staff all have responsibilities to execute the Procurement Policy and Procedure.

Executive Officer Administrative Policies and Procedures

- Travel

  The Travel Policy provides guidance on allowable travel expenses, travel advances, and documentation requirements.

- Fixed Assets and Controlled Items

  The Fixed Assets and Controlled Items policy provides guidance on the receipt, transfer, inventory, accountability, and disposal of fixed assets and controlled items.

- Purchasing of Non-Consultant Services and Supplies

  The Purchasing of Non-Consultant Services and Supplies policy provides guidance in implementing the purchase of non-consultant services and supplies as addressed in Section IV of the SCAQMD Procurement Policy and Procedure document.

- Contracting for Consulting and Professional Services

  Contracting for Consulting and Professional Services policy provides guidance in contracting for consulting and professional services in both a competitive and sole source environment as addressed in Section VIII of the SCAQMD Procurement Policy and Procedure document.

BUDGET GLOSSARY

Adopted Budget	The annual budget for the General Fund that has been approved by SCAQMD's Governing Board.
Amended Budget	The adopted budget plus any modifications approved by SCAQMD's Governing Board during the fiscal year.
Appropriation	A specific amount of money authorized by SCAQMD's Governing Board which permits the SCAQMD to incur obligations and to make expenditures of resources.
Assigned Fund Balance	The portion of the fund balance that has been allocated by SCAQMD's Governing Board for a specific purpose.
Budget Advisory Committee	A committee made up of representatives from the business and environmental communities who review and provide feedback on SCAQMD's financial performance and proposed budget.
Budgetary Basis of Accounting	A form of accounting used in the budget where encumbered amounts are recognized as cash expenditures.
Balanced Budget	A budget in which planned expenditures do not exceed planned revenues.
Capital Asset	Tangible asset with an initial individual cost of $5,000 or more and a useful life of at least three years or intangible assets with an individual cost of $5,000 or more and a useful life of at least one year.
Capital Outlays	Expenditures for capital assets; A Major Object, or classification of expenditures, within SCAQMD's budget.
Committed Fund Balance	The portion of the fund balance that includes amounts that can be used only for specific purposes as determined by the SCAQMD Governing Board.
CPI-Based Fee Increase	Increases to fees (emission, annual operating, permit processing, Hot Spots, area sources, transportation, source test/analysis, and Hearing Board) based on the change in the Consumer Price Index for the preceding calendar year as reported for California Department of Finance– All Urban Consumer Series. This is in accordance with the California Health and Safety Code §40510.5.

Debt Service The cost to cover the repayment of interest and principal on a debt for a particular period of time.

Debt Structure The make-up of long-term debt. SCAQMD's long-term debt has been taken on to fund building and pension obligations.

Designation A portion of the Fund Balance that has been assigned for specific purposes by actions of SCAQMD's Governing Board.

Encumbrance An amount of money committed for the payment of goods and services that have not yet been received or paid for.

Expenditures Charges incurred for goods and services.

Fee Schedule The State Legislature has authorized air districts to levy fees to support industry related programs which improve air quality. The schedule of fees levied by SCAQMD is approved by SCAQMD's Governing Board as part of the annual budget process. (Also see Regulation III.)

Fiscal Year A period of 12 consecutive months selected to be the budget year. SCAQMD's fiscal year runs from July 1 to June 30.

FTE Full Time Equivalent; A measure of the level of staffing. One FTE equates to 2,080 hours of paid time within a 12 month period.

Fund Balance The accumulation of revenues less expenditures within a fund for a specific year. SCAQMD's fund balance is broken out into Reserves (nonspendable and committed) and Unreserved Designations. Unreserved Designations is further broken out into Assigned and Unassigned Fund Balance. This terminology is in accordance with GASB 54.

GASB 54 A standard issued by the Government Accounting Standards Board (GASB) to guide fund balance reporting.

General Fund The primary operating fund for SCAQMD where expenditures and revenues associated with the daily operations of SCAQMD are accounted for.

Grant A sum of money given by an organization for a particular purpose. The grants which provide funding to SCAQMD's General Fund are primarily received from the U. S. Environmental Protection Agency (EPA), the

	Department of Homeland Security (DHS), and the Department of Energy (DOE).
Inventory	Value at cost of office, computer, cleaning and laboratory supplies at year-end.
Major Object	The expenditure classification of SCAQMD's annual budget into four categories: Salaries and Employee Benefits, Services and Supplies, Capital Outlays, and Building Remodeling. Transfers between Major Objects must be Board approved.
Mobile Source Revenues	Revenues received from motor vehicle registrations and from the administration of motor vehicle programs aimed at reducing air pollution from motor vehicles.
Nonspendable Fund Balance	Amounts in the fund balance that are not in a spendable form. In SCAQMD's General Fund, inventory makes up the nonspendable fund balance.
Pension Obligation Bonds (POBs)	A method of financing used by SCAQMD to refinance its obligations to its employees' pension fund.
Proposed Budget	The annual budget that has been developed by SCAQMD and made available to the public for review before being presented to the Governing Board for approval.
Regulation III	The rule that establishes the fee rates and schedules associated with permitting, annual renewals, emissions and other activities that help fund most of SCAQMD's regulatory programs and services. (Also see Fee Schedule.)
Reserves	Funding within the Fund Balance that is set aside for a specific future use and not available for any other purpose. It consists of both nonspendable amounts (inventory of supplies) and committed amounts (encumbrances).
Revenue	Monies the SCAQMD receives as income. SCAQMD's revenue is mainly from fees charged to control or regulate emissions.
SBCERA	San Bernardino County Employment Retirement System manages the retirement plan for SCAQMD employees.

Salaries and Employee Benefits	Expenditures for Salary expenses, employee benefits, retirement and insurance benefits. It is a Major Object, or classification of expenditures, within SCAQMD's budget.
Services and Supplies	Expenditures for items and services needed for the daily operations of the SCAQMD including professional services, utilities, office expenses, maintenance, and debt service. It is a Major Object, or classification of expenditures, within SCAQMD's budget.
Special Revenue Fund	A fund used to account for revenues and expenditures from specific sources earmarked for specific purposes. SCAQMD's main operating fund is its General Fund. All other funds are designated as Special Revenue Funds. The SCAQMD does not adopt a budget for Special Revenue Funds. Instead, Board action is required for all expenditures.
State Subvention	The state of California provides assistance to air districts for on-going operations to perform mandated functions such as compliance and enforcement, planning, and rule development.
Stationary Source Fees	Revenues collected from emission fees, permit fees, and annual operating fees to support activities for improving air quality.
Transfer In/Out	A transfer of funds between different funds within SCAQMD. A transfer of cash from the General Fund to a Special Revenue Fund would be a Transfer Out for the General Fund and a Transfer In for the Special Revenue Fund.
Unassigned Fund Balance	The residual fund balance of the General Fund. It is not designated for a specific purpose and can only be used upon approval of SCAQMD's Governing Board.
Unreserved Designations	The portion of the Fund Balance that has not been committed by SCAQMD's Governing Board or is nonspendable due to specific Board constraints. It is further broken down into either amounts assigned by SCAQMD's Governing Board for specific purposes or an unassigned amount that can only be used upon approval of SCAQMD's Governing Board.
Work Programs	Activities carried out by SCAQMD staff. Work Programs are classified into nine Work Program Categories according to the nature of the activity being performed.

Air Quality Historical Timeline

Photo courtesy of Los Angeles Times Collection, Department of Special Collections, UCLA Library

First recognized episodes of smog occur in Los Angeles in the summer of 1943.

1943

1947

Los Angeles County Air Pollution Control District (APCD) established–the first of its kind in the nation.

1950

Orange County APCD established.

1957

San Bernardino and Riverside County APCDs formed.

1966

California adopts first automobile tailpipe emission standards in the nation.

1968

California Air Resources Board (CARB) holds its first meeting with Dr. Arie J. Haagen-Smit as its first chairman.

1970

Federal Clean Air Act is enacted, establishing the basic U.S. program for controlling air pollution.

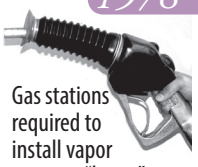
1971

U.S. EPA, created in 1970,adopts first national air quality standards.

1977

SCAQMD formed through merger of Los Angeles, Orange, Riverside and San Bernardino APCDs.

1978



Gas stations required to install vapor recovery "boots" on gas nozzles.

1984

California's Smog Check program takes effect.

1987

SCAQMD establishes ridesharing requirements for region's employers.

1989

SCAQMD adopts first Air Quality Management Plan to show attainment of clean air standards.

1990

Federal Clean Air Act Amendments of 1990 enacted. Established new programs aimed at curbing urban ozone, toxic emissions, and vehicle emissions.

1993

RECLAIM (REgional CLean Air Incentives Market) emissions trading program adopted.

1998

The Carl Moyer Program established to reduce mobile source emissions.

2002

SCAQMD adopts the nation's first phase-out of the toxic chemical perchloroethylene (or "perc") used at dry cleaners.

2003

SCAQMD Mow Down Air Pollution Electric Lawnmower Exchange Program begins.

2006

California Global Warming Solutions Act of 2006 (AB 32) enacted to establish first ever comprehensive program to reduce greenhouse gases.

2008

SCAQMD adopts Climate Change Policy.

2011

Federal agencies and the State of California establish single timeframe for corporate average fuel economy (CAFE) and greenhouse gas standards for the next generation of cars and light-duty trucks.

2014-2027

Projected achievement of current air quality health standards in South Coast air basin.

South Coast
Air Quality Management District

21865 Copley Drive
Diamond Bar, CA 91765-4178

www.aqmd.gov

South Coast Air Quality Management District

ANNIVERSARY 25 YEAR 1988 to 2018

Clean Fuels Program

MARCH 2018

2017 Annual Report & 2018 Plan Update

Technology Advancement Office

Leading the way to zero and near-zero emission technologies

Cover Photo Credits

Main Cover Photo:

- Fuel cell Class 8 truck – DOE ZECT Program

Top Row (left to right)

- Transit bus equipped with near-zero emission CNG Cummins 8.9L engine
- Battery electric school bus with vehicle-to-grid technology
- Hydrogen refueler for Class 8 trucks

Middle Row

- Near-zero emission CNG Cummins 8.9L engine
- Anaerobic digester – RNG production with SoCalGas pipeline injection
- DC fast charger for battery electric vehicles

Bottom Row

- Class 8 truck equipped with near-zero Cummins 11.9L engine operating on RNG
- Zero emission class 8 trucks
- Mobi: mobile auxiliary power and fast charger
- Battery electric Class 8 truck

Governing Board

Chairman
William A. Burke, Ed.D.
Assembly Speaker Appointee

County Representatives
Marion Ashley
Supervisor, Riverside County

Shawn Nelson
Supervisor, Orange County

Janice Rutherford*
Supervisor, San Bernardino County

Hilda L. Solis*
Supervisor, Los Angeles County

State Representatives
Joseph K. Lyou, Ph.D.
Governor's Appointee

Vice Chairman
Dr. Clark E. Parker, Sr.
Senate Rules Committee Appointee

Cities Representatives
Ben Benoit
Mayor, City of Wildomar
Riverside County Cities

Joe Buscaino**
Council Member, City of Los Angeles
City of Los Angeles

Michael Cacciotti
Council Member, City of South Pasadena
Los Angeles County, Eastern Region Cities

Larry McCallon*
Mayor, City of Highland
San Bernardino County Cities

Judith Mitchell*
Mayor Pro Tem, City of Rolling Hills Estates
Los Angeles County, Western Region Cities

Dwight Robinson*
Council Member, City of Lake Forest
Orange County Cities

Executive Officer
Wayne Nastri

*Technology Committee Members **Technology Committee Chairman

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This year's Annual Report and Plan Update
is dedicated in remembrance of

Dr. Vernon P. Roan, Jr.

University of Florida, Professor Emeritus

Founding Member of the SB 98 Clean Fuels Advisory Group
Serving from 1999 to 2017,
As a scientific and academic community representative.

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South Coast Air Quality Management District

Technology Advancement Office

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Vicki White, Technology Implementation Manager
Lourdes Cordova Martinez, Sr. Public Affairs Manager

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Adewale Oshinuga, Program Supervisor
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Michael Laybourn, Air Quality Specialist
Diana Thai, Air Quality Engineer II

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EXECUTIVE SUMMARY

Introduction

The South Coast Air Quality Management District (SCAQMD) is the air pollution control agency for all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties. This region, which encompasses all of the South Coast Air Basin plus small portions of the Mojave Desert and Salton Sea Air Basins, historically experiences the worst air quality in the nation due to the natural geographic and atmospheric conditions of the region, coupled with the high population density and associated mobile and stationary source emissions.

This year will mark the 30th year of the Clean Fuels Program, along with establishment of the Technology Advancement Office (TAO). It was in 1988 that SB 2297 (Rosenthal) was signed into law (Chapter 1546). It initially established a "five-year program to increase the use of clean fuels," but subsequent legislation extended and eventually removed the sunset clause for the Program. The Clean Fuels Program affords the SCAQMD the ability to fund research, development, demonstration and accelerated deployment of clean fuels and transportation technologies.

Using funding received through a $1 motor vehicle registration fee, the Clean Fuels Program has encouraged, fostered and supported clean fuels and transportation technologies, such as hydrogen and fuel cells, natural gas engines and infrastructure, battery electric vehicles, plug-in hybrid electric vehicles and related fueling infrastructure. A key strategy of the Program, which allows significant leveraging of the Clean Fuels funding (typically $3-$4 to every $1 of Clean Fuels funds), is its public-private partnership with private industry, technology developers, academic institutions, research institutions and government agencies. Further, while SCAQMD aggressively seeks to leverage funds to accomplish more with every dollar, it also strives to be a leader in technology development and commercialization to accelerate the reduction of criteria pollutants. As a result, the TAO Clean Fuels Program has traditionally supported a portfolio of technologies, in different stages of maturity, to provide a continuum of emission reductions and health benefits over time. This approach provides the greatest flexibility and optimizes the region's ability to achieve the National Ambient Air Quality Standards (NAAQS).

Health & Safety Code (H&SC) 40448.5.1 requires the SCAQMD to prepare, and submit to the Legislative Analyst each year, a Clean Fuels Annual Report and Plan Update. The Clean Fuels Annual Report looks at what the Program accomplished in the prior calendar year (CY) and the Clean Fuels Plan Update looks ahead at proposed projects for the next CY, essentially re-calibrating the technical emphasis of the Program. Preliminary review and comment by SCAQMD's Governing Board, advisory groups, technical experts and other interested parties are incorporated into the final Plan Update, along with the Clean Fuels Annual Report, which are due to the Legislative Analyst by March 31 of every year.

Setting the Stage

The overall strategy of TAO's Clean Fuels Program is based, in large part, on emission reduction technology needs identified through the Air Quality Management Plan (AQMP) process and the SCAQMD Governing Board's directives to protect the health of the approximately 17 million residents (nearly half the population of California) in the South Coast Basin. The AQMP, which is updated approximately every four years, is the long-term regional "blueprint" that relies on fair-share emission reductions from all jurisdictional levels (e.g., federal, state and local). The 2016 AQMP, which was adopted by the SCAQMD Governing Board in March 2017, is composed of stationary and mobile

source emission reductions from traditional regulatory control measures, incentive-based programs, projected co-benefits from climate change programs, mobile source strategies, and reductions from federally regulated sources (e.g., aircraft, locomotives and ocean-going vessels).

The emission reductions and control measures in the 2016 AQMP rely on a mix of currently available technologies as well as the expedited development and commercialization of lower-emitting mobile and stationary advanced technologies in the Basin to achieve health-based air quality standards. The 2016 AQMP projects that an approximate 45 percent reduction in NOx is required by 2023 and an additional 55 percent reduction by 2031. Figure 1 illustrates these needed NOx reductions in the South Coast Basin. The majority of these NOx reductions must come from mobile sources, both on- and off-road. Notably, the SCAQMD is currently only one of two regions in the nation designated as an extreme ozone nonattainment area (the other is San Joaquin Valley). Ground level ozone (a key component of smog) is created by a chemical reaction between NOx and volatile organic compound (VOC) emissions in sunlight. This is especially noteworthy because in the South Coast Air Basin the primary driver for ozone formation is NOx emissions, and mobile sources contribute approximately 88 percent of the NOx emissions in this region, as shown in Figure 2. Furthermore, NOx emissions, along with VOC emissions, also lead to the formation of PM2.5 [particulate matter measuring 2.5 microns or less in size, expressed as micrograms per cubic meter ($\mu g/m^3$)].

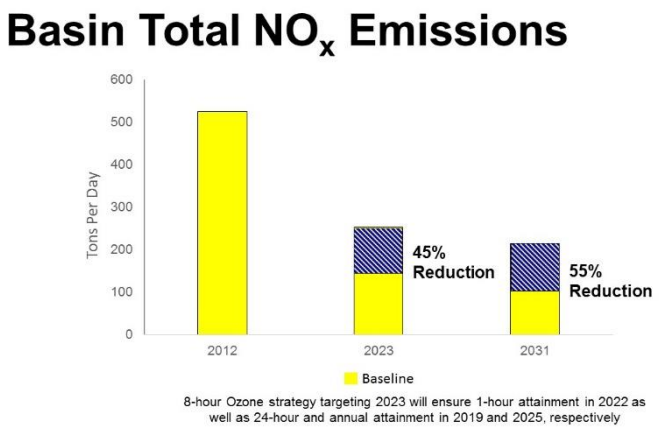


Figure 1: Total NOx Reductions Needed

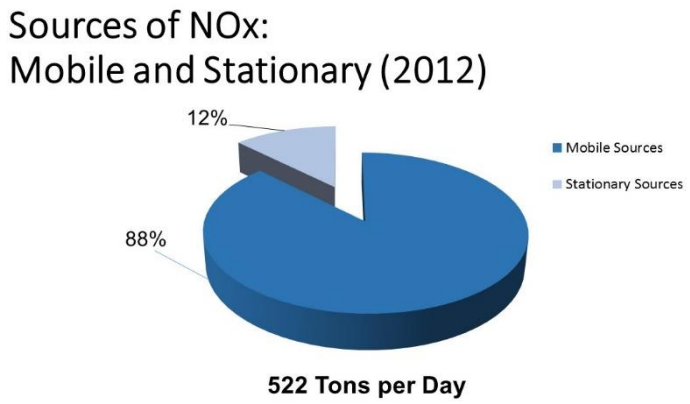
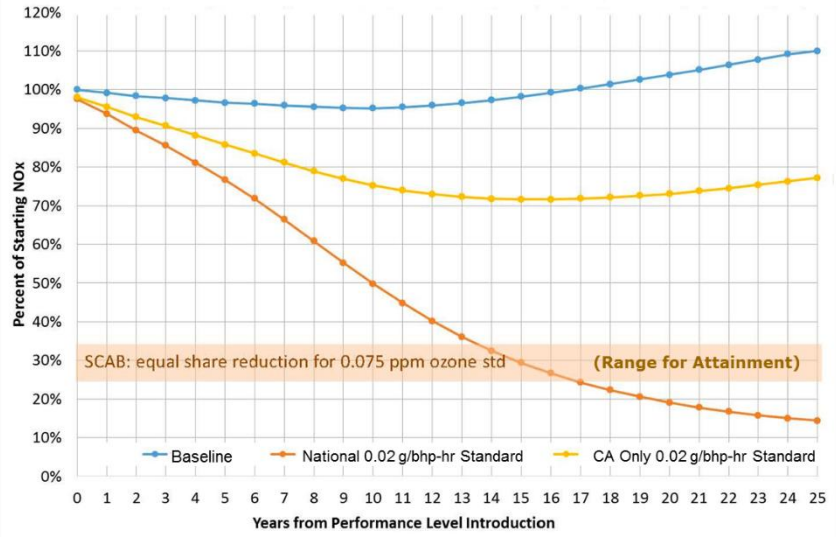


Figure 2: Sources of NOx 2012 Base Year

On a positive note, the 2016 AQMP for the first time envisions Southern California achieving attainment through regulations and incentives and identifies the clean technologies to be deployed that were formerly undefined as "blackbox" measures. This is due, in part, because the needed zero and near-zero technologies are being commercialized or nearing commercialization, albeit with deployment pathways that still require more specificity and scalability. Also, additional NOx and VOC emission reduction co-benefits are expected from carbon dioxide (CO2) reductions resulting from California's climate change policies, together with funding to incentivize the deployment of these cleaner technologies. There are significant challenges to attaining the air quality standards, however, including the need for the U.S. Environmental Protection Agency (U.S. EPA) and California Air Resources Board (CARB) to lower the heavy-duty engine exhaust NOx standard from 0.2 grams per brake horsepower-hour (g/bhp-hr) to an already commercially achievable (by natural gas powered engines) 0.02 g/bhp-hr.

Finally, financial resources will need to be identified that could be utilized to offset the higher procurement costs of these emerging clean technologies.

In June 2016, SCAQMD and 10 co-petitioners requested the U.S. EPA Administrator to undertake rulemaking to revise the national on-road heavy-duty engine exhaust NOx emission standard from 0.2 g/bhp-hr to 0.02 g/bhp-hr. It was recommended that the regulation be implemented by January 2022 or if not feasible, by January 2024, with a phase-in starting in January 1, 2022. A national standard (as opposed to only a California standard) is estimated to result in NOx emission reductions from this source category from 70 to 90 percent in 14 to 25 years, respectively. Given that the Basin must attain the 75 ppb ozone NAAQS by 2031 (within the next 13 years), a new on-road heavy-duty engine exhaust emissions standard for NOx is critical given the time needed for such standards to be adopted, for manufacturers to develop and produce compliant vehicles, and for national fleet turnover to occur.



Source: Presentation by Mr. Cory Palmer, CARB, at Symposium on California's Development of its Phase 2 GHG Emission Standards for On-Road Heavy-Duty Vehicles (April 22, 2015)

Figure 3: NOx Reduction Comparison: No New Regulations vs Low NOx Standard in California only vs National Standard

Figure 3 (above-right) shows the difference in NOx reductions from heavy-duty trucks between baseline (i.e., no new regulations) emissions (in blue), a low NOx standard adopted only in California (yellow), and reductions if the same low NOx standard is implemented nationally (orange).

Clean Fuels Program

Due to these daunting challenges to reduce NOx and PM2.5 to meet health-based air quality standards, the Clean Fuels Program is more important than ever to encourage and accelerate the advancement and commercialization of clean fuel and transportation technologies.

Below is a brief summary of the contents of the 2017 Clean Fuels Program Annual Report and 2018 Plan Update. Every new Plan Update is reviewed by two advisory groups--the Clean Fuels Advisory Group and the Technology Advancement Advisory Group. These two groups meet approximately every six months to provide expert analysis and feedback on potential projects and areas of focus. They are also briefed and comment on the accomplishments of the prior year in the context of the annual report. The membership of these two bodies is in Appendix A. For more information on this review process, refer to Program Review (page 2). Further review of the Clean Fuels Program is detailed under Strategy and Impact (page 15).

2017 Annual Report

In CY 2017, the SCAQMD Clean Fuels Program executed 59 new contracts, projects or studies and modified 8 continuing projects adding dollars toward research, development, demonstration and deployment (RDD&D) projects as well as technology assessment and transfer of alternative fuel and clean fuel technologies. An additional 8 revenue agreements totaling $14.3 million were also executed. Table 2 (page 36) lists the 67 projects or studies, which are further described in this report. The SCAQMD Clean Fuels Program contributed nearly $17.9 million in partnership with other governmental organizations, private industry, academia and research institutes, and interested parties, with total project costs of more than $118.7 million. The $17.9 million includes $6.2 million recognized into the Clean Fuels Fund as pass-through funds from project partners to facilitate project administration by the Clean Fuels Program. Table 3 (page 39) provides information on this outside funding received into the Clean Fuels Fund. In addition, in CY 2017, the Clean Fuels Program continued to leverage other outside funding opportunities, securing new awards totaling $20.5 million from federal, state and local funding opportunities. Table 4 (page 40) provides a comprehensive summary of these federal, state and local revenues awarded to the SCAQMD during CY 2017. Similar to the prior year, the significant project scope of a few key contracts executed in 2017 resulted in higher than average leveraging of Clean Fuels dollars. Typical leveraging is $3-$4 for every $1 in Clean Fuels funding. In 2016, leveraging was $1:$9; in 2017, SCAQMD continued this upward trend with more than $6 leveraged for every $1 in Clean Fuels funds. Leveraging dollars and aggressively pursuing funding opportunities are more important than ever given the magnitude of additional funding identified in the 2016 AQMP to achieve federal ozone air quality standards.

The projects or studies executed in 2017 included a diverse mix of advanced technologies. The following core areas of technology advancement for 2017 executed contracts (in order of funding percentage) include:

1. Electric and Hybrid Vehicle Technologies and Related Infrastructure (emphasizing electric and hybrid electric trucks and container transport technologies with zero emission operations);
2. Fuels and Emission Studies;
3. Engine Systems/Technologies (emphasizing alternative and renewable fuels for truck and rail applications);
4. Hydrogen and Mobile Fuel Cell Technologies and Infrastructure;
5. Technology Assessment and Transfer/Outreach; and
6. Fueling Infrastructure and Deployment (predominantly natural gas and renewable fuels).

The pie chart on page 34 shows the distribution by percentage of executed agreements in 2017 across these core technologies.

During CY 2017, the SCAQMD supported a variety of projects and technologies, ranging from near-term to long-term RDD&D activities. This “technology portfolio” strategy provides the SCAQMD the ability and flexibility to leverage state and federal funding while also addressing the specific needs of the South Coast Air Basin (Basin). Projects included significant electric and hybrid electric technologies and infrastructure to develop and demonstrate medium- and heavy-duty vehicles in support of transitioning to a zero and near-zero emissions goods movement industry; fuels and emissions studies to conduct in-use testing and fuel characterization and usage profiles as well as evaluating strategies for reducing emissions in the goods movement sector; development, demonstration and deployment of large displacement natural gas engines; and continued demonstration and deployment of electric charging infrastructure; and natural gas and renewable natural gas deployment and support.

In addition to the 67 executed contracts and projects, 19 RDD&D projects or studies and 24 technology assessment and transfer contracts were completed in 2017, as listed in Table 5 (page 72). Appendix C comprises two-page summaries of the technical projects completed in 2017. As of January 1, 2018, there were 94 open contracts in the Clean Fuels Program; Appendix B lists these open contracts by core technology.

In accordance with California Health and Safety Code Section 40448.5.1(d), this annual report must be submitted to the state legislature by March 31, 2018, after approval by the SCAQMD Governing Board.

2018 Plan Update

Every year, staff re-evaluates the Clean Fuels Program to develop a Plan Update based on a reassessment of the technology progress and direction for the agency. The Program continually seeks to support the development and deployment of lower-emitting technologies. The design and implementation of the Program Plan must balance the needs in the various technology sectors with technology readiness, emissions reduction potential and cofunding opportunities. As the state has turned a great deal of its attention to climate change and petroleum reduction goals, the SCAQMD has necessarily remained committed to developing, demonstrating and commercializing technologies that reduce criteria pollutants, specifically NOx. Fortunately many, if not the majority, of these technologies that address the Basin's need for NOx reductions also garner reductions in greenhouse gases (GHG) and petroleum use. Due to these "co-benefits," the SCAQMD has been successful in partnering with the state, which allows the Clean Fuels Program to leverage its funding extensively.

To identify technology and project opportunities where funding can make a significant difference in deploying progressively cleaner technologies in the Basin, the SCAQMD employs a number of outreach and networking activities. These activities range from close involvement with state and federal collaboratives, partnerships and industrial coalitions, to the issuance of Program Opportunity Notices to solicit project ideas and concepts as well as issuance of Requests for Information (RFI) to determine the state of various technologies and the development and commercialization challenges faced by those technologies. For example, in 2016, an RFI was released to solicit information from diesel engine manufacturers and other entities to identify ultra-low NOx emission technology strategies that will result in commercially viable diesel engine technologies, capable of using renewable diesel for on-road heavy-duty vehicles such that they can achieve emission levels 90% below the current 2010 emission standards for NOx and reduce PM emissions to the greatest extent possible. Subsequently, in partnership with CARB and the Port of Los Angeles, staff initiated a project with Southwest Research Institute to develop advanced control systems to lower emissions from large displacement diesel engines, including under low-load and low-temperature conditions. Potential follow-up development, demonstration and certification projects resulting from this RFI are included conceptually within the Draft 2018 Plan Update.

The Plan Update includes projects to develop, demonstrate and commercialize a variety of technologies, from near-term to long-term commercialization, that are intended to provide solutions to the emission control needs identified in the 2016 AQMP. Given the need for significant reductions over the next five to ten years, near-zero and zero emission technologies are emphasized. Areas of focus include:

- reducing emissions from port-related activities, such as cargo handling equipment and container movement technologies, including demonstration and deployment of cargo container movement systems with zero emission range;
- developing and demonstrating ultra-low emission liquid fuel larger displacement engines and zero emission heavy-duty vehicles;
- developing, demonstrating and deploying advanced natural gas engines and zero emission

technologies for high horsepower applications;
- mitigating criteria pollutant increases from renewable fuels, such as renewable natural gas, diesel and hydrogen as well as other renewable fuels and waste streams;
- developing and demonstrating electric-drive (fuel cell, battery, plug-in hybrid and hybrid) technologies across light-, medium- and heavy-duty platforms;
- producing transportation fuels and energy from renewable and waste stream sources; and
- establishing large-scale hydrogen refueling and EV charging infrastructures to help accelerate the introduction zero emission vehicles into the market.

Table 6 (page 89) lists the potential projects across nine core technologies by funding priority:

1. Hydrogen and Mobile Fuel Cell Technologies and Infrastructure;
2. Engine Systems/Technologies (emphasizing alternative and renewable fuels for truck and rail applications);
3. Electric and Hybrid Vehicle Technologies and Related Infrastructure (emphasizing electric and hybrid electric trucks and container transport technologies with zero emission operations);
4. Fueling Infrastructure and Deployment (predominantly natural gas and renewable fuels);
5. Fuel and Emissions Studies;
6. Technology Assessment and Transfer/Outreach;
7. Stationary Clean Fuels Technologies (including renewables);
8. Emission Control Technologies; and
9. Health Impacts Studies.

These potential projects for 2018 total $16.7 million, with anticipated leveraging of more than $4 for every $1 of Clean Fuels funding for total project costs of nearly $70 million. Some of the proposed projects may also be funded by revenue sources other than the Clean Fuels Program, especially VOC and incentive projects.

CLEAN FUELS PROGRAM
Background and Overview

Program Background

The South Coast Air Basin, which comprises all of Orange County and the urban portions of Los Angeles, San Bernardino and Riverside Counties, has the worst air quality in the nation due to a combination of factors, including high vehicle population, high vehicle miles traveled within the region and geographic and atmospheric conditions favorable for photochemical oxidant (smog) formation. This region, which encompasses all of the South Coast Air Basin plus small portions of the Mojave Desert and Salton Sea Air Basins, is home to approximately 17 million people (nearly half the population of California). Due to these confluence of factors which present unique challenges, the state legislature enabled the SCAQMD to implement the Clean Fuels Program to accelerate the implementation and commercialization of clean fuels and advanced mobile source technologies.

In fact, this year will mark the 30th year of the Clean Fuels Program, along with establishment of the Technology Advancement Office (TAO). It was in 1988 that SB 2297 (Rosenthal) was signed into law (Chapter 1546). It initially established a "five-year program to increase the use of clean fuels," but subsequent legislation extended and eventually removed the sunset clause for the Program.

In 1999, further state legislation was passed which amended the Clean Fuels Program. Specifically, as stated in the California Health and Safety Code (H&SC) section 40448.5.1(d), the SCAQMD must submit to the Legislature, on or before March 31 of each year, an annual report that includes:

1. A description of the core technologies that the SCAQMD considers critical to ensure attainment and maintenance of ambient air quality standards and a description of the efforts made to overcome barriers to commercialization of those technologies;
2. An analysis of the impact of the SCAQMD's Clean Fuels Program on the private sector and on research, development and commercialization efforts by major automotive and energy firms, as determined by the SCAQMD;
3. A description of projects funded by the SCAQMD, including a list of recipients, subcontractors, cofunding sources, matching state or federal funds and expected and actual results of each project advancing and implementing clean fuels technology and improving public health;
4. The title and purpose of all projects undertaken pursuant to the Clean Fuels Program, the names of the contractors and subcontractors involved in each project and the amount of money expended for each project;
5. A summary of the progress made toward the goals of the Clean Fuels Program; and
6. Funding priorities identified for the next year and relevant audit information for previous, current and future years covered by the project.

Furthermore, H&SC section 40448.5.1(a)(2) requires the SCAQMD to find that the proposed program and projects funded as part of the Clean Fuels Program will not duplicate any other past or present program or project funded by the state board and other government and utility entities. This finding does not prohibit funding for programs or projects jointly funded with another public or private agency where there is no duplication.

The following section describes the various panels of external experts that helps review the Clean Fuels Program every year.

Program Review

In 1990, the SCAQMD initiated an annual review of its technology advancement program by an external panel of experts. That external review process has evolved, in response to SCAQMD policies and legislative mandates, into two external advisory groups. The Technology Advancement Advisory Group (one of six standing Advisory Groups that make up the SCAQMD Advisory Council) is made up of stakeholders representing industry, academia, regulatory agencies, the scientific community and environmental impacts. The Technology Advancement Advisory Group serves to:

- Coordinate the SCAQMD program with related local, state and national activities;
- Review and assess the overall direction of the program; and
- Identify new project areas and cost-sharing opportunities.

In 1999, the second advisory group was formed as required by SB 98 (Alarcon). Under H&SC Section 40448.5.1(c), this advisory group must comprise 13 members with expertise in clean fuels technology and policy or public health and appointed from the scientific, academic, entrepreneurial, environmental and public health communities. This legislation further specified conflict-of-interest guidelines prohibiting members from advocating expenditures towards projects in which they have professional or economic interests. The objectives of the SB 98 Clean Fuels Advisory Group are to make recommendations regarding projects, plans and reports, including consulting with regarding approval of the required annual report prior for submittal to the SCAQMD Governing Board. Also in 1999, in light of the formation of the SB 98 Clean Fuels Advisory Group, the SCAQMD also revisited the charter and membership of the Technology Advancement Advisory Group to ensure their functions would complement each other.

On an as-needed basis, changes to the composition of the Clean Fuels Advisory Group are reviewed by the SCAQMD Board while changes to the Technology Advancement Advisory Group are reviewed by the SCAQMD Board's Technology Committee. Current membership changes to both advisory groups, if required, will be considered by the SCAQMD Board and its Technology Committee, respectively, as part of consideration of the 2017 Annual Report and 2018 Plan Update. The current members of the SB 98 Clean Fuels Advisory Group and Technology Advancement Advisory Group are listed in Appendix A, with any proposed changes, subject to SCAQMD Board approval, duly noted.

The review process of the Clean Fuels Program now includes, at minimum: 1) two full-day retreats of the both Advisory Groups, typically in the summer and winter; 2) review by other technical experts; 3) occasional technology forums or roundtables bringing together interested parties to discuss specific technology areas; 4) review by the Technology Committee of the SCAQMD Governing Board; 5) a public hearing of the Annual Report and Plan Update before the full SCAQMD Board, along with adoption of a resolution finding that the proposed program and projects funded as part of the Clean Fuels Program will not duplicate any other past or present program or project funded by the state board and other government and utility entities, as required by the H&SC; and 6) finally submittal of the Clean Fuels Program Annual Report and Plan Update to the Legislature by March 31 of every year.

The Need for Advanced Technologies & Clean Fuels

Achieving federal and state clean air standards in Southern California will require emission reductions from both mobile and stationary sources beyond those expected using current technologies. The need for advanced mobile source technologies and clean fuels is best illustrated by Figure 1 below, which identifies just how far NOx emissions must be reduced to meet federal standards by 2023 and 2031.

To fulfill long-term emission reduction targets, the 2016 AQMP relies on a mix of currently available technology as well as the expedited development and demonstration of advanced technologies that are not yet ready for commercial use. Significant reductions are anticipated from implementation of advanced control technologies for both on-road and off-road mobile sources. In addition, the air quality standards for ozone (80 ppb, 8-hour average) and fine particulate matter, promulgated by the U.S. EPA in 1997 and 2006, are projected to require additional long-term control measures for both NOx and VOC. The 2016 AQMP's estimate of needed NOx reductions will require the SCAQMD Clean Fuels Program to encourage and accelerate advancement of clean transportation technologies that are used as control strategies in the AQMP.

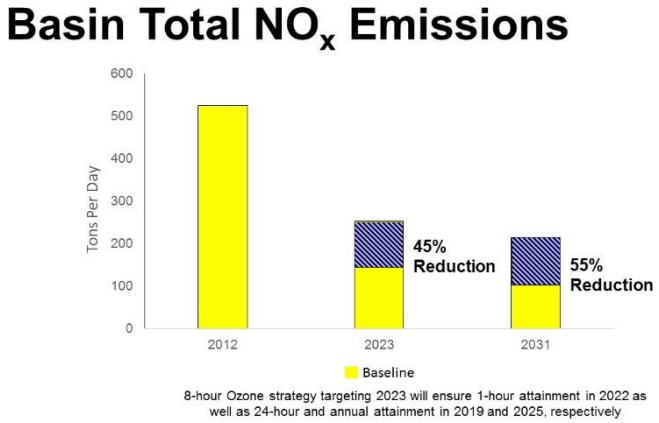


Figure 1: Total NOx Reductions Needed

Health studies also indicate a greater need to reduce NOx emissions and toxic air contaminant emissions. For example, the goal of SCAQMD's Multiple Air Toxics Exposure Study (MATES) IV, completed in 2015, like the prior three MATES efforts, was to assess air toxic levels, update risk characterization, and determine gradients from selected sources. However, MATES IV added ultrafine PM and black carbon monitoring components as well. The study found a dramatic decrease in ambient levels of diesel particulate matter and other air toxics. Diesel PM was still the major driver of air toxics health risks. While the levels and exposures decreased, a revision to the methods used to estimate cancer risk from toxics developed by the California Office of Health Hazard Identification increased the calculated risk estimates from these exposures by a factor of up to three. In 2017, SCAQMD initiated MATES V to update the emissions inventory of toxic air contaminants and modeling to characterize risks, including measurements and analysis of ultrafine particle concentrations typically emitted or converted from vehicle exhaust.

The emission reductions needed for this region are outlined further in CARB's draft "Mobile Source Strategy" (May 2016)[1], which is an integrated plan to transform California's mobile sector. Specifically, it calls for California to build upon its successful efforts to meet critical air quality and climate goals, as summarized below:

- Attaining federal health-based air quality standards for ozone in 2023 and 2031 in the South Coast and San Joaquin Valley, and fine particulate matter (PM2.5) standards in the next decade;
- Achieving GHG emission reduction targets of 40 percent below 1990 levels by 2030;
- Reducing our petroleum use by up to 50 percent by 2030;
- Minimizing health risk from exposure to toxic air contaminants; and
- Increasing energy efficiency and deriving 50 percent of our electricity from renewable sources by 2030.

The CARB document focuses on mobile sources, both on- and off-road equipment, that are responsible for approximately 80 percent of smog-forming NOx emissions, 95 percent of diesel particulate matter emissions and 50 percent of GHG emissions in California. In the South Coast Air Basin the primary

[1] https://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf

driver for ozone formation is NOx emissions, and mobile sources contribute approximately 88 percent of the NOx emissions in this region, as shown in Figure 2. Given this contribution, significant cuts in pollution from these sources are needed, therefore the proposed mobile source strategy calls for establishing requirements for cleaner technologies (both zero and near-zero) and deploying these technologies into the fleet, requiring cleaner and renewable fuels, and ensuring continued clean performance in use. Actions to accelerate the deployment of cleaner technologies through incentives, efficiency increases in moving people and freight, and support for the use of advanced transportation technologies such as intelligent transportation systems and autonomous vehicles, are also needed. Taken together, these actions would provide the reductions necessary from mobile sources to achieve the air quality and climate goals outlined above.

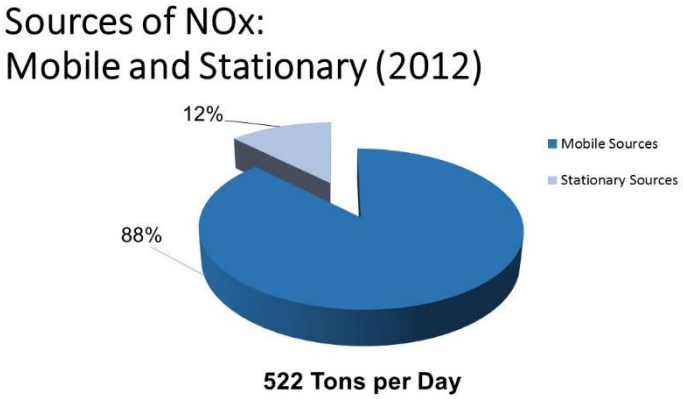


Figure 2: Sources of NOx 2012 Base Year

Subsequently, in November 2016, CARB released a revised draft of the Short Lived Climate Pollutant strategy to address emissions from methane, black carbon and hydrofluorocarbons (HFCs). And in 2017, an updated California Sustainable Freight Action Plan[2] (CSFAP) incorporating pilot projects was released. The CSFAP outlines a transition to a more efficient, economically competitive, and cleaner freight transport system.

In summary, advanced, energy efficient and renewable technologies are needed not only for attainment, but also to protect the health of those who reside within the SCAQMD's jurisdiction; to reduce long-term dependence on petroleum-based fuels; and to support a more sustainable energy future. Conventional strategies and traditional supply and consumption need to be retooled in order to achieve the federal air quality goals. To help meet this need for advanced, clean technologies, the SCAQMD Board continues to aggressively carry out the Clean Fuels Program and promote alternative fuels through its Technology Advancement Office.

The Clean Fuels Program is intended to assist in the accelerated development and deployment of progressively lower-emitting technologies and fuels through innovative public-private partnership. Since its inception, SCAQMD's TAO has cofunded projects in cooperative partnerships with private industry, technology developers, academic and research institutions and local, state and federal agencies. The following sections describe program funding, provide a 2017 overview and describe core technologies of the Clean Fuels Program.

Program Funding

The Clean Fuels Program is established under California H&SC Sections 40448.5 and 40512 and Vehicle Code Section 9250.11. This legislation establishes mechanisms to collect revenues from mobile and stationary sources to support the program objectives and identifies the constraints on the use of funds. In 2008, these funding mechanisms were reauthorized under SB 1646 (Padilla), which removed the funding sunset of January 1, 2010, and established the five percent administrative cap instead of the

[2] http://www.casustainablefreight.org/

previous cap of two-and-half percent.

Specifically, the Program is funded through a $1 fee on motor vehicles registered in the SCAQMD. Revenues collected from these motor vehicles must be used to support mobile source projects. Stationary source projects are funded by an emission fee surcharge on stationary sources emitting more than 250 tons of pollutants per year within the SCAQMD. For CY 2017, the funds available through each of these mechanisms were as follows:

- Mobile sources (DMV revenues) $13,610,601
- Stationary sources (emission fee surcharge) $330,224

The SCAQMD Clean Fuels Program also receives grants and cost-sharing revenue contracts from various agencies, on a project-specific basis, that supplement the SCAQMD program. Historically, such cooperative project funding revenues have been received from CARB, the CEC, the U.S. EPA, the U.S. Department of Energy (DOE) and the U.S. Department of Transportation (DOT). These supplemental revenues depend in large part on the originating agency, its budgetary and planning cycle and the specific project or intended use of the revenues.

Table 3 (page 39) lists the supplemental grants and revenues totaling $6.2 million for contracts executed in CY 2017.

Table 4 (page 40) lists the federal and state revenue totaling nearly $20.5 million awarded to the SCAQMD in 2017 for projects that will be part of the Clean Fuels Program or align well and complement the Clean Fuels Program.

The final and perhaps most significant funding source can best be described as an indirect source, i.e., funding not directly received by the SCAQMD. This indirect source is the cost-sharing provided by private industry and other public and private organizations. Historically, the Technology Advancement Office has been successful in leveraging its available public funds with $3 to $4 of outside funding for each $1 of SCAQMD funding. For 2017, the Clean Fuels Program leveraged each $1 to more than $6 of outside funding. Similar to last year, this atypical leverage was the result of a few key contracts with significant project scopes executed in 2017, such as the $23 million award from CARB's California Climate Investment Program (see Table 2 for more information on these key projects). Through these public-private partnership, the SCAQMD has shared the investment risk of developing new technologies along with the benefits of expedited development and commercial availability, increased end-user acceptance, reduced emissions from the demonstration projects and ultimately increased use of clean technologies in the Basin. While the SCAQMD aggressively seeks leverage funds to accomplish more with every dollar, it also strives to be a leader in technology development and commercialization in an effort to accelerate the reduction of criteria pollutants. Leveraging dollars and aggressively applying for additional funds whenever funding opportunities arise is more important than ever given the magnitude of additional funding identified in the 2016 AQMP to achieve federal ozone air quality standards. The SCAQMD's Clean Fuels Program has also avoided duplicative efforts by coordinating and jointly funding projects with major funding agencies and organizations. The major funding partners for 2017 are listed in Table 1 (page 16).

2017 Overview

This report summarizes the progress of the SCAQMD Clean Fuels Program for CY 2017. The SCAQMD Clean Fuels Program cosponsors projects to develop and demonstrate zero, near-zero and low emission clean fuels and advanced technologies and to promote commercialization and deployment of promising or proven technologies in Southern California. These projects are conducted through public-private partnerships with industry, technology developers, academic and research institutes and local, state and federal agencies.

This report also highlights achievements and summarizes project costs of the SCAQMD Clean Fuels Program in CY 2017. During the period between January 1 and December 31, 2017, the SCAQMD executed 59 new contracts, projects or studies and modified 8 continuing projects adding dollars during CY 2017 that support clean fuels and advanced zero, near-zero and low emission technologies. The SCAQMD Clean Fuels Program contribution for these projects was approximately $17.9 million, inclusive of $6.2 million received into the Clean Fuels Fund as cost-share for contracts executed in this reporting period. Total project costs exceed $118.7 million. These projects address a wide range of issues with a diverse technology mix. The report not only provides information on outside funding received into the Clean Fuels Fund as cost-share for contracts executed in this period (summarized in Table 3, page 39), but also funds awarded to the SCAQMD for projects to be included in the Clean Fuels Program or which align well and are complementary to the Clean Fuels Program ($20.5 million in 2017, see Table 4). More details on this financial summary can be found later in this report. The SCAQMD will continue to pursue federal, state and private funding opportunities in 2018 to amplify leverage, while acknowledging that support of a promising technology is not contingent on outside cost-sharing and affirming that SCAQMD will remain committed to being a leader in developing advanced technologies that lower criteria pollutants.

Core Technologies

Given the diversity of sources that contribute to the air quality problems in the Basin, there is no single technology or "Silver Bullet" that can solve all of the problems. A number of technologies are required and these technologies represent a wide range of applications, with full emissions benefit "payoffs," i.e., full commercialization and mass deployment occurring at different times. The broad technology areas of focus – the "Core Technologies" – for the Clean Fuels Program are as follows:

- Hydrogen and Fuel Cell Technologies and Infrastructure (especially large-scale refueling facilities)
- Engine Systems/Technologies (emphasizing heavy-duty alternative and renewable fuel engines for truck and rail applications)
- Electric and Hybrid Vehicle Technologies and Infrastructure (emphasizing electric and hybrid electric trucks and container transport technologies with zero emission operation)
- Fueling Infrastructure and Deployment (predominantly natural gas and renewable fuels)
- Fuels and Emissions Studies
- Technology Assessment and Transfer/Outreach
- Stationary Clean Fuels Technologies
- Emission Control Technologies
- Health Impacts Studies

The SCAQMD continually seeks to support the deployment of lower-emitting technologies. The Clean Fuels Program is shaped by two basic factors:

1. Low, near-zero and zero emission technologies needed to achieve clean air standards in the Basin; and
2. Available funding to support technology development within the constraints imposed by that funding.

The SCAQMD strives to maintain a flexible program to address dynamically evolving technologies and the latest progress in the state of the technology while balancing the needs in the various technology sectors with technology readiness, emissions reduction potential and cofunding opportunities. Although the SCAQMD program is significant, national and international activities affect the direction of

technology trends. As a result, the SCAQMD program must be flexible in order to leverage and accommodate these changes in state, national and international priorities. Nonetheless, while the state and federal governments have in recent years turned a great deal of their attention to climate change, SCAQMD has remained committed to developing, demonstrating and commercializing zero and near-zero emission technologies. Fortunately many, if not the majority, of technology sectors that address our need for NOx reductions also garner greenhouse gas (GHG) reductions. Due to these "co-benefits," the SCAQMD has been successful in partnering with the state and federal government. Even with the leveraged funds, the challenge for the SCAQMD remains the need to identify project or technology opportunities in which its available funding can make a difference in achieving progressively cleaner air in the Basin.

To achieve this, the SCAQMD will need to continue to employ a number of outreach and networking activities as well as evaluate new ways to expand these activities. Typical activities range from intimate involvement with state and federal collaboratives, partnerships and industrial coalitions, to the issuance of Program Opportunity Notices to solicit project ideas and concepts as well as the issuance of Requests for Information to determine the state of various technologies and the challenges faced by those technologies for commercialization. While employing a number of creative outreach and networking activities to try to overcome these challenges, SCAQMD's TAO annually develops a comprehensive plan to encourage and accelerate the development and demonstration of cleaner technologies. Every year TAO staff re-evaluates the Clean Fuels Program to develop a comprehensive plan (referred to as the 2017 Plan Update within this document) to essentially re-assess the technology progress and direction for the agency.

Historically, mobile source projects have targeted low-emission developments in automobiles, transit buses, medium- and heavy-duty trucks and non-road applications. These vehicle-related efforts have focused on advancements in engine design, electric power-trains and energy storage/conversion devices (e.g., fuel cells and batteries); and implementation of clean fuels (e.g., natural gas, propane and hydrogen) including their infrastructure development. Stationary source projects have included a wide array of advanced low NOx technologies and clean energy alternatives such as fuel cells, solar power and other renewable and waste energy systems. The focus on recent years has been on zero and near-zero emission technologies to reduce emissions from mobile sources, which contribute to more than 80 percent of the current NOx emissions in this region. However, while mobile sources include both on- and off-road vehicles as well as aircraft and ships, only the federal government has the authority to regulate emissions from aircraft and ships. The SCAQMD is exploring opportunities to expand its authority in ways that would allow the agency to do more to foster technology development for ship and train activities as well as locomotives as they relate to goods movement.

Specific projects are selected for cofunding from competitive solicitations, cooperative agency agreements and unsolicited proposals. Criteria considered in project selection include emissions reduction potential, technological innovation, potential to reduce costs and improve cost effectiveness, contractor experience and capabilities, overall environmental impacts or benefits, commercialization and business development potential, cost sharing and cost-sharing partners, and consistency with program goals and funding constraints. The core technologies for the SCAQMD programs that meet both the funding constraints as well as 2016 AQMP needs for achieving clean air are briefly described below.

Hydrogen and Mobile Fuel Cell Technologies and Infrastructure

Toyota and Hyundai commercialized light-duty fuel cell vehicles in 2015, Honda started delivering their Fuel Cell Clarity in 2016, and numerous others have plans to commercialize their own in the near future. As automakers continue to collaborate on development efforts (e.g., Honda and GM) and commercialize fuel cell vehicles, in the interim plug-in hybrid technology could help enable fuel cells

by using larger capacity batteries until fuel cell components mature. For example, Mercedes-Benz announced production of a plug-in fuel cell model GLC for 2018, with U.S. availability approximately late 2019. However, the greatest challenge for the viability of fuel cell vehicles remains the installation and operations of hydrogen fueling stations. AB 8 requires the CEC to allocate $20 million annually from the Alternative and Renewable Fuel and Vehicle Technology Program until there are at least 100 publicly accessible hydrogen stations in operation in California. Of the 65 stations funded by CEC and CARB by the end of 2017, partially funded by SCAQMD for those in our region, there are five non-retail and 31 retail operational in California, but most if not all 65 are expected to be operational by the end of 2019 with capacity for more than 10,000 fuel cell vehicles. AB 8 also requires CARB to annually assess current and future FCVs and hydrogen stations in the marketplace. *The Joint Agency Staff Report on Assembly Bill 8: 2017 Annual Assessment of Time and Cost Needed to Attain 100 Hydrogen Refueling Stations in California*[3] released in December 2017 reporting on 2017 findings states that there were 2,473 fuel cell vehicles registered in California by October 2017. However, CARB's 2017 Annual Evaluation projects 13,400 FCEVs in California by 2020 and 37,400 by the end of 2023. Clearly, the SCAQMD must continue to support the infrastructure required to refuel retail fuel cell vehicles. To that end, SCAQMD is also actively engaged in finding alternatives to reducing the cost of hydrogen (e.g., large-scale hydrogen refueling stations) and potential longer term fuel cell power plant technology.

Engine Systems/Technologies

Medium- and heavy-duty on-road vehicles contributed approximately 33 percent of the Basin's NOx based on 2016 AQMP data. More importantly, on-road heavy-duty diesel trucks account for 33 percent of the on-road mobile source PM2.5, a known toxic air contaminant. Furthermore, according to CARB, trucks and buses are responsible for 37 percent of California's greenhouse gases and criteria emissions. These figures notably do not include the significant contribution from off-road mobile sources, which contribute significantly to NOx and PM2.5 emissions in the Basin. Furthermore, while MATES IV found a dramatic decrease in ambient levels of diesel PM and other air toxics, diesel PM is still the major driver of air toxics health risks. Clearly, significant emission reductions will be required from mobile sources, especially from the heavy-duty sector, to attain the federal clean air standards.

The use of alternative fuels in heavy-duty vehicles can provide significant reductions in NOx and particulate emissions. The current NOx emissions standard for heavy-duty engines is 0.2 g/bhp- hr. The SCAQMD, along with various local, state and federal agencies, continues to support the development and demonstration of alternative-fueled low emission heavy-duty engine technologies, using natural gas, renewable natural gas or hydrogen, renewable diesel and potentially other renewable or waste stream fuels, for applications in heavy-duty transport trucks, transit and school buses, rail operations, and refuse collection and delivery vehicles to meet future federal emission standards.

In connection with the challenge to develop cleaner engine systems, on June 3, 2016, the EPA received a Petition, led by SCAQMD and joined by many other state air quality management agencies, to initiate rulemaking guidelines to create a national standard for ultra-low NOx heavy-duty engines. The EPA has since acknowledged a need for additional NOx reductions through a harmonized and comprehensive national NOx reduction program for heavy duty on-highway engines and vehicles. The EPA has initiated action towards proposed rulemaking for a revised heavy-duty NOx program, with the intent of proposing standards that could begin model year 2024, consistent with the lead-time requirements of the Clean Air Act and the AQMP goals. If EPA adopts a more stringent heavy-duty NOx standard for the nation, engine manufacturers will be required to step up further to develop cleaner engines, and this region will also benefit from cleaner vehicles coming into the state as part of the goods movement industry.

[3] http://www.energy.ca.gov/2017publications/CEC-600-2017-011/CEC-600-2017-011.pdf

Electric and Hybrid Vehicle Technologies and Infrastructure

There has been an increased level of activity and attention on electric and hybrid vehicles due to a confluence of factors, including the highly successful commercial introductions of hybrid passenger vehicles and more recently plug-in electric vehicles (PEVs) by almost all of the automakers and increased public attention on global warming, as well as several Executive Orders issued by Governor Brown over the last couple of years. The Governor's most recent Executive Order, which was issued on January 26, 2018, calls for 5 million ZEVs by 2030.

The growing awareness by both government and the public for the need for better air quality is leading to stricter emissions targets and a demand for greater fuel efficiency for vehicles. As a result, there is now a window of opportunity to leverage state and federal activities in the development and deployment of technologies that can accelerate advanced electric and hybrid technologies, including medium- and heavy-duty hybrid vehicle deployment, energy storage technologies and other power options, development of medium- and heavy-duty hybrid emission certification cycles, battery durability testing and establishment of driver use patterns. Such technology developments, if successful, are considered enabling because they can be applied to a variety of fuels (e.g., gasoline, natural gas, biofuels and hydrogen) and propulsion systems - e.g., internal combustion engines (ICEs), batteries and fuel cells. In particular, utilizing electric drive technologies to enable zero emission mile capable heavy-duty trucks for goods movement remains a top priority.

EV adoption surpassed a huge milestone in 2107, selling more than 360,000 cumulative electric vehicles in California, according to Veloz (formerly the PEV Collaborative), with increasingly more announcements by international automakers (e.g., Mercedes-Benz, Volkswagen-Audi-Porsche and several growing Chinese brands) on a variety of electrification plans, including some with extended zero emission range. Joining the trend with Tesla Model 3 to longer electric ranges and faster charging, the 2017 Chevy Bolt EV, with an estimated EPA range of 238 miles and an affordable price after incentives, was a best seller. However, in order to achieve the fleet penetration required for clean air, the need for charging infrastructure is significant. One sign of progress in this area is last year's California Public Utility Commission action recognizing the need for transportation electrification and approving Southern California Edison's (SCE's) $22 million "Charge Ready" pilot program to support installation of as many as 1,500 EV charging stations in their service territory. The SCAQMD will work with SCE to identify the best strategy for EV infrastructure (e.g., destination and residential charging) to complement this new program and continue to work with CEC, other government agencies and private entities to implement installation of charging infrastructure in our region. In January 2018, SCE detailed plans for four pilot programs aimed at accelerating the electrification of the state's transportation, with half the projects focused on fleet and heavy-duty uses. SCAQMD plans to closely follow the progress of these pilot programs to determine how they might mesh with our own programs.

Fueling Infrastructure and Deployment (NG/RNG)

A key element for increased use of alternative fueled vehicles and resulting widespread acceptance is the availability of the supporting refueling infrastructure. The refueling infrastructure for gasoline and diesel fuel is well established and accepted by the driving public. Alternative, clean fuels such as alcohol-based fuels, propane, hydrogen, and even electricity are much less available or accessible, whereas natural gas and renewable fuels have recently become more readily available and cost-effective. Nonetheless, to realize emissions reduction benefits, alternative fuel infrastructure, especially fuels from renewable feedstocks, must be developed in tandem with the growth in alternative fueled vehicles. While California appears to be on track to meet its Renewable Portfolio Standard targets of 33% by 2020 and 50% by 2030 as required by SB 350 (chaptered October 2015), the objectives of the SCAQMD are to expand the infrastructure to support zero and near-zero emission vehicles through the development, demonstration and installation of alternative fuel vehicle refueling technologies.

However, this category is predominantly targeted at natural gas and renewable natural gas (RNG) infrastructure and deployment (electric and hydrogen fueling are included in their respective technology categories). Changes to the Carl Moyer Program as a result of SB 513 (chaptered October 2015) may help stimulate deployment of alternative and natural gas vehicles and related infrastructure. The Clean Fuels Program will continue to examine opportunities where current incentive funding is either absent or insufficient. Market offerings such as Ford's 2016 F-150 which has the ability to run on natural gas may help further spur demand in this area.

Health Impacts, Fuel and Emissions Studies

The monitoring of pollutants in the Basin is extremely important, especially when focused on (1) a particular sector of the emissions inventory (to identify the responsible technology) or (2) exposure to pollution (to assess the potential health risks). Several studies indicate that areas with high levels of air pollution can produce irreversible damage to children's lungs. This information highlights the need for further emissions and health studies to identify the emissions from high polluting sectors as well as the health effects resulting from these technologies. Considering the transition to alternative and renewable fuels, accelerated by federal and state requirements, it is important to understand the impacts that changing fuel composition will have on exhaust emissions and in turn on ambient air quality. This area focuses on exhaust emission studies, with a focus on NOx and PM2.5 emissions and a detailed review of other potential toxic tailpipe emissions, for alternative fuel and diesel engines, especially in the heavy-duty sector, as well as light- and heavy-duty engines that operate on renewable fuels or higher compression spark- ignited engines. These types of in-use emissions studies have found significantly higher emissions than certification values for heavy-duty diesel engines, depending on the duty-cycle.

Stationary Clean Fuel Technologies

Given the limited funding available to support low emission stationary source technology development, this area has historically been limited in scope. To gain the maximum air quality benefits in this category, higher polluting fossil fuel-fired electric power generation needs to be replaced with clean, renewable energy resources or other advanced near zero-emission technologies, such as solar, wind, geo-thermal energy, bio-mass conversion and stationary fuel cells. Although combustion sources are lumped together as stationary, the design and operating principles vary significantly and thus also the methods and technologies for control of their emissions. Included in the stationary category are boilers, heaters, gas turbines and reciprocating engines. The key technologies for this category focus on using advanced combustion processes, development of catalytic add-on controls, alternative fuels and technologies and stationary fuel cells in novel applications.

Emission Control Technologies

This broad category refers to technologies that could be deployed on existing mobile sources, aircraft, locomotives, marine vessels, farm and construction equipment, cargo handling equipment, industrial equipment, and utility and lawn-and-garden equipment. The in-use fleet comprises the majority of emissions, especially the older vehicles and non-road sources, which are typically uncontrolled and unregulated, or controlled to a much lesser extent than on-road vehicles. The authority to develop and implement regulations for retrofit on-road and non-road mobile sources lies primarily with the U.S. EPA and CARB.

Low-emission and clean-fuel technologies that appear promising for on-road mobile sources should be effective at reducing emissions from a number of non-road sources. For example, immediate benefits are possible from particulate traps and selective catalytic reduction (SCR) that have been developed for diesel applications. Clean fuels such as natural gas, propane, hydrogen and hydrogen-natural gas mixtures may also provide an effective option to reduce emissions from some non-road applications. Reformulated gasoline, ethanol and alternative diesel fuels, such as biodiesel and gas-to-liquid (GTL),

also show promise when used in conjunction with advanced emissions controls and new engine technologies.

Technology Assessment and Transfer/Outreach

Since the value of the Clean Fuels Program depends on the deployment and adoption of the demonstrated technologies, technology assessment and transfer efforts are essential to its success. This core area encompasses assessment of advanced technologies, including retaining outside technical assistance as needed, efforts to expedite the implementation of low emission and clean fuels technologies, and coordination of these activities with other organizations. Technology transfer efforts also include support for various clean fuel vehicle incentive programs. The other spectrum of this core technology is information dissemination to educate the end user and increase awareness. While SCAQMD's Public Affairs office oversees and carries out the majority of such education and awareness efforts on behalf of the entire agency, TAO cosponsors and occasionally hosts various technology-related events to complement their efforts. These efforts range from general outreach and partnerships to convening or cosponsoring events. Some examples include: 1) partnerships with local colleges such as Cal State Los Angeles' Hydrogen Research and Fueling Facility; 2) SCAQMD's A World We Can Change high school conferences; 3) participation in the Jet Propulsion Laboratory's Annual Climate Day for middle schoolers promoting STEM education; 4) partnerships for national events such as Drive Electric Week; and 5) hosting tours of SCAQMD's clean fuel vehicle fleet and their respective fueling platforms.

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CLEAN FUELS PROGRAM
Barriers, Scope and Impact

Overcoming Barriers

Commercialization and implementation of advanced technologies come with a variety of challenges and barriers. A combination of real-world demonstrations, education, outreach and regulatory impetus and incentives is necessary to bring new, clean technologies to market. To reap the maximum emissions benefits from any technology, widespread deployment and user acceptance must occur. The product manufacturers must overcome technical and market barriers to ensure a competitive and sustainable business. Barriers include project-specific issues as well as general technology concerns.

Technology Implementation Barriers

- Viable commercialization Path
- Technology price/performance parity with convention technology
- Consumer acceptance
- Fuel availability/convenience issues
- Certification, safety and regulatory barriers
- Quantifying emissions benefits
- Sustainability of market and technology

Project-Specific Issues

- Identifying a committed demonstration site
- Overall project cost and cost-share using public monies
- Securing the fuel
- Identifying and resolving real and perceived safety issues
- Quantifying the actual emissions benefits
- Viability of the technology provider

Other barriers include reduced or shrinking research budgets, infrastructure and energy uncertainties and risks, sensitivity to multi-media environmental impacts and the need to find balance between environmental needs and economic constraints. The SCAQMD seeks to address these barriers by establishing relationships through unique public-private partnerships with key stakeholders; e.g., industry, end-users and other government agencies with a stake in developing clean technologies. Partnerships that involve all the key stakeholders have become essential to address these challenges in bringing advanced technologies from development to commercialization.

Each of these stakeholders and partners contributes more than just funding. Industry, for example, can contribute technology production expertise as well as the experience required for compatibility with process operations. Academic and research institutes bring state-of-the- technology knowledge and testing proficiency. Governmental and regulatory agencies can provide guidance in identifying sources with the greatest potential for emissions reduction, assistance in permitting and compliance issues, coordinating of infrastructure needs and facilitation of standards setting and educational outreach. Often, there is considerable synergy in developing technologies that address multiple goals of public and private bodies regarding the environment, energy and transportation.

Scope and Benefits of the Clean Fuels Program

Since the time needed to overcome barriers can be long and the costs high, both manufacturers and end-users tend to be discouraged from considering advanced technologies. The Clean Fuels Program addresses these needs by cofunding research, development, demonstration and deployment projects to share the risk of emerging technologies with their developers and eventual users.

Figure 3 provides a conceptual design of the wide scope of the Clean Fuels Program. As mentioned in the Core Technologies section, various stages of technology projects are funded not only to provide a portfolio of emissions technology choices but to achieve emission reduction benefits in the nearer as well as over the longer term.

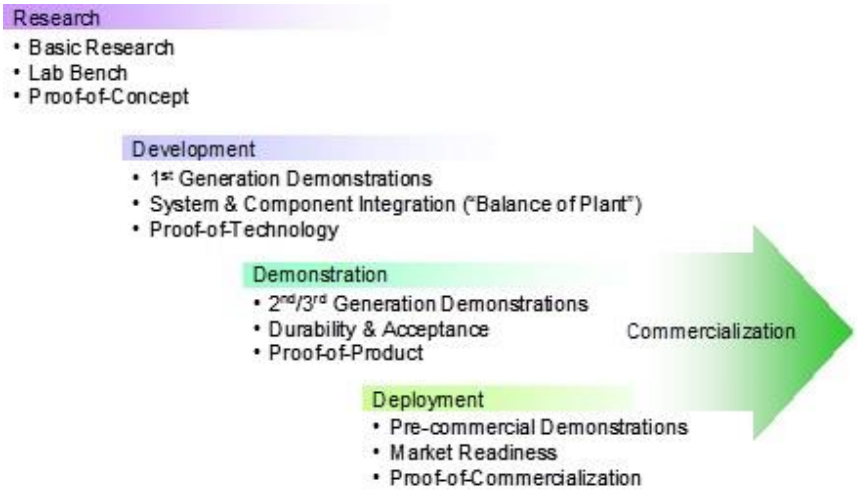


Figure 3: Stages of Clean Fuels Program Projects

Due to the nature of these advanced technology research, development, demonstration and deployment projects, the benefits are difficult to quantify since their full emission reduction potential may not be realized until sometime in the future, or perhaps not at all if displaced by superior technologies. Nevertheless, a good indication of the impact and benefits of the Clean Fuels Program overall is provided by this selective list of sponsored projects that have resulted in commercialized products or helped to advance the state-of-the-technology.

- CNG Engine Development for Heavy-Duty Vehicles
  - Cummins Westport: low-NOx natural gas ISL G 8.9L and 12L engines (0.2 & 0.02 g/bhp-hr);
  - Detroit Diesel: Series 60G (CNG/LNG), Series 50G (CNG/LNG); and
  - Clean Air Partners/Power Systems (Caterpillar): 3126B (Dual Fuel), C-10 (Dual Fuel), C-12 (Dual Fuel).
- Fuel Cell Development and Demonstrations
  - Ballard Fuel Cell Bus (first of its kind);
  - Retail light-duty passenger fuel cell vehicles (Toyota Mirai, Hyundai Tucson, Honda Clarity);
  - SunLine Transit Agency Advanced Fuel Cell Bus projects;
  - Commercial stationary fuel cell demonstration with UTC and SoCalGas (first of its kind);
  - Orange County Sanitation District hydrogen and combined heat and power generation from biogas using molten carbonate fuel cell technology (as well as their renewable hydrogen station);
  - New Flyer and El Dorado Transit Bus at OCTA;
  - UPS demonstration of fuel cell delivery trucks; and
  - Fuel cell Class 8 trucks under Zero Emission Cargo Transport (ZECT) II Program

- Electric and Hybrid Electric Vehicle Development and Demonstrations
  - Plug-in Hybrid Electric Van with EPRI, DaimlerChrysler and SCE;
  - Hybrid electric delivery trucks with NREL, FedEx and UPS;
  - Proterra battery electric transit bus and fast charging system;
  - Municipal battery electric utility truck;
  - South Bay City Council of Governments' electric vehicle project;
  - EVI/UPS electric truck;
  - Plug-in hybrid work truck with Odyne Systems;
  - Plug-in hybrid van and pickup with VIA Motors;
  - BYD all-electric transit bus and trucks (yard hostlers and drayage);
  - LACMTA battery electric buses;
  - Electric school buses, including V2G capability;
  - TransPower/US Hybrid battery electric heavy-duty truck and yard hostlers; and
  - PACCAR (Kenworth and Peterbilt) battery-electric and plug-in hybrid electric drayage trucks.
- Aftertreatment Technologies for Heavy-Duty Vehicles
  - Johnson Matthey and Engelhard trap demonstrations on buses and construction equipment;
  - Johnson Matthey SCRT and SCCRT NOx and PM reduction control devices on heavy-duty on-road trucks; and
  - Southwest Research Institute development of aftertreatment for medium-duty diesel engines

SCAQMD played a leading or major role in the development of these technologies, but their benefits could not have been achieved without all stakeholders (i.e., manufacturer, end-users and government) working collectively to overcome the technology, market and project-specific barriers encountered at every stage of the research, development, demonstration and deployment process.

Strategy and Impact

In addition to the feedback and input detailed in Program Review (page 2), the SCAQMD actively seeks additional partners for its program through participation in various working groups, committees and task forces. This participation has resulted in coordination of the SCAQMD program with a number of state and federal government organizations, including CARB, CEC, U.S. EPA and DOE/DOT and several of the national laboratories. Coordination also includes the AB 2766 Discretionary Fund Program administered by the Mobile Source Air Pollution Reduction Review Committee (MSRC), various local air districts, National Association of Fleet Administrators (NAFA), major local transit districts and local gas and electric utilities. The list of organizations with which the SCAQMD coordinates research and development activities also includes organizations specified in H&SC Section 40448.5.1(a)(2).

In addition, the SCAQMD holds periodic meetings with several organizations specifically to review and coordinate program and project plans. For example, the SCAQMD staff meets with CARB staff to review research and development plans, discuss project areas of mutual interest, avoid duplicative efforts and identify potential opportunities for cost-sharing. Periodic meetings are also held with industry-oriented research and development organizations, including but not limited to the California Fuel Cell Partnership (CaFCP), the California Stationary Fuel Cell Collaborative, the California Natural Gas Vehicle Partnership (CNGVP), the California Hydrogen Business Council (CHBC), the Electric Power Research Institute (EPRI), the SoCalEV Collaborative and the West Coast Collaborative, which is part of the National Clean Diesel Campaign. The coordination efforts with these various stakeholders have resulted in a number of cosponsored projects.

Descriptions of some of the key contracts executed in CY 2017 are provided in the next section of this report. It is noteworthy that most of the projects are cosponsored by various funding organizations and include the active involvement of original equipment manufacturers (OEMs). Such partnerships are essential to address commercialization barriers and to help expedite the implementation of advanced low emission technologies. Table 1 below lists the major funding agency partners and manufacturers actively involved in SCAQMD projects for this reporting period. It is important to note that, although not listed, there are many other technology developers, small manufacturers and project participants who make important contributions critical to the success of the SCAQMD program. These partners are identified in the more detailed 2017 Project Summaries (beginning page 41) contained within this report.

Table 1: SCAQMD Major Funding Partners in CY 2017

Research Funding Organizations	**Major Manufacturers/Providers**
California Air Resources Board	BYD Motors Inc.
California Energy Commission	Cummins Westport, Inc.
National Renewable Energy Laboratory	Hydrogenics USA Inc.
Department of Energy	Kenworth Truck Company
Department of Transportation	North American Repower LLC
U.S. Environmental Protection Agency	Peterbilt Motors
West Virginia University Research Corporation	Ports of Los Angeles & Long Beach
Local Air Districts & Utilities	Odyne Systems, LLC
Bay Area AQMD	Orange County Transportation Authority
San Diego APCD	University of California Riverside/ CE-CERT
San Joaquin APCD	VeRail Technologies Inc.
Southern California Edison	Volvo Technology of America LLC
Southern California Gas Company	
San Diego Gas & Electric/Sempra Energy	

The following two subsections broadly address the SCAQMD's impact and benefits by describing specific examples of accomplishments including commercial or near-commercial products supported by the Clean Fuels Program in CY 2017. Such examples are provided in the following sections on the Technology Advancement Office's Research, Development and Demonstration projects and Technology Deployment and Commercialization efforts.

Research, Development and Demonstration

Important examples of the impact of the SCAQMD research and development coordination efforts in 2017 include: (a) the California Collaborative Advanced Technology Drayage Truck Demonstration (b) Development and Demonstration of Medium-Duty (Class 5-7) Plug-In Hybrid Electric Vehicles (PHEVs) for Work Truck Applications; (c) Development and Demonstration of Ten Transit Fuel Cell Buses; and (d) Development of Retrofit Technology for Natural Gas Engines and In-Use Emissions Testing of On-Road Heavy-Duty Trucks.

California Collaborative Advanced Technology Drayage Truck Demonstration

The SCAQMD and the other four large air districts in the state[4] jointly partnered to develop the most commercially promising zero and near-zero emissions drayage truck technologies. Guided by extensive commercialization research, the partnership successfully engaged three major U.S. original equipment manufacturers' (OEMs), an international OEM leader in heavy-duty electrification, and two of the foremost zero emission technology integrators in order to leverage past success to drive true product development stages in a targeted portfolio of zero emission and near-zero emission technologies and increased efficiency solutions. These vehicles will support the diverse geographic and operational challenges across the state's interconnected goods movement system and include: 1) plug-in battery-electric trucks (BYD and Peterbilt-TransPower), 2) natural gas range-extended electric with plug-in charging trucks (Kenworth-BAE), and 3) plug-in diesel hybrid electric with ITS (Volvo). This exceptional portfolio features demonstrations of truly commercial pathway trucks with some of the largest goods movement service providers. This is significant because major OEMs can bring necessary engineering resources, manufacturing capability and a distribution-service network to support the future commercialization of these demonstration vehicles. The partnership also includes Los Angeles County Metro's participation with ITS efficiency integration, electric utility participation, and 13 confirmed end-user fleets experienced with the specific challenges and opportunities associated with early technology integration efforts. Each air district is committing staffing, significant cost-share, and fleet demonstration oversight to support this groundbreaking commercialization initiative, as everyone collectively pools resources to validate and drive to market economically viable solutions to the criteria pollutant and GHGs associated with drayage truck and goods movement operations throughout the state.

The collective experience has shown that there is no "silver-bullet" zero emission technology solution, and each air district faces highly individualized drayage economies and operational challenges. The SCAQMD needs drayage technologies capable of meeting the localized work in the Ports of Long Beach and Los Angeles and also technologies that can complete roundtrips to the warehousing centers throughout the Inland Empire. The BAAQMD needs technologies to support operations in and around the Port of Oakland, and also operations that connect the Port with the Central Valley. The SDAPCD is targeting demonstration efforts on port-specific and highly localized local operations, though these same fleets operate throughout Southern California. The SJVAPCD supports operations in and around the Port of Stockton, in addition to significant goods movement traffic that connects to other air districts along the I-5 corridor, with approximately 45% of all of the truck traffic within the state's four major trade corridors occurring within the San Joaquin Valley. For both SJVAPCD and SMAQMD, unique circumstances, such as distances and bordering mountain passes, pose challenges for the adoption of pure zero emission technologies.

In order to rapidly commercialize a commercially viable mix of the most promising Class 8 drayage technologies for the California marketplace, this collaborative project will: 1) build class 8 products based on existing battery-electric, plug-in hybrid and range-extender truck technologies; 2) integrate cooperative intelligent transportation system (C-ITS) and efficiency innovations into a near-zero emission truck product; 3) work with experienced, confirmed early-adopter fleets throughout the state to demonstrate and optimize product offerings; and 4) facilitate large-scale knowledge and technology transfer via new and expanded partnerships with the nation's foremost heavy-duty OEMs and zero emission technology developers:

[4]Bay Area Air Quality Management District (BAAQMD), Sacramento Metropolitan Air Quality Management District (SMAQMD), San Diego Air Pollution Control District (SDAQMD) and San Joaquin Valley Air Pollution Control District (SJVAPCD)

- BYD will develop a 100% battery-electric drayage truck that is optimized to serve near-dock and short regional drayage routes. BYD is a global company with over $9 billion in revenue and 180,000 employees, including manufacturing in Lancaster, CA. BYD's clean energy division produces battery storage stations, solar panels and LED lights. In 2003, BYD entered the automotive market and is now the largest selling domestic car manufacturer in China. Their global market strategy is focused on electric transportation, and BYD is the global leader in electric bus and taxi sales, with 5,000 orders in each segment, and trucks are its emerging segment. BYD will develop 25 vehicles under this project.

Figure 4: BYD Battery-Electric Drayage Truck

- Peterbilt, part of the PACCAR Group, has partnered with TransPower to develop two 100% battery-electric drayage truck products for this project, one with an 80-mile range focused on near-dock drayage routes (eight trucks) and an extended-range battery electric truck with a 200 mile range (four trucks) to help serve longer drayage routes, such as Southern California's Inland Empire and routes from the Port of Oakland into Sacramento and the San Joaquin Valley. In 2013, PACCAR achieved 28% of the Class 8 retail market share in the U.S. and Canada. And over the past five years, TransPower has established itself as a zero emission leader, successfully deploying more working, zero emission drayage trucks into actual real-world service in California than any other company.

Figure 5: Peterbilt Electric Truck

- Kenworth, also part of the PACCAR Group, expands its BAE Systems partnership to develop four natural gas range-extended electric trucks that leverage the prototype development under the SCAQMD and DOE ZECT II Program. These vehicles will target longer regional drayage routes, which Kenworth believes will include other regional heavy-haul markets. Kenworth ended 2014 with 14.5% heavy-duty market share for the U.S. and Canada, and BAE systems is a global defense and security company with approximately 100,000 employees worldwide. Its HybriDrive® Systems is a world leader in hybrid electric propulsion technology solutions for the transit bus industry.

Figure 6: Kenworth CNG Hybrid Truck

- Volvo is building on their PHEV diesel hybrid Class 8 truck developed under a SCAQMD and DOE grant. Volvo will continue refinement towards commercialization, including integration of innovative and significant C-ITS efficiency measures, in cooperation with Los Angeles

Figure 7: Volvo Diesel Hybrid Drayage Truck

County Metro. The Volvo Group's combined market share for North American heavy-duty trucks amounts to more than 20%. Volvo will develop two trucks under this project but move through several critical internal product development "gates."

The foundation of this project is formalizing the partnership connecting OEMs that have significant engineering, distribution and service and customer resources with the most promising zero and near-zero technology developers. The stateside district partners leveraged their expertise in successful drayage grant and advanced technology rollouts to engage fleet partners who can demonstrate these technologies in a range of drayage operations. This uniquely collaborative project also welcomes stakeholders such as Los Angeles County Metro to help demonstrate innovative approaches to efficiency with traffic management using C-ITS. Two utilities - Southern California Edison and San Diego Gas & Electric (SDG&E) - are committed to the EVSE planning and implementation efforts to support plug-in charging needs, with SDG&E providing direct cost-share to demonstrate and assess scalable EVSE support. Another partner, Calstart Inc., will help assess expanded markets and next stage deployments to help assist the move to full production.

Development and Demonstration of Medium-Heavy Duty (Class 5-7) PHEVs for Work Truck Applications

The work-truck segment is almost exclusively made up of medium- and heavy-duty vehicles, and is responsible for creating a disproportionate amount of emissions in the South Coast region since they represent a relatively small percentage of the vehicle population, yet are responsible for significant NOx and PM emissions, especially localized emissions within residential neighborhoods. The hybridization and electrification of vehicles in this segment provides one such opportunity to reduce criteria pollutant and greenhouse gas emissions. Additionally, eliminating the need for idling, especially in residential communities, minimizes localized exposure and noise issues.

Figure 8: Medium-Heavy Duty Plug-in Hybrid Work Truck Applications

Earlier development efforts funded by the American Recovery and Reinvestment Act have yielded the first generation modular PHEV system that can be installed on new and retrofit vehicles. In an effort to further lower emissions and improve performance via system optimization, Odyne was awarded $2.9 million from the Department of Energy for further development of existing technology. Odyne partnered with the SCAQMD, Freightliner Trucks, Allison Transmission, National Renewable Energy Laboratory (NREL), Oak Ridge National Laboratory (ORNL), Duke Energy, Sempra Energy, AVL and LG Chem to design, develop and demonstrate a new generation of medium-heavy duty (Class 5-7) PHEV work truck that achieves a significant reduction in fuel consumption versus a conventional vehicle baseline. The plug-in hybrid technology includes idle reduction, launch assist, regenerative

braking, in-cab climate controls and exportable power, improving vehicle efficiency while driving and eliminating idling and emissions during operation at a jobsite. This project will address significant improvements in powertrain integration and adaptive control, a higher level of hybridization, fully electric jobsite operation and low cost modular battery pack solution through integrated three development streams into a final vehicle.

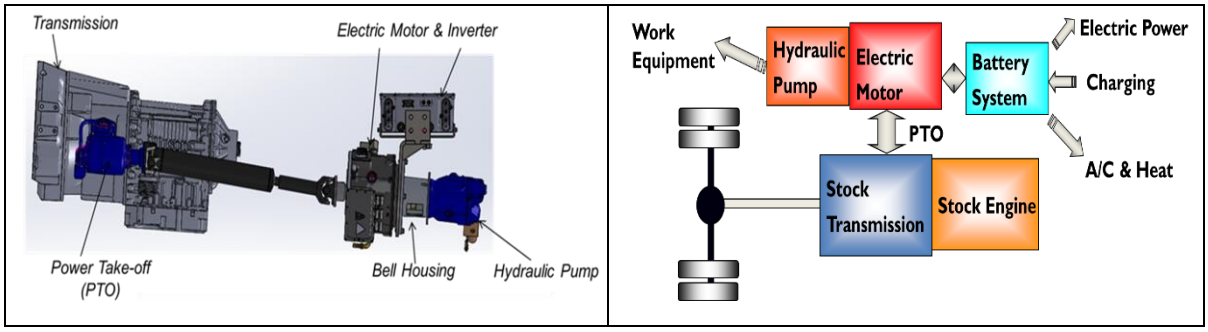


Figure 9: Odyne Power Take-Off (PTO) System

The primary objectives of this project are:

- To improve the hybrid driving mode of the existing Odyne's PHEV system with a targeted improvement of 50% fuel economy gain when compared to a conventional work truck.
- To improve the base cost of the existing system through the development and integration of a modular lithium-ion battery pack based on automotive light duty cells.
- To optimize the system and selected powertrain components for high volume production to enhance commercial appeal through lower-cost products and components.
- To quantify improvements in fuel economy and emissions. The project will gather vehicle and component performance data during deployment that will enable the operating cost and environmental impact of the vehicle to be assessed.

This hybridization of transportation technologies has the potential to lower criteria pollutant emissions and reduce GHGs. This can provide substantial air quality benefits to communities, neighborhoods and schools where these vehicles operate.

Development and Demonstration of Ten Fuel Cell Transit Buses

The SCAQMD has identified the development and deployment of zero emission transit buses as one of the key strategies towards attaining the federal air quality standards, as well as the technology transfer potential to other heavy-duty vehicles including drayage trucks. This is consistent with the goods movement strategy for zero emission technologies and infrastructure in heavy-duty vehicle categories proposed in SCAQMD's 2016 Air Quality Management Plan, SCAG's 2016 *Regional Transportation Plan* as well as the joint CARB, SCAQMD and SJVAPCD *Vision for Clean Air: A Framework for Air Quality and Climate Planning*. Zero emission transit bus deployment is proposed through the year 2040 to meet goals outlined in the 2016 *Regional Transportation Plan/Sustainable Communities Strategy*.

As part of a $45 million development and demonstration project, the Center for Transportation and the Environment (CTE) was awarded a $22 million grant from CARB through its Low Carbon Transportation Greenhouse Gas Reduction Fund (GGRF) Investments Grant Program. Project partners include CARB, SCAQMD, BAAQMD, CTE, New Flyer and Ballard Power Systems. SCAQMD provided $1 million in cost-share to develop and demonstrate 10 zero emission fuel cell transit buses for the Orange County Transportation Authority (OCTA). As a part of this project, Trillium CNG working with Air Products and Chemicals Inc. will also construct and maintain a hydrogen refueling station. The fuel cell buses will be on a New Flyer Xcelsior® XHE40 platform with a Ballard Power Systems fuel cell. CTE anticipates that these fuel cell buses will be in service at the transit agencies by December 2018. Ten fuel cell buses and an upgraded hydrogen refueling station will also be demonstrated at AC Transit in Northern California. The New Flyer 40-foot transit bus will be assigned to five OCTA routes serving disadvantaged communities near its bus depot in Santa Ana. These routes are shown in Figure 10.

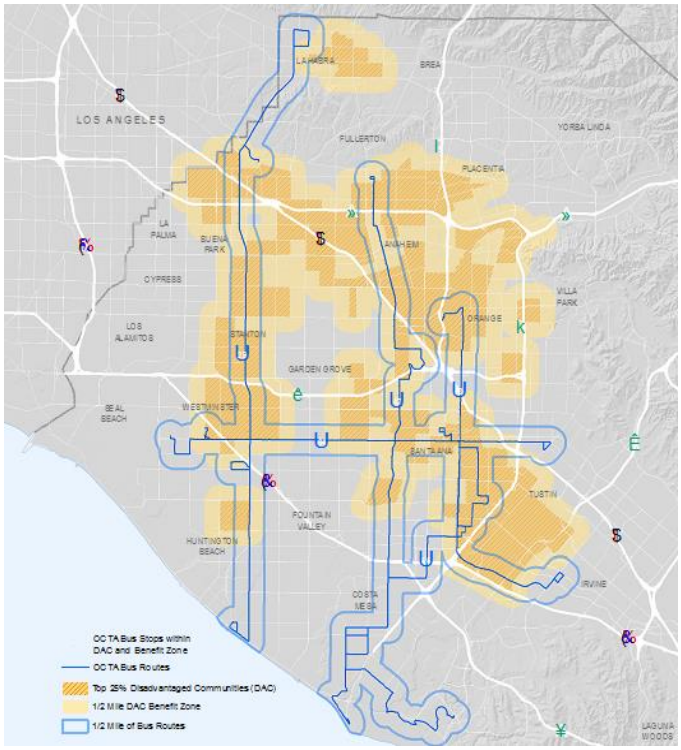


Figure 10: OCTA Routes in Disadvantaged Communities

The New Flyer 40-foot XHE 40 platform builds upon a weight reduced Xcelsior® platform, with more than 6,000 buses sold in 35-foot, 40-foot and 60-foot versions. This ensures that transit agencies can count on reliability and expect a 12-year, 500,000-mile equipment life typical for an urban transit bus.

New Flyer will be the primary integrator of battery electric and fuel cell technology, utilizing a combination of batteries, fuel cell and hydrogen storage. The electric drive system enables the fuel cell to operate at a relative steady state, while the batteries will feature regenerative breaking and power for acceleration. Technology advancements for this version of the New Flyer fuel cell transit bus include a Siemens modular electric hybrid traction system with the highest degree of flexibility, inverters and system controls which has been deployed on over 3,000 vehicles worldwide, and an efficient permanent magnet electric traction motor that has been deployed since 2008. For the battery pack, New Flyer customizes its own 80 kWh lithium-iron-phosphate battery pack with a proprietary liquid cooled system to maintain ideal battery temperatures. The battery electric version of the New Flyer XHE 40 bus passed all Federal Transit Administration's Altoona testing, designed to ensure better reliability and in-service performance of transit buses by providing an unbiased and accurate comparison of bus models through the use of an established set of test procedures.

Figure 11: New Flyer Xcelsior® XHE 40 Bus

New Flyer will be partnering with Ballard Fuel Cells to integrate Ballard's proton exchange membrane (PEM) fuel cell technology into the XHE 40 bus to incorporate a commercially available Ballard FCveloCity® HD 85 kW fuel cell, which has a proven durability of over 20,000 hours of operation in the field without failure. Hydrogen storage will be roof-mounted as on the CNG fueled Xcelsior® XN40 model with 38 kg of hydrogen fuel tanks at 350 bar pressure. The hydrogen storage system is compatible with fast-fill requirements using SAE's J2601-2 and J2578 fueling and safety protocols. The bus is expected to have a range of up to 300 miles. The features of New Flyer's XHE 40 fuel cell transit bus are shown below in Figure 12.

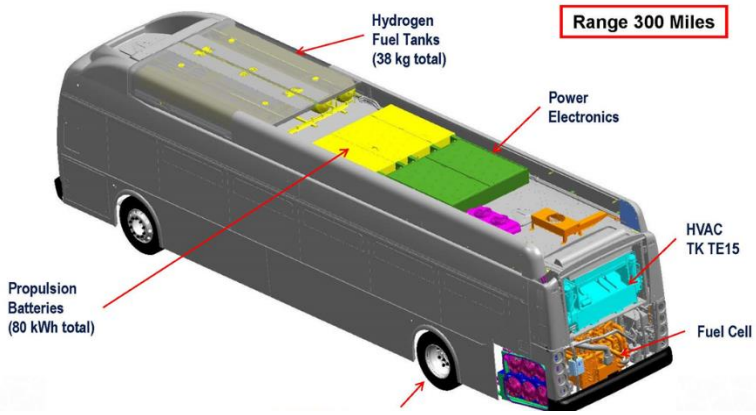


Figure 12: Features of Fuel Cell Transit Bus

Technical specifications, Altoona testing and integration of battery and fuel cell components will occur in 2018. It is anticipated that fuel cell bus deliveries to the transit agencies will be initiated by December 2018, with staggered deployment occurring through 2020; data collection activities and final reporting will be completed by spring 2020.

In November 2017, OCTA approved the execution of a contract with Trillium CNG, Inc., to construct a new hydrogen fueling station at OCTA's headquarters. This will be a fast-fill hydrogen station with 310 kg of high pressure storage capacity at 450 bar, capable of over six back-to-back fills per hour and an average fill time of six minutes.

Figure 13: Transit Bus Hydrogen Fueling Station

In preparation for construction of the new hydrogen fueling station, the OCTA site will have electrical, water, communication, ventilation and gas detection system upgrades. It is anticipated that OCTA's new hydrogen fueling station should be operational by the end of 2018, in time for the first two fuel cell buses to be delivered to OCTA for the beginning of the one year demonstration period. This project will leverage past efforts by AC Transit to demonstrate fuel cell transit buses and infrastructure and OCTA's first demonstration of fuel cell transit buses and infrastructure.

Development of Retrofit Technology for Natural Gas Engines and In-Use Emissions Testing of On-Road Heavy-Duty Trucks

On-road heavy-duty engines are now subject to the 2010 U.S. EPA emissions standards of 0.2 g/bhp-hr NOx and 0.01 g/bhp-hr PM. However, engine manufacturers are still using emission credits which allow them to produce a mixture of engines certified at or below the 2010 NOx emission standard of 0.2 g/bhp-hr NOx and engines certified at a level higher than 0.2 g NOx to comply with emission standards on an average basis. While recent studies have shown NOx and PM emissions are reduced from heavy-duty vehicles powered by modern technology engines, emissions from heavy-duty vehicles still dominate the total basin-wide NOx and PM emissions. In addition, a new heavy-duty natural gas

engines recently certified by CARB achieves a 90% lower NOx emissions level than the current 2010 engine emission standard. Therefore, additional assessment of in-use vehicle emissions remains a critical component for measuring the effectiveness of engine, fuel and aftertreatment technologies and improving emission inventories for air quality modeling and planning as well as developing effective strategies toward achieving the federal ambient air quality standards.

In 2016, the SCAQMD decided to conduct in-use emissions testing, including fuel usage profile characterization as well as an assessment of the impact of current technology and alternative fuels on fuel consumption. The in-use emissions testing would be conducted on heavy-duty vehicles with a gross weight rating greater than 14,000 pounds. The project was designed to involve up to 200 on-road heavy-duty vehicles used in transit, school bus, refuse, delivery and goods movement applications and powered by engines fueled with alternative fuels, conventional and alternative diesel fuels, and a combination of diesel and natural gas (dual) fuels. The engines will be categorized into six groups including natural gas engines certified at or below 0.2 g/bhp-hr NOx, engines certified at or below 0.02 g/bhp-hr NOx, diesel engines certified at or below 0.2 g/bhp-hr NOx, diesel engines without selective catalytic reduction, dual fuel engines and alternative fuel engines (hybrid and fully electric technology). Because of the complexity and breadth of the project, two contractors will complete the project, ensuring reliability and quality assurance of the test results.

Figure 14: Examples of Test Vehicles

West Virginia University (WVU) and the University of California Riverside/College of Engineering-Center for Environmental Research & Technology (UCR/CE-CERT) will be required to instrument test vehicles with portable emissions measurement systems (PEMS), portable vehicle activity measurement systems (PAMS), and other hardware to monitor daily vehicle activities, fuel usage profile and emissions. Both contractors will then use the PEMS' and PAMS' results to recommend whether to develop new and improved or retain existing vocation-based heavy-duty drive cycles.

In addition, they will be required to: 1) perform chassis dynamometer tests of a number of selected test vehicles, 2) instrument a number of test vehicles used in delivery and good movement applications with laboratory-grade test equipment to assess real-world in-use emissions, fuel usage profile and engine aftertreatment technology performance as the vehicles are driven over typical vocation routes, 3) match vehicle technologies to vocations for which technology benefits can be maximized, and 4) provide recommendations on how to prioritize staff and financial resources to support advanced engine and aftertreatment technology research and demonstration programs.

Figure 15: Sample PAMS

Figure 16: Sample PEMS

Emissions analysis will include total hydrocarbon, methane and non-methane hydrocarbon, nitrogen monoxide, nitrous oxide, nitrogen dioxide, carbon monoxide, carbon dioxide, ammonia, particulate matter, and ultrafine emissions at engine-out, tailpipe, and pre and post aftertreatment devices. Additionally, emissions of benzene, toluene, ethylbenzene, xylene, formaldehyde, acetaldehyde, and carbonyl will be assessed. Complementary to the in-use emissions study, UCR/CE-CERT will investigate the physical and chemical composition of secondary organic aerosol formation formed by the reaction of gaseous and particulate emissions from two natural and two diesel heavy-duty vehicles. The in-use emissions study will be used to measure the effectiveness of engine, fuel, and aftertreatment technologies, improve emission inventories for air quality modeling and planning, and match vehicle technologies to vocations for which technology benefits can be maximized as well as develop effective strategies toward achieving the federal ambient air quality standards. The result of the SOA study will provide valuable information on primary and secondary particulate emissions including SOA from in-use heavy-duty diesel and natural gas vehicles and facilitate a discussion on potential mitigation strategies.

Figure 17: Chassis Dynamometers at UCR and WVU

Technology Deployment and Commercialization

One function of the Clean Fuels Program is to help expedite the deployment and commercialization of low and zero emission technologies and fuels needed to meet the requirements of the AQMP control measures. In many cases, new technologies, although considered "commercially available," require assistance to fully demonstrate the technical viability to end-users and decision-makers.

It is important to note here that SCAQMD's Technology Advancement Office (TAO) administers not only the Clean Fuels Program but also the Carl Moyer Program. While the Clean Fuels Program will mark its 30th year in 2018, so too does the Carl Moyer Program[5] achieve a hallmark in 2018. Specifically, it is the 20th year of the Carl Moyer Program. These two programs produce a unique synergy, with the Carl Moyer Program providing the necessary incentives to push market penetration of the technologies developed and demonstrated by the Clean Fuels Program. This synergy enables the SCAQMD through its Clean Fuels Program, coupled with Carl Moyer and other incentive programs TAO oversees, to act as a leader in both technology development and commercialization efforts targeting reduction of criteria pollutants.

This report, however, is required to detail the accomplishments and achievements of the Clean Fuels Program. Therefore, the following projects contracted during CY 2017 illustrate the impact of the SCAQMD's technology deployment and commercialization efforts under the Clean Fuels Program and include: (a) Production and Commercialization of CNG Engines Certified at 0.02 NOx g/bhp-hr; (b) Development, Demonstration and Commercialization of Vehicle-to-Grid Electric School Buses; and

[5]For more information about the Carl Moyer Program and other SCAQMD incentive programs, visit this link: http://www.aqmd.gov/home/programs/business/business-detail?title=heavy-duty-engines&parent=vehicle-engine-upgrades

(c) he California Fuel Cell Partnership and Strides in Fuel Cell Vehicles and Hydrogen Infrastructure.

Production and Commercialization of CNG Engines Certified at 0.02 NOx g/bhp-hr

The development of CNG engines certified 90% below the existing CARB heavy-duty engine NOx standard, under the optional low-NOx standard, has led to successful development, production and commercialization of two CNG engines - an 8.9L and an 11.9L. These commercialized near-zero CNG engines provide additional and vital support towards California's efforts on lowering heavy-duty engine standards, as well as the SCAQMD's petition to the U.S. EPA for a similar national standard.

Cummins Westport, Inc. (CWI), using cost-sharing from SCAQMD, the California Energy Commission, Clean Energy and the Southern California Gas Company, was able to obtain CARB and U.S. EPA certification for both engines at 0.02 g/ bhp-hr for NOx. The intended pathway to commercialization was successful and both engines are now in production. More than a million miles of successful demonstration proved the engines are ready for commercialization, with the 8.9L engine in refuse and other vocational trucks as well as transit and school buses, and the 11.9L in Class 8 drayage trucks and 60-foot articulated transit buses.

Figure 18: CWI's 8.9L Engine

The 11.9L commercialization path is even more significant, since it provides an important alternative to diesel engines, especially for near-term 90% reduction in NOx emissions; and incentive funds, combined with the Clean Air Action Plan adopted by local ports and California's Sustainable Freight Action Plan, are anticipated to accelerate the fleet turnover for drayage trucks. Of the 260,000 diesel trucks operating throughout the South Coast region, approximately 10,000 are drayage trucks operating in and around the Ports. The use of RNG, combined with

The 8.9L has been offered in bus applications and refuse trucks throughout the region and has been eligible for incentive funding, including SCAQMD's Carl Moyer Program, with significant market penetration in the SCAQMD. The use of renewable natural gas (RNG) in the 8.9L engine, considering the funding available through the Low Carbon Fuel Standard Program and shared by the suppliers with the end users, has been a cost-effective option for local transit authorities to reduce criteria pollutant emissions and achieve the GHG reduction goals.

Figure 19: CWI's 11.9L Engine

the 11.9L near-zero emission engine in the drayage truck market is anticipated to be a more cost-effective pathway in the near-term to achieve significant NOx and GHG reduction goals included in the 2016 Air Quality Management Plan. Whilst other alternative technologies, including battery electric and fuel cells, have been announced by OEMS as viable alternatives to ICEs, significant implementation is not anticipated for the next ten years, mainly due to the greater incremental cost and lack of charging/refueling infrastructure.

Development, Demonstration and Commercialization of Vehicle-to-Grid Electric School Buses

The V2G Electric School Bus Demonstration Project was to demonstrate that vehicle-to-grid (V2G) capable school buses can overcome the capital cost barriers associated with EV technology and be financially viable on a total cost-of-ownership basis. In October 2013, the CEC awarded National Strategies, LLC (NSI), a $1,473,488 grant to develop and demonstrate six electric school buses with vehicle-to-grid and vehicle-to-building functionality (V2G/B) in school districts across California. School buses are ideal for V2G/B operation since they typically operate in the morning and afternoon for a few hours but remain parked most of the day. In this project, two of the zero emission school buses were demonstrated in the South Coast Air Basin with Torrance Unified School District (TUSD). The TUSD was awarded $456,552 by SCAQMD for two diesel school buses that were converted to electric buses with vehicle-to-grid (V2G) capability. National Strategies, LLC, was awarded $250,000 from the Clean Fuels Fund to develop and demonstrate V2G technology with TUSD. TUSD's contract closed in 2017, while the contract with NSI closes in 2018.

In collaboration with the V2G School Bus Management Team, comprising TransPower, University of Delaware, the National Renewable Energy Laboratory (NREL) and TUSD, the project has successfully demonstrated a path towards V2G capabilities using the stored battery energy of the TransPower electric school bus to safely and efficiently feed the test grid at NREL's Energy Systems Integration Facility. This project has laid the groundwork for follow on V2G capabilities of the electric school buses, as well as TransPower's entire product line. The project also supported SAE's J3072 (Interconnection Requirements for Onboard, Utility-Interactive Inverter Systems), as well as supported future industry standards for heavy-duty vehicle onboard high power charging systems. The resulting test data from this project has been shared with all our project partners, including Southern California Edison and will support the interconnection agreement at TUSD, enabling real-world demonstration of V2G capabilities and direct monetary benefits to V2G enabled school districts.

Figure 20: Electric School Bus with V2B and V2B Functionality

Because of the encouraging results of V2G Electric School Bus Demonstration, which is ongoing, SCAQMD decided to continue efforts to assist the commercialization of electric school buses and further the development of V2G technology. Blue Bird Body Company (Blue Bird) is one of the largest suppliers of school buses in the South Coast and has previously developed and commercialized alternative fuel buses. Blue Bird has been investigating methods of introducing electric vehicles into the national school bus market for the last decade. In 2010, Blue Bird hired consulting firm NSI to conduct an independent evaluation of market entry strategies. In 2015, Blue Bird reengaged with NSI and in parallel conducted its own independent evaluation of potential electric drivetrain suppliers. DOE recently awarded the Blue Bird Body Company a $4,902,237 grant to develop and demonstrate electric

school buses with V2G capability. SCAQMD is providing $1.9 million towards this follow-up effort.

A unifying, higher-level objective for Blue Bird's targeted technologies is to create a compelling value proposition for electric school buses, mainly by improving performance and efficiency, thereby reducing operating costs, and to create new opportunities for generating revenues through the export of battery power. This strategy led the Blue Bird Team to select three critical powertrain technologies for refinement: automated manual transmission (AMT), battery management system (BMS), and inverter-charger unit (ICU). The first critical success factor for achieving the project goal is leverage – leveraging Blue Bird's position as a leading bus OEM and its capabilities to put an electric bus through a complete OEM safety certification process for the first time; leveraging the millions of dollars their partners have invested and are continuing to invest in AMT technology to drive EVs to new levels of efficiency. Eventually, Blue Bird believes its V2G/V2B focus will leverage the interest of utilities in maintaining the efficiency and stability of the grid and society's need for portable energy sources to provide disaster resiliency, further enhancing the overall value of the project.

The current state of existing programs for full-size electric EV school buses is represented by a handful of vehicle models that have been introduced to the market over the last year. These buses have reported energy efficiency of 1.4 to 1.5 kWh per mile on a defined duty cycle, but most do not include V2G capability. At $325,000 for the entry-level model, the buses are about $215,000 more expensive than conventional California-ready diesel school buses.

Figure 21: Conventional California School Buses Ready For Electrification

The ultimate impacts from the proposed project will unfold at four levels. The first level of impact is the direct technical improvements to the AMT and BMS. The Blue Bird Team is targeting energy efficiency of 1.1 kWh per mile for an improvement around 20-30%. An efficiency gain of this magnitude will enable commensurate reductions in the amount of battery energy storage. Blue Bird expects that once the manufacturing innovations and economies of scale being pursued by the Blue Bird Team hit their stride, battery subsystem costs could be reduced by 50% or more versus the current state.

Figure 22: An Opportunity for Revenue in V2G Capabilities?

The second level of impact will be on the competitive economics of the EV school bus versus conventional diesel buses. The nature and importance of this impact will be documented in a market transformation study and analysis.

The third level of impact will be the displacement of diesel fuel. The national fleet of 500,000 school buses burns an estimated 750 million gallons of diesel fuel per year. Notably, this is 15-20% more than the national fleet of transit buses. Blue Bird believes that under the right circumstances, EV school buses will be taken up rapidly and help meet DOE's 2020 petroleum reduction goal, with growing impacts throughout the ensuing two decades. In addition, each EV bus will have a GHG footprint that is 70-80% smaller than a diesel bus, depending on the carbon intensity of local electricity generation.

The final level of impact will be the acceleration of the entrance of V2G technology into the commercial market. School buses represent an optimal use-case for V2G across all types of vehicles because of their significant energy storage capacity and usage patterns that allow them to be plugged in for 85% of the hours in a year. Once V2G technology and systems appropriate for heavy-duty fleets have been developed for school buses – and revenue benchmarks have been established (projected by the Blue Bird to be $4,000-$6,000 per year per vehicle) – a wide range of other medium- and heavy-duty fleet vehicles could be encouraged to follow the school buses' lead.

As a part of this effort, substantial work will be devoted to each of the three technical innovation modules listed above. All three components have been successfully developed through the proof-of-concept phase. The proposed project will focus on refining their configurations to production-ready designs and component certification and durability testing, including NREL export power testing and UL certification of the bi-directional inverter. Subsequently, the focus of effort shifts to powertrain integration. Blue Bird will build four electric school buses that will be subjected to usual safety and durability test program. This includes crash testing of one-to-two buses and durability testing of another. This will be followed by integration of eight additional buses to be deployed by the Rialto Unified School District (RUSD). The eight production buses, upon receipt of certification from the California Highway Patrol, will be placed into service with RUSD. The final task will be development of a Market Transformation Plan describing in detail how Blue Bird, with the assistance of its team members, will commercialize electric school buses using the demonstrated drive system.

In 2017, incentive funding available for electric school buses has initiated significant interest in this technology, with four OEMs registered under the Hybrid and Zero Emission Truck and Bus Voucher Incentive Project (HVIP) program, and SCAQMD has awarded numerous school districts funds towards this commercialization effort.

The California Fuel Cell Partnership and Strides in Fuel Cell Vehicles (FCVs) and Hydrogen Infrastructure

The California Fuel Cell Partnership (CaFCP) was initiated in 1999 with public and private entities as a means to accelerate response to CARB's ZEV regulations. Because of the alignment of CARB, SCAQMD and CaFCP goals for accelerated fuel cell vehicle commercialization, the SCAQMD Board accepted the CaFCP's formal invitation to join as a full member in March 2000.

Initially, the CaFCP focused on development of vehicles, infrastructure and outreach plans for future projects. Leveraging resources from members including vehicle OEMs, energy providers and government, CaFCP established a goal to accelerate and improve the commercialization process for all categories of vehicles: passenger, bus, truck, etc. The members have a shared vision, refined over time, about the potential of fuel cells as a practical solution to many of California's environmental issues and similar issues around the world. The CaFCP provides a unique forum where infrastructure, technical and interface challenges can be identified early, discussed and potentially resolved through cooperative efforts. The CaFCP has been involved in the demonstration of cars and buses using gaseous and liquid hydrogen and methanol since its inception.

A CaFCP Fuel Scenarios Study resulted in the coordinated demonstration of fuel cell passenger vehicles, and then a limited number of fleet customer placements began in 2002. The CaFCP and

Figure 23: CaFCP Press Event at SCAQMD for Fuel Scenario Study (2001)

members demonstrated several generations of fuel cell cars and buses focused on using increasingly standardized gaseous hydrogen fuel at 350 bar and 700 bar pressures.

Next, several automakers started retail placement of fuel cell vehicles near hydrogen stations in early market communities. The CaFCP staff, with member support, developed a "Roadmap" for the introduction of fuel cell passenger vehicles with sufficient hydrogen fueling stations in California, followed by a "Bus Roadmap" and, most recently, a Medium- & Heavy-Duty Fuel Cell Electric Vehicle Action Plan. These roadmaps and other studies provided technical support for public funding of hydrogen fueling stations.

Figure 24: CaFCP Road Rally started by fueling at first SCAQMD Hydrogen Station (2004)

In January 2012, CARB approved advanced clean car regulations, which harmonized California requirements with federal requirements from 2017–2025 and incorporated GHG emission reductions. The SCAQMD's 2016 AQMP and Clean Fuels Program 2018 Plan Update identify fuel cells for on- and off-road applications as a core technology for attaining and maintaining cleaner air quality.

With the commitment of funding under AB 8 to develop and operate approximately 100 hydrogen retail fueling stations in California through 2023, and the collaboration of California with other states to support ZEVs, automakers are continuing to announce market launches. Some automakers are combining efforts to share intellectual property, build component supply chains and leverage resources - Daimler with Ford and Nissan, Toyota with BMW, and General Motors with Honda. Germany, Japan and South Korea have also committed funding to build more hydrogen stations, and international momentum is building with establishment of the Hydrogen Council in 2017. More recently, California Governor Jerry Brown issued an executive order (#B-48-18 issued 1/16/18) calling for increasing the deployment of zero emission vehicles and developing 200 hydrogen refueling stations.

Figure 25: CaFCP Hydrogen Quality Sampling Adapter

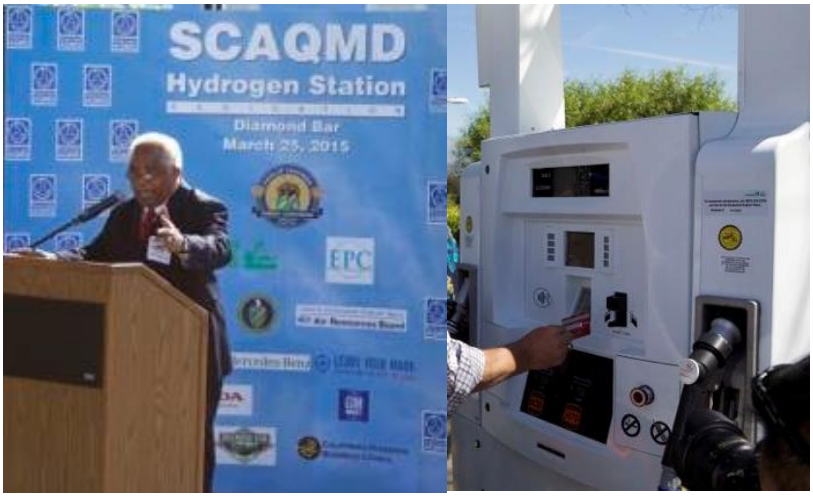
Figure 26: CaFCP Road Rally Visits Santa Monica Pier on the way from Chula Vista, CA, to Vancouver, B.C. (2009)

Figure 27: CaFCP Member SunLine Transit Provides Fuel Cell Bus Transportation for Fuel Cell Seminar (2009)

Figure 28: CaFCP & DOE Provide LA County Fire Dept. Emergency Responder Training (2012)

At the request of SCAQMD, the CaFCP expanded its presence in Southern California due to the increased deployment of vehicles, the largest number of fueling stations and the greatest air quality need in this region. A CaFCP Regional Coordinator based in the South Coast region supports member activities and outreach and an Infrastructure Specialist facilitates hydrogen station development.

Figure 29: SCAQMD Board Member Clark E. Parker, Sr., at SCAQMD Retail H2 Station Event (2015)



Major accomplishments for 2017 include:

- More than 3,000 consumers and fleets have purchased or leased passenger category FCEVs from Hyundai, Toyota and Honda since they entered the commercial market starting in 2015.
- Transit agency members have 20 fuel cell electric buses currently in operation and more than 30 additional funded and to be deployed. Now operating five fuel cell electric buses in regular service, SunLine Transit is planning to add 12 fuel cell transit buses and two shuttle buses by the end of 2018 and is upgrading its hydrogen station.
- There are 31 retail and four other non-retail hydrogen fueling stations in operation in California, with an additional 34 in development, with the majority in the Southern California area.
- CaFCP staff and members continue to conduct outreach and education in communities throughout California.
- CaFCP, the Governor's Office of Business and Economic Development (GO-Biz) and the California Energy Commission, continue advising and responding to city staff across the state of California to optimize station permitting.
- CaFCP created and maintains the Station Operational Status System (SOSS) that more than 30 hydrogen stations in the U.S. use to report status. This data, in turn, feeds real-time information (address, availability, etc.) to consumers through a CaFCP mobile-friendly website and several other apps and systems that support consumers.

While research by multiple entities will be needed to reduce the cost of fuel cells and improve fuel storage and infrastructure, the CaFCP has played a vital role in demonstrating fuel cell vehicle reliability and durability, fueling infrastructure and storage options and increasing public knowledge and acceptance of the vehicles and fueling.

CaFCP's goals relate to preparing for and supporting market launch through coordinated individual and collective effort. CaFCP members, individually or in groups, are focusing on the following important goals:

- Prepare for larger-scale manufacturing, which encompasses cost reduction, supply chain and production.
- Reduce costs of station equipment, increase supply of renewable hydrogen at lower cost, and develop new retail station approaches.
- Support cost reduction through incentives and targeted RDD&D projects.
- Continue research, development and demonstration of advanced concepts in renewable and other low-carbon hydrogen.
- Provide education and outreach to the public and community stakeholders on the role of FCEVs and hydrogen in the evolution to electric drive. With additional support from some CaFCP members to facilitate the foundational work required for the growth of medium- and heavy-duty fuel cell truck and bus deployments, additional tasks for fuel cell truck and bus codes and standards coordination are proposed for 2018:
- Sponsor revision of SAE J2600, Compressed Hydrogen Surface Vehicle Fueling Connection Devices, to include high flow interface geometries and align with ISO 17268.

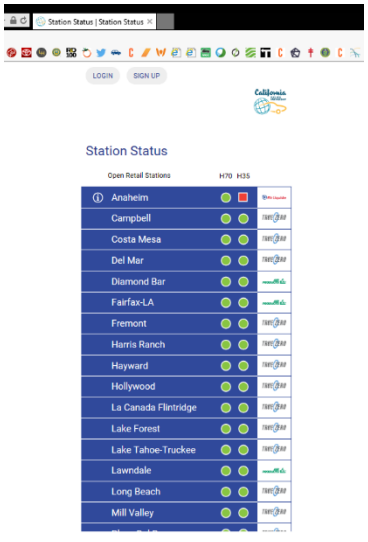


Figure 30: CaFCP SOSS

- Sponsor SAE J2601-2, Fueling Protocol for Gaseous Hydrogen Powered Heavy Duty Vehicles, from Technical Information Report (TIR 2014) to Surface Vehicle Standard & align with J2600 & ISO.
- Update general medium-duty/heavy-duty vehicle and infrastructure safety, codes and standards, and update first responder training.
- Facilitate task forces (truck and bus) and outreach and coordinate a 2018 Fuel Cell Electric Truck (FCET) Action Plan, building on the Project Portal demonstration by Toyota designed to support Class 8 port drayage operations at the Port of Los Angeles.

The next couple of years should continue to achieve huge strides in fuel cell vehicle technology and hydrogen infrastructure growth, supporting a variety of vehicles. SCAQMD plans to continue to be a leader in this core technology area.

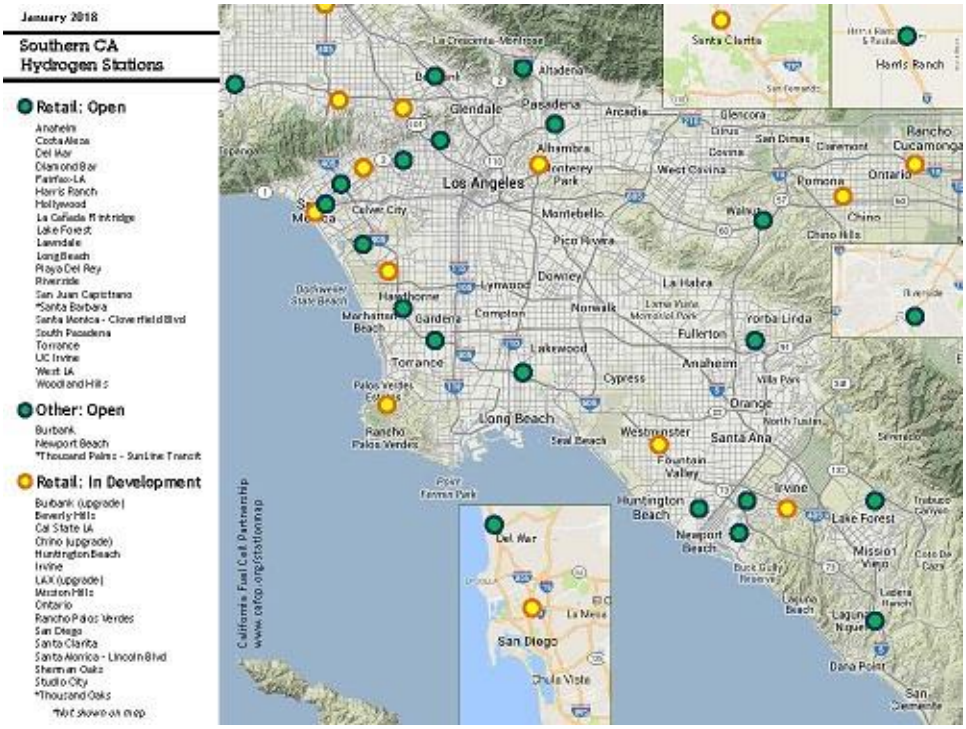


Figure 31: Southern California Hydrogen Stations (January 2018)

(Photo Credit: Photos and images above courtesy of CaFCP)

CLEAN FUELS PROGRAM
2017 Funding & Financial Summary

The SCAQMD Clean Fuels Program supports clean fuels and technologies that appear to offer the most promise in reducing emissions, promoting energy diversity, and in the long-term, providing cost-effective alternatives to current technologies. In order to address the wide variety of pollution sources in the Basin and the need for reductions now and in the future, using revenue from a $1 motor vehicle registration fee (see Program Funding on page 4), the SCAQMD seeks to fund a wide variety of projects to establish a diversified technology portfolio to proliferate choices with the potential for different commercial maturity timing. Given the evolving nature of technology and changing market conditions, such a representation is only a "snapshot-in-time," as reflected by the projects approved by the SCAQMD Governing Board.

As projects are approved by the SCAQMD Governing Board and executed into contracts throughout the year, the finances may change to reflect updated information provided during the contract negotiation process. As such, the following represents the status of the Clean Fuels Fund as of December 31, 2017.

Funding Commitments by Core Technologies

The SCAQMD continued its successful leveraging of public funds with outside investment to support the development of advanced clean air technologies. During the period from January 1 through December 31, 2017, a total of 67 contracts, projects or studies that support clean fuels were executed or amended, as shown in Table 2 (page 36). The major technology areas summarized are (listed in order of funding priority). The distribution of funds based on technology area is shown graphically in Figure 32 (page 34). This wide array of technology support represents the SCAQMD's commitment to researching, developing, demonstrating and deploying potential near-term and longer-term technology solutions.

The project commitments that were contracted or purchased for the 2017 reporting period are shown below with the total projected project costs:

- SCAQMD Clean Fuels Fund Contribution $17,855,039
- Total Cost of Clean Fuels Projects $118,710,080

Traditionally every year, the SCAQMD Governing Board approves funds to be transferred to the General Fund Budget for Clean Fuels administration. For 2017, the fund transfer from Clean Fuels to the General Fund was handled through the annual budget process. Thus, when the Board approved the SCAQMD's FY 2017-18 Budget on June 2, 2017, it included $1 million from Clean Fuels recognized in TAO's budget for workshops, conferences, cosponsorships and outreach activities as well as postage, supplies and miscellaneous costs. Only the funds committed by December 31, 2017, are included within this report. Any portion of the Clean Fuels Funds not spent by the end of Fiscal Year 2017-18 ending June 30, 2018, will be returned to the Clean Fuels Fund.

Partially included within the SCAQMD contribution are supplemental sponsorship revenues from various organizations that support these technology advancement projects. This supplemental revenue for pass-through contracts executed in 2017 totaling $6.2 million is listed within Table 3 (page 39).

Appendix B lists the 94 Clean Fuels Fund contracts that were open and active as of January 1, 2018.

For Clean Fuels executed and amended contracts, projects and studies in 2017, the average SCAQMD contribution is approximately 16.5 percent of the total cost of the projects, identifying that

each dollar from the SCAQMD was leveraged with more than $6 of outside investment. The typical leverage amount is $3-$4 for every $1 of SCAQMD Clean Fuels funds, but both 2016 and 2017 notably had several significant contracts, significant both in funding and in the impact they hopefully will make in strides toward developing and commercializing clean transportation technologies.

During 2017, the distribution of funds for SCAQMD executed contracts, purchases and contract amendments with additional funding for the Clean Fuels Program totaling approximately $17.9 million are shown below in Figure 32.

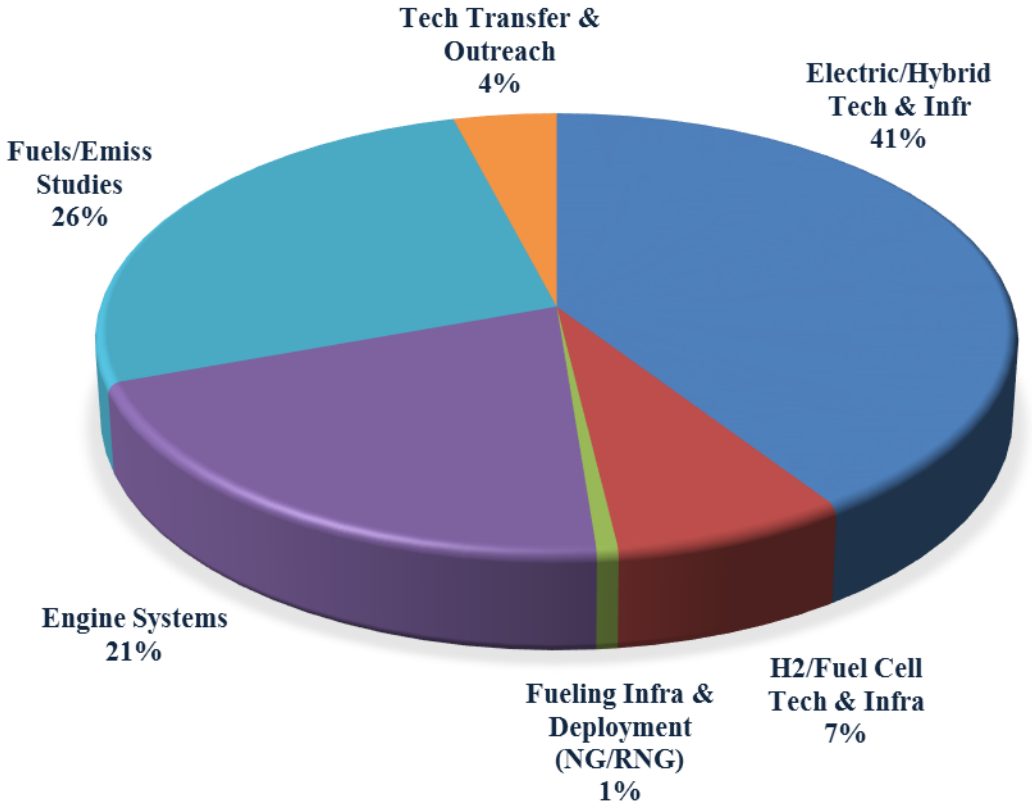


Figure 32: Distribution of Funds for Executed Clean Fuels Projects CY 2017 ($17.9M)

Table 2 (page 36) provides a breakdown of this $17.9 million in executed contracts.

Table 3 (page 39) provides information on outside funding recognized and received into the Clean Fuels Fund ($6.2 million) for contracts executed in CY 2017. Additionally, the SCAQMD continued to seek funding opportunities and

Table 4 (page 40) lists the additional $20.5 awarded in 2017 for projects that will be implemented as part of the Clean Fuels Program or which align well and complement the Clean Fuels Program but were recognized in another special revenue fund for fiduciary reasons.

Review of Audit Findings

State law requires an annual financial audit after the closing of each SCAQMD's fiscal year. The financial audit is performed by an independent Certified Public Accountant selected through a competitive bid process. For the fiscal year ended June 30, 2017, the firm of BCA Watson Rice, LLP, conducted the financial audit. As a result of this financial audit, a Comprehensive Annual Financial Report (CAFR) was issued. There were no adverse internal control weaknesses with regard to SCAQMD financial statements, which include the Clean Fuels Program revenue and expenditures.

BCA Watson Rice, LLP, gave the SCAQMD an "unmodified opinion," the highest obtainable. Notably, the SCAQMD has achieved this rating on all prior annual financial audits.

Project Funding Detail by Core Technologies

The 67 new and continuing contracts, projects and studies that received SCAQMD funding in 2017 are summarized in Table 2, together with the funding authorized by the SCAQMD and by the collaborating project partners.

Table 2: Contracts Executed or Amended (w/$) between Jan. 1 & Dec. 31, 2017

Contract	Contractor	Project Title	Start Term	End Term	SCAQMD $	Project Total $
Hydrogen/Mobile Fuel Cell Technologies and Infrastructure						
17312	Hydrogenics USA Inc.	ZECT II: Develop Fuel Cell Range-Extended Drayage Truck	11/20/17	05/19/21	125,995	2,433,553
17316	Center for Transportation and the Environment	Develop and Demonstrate Ten Zero Emission Fuel Cell Electric Buses	06/09/17	04/30/20	1,000,000	45,328,859
17317	American Honda Motor Company, Inc.	Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle for TAO's Fleet Demonstration Program	03/22/17	03/21/20	17,304	17,304
17343	American Honda Motor Company, Inc.	Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle for TAO's Fleet Demonstration Program	02/21/17	02/20/20	17,328	17,328
17385	American Honda Motor Company, Inc.	Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle for TAO's Fleet Demonstration Program	05/17/17	05/16/20	17,304	17,304
17394	Energy Independence Now	Provide Analysis of Renewable Hydrogen Pathways, Economics and Incentives	10/20/17	03/19/18	25,000	140,000
18118	Frontier Energy, Inc. (formerly BKi)	Participate in California Fuel Cell Partnership in CY 2017 and Provide Support for Regional Coordinator	01/01/17	12/31/17	120,000	1,520,000
Engine Systems/Technologies						
16205	Cummins Westport, Inc.	Develop, Integrate and Demonstrate Ultra-Low Emission 12L Natural Gas Engines for On-Road Heavy-Duty Vehicles	06/03/16	06/30/18	2,500,000	2,500,000
17197	VeRail Technologies Inc.	Develop and Demonstrate Ultra-Low Emission Natural Gas Switcher Locomotive	03/03/17	09/02/19	1,000,000	5,100,000
18018	North American Repower LLC	Develop High Efficiency Near-Zero Natural Gas Engines for Heavy-Duty Vehicles	12/14/17	12/12/19	200,000	1,958,096
Electric/Hybrid Technologies and Infrastructure						
15610	Goss Engineering, Inc.	Conduct Engineering Services at SCAQMD Headquarters	06/02/15	12/31/17	10,000	10,000
17029	University of California Irvine	Demonstrate and Evaluate Plug-In Smart Charging at Multiple Electric Grid Scales	06/29/17	06/28/20	250,000	750,000
17105	BYD Motors Inc.	Develop and Demonstrate Up to 25 Class 8 Battery Electric Drayage Trucks	04/14/17	10/13/23	794,436	8,942,400

Table 2: Contracts Executed or Amended (w/$) between Jan. 1 & Dec. 31, 2017 (cont'd)

Contract	Contractor	Project Title	Start Term	End Term	SCAQMD $	Project Total $
Electric/Hybrid Technologies and Infrastructure (cont'd)						
17207	Peterbilt Motors	Develop and Demonstrate Up to 12 Class 8 Battery Electric Drayage Trucks	04/07/17	10/06/23	642,436	11,006,340
17225	Volvo Technology of America LLC	Develop and Demonstrate Up to Two Class 8 Battery Electric Drayage Trucks	06/09/17	06/08/20	1,741,184	9,458,446
17244	Kenworth Truck Company	Develop and Demonstrate Up to Two Class 8 Battery Electric Drayage Trucks	09/08/17	01/08/20	2,823,475	9,743,739
17353	Odyne Systems, LLC	Develop and Demonstrate Medium-Heavy-Duty (Class 5-7) Plug-In Hybrid Electric Vehicles for Work Truck Applications	06/09/17	09/08/20	900,000	6,955,281
18075	Selman Chevrolet Company	Lease Two 2017 Chevrolet Bolt All-Electric Vehicles for Three Years for TAO's Fleet Demonstration Program	08/18/17	08/17/20	26,824	26,824
Direct Pay	Clean Fuel Connection Inc.	Install Electric Vehicle Supply Equipment	01/03/17	08/15/17	20,614	20,614
Direct Pay	Various	Conduct Work for EVSE Upgrade at SCAQMD Headquarters	01/24/17	08/11/17	14,143	14,143
Direct Pay	Selman Chevrolet Company	Purchase One 2017 Chevrolet Volt EV for TAO's Fleet Demonstration Program	09/06/17	09/06/17	38,653	38,563
Fueling Infrastructure and Deployment (NG/RNG)						
15541	Foundation for California Community Colleges	Implement Enhanced Fleet Modernization Program	05/07/15	01/30/19	21,270	30,000
17349	University of California Riverside/CE-CERT	Establish Renewable Natural Gas Center	08/03/17	08/02/18	100,000	261,110
Fuels/Emissions Studies						
15680	National Renewable Energy Laboratory	ComZEV: Develop Detailed Technology and Economics-Based Assessment for Heavy-Duty Advanced Technology Development	08/25/15	06/30/18	20,000	40,000
17245	West Virginia University Research Corporation	Conduct In-Use Emissions Testing and Fuel Usage Profile of On-Road Heavy-Duty Vehicles	04/14/17	10/31/18	1,625,000	1,625,000
17276	University of California Riverside/CE-CERT	Develop ECO-ITS Strategies for Cargo Containers	08/03/17	08/02/20	543,000	2,190,233
17277	University of Southern California	Conduct Market Analysis for Zero Emission Heavy-Duty Trucks in Goods Movement	11/03/17	11/02/19	350,000	524,000

Table 2: Contracts Executed or Amended (w/$) between Jan. 1 & Dec. 31, 2017 (cont'd)

Contract	Contractor	Project Title	Start Term	End Term	SCAQMD $	Project Total $
Fuels/Emissions Studies (cont'd)						
17278	University of Southern California	Develop Freight Loading Strategies for Zero Emissions Heavy-Duty Trucks in Goods Movement	11/03/17	11/02/19	200,000	1,001,000
17286	University of California Riverside/CE-CERT	Conduct In-Use Emissions Testing and Fuel Usage Profile of On-Road Heavy-Duty Vehicles	06/09/17	06/08/21	1,625,000	1,625,000
17331	University of California Riverside/CE-CERT	Conduct In-Use PM Emissions Study for Gasoline Direct Injection Vehicles	07/14/17	07/31/18	222,000	273,000
17352	California State University Maritime Academy	Develop and Demonstrate Vessel Performance Management Software and Equipment	06/09/17	06/08/21	50,086	195,195
18090	University of California Riverside/CE-CERT	Study Secondary Organic Aerosol Formation from Heavy-Duty Diesel and Natural Gas Vehicles	12/05/17	12/04/18	85,000	85,000
Technology Assessment/Transfer and Outreach						
17037	Clean Fuel Connection Inc.	Technical Assistance with Alternative Fuels, Electric Vehicles, Charging and Fueling Infrastructure and Renewable Energy	11/18/16	11/17/18	50,000	50,000
17097	Gladstein, Neandross & Associates LLC	Technical Assistance with Alternative Fuels and Fueling Infrastructure, Emissions Analysis and On-Road Sources	11/04/16	11/03/18	100,000	100,000
17336	Three Squares Inc.	Conduct Education Outreach for the Basin DC Fast Charging Network Project	05/12/17	06/30/18	64,183	64,183
17358	AEE Solutions, LLC	Technical Assistance with Heavy-Duty Vehicle Emissions Testing, Analysis and Engine Development	06/09/17	09/08/19	100,000	100,000
18019	Ricardo Inc.	Technical Assistance with Heavy-Duty Vehicle Emissions Testing, Analysis, and Engine Development and Applications	09/01/17	08/31/19	50,000	50,000
Direct Pay	Hartford/Alliant Insurance	Insurance for Alternative Fuel Vehicles in TAO's Fleet Demonstration Program	01/01/17	12/31/17	40,000	40,000
Direct Pay	Various	Cosponsor 22 Conferences, Workshops & Events plus 5 Memberships	01/01/17	12/31/17	324,804	4,456,755
		GRANDTOTAL – ALL CORE TECHNOLOGIES			**$17,855,039**	**$118,710,080**

Table 3: Supplemental Grants/Revenue Received into the Clean Fuels Fund (31) in CY 2017

Revenue Agreement #	Revenue Source	Project Title	Contractor	SCAQMD Contract #	Award Total $
15022 Mod2	California Energy Commission	Develop, Integrate and Demonstrate Ultra-Low Emission 12L Natural Gas Engines for On-Road Heavy-Duty Vehicles	Cummins Westport Inc.	16205	1,000,000
17039	Clean Energy	Develop, Integrate and Demonstrate Ultra-Low Emission 12L Natural Gas Engines for On-Road Heavy-Duty Vehicles	Cummins Westport Inc.	16205	500,000
17096	California Energy Commission	Develop, Integrate and Demonstrate Ultra-Low Emission 12L Natural Gas Engines for On-Road Heavy-Duty Vehicles	Cummins Westport Inc.	16205	1,000,000
16220	California Energy Commission	On-Road In-Use Emissions Testing and (Fuel) Usage	University of California Riverside/ West Virginia University	17286/ 17245	2,000,000
17209	California Air Resources Board	On-Road In-Use Emissions Testing and (Fuel) Usage	University of California Riverside/ West Virginia University	17286/ 17245	150,000
17281	Southern California Gas Company	On-Road In-Use Emissions Testing and (Fuel) Usage	University of California Riverside/ West Virginia University	17286/ 17245	500,000
17038	Southern California Gas Company	Develop and Demonstrate Ultra-Low Emission Natural Gas Switcher Locomotive	VeRail Technologies, Inc.	17197	500,000
17055	U.S. Environmental Protection Agency	Develop and Demonstrate Ultra-Low Emission Natural Gas Switcher Locomotive	VeRail Technologies, Inc.	17197	500,000
Transfer	BP ARCO Settlement Fund 46	Design and Demonstrate Vessel Performance Management Software and Equipment	Cal State University Maritime Academy	17352	50,086
Table 3 lists revenue recognized by SCAQMD into the Clean Fuels Fund (31) only if the pass-through contract was executed during the reporting CY (2017).					**$6,200,086**

Table 4: Summary of Federal, State and Local Funding Awarded or Recognized in CY 2017

Awarding Entity or Program	Award or Board Date	Purpose	Contractors	Award Total $/Fund
CARB	02/03/17	FY 2016-17 Implementation of the Retire and Replace Component of Enhanced Fleet Modernization Program (EFMP) Plus-Up	Various	$5,000,000 Fund 56
Port of Los Angeles	10/31/17	Develop Ultra-Low Emission Diesel Engine for On-Road Heavy-Duty Vehicles	Southwest Research Institute	$287,500 Fund 31
2016 U.S. EPA Targeted Air Shed Grant	03/15/17	Commercial Electric Lawn and Garden Equipment Package Program	TBD	$2,477,250 Fund 17
BNSF	03/03/17	Install Air Filtration systems at Schools	IQAir North America	$625,000 Fund 75
Southern California Gas Company	02/07/17	Conduct RNG Commercial Field Test Project	KORE Infrastructure, Inc.	$1,000,000 Fund 76
California Energy Commission	02/22/17	Demonstrate Zero and Near-Zero Emission Drayage Trucks and Cargo Handling Equipment	Clean Energy/ Hyster-Yale Nederland BV/ Velocity Vehicle Group	8,395,000 Fund 31
U.S. EPA/ CATI	7/27/17	Develop Ultra-Low NOx Aftertreatment System for Large Displacement Engines	Southwest Research Institute/Rail Propulsion Systems	500,000 Fund 31
Port of Long Beach	07/07/17	Develop and Demonstrate Zero Emission Drayage Trucks	Hydrogenics USA Inc.	157,500 Fund 61
SSA Terminals	07/07/17	Install Air Filtration Systems at Schools	IQ Air North America	1,250,000 Fund 75
Wal-Mart Transportation, LLC/ Murillo's Trucking	10/06/17	Install and Maintain Air Filtration Systems at Schools	IQ Air North America	327,000 Fund 75
Ports of Los Angeles and Long Beach	10/06/17	Electric Yard Tractor Replacements at San Pedro Bay Ports	West Basin Container Terminal/Total Terminals International	500,000 Fund 17
U.S. EPA/ FY 2017 DERA	09/27/17	On-Road Heavy-Duty Diesel Drayage Truck Replacement Projects	Puget Sound Clean Air Agency/Others (TBD)	1,050,00 Fund 17
Table 4 provides a comprehensive summary of revenue awarded to SCAQMD during the reporting CY (2017) if it will be considered part of, or complementary to, the Clean Fuels Program, regardless of whether the pass-through contract has been executed.				**$20,519,250**

Project Summaries by Core Technologies

The following represents summaries of the contracts, projects and studies executed, or amended with additional dollars, in CY 2017. They are listed in the order found in Table 2 by category and contract number. As required by H&SC Section 40448.5.1(d), the following project summaries provide the project title; contractors and if known at the time of writing key subcontractors or project partners; SCAQMD cost-share, cosponsors and their respective contributions; contract term; and a description of the project.

Hydrogen/Mobile Fuel Cell Technologies and Infrastructure

17312: ZECT II: Develop Fuel Cell Range-Extended Drayage Truck

Contractor: Hydrogenics USA Inc.	SCAQMD Cost-Share	$ 125,995
	Cosponsors	
	Department of Energy *(received as pass-through funds into Fund 61)*	825,784
	California Energy Commission *(received as pass-through funds into Fund 61)*	983,858
	Port of Long Beach *(received as pass-through funds into Fund 61)*	157,500
	Hydrogenics USA Inc. (in-kind)	340,416
Term: 11/20/17 – 05/19/21	Total Cost:	$ 2,433,553

Hydrogenics USA Inc. and their OEM partners propose to build and demonstrate a fuel cell range extended Class 8 truck for the DOE Zero Emission Cargo Transport (ZECT) project. The drayage truck will be identical to the CEC drayage truck that Hydrogenics is currently designing under a CEC funded project. The truck design and development effort is fully funded under the CEC truck project, the electric drive system design of the truck will be duplicated for the ZECT Project. The fuel cell drayage truck will be demonstrated for 24 months in the Ports of LA and Ports of Long Beach. Hydrogenics will provide necessary support throughout the demonstration period, quarterly performance reports to SCAQMD, and one final report at the end of the project. The project is expected to be three years in duration, including one year of truck production and two years of demonstration.

17316: Develop and Demonstrate Ten Zero Emission Fuel Cell Electric Buses

Contractor: Center for Transportation and the Environment	SCAQMD Cost-Share	$ 1,000,000
	Cosponsors	
	California Air Resources Board	22,347,502
	Orange County Transportation Authority	9,334,772
	AC Transit	8,710,000
	Other Partners & In-Kind	2,936,585

	Bay Area Air Quality Management District	1,000,000
Term: 06/09/17 – 04/30/20	Total Cost:	$ 45,328,859

As part of a $45 million project and a $22 million CARB grant to Center for Transportation and the Environment (CTE), SCAQMD provided $1 million in cost-share to develop and demonstrate 10 zero emission fuel cell transit buses and a hydrogen fueling station at Orange County Transportation Authority. These fuel cell buses will be on a New Flyer platform with a Ballard Power Systems fuel cell. CTE anticipates that these fuel cell buses will be in service at the transit agencies by December 2018. Ten fuel cell buses and a hydrogen fueling station will also be demonstrated at AC Transit in a similar demonstration in Northern California.

17317: Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle for TAO's Fleet Demonstration Program

Contractor: American Honda Motor Company, Inc.	SCAQMD Cost-Share	$ 17,304
Term: 03/22/17 – 03/21/20	Total Cost:	$ 17,304

SCAQMD has been working with American Honda and has participated in on-road testing of their fuel cell electric vehicles starting with research programs since 2004 when SCAQMD's first hydrogen station in Diamond Bar started fueling the first fuel cell car – the Honda FCX - in our fleet. Several fuel cell vehicle generations have resulted in the 2017 Honda Clarity Fuel Cell for retail lease through 12 specially trained dealerships near retail hydrogen fueling stations in California. The Honda Clarity fuel cell vehicle is a five-passenger sedan that travels 366 miles before refueling with 70 MPa gaseous hydrogen and has U.S. EPA estimated fuel economy of 67 mpge. The vehicle will be placed into SCAQMD's alternative fuel vehicle fleet to demonstrate new fuel cell vehicles to public and private organizations to promote zero emission technologies.

17343: Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle for TAO's Fleet Demonstration Program

Contractor: American Honda Motor Company, Inc.	SCAQMD Cost-Share	$ 17,328
Term: 02/21/17 – 02/20/20	Total Cost:	$ 17,328

As noted, SCAQMD has been working with American Honda and has participated in on-road testing of their fuel cell electric vehicles starting with research programs since 2004 when SCAQMD's first hydrogen station in Diamond Bar started fueling the first fuel cell car – the Honda FCX - in our fleet. Several fuel cell vehicle generations have resulted in the 2017 Honda Clarity Fuel Cell for retail lease through 12 specially trained dealerships near retail hydrogen fueling stations in California. This second vehicle will also be placed into SCAQMD's alternative fuel vehicle fleet to demonstrate new fuel cell vehicles to public and private organizations to promote zero emission technologies.

17385: Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle for TAO's Fleet Demonstration Program

Contractor: American Honda Motor Company, Inc.	SCAQMD Cost-Share	$ 17,304
Term: 05/17/17 – 05/16/20	Total Cost:	$ 17,304

This third Honda 2017 Clarity Fuel Cell will also be placed into SCAQMD's alternative fuel vehicle fleet to demonstrate new fuel cell vehicles to public and private organizations to promote zero emission technologies. Given the number of events the SCAQMD cosponsors and attends throughout the South Coast Air Basin, three of these vehicles were added to the Fleet Demonstration Program in 2017.

17394: Provide Analysis of Renewable Hydrogen Pathways, Economics and Incentives

Contractor: Energy Independence Now	SCAQMD Cost-Share	$ 25,000
	Cosponsors	
	Automakers: American Honda Motor Company, Toyota Motor Corporation	50,000
	Fuel Providers: Southern California Gas Company, Linde, Air Liquid and Hydrogenics USA Inc.	65,000
Term: 10/20/17 – 03/19/18	Total Cost:	$ 140,000

Energy Independence Now (EIN) will perform an analysis of renewable hydrogen pathways, economics and incentives. EIN will also develop a white paper and presentation to engage the broader stakeholder community to support renewable hydrogen education and outreach. This project will be cost-shared by automakers and fuel providers.

18118: Participate in California Fuel Cell Partnership in CY 2017 and Provide Support for Regional Coordinator

Contractor: Frontier Energy, Inc. (formerly BKi)	SCAQMD Cost-Share	$ 120,000
	Cosponsors	
	7 automakers, 6 public agencies, 2 industry stakeholders, 28 Full & Associate Members	1,400,000
Term: 01/01/17 – 12/31/17	Total Cost:	$ 1,520,000

In April 1999, the California Fuel Cell Partnership (CaFCP) was formed with eight members; SCAQMD joined and has participated since 2000. The CaFCP and its members are demonstrating and deploying fuel cell passenger cars and transit buses with associated hydrogen fueling infrastructure in California. Since the CaFCP is a voluntary collaboration, each participant contracts with Frontier Energy Inc. (previously Bevilacqua-Knight, Inc. or BKi) for their portion of the CaFCP's administration. In 2017, SCAQMD contributed $70,000 for Executive membership and up to $50,000, along with four cubicles at SCAQMD Headquarters, to provide support for the CaFCP Regional Coordinator.

Engine Systems/Technologies

16205: Develop, Integrate and Demonstrate Ultra-Low Emission 12L Natural Gas Engines for On-Road Heavy-Duty Vehicles

Contractor: Cummins Westport, Inc.	SCAQMD Cost-Share *(all received as pass-through funds)*	$ 2,500,000
Term: 06/03/16 – 06/30/18	Total Cost:	$ 2,500,000

This contract was amended to add cost-share from two project partners, specifically $2,000,000 from the California Energy Commission and $500,000 from Clean Energy, which had been recognized into the Clean Fuels Fund (31). The objective of this project is to apply the ultra-low emission engine and after-treatment technologies developed for an 8.9-liter ISL-G Z engine to the 11.9-liter ISX12-G Cummins Westport engine. The project includes 1) engine and after-treatment system design, development, and emission testing; 2) integration of the engine and after-treatment system into multiple vehicle chassis; and 3) on-road demonstrations including chassis dynamometer testing. Development targets are 1) power and torque suitable for heavy-heavy duty Class 8 vehicles; 2) a technology pathway to commercial production3) certification to the CARB Optional NOx standard of 0.02 g/bhp-hr, and 4) ammonia emissions and fuel economy penalties as low as possible. Development of ultra-low emission engines that emit 90% lower NOx than the 2010 0.2 g/bhp-hr NOx standard would significantly reduce their emissions and assist the region in meeting federal ambient air quality standards in future years. The Cummins Westport ISL-G NZ 8.9-liter natural gas engines, developed with the funding from the SCAQMD, the California Energy Commission and Southern California Gas Company, was certified by CARB to the Optional 0.02 g/bhp-hr NOx standard and is now being commercially used in refuse trucks and buses. However, the 8.9-liter engine is too small for heavy-heavy duty vehicles in Class 8, which requires development of larger displacement engines such as this 12L engine.

17197: Develop and Demonstrate Ultra-Low Emission Natural Gas Switcher Locomotive

Contractor: VeRail Technologies Inc.	SCAQMD Cost-Share *(all received as pass-through funds)*	$ 1,000,000
	Cosponsors	
	Port of Long Beach	300,000
	Port of Los Angeles	300,000
	VeRail Technologies Inc.	3,100,000
	PHL (in-kind)	400,000
Term: 03/03/17 – 09/02/19	Total Cost:	$ 5,100,000

This project will develop and demonstrate a 2,100 horsepower CNG-powered locomotive capable of operation in the San Pedro Bay Ports while producing near-zero emissions. CARB Tier 4 locomotive standards require a reduction in in NOx and PM by 70 %. The VeRail engine is expected to be 90% below current and with a 23% reduction in GHG. The project is expected to take place over two years with the objective of achieving a commercial ready product which can replace all 25 locomotives eventually in the Ports of Los Angeles and Long Beach. The goal is to develop an engine capable of operating at the San Pedro Bay Ports required duty cycle and certified at the CARB low NOx standard of 0.02 g/bhp-hr. The engine must also be fuel efficient and only be re-fueled once per week. The U.S. EPA and the Southern California Gas Company each provided $500,000 as pass-through funding, recognized into the Clean Fuels Fund (31), for this project.

18018: Develop High Efficiency Near-Zero Emission Natural Gas Engines for Heavy-Duty Vehicles

Contractor: North American Repower LLC	SCAQMD Cost-Share	$ 200,000
	Cosponsors	
	California Energy Commission	900,000
	Southern California Gas Company	150,000
	North American Repower LLC (in kind)	708,096
Term: 12/14/17 – 12/12/19	Total Cost:	$ 1,958,096

North American Repower LLC converts engines to CNG power for class 5-8 vehicles. The demand for more power and higher efficiency from CNG engines has led to a developmental project sponsored by the California Energy Commission and Southern California Gas Company. The objectives are to use a commercially available 13-liter diesel engine and convert it to CNG. The requirements will be to create more power and efficiency while achieving near-zero emissions. The engine is scheduled for production readiness in 2019.

Electric/Hybrid Technologies and Infrastructure

15610: Conduct Engineering Services at SCAQMD Headquarters

Contractor: Goss Engineering, Inc.	SCAQMD Cost-Share	$ 10,000
Term: 06/02/2015 – 12/31/17	Total Cost:	$ 10,000

In June 2015, SCAQMD executed a contract with Goss Engineering Services in the amount of $50,000 in response to RFP #P2015-21 to perform all necessary engineering services for the upgrade and expansion of SCAQMD's electric vehicle charging (EVC) infrastructure, to develop plans and diagrams for the installation of a separate electric utility line, transformer and meter for the CNG station, and to prepare as-built drawings. Due to the numerous pieces involved with the upgrade and expansion of SCAQMD's EVC infrastructure and electric demands, this contract was amended to add an additional $10,000. These additional funds were added to cover unanticipated site plan and permitting expenses. Specifically, permitting requirements which were not anticipated included a site survey to address American with Disabilities Act requirements and a short circuit study to address National Electrical Code requirements.

17029: Demonstrate and Evaluate Plug-In Smart Charging at Multiple Electric Grid Scales

Contractor: University of California Irvine	SCAQMD Cost-Share	$ 250,000
	Cosponsors	
	Department of Energy	100,000
	Southern California Edison	100,000
	Hyundai (in-kind)	300,000
Term: 06/29/17 – 06/28/20	Total Cost:	$ 750,000

The University of California Irvine's Advanced Power and Energy Program will develop and demonstrate a software algorithm for coordinating the charging of plug-in electric vehicles (PEVs) to support grid resource operation without compromising the ability of PEV drivers to meet their transportation needs. This project will simulate the deployment of the PEV Smart Charging algorithm at two different grid scales using ten Kia Soul EVs with smart charging capability.

17105: Develop and Demonstrate Up to 25 Class 8 Battery Electric Drayage Trucks

Contractor: BYD Motors Inc.	SCAQMD Cost-Share	$ 794,436
	Cosponsors	
	California Air Resources Board *(received as pass-through funds into Fund 67)*	5,657,564
	Bay Area Air Quality Management District *(received as pass-through funds into Fund 67)*	1,200,000
	San Joaquin Air Pollution Control District *(received as pass-through funds into Fund 67)*	100,000
	San Diego Air Pollution Control District/San Diego Gas & Electric *(received as pass-through funds into Fund 67)*	200,000
	BYD Motors Inc.	990,400
Term: 04/14/17 – 10/13/23	Total Cost:	$ 8,942,400

BYD will be developing a 100% battery-electric drayage truck that is optimized to serve near-dock and short regional drayage routes. BYD is a global company with over $9 billion in revenue and 180,000 employees, including manufacturing in Lancaster, CA. BYD's clean energy division produces battery storage stations, solar panels and LED lights. In 2003, BYD entered the automotive market and is now the largest selling domestic car manufacturer in China. Their global market strategy is focused on electric transportation, and BYD is the global leader in electric bus and taxi sales, with 5,000 orders in each segment, and trucks are its emerging segment. BYD will develop 25 vehicles under this project.

17207: Develop and Demonstrate Up to 12 Class 8 Battery Electric Drayage Trucks

Contractor: Peterbilt Motors	SCAQMD Cost-Share	$ 642,436
	Cosponsors	
	California Air Resources Board *(received as pass-through funds into Fund 67)*	5,657,564
	Bay Area Air Quality Management District	1,200,000

	(received as pass-through funds into Fund 67)	
	San Joaquin Air Pollution Control District *(received as pass-through funds into Fund 67)*	300,000
	San Diego Air Pollution Control District/San Diego Gas & Electric *(received as pass-through funds into Fund 67)*	200,000
	Peterbilt Motors	3,006,340
Term: 04/04/17 – 10/06/23	Total Cost:	$ 11,006,340

Peterbilt will develop 12 Class 8 battery electric trucks, which will be placed into demonstration in real-world drayage service with fleet operation in port regions throughout California. The drive system of the demonstration vehicles will be powered by an innovative dual-motor combination rated at 300kW and equipped with Inverter-Charger Units that combine the functions of the vehicle inverter and battery charger, reducing capital costs and simplifying charging logistics. The battery packs in eight of the trucks will have approximately 215kWh in total capacity, providing an estimated 70-80 miles of all-electric range under normal conditions. The remaining trucks will have increased capacity of battery packs up to 320kWh and extended total operating range to approximately 100-120 miles. A proprietary vehicle control system will optimize vehicle efficiency, maximize battery life and protect key components, such as batteries and power electronics from excessive temperatures, voltage spikes or current surges.

17225: Develop and Demonstrate Up to Two Class 8 Battery Electric Drayage Trucks

Contractor: Volvo Technology of America LLC	SCAQMD Cost-Share	$ 1,741,184
	Cosponsors	
	California Air Resources Board *(received as pass-through funds into Fund 67)*	5,657,564
	Bay Area Air Quality Management District *(received as pass-through funds into Fund 67)*	300,000
	San Diego Air Pollution Control District/San Diego Gas & Electric *(received as pass-through funds into Fund 67)*	300,000
	Volvo Technology of America LLC	1,459,698
Term: 06/09/17 – 06/08/20	Total Cost:	$ 9,458,446

Volvo is building on their PHEV diesel hybrid Class 8 truck developed under a SCAQMD/DOE grant. Volvo proposes to continue refinement towards commercialization, including integration of innovative and significant C-ITS efficiency measures, in cooperation with LA Metro. The Volvo Group's

combined market share for North American heavy-duty trucks is over 20%. Volvo will develop two trucks under this project but move through several critical internal product development "gates."

17224: Develop and Demonstrate Up to Two Class 8 Battery Electric Drayage Trucks

Contractor: Kenworth Truck Company	SCAQMD Cost-Share	$ 2,823,475
	Cosponsors	
	California Air Resources Board *(received as pass-through funds into Fund 67)*	5,714,264
	Bay Area Air Quality Management District *(received as pass-through funds into Fund 67)*	300,000
	San Joaquin Air Pollution Control District *(received as pass-through funds into Fund 67)*	300,000
	Kenworth Truck Company	606,000
Term: 09/08/17 – 01/08/20	Total Cost:	$ 9,743,739

Kenworth will develop four Class 8 plug-in hybrid electric trucks with zero emission operation capability for demonstration in revenue drayage service. The proposed fleet is intended to operate in all-electric and in conventional hybrid electric mode using a CNG engine. This fleet provides an opportunity to test the manufacturing processes for repeatability, optimize an architecture developed for this application and re-introduce field operations to this type of product. The power output of the electric drivetrain is comparable to standard Class 8 vehicles, but it will have a greater operating efficiency and improved fuel economy.

17353: Develop and Demonstrate Medium-Heavy Duty (Class 5-7) Plug-In Hybrid Electric Vehicles for Work Truck Applications

Contractor: Odyne Systems, LLC	SCAQMD Cost-Share	$ 900,000
	Cosponsors	
	Department of Energy	2,932,193
	Odyne Systems, LLC	1,033,088
	Freightliner	65,000
	Allison Transmission	25,000
	Sempra Energy (in-kind)	1,000,000
	Duke Energy (in-kind)	1,000,000
Term: 06/09/17 – 09/08/20	Total Cost:	$ 6,955,281

Odyne partners with the Freightliner Trucks, Allison Transmission, National Renewable Energy Laboratory (NREL), Oak Ridge National Laboratory (ORNL), Duke Energy, Sempra Energy, AVL, LG Chem and SCAQMD to design, develop and demonstrate a new generation of medium-heavy duty (Class 5-7) PHEV work truck that achieves a significant reduction in fuel consumption versus a conventional vehicle baseline. The plug-in hybrid technology will include idle reduction, launch assist,

regenerative braking, in-cab climate controls and exportable power, improving vehicle efficiency while driving and eliminating idling and emissions during operation at a jobsite. This project will address significant improvements in powertrain integration and adaptive control, a higher level of hybridization, fully electric jobsite operation and a low cost modular battery pack solution through integrated three development streams into a final vehicle.

18075: Lease Two 2017 Chevrolet Bolt All-Electric Vehicles for Three Years for TAO's Fleet Demonstration Program

Contractor: Selman Chevrolet Company	SCAQMD Cost-Share	$ 26,824
Term: 08/18/17 – 08/17/20	Total Cost:	$ 26,824

The SCAQMD operates a number of alternative fuel vehicles (AFVs) in its Fleet Demonstration Program to support the use of zero emission vehicles and bring awareness to the public of their viability. The all-new 2017 Chevrolet Bolt EV is available in all 50 states and was selected as the Green Car Journal 2017 Green Car of the Year. It uses a 60 kWh LG Chem lithium ion (nickel-manganese-cobalt) low-profile battery pack for this five-passenger crossover, providing 238 miles U.S. EPA-estimated all-electric range, with improved passenger and cargo capacity. Increased safety technology includes a rear camera mirror with wide-angle rearview and overhead view. Use of DC fast chargers to replenish the battery up to an estimated 90 miles of range in 30 minutes will be demonstrated and evaluated during lease for broader fleet implementation. Carpool lane solo-access with white carpool sticker will be utilized when out in the community.

Direct Pay: Install Electric Vehicle Supply Equipment

Contractor: Clean Fuel Connection Inc.	SCAQMD Cost-Share	$ 20,614
Term: 01/03/17 – 08/15/17	Total Cost:	$ 20,614

This project provides for the demonstration of Level 2 chargers from several manufacturers including Clipper Creek and BTC Power, Inc. Clean Fuel Connection Inc. purchased and installed one Level 2 charger at a Board Member residence to allow for demonstration of a plug-in electric vehicle and four Level 2 chargers for fleet charging at SCAQMD headquarters as part of a larger EV infrastructure installation project. These chargers have been utilized extensively by SCAQMD Board members, staff and the general public.

Direct Pay: Conduct Work for EVSE Upgrade at SCAQMD Headquarters

Contractor: Various	SCAQMD Cost-Share	$ 14,143
Term: 01/24/17 – 08/11/17	Total Cost:	$ 14,143

In support of a larger project to install 92 new Level 2 charging ports at SCAQMD headquarters for workplace, public and fleet charging, SCAQMD engaged multiple contractors for smaller tasks connected to this upgrade. These tasks included breaker certification for the replacement of a transformer in the main electrical room; restorative landscaping in several areas of the parking lot due to trenching to install electrical conduit feeding the EV chargers; purchase of several TMobile SIM cards for multiple routers to create a WiFi network to allow the EV chargers to communicate with the Greenlots network for data collection, payment transactions and future demand response capabilities; resubmittal of the construction plans to the City of Diamond Bar due to necessary changes to accommodate transformer and electrical panel changes that occurred during the project; and additional

costs for the installer Clean Fuel Connection Inc. due to scope changes in the installation phase of the project.

Direct Pay: Purchase One 2017 Chevrolet Volt EV for TAO's Fleet Demonstration Program

Contractor: Selman Chevrolet Company	SCAQMD Cost-Share	$ 38,653
Term: 09/06/17 – 09/06/17	Total Cost:	$ 38,653

As noted, the SCAQMD operates a number of AFVs including electric vehicles, fuel cell vehicles and plug-in hybrid electric vehicles. The primary objective of having these vehicles as part of the SCAQMD's Fleet Demonstration Program is to continue to support the use of zero emission vehicles and bring awareness to the public of their viability. Due to the large area covered by SCAQMD, and the trend of purchasing Chevy Volts at end-of-lease anyway, one 2017 Chevrolet Volt was purchased in order to add it permanently to the Fleet Demonstration Program and ensure the green carpool stickers could continue to be utilized when out in the community.

Fueling Infrastructure and Deployment (NG/RNG)

15541: Implement Enhanced Fleet Modernization Program

Contractor: Foundation for California Community Colleges	SCAQMD Cost-Share	$ 21,270
	Cosponsor	
	HEROS II Revenue Fund (56)	8,730
Term: 05/07/15 – 01/30/19	Total Cost:	$ 30,000

This contract was amended in 2017 to add additional funding to provide for continued contractor assistance for the implementation of SCAQMD's Enhanced Fleet Modernization Program, which is branded by SCAQMD as "Replace Your Ride". The Replace Your Ride Program provides low- and moderate-income participants with incentives up to $9,500 to replace their older, higher-emitting vehicles with cleaner, more fuel efficient vehicles. The Foundation for California Community Colleges provides direct assistance to program participants and evaluates participant applications for SCAQMD approval. More than 90% of program participants reside in disadvantaged communities and more than 85% of participants have incomes at less than 225% of the Federal Poverty Level. More than 85% of the replacement vehicles deployed through this program are advanced technology vehicles, such as hybrids, plug-in hybrids and battery-electric vehicles. The impact on NOx emission reductions is significant since the zero and near-zero vehicles being deployed replace very dirty older vehicles. In fact, the average age of the vehicles being replaced is 18 years while the average age of the replacement vehicles being deployed is 2 years.

17349: Establish Renewable Natural Gas Center

Contractor: University of California Riverside/CE-CERT	SCAQMD Cost-Share	$ 100,000
	Cosponsors	
	Southern California Gas Company	100,000
	Department of Transportation	25,000

	University of California Riverside/CE-CERT	36,110
Term: 08/03/17 – 08/02/18	Total Cost:	$ 261,110

This project supports the establishment of a Center for Renewable Natural Gas (CRNG) to study and research key renewable natural gas (RNG) production technologies in demonstration-scale testbeds to help address challenges to commercial implementation of such technologies in California and beyond. The University of California Riverside/College of Engineering–Center for Environmental Research and Technology (CE-CERT) will evaluate RNG production potentials via thermochemical conversion and power-to-gas (P2G) technologies; conduct technological and economic evaluations of high viability projects, including wells-to-wheels analyses of GHG and criteria pollutant emissions and energy use; develop a basis for the design of demonstration-scale projects; develop a roadmap that details the most feasible path towards commercialization, including technology choices, policy and regulatory barriers, timeline and financing strategies; and conduct education and outreach to the public, policymakers and other stakeholders through conferences, communications and media outlets, as well as technology demonstrations and publications.

Fuels/Emissions Studies

15680: ComZEV: Develop Detailed Technology and Economics-Based Assessment for Heavy-Duty Advanced Technology Development

Contractor: National Renewable Energy Laboratory	SCAQMD Cost-Share	$ 20,000
	Cosponsor	
	Southern California Gas Company	20,000
Term: 08/28/15 – 06/30/18	Total Cost:	$ 40,000

The objective of the Commercial Zero Emission Vehicle (ComZEV) project is to facilitate the reduction of NOx and GHG emissions through 2050 through development of a plan for the commercialization of advanced vehicle technologies in the SCAQMD's jurisdiction. Specifically, a detailed technology and economics based roadmap will be developed, focusing on identifying barriers and opportunities to match advanced technology options to key commercial medium- and heavy-duty vehicle vocations. The original scope of the ComZEV project is near to completion, analyzing five technologies: battery electric vehicles, fuel cell vehicles, ultra-low NOx compressed natural gas spark-ignited engines, ultra-low NOx diesel engines and conventional diesel (baseline) engines for four vehicle vocations - Class 5-6 medium-duty delivery vehicles and Class 8 port drayage, short haul and long haul trucks. The Southern California Gas Company (SoCalGas) approached the SCAQMD to expand the scope of the ComZEV project to add two more vehicle vocations - Class 8 refuse and transit vehicles, and one technology - the near-zero heavy-duty CNG engine with electric range extension. The additional cost of the expanded scope is $40,000, which is being shared equally by SoCalGas and SCAQMD. SoCalGas is providing its cost-share for the expanded project directly to NREL. This amendment also provided additional time through June 30, 2018, to complete the expanded scope of work.

17245: Conduct In-Use Emissions Testing and Fuel Usage Profile of On-Road Heavy-Duty Vehicles

Contractor: West Virginia University Research Corporation	SCAQMD Cost-Share *(partially received as pass-through funds)*	$ 1,625,000

Term: 04/14/17 – 10/31/18	Total Cost:	$ 1,625,000

On-road heavy-duty engines are now subject to the 2010 U.S. EPA emissions standards of 0.2 g/bhp-hr NOx and 0.01 g/bhp-hr PM. However, engine manufacturers are still using emission credits which allow them to produce a mixture of engines certified at or below the 2010 NOx emission standard of 0.2 g/bhp-hr NOx and engines certified at a level higher than 0.2 g NOx to comply with emission standards on an average basis. While recent studies have shown NOx and PM emissions are reduced from heavy-duty vehicles powered by modern technology engines, emissions from heavy-duty vehicles still dominate the total basinwide NOx and PM emissions. In addition, a new heavy-duty natural gas engine recently certified by CARB achieves a 90% lower NOx emissions level than the current 2010 engine emission standard. Therefore, additional assessment of in-use vehicle emissions remains a critical component for measuring the effectiveness of engine, fuel and aftertreatment technologies and improving emission inventories for air quality modeling and planning as well as developing effective strategies toward achieving the federal ambient air quality standards. This project is to conduct in-use emissions testing, characterize fuel usage profiles, develop new or improve existing heavy-duty vehicle drive cycles, and assess the impact of current technology and alternative fuels on fuel consumption and in-use emissions from on-road heavy-duty vehicles with a gross vehicle weight rating of greater than 14,000 lb. To achieve this objective, the proposed project is designed to involve up to 200 on-road heavy-duty vehicles used in transit, school bus, refuse, delivery and goods movement applications and powered by engines fueled with alternative fuels, conventional and alternative diesel fuels, and a combination of diesel and natural gas (dual) fuels. The engines will be categorized into six groups including natural gas engines certified at or below 0.2 g/bhp-hr NOx, engines certified at or below 0.02 g/bhp-hr NOx, diesel engines certified at or below 0.2 g/bhp-hr NOx, diesel engines without selective catalytic reduction, dual fuel engines and alternative fuel engines (hybrid and fully electric technology). Because of the complexity and breadth of the proposed project, West Virginia University and the University of California Riverside/CE-CERT were selected to complete the project in a timely manner. Using two contractors also provides redundancy needed in such projects to measure reliability of the test results and guarantee quality assurance. SCAQMD's cost-share from the Clean Fuels Fund (31) was $300,000. Additionally, pass through funding for this project was received into the Clean Fuels Fund (31) from the following cost-share partners: California Energy Commission - $1,000,000; Southern California Gas Company - $250,000; and California Air Resources Board - $75,000.

17276: Develop ECO-ITS Strategies for Cargo Containers

Contractor: University of California Riverside/CE-CERT	SCAQMD Cost-Share	$ 543,000
	Cosponsor	
	California Energy Commission	1,647,233
Term: 08/03/17 – 08/02/20	Total Cost:	$ 2,190,233

This project is to develop and demonstrate more comprehensive ECO-ITS freight strategies, complementing the CEC-funded ECO-FRATIS Program. Specifically, UCR/CE-CERT will design and evaluate the user interface of a truck eco-approach and departure application for real-world implementation along goods movement corridors. The ECO-ITS strategies will investigate how advanced truck technologies, such as electric and hybrid trucks, can be integrated into a dynamic routing system by integrating eco-routing algorithms into a truck scheduling and routing system. Based on the evaluation results, UCR/CE-CERT will provide recommendations on the effective use of the ECO-ITS freight strategies to reduce fuel consumption as well as GHGs and criteria pollutant emissions from goods movement operations.

17277: Conduct Market Analysis for Zero Emission Heavy-Duty Trucks in Goods Movement

Contractor: University of Southern California	SCAQMD Cost-Share	$ 350,000
	Cosponsor	
	California Energy Commission	174,000
Term: 11/03/17 – 11/02/19	Total Cost:	$ 524,000

The University of Southern California (USC) will develop strategies to improve urban freight system efficiency by incorporating a centrally coordinated load-balancing system. In the proposed system, a central coordinator with access to information from all parties involved, including port terminals, trucking fleets and railyards, will be responsible for coordinating freight assignments across routes, time periods and transport modes to achieve optimum load-balancing strategies. The system will take advantage of computational capabilities and high fidelity simulation models of the road and rail networks in order to make more reliable decisions than those offered by traditional approaches. USC will also investigate the impact of new technologies, such as electric and hybrid electric trucks, on load balancing and management. This project aims to identify the best use of these trucks in combination with conventional trucks to achieve desired energy efficiency and reductions in criteria pollutants and GHGs.

17278: Develop Freight Loading Strategies for Zero Emissions Heavy-Duty Trucks in Goods Movement

Contractor: University of Southern California	SCAQMD Cost-Share	$ 200,000
	Cosponsor	
	California Energy Commission	801,000
Term: 11/03/17 – 11/02/19	Total Cost:	$ 1,001,000

USC proposes to examine the potential for zero emission and near-zero emission truck technologies from both economic and environmental perspectives, focusing on their use in short-haul drayage service. This research will take place in two parts. The first part will be to analyze potential markets; the second part, to examine effective incentives to accelerate market penetration. The simulation models will be used to estimate the impacts of using zero emission vehicles relative to conventional diesel trucks and estimate the purchase and operation costs for various scenarios to identify the best potential markets. USC will use demonstration vehicles from current SCAQMD projects, involving collectively over 60 electric and hybrid-electric drayage trucks as the vehicle and service types for this research, providing directly relevant analysis and strategies for the SCAQMD-funded trucks.

17286: Conduct In-Use Emissions Testing and Fuel Usage Profile of On-Road Heavy-Duty Vehicles

Contractor: University of California Riverside/CE-CERT	SCAQMD Cost-Share *(partially received as pass-through funds)*	$ 1,625,000
Term: 06/09/17 – 12/08/18	Total Cost:	$ 1,625,000

As noted in the project summary for West Virginia University Contract # 07245 above, this project, which involves up to 200 on-road heavy-duty vehicles used in transit, school bus, refuse, delivery and goods movement applications and powered by engines fueled with alternative fuels, conventional and alternative diesel fuels, is to conduct in-use emissions testing, characterize fuel usage profiles, develop new or improve existing heavy-duty vehicle drive cycles, and assess the impact of current technology and alternative fuels on fuel consumption and in-use emissions from on-road heavy-duty vehicles with a gross vehicle weight rating of greater than 14,000 lb. Using both West Virginia University and the University of California Riverside/CE-CERT provides redundancy needed in such projects to measure reliability of the test results and guarantee quality assurance. And just like West Virginia University's contract, SCAQMD's cost-share from the Clean Fuels Fund (31) was $300,000, with pass through funding received into the Clean Fuels Fund (31) from the following cost-share partners: California Energy Commission - $1,000,000; Southern California Gas Company - $250,000; and California Air Resources Board - $75,000.

17331: Conduct In-Use PM Emissions Study for Gasoline Direct Injection Vehicles

Contractor: University of California/CE-CERT	SCAQMD Cost-Share	$ 222,000
	Cosponsor	
	Manufacturers of Emission Controls Association (MECA)	51,000
Term: 07/14/17 – 07/31/18	Total Cost:	$ 273,000

Currently, there is an increased concern about the degradation of the actual atmospheric pollution levels of NOx and PM in spite of the stricter vehicle emission limits in recent years. Differences between conditions for chassis or engine test cycles defined by vehicle emission regulations and real driving can contribute to the differences between expected and actual pollution. SCAQMD, in partnership with the University of California Riverside and MECA, will conduct this in-use real-world driving test study using three light-duty GDI vehicles - two GDI vehicles complying with the 2017 PM mass emissions standards of three mg/mile and one 'Tier 3-like' vehicle with an older model year. Specifically, the vehicles will be tested on routes representing many different driving requirements using the latest PEMS technology. A baseline test will be performed and then an external PM filter will also be added and tested under the same driving route. The results should yield a better understanding of in-use emissions during real-time driving conditions.

17352: Develop and Demonstrate Vessel Performance Management Software and Equipment

Contractor: California State University Maritime Academy	SCAQMD Cost-Share *(all transferred from BP ARCO Settlement Projects Fund 46)*	$ 50,086
	Cosponsors	
	Bay Area Air Quality Management District (cash and in-kind)	66,518
	Federal Maritime Administration (MARAD)	79,311
Term: 06/09/17 – 06/08/21	Total Cost:	$ 195,915

Ocean Going Vessels (OGVs) are very large vessels designed for deep water navigation. OGVs include large cargo vessels such as container vessels, tankers, bulk carriers and car carriers, as well as passenger cruise vessels. These vessels transport containerized cargo; bulk items such as vehicles, cement, and coke; liquids such as oil and petrochemicals; and passengers. OGVs travel internationally and may be registered by the U.S. Coast Guard (U.S.-flagged), or under the flag of another country (foreign-flagged). The majority of vessels that visit California ports are foreign-flagged vessels, and local ports are considering various approaches to incentivizing cleaner OGVs. This project proposes to demonstrate a technology capable of harvesting high altitude wind energy while employing a vessel performance optimization system. The first phase of the project includes the design and installation of the performance management software and equipment followed by demonstration of the equipment with performance evaluation of its fuel and emissions reductions capabilities. The installation of this system is designed to enable smarter decisions while at sea, by providing real-time data point-related fuel consumption, engine performance along with external information, such as weather, to optimize ship speed, route plan, trim and energy management. The results of this study will quantify lower fuel use by the Training Ship Golden Bear on its summer cruises and help to improve air quality in coastal communities by increasing efficiency of OGVs.

18090: Study Secondary Organic Aerosol Formation from Heavy-Duty Diesel and Natural Gas Vehicles

Contractor: University of California Riverside/CE-CERT	SCAQMD Cost-Share	$ 85,000
Term: 12/05/17 – 12/04/18	Total Cost:	$ 85,000

On-road heavy-duty vehicles are currently one of the largest sources of NOx and PM emissions, which are major contributors to secondary organic aerosol (SOA) formation, along with some volatile and semi-volatile organic compounds. SOA formed from atmospheric reactions of organic compounds in the presence of NOx constitutes an important component of suspended fine atmospheric PM with significant environmental risks, such as respiratory and heart diseases as well as visibility degradation. Design of an effective emission control strategy to reduce SOA emissions and associated risks necessitates further understanding of the formation of SOA in the atmosphere. Complementary to the ongoing emissions study to assess in-use emissions from heavy duty vehicles, this project will investigate the physical and chemical composition of SOA formed by the reaction of gaseous and particulate emissions from heavy-duty diesel and natural gas vehicles. During the vehicle in-use emissions testing, the University of California Riverside/CE-CERT will collect samples of exhaust gases in a mobile chamber and transport the chamber to an atmospheric processes laboratory where the samples will be photochemically aged and characterized. During the aging process, the University of California Riverside/CE-CERT will also classify the aerosol and measure the size, mass and composition distribution of the non-refractory aerosol as well as gaseous, particulate size distribution and black carbon emissions. The results of this study will provide valuable information on primary and secondary particulate emissions including SOA from in-use heavy-duty diesel and natural gas vehicles and facilitate a discussion on potential mitigation strategies.

Technology Assessment and Transfer/Outreach

17037: Technical Assistance with Alternative Fuels, Electric Vehicles, Charging and Fueling Infrastructure and Renewable Energy

Contractor: Clean Fuel Connection Inc.	SCAQMD Cost-Share	$ 50,000
Term: 11/18/16 – 11/17/18	Total Cost:	$ 50,000

This level-of-effort contract was amended in 2017 to add an additional $50,000 for Clean Fuel Connection Inc. (CFCI) to continue to provide technical assistance with alternative fuels, electric vehicles, charging and fueling infrastructure and renewable energy. Ms. Enid Joffe (principal) has more than 15 years of experience with low and zero emission technologies, electric vehicles and charging infrastructure and renewable energy.

17097: Technical Assistance with Alternative Fuels and Fueling Infrastructure, Emissions Analysis and On-Road Sources

Contractor: Gladstein, Neandross & Associates LLC	SCAQMD Cost-Share	$ 100,000
Term: 11/04/16 – 11/03/18	Total Cost:	$ 100,000

This level-of-effort contract leverages staff resources with specialized outside expertise. Gladstein, Neandross & Associates LLC (GNA) has previously assisted SCAQMD with implementing a wide-array of incentive programs to deploy lower-emitting heavy-duty vehicles and advanced transportation technologies. Under this contract, GNA will provide technical expertise across a broad spectrum of emission reduction technologies, including alternative and renewable fuels and fueling infrastructure, emissions analysis and heavy-duty on-road sources on an-as-needed basis. On 8/14/17, this contract was amended adding $50,000 to augment resources working on an in-use emissions study being conducted by SCAQMD. Similar to AEE Solutions (Contract #17358), GNA will be assisting with: 1) development of test vehicle selection, activity and emissions protocols, 2) recruitment of 200 heavy-duty test vehicles, 3) preparation of a technology assessment plan to identify the impact of current and near-future technology on engine performance, emissions and fuel usage, 4) identification of engine and aftertreatment issues and how to mitigate them, and 5) matching of vehicle technologies to vocations for which technology benefits can be maximized. On 10/5/17, this contract was amended for a second time adding another $50,000 to continue this work as well as to continue to provide specialized outside expertise on an as-needed basis.

17336: Conduct Education Outreach for the Basin DC Fast Charging Network Project

Contractor: Three Squares Inc.	SCAQMD Cost-Share	$ 64,183
Term: 05/12/17 – 06/30/18	Total Cost:	$ 64,183

Three Squares Inc. (TSI) was selected through an RFP process to conduct a DC fast charger education outreach campaign as part of SCAQMD's cost-share for two CEC-funded grants to install a DC fast charging network. The education outreach campaign educated EV drivers and the general public on the differences between Level 1, Level 2 and DC fast charging, benefits of public charging to increase electric vehicle miles traveled, availability of public charging to supplement residential and/or workplace charging, environmental benefits associated with the use of plug-in electric vehicles and electric vehicle infrastructure, and charging etiquette. TSI created a SoCalFast website to collect information on charging and make it easily accessible to mainstream consumers and reached out and coordinated with local governments, utilities, OEMs, advocacy group, and event organizers to publicize installation of DC fast chargers. These include a traditional press event and ribbon cutting at Calabasas City Hall and EV awareness events in conjunction with the Coachella Music Festival weekends for the fast chargers in Palm Springs and Palm Desert as well as an online EV awareness event for Mel's Diner in West Hollywood. Under this contract, TSI will continue to organize EV awareness events as future fast chargers are installed, both separately and as part of an overall traditional and online social media campaign. This work was initially started under Contract #14185.

17358: Technical Assistance with Heavy-Duty Vehicle Emissions Testing, Analysis and Engine Development

Contractor: AEE Solutions, LLC	SCAQMD Cost-Share	$ 100,000
Term: 06/09/17 – 06/08/19	Total Cost:	$ 100,000

This contract leverages staff resources with specialized outside expertise. Under this contract, AEE Solutions, LLC, will provide technical assistance for the in-use emissions study under this existing Board-approved technical assistance contract. Specifically, AEE Solutions will assist in the: 1) development of test vehicle selection, activity and emissions protocols, 2) recruitment of 200 heavy-duty test vehicles, 3) preparation of a technology assessment plan to identify the impact of current and near-future technology on engine performance, emissions and fuel usage, 4) identification of engine and aftertreatment issues and how to mitigate them, and 5) matching of vehicle technologies to vocations for which technology benefits can be maximized. This level-of-effort contract was initially executed on 6/9/17 for $50,000. In light of the additional work needed, a subsequent amendment was executed on 9/13/17 for an additional $50,000.

18019: Technical Assistance with Heavy-Duty Vehicle Emissions Testing, Analysis and Engine Development and Applications

Contractor: Ricardo Inc.	SCAQMD Cost-Share	$ 50,000
Term: 09/01/07 – 08/31/19	Total Cost:	$ 50,000

Mobile sources emit the majority of air pollution in the South Coast Air Basin (Basin). In particular, heavy-duty diesel vehicles emit high levels of nitrogen oxides (NOx), a precursor to photochemical smog, as well as diesel particulate exhaust, which has been categorized by CARB as a toxic air contaminant. The 2106 AQMP identifies the application of clean burning alternative fuels (e.g., natural gas, ethanol and hydrogen), advanced vehicle technologies (e.g., fuel cells, hybrid electric and plug-in hybrid electric vehicles) and advanced stationary source pollution control technologies to meet the national ambient air quality standards. These air quality gains, however, may only be realized if programs are in place to develop, commercialize and implement these technologies. As a result, SCAQMD seeks to implement aggressive programs to develop and demonstrate pre-commercial technologies as well as incentivize early-commercial technologies. Due to the rapid pace at which technologies are evolving, additional assistance is required for advanced, pre-commercial technology demonstration programs. To promote, fund, manage and expedite the development and demonstration of such advanced technology projects, SCAQMD relies on expert input and consultation. Ricardo Inc. has expertise in the areas of alternative fuels, low and zero emission technologies, emission controls, federal policies and state regulations. Under this contract, Ricardo Inc. will provide technical expertise across a broad spectrum of emission reduction technologies, including alternative and renewable fuels and fueling infrastructure, emissions analysis, and on- and off-road heavy-duty sources on an-as-needed basis.

Direct Pay: Insurance for Alternative Fuel Vehicles in TAO's Fleet Demonstration Program

Contractor: Hartford/Alliant Insurance	SCAQMD Cost-Share	$ 40,000
Term: 01/01/17- 12/3/17	Total Cost:	$ 40,000

In order to showcase and demonstrate advanced, low emission technologies, the SCAQMD often leases and/or purchases clean alternative fuel vehicles to educate public and private organizations on the

benefits of advanced technologies, as well as provide valuable in-use test data to the manufacturers. These vehicles are displayed at outreach events and conferences, used in Ride-and-Drive demonstrations, and are part of the SCAQMD carpool fleet. Private insurance is obtained for these advanced technology vehicles to ensure proper coverage.

Direct Pay: Cosponsor 22 Conferences, Workshops & Events plus 5 Memberships

Contractor: Various	SCAQMD Cost-Share	$ 324,804
	Cosponsors	0
	Various	4,131,951
Term: 01/01/17 – 12/31/17	Total Cost:	$ 4,456,755

The SCAQMD regularly participates in and hosts or cosponsors conferences, workshops and miscellaneous events. These funds provide support for the 22 conferences, workshops and events sponsored throughout 2017 as follows: Coordinating Research Council's 2017 Mobile Source Air Toxics Workshop in February and their Real World Emissions Workshop in March; University of California Irvine's ICEPAG Conference & Expo in March; University of California Riverside's 2017 Portable Emissions Measurement Systems (PEMS) Conference & Workshop in March; California Science Fair Awards in April; Transportation Research Board's Minority Student Fellow; Clean Fuels Advisory Group retreats in September 2016 and January and September 2017; Whittier Uptown Association's Whittier Earth Day in April; the Emerging Technologies Summit in April; CAPCOA's 2017 Grants 7 Mobile Sources Conference in April; GNA's Act Expo in May; California Hydrogen Business Council's Hydrogen and Fuel Cell On-Road Freight Workshop in May; FuturePorts Annual Conference 2017 in June; University of California Davis/ITS' The Asilomar 2017 Conference on Transportation & Energy Policy in August; Southern California Chinese American Environmental Protection Association's 2017 Los Angeles Environmental Forum in August; 2017 Women in Green Forum; Plug-In America's Los Angeles National Drive Electric Week; Platia Productions' 2017 Santa Monica AltCar Expo & Conference in September; SustainOC's 2017 Advanced Transportation Symposium and Expo in September; Calstart's 25th Anniversary Symposium in October; CalETC's 2017 Los Angeles Auto Show panel; and BRC's Southern California Energy Water & Green Living Summit in January 2018. Additionally, for 2017 four memberships were renewed for participation in the Plug-In Electrict Vehicle (PEV) Collaborative, California Hydrogen Business Council, Fuel Cell Hydrogen Energy Association, Calstart and the California Stationary Fuel Cell Collaborative.

CLEAN FUELS PROGRAM
Progress and Results in 2017

Key Projects Completed

A large number of emission sources contribute to the air quality problems in the South Coast Air Basin. Given the diversity of these sources, there is no single technology or "silver bullet" that can solve all of the region's problems. Accordingly, the SCAQMD continues to support a wide range of advanced technologies, addressing not only the diversity of emissions sources, but also the time frame to commercialization of these technologies. Projects cofunded by the SCAQMD's Clean Fuels Program include emission reduction demonstrations for both mobile and stationary sources, although legislative requirements limit the use of available funds primarily to on-road mobile sources.

Historically, mobile source projects have targeted low-emission technology developments in automobiles, transit buses, medium- and heavy-duty trucks and off-road applications. These vehicle-related efforts have focused on: 1) Development, Integration and Demonstration of Ultra-Low Emission Natural Gas Engines Certified for Production; 2) Replacement and Demonstration of UPS Diesel Delivery Trucks with Zero Emission Medium-Duty Trucks; 3) Zero Emission Cargo Transport Demonstration; and 4) .

Table 5 (page 72) provides a list of 43 projects and contracts completed in 2017. Summaries of the completed technical projects are included in Appendix C. Selected projects which represent a range of key technologies from near-term to long-term are highlighted below.

Development, Integration and Demonstration of Ultra-Low Emission Natural Gas Engines Certified for Production

Heavy-duty on-road vehicles represent one of the largest sources of NOx emissions and fuel consumption in North America. Heavy-duty vehicles are predominantly diesels. As emissions and greenhouse gas regulations continue to tighten, new opportunities for advanced fleet specific heavy-duty vehicles are becoming available with improved fuel economy. NOx emissions have dropped significantly from heavy-duty vehicles with the 2010 heavy-duty engine standard; however, additional NOx reductions of another 90% are necessary for the South Coast Air Basin to meet goals in the 2016 AQMP.

Although the 2010 certification standards were designed to reduce NOx emissions, subsequent studies have shown that in-use NOx emissions are actually much higher than standard. The main reason is a result of the poor performance of aftertreatment systems for diesel vehicles during low temperature and load operation. Recent studies by UCR suggest 99% of the operation within 10 miles of the ports represents up to 1 g/bhp-hr NOx for some diesel trucks. Thus, a real NOx success will not only be providing a solution that is independent of duty cycle, but one that also reduces the emissions an additional 90%. It is expected natural gas vehicles could play a role in the reduction of the South Coast NOx inventory problem.

In July 2015, the Board awarded a contract to Cummins Westport Inc. (CWI) to develop and demonstrate an ultra-low NOx emission 8.9L natural gas engine. The objectives of this project were to:

- Design, develop and demonstrate an ultra-low emissions, commercially viable natural gas engine suitable for on-road heavy duty vehicle applications;
- Achieve emissions targets of 0.02 g/bhp·hr NOx, 0.01 g/bhp·hr PM, 0.14 g/bhp hr NMHC, and 15.5 g/bhp·hr CO or lower as determined by the heavy-duty engine FTP;

- Keep exhaust NH3 emissions as low as achievable while targeting NH3 emissions at 10 ppm or lower;
- Achieve thermal efficiency and incorporate methods to achieve minimal (or zero) fuel economy penalties relative to 2010 U.S. EPA and CARB-certified diesel engines in similar duty cycles; and
- Obtain certification by the U.S. EPA and CARB.

The project was completed in July 2017 with a cumulative log of 581,963 miles. The ISL G NZ 8.9L natural gas engine met and exceeded the target NOx emissions of 0.02 g/bhp-hr and maintained those emissions during a full ration of duty cycles found in the South Coast Air Basin.

- A peak rating of 320 horsepower and 1,000 feet per pound of torque.
- Fuel consumption and mileage data from San Diego Transit indicated they were achieving 3.39 to 3.83 MPGde in a transit application. UCR's testing indicated the MPG on a diesel gallon equivalent (DGE) - assuming 2,863 gram NG/gallon diesel ranges - from 4.5 MPGde for the regional port cycle (DPT3) to 2.5 MPGde for CBD cycle.
- In late 2015, CWI obtained certification of the 8.9L engine from both CARB and U.S. EPA. While the certification is at CARB's Optional Low NOx 0.02 gram standard, actual results were lower than CARB's optional low NOx standard, and the resulting engine has a reduction of over 90% NOx from current federal standards.

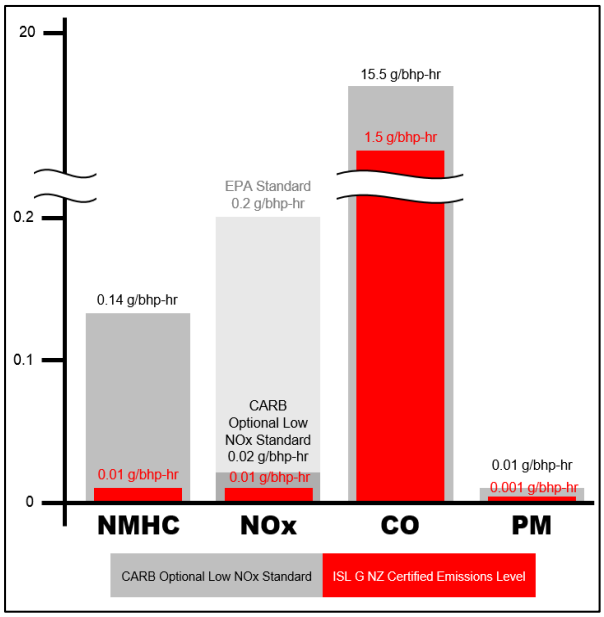


Figure 33: Certified 8.9L NG engine, below CARB's Optional Low NOx Standard

chassis resulting in commercial availability of vehicles powered by the ISL G near-zero engine.

Furthermore, on a related note, in May 2013, SCAQMD released a RFP to develop and demonstrate certified ultra-low NOx natural gas engines for on-road use. Since then, an 8.9L engine was certified and is in full production. Other technologies and engines were also investigated at this time leading to future potential projects.

Following the development work and in parallel with the demonstration work conducted as part of this project, full commercialization tasks were undertaken and completed resulting in the ISL G ultra-low NOx engine entering production in the spring of 2016. The engine was then integrated into vehicles, such as refuse trucks and transit buses, and demonstrated until July 2017. The vehicles were existing OEM customers who integrated the ISL G near-zero in their vehicle

Figure 34: Full Production 2018, 8.9-L Natural Gas Engine Certified at 0.02 g/bhp-hr NOx Emissions

Success in ultra-low NOx engine development and demonstration is continuing with CWI in a follow-on project to develop a 12L natural gas engine for heavy-duty trucks. The 12L has received CARB and U.S. EPA certification at 0.02 g/bhp-hr NOx and is currently being demonstrated in the ports and other truck applications. The 12L engine is expected to go into full production early 2018 when it will be commercially available for drayage trucks and 60-foot articulated transit buses. SCAQMD has various incentive programs (e.g., Carl Moyer Program) to assist in pushing penetration of these engines into the marketplace including into large fleet service. These incentives, which help accelerate fleet turnover, offer an opportunity for greater emissions reductions sooner and, as noted earlier, together with the Clean Fuels Program create a unique synergy.

Replacement and Demonstration of UPS Diesel Delivery Trucks with Zero Emission Medium-Duty Trucks

In 2011, Electric Vehicle International (EVI) and UPS began working with the SCAQMD to identify a partnership that would provide incentive funding for UPS and in return put clean, zero emission vehicles on the road. The SCAQMD Board approved a $1.4 million grant to help UPS replace diesel trucks with all electric vehicles in San Bernardino. The Zero Emission Community-Level Goods Movement and Delivery Demonstration was a five-year project that replaced older UPS vehicles with 40 of EVI's clean medium-duty vehicles and provided vehicle and environmental savings data to the SCAQMD. The Zero Emission Community-Level Goods Movement and Delivery Demonstration was a collaborative funding effort including the SCAQMD, CARB's Resource Board Hybrid Truck and Bus Voucher Inventive Project (HVIP), the California Energy Commission through its Diesel Emissions Reduction Act (DERA) Program, UPS and EVI.

Figure 35: UPS P-1000 Electric Delivery Van

Figure 36:UPS Electric Van Fleet at San Bernardino Plant

One of the main objectives of this project was to decrease the localized and regional emissions created by door-to-door goods movement services. As part of this project, the emission reductions were calculated for at least five years, although the benefits to the San Bernardino community will continue for many years after the demonstration project is over. Replacing harmful diesel vehicles with similar zero emission vehicles also provided direct NOx and PM emission reductions.

As part of this project, EVI delivered two different types of clean vehicles to UPS in San Bernardino. The P1000 was equipped with 1,000 square feet of package space and the P70 had 700 square feet of package space. UPS received their first vehicle in November 2012, and in June 2013, EVI delivered the final of 40 vehicles, creating the largest, single Class 6 electric vehicle deployment in California.

As part of the initial agreement with the SCAQMD, UPS was asked to de-commission one diesel vehicle for every new zero emission vehicle received. UPS chose to de-commission 40 diesel vehicles that were built in the early 1990s.

The chart below illustrates additional emission reductions in NOx, PM2.5, HC, CO and CO2. Over the life of the vehicles in this project, the SCAQMD will have saved over 40 tons of NOx, 1.5 tons of PM2.5, 2.35 tons of HC, over 12 tons of CO and 2,110 tons of CO2.

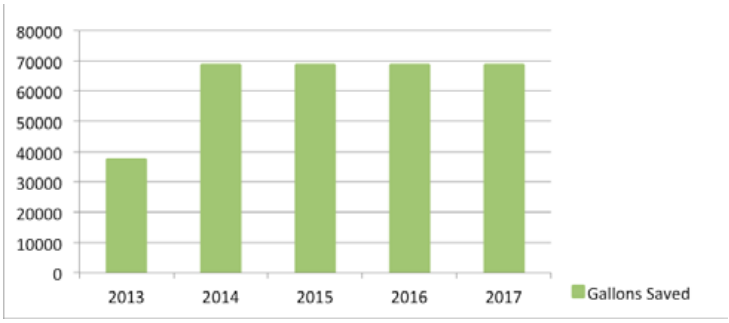
Annual	NOx (short tons/year)	PM2.5 (short tons/year)	HC (short tons/year)	CO (short tons/year)	CO2 (short tons/year)	Diesel–Equivalent (gallons/year)
Baseline of Entire Fleet	8.3894	0.3027	0.4747	2.4421	421.9776	38,016.0000
Baseline of Vehicles Retrofitted	8.3894	0.3027	0.4747	2.4421	421.9776	38,016.0000
Percent Reduced (%)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Amount Reduced Per Year	8.3894	0.3027	0.4747	2.4421	421.9776	38,016.0000

Daily	NOx (kg/day)	PM2.5 (kg/day)	HC (kg/day)	CO (kg/day)	CO2 (kg/day)	Diesel–Equivalent (gal/day)
Kilograms Reduced Per Day (kg/day)	20.8513	0.7524	1.1797	6.0698	1,048.7990	104.1534

Figure 37: Estimated Emission Reductions

Over 300,000 clean, diesel free miles were driven in 2017. In the five-year demonstration period, over 1.5 million zero emission miles were driven under this project. The zero emission miles driven saved UPS over 34,000 gallons of diesel in 2013 and is expected to save close to 70,000 for the remaining project years. Total gallons of fuel saved under this project will be over 300,000.

Figure 38: Gallons of Fuel Saved



The Zero Emission Community-Level Goods Movement and Delivery Demonstration was a first step toward transitioning more UPS vehicles to electrification. Through this successful project, we hope that more return-to-base companies will look toward electrification as a fleet vehicle option.

Zero emission, battery electric technology is still plagued with cost-effectiveness when compared to similar hybrid electric vehicles. Although the environmental savings are so much greater with all electric vehicles, hybrid electric vehicles have a much lower incremental cost increase. We can continue to drive fleet market adoption with continued partnerships and increased incentive opportunities for all electric vehicles.

EVI and UPS see continued partnerships with the SCAQMD and CARB as a catalyst to transition diesel fleets to clean electric, including fuel cell, technology in the South Coast Air Basin and throughout California.

Zero Emission Cargo Transport (ZECT) Demonstration

On-road heavy-duty diesel trucks are one of the largest sources of diesel particulate matter and NOx emissions in the South Coast Air Basin. The impact on air quality and public health is more pronounced in the surrounding communities along the goods movement corridors near the San Pedro Bay Ports - Ports of Los Angeles and Long Beach, and next to major freeways in Southern California. As a measure

to reduce the impact and meet federal ambient air quality standards, the SCAQMD has been working with regional stakeholders to promote and support the development and deployment of advanced zero emission cargo transport technologies. In 2012, SCAQMD applied for and received a $4.17 million grant from the Department of Energy under the Zero Emission Cargo Transport (ZECT) Demonstration Program to develop various Class 8 electric drayage trucks with zero emission operation capability. One of the four technologies funded by the DOE grant was battery electric trucks developed by Transportation Power, Inc. (TransPower).

In partnership with Navistar and Total Transportation Services, Inc. (TTSI), TransPower designed and manufactured pre-commercial Class 8 battery-electric drayage trucks - Electric Drayage Demonstration (EDD) trucks - and conducted a demonstration over a three-and-a-half year period in real-world drayage operation environments, transporting cargo containers in and around the Ports of Los Angeles (POLA) and Long Beach (POLB). The original project scope included only four EDD trucks, but by leveraging a grant from the CEC and additional cost-sharing from the SCAQMD and the two Ports through their Technology Advancement Program (TAP), the project later increased the demonstration fleet from three to seven trucks and extended the demonstration period by two years through September 30, 2017, to allow more time for testing of these trucks.

These trucks featured a high-power electric drive system designed and developed by TransPower and a team of U.S. based component suppliers. The EDD trucks were expected to demonstrate new industry-leading technologies and products in at least three key areas:

Power Conversion: advanced Inverter-Charger Unit (ICU) that combines the functions of vehicle inverter and battery charger with the expectation of reducing capital costs and simplifying battery recharging.

Energy Storage: high-energy battery modules using the lowest cost lithium-ion cells available, along with an advanced battery management system (BMS).

Vehicle Control: a proprietary vehicle control system to optimize vehicle efficiency, maximize battery life and protect key components such as batteries and power electronics from excessive temperatures, voltage spikes or current surges.

Figure 39: First Four EDD Trucks (March 2015)

The demonstration activities were conducted under real-world cargo transport conditions at the San Pedro Bay Ports. The trucks were projected to provide 100 miles of daily operating range under normal conditions and 60-65 miles of range under fully-loaded conditions, with a top speed of at least 60 mph and significantly faster acceleration than conventional diesel trucks. EDD-1, the first of the seven demonstration vehicles, was first deployed into drayage service in April 2014 and was demonstrated for most of 2014. EDD-1 was the evolution of TransPower's prototypes in 2011 and 2013 and utilized the latest version of TransPower's ElecTruck™ drive system. The ElecTruck™ drive system is the basis of TransPower's battery electric vehicle drive system and consists of three major subsystems. (1) the Power Control and Accessory Subsystem (PCAS) that combines a network control architecture, control software, and power conversion modules into an integrated subsystem that links all drive system components and enables them to communicate with vehicle controls and displays. A key component of the PCAS is an onboard Inverter-Charger Unit (ICU) developed with EPC Power Corp. (2) the Motive

Drive Subsystem (MDS) that converts electrical power from the battery subsystem and ICU into mechanical power to drive the vehicle's wheels. The MDS makes innovative use of a motor originally designed for a high-performance hybrid passenger car--the Fisker Karma. Developed and supplied by Quantum Technologies, TransPower used two of these motors, each providing 150 kW of peak power, to meet the demanding truck requirements. TransPower developed a proprietary means of mounting the two motors in tandem with a through shaft which is then mated to an Eaton 10-speed "automated manual transmission" (AMT); this represented a major industry innovation and a huge improvement over the gearbox installed into TransPower's first prototype Class 8 truck. (3) The Energy Storage Subsystem (ESS), which includes the batteries and interconnects. Each sub-system was continually assessed for improvement during the ZECT Demonstration Program.

Figure 40: EDD Truck Carrying a Load of Steel

Developing a reliable, cost effective ESS turned out to be the greatest engineering challenge of the ZECT project. A small module battery installation design used in EDD-1 was based on the idea that these modules afforded greater interchangeability between different types of vehicles and possibly even used in stationary battery energy systems once their vehicle use was exhausted. A key lesson learned is that installing many separate battery modules, each with its own structure, lid and network of cables and connectors into a vehicle with limited volume, and doing so safely and with precision, is exceedingly complex. In addition, it was determined that any benefits gained by standardizing module design were largely offset by the need to build heavy-duty cradles to support the modules – cradles that need to be customized to the physical dimensions of the truck, so they can never be standardized. A major redesign of the ESS to simplify the assembly and servicing of TransPower's electric trucks resulted in development of the larger, more rugged battery enclosures used in EDD-2 and all subsequent EDD trucks (Figure 41).

Figure 41: New ESS - 5 large modules (300 Ah cells) mounted on frame rails & behind cab of EDD-2

EDD-2 was completed in August 2014 and underwent four months of drive testing and optimization of the new ESS, including the new Cell-Saver™ battery management system. The University of California Riverside (UCR) tested the truck and reported a "high degree of reliability" with the ElecTruck™ drive system. UCR concluded that the EDD-2 vehicle consumed half as much battery energy per mile relative to another battery electric truck evaluated by UCR in 2011. EDD-2 was deployed into drayage service in early 2015 and continued operating through September 2017.

In September 2015, EDD-3 was delivered to the California Cartage (CalCartage) Company in Wilmington, the largest drayage company supporting the Ports, where it began demonstration operation in October 2015. Starting in December 2015, EDD-3 initiated regular single-shift, daily operation, 6 days a week, averaging 40 miles per day and 2-4 "pulls" per 8-hour shift. Through the end of the ZECT project in September 2017, it accrued 11,703 miles and continued to perform reliably. However, CalCartage found it difficult to find uses for EDD-3 due to its range limitations.

Test operation of EDD-4 was initiated in the spring of 2015, when it was showcased at an environmental event hosted by San Diego Gas & Electric Company and used for brief demonstrations with fleet operators in the San Diego region. In September 2015, EDD-4 began performing regular demonstration service with National Retail Trucking (NRT) based in Compton, exclusively for draying IKEA containers from the various terminals at the San Pedro Bay Ports. In early 2016, EDD-4 was returned to TransPower to address an intermittent power steering fault and for planned upgrades to the ICU. After three weeks of service to address these issues, it was returned to NRT, where it operated with a high degree of reliability for the duration of the project. Through the end of the project, EDD-4 accumulated 13,195 miles of operation, including more than 12,500 miles of commercial drayage service.

EDD-5 and EDD-6 were both delivered to the Los Angeles/Long Beach port region for service in early 2016. Deployment of these trucks was delayed for several months due an unexpectedly long development cycle for the RS-12, which is the inverter-only unit that TransPower elected to introduce in these three newer trucks. The RS-12 replaced the second ICU in trucks of the EDD design, which proved to save on cost and weight without sacrificing operations because only one ICU is required for battery charging. EDD-7 was the primary truck used for this "motor characterization" testing and tuning of the ICUs and RS-12 inverters. At the conclusion of this effort, the RS-12 was actually shown to be capable of coaxing 165 kW of power out of each JJE motor, a 10% improvement over the previous peak power level of 150 kW.

The seven vehicles collectively accrued more than 43,000 miles. The first four trucks gained 37,841 miles and the remaining 3 trucks saw less mileage but helped validate the latest drive system improvements. Most of the miles accrued on the fleet of EDDs were hauling heavy loads in real-world drayage operations. The technologies used in these trucks were improved continuously throughout the project, achieving the more important goal of bringing them close to a state of commercial readiness. Many of the trucks are expected to continue routine drayage operations with TTSI under a lease agreement with TransPower.

The ZECT research added to the understanding of heavy-duty battery electric vehicle technology in many ways. TransPower continuously improved its electric drive components in response to many valuable lessons learned. Improvements were achieved in each of the principal technology areas:

Power Conversion: The ICU was improved to make it more robust, and a new control scheme was developed to control one of the truck's two motors with a smaller, less expensive inverter, rather than duplicating the battery charging hardware in the ICU. A new automotive accessory inverter was integrated into the system, replacing a failure-prone industrial inverter.

Energy Storage: Battery module designs shifted from installing batteries in a large number of small modules to using a smaller number of large battery enclosures (Figure 3). This greatly reduced the complexity of battery subsystem integration. A new advanced BMS was developed, featuring active cell balancing and high-power charge "shuffling."

Vehicle Control: A new method of mechanically integrating power control and accessory components was developed, greatly reducing the time and effort required to install these components into a truck. TransPower's automated manual transmission (AMT) system was greatly improved, with the adoption of a 10-speed Eaton transmission and refined transmission controls.

These and other improvements helped advance the state-of-the-art of electric truck component technology from early prototype/proof-of-concept to pre-commercial, where future investments can be focused on improving producibility and reducing manufacturing costs rather than demonstrating basic feasibility.

TransPower's No. 1 lesson learned from the ZECT project is that battery energy storage remains the primary technical obstacle to widespread adoption of electric trucks. Despite major investments in improving every aspect of its energy storage subsystem, variations in cell voltage and BMS failures caused problems in every truck, from the beginning of the project until the very end. While these problems were reduced in frequency and severity in six of the seven trucks over the course of the project, they remained by far the largest single cause of maintenance-related issues. The rest of the ElecTruck™ drive system was, for the most part, perfected by the end of the project and rarely caused any problems. While it is noteworthy that nearly all maintenance-related issues toward the end of the project were battery related, it should be emphasized that these problems were not the primary limitation to use of the EDD trucks. The greatest obstacle to EDD truck utilization was, by far, the limited operating range of these trucks.

The methods and techniques investigated and demonstrated in this study were shown to be highly effective technologically and economically. Prior to the ZECT project, the idea of using battery-electric technology to power Class 8 trucks weighing up to 80,000 pounds was considered impractical by many. Four years later, TransPower's fleet of electric trucks proved unequivocally that battery-electric propulsion can meet the demanding performance requirements of the heaviest Class 8 trucks, and it now appears that many new companies are entering this market such as Cummins, BYD, Daimler, Volvo and Tesla who developing and demonstrating their own electric truck systems.

The ZECT trucks were shown to be capable of hauling heavy loads with an average energy consumption of approximately 2.3 kilowatt-hours (kWh) per mile, and the base recurring cost of manufacturing an electric truck was reduced from about four times the cost of a high-end diesel truck to about twice the diesel truck cost. Extrapolations suggest that further reductions can be achieved with future modifications of TransPower components and larger scale manufacturing.

In addition to demonstrating the essential feasibility of electric Class 8 trucks the ZECT project is expected to yield public health benefits by helping to reduce emissions of carbon and criteria pollutants by large trucks. These benefits will be particularly impactful in economically and environmentally disadvantaged communities with high truck traffic, such as neighborhoods adjacent to California's seaports and near major warehouses and distribution centers. Many of these communities are in the South Coast Air Basin.

During the course of the ZECT project, the EDD trucks were operated for varying lengths of time by several fleet operators, including TTSI, CalCartage, NRT, 3 Rivers Trucking, SA Recycling, Knight Transportation Services, Pasha Stevedoring and Terminals, BAE Systems, and Terminalift. Mileage accumulations from the ZECT trucks did not measure up to initial expectations, but the experience gained while operating electric trucks in all of these fleets was invaluable. All seven trucks encountered maintenance issues of varying degrees of severity, but only one truck, EDD-1, was inoperable for an extended period of time. The other six trucks experienced reliability and maintainability issues typical for vehicles using completely new technologies, but could have been used much more extensively if not due to external factors such as limited viability of charging infrastructure, insufficient driver training/motivation, and "range anxiety." Of these factors, range anxiety was by far the most prevalent, as fleet operators had difficulty finding productive ways to operate trucks that can only operate for 60-70 miles on a single charge – the typical maximum range for an EDD truck when fully loaded.

To build on the success of the ZECT project, TransPower intends to consolidate the EDD fleet in the hands of a single fleet operator, TTSI, to make service and support easier and to achieve a "critical mass" of EV technology in one fleet. A lesson learned from the ZECT project is that when a fleet operator has only a single vehicle of a given technology type, it is difficult for that operator to divert attention from the rest of the truck in its fleet to make the continuing investments required to keep their one high-technology truck operating productively. It is hoped that deploying many of the EDD trucks with TTSI will make it more economical for TTSI to invest the resources required to keep electric

trucks operating in its fleet, and provide an opportunity to deploy the EDD trucks for limited-duty cycles.

TransPower is also pursuing development of new technologies that will directly address the shortcomings observed in the EDD fleet. These include advanced battery technologies that will extend operating range while also reducing vehicle weight and cost, and various strategies for extending operating range with onboard internal combustion engines and fuel cells. Equally important was TransPower's progress toward establishing a go-to-market strategy for commercialization of its technologies. TransPower made progress in these efforts during the ZECT project by repackaging its major subsystems in ways that will make it easier for them to be shipped to vehicle manufacturers for installation on their own assembly lines. The integrated PCAS assembly, described earlier in this report, is an excellent example of how TransPower made significant changes in its product designs and integration methods during the ZECT project to facilitate this transition, expected to be implemented in Class 8 trucks funded under other grants.

In summary, the ZECT project achieved all of its major technical and economic objectives, including demonstrating the ability of electric port drayage trucks to match or surpass the performance of conventional diesel and natural gas drayage trucks; improving reliability than previous generations of electric Class 8 trucks; zero emission operation and high energy efficiency; and quantifiable environmental and economic benefits, based on actual in-use data.

Utilization of Fleet DNA Approach and Capabilities to Provide Vehicle Vocation Analysis in the SCAQMD

According to the Energy Information Administration (EIA), diesel and gasoline account for more than 92% of the total energy used in the transportation sector. The largest consumers of fuel in the transportation sector are medium- and heavy-duty vehicles, which are also the largest contributors to NOx, PM and ozone air pollution in the South Coast and a significant source of global GHG emissions. The National Renewable Energy Laboratory (NREL) & the Department of Energy (DOE) have been conducting research, development and demonstration (RD&D) projects to facilitate the deployment of advanced vehicle technology and alternative fuels into the marketplace in order to reduce petroleum use and enhance the reduction of mobile source emissions in California and the U.S. NREL and the SCAQMD collaborated on a joint project, referred to as the Fleet DNA study, to collect data on medium- and heavy-duty vehicles used in various vocations in the South Coast; to analyze vehicle usage characteristics to better understand how vehicle vocations differ or compare; to assess their respective vehicle performances; and to provide some recommendations to improve efficiency and some technologically feasible "clean fuel" alternatives.

OEMs, commercial fleets and research organizations have identified a lack of medium- and heavy-duty vehicle use data as a barrier to intelligent vehicle design and deployment. The usage data developed in the Fleet DNA study helps to identify average and extreme use patterns for various vehicle vocations that could help identify similar use patterns across dissimilar vocations which could lead to more optimized and efficient designs that are appropriate to multiple uses. The study was intended to provide information that could enable intelligent deployment of advanced vehicle technology within key vocations. This was accomplished by showing the relationship between vocational duty cycles and technology performance.

The Fleet DNA study consisted of three parts: 1) Identification of Appropriate Vocations, 2) Data Collection and Analysis, and 3) Powertrain and Advanced Technology Matching by Vocation.

Identification of Appropriate Vocations: NREL commenced this study with an in-depth assessment of the SCAQMD vehicle population to categorize the medium- and heavy-duty (Class 3–8) on-road commercial vehicle vocations in the South Coast Air Basin. The size and age of the vehicle population

was ascertained by acquiring and mining data from the 2014 R.L. POLK medium- and heavy-duty vehicle registration database (now part of IHS Inc.). Annual vehicle miles travelled (VMT) and fuel usage numbers were estimated by leveraging data from the U.S. DOT's Vehicle In-Use Survey (VIUS) database, the Oak Ridge National Laboratory's Transportation Energy Data Book (TEDB), and CARB's EMFAC model (EMFAC is short for EMissions FACtors). To estimate NOx emissions contributions from various vehicle types, weight classes and model years, NREL developed a method to relate NOx emissions from different engine emission certification levels to fuel economy. This data was entered into NREL's Scenario Evaluation, Regionalization & Analysis (SERA) model to estimate the NOx emissions contribution from each vocational category in the SCAQMD inventory.

Results of the data mining activity using the R.L. Polk database as of April 1, 2014, produced the following results: 518,863 Class 3-8 vehicles are registered in the SCAQMD; 304,804 are registered to over 60,000 businesses, and 214,059 are registered to individuals, of which 136,685 are pre-model year (MY) 2002; the percentages of each class of vehicle in the SCAQMD fleet is comparable to those on a national level as are the percentages of Class 7-8 vehicles that meet the pre-2007, the 2007-2010, and the 2010 and newer diesel emission standards; on average, vehicles in the SCAQMD are older than the national average with 73% of Class 7-8 diesels being MY 2006 (7 years) and older and 57% being pre-MY 2002 (more than 10 years old); 65% of vehicles are registered to fleets comprising 10 or fewer vehicles.

The initial vehicle analysis led NREL to recommend and SCAQMD to agree to two scope modifications:

- Eliminate all gasoline vehicles from analysis: gasoline vehicles have significantly lower NOx impact than diesel for any given MY and are weighted towards individual ownership.
- Eliminate motorhomes from analysis: motor homes may be used sporadically and usage probably isn't confined to SCAQMD. Motor homes are weighted towards individual ownership, and there are fewer opportunities to influence this market with new low emissions technologies.

These changes reduced the Class 3-8 vehicle population by 45% (from 518,863 to 283,001) and shifted the weight class split of vehicles, reducing the Class 3-4 population the most. The selected and reduced vehicle population data was combined with VMT data from EMFAC and TEDB, fuel economy (mpg) data from TEDB, and entered into NREL's SERA model for modeling the current vehicle population's breakdown along vocation, class and vehicle type categories; generating estimated miles and fuel consumption; and, when combined with NREL's fuel consumption-to-NOx emissions correlation, estimating NOx emissions from each vehicle category. To develop its NOx vs Fuel Consumption correlation, NREL conducted an extensive literature study of chassis dyno test results. The combined studies included 277 vehicles, 29 test cycles and almost 600 individual test runs. This information was compared to corresponding engine emissions certifications levels. The derived NOx/Fuel Consumption correlation compared more favorably against engine emission certification levels for MYs 2007 and newer and less so for older vehicles.

Because Class 8 vehicles are the largest commercial vehicle population segment, travel the most miles and have the lowest average fuel economy (mpg), they are the largest NOx contributors in the vehicle population study. Class 8 vehicles comprised 50% of the Class 3-8 population and contributed 77% of vehicle NOx emissions from this population across all model years. The two figures on the next page show the vehicle population estimated aggregate NOx emissions by vehicle class and model year (Figure 42) and by vocation and model year (Figure 43).

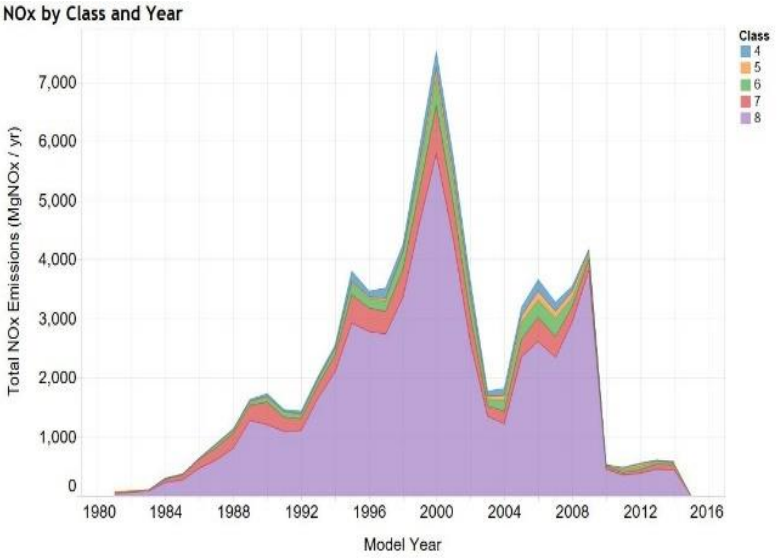


Figure 42: NOx Emissions by Vehicle Class and MY

Based on the above vehicle population and NOx inventory analysis, the following vocations were recommended for further study: Class 8 vehicles in General Freight, Services, Wholesale/Retail and Refuse vocational groups. By looking at fleets owning Class 8 vehicles under those categories, the following groups were recommended due to the presence of larger fleets: drayage/logistics fleets; auto wrecking/used auto parts fleets; and curbside refuse collection. NREL identified potential commercial fleets in the above business sectors to obtain detailed vehicle usage data. Based on a review of the NREL recommendations and other programmatic considerations, SCAQMD decided on the following fleet vocations for data collection: Class 8 drayage and transfer trucks and Class 3-7 delivery trucks.

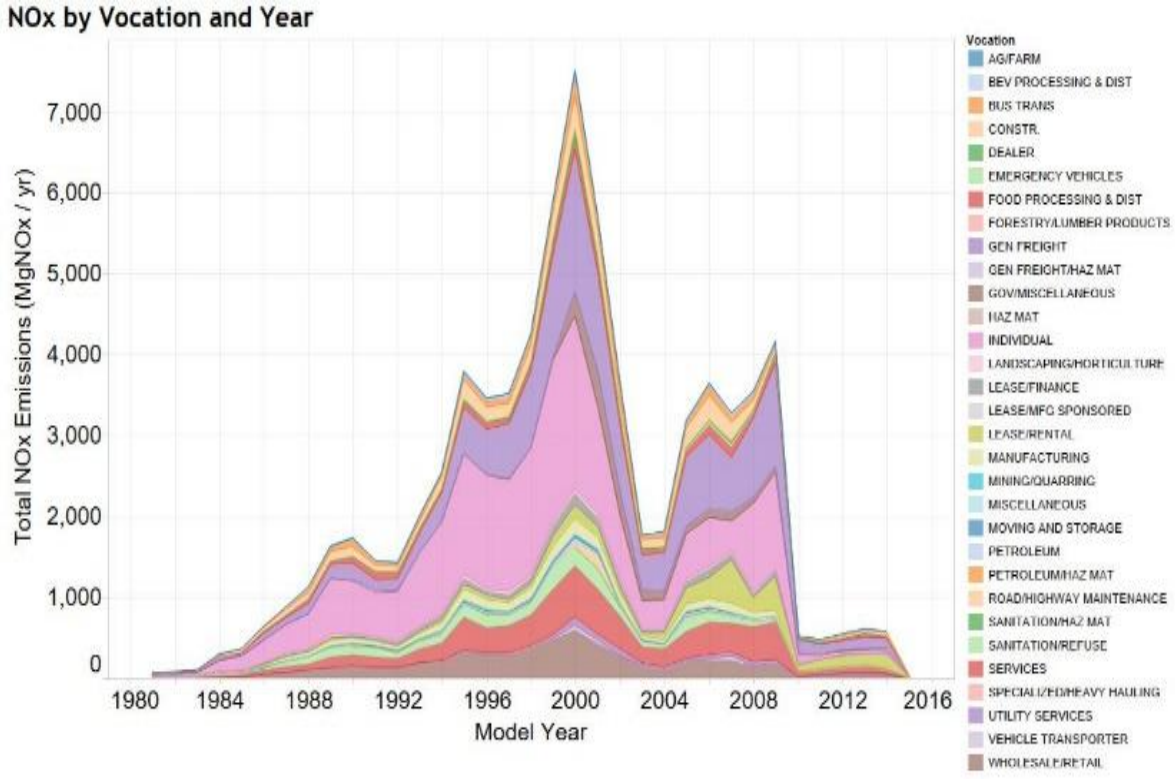


Figure 43: Annual NOx Emissions by Vocation and MY

Data Collection and Analysis: NREL completed a campaign of commercial vehicle data logging within SCAQMD to capture detailed 1 Hz GPS and engine CAN6 data on the three specified vocations: Class 8 drayage and transfer trucks and Class 3-7 delivery trucks. This effort resulted in almost 5,000 vehicle trips and over 1,500 recorded days of operation from 114 vehicles. NREL completed detailed duty-cycle analysis of each of these vocations and selected representative chassis drive cycles that could be used to evaluate technologies on vehicle platforms. NREL also leveraged recent data logging activities within these vocations and this region including data collected by NREL under the California Hybrid Truck and Bus Voucher Incentive Project (HVIP) and Phase 1 of the DOE-funded Zero Emission Cargo Transport (ZECT I). Under the HVIP, data was collected between October 2012 to September 2013 from 62 delivery vehicles for 2 to 3 weeks, each including parcel and linen delivery vocations with UPS, Aramark and FedEx. Data from the ZECT I project included datalogging of drayage service from TTSI including 149 days of conventional baseline vehicle operation on 2 trucks and 26 days of operation of the TransPower electrified drayage trucks.

NREL conducted drive cycle analysis from all vehicles within each of the three selected vocations as a group with no separation by operator or location. As would be expected, each of the three vocations has different drive cycle statistics based on their different vocational operations.

Figure 44 shows a histogram of average driven speed (not including idle time) of each vocation. Both delivery trucks and drayage trucks have average driven speeds near 30 mph, but the average driven speed of the drayage group is likely reduced by the slow speed "creep" time while in queue at or near the port. The transfer trucks have more days with average speed in the 40-50 mph range, but are still

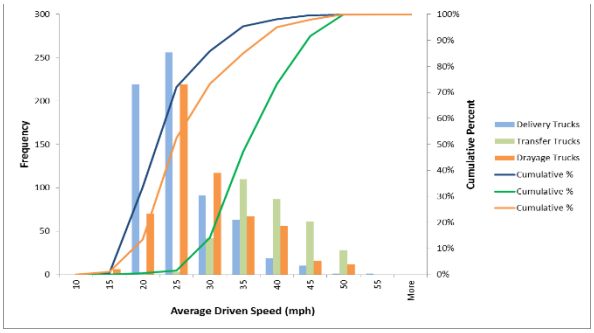


Figure 44: Average Driven Speed

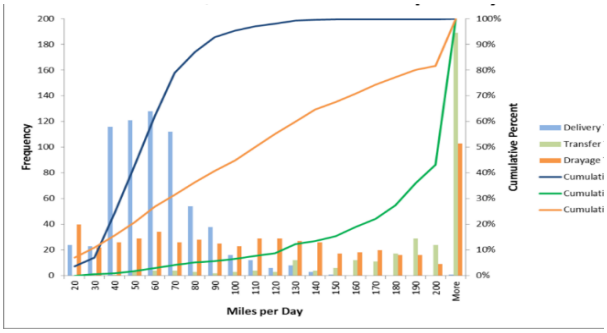


Figure 45: Miles Driven Per Day

not a pure highway driving type. NREL applied its Drive-cycle Rapid Investigation, Visualization and Evaluation tool (DRIVE™) to compare representative drive cycle metrics from the data collected for this project to a variety of standard drive cycles. Figure 45 shows a histogram of the miles driven per day by each of the vocations. The delivery group has the narrowest range of daily miles while drayage and transfer trucks have greater variation day-to-day as well as higher miles per day as would be expected. NREL used this comparison to select drive cycles that best represent and bracket the observed operational data.

Powertrain and Advanced Technology Matching by Vocation: NREL completed an extensive analysis on the impact of technology improvements on vehicle efficiency and performance using the Future Automotive Systems Technology Simulator tool (FASTSim) batch processing all the real world recorded drive cycles collected in the study. Assessed technologies included: battery electric, natural gas, aerodynamic improvements, mass reduction and rolling resistance. A brief summary of the technology trends is provided below.

[6] The Controller Area Network (CAN, also known as CAN Bus) is a vehicle data bus standard designed to allow automotive electronic control units and devices to communicate with each other.

Delivery Trucks (Class 3-7) - NREL modeled the effects of rolling resistance, aerodynamic drag, vehicle mass reduction, CNG engines and vehicle electrification across over 2100 real-world delivery truck trips in the Fleet DNA database for class 3-7 delivery trucks. The results showed that delivery trucks benefit more from mass reduction than from rolling resistance reduction or aerodynamic improvements. The stop-and-go nature of delivery vehicles means they save fuel from reduced mass on every acceleration. Conversely they do not typically drive enough miles for rolling resistance improvements to have the same impact and they do not drive enough at high speeds for aerodynamic improvements to save substantial amounts of energy. When routes are within the range of EV powertrains large savings can be realized, but payback due to the cost of batteries and electric rate structure must be considered on an individual site basis. Simulations of delivery truck routes showed EVs using significantly less energy than their diesel counterparts (approximately 1.3 kWh/mile EV vs. 4.4 kWh/mile diesel). The Fleet DNA duty cycle data showed that approximately 80% of daily driving was less than 70 miles per day, which could be accomplished with a 100kWh battery pack. CNG, while somewhat less efficient on an energy basis may offer fuel cost savings when natural gas prices remain below diesel with lower emissions relative to baseline diesel technology.

Transfer Trucks (Class 8) - NREL modeled the effects of rolling resistance, aerodynamic drag, vehicle mass reduction, and CNG engines across over 800 real-world transfer truck trips in the database. EVs were not considered because of the long daily driving distances (i.e., 90% of the daily driving was over 100 miles). The simulations showed that transfer trucks benefit more from mass reduction and rolling resistance reduction than from aerodynamic improvements; but small aerodynamic improvements may be achievable as the vocation currently has not typically implemented aerodynamic improvements even though these vehicles spend significant time at highway speeds. Care would have to be taken to implement aerodynamic solutions that improve the drag coefficient without adversely affecting the job function. While current EV technology cannot provide the range needed; CNG engines can provide the range needed with reduced emissions and possible fuel cost savings when natural gas prices remain below diesel on an energy equivalent basis.

Drayage Trucks (Class 8) - NREL modeled the effects of rolling resistance, aerodynamic drag, vehicle mass reduction, CNG engines and vehicle electrification across over 1800 real-world drayage truck trips in the database. The simulations showed that drayage trucks benefit more from mass reduction than from rolling resistance reduction or aerodynamic improvements and mass reduction on the tractor is the aspect most under the control of the fleet operator. CNG and EV powertrains offer advantages that are completely separate from the chassis and container designs. EV powertrains are a good fit for drayage vehicles if the daily driving distance is within the range of a specific vehicle design and battery usage can be maximized. CNG vehicles also work well and can provide the range needed for the full spectrum of drayage operations with reduced emissions and possible fuel cost savings for the full spectrum of routes.

The results from this study were primarily intended to show the relationship between vocational duty cycles and technology performance. A follow-on more detailed "total cost of ownership" analysis, referred to as the Commercial Zero Emission Vehicle (ComZEV) Roadmap, is currently being conducted by NREL and Ricardo Engineering to fully understand economic drivers associated with each technology option, leveraging the data and results from the FleetDNA Study. SCAQMD and the Southern California Gas Company are cosponsoring ComZEV.

Table 5: Projects Completed between January 1 & December 31, 2017

Contract	Contractor	Project Title	Date
Hydrogen and Mobile Fuel Cell Technologies and Infrastructure			
10482	California State University Los Angeles	Install and Demonstrate a PEM Electrolyzer in Los Angeles, Providing Hydrogen Fueling for Vehicles and Utilizing the Technology in the Engineering Technology Curriculum at the University	Oct-2017
13155†	Fletcher Jones Motor Cars Inc.	Lease Two F-Cell Fuel Cell Vehicles for Two Years	Feb-2017
14139†	Hyundai America Technical Center Inc.	No-Cost Lease of Fuel Cell Vehicle	Dec-2017
16039	Lawrence Livermore National Laboratory	Demonstrate Prototype Hydrogen Sensor and Electronics Package	Apr-2017
18118	Frontier Energy, Inc. (formerly BKi)	Participate in California Fuel Cell Partnership for CY 2017 and Provide Support for Regional Coordinator	Dec-2017
Engine Systems/Technologies			
15626	Cummins Westport, Inc.	Develop, Integrate and Demonstrate Ultra-Low Emission Natural Gas Engines for On-Road Heavy-Duty Vehicles	Jul-207
Electric/Hybrid Technologies and Infrastructure			
12028	Electric Vehicle International, Inc.	Demonstrate and Replace UPS Delivery Trucks with Zero Emission Medium-Duty Trucks	Sep-2017
13396	Transportation Power, Inc.	Develop and Demonstrate Seven Class 8 Zero Emission Electric Trucks	Sep-2017
14156†	Galpin Motors Inc. (Galpin Ford)	Lease Two Fusion Energi and One C-Max Energi PHEVs for a Three-Year Period	Jan-2017
14224	Complete Coach Works	Develop and Demonstrate Long Range All-Electric Transit Bus	Feb-2017
14323†	Selman Chevrolet Company	Lease Two 2014 Chevrolet Volt Extended-Range Electric Vehicles for Three Years	Mar-2017
15448†	University of California Los Angeles	Site Selection for DC Fast Charge Network	Apr-2017
Fueling Infrastructure and Deployment (NG/RNG)			
07246	USA Waste of California, Inc.	Purchase and Install New LNG Storage Tank at Long Beach LNG Refueling Station	Jun-2017
08098	Redlands Unified School District	Purchase and Install New CNG Fueling Station	Apr-2017
12135	Placentia-Yorba Linda Unified School District	Upgrade CNG Fueling Station	Nov-2017
14311	Southern California Gas Company	Construct CNG Fueling Station in Murrieta	Dec-2017

Table 5: Projects Completed between January 1 & December 31, 2017 (cont'd)

Contract	Contractor	Project Title	Date
Fuels/Emissions Studies			
10722	University of California Riverside/CE-CERT	Re-Establish Testing Facility and Quantify PM Emission Reductions from Charbroiling Operations	Sep-2017
14162	National Renewable Energy Laboratory	Utilize Fleet DNA Approach and Capabilities to Provide Vehicle Vocational Analysis within SCAQMD	Jun-2017
15623	University of California Riverside/CE-CERT	Evaluate Ozone and SOA Formation from Gasoline and Diesel Compounds	Mar-2017
16198	Gladstein, Neandross & Associates LLC	Study Opportunities and Benefits of Deploying Next Generation Heavy-Duty Natural Gas Vehicles Operating on Renewable Natural Gas	Jan-207
16254	University of California Berkeley	Evaluate Ozone and Secondary Aerosol Formation from Diesel Fuels	Dec-2017
Stationary Clean Fuel Technologies			
13408	University of California Irvine	Demonstrate Building Integration of Electric Vehicles, Photovoltaics and Stationary Fuel Cells	Sep-2017
Health Impacts Studies			
14171	Southern California Research Center/Allergy & Asthma Associates of Southern California	Study Air Pollution Health Effects on In-Utero Exposure to Traffic-Related Pollutants	May-2017
Technology Assessment and Transfer/Outreach			
05128†	Mid-Atlantic Research Institute LLC	Technical Assistance for Development, Outreach and Commercialization of Advanced Heavy-Duty and Off-Road Technologies	Mar-2017
13194†	Clean Fuel Connection Inc.	Technical Assistance with Alternative Fuels, Renewable Energy and Electric Vehicles	Mar-2017
15369†	Breakthrough Technologies Institute, Inc.	Technical Assistance with Low and Zero Emission Vehicles, Fuel Cells, Stationary Applications and Emissions Analyses	Dec-2017
15507†	Jerald A. Cole	Technical Assistance with Alternative Fuels, Emissions Analysis and Combustion Technologies	Jan-2017
15610	Goss Engineering, Inc.	Conduct Engineering Services at SCAQMD Headquarters	Dec-2017
17076†	Gladstein, Neandross & Associates, Inc.	Cosponsor Rethink Methane 2017	Apr-2017
17174†	Coordinating Research Council, Inc.	Cosponsor 27th Real-World Emissions Workshop	May-2017
17175†	Coordinating Research Council, Inc.	Cosponsor 2017 Mobile Source Air Toxics Workshop	Apr-2017

Table 5: Projects Completed between January 1 & December 31, 2017 (cont'd)

Contract	Contractor	Project Title	Date
Technology Assessment and Transfer/Outreach (cont'd)			
17275†	University of California Irvine	Cosponsor ICEPAG 2017	Sep-2017
17314†	University of California Irvine	Cosponsor the 2017 Portable Emissions Measurement Systems (PEMS) Conference & Workshop	Mar-2017
17324†	Whittier Uptown Association	Cosponsor Whittier Earth Day 2017	Oct-2017
17334†	Fourth Wall Events Inc.	Cosponsor the Emerging Technologies Summit	Apr-2017
17346†	Gladstein, Neandross & Associates LLC	Cosponsor the ACT Expo 2017	Jun-2017
17369†	FuturePorts	Cosponsor FuturePorts Annual Conference 2017	Jul-2017
17370†	Sustain OC	Cosponsor the 2017 Advanced Transportation Symposium & Expo	Aug-2017
17401†	University of California Davis-Institute of Transportation Studies	Cosponsor The Asilomar 2017 Conference on Transportation & Energy Policy	Oct-2017
18003†	Southern California Chinese American Environmental Protection Association	Cosponsor 2017 Los Angeles Environmental Forum	Sep-2017
18030†	Platia Productions	Cosponsor the 2017 Santa Monica AltCar Expo & Conference	Nov-2017
18039†	Three Squares Inc.	Cosponsor the 2017 Women in Green Forum	Nov-2017
18092†	California Electric Transportation Coalition	Cosponsor the CalETC 2017 Los Angeles Auto Show Events	Dec-2017

†Two-page summary reports (as provided in Appendix C) are not required for level-of-effort technical assistance contracts, leases or cosponsorships; or it was unavailable at time of printing this report.

CLEAN FUELS PROGRAM
2018 Plan Update

As noted earlier, this year marks the 30th year of the SCAQMD's Clean Fuels Program, along with establishment of the Technology Advancement Office (TAO) to oversee the Program, as a result of state legislation in 1988. The funding source is a $1 motor vehicle registration surcharge that, like the Program, was originally approved for a limited five-year period, but legislation eventually extended both the Program and surcharge indefinitely. The Clean Fuels Program has evolved over the years but has continued to fund a broad array of technology applications spanning near- and long-term implementation. More recently, the focus has been and will continue to be to support the development and deployment of zero and near-zero emission technologies. Similarly, planning has been and will remain an ongoing activity for the Program, which must remain flexible to address evolving technologies as well as the latest progress in the state-of-technologies, new research areas and data.

Every year the SCAQMD re-evaluates the Clean Fuels Program to develop a Plan Update based on a reassessment of the technology progress and direction of the SCAQMD's Board. This Plan Update for CY 2018 targets several near-term projects to help achieve emissions reductions needed for the South Coast to meet health-based air quality standards.

Overall Strategy

The overall strategy of the TAO's Clean Fuels Program is based, in large part, on emission reduction technology needs identified through the AQMP process and the SCAQMD Board's directives to protect the health of the approximately 17 million residents (nearly half the population of California) in the South Coast Basin. The AQMP, which is updated approximately every four years, is the long-term regional "blueprint" that relies on fair-share emission reductions from all jurisdictional levels (e.g., federal, state and local). The 2016 AQMP, which was adopted by the SCAQMD Governing Board in March 2017, is composed of stationary and mobile source emission reductions from traditional regulatory control measures, incentive-based programs, projected co-benefits from climate change programs, mobile source strategies and reductions from federally regulated sources (e.g., aircraft, locomotives and ocean-going vessels).

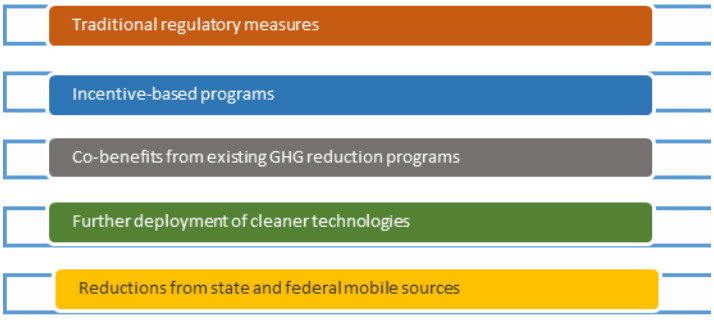


Figure 46: 2016 AQMP Components

The emission reductions and control measures in the 2016 AQMP rely on commercial adoption of a mix of currently available technologies as well as the expedited development and commercialization of lower-emitting mobile and stationary advanced technologies in the Basin to achieve air quality standards. The 2016 AQMP projects that an approximate 45 percent reduction in NOx is required by 2023 and an additional 55 percent reduction by 2031. The majority of these NOx reductions must come from mobile sources, both on- and off-road. Notably, the SCAQMD is currently only one of two regions in the nation designated as an extreme ozone nonattainment area (the other is San Joaquin Valley). Ground level ozone (a key component of smog) is created by a chemical reaction between NOx and volatile organic compound (VOC) emissions in sunlight. This is especially noteworthy because in the South Coast Air Basin the primary driver for ozone formation is NOx emissions, and mobile sources contribute approximately 88 percent of the NOx emissions in this region. Furthermore, NOx emissions, along with VOC emissions, also lead to the

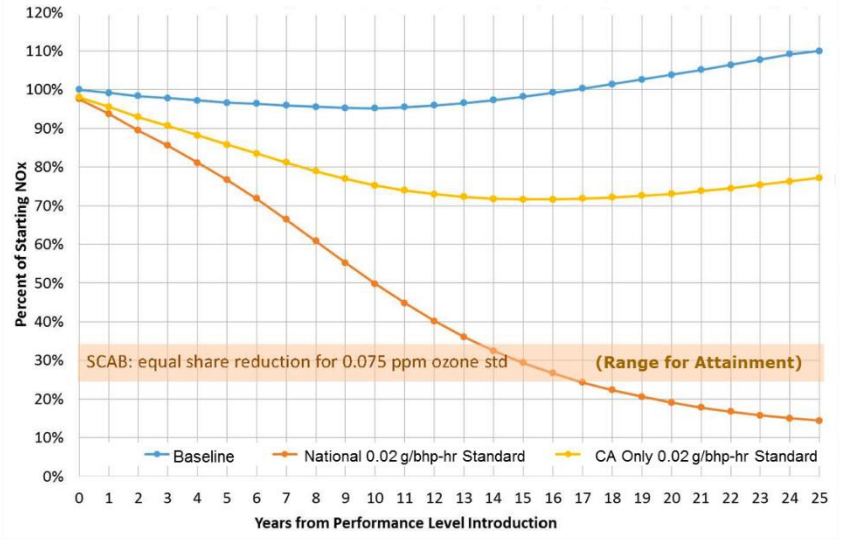
formation of PM2.5 [particulate matter measuring 2.5 microns or less in size, expressed as micrograms per cubic meter (µg/m^3)].

The 2016 AQMP includes integrated strategies and measures to demonstrate attainment of the following National Ambient Air Quality Standards (NAAQS):

- 8-hour Ozone (75 parts per billion or ppb) by 2031
- Annual PM2.5 (12 µg/m^3) by 2025
- 24-hour PM2.5 (35 µg/m^3) by 2019
- 8-hour Ozone (80 ppb) by 2023 (updated from the 2012 AQMP)
- 1-hour Ozone (120 ppb) by 2022 (updated from the 2012 AQMP)

On a positive note, the 2016 AQMP for the first time envisions Southern California achieving attainment through regulations and identifies the clean technologies to be deployed that were formerly undefined as "blackbox" measures. This is due, in part, because the needed zero and near-zero technologies are being commercialized or nearing commercialization, albeit with deployment pathways that still require more specificity and scalability. Also, additional NOx and VOC emission reduction co-benefits are expected from carbon dioxide (CO2) reductions resulting from California's climate change policies, together with funding to incentivize the deployment of these cleaner technologies. There are significant challenges to getting there, however, including the need for the U.S. EPA and CARB to lower the heavy-duty engine exhaust NOx standard from 0.2 grams per brake horsepower-hour (g/bhp-hr) to an already commercially achievable (by natural gas powered engines) 0.02 g/bhp-hr. Finally, financial resources will need to be identified that could be utilized to offset the higher procurement costs of these emerging clean technologies.

In June 2016, SCAQMD and 10 co-petitioners requested the U.S. EPA Administrator to undertake rulemaking to revise the national on-road heavy-duty engine exhaust NOx emission standard from 0.2 g/bhp-hr to 0.02 g/bhp-hr. It was recommended that the regulation be implemented by January 2022 or if not feasible, by January 2024, with a phase-in starting in January 1, 2022. A national standard (as opposed to only a California standard) is estimated to result in NOx emission reductions from this source category from 70 to 90 percent in 14 to 25 years, respectively. Given that the Basin must attain the 75 ppb ozone NAAQS by 2031 (within the next 13 years), a new on-road heavy-duty engine exhaust emissions standard for NOx is critical given the time needed for such standards to be adopted, for manufacturers to develop and produce compliant vehicles, and for national fleet turnover to occur.



Source: Presentation by Mr. Cory Palmer, ARB at the Symposium on California's Development of its Phase 2 Greenhouse

Figure 47: NOx Reduction Comparison: No New Regulations vs Low NOx Standard in California only vs National Standard

This chart here shows the difference in NOx reductions from heavy-duty trucks between baseline (no new

regulations) emissions (in blue), a low NOx standard adopted only in California (yellow) and reductions if the same low NOx standard is implemented nationally (orange).

The findings from the MATES IV[7] (released May 2015), which included local scale studies near large sources such as ports and freeways, reinforce the importance of these impacts and the need for transformative transportation technologies, especially near the goods movement corridor. In recognition of these impacts, the SCAQMD added as a key element to its strategy a concerted effort to develop and demonstrate zero and near-zero emissions' goods movement technologies, including electric trucks, plug-in hybrid trucks with all-electric range, zero emission container transport technologies, trucks operating from wayside power including catenary technology. In 2017, as noted earlier in this report, SCAQMD initiated MATES V to update the emissions inventory of toxic air contaminants and modeling to characterize risks, including measurements and analysis of ultrafine particle concentrations typically emitted or converted from vehicle exhaust. CARB is also in the processing of updating its EMFAC model, which assesses emissions from on-road vehicles including cars, trucks and buses.

A key strategy of the Clean Fuels Program is its public-private partnership with private industry, technology developers, academic institutions, research institutions and government agencies. This public-private partnership has allowed the Program to leverage its funding with $3-$4 of spending on R&D projects to every $1 of SCAQMD funds. The SCAQMD aggressively seeks leverage funds to accomplish more with every dollar and will continue to do so.

CY 2018 marks another hallmark in TAO – the 20th year of the Carl Moyer Program. The Carl Moyer Program provides the necessary incentives to push market penetration of the technologies developed and demonstrated by the Clean Fuels Program. Together these two synergistic programs allow the SCAQMD to be a leader in technology development and commercialization to accelerate the reduction of criteria pollutants.

As the state government continues to turn much of their attention to climate change (CO2 reductions), the SCAQMD remains committed to developing, demonstrating and commercializing zero and near-zero emission technologies and renewable fuels. Fortunately many of the technologies that address the South Coast Basin's needed NOx reductions also enable GHG reductions. Because of these "co-benefits," the SCAQMD has successfully partnered with the state and federally funded projects that promise emission reductions.

Program and Funding Scope

This 2018 Plan Update includes projects to develop, demonstrate and commercialize a variety of technologies, from near-term to long-term, that are intended to address the increasing challenges this region is facing to meet air quality standards, including:

1) implementation of new and changing federal requirements, such as the federal 8-hour ozone standard of 70 ppb promulgated by U.S. EPA in late 2015;
2) implementation of new technology measures by including accelerated development of technologies getting ready for commercialization and deploying ready technologies; and
3) continued development of cost-effective approaches.

The overall scope of projects in the 2018 Plan Update also needs to remain sufficiently flexible to address new challenges and measures that are identified in the 2016 AQMP, consider dynamically

[7] http://www.aqmd.gov/docs/default-source/air-quality/air-toxic-studies/mates-iv/mates-iv-final-draft-report-4-1-15.pdf?sfvrsn=7

evolving technologies, and take into account new research and data. The latter, for example, might include initial findings from MATES V and models generated using EMFAC 2017.

The Clean Air Act, in addition to providing for specific control measures based on known technologies and control methods, has provisions for more general measures based on future, yet-to-be-developed technologies. These "black box" measures are identified under Section 182(e)(5) of the Clean Air Act for regions that are extreme non-attainment areas, such as the South Coast Basin. In the past, some of the technologies that have been developed and demonstrated in the Clean Fuels Program may have served as guidance for the "black box." However, as noted above, the 2016 AQMP calls for elimination on the reliance of these "black box" (future technologies) to the maximum extent possible.

Within the core technology areas defined later in this section, project objectives range from near-term to long-term. However, the SCAQMD Clean Fuels Program concentrates on supporting development, demonstration and technology commercialization and deployment efforts rather than fundamental research. The nature and typical time-to-product for the Program's projects is described below, from near-term to longer-term.

- *Deployment* or technology commercialization efforts focus on increasing the utilization of clean technologies in conventional applications, promising immediate and growing emissions reduction benefits. It is often difficult to transition users to a non-traditional technology or fuel due to higher costs or required changes to user behaviors, even if such a technology or fuel offers significant societal benefits. As a result, in addition to government's role to reduce risk by funding technology development and testing, one of government's roles is to support and offset any incremental cost through incentives to help accelerate the transition and use of the cleaner technology. The increased use and proliferation of these cleaner technologies often depends on this initial support and funding as well as efforts intended to increase confidence of stakeholders that these technologies are real, cost-effective in the long term and will remain applicable.
- Technologies ready to begin field *demonstration* in 2018, are expected to result in a commercial product in the 2021-2023 timeframe, and technologies being field demonstrated generally are in the process of being certified. The field demonstrations provide a controlled environment for manufacturers to gain real-world experience and address any end-user issues that may arise prior to the commercial introduction of the technology. Field demonstrations provide real-world evidence of a technology's performance to help allay any concerns by potential early adopters.
- Finally, successful technology *development* projects are expected to begin during 2018 with durations of at least two or more years. Additionally, field demonstrations to gain longer-term verification of performance may also be needed prior to commercialization. Certification and ultimate commercialization would be expected to follow. Thus, development projects identified in this plan may result in technologies ready for commercial introduction as soon as 2022-2024. Projects are also proposed that may involve the development of emerging technologies that are considered longer term and, perhaps higher risk, but with significant emission reduction potential. Commercial introduction of such long-term technologies would not be expected until 2025 or later.

Core Technologies

The following technologies have been identified as having the largest potential and best prospects to enable the emission reductions need to achieve NAAQS and thus form the core of the Program.

Not all project categories will be funded in 2018 due to funding limitations, and focus will remain on control measures identified in the 2016 AQMP, with consideration for availability of suitable projects. The technical areas identified below are appropriate within the context of the current air quality

challenges and opportunities for technology advancement. Within these areas there is significant opportunity for SCAQMD to leverage its funds with other funding agencies to expedite the implementation of cleaner alternative technologies in the Basin. A concerted effort is continually made to form private partnerships to leverage Clean Fuels funds. For example, in January 2016, the SCAQMD was awarded $23.5 million from CARB's Low Carbon Transportation Greenhouse Gas Emission Reduction Fund for heavy-duty truck projects. In 2018, SCAQMD hopes to participate in a CARB-funded zero and near-zero emissions freight facilities project using FY 2017-18 monies their Board has dedicated to clean transportation incentives.

Several of the core technologies discussed below are synergistic. For example, a heavy-duty vehicle such as a transit bus or drayage truck, may utilize a hybrid electric drive train with a fuel cell operating on hydrogen fuel or an internal combustion engine operating on an alternative fuel as a range extender. The core hybrid electric technologies overlap with each other.

Priorities may shift during the year in keeping with the diverse and flexible "technology portfolio" approach. Priorities may also shift to address specific technology issues which affect residents within the SCAQMD's jurisdiction. Changes in priority may also occur to leverage opportunities such as cost-sharing by the state government, the federal government or other entities.

The following nine core technology areas are listed by current SCAQMD priorities based on the goals for 2018.

Hydrogen & Fuel Cell Technologies & Infrastructure

The SCAQMD supports hydrogen infrastructure and fuel cell technologies as one option in our technology portfolio and is dedicated to assisting federal and state government programs to deploy light-duty fuel cell vehicles (FCVs) by supporting the required refueling infrastructure.

Calendar Years 2015-2018 have been a critical timeframe for the introduction of hydrogen fueling infrastructure. In 2014, Hyundai introduced the Tucson FCV for lease; in 2015, Toyota commercialized the first FCV available to consumers for purchase; and in December 2016, Honda started delivering its 2017 Honda Clarity Fuel Cell. Other OEMS have similarly disclosed plans to introduce FCVs in 2018 and beyond. Since hydrogen refueling stations need 18-36 month lead times for permitting, construction and commissioning, plans for stations need to be implemented now. While coordination efforts with the California Division of Measurement Standards (DMS) to establish standardized measurements for hydrogen fueling started in 2014, additional efforts to offer hydrogen for sale in higher volumes to general consumers are still needed. In addition, SCAQMD continues to review the market to understand new business models and new sources of funding besides grants for construction necessary to enable the station operations to remain solvent during the early years until vehicle numbers ramp up. Lastly, a deliberate and coordinated effort is necessary to ensure that the retail hydrogen stations are developed with design flexibility to address specific location limitations, and with refueling reliability matching those of existing gasoline and diesel fueling stations.

Fuel cells can also play a role in medium- and heavy-duty applications where battery capacity is insufficient to meet range requirements. The California Fuel Cell Partnership's (CaFCP) Medium- and Heavy-Duty Fuel Cell Electric Truck Action Plan completed in October 2016 focuses on Class 4 parcel delivery trucks and Class 8 drayage trucks with infrastructure development and establishes metrics for measuring progress. Toyota Motors has also displayed a Class 8 fuel cell truck with planned demonstrations at Port of Long Beach.

The 2018 Plan Update identifies key opportunities while clearly leading the way for pre-commercial demonstrations of OEM vehicles. Future projects may include the following:

- continued development and demonstration of distributed hydrogen production and fueling stations, including energy stations with electricity and hydrogen co-production and higher pressure (10,000 psi) hydrogen dispensing and scalable/higher throughput;
- development and demonstration of cross-cutting fuel cell applications (e.g. plug-in hybrid fuel cell vehicles);
- development and demonstration of fuel cells in off-road, locomotive and marine applications;
- demonstration of fuel cell vehicles in controlled fleet applications in the Basin;
- development and implementation of strategies with government and industry to build participation in the hydrogen market including certification and testing of hydrogen as a commercial fuel to create a business case for investing as well as critical assessments of market risks to guide and protect this investment; and
- coordination with fuel cell vehicle OEMs to develop an understanding of their progress in overcoming the barriers to economically competitive fuel cell vehicles and develop realistic scenarios for their large scale introduction.

Engine Systems

Natural gas engines are experiencing market growth due to the low cost of fuel. In order to achieve the emission reductions required for the South Coast Air Basin, the internal combustion engines (ICEs) used in the heavy-duty sector will require emissions that are 90% lower than the 2010 standards. In 2016, commercialization of the Cummins 8.9L natural gas engine achieving 90% below the existing federal standard was a game changer. The 8.9L engine works well in refuse and other vocational trucks as well as transit and school buses. In 2017, Cummins Westport Inc. with SCAQMD and other project partners achieved certification of the 12-liter natural gas engine. The 11.9L engine in Class 8 drayage trucks and 60-foot articulated transit buses is a further game changer. CARB and U.S. EPA certified both engines at 0.02 g/ bhp-hr for NOx. The Plan Update continues to incorporate pursuit of cleaner engines for the heavy-duty sector. Future projects will support the development, demonstration and certification of engines that can achieve these massive emission reductions using an optimized systems approach. Specifically, these projects are expected to target the following:

- development of ultra-low emission, natural gas engines for heavy-duty vehicles and high horsepower applications;
- continued development and demonstration of gaseous- and liquid-fueled, advanced fuels or alternative fuel medium-duty and heavy-duty engines and vehicles;
- development and demonstration of alternative fuel engines for off-road applications;
- evaluation of alternative engine systems such as hydraulic plug-in hybrid vehicles;
- development and demonstration of engine systems that employ advanced engine design features, waste heat recovery, improved exhaust or recirculation systems, and aftertreatment devices; and
- development of cold start technologies for hybrids and diesels where high level emissions occur

The National Highway Traffic Safety Administration's finalized standards to improve fuel efficiency of medium- and heavy-duty vehicles for model year 2018 and beyond should spur further interest by manufacturers to partner on engine system development. The EPA's recent initiation to create a rule for a national low NOx standard for all on highway heavy duty engines will require all manufacturers to participate by 2024.

Electric/Hybrid Technologies & Infrastructure

If the region expects to meet the federal standards for PM2.5 and ozone, a primary focus must be on zero and near-zero emission technologies. A key strategy to achieve these goals is the electrification of transportation technologies on a wide and large scale. With that in mind, the SCAQMD supports projects to address the main concerns regarding cost, battery lifetime, travel range, charging station infrastructure and original equipment manufacturer (OEM) commitment. Integrated transportation

systems can encourage further reduction of emissions by matching the features of electric vehicles (zero emissions, zero start-up emissions, all electric range) to typical consumer demands for mobility by linking them to transit. Additionally, the impact of fast charging on battery life and infrastructure costs needs to be better understood. This is especially important today when every month roughly 10,000 new plug-in vehicles are sold or leased in the U.S., and this number may increase significantly with the introduction of vehicles with anticipated 200+ mile ranges, such as the Chevy Bolt for which U.S. sales launched in December 2016 and the more affordable Tesla Model 3 which came out in 2017.

The development and deployment of zero emission goods movement systems remains one of the top priorities for the SCAQMD to support a balanced and sustainable growth in the port complex. The SCAQMD continues to work with our regional partners, in particular the Ports of Los Angeles and Long Beach, the Southern California Association of Governments (SCAG) and Los Angeles County Metropolitan Transportation Authority (LACMTA) to identify technologies that could be beneficial to and garner support from all stakeholders. Specific technologies include zero emission trucks (using batteries and/or fuel cells), near-zero emission trucks with all-electric range using wayside power (catenary or roadbed electrification) or with plug-in hybrid powertrains, locomotives with near-zero emissions (e.g., 90% below Tier 4), electric locomotives using battery tender cars and catenary, and linear synchronous motors for locomotives and trucks. Additionally, the California Sustainable Freight Action Plan outlines a blueprint to transition the state's freight system to an environmentally cleaner, more efficient and more economical one than it is today, including a call for a zero and near-zero emissions vehicle pilot project in Southern California. The Port of Los Angeles's Sustainable City Plan corroborates this effort, setting a goal of 15 percent of zero emission goods movement trips by 2025 and 35 percent by 2035. More recently, the Clean Air Action Plan 2017 Update adopted by Ports of Los Angeles and Long Beach call for zero emission cargo handling equipment by 2030 and zero emission drayage trucks by 2035. Cummins and Tesla have announced plans to demonstrate zero emission heavy-duty trucks, with future commercial plans for heavy-duty vehicle electrification.

There are now over 11 light-duty PHEVs certified to California's cleanest ATPZEV or TZEV standard and 16 pure battery electric vehicles (BEVs) commercially available in California. All of these vehicles offer the benefits of higher fuel economy and range, as well as lower emissions. Continued advancements in the light-duty arena may have applications for medium- and heavy-duty vehicles.

Opportunities to develop and demonstrate technologies that could enable expedited widespread use of electric and hybrid-electric vehicles in the Basin include the following:

- demonstration of electric and hybrid technologies for cargo container transport operations, e.g., heavy-duty battery electric or plug-in electric drayage trucks with all electric range;
- demonstration of medium-duty electric and hybrid electric vehicles in package delivery operations, e.g., electric walk-in vans with fuel cell or CNG range extender ;
- development and demonstration of CNG hybrid vehicle technology;
- demonstration of niche application battery electric vehicles, including school and transit buses and refuse trucks with short-distance fixed service routes;
- demonstration of integrated programs that make best use of electric drive vehicles through interconnectivity between fleets of electric vehicles and mass transit, and web-based reservation systems that allow multiple users;
- development of eco-friendly intelligent transportation system (ITS) strategies, optimized load-balancing strategies for cargo freight and market analysis for zero emission heavy-duty trucks;
- demonstration and installation of EV infrastructure to support the electric and hybrid-electric vehicle fleets currently on the roads or soon entering the market, and to reduce cost, improve convenience and integrate with renewable energy and building demand management strategies (e.g., vehicle-to-grid or vehicle-to-building functionality);
- repurpose of EV batteries for other or second third energy storage uses, as well as reusing battery packs and approaches to recycle lithium, cobalt and other metals; and

- development of a methodology to increase understanding of the capability to accept fast-charging and the resultant life cycle and demonstration of the effects of fast-charging on battery life and vehicle performance.

Fueling Infrastructure and Deployment (NG/RNG)

The importance of natural gas, renewable natural gas (RNG) and related refueling infrastructure cannot be overemphasized for the realization of large deployment of alternative fuel technologies. Significant demonstration and commercialization efforts funded by the Clean Fuels Program as well as other local, state and federal agencies are underway to: 1) support the upgrade and buildup of public and private infrastructure projects, 2) expand the network of public-access and fleet fueling stations based on the population of existing and anticipated vehicles, and 3) put in place infrastructure that will ultimately be needed to accommodate transportation fuels with very low gaseous emissions.

Compressed and liquefied natural gas (CNG and LNG) refueling stations are being positioned to support both public and private fleet applications. Upgrades and expansions are also needed to refurbish or increase capacity for some of the stations installed five or more years ago as well as standardize fueling station design, especially to ensure growth of alternative fuels throughout the South Coast Air Basin and beyond. There is also growing interest for partial or complete transition to renewable natural gas delivered through existing natural gas pipelines. Funding has been provided at key refueling points for light-, medium- and heavy-duty natural gas vehicle users traveling from the local ports, along I-15 and The Greater Interstate Clean Transportation Corridor (ICTC) Network. SB 350 (De León) further establishes a target to double the energy efficiency in electricity and natural gas end uses by 2030.

Active participation in the development of National Fire Protection Association (NFPA) fire and safety codes and standards, evaluation of the cost and economics of the new fuels, public education and training and emergency response capability are just a few areas of the funded efforts that have helped overcome public resistance to these new technologies. Some of the projects expected to be developed and cofunded for infrastructure development are:

- development and demonstration of renewable natural gas as a vehicle fuel from renewable feedstocks and biowaste;
- development and demonstration of advanced, cost effective methods for manufacturing synthesis gas for conversion to renewable natural gas;
- enhancement of safety and emissions reductions from natural gas refueling equipment;
- expansion of fuel infrastructure, fueling stations, and equipment; and
- expansion of infrastructure connected with existing fleets, public transit, and transportation corridors, including demonstration and deployment of closed loop systems for dispensing and storage.

Health Impacts, Fuel and Emissions Studies

The monitoring of pollutants in the Basin is extremely important, especially when linked to (1) a particular sector of the emissions inventory (to identify the responsible source or technology) and/or (2) exposure to pollution (to assess the potential health risks). In fact, studies indicate that smoggy areas can produce irreversible damage to children's lungs. This information highlights the need for further emissions and health studies to identify the emissions from high polluting sectors as well as the health effects resulting from these technologies.

Over the past few years, the SCAQMD has funded emission studies to evaluate the impact of tailpipe emissions of biodiesel and ethanol fueled vehicles mainly focusing on criteria pollutants and greenhouse gas (GHG) emissions. These studies showed that biofuels, especially biodiesel in some applications and duty cycles, can contribute to higher NOx emissions while reducing other criteria pollutant emissions. Furthermore, despite recent advancements in toxicological research related to air

pollution, the relationship between particle chemical composition and health effects is still not completely understood, especially for biofuels. Therefore, a couple of years ago the SCAQMD funded studies to investigate the physical and chemical composition and toxicological potential of tailpipe PM emissions from biodiesel and ethanol fueled vehicles to better understand their impact on public health. Studies continued in 2015 to further investigate the toxicological potential of emissions, such as ultrafine particles and vapor phase substances, and to determine whether or not other substances such as volatile or semi-volatile organic compounds are being emitted in lower mass emissions that could pose harmful health effects. In addition, as the market share for gasoline direct injection (GDI) vehicles has rapidly increased from 4% of all vehicle sales in the U.S. in 2009 to 38% in 2014, with an expectation to top 60% by 2016, it is important to understand the impact on air quality from these vehicles. As such, SCAQMD has funded studies to investigate both physical and chemical composition of tailpipe emissions, focusing on PM from GDI vehicles as well as secondary organic aerosol formation formed by the reaction of gaseous and particulate emissions from natural gas and diesel heavy-duty vehicles. In 2017, SCAQMD initiated an in-use real-world emissions study, including fuel usage profile characterization as well as an assessment of the impact of current technology and alternative fuels on fuel consumption.

In recent years, there has also been an increased interest both at the state and national level on the use of alternative fuels including biofuels to reduce petroleum oil dependency, GHG emissions and air pollution. In order to sustain and increase biofuel utilization, it is essential to identify feedstocks that can be processed in a more efficient, cost-effective and sustainable manner.

Some areas of focus include:

- demonstration of remote sensing technologies to target different high emission applications and sources;
- studies to identify the health risks associated with ultrafine and ambient particulate matter including their composition to characterize their toxicity and determine specific combustion sources;
- in-use emission studies using biofuels, including renewable diesel, to evaluate in-use emission composition;
- in-use emission studies to determine the impact of new technologies, in particular PEVs on local air quality as well as the benefit of telematics on emissions reduction strategies;
- lifecycle energy and emissions analyses to evaluate conventional and alternative fuels; and
- analysis of fleet composition and its associated impacts on criteria pollutants.

Stationary Clean Fuel Technologies

Although stationary source emissions are small compared to mobile sources in the South Coast Air Basin, there are applications where cleaner fuel technology can be applied to reduce NOx, VOC and PM emissions. For example, a recent demonstration project funded in part by the SCAQMD at a local sanitation district consisted of retrofitting an existing biogas engine with a digester gas cleanup system and catalytic exhaust emission control. The retrofit system resulted in significant reductions in NOx, VOC and CO emissions. This project demonstrated that cleaner, more robust renewable distributed generation technologies exist that could be applied to not only improve air quality, but enhance power quality and reduce electricity distribution congestion.

Additionally, alternative energy storage could be achieved through vehicle-to-grid or vehicle-to-building technologies, as well as Power-to-Gas that could allow potentially stranded renewable electricity stored as hydrogen fuel. The University of California (U.C.) Riverside's Sustainable Integrated Grid Initiative and U.C. Irvine's Advanced Energy and Power Program, funded in part by the SCAQMD, for example could assist in the evaluation of these technologies.

Projects conducted under this category may include:

- development and demonstration of reliable, low emission stationary technologies (e.g., low NOx burners, fuel cells or microturbines);
- exploration of renewables as a source for cleaner stationary technologies;
- evaluation, development and demonstration of advanced control technologies for stationary sources; and
- vehicle-to-grid or vehicle-to-building, or other stationary energy demonstration projects to develop sustainable, low emission energy storage alternatives.

Emission Control Technologies

Although engine technology and engine systems research is required to reduce the emissions at the combustion source, dual fuel technologies and post-combustion cleanup methods are also needed to address the current installed base of on-road and off-road technologies. Existing diesel emissions can be greatly reduced with introduction of natural gas into the engine or via aftertreatment controls such as PM traps and catalysts, as well as lowering the sulfur content or using additives with diesel fuel. Gas-to-Liquid (GTL) fuels, formed from natural gas or other hydrocarbons rather than petroleum feedstock and emulsified diesel, provide low emission fuels for use in diesel engines. As emissions from engines become lower and lower, the lubricant contributions to VOC and PM emissions become increasingly important. The most promising of these technologies will be considered for funding, specifically:

- evaluation and demonstration of new emerging liquid fuels, including alternative and renewable diesel and GTL fuels;
- development and demonstration of renewable-diesel engines and advanced aftertreatment technologies for mobile applications (including diesel particulate traps and selective catalytic reduction catalysts); and non-thermal regen technology
- development and demonstration of low-VOC and PM lubricants for diesel and natural gas engines.

Technology Assessment and Transfer/Outreach

Since the value of the Clean Fuels Program depends on the deployment and adoption of the demonstrated technologies, outreach and technology transfer efforts are essential to its success. This core area encompasses assessment of advanced technologies, including retaining outside technical assistance as needed, efforts to expedite the implementation of low emission and clean fuels technologies, coordination of these activities with other organizations and information dissemination to educate the end user. Technology transfer efforts include support for various clean fuel vehicle incentive programs as well.

Target Allocations to Core Technology Areas

Figure 48 below presents the potential allocation of available funding, based on SCAQMD projected program costs of $16.7 million for all potential projects. The expected actual project expenditures for 2018 will be less than the total SCAQMD projected program cost since not all projects will materialize. The target allocations are based on balancing technology priorities, technical challenges and opportunities discussed previously and near-term versus long-term benefits with the constraints on available SCAQMD funding. Specific contract awards throughout 2018 will be based on this proposed

allocation, the quality of proposals received and evaluation of projects against standardized criteria and ultimately SCAQMD Governing Board approval.

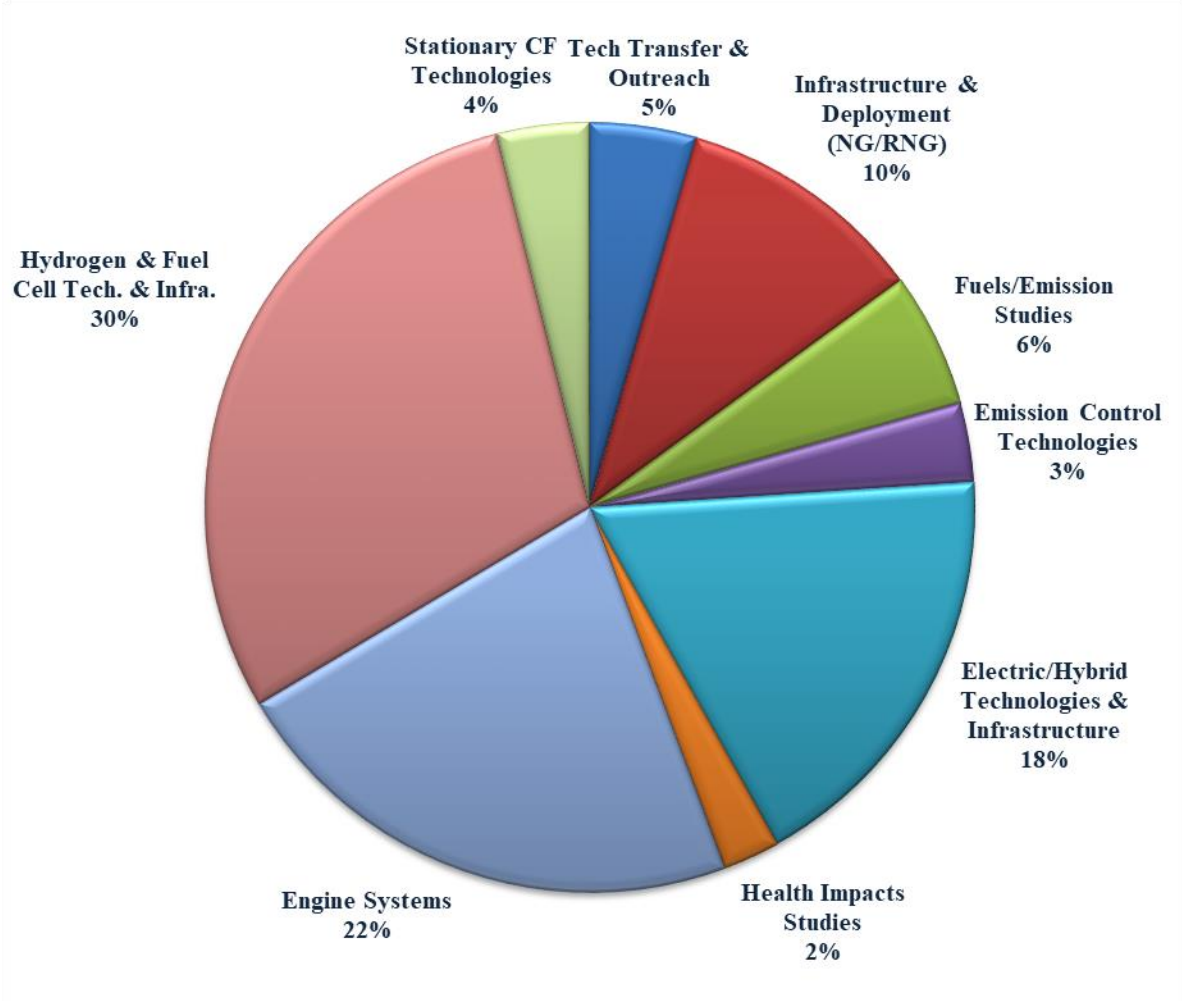


Figure 48: Projected Cost Distribution for Potential SCAQMD Projects in 2018 ($16.7M)

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CLEAN FUELS PROGRAM
Program Plan Update for 2018

This section presents the Clean Fuels Program Plan Update for 2018. The proposed projects are organized by program areas and described in further detail, consistent with the SCAQMD budget, priorities and the best available information on the state-of-the-technology. Although not required, this Plan also includes proposed projects that may be funded by revenue sources other than the Clean Fuels Program, specifically related to VOC and incentive projects.

Table 6 (page 89) summarizes potential projects for 2018 as well as the distribution of SCAQMD costs in some areas as compared to 2017. The funding allocation continues the focus on development and demonstration of zero and near-zero emission technologies including the infrastructure for such technologies. For the 2018 Draft Plan, the SCAQMD shifts some resources onto hydrogen and fuel cell technologies to incentivize large-scale hydrogen infrastructure projects at the Ports and in the Inland Empire and in light of current and projected roll out of fuel cell vehicles in 2016-2018. There is a small decrease in electric and hybrid-electric technologies in light of the large award the SCAQMD received in early January 2016 from the GGRF Program to demonstrate vehicles in this technology area. A small funding shift to Engine Systems and Fueling Infrastructure and Deployment (natural gas and renewable fuels) is also recommended for biogas production and to ensure continued development and deployment of near-zero natural gas engines and liquid-fueled high horsepower engines for long-haul trucks. The other areas will continue with similar allocations for 2018. As in prior years, the funding allocations again align well with the SCAQMD's FY 2017-18 Goals and Priority Objectives. Overall, the Program is designed to ensure a broad portfolio of technologies and leverage state and federal efforts, and maximize opportunities to leverage technologies in a synergistic manner.

Each of the proposed projects described in this Plan, once fully developed, will be presented to the SCAQMD Governing Board for approval prior to contract initiation. This development reflects the maturity of the proposed technology and identifies contractors to perform the projects, participating host sites, and securing sufficient cost-sharing needed to complete the project and other necessary factors. Recommendations to the SCAQMD Governing Board will include descriptions of the technology to be demonstrated and in what application, the proposed scope of work of the project and the capabilities of the selected contractor and project team, in addition to the expected costs and expected benefits of the projects as required by H&SC 40448.5.1.(a)(1). Based on communications with all of the organizations specified in H&SC 40448.5.1.(a)(2) and review of their programs, the projects proposed in this Plan do not appear to duplicate any past or present projects.

Funding Summary of Potential Projects

The remainder of this section contains the following information for each of the potential projects summarized in Table 6 (page 89).

Proposed Project: A descriptive title and a designation for future reference.

Expected SCAQMD Cost: The estimated proposed SCAQMD cost share as required by H&SC 40448.5.1.(a)(1).

Expected Total Cost: The estimated total project cost including the SCAQMD cost share and the cost share of outside organizations expected to be required to complete the proposed project. This is an indication of how much SCAQMD public funds are leveraged through its cooperative efforts.

Description of Technology and Application: A brief summary of the proposed technology to be

developed and demonstrated, including the expected vehicles, equipment, fuels, or processes that could benefit.

Potential Air Quality Benefits: A brief discussion of the expected benefits of the proposed project, including the expected contribution towards meeting the goals of the AQMP, as required by H&SC 40448.5.1.(a)(1). In general, the most important benefits of any technology research, development and demonstration program are not necessarily realized in the near-term. Demonstration projects are generally intended to be proof-of-concept for an advanced technology in a real-world application. While emission benefits, for example, will be achieved from the demonstration, the true benefits will be seen over a longer term, as a successfully demonstrated technology is eventually commercialized and implemented on a wide scale.

Table 6: Summary of Potential Projects for 2018

Proposed Project	Expected SCAQMD Cost $	Expected Total Cost $
Hydrogen and Fuel Cell Technologies and Infrastructure		
Develop and Demonstrate Operation and Maintenance Business Case Strategies for Hydrogen Stations	350,000	4,000,000
Develop and Demonstrate Hydrogen Production and Fueling Stations	2,000,000	6,000,000
Develop and Demonstrate Medium- and Heavy-Duty Fuel Cell Vehicles	2,500,000	10,000,000
Demonstrate Light-Duty Fuel Cell Vehicles	100,000	100,000
Subtotal	$4,950,000	$20,100,000
Engine Systems/Technologies		
Develop and Demonstrate Advanced Gaseous- and Liquid-Fueled Medium- and Heavy-Duty Engines and Vehicle Technologies to Achieve Ultra-Low Emissions	3,000,000	5,600,000
Develop and Demonstrate Alternative Fuel and Clean Conventional Fueled Light-Duty Vehicles	200,000	1,500,000
Develop and Demonstrate Cold-Start Technologies	250,000	1,000,000
Develop and Demonstrate Waste-Heat Recovery on Heavy-Duty Diesel Engines	250,000	1,000,000
Subtotal	$3,700,000	$9,100,000
Electric/Hybrid Technologies & Infrastructure		
Develop and Demonstrate Electric and Hybrid Vehicles	1,000,000	2,000,000
Develop and Demonstrate Infrastructure for Deployment of Plug-in Electric and Hybrid Electric Vehicles	500,000	3,000,000
Demonstrate Alternative Energy Storage	300,000	2,000,000
Develop and Demonstrate Electric Container Transport Technologies	1,200,000	4,000,000
Subtotal	$3,000,000	$11,000,000
Fueling Infrastructure and Deployment (NG/RNG)		
Deploy Natural Gas Vehicles in Various Applications	500,000	2,000,000
Develop, Maintain & Expand Natural Gas Infrastructure	250,000	1,500,000
Demonstrate Natural Gas Manufacturing and Distribution Technologies Including Renewables	1,000,000	10,000,000
Subtotal	$1,750,000	$13,500,000
Fuel/Emissions Studies		
Conduct In-Use Emissions Studies for Advanced Technology Vehicle Demonstrations	400,000	800,000
Conduct Emissions Studies on Biofuels and Alternative Fuels	300,000	1,000,000

Table 6: Summary of Potential Projects for 2018(cont'd)

Proposed Project	Expected SCAQMD Cost $	Expected Total Cost $
Fuel/Emissions Studies (cont'd)		
Identify and Demonstrate In-Use Fleet Emissions Reduction Technologies & Opportunities	250,000	2,000,000
Subtotal	$950,000	$3,800,000
Stationary Clean Fuel Technologies		
Develop and Demonstrate Reliable, Advanced Emission Control Technologies, and Low Emission Monitoring Systems and Test Methods	100,000	250,000
Develop and Demonstrate Clean Stationary Technologies	250,000	750,000
Develop and Demonstrate Renewables-Based Energy Generation Alternatives	300,000	1,000,000
Subtotal	$650,000	$2,000,000
Emission Control Technologies		
Develop and Demonstrate Advanced Aftertreatment Technologies	300,000	5,000,000
Demonstrate On-Road Technologies in Off-Road and Retrofit Applications	250,000	1,000,000
Subtotal	$550,000	$6,000,000
Health Impacts Studies		
Evaluate Ultrafine Particle Health Effects	100,000	2,000,000
Conduct Monitoring to Assess Environmental Impacts	150,000	500,000
Assess Sources and Health Impacts of Particulate Matter	150,000	300,000
Subtotal	$400,000	$2,800,000
Technology Assessment & Transfer/Outreach		
Assess and Support Advanced Technologies and Disseminate Information	425,000	800,000
Support Implementation of Various Clean Fuels Vehicle Incentive Programs	325,000	400,000
Subtotal	$750,000	$1,200,000
TOTALS FOR POTENTIAL PROJECTS	**$16,700,000**	**$69,500,000**

Technical Summaries of Potential Projects

Hydrogen and Fuel Cell Technologies & Infrastructure

Proposed Project: Develop and Demonstrate Operation and Maintenance Business Case Strategies for Hydrogen Stations

Expected SCAQMD Cost: $350,000

Expected Total Cost: $4,000,000

Description of Technology and Application:

California regulations require automakers to place increasing numbers of zero emission vehicles into service every year. By 2050, CARB projects that 87% of light-duty vehicles on the road will be zero emission battery and fuel cell vehicles with fuel cell electric becoming the dominant powertrain.

In 2013, cash-flow analysis resulting in a Hydrogen Network Investment Plan and fuel cell vehicle development partnership announcements by major automakers enabled the passage of AB 8 which provides $20 million per year for hydrogen infrastructure cofunding through the CEC. This resulted in fuel cell vehicle production announcements by Hyundai, Toyota and Honda in 2014-2015.

In October 2016, the CaFCP released its Medium- and Heavy-Duty Fuel Cell Electric Truck Action Plan focusing on Class 4 parcel delivery trucks and Class 8 drayage trucks with infrastructure development and establishing metrics for measuring progress. Additionally, the CaFCP released a Vision 2030 document establishing a roadmap for future fuel cell vehicle and hydrogen refueling stations, including barriers that need to be overcome.

In 2015, Hyundai and Toyota introduced fuel cell vehicles, with Honda initiating delivery in 2016 and others following in 2017 or soon thereafter. Government actions over the last couple of years, coupled with early adopter response, is helping to establish demand and thus a business case model for hydrogen stations.

Additional work in this project category includes (1) developing a plan to secure long-term funding to complete the hydrogen fueling network build-out; (2) providing details how funding can be invested; (3) assessing alternative revenue streams such as renewable incentives; (4) proposing alternative financing structures to leverage/extend CEC funding; and (5) supporting station operation during the transition to commercial viability, including optimizing designs with flexibility to address individual site characteristics, as well as ensuring higher levels of dispensing availability and reliability.

Furthermore, in the next couple of years an evaluation of actual market penetration of FCVs should be conducted to guide and protect local and state investments in the hydrogen market.

Potential Air Quality Benefits:

The 2016 AQMP identifies the use of alternative fuels and zero emission transportation technologies as necessary to meet federal air quality standards. One of the major advantages of Fuel Cell vehicles (FCEVs) is the fact that they use hydrogen, a fuel that can be domestically produced from a variety of resources such as natural gas (including biogas), electricity (stationary turbine technology, solar or wind) and biomass. The technology and means to produce hydrogen fuel to support FCEVs are available now. The deployment of large numbers of FCEVs, which is an important strategy to attain air quality goals, requires a well-planned and robust hydrogen fueling infrastructure. This SCAQMD project, with significant additional funding from other governmental and private entities, will provide the hydrogen fueling infrastructure that is necessary in the South Coast Air Basin. The deployment of FCEVs and the development of the necessary fueling infrastructure

Proposed Project: Develop and Demonstrate Distributed Hydrogen Production and Fueling Stations

Expected SCAQMD Cost: $2,000,000

Expected Total Cost: $6,000,000

Description of Technology and Application:

Alternative fuels, such as hydrogen and the use of advanced technologies, such as fuel cell vehicles, are necessary to meet future clean air standards. A key element in the widespread acceptance and resulting increased use of alternative fuel vehicles is the development of a reliable and robust infrastructure to support the refueling of vehicles, cost-effective production and distribution and clean utilization of these new fuels.

A major challenge to the entry and acceptance of direct-hydrogen fuel cell vehicles is the limited number of hydrogen refueling sites. This project would support the development and demonstration of hydrogen refueling technologies. Proposed projects would address:

Fleet and Commercial Refueling Stations: Further expansion of the hydrogen fueling network based on retail models, providing renewable generation, adoption of standardized measurements for hydrogen refueling, other strategic refueling locations and increased dispensing pressure of 10,000 psi and compatibility with existing CNG stations may be considered.
Energy Stations: Multiple-use energy stations that can produce hydrogen for fuel cell vehicles or for stationary power generation are considered an enabling technology with the potential for costs competitive with large-scale reforming. System efficiency, emissions, hydrogen throughput, hydrogen purity and system economics will be monitored to determine the viability of this strategy for hydrogen fueling infrastructure deployment and as a means to produce power and hydrogen from renewable feedstocks (e.g., biomass, digester gas).

Home Refueling Appliances: Home refueling/recharging is an attractive advancement for alternative clean fuels due to the limited conventional refueling infrastructure. This project would evaluate a hydrogen home refueler for cost, compactness, performance, durability, emission characteristics, ease of assembly and disassembly, maintenance and operations. Other issues such as building permits, building code compliance and UL ratings for safety would also be evaluated.

It is estimated that approximately 13,400 fuel cell vehicles will be deployed by 2020 in California and the majority of these vehicles will be in the South Coast Air Basin. To provide fuel for these vehicles, the hydrogen fueling infrastructure needs to be significantly increased and become more reliable in terms of availability. SCAQMD will seek additional funding from CEC and CARB to construct and operate hydrogen fueling stations.

Potential Air Quality Benefits:

The 2016 AQMP identifies the use of alternative clean fuels in mobile sources as a key attainment strategy. Pursuant to AQMP goals, the SCAQMD has in effect several fleet rules that require public and certain private fleets to purchase clean-burning alternative-fueled vehicles when adding or replacing vehicles to their vehicle fleets. Fuel cell vehicles constitute some of the cleanest alternative-fuel vehicles today. Since hydrogen is a key fuel for fuel cell vehicles, this project would address some of the barriers faced by hydrogen as a fuel and thus assist in accelerating its acceptance and ultimate commercialization. In addition to supporting the immediate deployment of the demonstration fleet, expanding the hydrogen fuel infrastructure should contribute to the market acceptance of fuel cell technologies in the long run, leading to substantial reductions in NOx, VOC, CO, PM and toxic compound emissions from vehicles.

Proposed Project: Develop and Demonstrate Medium- and Heavy-Duty Fuel Cell Vehicles

Expected SCAQMD Cost: $2,500,000

Expected Total Cost: $10,000,000

Description of Technology and Application:

This proposed project would support evaluation including demonstration of promising fuel cell technologies for applications using direct hydrogen with proton exchange membrane (PEM) fuel cell technology. Battery dominant fuel cell hybrids are another potential technology being mentioned by battery experts as a way of reducing costs and enhancing performance of fuel cell vehicles.

The California ZEV Action Plan specifies actions to help deploy an increasing number of zero emission vehicles, including medium- and heavy-duty ZEVs. Fleets are useful demonstration sites because economies of scale exist in central refueling, in training skilled personnel to operate and maintain the vehicles, in the ability to monitor and collect data on vehicle performance and for manufacturer technical and customer support. In some cases, medium- and heavy-duty fuel cell vehicles could leverage the growing network of hydrogen stations, providing an early base load of fuel consumption until the number of passenger vehicles grows. These vehicles could include hybrid-electric vehicles powered by fuel cells and equipped with batteries capable of being charged from the grid and even supplying power to the grid.

In 2012, the DOE awarded SCAQMD funds to demonstrate Zero Emission Container Transport (ZECT) technologies. In 2015, the DOE awarded SCAQMD additional funds to develop and demonstrate additional fuel cell truck platforms and vehicles under ZECT II.

This category may include projects in the following applications:

On-Road:	**Off-Road:**
Transit Buses	Vehicle Auxiliary Power Units
Shuttle Buses	Construction Equipment
Medium- & Heavy-Duty Trucks	Lawn and Garden Equipment
	Cargo Handling Equipment

Potential Air Quality Benefits:

The 2016 AQMP identifies the need to implement zero emission vehicles. SCAQMD adopted fleet regulations require public and some private fleets within the Basin to acquire alternatively fueled vehicles when making new purchases. In the future, such vehicles could be powered by zero emission fuel cells operating on hydrogen fuel. The proposed projects have the potential to accelerate the commercial viability of fuel cell vehicles. Expected immediate benefits include the establishment of zero- and near-zero emission proof-of-concept vehicles in numerous applications. Over the longer term, the proposed projects could help foster wide-scale implementation of zero emission fuel cell vehicles in the Basin. The proposed projects could also lead to significant fuel economy improvements, manufacturing innovations and the creation of high-tech jobs in Southern California, besides realizing the air quality benefits projected in the AQMP.

Proposed Project: Demonstrate Light-Duty Fuel Cell Vehicles
Expected SCAQMD Cost: $100,000

Expected Total Cost: $100,000

Description of Technology and Application:

This proposed project would support the demonstration of limited production and early commercial fuel cell passenger vehicles using gaseous hydrogen with proton exchange membrane (PEM) fuel cell technology, mainly through showcasing this technology. Recent designs of light-duty fuel cell vehicles include hybrid batteries to recapture regenerative braking and improve overall system efficiency.

With the implementation of the California ZEV Action Plan, supplemented by the existing and planned hydrogen refueling stations in the Southern California area, light-duty fuel cell limited-production vehicles are planned for retail deployment in early commercial markets near hydrogen stations by several automakers. Fleets are useful demonstration sites because economies of scale exist in central refueling, in training skilled personnel to operate and maintain the vehicles, in the ability to monitor and collect data on vehicle performance and for manufacturer technical and customer support. SCAQMD has included fuel cell vehicles as part of its demonstration fleet since our first hydrogen station began operation in 2005; strengthening support, education, and outreach regarding fuel cell vehicle technology on an on-going basis. In addition, demonstration vehicles could include hybrid-electric vehicles powered by fuel cells and equipped with larger batteries capable of being charged from the grid and even supplying power to the grid.

Recently, Hyundai, Toyota and Honda have commercialized fuel cell vehicles in California. Mercedes-Benz announced its pre-production of GLC F-Cell plug-in fuel cell model to be introduced at the end of 2019. Hyundai also has announced its Next-Generation Fuel Cell SUV, which it plans to introduce sometime in 2018. Innovative strategies and demonstration of dual fuel, zero emission vehicles could expand the acceptance of battery electric vehicles and accelerate the introduction of fuel cells in vehicle propulsion.

Potential Air Quality Benefits:

The 2016 AQMP identifies the need to implement zero emission vehicles. SCAQMD adopted fleet regulations require public and some private fleets within the Basin to acquire alternatively fueled vehicles when making new purchases. In the future, such vehicles could be powered by zero emission fuel cells operating on hydrogen fuel. The proposed projects have the potential to accelerate the commercial viability of fuel cell vehicles. Expected immediate benefits include the deployment of zero-emission vehicles in SCAQMD's demonstration fleet. Over the longer term, the proposed projects could help foster wide-scale implementation of zero emission fuel cell vehicles in the Basin. The proposed projects could also lead to significant fuel economy improvements, manufacturing innovations and the creation of high-tech jobs in Southern California, besides realizing the air quality benefits projected in the AQMP.

Engine Systems/Technologies

Proposed Project: Develop and Demonstrate Advanced Gaseous- and Liquid-Fueled Medium- and Heavy-Duty Engines and Vehicles Technologies to Achieve Ultra-Low Emissions

Expected SCAQMD Cost: $3,000,000

Expected Total Cost: $5,600,000

Description of Technology and Application:

The objective of this proposed project would be to support development and certification of near commercial prototype low-emission medium- and heavy-duty gaseous- and liquid-fueled engine technologies and integration and demonstration of these technologies in on-road vehicles. The NOx emissions target for this project area is 0.02 g/bhp-hr and lower and the PM emissions target is below 0.01 g/bhp-hr. To achieve these targets, an effective emission control strategy must employ advanced fuel system and engine design features, aggressive engine calibration and improved thermal management, improved exhaust gas recirculation systems, and aftertreatment devices that are optimized using a system approach. This effort is expected to result in several projects, including:

- Development and demonstration of advanced engines in medium- and heavy-duty vehicles and high horsepower applications;
- development of durable and reliable retrofit technologies to partially or fully convert engines and vehicles from petroleum fuels to alternative fuels; and
- anticipated fuels for these projects include but are not limited to alternative fuels (fossil fuel-based and renewable natural gas, propane, hydrogen blends, electric and hybrid), conventional and alternative diesel fuels, ultra-low sulfur diesel, emulsified diesel, dimethyl ether and gas-to-liquid fuels. The project proposes to expand field demonstration of these advanced technologies in various vehicle fleets operating with different classes of vehicles.

The use of alternative fuel in heavy-duty trucking applications has been demonstrated in certain local fleets within the Basin. These vehicles typically require 200-400 horsepower engines. Higher horsepower alternative fuel engines are beginning to be introduced. However, vehicle range, lack or limited accessible public infrastructure, lack of experience with alternative fuel engine technologies and limited selection of appropriate alternative fuel engine products have made it difficult for more firms to consider significant use of alternative fuel vehicles. For example, in recent years, several large trucking fleets have expressed interest in using alternative fuels. However, at this time the choice of engines over 400 HP or more is limited. Continued development of cleaner dedicated alternative gaseous- or diesel-fueled engines over 400 HP would increase availability to end-users and provide additional emission reductions.

Potential Air Quality Benefits:

This project is intended to expedite the commercialization of near zero emission gaseous- and liquid-fueled medium- and heavy-duty engine technology in California, both in the Basin and in intrastate operation. The emission reduction benefit of replacing one 4.0 g/bhp-hr heavy-duty engine with a 0.2 g/bhp-hr engine in a vehicle that consumes 10,000 gallons of fuel per year is about 1,400 lb/yr of NOx. A heavy-duty 8.9L engine using natural gas and achieving NOx emissions of 0.02 g/bhp-hr has been certified and commercialized, with larger displacement engines expected to be certified in early 2018. Further, neat or blended alternative fuels can also reduce heavy-duty engine particulate emissions by over 90 percent compared to current diesel technology. This project is expected to lead to increased availability of low-emission alternative fuel heavy-duty engines. Fleets can use the engines and vehicles emerging from this project to comply with SCAQMD fleet regulations and towards implementation of the 2016 AQMP control measures.

Proposed Project: Develop and Demonstrate Alternative Fuel and Clean Conventional Fueled Light-Duty Vehicles

Expected SCAQMD Cost: $200,000

Expected Total Cost: $1,500,000

Description of Technology and Application:

Although new conventionally fueled vehicles are much cleaner than their predecessors, not all match the lowest emissions standards often achieved by alternative fuel vehicles. This project would assist in the development, demonstration and certification of both alternative-fueled and conventional-fueled vehicles to meet the strictest emissions requirements by the state, e.g., SULEV for light-duty vehicles. The candidate fuels include CNG, LPG, ethanol, GTL, clean diesel, bio-diesel and ultra low-sulfur diesel, and other novel technologies. The potential vehicle projects may include:

- certification of CNG light-duty sedans and pickup trucks used in fleet services;
- assessment of "clean diesel" vehicles, including hybrids and their ability to attain SULEV standards; and
- assessment of other clean technologies.

Other fuel and technology combinations may also be considered under this category.

Potential Air Quality Benefits:

The 2016 AQMP identifies the use of alternative clean fuels in mobile sources as a key attainment strategy. Pursuant to AQMP goals, the SCAQMD has in effect several fleet rules that require public and certain private fleets to purchase clean-burning alternative-fueled vehicles when adding or replacing vehicles to their vehicle fleets. This project is expected to lead to increased availability of low emission alternative-and conventional-fueled vehicles for fleets as well as consumer purchase.

Proposed Project: Develop and Demonstrate Cold-Start Technologies

Expected SCAQMD Cost: $250,000

Expected Total Cost: $1,000,000

Description of Technology and Application:

Cold start of internal combustion engines has negative impacts on the environment. The thermal efficiency of the internal combustion engine is significantly lower at cold-start than when the engine reaches steady state temperatures. If an engine can start at optimal lubricant and component temperatures, an increase in fuel economy and reduction in emissions should be achievable. Diesel engines at cold start increase emissions as much as 10%. It is also now known that the smaller hybrid engines are experiencing similar warm-up issues due to the on-off drive cycles. The need for thermal efficiency at start- up has led to a variety of suggestions and trials. The primary goal is to reduce energy losses so that systems and components such as the catalytic converter system reach their intended operating temperature range as soon as possible after engine start. In most cases, the lubrication system is the primary target of concern. Lubricant viscosity is highly sensitive to temperature and viscosity increases at low temperatures resulting in higher frictional and pumping losses than would be observed at the target operating temperature. This technology should no longer be looked at as "Seasonal". If the oil temperature can increase at start-up, the greatest benefit may be achieved Further benefits can include, but not be limited to, adaptation of algorithms associated with EGR fraction, air preheaters, SCR and fueling requirements. Emissions reductions can be gained and fuel economy improved. This project is to investigate technology to improve oil temperature at start-up with minimal economic impact and time. This technology could be applied to a range of vehicles from Hybrid electric light duty vehicles to heavy duty trucks. The following items are the most recently developed best practices with respect to cost and functionality. Emphasis should be on steady temperature control at start up at optimal degrees already proven and established through significant research.

- Design and prove a battery assisted electric oil heater to maintain a specified temperature continuously before start-up
- Design a lubricant flow system directly from engine head to oil pump to achieve oil temperature more quickly.

The project should be implemented, and fleet tested, and recorded over a minimum twelve month period. Further projects can develop from this technology and should be tested in regards to other liquid fuel burning engines.

Potential Air Quality Benefits:

The technology to reduce emissions at cold starts is beneficial to a broad spectrum of vehicles from hybrid electric, light duty to heavy duty engines in long haul trucks. The advancement in this technology will directly contribute toward the ultra-low NOx reductions soon to be required by manufacturers through a national EPA air quality standard and the current attainment policies in effect. Eliminating cold starting engine issues also directly creates a co- benefit of reducing fuel consumption.

Proposed Project: Develop and Demonstrate Waste-Heat Recovery in Heavy-Duty Diesel Engines

Expected SCAQMD Cost: $250,000

Expected Total Cost: $1,000,000

Description of Technology and Application:

The objective of this project is to support the demonstration and integration of Waste Heat Recovery (WHR) using the Rankine cycle for on road heavy-duty vehicles. Current WHR programs are showing reductions in GHG of 9-15 % and a 4-5% reduction in fuel consumption in long haul trucking. Diesel engines for heavy-duty commercial vehicles (HCV) convert on average approximately 40% of the primary energy into mechanical power. The residual part is released to the environment. The heat of the exhaust gas can be converted into mechanical power for the vehicle by applying a thermodynamic process. A suitable process is the Rankine process. Research on organic Rankine processes for waste heat utilization in the industry is already being reported as a successful approach. Due to the low oil prices three decades ago, these approaches were not implemented. Today, waste heat recovery can be an attractive approach to reduce fuel consumption and operating costs. Additionally emissions can be lowered 9-15% accordingly. This project is expected to demonstrate in use results in:

- Exhaust gas based recovery systems
- Coolant based recovery systems

A typical Rankine Cycle is a thermodynamic cycle that uses an environmentally friendly organic working fluid such as R134a and works through four reversible processes. In transportation, Rankine cycle systems vaporize a pressurized fluid coming from a steam generator located in the exhaust pipe or from the engine coolant. As a result of the heating, the fluid is turned into steam/vapor. The pressure will then drive the expander of the Rankine engine, which could be a turbine as well as a volumetric expander and that high efficiencies can be achieved at practical operating pressures. The mechanical energy generated by the Rankine process can be delivered to the engine either directly or via a belt transmission. Compared to an electrical utilization concept the mechanical usage shows the advantage of lower energy conversion losses. A belt transmission has the advantage of reducing oscillations. In case of an expansion machine directly coupled with the engine, significant effort is necessary to dampen unfavorable oscillations. The development on going by leading manufacturers in the industry shows great potential for further research and cost saving with the use of cost saving materials such as plastics and aluminum.

Potential Air Quality Benefits:

This project is expected to contribute to the total emissions reductions in heavy-duty on road engines. Emission reduction of 9-15 % in heavy-duty diesel long haul trucks has already been proven when the Rankine cycle is used. This technology can add to the total reduction in emissions in order to meet the ultra-low NOx air quality standards. The fuel savings benefit is especially attractive to long haul fleet operations.

Electric/Hybrid Technologies & Infrastructure

Proposed Project: Develop and Demonstrate Electric and Hybrid Vehicles

Expected SCAQMD Cost: $1,000,000

Expected Total Cost: $2,000,000

Description of Technology and Application:

The significance of transportation in overall carbon emissions is increasing as energy utilities move toward cleaner and more sustainable ways to generate electricity. In the United States, the EPA estimated that in 2015, transportation was responsible for about 28% of the nation's carbon emissions, second only to power plants at 31%.

The global light-duty vehicle market is changing rapidly in response to government-led initiatives to improve fuel economy and market demand for alternative transportation options. These changes are being driven primarily by the adoption of vehicles with various levels of drivetrain electrification. The SCAQMD has long supported the concept of using increased battery power to allow a portion of the driving cycle to occur in all-electric mode for true zero emission miles. This battery dominant strategy is accomplished by incorporating an advanced battery pack initially recharged from the household grid or EV chargers. This "plug-in" hybrid EV strategy allows reduced emissions and improved fuel economy. In 2009, CARB adopted Plug-In Hybrid Electric Vehicle Test Procedure Amendments and Aftermarket Parts Certification. Most automobile manufacturers have announced production plans for a range of electrified vehicle powertrains, including "blended" plug-in hybrid electric, extended-range electric vehicles (E-rEV), or battery electric vehicles (BEVs). Electric utilities refer to PHEVs, E-rEVs and BEVs as plug-in electric drive vehicles (PEVs) and are working with automakers to support PEVs. Long-range BEVs are now becoming price competitive after subsidies and affordable 200+ mile BEVs should have a big impact on the vehicle market. Plug-in hybrids (PHEVs) are also making significant advances. Continued market expansion is likely to result from expanding OEM applications of the powertrain in new, larger vehicle body types, and most large OEMs have made statements regarding a path towards electrification of their vehicle models.

The SCAQMD has long been a leader in promoting early demonstrations of next generation light-duty vehicle propulsion technologies (and fuels). However, given the current and planned market offerings in this category, priorities have shifted. Nevertheless, the SCAQMD will continue to evaluate market offerings and proposed technologies in light-duty vehicles to determine if any future support is required.

Medium- and heavy-trucks make up 4.3% of vehicles in the United States and drive 9.3% of all miles driven each year, yet are responsible for more than 25% of all the fuel burned annually. Hybrid technologies have gained momentum in the light-duty sector with commercial offerings by most of the automobile manufacturers. Unfortunately, the medium- and heavy-duty platforms are where most emissions reductions are required, especially for the in-use fleet due to low turnover.

CARB's Low Carbon Transportation programs, local support and federal funds have collectively accelerated the development and demonstration of medium-duty plug-in hybrid electric truck platforms. Analysis of project data and use profiles will help optimize drive systems, target applications for early commercialization and fill gaps in product offerings.

The SCAQMD has investigated the use of hybrid technologies to achieve similar performance as the conventional-fueled counterparts while achieving both reduced emissions and improved fuel economy. Development and validation of emission test procedures is needed, but is complicated due to the low volume and variety of medium- and heavy-duty vehicles.

Platforms to be considered include utility trucks, delivery vans, shuttle buses, transit buses, waste haulers, construction equipment, cranes and other off-road vehicles. Innovations that may be

considered for demonstration include: advancements in the auxiliary power unit, either ICE or other heat engine; battery-dominant hybrid systems utilizing off-peak re-charging, with advanced battery technologies such as lithium-ion; and hydraulic energy storage technologies where applicable. Alternative fuels are preferred in these projects, e.g., natural gas, especially from renewable sources, LPG, hydrogen, GTL and hydrogen-natural gas blends, but conventional fuels such as gasoline, clean diesel, or even biodiesel may be considered if the emissions benefits can be demonstrated as equivalent or superior to alternative fuels. Both new designs and retrofit technologies and related charging infrastructure will be considered.

This project category is to develop and demonstrate:

- various PEV architectures;
- anticipated costs for such architectures;
- customer interest and preferences for each alternative;
- integration of the technologies into prototype vehicles and fleets;
- evaluation of any new promising light-duty vehicle propulsion technologies or fuels; and
- electric and hybrid-electric medium- and heavy-duty vehicles (e.g., utility trucks, delivery vans, shuttle buses, transit buses, waste haulers, construction equipment, cranes and other off-road vehicles)

Potential Air Quality Benefits:

The 2016 AQMP identifies zero or near-zero emitting vehicles as a key attainment strategy. Plug-in HEV technologies have the potential to achieve near-zero emissions while retaining the range capabilities of a conventionally gasoline-fueled combustion engine vehicle, a key factor expected to enhance broad consumer acceptance. Given the variety of PEV systems under development, it is critical to determine the true emissions and performance utility compared to conventional vehicles. Successful demonstration of optimized prototypes would promise to enhance the deployment of near-ZEV and ZEV technologies.

Expected benefits include the establishment of criteria for emissions evaluations, performance requirements, and customer acceptability of the technology. This will help both regulatory agencies and OEMs to expedite introduction of zero and near-zero emitting vehicles in the South Coast Basin, which is a high priority of the AQMP.

Proposed Project: Develop and Demonstrate Infrastructure for Deployment of Plug-in Electric and Hybrid Electric Vehicles

Expected SCAQMD Cost: $500,000

Expected Total Cost: $3,000,000

Description of Technology and Application:

There is a critical need to address gaps in EV charging infrastructure which has resulted in a deficiency of public EV charging infrastructure availability. Almost half (48%) of the 679,592 EVs sold in the U.S. since 2011 were in California, and of those sales in California, it is estimated that almost half (43%) received CA rebate incentives in SCAQMD. In addition, the California ZEV Action Plan, which was updated in 2016, calls for 1.5 million ZEVs by 2025, calling for an increase of about 200,000 ZEVs annually between now and 2025.

The recent adoption of revised recommended practice SAE J1772 enables passenger vehicles to charge from 110/120V AC (Level 1), 220/240V AC (Level 2), and faster 440/480V DC charging using a common conductive connector in 30 minutes or less in the U.S. and Europe. Together with the growing adoption of long range EVs, the technology and infrastructure of three fast DC charging systems (SAE combo, CHAdeMO and Tesla) are developing as well. Technological developments improving the driving range of EVs, as well as increasing availability and speed of charging infrastructure, could change the need for charging infrastructure in the future. However, a study of fast-charging impact on battery life and degradation is very limited. The research and demonstration to increase understanding of the degradation effects of fast-charging will have implications on what types of charging EV owners will leverage and what EVSE stakeholders will bring to market. SCAQMD is committed to continuing to support the successful deployment of EV charging infrastructure as well as demonstration of fast-charging effect on battery life, leveraging funds from the state and the Volkswagen Penalty Fund.

The SCAQMD is actively pursuing development of intelligent transportation systems to improve traffic efficiency of electric and hybrid cargo container trucks. This system provides truck drivers real-time vehicle operation advice based on changing traffic and road conditions where trucks can dynamically change their speed to better flow through intersections. A truck eco-routing system can provide the most eco-friendly travel route based on truck engine/emission control characteristics, loaded weight, road grade and real-time traffic conditions. Integrated programs can interconnect fleets of electric drive vehicles with mass transit via Web-based reservation systems that allow multiple users. These integrated programs can match the features of EVs (zero emissions, zero start-up emissions, short range) to typical consumer demands for mobility in a way that significantly reduces emissions of pollutants and greenhouse gases.

This project category is one of SCAQMD's continued efforts to:

- deploy a network of DC fast charging infrastructure and rapidly expand the existing network of public plug-in EV charging stations;
- support investigation of fast-charging impact on battery life;
- develop intelligent transportation system strategies for cargo containers;
- develop freight load-balancing strategies as well as to conduct market analysis for zero emission heavy-duty trucks in goods movement; and
- support for local government outreach and charging installation permit streamlining.

Potential Air Quality Benefits:

The 2016 AQMP identifies zero or near-zero emitting vehicles as a key attainment strategy. Hybrid technologies have the potential to redirect previously wasted kinetic energy into useable vehicle power. This proposed project category will reduce Particulate Matter (PM) pollution along major roadways through the expansion of the public plug-in EV charging infrastructure network by allowing drivers to

shift away from petroleum-fueled vehicles to plug-in EVs. In addition, this project will assist in achieving improved fuel economy and lower tailpipe emissions, further helping the region to achieve federal ambient air quality standards and protect public health. Expected benefits include the establishment of criteria for emissions evaluations, performance requirements and customer acceptability of the technology. This will help both regulatory agencies and OEMs to expedite introduction of near-zero emitting vehicles in the South Coast Basin, which is a high priority of the AQMP.

Proposed Project: Demonstrate Alternative Energy Storage

Expected SCAQMD Cost: $300,000

Expected Total Cost: $2,000,000

Description of Technology and Application:

The SCAQMD has been involved in the development and demonstration of energy storage systems for electric and hybrid-electric vehicles, mainly lithium ion chemistry battery packs. Over the past few years, new technologies, including nickel sodium chloride, lithium-ion and lithium iron phosphate batteries have shown robust performance. Other technology manufacturers have also developed energy storage devices including beyond lithium-ion batteries, flywheels, hydraulic systems and ultracapacitors. Energy storage systems optimized to combine the advantages of ultracapacitors and high-energy but low-power advanced batteries could yield benefits. Beyond lithium-ion batteries (e.g., lithium-sulfur, lithium-oxygen, sodium-ion, flow, and solid-state batteries) also have opportunities to achieve higher energy density, longer cycle life, and cheaper cost.

This project category is to apply these advanced storage technologies in vehicle platforms to identify best fit applications, demonstrate their viability (reliability, maintainability and durability), gauge market preparedness and provide a pathway to commercialization.

The long-term objective of this project is to decrease fuel consumption and resulting emissions without any changes in performance compared to conventional vehicles. This effort will support several projects for development and demonstration of different types of low emission hybrid vehicles using advanced energy storage strategies and conventional or alternative fuels. The overall net emissions and fuel consumption of these types of vehicles are expected to be much lower than traditional engine systems. Both new and retrofit technologies will be considered.

Additionally, this project will also assess potential for repurposing of electric vehicle batteries for storage as well as the longer term more cost-effective recycling approaches currently in a nascent "pilot" stage, especially for metals such as Lithium and Cobalt.

Potential Air Quality Benefits:

Certification of low emission vehicles and engines and their integration into the Basin's transportation sector is a high priority under the 2016 AQMP. This project is expected to further efforts to develop alternative energy storage technologies that could be implemented in medium- and heavy-duty trucks, buses and other applications. Benefits will include proof of concept for the new technologies, diversification of transportation fuels and lower emissions of criteria, toxic pollutants and greenhouse gases.

Proposed Project: Develop and Demonstrate Electric Container Transport Technologies

Expected SCAQMD Cost: $1,200,000

Expected Total Cost: $4,000,000

Description of Technology and Application:

Advanced transportation systems can be used to transfer cargo containers from ports to both local and "distant" intermodal facilities, thereby significantly reducing emissions from on-road trucks and locomotives and also reducing traffic congestion in local transportation corridors. Such systems could be stand-alone systems that use magnetic levitation (maglev), linear synchronous motors or linear induction motors on dedicated guideways. A more near-term design could use existing roadways that are electrified with catenary electric lines or linear electric motors to move containers on modified trucks equipped to run on electricity. In both scenarios, containers are transported relatively quietly and without direct emissions. The footprints for such systems are similar to conventional rail systems but have reduced impact on adjacent property owners including noise and fugitive dust. These systems can even be built above or adjacent to freeways or on elevated guideways. These container freight systems are not designed to carry any operators on the guideways, where the over-the-roadway system may require the operator to actively control the transport of the containers.

One of the container transportation concepts the SCAQMD is actively pursuing is the eHighway catenary hybrid truck system by Siemens Mobility. Siemens and their partners have developed a catenary system and hybrid electric trucks to utilize the catenary for zero emission transport of containers. The hybrid drive system will extend the operating range of the truck beyond the all-electric range of the catenary system, thus enabling the truck to perform regional drayage operations and bridge gaps in catenary infrastructure as it is deployed on a regional level. The proposed Siemens pantograph system will allow for seamless connection and disconnection from the catenary wires. When entering the catenary system corridor, the pantograph system will verify the presence of catenary lines and allow the driver to raise the pantograph from within the cab of the truck. Upon leaving the catenary system, the pantograph automatically retracts and the truck switches to on-board power systems. The on-board power systems could be a range of technologies, including batteries, fuel cells, or internal combustion engines. In addition, SCAQMD is administering a project to develop and demonstrate zero emission drayage trucks for goods movement operations, consisting of three different battery electric truck technologies and a fuel cell hybrid electric truck platform. This project is funded by a $4.2 million award from Department of Energy to promote the deployment of zero emission cargo transport technologies. These trucks can be also upfitted to connect to wayside power via a catenary or linear synchronous motor (LSM) system in the future. Recently, CARB awarded SCAQMD more than $23 million towards the development, demonstration and deployment of up to 43 trucks for goods movement, either with all electric operation or all electric range within disadvantaged communities. The total project cost is approximately $40 million, with the remainder funds cost-shared between five sister air quality agencies, OEMs and demonstration sites.

In addition to these technologies, there are other options for electric container applications such as dual-mode locomotives, hybrid electric technologies with battery storage, a battery tender car, fuel cell propulsion systems and other wayside power alternatives. This technical review will evaluate all available technology options to determine whether their systems can be successfully developed and deployed, financially viable, and reliably operated on a long-term basis.

Potential Air Quality Benefits:

On-road heavy-duty diesel truck travel is an integral part of operations at the ports moving cargo containers into the Basin and beyond. The 2016 AQMP proposes to reduce emissions from this activity by modernizing the fleet and retrofitting NOx and PM emission controls on older trucks. An alternative approach, especially for local drayage to the nearby intermodal facilities, is to use advanced container

transport systems that use electric propulsion for the containers on fixed guideways or modified trucks able to operate on electricity which will eliminate local diesel truck emissions. The emission benefits have not yet been estimated because the fate of the displaced trucks has not been determined.

Fueling Infrastructure and Deployment (NG/RNG)

Proposed Project: Deploy Natural Gas Vehicles in Various Applications

Expected SCAQMD Cost: **$**500,000

Expected Total Cost: $2,000,000

Description of Technology and Application:

Natural gas vehicles (NGVs) have been very successful in reducing emissions in the South Coast Air Basin due to the deployment of fleets and heavy-duty vehicles utilizing this clean fuel. In order to maintain the throughput, utility and commercial potential of the natural gas infrastructure and the corresponding clean air benefits, deploying additional models of NGVs in existing applications are needed. This technology category seeks to support the implementation of early-commercial vehicles in a wide variety of applications, such as taxis, law enforcement vehicles, shuttle buses, delivery vans, transit buses, waste haulers, class 8 tractors and off-road equipment such as construction vehicles and yard hostlers. It also seeks to deploy low-emission natural gas vehicles using renewable fuels to achieve further emission reductions.

Potential Air Quality Benefits:

Natural gas vehicles have inherently lower engine criteria pollutant emissions than conventional vehicles, especially in the heavy-duty applications where older diesel engines are being replaced. Incentivizing these vehicles in city fleets, goods movement applications and transit bus routes help to reduce the local emissions and exposure to nearby residents. Natural gas vehicles also can have lower greenhouse gas emissions and increase energy diversity depending on the feedstock and vehicle class. Deployment of additional NGVs is in agreement with SCAQMD's AQMP as well as the state's Alternative Fuels Plan as part of AB 1007 (Pavley).

Proposed Project: Develop, Maintain & Expand Natural Gas Infrastructure

Expected SCAQMD Cost: $250,000

Expected Total Cost: $1,500,000

Description of Technology and Application:

This project supports the development, maintenance and expansion of natural gas fueling station technologies to increase the overall number of such fueling stations in strategic locations throughout the Basin including the Ports. The intent is to develop and demonstrate advanced technologies to reduce the cost of natural gas equipment, develop and demonstrate closed loop systems for dispensing and storage, standardize fueling station design and construction and help with the implementation of SCAQMD's fleet rules. As natural gas fueling equipment begins to age or has been placed in demanding usage, components will deteriorate. This project offers an incentive to facilities to replace worn-out equipment or to upgrade existing fueling and/or garage and maintenance equipment to offer increased fueling capacity to public agencies, private fleets and school districts.

Potential Air Quality Benefits:

The AQMP identifies the use of alternative clean fuels in mobile sources as a key attainment strategy. NGVs have significantly lower emissions than gasoline vehicles and represent the cleanest internal combustion engine powered vehicles available today. The project has the potential to significantly reduce the installation and operating costs of NGV refueling stations, besides improving the refueling time. While new or improved NGV stations have an indirect emissions reduction benefit, they help facilitate the introduction of low emission, NGVs in private and public fleets in the area, which have a direct emissions reduction benefit. The increased exposure and fleet and consumer acceptance of NGVs would lead to significant and direct reductions in NOx, VOC, CO, PM and toxic compound emissions from mobile sources. Such increased penetration of NGVs will provide direct emissions reductions of NOx, VOC, CO, PM and air toxic compounds throughout the Basin.

Proposed Project: Demonstrate Natural Gas Manufacturing and Distribution Technologies Including Renewables

Expected SCAQMD Cost: $1,000,000

Expected Total Cost: $10,000,000

Description of Technology and Application:

Lack of sufficient statewide LNG production results in increased fuel costs and supply constraints. The cost of transporting LNG from out-of-state production facilities increases the fuel cost from 15 to 20 cents per gallon of LNG and subjects users to the reliability of a single supply source. High capital costs prevent construction of local, large-scale liquefaction facilities. Small-scale, distributed LNG liquefaction systems may provide 25 percent lower capital costs than conventional technology per gallon of LNG produced. Because these smaller plants can be sited near fleet customers, costs for transporting the LNG to end-users are much lower than those for remote larger plants. Beyond these cost reductions, the smaller plants offer key benefits of much smaller initial capital investment and wider network of supply than the larger plant model.

The project category will also consider the development and demonstration of technologies for the production of Renewable Natural Gas (RNG) from various feed stocks including landfill gas, green waste, and anaerobic digester gases.

The main objectives of this project are to investigate, develop and demonstrate:

- commercially viable methods for converting renewable feed stocks into CNG or LNG (e.g., production from biomass);
- economic small-scale natural gas liquefaction technologies;
- utilization of various gaseous feed stocks locally available;
- commercialize incentives for fleets to site, install and use LNG and L/CNG refueling facilities; and
- strategic placement of LNG storage capacity sufficient to provide supply to users in the event of a production outage.

Potential Air Quality Benefits:

The SCAQMD relies on a significant increase in the penetration of zero- and low-emission vehicles in the South Coast Basin to attain federal clean air standards by 2014, 2023 and 2032. This project would help develop a number of small-scale liquefaction technologies that can reduce LNG costs to be competitive with diesel fuel. Such advances are expected to lead to greater infrastructure development. This would make LNG fueled heavy-duty vehicles more available to the commercial market leading to direct reductions in NOx, PM and toxic compound emissions.

Fuels/Emission Studies

Proposed Project: Conduct In-Use Emissions Studies for Advanced Technology Vehicle Demonstrations

Expected SCAQMD Cost: $400,000

Expected Total Cost: $800,000

Description of Technology and Application:

Hybrid electric, hybrid hydraulic, plug-in electric hybrid and pure EVs will all play a unique role in the future of transportation. Each of these transportation technologies has attributes that could provide unique benefits to different transportation sectors. Identifying the optimal placement of each transportation technology will provide the co-benefits of maximizing the environmental benefit and return on investment for the operator.

The environmental benefit for each technology class will be highly duty-cycle and application specific. Identifying the attributes of a specific application or drive cycle that would take best advantage of a specific transportation technology would speed the adoption and make optimal use of financial resources in the demonstration and deployment of a technology. The adoption rates would be accelerated since the intelligent deployment of a certain technology would ensure that a high percentage of the demonstration vehicles showed positive results. These positive results would spur the adoption of this technology in similar applications, as opposed to negative results derailing the further development or deployment of a certain technology.

The proposed project would review and potentially coordinate application specific drive cycles to for specific applications. The potential emissions reductions and fossil fuel displacement for each technology in a specific application would be quantified on a full-cycle basis. This information could be used to develop a theoretical database of potential environmental benefits of different transportation technologies when deployed in specific applications.

Another proposed project would be the characterization of intermediate volatility organic compound (IVOC) emissions which is critical in assessing ozone and SOA precursor production rates. Diesel vehicle exhaust and unburned diesel fuel are major sources of and contribute to the formation of urban ozone and secondary organic aerosol (SOA), which is an important component of PM2.5.

Finally, while early developments in autonomous and vehicle-to-vehicle controls are focused on light-duty passenger vehicles, the early application of this technology to heavy-duty, drayage and container transport technologies is more likely. The impact on efficiency and emissions could be substantial. A project to examine this technology to assess its effect on goods movement and emissions associated with goods movement could be beneficial at this time.

Potential Air Quality Benefits:

The development of an emissions reduction database, for various application specific transportation technologies, would assist in the targeted deployment of new transportation technologies. This database coupled with application specific vehicle miles traveled and population data would assist in intelligently deploying advanced technology vehicles to attain the maximum environmental benefit. These two data streams would allow vehicle technologies to be matched to an application that is best suited to the specific technology, as well as selecting applications that are substantial enough to provide a significant environmental benefit. The demonstration of a quantifiable reduction in operating cost through the intelligent deployment of vehicles will also accelerate the commercial adoption of the various technologies. The accelerated adoption of lower emitting vehicles will further assist in attaining SCAQMD's air quality goals.

Proposed Project: Conduct Emissions Studies on Biofuels and Alternative Fuels

Expected SCAQMD Cost: $300,000

Expected Total Cost: $1,000,000

Description of Technology and Application:

The use of biofuels can be an important strategy to reduce petroleum dependency, air pollution and greenhouse gas emissions. Biofuels are in fact receiving increased attention due to national support and state activities resulting from SB 32, AB 1007 and the Low-Carbon Fuel Standard. With an anticipated increase in biofuel use, it is the objective of this project to further analyze these fuels to better understand their benefits and impacts not only on greenhouse gases but also on air pollution and associated health effects.

In various diesel engine studies, replacement of petroleum diesel fuel with biodiesel fuel has demonstrated reduced PM, CO and air toxics emissions. Biodiesel also has the potential to reduce greenhouse gas emissions because it can be made from renewable feedstocks, such as soy and canola. However, certain blends of biodiesel have a tendency to increase NOx emissions for certain engines and duty cycles, which exacerbates the ozone and PM2.5 challenges faced in the Basin. In addition, despite recent advancements in toxicological research in the air pollution field, the relationship between biodiesel particle composition and associated health effects is still not completely understood.

Ethanol is another biofuel that is gaining increased national media and state regulatory attention. CARB has recently amended the reformulated gasoline regulation to further increase the ethanol content to 10% as a means to increase the amount of renewable fuels in the state. It is projected that the state's ethanol use will increase from 900 million gallons in 2007 to 1.5 billion gallons by 2012 as a result. As in the case of biodiesel, ethanol has demonstrated in various emission studies to reduce PM, CO and toxic emissions; however, the relationship between particle composition and associated health effects from the combustion of ethanol is not well understood either.

Furthermore, CARB recently proposed a regulation on the commercialization of alternative diesel fuels, including biodiesel and renewable diesel, while noting that biodiesel in older heavy-duty vehicles can increase NOx and the need for emerging alternative diesel fuels to have clear ground rules for commercialization. The impact of natural gas fuel composition on emissions from heavy-duty trucks and transit buses is also being studied.

In order to address these concerns on potential health effects associated with biofuels, namely biodiesel and ethanol blends, this project will investigate the physical and chemical composition and associated health effects of tailpipe PM emissions from light- to heavy-duty vehicles burning biofuels in order to ensure public health is not adversely impacted by broader use of these fuels. This project also supports future studies to identify mitigation measures to reduce NOx emissions for biofuels. Additionally, a study of emissions from well-to-wheel for the extraction and use of shale gas might be considered.

Potential Air Quality Benefits:

If biodiesel and biodiesel blends can be demonstrated to reduce air pollutant emissions with the ability to mitigate any NOx impact, this technology will become a viable strategy to assist in meeting air pollutant standards as well as the goals of SB 32 and the Low-Carbon Fuel Standard. The use of biodiesel is an important effort for a sustainable energy future. Emission studies are critical to understanding the emission benefits and any tradeoffs (NOx impact) that may result from using this alternative fuel. With reliable information on the emissions from using biodiesel and biodiesel blends, the SCAQMD can take actions to ensure the use of biodiesel will obtain air pollutant reductions without creating additional NOx emissions that may exacerbate the Basin's ozone problem.

Proposed Project: Identify and Demonstrate In-Use Fleet Emissions Reduction Technologies and Opportunities

Expected SCAQMD Cost: $250,000

Expected Total Cost: $2,000,000

Description of Technology and Application:

New technologies, such as alternative fueled heavy-duty engines, are extremely effective at reducing emissions because they are designed to meet the most stringent emissions standards while maintaining vehicle performance. In addition, many new vehicles are now equipped with telematics enabling motorists to obtain transportation information such as road conditions to avoid excessive idling and track information about the vehicle maintenance needs, repair history, tire pressure and fuel economy. Telematics have been shown to reduce emissions from new vehicles. Unfortunately, the in-use fleet lacks telematic systems--particularly heavy-duty engines in trucks, buses, construction equipment, locomotives, marine vessels and cargo handling equipment--have fairly long working lifetimes (up to 20 years due to remanufacturing in some cases). Even light-duty vehicles routinely have lifetimes exceeding 200,000 miles and 10 years. And it is the in-use fleet, especially the oldest vehicles, which are responsible for the majority of emissions.

This project category is to investigate near-term emissions control technologies that can be cost-effectively applied to reduce emissions from the in-use fleet. The first part of the project is to identify and conduct proof-of-concept demonstrations of feasible candidate technologies, such as:

- remote sensing for heavy-duty vehicles;
- annual testing for high mileage vehicles (>100,000 miles);
- replace or upgrade emissions control systems at 100,000 mile intervals;
- on-board emission diagnostics with remote notification;
- low-cost test equipment for monitoring and identifying high emitters;
- test cycle development for different class vehicles (e.g. four wheel drive SUVs);
- electrical auxiliary power unit replacements; and
- development, deployment and demonstration of smart vehicle telematic systems

Potential Air Quality Benefits:

Many of the technologies identified can be applied to light-duty and heavy-duty vehicles to identify and subsequently remedy high-emitting vehicles in the current fleet inventory. Estimates suggest that 5 percent of existing fleets account for up to 80 percent of the emissions. Identification of higher emitting vehicles would assist with demand-side strategies, where higher emitting vehicles have correspondingly higher registration charges.

Stationary Clean Fuel Technologies

Proposed Project: Develop and Demonstrate Reliable, Advanced Emission Control Technologies, and Low-Emission Monitoring Systems and Test Methods

Expected SCAQMD Cost: $100,000

Expected Total Cost: $250,000

Description of Technology and Application:

Currently, the inability of air/fuel ratio control (AFRC) systems to keep rich-burn engines in compliance contributes significantly to air pollution in the basin. Reliable, low-cost emission monitoring systems are needed for small-to-intermediate size combustion devices, including stationary engines, boilers, heaters, furnaces and ovens that are not large enough to justify a continuous emission monitoring system (CEMS). This class of combustion device is often permitted on the basis of a single demonstration or periodic demonstrations of NOx and CO emissions meeting SCAQMD rule requirements or a RECLAIM concentration limit. However, SCAQMD-unannounced tests on engines and boilers have found that in many cases NOx and/or CO levels have increased significantly above levels that have been initially or periodically demonstrated due to equipment malfunction and/or inadequate operator attention. It is suspected that the same may be true of heaters, furnaces and ovens.

A recent demonstration project funded in part by the SCAQMD consisted of retrofitting a biogas engine with a digester gas clean up system and catalytic oxidizer at the exhaust followed by SCR which resulted in significant reductions of NO_x, VOC and CO. Based on the successful deployment of this project, further emission reductions may be achieved by other biogas combustion sources such as gas turbines and boilers by the continued development of specialized low cost biogas clean up systems that will allow for the use of catalytic after control systems.

Demonstrations of newer technologies in recent years could result in a commercially viable alternative to CEMS that is both reliable and feasible in terms of lower costs. For example, manufacturers of flue gas analyzers have, in recent years, developed low-cost multi-gas analyzers suitable for portable or stack-mounted use. Some preliminary testing of a new type of AFRC, which uses a different type of O2 sensor known as a wide-band O2 sensor, is another alternative that can be analyzed. Another technical approach might be to deploy technology utilizing the O2 signature of a post-catalyst O2 sensor and additional control concepts being developed by manufacturers. Since an underlying problem has been that engine, catalyst and AFRC manufacturers have developed systems independently, a system being co-developed to perform continuous diagnostics to assist operators in keeping rich-burn engines in compliance is possibly another alternative for demonstration.

Potential Air Quality Benefits:

Stationary engines, boilers, heaters, furnaces and ovens account for approximately 11 percent of total NO_x emissions and about 6 percent of total CO emissions. There has been a long-standing compliance problem with rich-burn IC engines in the basin and evidence indicates that many of these devices are operating with NOx and/or CO emissions above levels required in their permits. Projects could potentially reduce a significant class of NOx and CO emissions that are in excess of the assumptions in the AQMP and further enhance SCAQMD's ability to enforce full-time compliance.

Proposed Project: Develop and Demonstrate Clean Stationary Technologies

Expected SCAQMD Cost: $250,000

Expected Total Cost: $750,000

Description of Technology and Application:

Stationary sources, including VOC sources such as large printing facilities and furniture manufacturers, have become cleaner and cleaner due to the regulatory requirements for low emissions and the advancements in technology to meet those requirements. Best Available Control Technology (BACT) regulations, however, are only required for new, modified, or relocated sources. This project category is to develop and demonstrate new technologies that can provide emissions reductions in new installations or as retrofit modifications. Possible technology examples include:

- low NOx technologies (burners and ICEs);
- low-Btu gas technologies (e.g., digester, landfill, or diary gases);
- alternative fuels and hydrogen blends;
- alternative diesel fuels (emulsified, gas-to-liquids, biodiesel with aftertreatment);
- low emission refinery flares;
- catalytic combustion;
- cost-effective fuel cell and fuel cell hybrid distributed generation;
- fumes-to-fuel technology to replace thermal oxidizers and capture VOC emissions for electricity generation while ensuring no emission of air toxics; and
- boiler optimization design and strategies to improve efficiencies.

Depending on the technology, a proof-of-concept project, demonstration, or pre-commercial deployment would be considered to garner further information on the technology. Issues to investigate include viability (reliability, maintainability and durability) of the technology, cost-effectiveness and operator ease-of-use in order to assess commercialization.

Potential Air Quality Benefits:

The SCAQMD has a substantial number of older, small, stationary source technologies within its jurisdiction. Since these devices are not subject to continuous emissions monitoring system requirements, evidence suggests that these devices may not be operating at their permitted NOx, CO, hydrocarbon and PM emissions levels. Replacing these devices with cleaner and more reliable technologies or technology/fuel combinations can have dramatic reductions in all of these criteria pollutants. VOC emission reductions may also be achieved at larger stationary VOC sources to achieve the new federal ozone and PM2.5 standards.

Proposed Project: Develop and Demonstrate Renewables-Based Energy Generation Alternatives

Expected SCAQMD Cost: $300,000

Expected Total Cost: $1,000,000

Description of Technology and Application:

The objective of this proposed project is to support the development and demonstration of clean energy, renewable alternatives in stationary applications. The technologies to be considered include thermal, photovoltaic and other solar energy technologies; wind energy systems; energy storage potentially including vehicle to grid or vehicle to building functionalities for alternative energy storage; biomass conversion; and other renewable energy and recycling technologies. Innovative solar technologies, such as solar thermal air conditioning and photovoltaic-integrated roof shingles, are of particular interest. Also, in the agricultural sections of the Basin, wind technologies could potentially be applied to drive large electric motor-driven pumps to replace highly polluting diesel-fired pumps. Besides renewable technologies, electrolyzer technology could be used to generate hydrogen, a clean fuel. Hydrogen, when used in regular engines, can potentially reduce tail-pipe emissions, while in fuel cells the emissions are reduced to zero.

The project is expected to result in pilot-scale production demonstrations, scale-up process design and cost analysis, overall environmental impact analysis and projections for ultimate clean fuel costs and availability. This project is expected to result in several projects addressing technological advancements in these technologies that may improve performance and efficiency, potentially reduce capital and operating costs, enhance the quality of natural gas generated from renewable sources for injection into natural gas pipelines, improve reliability and user friendliness and identify markets that could expedite the implementation of successful technologies.

Potential Air Quality Benefits:

The 2016 AQMP identifies the development and ultimately the implementation of non-polluting power generation. To gain the maximum air quality benefit, polluting fossil fuel-fired electric power generation needs to be replaced with clean renewable energy resources or other advanced zero emission technologies, such as hydrogen fuel cells, particularly in a distributed generation context.

The proposed project is expected to accelerate the implementation of advanced zero emission energy sources. Expected benefits include directly reducing the emissions by the displacement of fossil generation; proof-of-concept and potential viability for such zero emission power generation systems; increased exposure and user acceptance of the new technology; reduced fossil fuel usage; and the potential for increased use, once successfully demonstrated, with resulting emission benefits, through expedited implementation. These technologies would also have a substantial influence in reducing global warming emissions.

Emission Control Technologies

Proposed Project: Develop and Demonstrate Advanced Aftertreatment Technologies

Expected SCAQMD Cost: $300,000

Expected Total Cost: $5,000,000

Description of Technology and Application:

There are a number of aftertreatment technologies which have shown substantial emission reductions in diesel engines. These technologies include diesel particulate filters (DPFs), oxidation catalysts, selective catalytic reduction (SCR) systems and NOx adsorbers. This project category is to develop and demonstrate these aftertreatment technologies alone or in tandem with an alternative fuel to produce the lowest possible PM, ultrafine particles, nanoparticles, NOx, CO, carbonyl and hydrocarbon emissions in retrofit and new applications. With the increasing focus on zero- and near-zero emission goods movement technologies, this category should examine idle reduction concepts and technologies that can be employed at ports and airports.

Possible projects include advancing the technologies for on-road retrofit applications such as heavy-duty line-haul diesel engines, street sweepers, waste haulers and transit buses. Applications for non-road may include construction equipment, yard hostlers, gantry cranes, locomotives, marine vessels, ground support equipment and other similar industrial applications. Potential fuels to be considered in tandem are low-sulfur diesel, emulsified diesel, biodiesel, gas-to-liquids, hydrogen and natural gas. This project category will also explore the performance, economic feasibility, viability (reliability, maintainability and durability) and ease-of-use to ensure a pathway to commercialization.

Potential Air Quality Benefits:

The transfer of mature emission control technologies, such as DPFs and oxidation catalysts, to the off-road sector is a potentially low-risk endeavor that can have immediate emissions reductions. Further development and demonstration of other technologies, such SCR and NOx adsorbers, could also have NOx reductions of up to 90%.

Proposed Project: Demonstrate On-Road Technologies in Off-Road and Retrofit Applications

Expected SCAQMD Cost: $250,000

Expected Total Cost: $1,000,000

Description of Technology and Application:

Heavy-duty on-road engines have demonstrated progress in meeting increasingly stringent Federal and state requirements. New heavy-duty engines have progressed from 2 g/bhp-hr NOx in 2004 to 0.2 g/bhp-hr NOx in 2010, which is an order of magnitude decrease in just six years. Off-road engines, however, have considerably higher emissions limits depending on the engine size. For example, Tier-3 standards for heavy-duty engines require only 3 g/bhp-hr NOx. There are apparent opportunities to implement cleaner on-road technologies in off-road applications. There is also an opportunity to replace existing engines in both on-road and off-road applications with the cleanest available technology. Current regulations require a repower (engine exchange) to only meet the same emissions standards as the engine being retired. Unfortunately, this does not take advantage of recently developed clean technologies.

Exhaust gas cleanup strategies, such as SCR, electrostatic precipitators, baghouses and scrubbers, have been used successfully for many years on stationary sources. The exhaust from the combustion source is routed to the cleaning technology, which typically requires a large footprint for implementation. This large footprint has made installation of such technologies on some mobile sources prohibitive. However, in cases where the mobile source is required to idle for long periods of time, it may be more effective to route the emissions from the mobile source to a stationary device to clean the exhaust stream.

Projects in this category will include utilizing proven clean technologies in novel applications, such as:

- demonstrating certified LNG and CNG on-road engines in off-road applications including yard hostlers, switcher locomotives, gantry cranes, waste haulers and construction equipment;
- implementing lower emission engines in repower applications for both on-road and off-road applications; and
- applying stationary best available control technologies, such as SCR, scrubbers, baghouses and electrostatic precipitators, to appropriate on- and off-road applications, such as idling locomotives, marine vessels at dock and heavy-duty line-haul trucks at weigh stations.

Potential Air Quality Benefits:

The transfer of mature emission control technologies, such as certified engines and SCR, to the non-road and retrofit sectors offers high potential for immediate emissions reductions. Further development and demonstration of these technologies will assist in the regulatory efforts which could require such technologies and retrofits.

Health Impacts Studies

Proposed Project: Evaluate Ultrafine Particle Health Effects

Expected SCAQMD Cost: $100,000

Expected Total Cost: $2,000,000

Description of Technology and Application:

Reducing diesel exhaust from vehicles has become a high priority in the South Coast Air Basin since CARB identified the particulate phase of diesel exhaust as a surrogate for all of the toxic air contaminant emitted from diesel exhaust. Additionally, health studies indicate that the ultrafine portion of particulate matter may be more toxic on a per-mass basis than other fractions. Several technologies have been introduced and others are under development to reduce diesel emissions. These include among others low-sulfur diesel fuel, particulate matter traps and heavy-duty engines operating on alternative fuel such as CNG and LNG. Recent studies have shown that control technologies applied to mobile sources have been effective in reducing the mass of particulates emitted. However, there is also evidence that the number of ultrafine particles on and near roadways has increased, even while the mass of particulates has decreased. To have a better understanding of changes in ultrafine particulate emissions from the application of the new technologies and the health effects of these emissions, an evaluation and comparison of ultrafine particulate matter and the potential impacts on community exposures are necessary.

In this project, measurements and chemical composition of ultrafine particulates will be done, as well as studies conducted to characterize their toxicity. The composition of the particulates can further be used to determine the contribution from specific combustion sources. Additionally, engine or chassis dynamometer testing may be conducted on heavy-duty vehicles to measure, evaluate and compare ultrafine particulate matter, PAH and other relevant toxic emissions from different types of fuels such as CNG, low-sulfur diesel, biofuels and others. This project needs to be closely coordinated with the development of technologies for alternative fuels, aftertreatment and new engines in order to determine the health benefits of such technologies.

Furthermore, gasoline direct injection (GDI) vehicles are known for higher efficiency and power output but the PM emissions profile is not well understood especially on secondary organic aerosol (SOA) formation potential. As manufacturers introduce more GDI models in the market to meet new fuel economy standards, it is important to understand the SOA potential from these vehicles as it could lead to further impact on the ambient PM concentration in our region. Consequently, in 2015 a project was initiated with UCR/CE-CERT to investigate the physical and chemical composition of aerosols from GDI vehicles using a mobile environmental chamber that has been designed and constructed to characterize secondary emissions. Based on this initial results indicating an increase in particle numbers, follow-up in-use studies to assess PM emissions including with and without particle filters will be beneficial.

Potential Air Quality Benefits:

The AQMP for the South Coast Basin relies on significant penetration of low emission vehicles to attain federal clean air standards. Reduction of particulate emissions from the combustion of diesel and other fuels is a major priority in achieving these standards. This project would help to better understand the nature and amount of ultrafine particulates generated by different types of fuels and advanced control technologies as well as provide information on potential health effects of ultrafine particles. Such an understanding is important to assess the emission reduction potentials and health benefits of these technologies. In turn, this will have a direct effect on the policy and regulatory actions for commercial implementation of alternative fuel vehicles in the Basin.

Proposed Project: Conduct Monitoring to Assess Environmental Impacts

Expected SCAQMD Cost: $150,000

Expected Total Cost: $500,000

Description of Technology and Application:

Facilities, buildings, structures, or highways which attract mobile sources of pollution are considered "indirect" sources. Ambient and saturation air monitoring near sources such as ports, airports, rail yards, distribution centers and freeways is important to identify the emissions exposure to the surrounding communities and provide the data to then conduct the health impacts due to these sources. This project category would identify areas of interest and conduct ambient air monitoring, conduct emissions monitoring, analyze the data and assess the potential health impacts from mobile sources. The projects would need to be at least one year in duration in order to properly assess the air quality impacts in the area.

Potential Air Quality Benefits:

The proposed project will assist in the evaluation of adverse public health impacts associated with mobile sources. The information will be useful in (a) determining whether indirect sources have a relatively higher impact on residents living in close proximity; and (b) providing guidance to develop some area-specific control strategies in the future should it be necessary.

Proposed Project: Assess Sources and Health Impacts of Particulate Matter

Expected SCAQMD Cost: $150,000

Expected Total Cost: $300,000

Description of Technology and Application:

Previous studies of ambient levels of toxic air contaminants, such as the MATES series of studies, have found that diesel exhaust is the major contributor to health risk from air toxics. Analyses of diesel particulate matter in ambient samples have been based on measurements of elemental carbon. While the bulk of particulate elemental carbon in the South Coast Air Basin is thought to be from combustion of diesel fuels, it is not a unique tracer for diesel exhaust.

The MATES III study collected particulate samples at ten locations in the South Coast Air Basin. Analysis of particulate bound organic compounds was utilized as tracers to estimate levels of ambient diesel particulate matter as well as estimate levels of particulate matter from other major sources. Other major sources that were taken into consideration include automobile exhaust, meat charbroiling, road dust, wood smoke and fuel oil combustion. Analyzing for organic compounds and metals in conjunction with elemental carbon upon collected particulate samples was used to determine contributing sources.

MATES IV, completed in 2015, included an air monitoring program, an updated emissions inventory of toxic air contaminants and a regional modeling effort to characterize risk across the Basin. In addition to air toxics, MATES IV also measured ultrafine particle concentrations and black carbon at the monitoring sites as well as near sources such as airports, freeways, rail yards, busy intersections and warehouse operations.

MATES V was launched in 2017 to update the emissions inventory of toxic air contaminants and modeling to characterize risks, including measurements and analysis of ultrafine particle concentrations typically emitted or converted from vehicle exhaust. Based on preliminary results of MATES V, further assessment may need to be performed.

This project category would include other related factors, such as toxicity assessment based on age, source (heavy-duty, light-duty engines) and composition (semi-volatile or non-volatile fractions) to better understand the health effects and potential community exposures. Additionally, early identification of new health issues could be of considerable value and could be undertaken in this project category.

Potential Air Quality Benefits:

Results of this work will provide a more robust, scientifically sound estimate of ambient levels of diesel particulate matter as well as levels of particulate matter from other significant combustion sources, including gasoline and diesel generated VOCs. This will allow a better estimation of potential exposures to and health effects from toxic air contaminants from diesel exhaust in the South Coast Air Basin. This information in turn can be used to determine the health benefits of promoting clean fuel technologies.

Technology Assessment and Transfer/Outreach

Proposed Project: Assess and Support Advanced Technologies and Disseminate Information

Expected SCAQMD Cost: $425,000

Expected Total Cost: $800,000

Description of Project:

This project supports the assessment of clean fuels and advanced technologies, their progress towards commercialization and the dissemination of information on demonstrated technologies. The objective of this project is to expedite the transfer of technology developed as a result of Technology Advancement Office projects to the public domain, industry, regulatory agencies and the scientific community. This project is a fundamental element in the SCAQMD's outreach efforts to expedite the implementation of low emission and clean fuels technologies and to coordinate these activities with other organizations.

This project may include the following:

- technical review and assessment of technologies, projects and proposals;
- support for alternative fuel refueling and infrastructure;
- advanced technology curriculum development, mentoring and outreach to local schools;
- emissions studies and assessments of zero emission alternatives;
- advanced technology vehicle demonstrations;
- preparation of reports, presentations at conferences, improved public relations and public communications of successful demonstrations of clean technologies;
- participation in and coordination of workshops and various meetings;
- support for training programs related to fleet operation, maintenance and refueling of alternative fuel vehicles;
- publication of technical papers, reports and bulletins; and
- production and dissemination of information, including web sites.

These objectives will be achieved by consulting with industry, scientific, health, medical and regulatory experts and co-sponsoring related conferences and organizations, resulting in multiple contracts. In addition, an ongoing outreach campaign will be conducted to encourage decision-makers to voluntarily switch to alternatively fueled vehicles and train operators to purchase, operate and maintain these vehicles and associated infrastructure.

Potential Air Quality Benefits:

SCAQMD adopted fleet regulations requiring public and private fleets within the Basin to acquire alternatively fueled vehicles when making new purchases. Expected benefits of highlighting success stories in the use of advanced alternatively fueled vehicles could potentially expedite the acceptance and commercialization of advanced technologies by operators seeking to comply with the provisions of the recently adopted SCAQMD fleet rules. The resulting future emissions benefits will contribute to the goals of the AQMP.

Proposed Project: Support Implementation of Various Clean Fuels Vehicle Incentive Programs

Expected SCAQMD Cost: $325,000

Expected Total Cost: $400,000

Description of Project:

This project supports the implementation of zero emission vehicle incentive programs, the Carl Moyer incentives program and the school bus incentives program. Implementation support includes application approval, grant allocation, documentation to the CARB, verification of vehicle registration and other support as needed. Information dissemination is critical to successful implementation of a coordinated and comprehensive package of incentives. Outreach will be directed to vehicle dealers, individuals and fleets.

Potential Air Quality Benefits:

As described earlier, the SCAQMD will provide matching funds to implement several key incentives programs to reduce diesel emissions in the Basin. Furthermore, the SCAQMD recently adopted fleet regulations requiring public and private fleets within the Basin to acquire alternatively fueled vehicles when making new purchases. Expected benefits of highlighting zero emission vehicle incentives could potentially expedite the acceptance and commercialization of advanced technologies by operators seeking to comply with the provisions of the recently adopted SCAQMD fleet rules. The resulting future emissions benefits will contribute to the goals of the AQMP. The school bus program and the Carl Moyer incentives program will also reduce large amounts of NOx and PM emissions in the basin in addition to reducing toxic air contaminants.

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Appendix A

SCAQMD Advisory Groups

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Technology Advancement Advisory Group

Dr. Matt Miyasato, Chair	SCAQMD
*Don Anair	Non-Governmental Organization
Vacant	California Air Resources Board
*Dr. Sunita Satyapal	Department of Energy
Dr. John Froines	Professor Emeritus University of California, Los Angeles
Gretchen Hardison	Los Angeles Department of Water and Power; Chair of Technical Advisory Committee of the Mobile Source Air Pollution Reduction Review Committee
Dawn Wilson	Southern California Edison
David Pettit	Natural Resources Defense Council
Randall Lewis	Lewis Group of Companies
Tim Olson	California Energy Commission
Nick Economides	Western States Petroleum Association
Cherif Youssef	Southern California Gas Company

*Newly appointed members

SB 98 Clean Fuels Advisory Group

Dr. Matt Miyasato, Chair	SCAQMD
Robert Bienenfeld	American Honda Motor Company Inc.
*Dr. Stephen Charlton	Independent Consultant in Combustion Technology
Dr. Mridul Gautam	West Virginia University, Adjunct Professor, & University of Nevada-Reno
Dr. Fritz Kalhammer	Independent Consultant in Energy and Process Technology
John Faust	California Environmental Protection Agency, Office of Environmental Health Hazard Assessment
Dr. Wayne Miller	University of California, Riverside, College of Engineering, Center for Environmental Research and Technology
Vacant	University of Florida, Professor Emeritus
Dr. Scott Samuelsen	University of California, Irvine, Combustion Laboratory/National Fuel Cell Research Center
Dr. Robert Sawyer	Sawyer Associates
Kevin Walkowicz	National Renewable Energy Laboratory
*Andreas Truckenbrodt	Independent Consultant in Fuel Cell Technologies
Michael Walsh	Independent Consultant in Motor Vehicle Pollution Control

*Newly appointed members

Appendix B

Open Clean Fuels Contracts as of January 1, 2018

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Contract	Contractor	Project Title	Start Term	End Term	SCAQMD $	Project Total $
Hydrogen and Mobile Fuel Cell Technologies and Infrastructure						
11555	University of California Los Angeles	Construct Hydrogen Fueling Infrastructure	12/07/12	12/31/19	400,000	2,589,990
12057	Linde, LLC	Expand Hydrogen Fueling Infrastructure	11/02/12	04/01/19	80,000	160,000
14684	California Department of Food and Agriculture, Division of Measurement Standards	Conduct Hydrogen Station Site Evaluations for Site Certifications for Commercial Sale of Hydrogen	12/11/15	02/28/18	100,000	100,000
15150	Air Products and Chemicals Inc.	Install and Upgrade Eight Hydrogen Fueling Stations Throughout SCAB (including SCAQMD's Diamond Bar Hydrogen Station)	10/10/14	04/09/19	1,000,000	17,335,439
15366	EPC LLC	Operate and Maintain Publicly Accessible Hydrogen Fueling Station at SCAQMD's Headquarters	10/10/14	02/16/18	0	0
15609	ITM Power, Inc.	Installation of Riverside Renewable Hydrogen Fueling Station	10/06/15	10/05/19	200,000	2,325,000
15611	Ontario CNG Station, Inc.	Installation of Ontario Renewable Hydrogen Fueling Station	07/10/15	07/09/20	200,000	2,325,000
15618	FirstElement Fuel, Inc.	Installation of Eight Hydrogen Stations in Various Cities (two renewable, six delivered)	02/05/16	02/04/21	1,000,000	16,442,000
15619	H2 Frontier Inc.	Installation of Chino Renewable Hydrogen Station	12/04/15	12/03/20	200,000	4,558,274
15635	Center for Transportation and Environment	ZECT II: Develop and Demonstrate One Class 8 Fuel Cell Range-Extended Electric Drayage Truck	04/27/16	10/26/20	821,198	7,109,384
15641	Hardin Hyundai	Three-Year Lease of 2015 Tucson Fuel Cell Vehicle	06/15/15	06/14/18	22,862	22,862
16025	Center for Transportation and Environment	Develop and Demonstrate Fuel Cell Hybrid Electric Medium-Duty Trucks	02/05/16	08/04/20	980,000	7,014,000
16171	Longo Toyota	Three-Year Lease of 2015 Toyota Mirai Fuel Cell Vehicle	12/15/15	12/14/18	24,567	24,567
16251	H2 Frontier, Inc.	Develop and Demonstrate Commercial Mobile Hydrogen Fueler	05/06/16	05/05/21	200,000	1,665,654
17059	Calstart Inc.	Develop and Demonstrate Fuel Cell Extended-Range Powertrain for Parcel Delivery Trucks	10/27/16	04/26/18	589,750	1,574,250
17312	Hydrogenics USA Inc.	ZECT II: Develop Fuel Cell Range-Extended Drayage Truck	11/20/17	05/19/21	125,995	2,433,553
17316	Center for Transportation and the Environment	Develop and Demonstrate Ten Zero Emission Fuel Cell Electric Buses	06/09/17	04/30/20	1,000,000	45,328,859
17317	American Honda Motor Company, Inc.	Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle for TAO's Fleet Demonstration Program	03/22/17	03/21/20	17,304	17,304

Contract	Contractor	Project Title	Start Term	End Term	SCAQMD $	Project Total $
Hydrogen and Mobile Fuel Cell Technologies and Infrastructure (cont'd)						
17343	American Honda Motor Company, Inc.	Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle for TAO's Fleet Demonstration Program	02/21/17	02/20/20	17,328	17,328
17385	American Honda Motor Company, Inc.	Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle for TAO's Fleet Demonstration Program	05/17/17	05/16/20	17,304	17,304
17394	Energy Independence Now	Provide Analysis of Renewable Hydrogen Pathways, Economics and Incentives	10/20/17	03/19/18	25,000	140,000
Engine Systems & Technologies						
15632	Gas Technology Institute	Develop Ultra Low-Emission Natural Gas Engine for On-Road Medium-Duty Vehicles	09/01/15	06/30/18	750,000	1,800,000
16205	Cummins Westport, Inc.	Develop, Integrate and Demonstrate Ultra-Low Emission 12-Liter Natural Gas Engines for On-Road Heavy-Duty Vehicles	06/03/16	06/30/18	5,250,000	6,250,000
17197	VeRail Technologies Inc.	Develop and Demonstrate Ultra-Low Emission Natural Gas Switcher Locomotive	03/03/17	09/02/19	1,000,000	5,100,000
18018	North American Repower LLC	Develop High Efficiency Near-Zero Emission Natural Gas Engines for Heavy-Duty Vehicles	12/14/17	12/12/19	200,000	1,958,096
Electric/Hybrid Technologies and Infrastructure						
08063	Quantum Fuel Systems Technologies Worldwide, Inc.	Develop & Demonstrate 20 Plug-In Hybrid Electric Vehicles	01/22/08	01/31/18	2,165,613	2,899,057
13058	Capstone Turbine Corporation	Develop Microturbine Series Hybrid System for Class 7 Heavy-Duty Vehicle Applications	08/12/13	12/31/18	360,000	1,210,000
13426	Transportation Power, Inc.	Develop & Demonstrate Catenary Class 8 Trucks (1 Electric & 1 CNG Platform)	06/07/13	07/31/18	2,617,887	3,182,795
13433	U.S. Hybrid Corporation	Develop and Demonstrate Two Class 8 Zero-Emission Electric Trucks	06/26/13	09/30/18	75,000	150,000
13439	City of Carson	MOU for Catenary Zero Emission Goods Movement Project	10/01/13	07/31/18	0	0
14052	Altec Capital Services, LLC	Lease of Two Plug-In Hybrid Electric Vehicles	01/02/15	01/01/20	61,302	61,302
14062	Siemens Industry Inc.	Develop and Demonstrate Catenary Zero Emissions Goods Movement System and Develop and Demonstrate Diesel Catenary Hybrid Electric Trucks	07/14/14	07/13/18	5,500,000	14,780,000
14184	Clean Fuel Connection Inc.	DC Fast Charging Network Provider	04/04/14	06/30/20	920,000	1,220,000

Contract	Contractor	Project Title	Start Term	End Term	SCAQMD $	Project Total $
Electric/Hybrid Technologies and Infrastructure (cont'd)						
14222	Odyne Systems,LLC	Develop and Demonstrate Plug-In Hybrid Electric Retrofit System for Class 6 to 78 Trucks	04/24/14	05/31/18	389,000	2,226,571
14256	National Strategies LLC	Develop and Demonstrate Vehicle-2-Grid Technology	09/05/14	03/04/18	250,000	3,377,689
15382	ChargePoint, Inc.	Install Electric Charging Infrastructure	01/23/15	1/31/18	162,000	162,000
15650	University of California San Diego	Develop and Demonstrate Solar Forecasting for Larger Solar Arrays with Storage and EV Charging	07/17/15	01/16/18	98,908	1,655,278
16022	Gas Technology Institute	ZECT II: Develop and Demonstrate One Class 8 CNG Hybrid Electric Drayage Truck	12/04/15	06/30/20	1,578,802	5,627,319
16046	Transportation Power, Inc.	ZECT: Develop and Demonstrate Two Class 8 CNG Plug-In Hybrid Electric Drayage Trucks	12/04/15	09/30/18	195,326	2,103,446
16047	U.S. Hybrid Corporation	ZECT: Develop and Demonstrate Three Class 8 LNG Plug-In Hybrid Electric Drayage Trucks	11/06/15	09/30/18	22,896	1,996,675
16081	Broadband TelCom Power, Inc.	Provide EV Hardware and Control System at SCAQMD Headquarters including Installation Support, Warranty and Networking	04/27/16	04/26/22	367,425	367,425
16200	California State University Los Angeles	Cost-Share Regional Universities for U.S. DOE EcoCAR 3 Competition	04/14/16	04/15/20	100,000	300,000
16227	Selman Chevrolet Company	Lease One 2016 Chevrolet Volt Extended-Range Electric Vehicle for Three Years	02/01/16	01/31/19	15,677	15,677
17029	University of California Irvine	Demonstrate and Evaluate Plug-In Smart Charging at Multiple Electric Grid Scales	06/29/17	06/28/20	250,000	750,000
17065	Clean Fuel Connection, Inc.	EV Infrastructure Installer	12/02/16	12/31/21	805,219	805,219
17105	BYD Motors Inc.	Develop and Demonstrate Up to 25 Class 8 Battery Electric Drayage Trucks	04/14/17	10/13/23	794,436	8,942,400
17207	Peterbilt Motors	Develop and Demonstrate Up to 12 Class 8 Battery Electric Drayage Trucks	04/07/17	10/06/23	642,436	11,006,340
17225	Volvo Technology of America LLC	Develop and Demonstrate Up to Two Class 8 Battery Electric Drayage Trucks	06/09/17	06/08/20	1,741,184	9,458,446
17244	Kenworth Truck Company	Develop and Demonstrate Up to Two Class 8 Battery Electric Drayage Trucks	09/08/17	01/08/20	2,823,475	9,743,739
17353	Odyne Systems, LLC	Develop and Demonstrate Medium-Heavy-Duty (Class 5-7) Plug-In Hybrid Electric Vehicles for Work Truck Applications	06/09/17	09/08/20	900,000	6,955,281
18075	Selman Chevrolet Company	Lease Two 2017 Chevrolet Bolt All-Electric Vehicles for Three Years for TAO's Fleet Demonstration Program	08/18/17	08/17/20	26,824	26,824

Contract	Contractor	Project Title	Start Term	End Term	SCAQMD $	Project Total $
Fueling Infrastructure and Deployment (NG/RNG)						
09364	Rim of the World Unified School District	Construct & Install a CNG Fueling Station	12/30/10	10/31/18	257,000	425,000
12667	West Covina Unified School District	Upgrade CNG Fueling Facility	10/12/12	03/01/20	60,000	60,000
12851	Clean Energy	Install, Operate and Maintain Three LNG Fueling Stations (Fontana, Coachella and Perris)	10/05/12	12/31/18	1,400,000	4,277,323
12852	City of Covina	Construct Public Access CNG Fueling Stations	10/12/12	12/31/18	200,000	618,429
12853	Rainbow Disposal Co. Inc.	Upgrade CNG Fueling Station	03/08/13	12/31/18	200,000	400,000
12854	Waste Management, Inc.	Upgrade LNG Fueling Station at Baldwin Park Facility	08/17/12	12/31/18	300,000	1,588,100
14219	City of West Covina	Upgrade CNG Station at City Yard	05/15/14	08/01/19	200,000	618,429
15438	United Parcel Service, Inc.	Refurbish/Upgrade Ontario UPS LCNG Infrastructure	12/31/14	06/30/18	246,707	484,535
15541	Foundation for California Community Colleges	Implement Enhanced Fleet Modernization Program	05/07/15	01/30/19	21,270	30,000
16075	City of Desert Hot Springs	Purchase One Heavy-Duty CNG-Powered Truck	03/11/16	03/10/20	38,000	63,000
16076	Coachella Valley Association of Governments	Purchase and Deploy One Heavy-Duty CNG Paratransit Vehicle	12/01/15	11/20/19	140,000	140,000
16244	CR&R, Inc.	Renewable Natural Gas Production and Vehicle Demonstration Project	09/03/16	03/02/20	900,000	55,000,000
16333	Ontario CNG Station, Inc.	Implement Alternative Fuel Station Expansion	05/13/16	11/12/19	200,000	798,535
17092	Kore Infrastructure, LLC	Construct RNG Production Facility and Demonstrate RNG with Next Generation Natural Gas Engine	10/14/16	10/13/21	2,500,000	25,500,000
17349	University of California Riverside/CE-CERT	Establish Renewable Natural Gas Center	08/03/17	08/02/18	100,000	261,110
Fuels/Emission Studies						
15607	University of California Riverside/CE-CERT	Innovative Transportation System Solutions for NOx Reductions in Heavy-Duty Fleets	12/19/15	04/30/18	79,980	139,980
15625	University of California Riverside/CE-CERT	Evaluate SOA Formation Potential from Light-Duty GDI Vehicles	10/02/15	06/30/18	149,972	224,972
15636	University of California Riverside/CE-CERT	Evaluate PEV Utilization Through Advanced Charging Strategies in a Smart Grid System	12/15/15	06/30/18	170,000	270,000

Contract	Contractor	Project Title	Start Term	End Term	SCAQMD $	Project Total $
Fuels/Emission Studies (cont'd)						
15680	National Renewable Energy Laboratory	ComZEV: Develop Detailed Technology and Economics-Based Assessment for Heavy-Duty Advanced Technology Development	08/25/15	06/30/18	520,000	540,000
17060	University of California Riverside	Bailment Agreement for Equipment Use for In-Use Emissions Testing of Heavy-Duty Inspection and Maintenance Program	10/13/16	10/12/18	0	0
17245	West Virginia University Research Corporation	Conduct In-Use Emissions Testing and Fuel Usage Profile on On-Road Heavy-Duty Vehicles	06/09/17	06/08/21	1,625,000	1,625,000
17276	University of California Riverside/CE-CERT	Develop ECO-ITS Strategies for Cargo Containers	08/03/17	08/02/20	543,000	2,190,233
17277	University of Southern California	Conduct Market Analysis for Zero Emission Heavy-Duty Trucks in Goods Movement	11/03/17	11/02/19	350,000	524,000
17278	University of Southern California	Develop Freight Loading Strategies for Zero Emissions Heavy-Duty Trucks in Goods Movement	11/03/17	11/02/19	200,000	1,001,000
17286	University of California Riverside/CE-CERT	Conduct In-Use Emissions Testing and Fuel Usage Profile on On-Road Heavy-Duty Vehicles	06/09/17	06/08/21	1,625,000	1,625,000
17331	University of California Riverside/CE-CERT	Conduct In-Use PM Emissions Study for Gasoline Direct Injection Vehicles	07/14/17	07/31/18	222,000	273,000
17352	California State University Maritime Academy	Develop and Demonstrate Vessel Performance Management Software and Vehicles	06/09/17	06/08/21	50,086	195,195
18090	University of California Riverside/CE-CERT	Study Secondary Organic Aerosol Formation from Heavy-Duty Diesel and Natural Gas Vehicles	12/05/17	12/04/18	85,000	85,000
Stationary Clean Fuels Technology						
13045	ClearEdge (novated from UTC Power Corp.)	Energy Supply and Services Agreement to Install One 400 kW Phosphoric Acid Fuel Cell at SCAQMD Headquarters	09/28/12	09/27/22	450,000	4,252,680
Technology Assessment/Transfer & Outreach						
08210	Sawyer Associates	Technical Assistance on Mobile Source Control Measures and Future Consultation on TAO Activities	02/22/08	02/28/18	10,000	10,000
09252	JWM Consulting Services	Technical Assistance with Review and Assessment of Advanced Technologies, Heavy-Duty Engines, and Conventional and Alternative Fuels	12/20/08	06/30/18	30,000	30,000
12376	University of California Riverside	Technical Assistance with Alternative Fuels, Biofuels, Emissions Testing and Zero-Emission Transportation Technology	06/13/14	05/31/18	75,000	75,000

Contract	Contractor	Project Title	Start Term	End Term	SCAQMD $	Project Total $
Technology Assessment/Transfer & Outreach (cont'd)						
12381	Integra Environmental Consulting Inc.	Technical Assistance Related to Emission Inventories, Goods Movement and Off-Road Sources	04/06/12	04/30/18	110,000	110,000
12453	Tech Compass	Technical Assistance with Alternative Fuels, Fuel Cells, Emissions Analysis and Aftertreatment Technologies	06/21/12	05/30/18	75,000	75,000
14185	Three Squares Inc.	Conduct Education Outreach for the Basin DC Fast Charging Network Project	04/11/15	06/30/18	89,183	89,183
15380	ICF Resources LLC	Technical Assistance with Goods Movement, Alternative Fuels and Zero-Emission Transportation Technologies	12/12/14	12/11/18	30,000	30,000
15516	Cordoba Corporation	Technical Assistance with Construction of Zero Emissions Goods Movement Demonstration Project	03/27/15	03/31/18	74,500	74,500
17037	Clean Fuel Connection, Inc.	Technical Assistance with Alternative Fuels, Electric Vehicles, Charging and Fueling Infrastructure and Renewable Energy	11/18/16	11/17/18	100,000	100,000
17097	Gladstein, Neandross & Associates, LLC	Technical Assistance with Alternative Fuels and Fueling Infrastructure, Emissions Analysis and On-Road Sources	11/04/16	11/03/18	200,000	200,000
17282	Calstart	Cosponsor CALSTART's 25th Anniversary Symposium	03/22/17	01/31/18	15,000	150,000
17336	Three Squares Inc.	Conduct Education Outreach for the Basin DC Fast Charging Network Project	05/12/17	06/30/18	64,183	64,183
17358	AEE Solutions, LLC	Technical Assistance with Heavy-Duty Vehicle Emissions Testing, Analysis and Engine Development	06/09/17	09/08/19	100,000	100,000
18019	Ricardo Inc.	Technical Assistance with Heavy-duty Vehicle Emissions Testing, Analysis, and Engine Development and Applications	09/01/17	08/31/19	50,000	50,000
18120	Burke Rix Communications	Cosponsor the Southern California Energy Water & Green Living Summit 2018	12/06/17	02/28/18	5,000	150,000

Appendix C

Final Reports for 2017

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SCAQMD Contract #10482 **October 2017**

Install and Demonstrate a PEM Electrolyzer in Los Angeles, Providing Hydrogen Fueling for Vehicles and Utilizing the Technology in the Engineering Technology Curriculum at the University

Contractor
California State University Los Angeles

Cosponsors
The Ahmanson Foundation
Automobile Club of Southern California
California Air Resources Board (CARB)
California State University Los Angeles
U.S. Department of Energy (DOE)
Fran Morris-Rosman & Richard Rosman Trust
Kenneth Brasher ('62) Trust
MSRC/AB 2766 Discretionary Fund
South Coast Air Quality Management District

Project Officer
Larry Watkins/Joseph Impullitti

Background
The implementation of zero emission vehicles (ZEVs) is a key component in the effort to achieve air quality improvements in the South Coast Air Basin. Fuel cell electric vehicle (FCEV) technology is emerging at an accelerated pace and may play a crucial role in this effort. To accelerate this technology as a viable commercial alternative, the SCAQMD includes funding in its program allocations to support a network of hydrogen fueling stations throughout the Basin to support the operation and demonstration of FCEVs in the South Coast air basin. California State University Los Angeles (CSULA) submitted a proposal to SCAQMD and was awarded funding to construct and demonstrate a hydrogen research and fueling station with a polymer electrolyte membrane (PEM) electrolyzer. This project also complemented similar objectives and mandates of CARB and the DOE.

Project Objective
The project objective was to construct, install and operate a hydrogen research and fueling station including a PEM electrolyzer system in Los Angeles for the generation, compression, storage and dispensing of hydrogen on the CSULA campus. The station was intended to be a public access hydrogen station in support of FCEV technology as well as a research and educational tool as part of CSULA's engineering technology curriculum.

Technology Description
The station PEM electrolyzer produces hydrogen onsite from the splitting of water molecules. As powered by renewable energy electricity sources, this results in hydrogen production with a "zero carbon" fuel cycle. The station is capable of producing 60 kg per day and is matched with 60 kg of hydrogen storage capacity in ASME storage vessels. Hydrogen compression is accomplished via one PDC diaphragm type and two Hydropac high-pressure reciprocating type compressors, providing for both 350 bar and 700 bar fueling. The dispenser has two hoses, for respective 350 bar and 700 bar fueling events, and is capable of point-of-sale transactions utilizing major credit cards. Hydrogen is chilled to -20C, with typical refueling times of 6-8 minutes. Based upon typical refueling volumes, the station can fuel upwards of 20 vehicles per day.

Status
The CSULA fueling station encountered significant difficulties during construction. A lack of "buffer tanks" capacity, and a construction dispute over the same, stalled the project for over two years. Ultimately, the general construction

Figure 1: CSULA's H_2 Station interior (from left to right): high pressure compressors, H_2 chiller, 350 bar compressor, electrolyzer, 350 bar storage banks, visitor gallery

contractor could not finish the project, and CSULA took over construction and commissioning. After buffer tanks were installed, the station was for the first time capable of conducting fueling events on the 700 bar side without pressure pulsations. Another latent defect was discovered soon afterwards--incomplete NFPA leak detection in the dispenser programming. This was also a function of the previous lack of buffer tanks. However, permission to proceed with station operations was obtained from the State Fire Marshall, so long as protective measures in the form of attended fueling by trained personnel and manual leak monitoring were provided. With implementation of such an "attended fueling" protocol, improvement to station operations was able to proceed, pending the leak test programming upgrades. Quantum Technologies was tasked with leak test programming improvements.

The station successfully passed temporary certification to sell hydrogen by the kilogram from the California Division of Measurements Standards on October 23, 2014. Subsequently, the station made the first recorded sale of hydrogen by the kilogram on November 12, 2014, making the facility the first in the world to sell hydrogen fuel by the kilogram directly to retail customers. Furthermore, the station dispenser became the first in history to receive California commercial certification on January 8, 2014. Fueling contracts with several OEMs were also commemorated during these milestone events.

In its first few months, the station completed more than 250 vehicle fueling events. The station consistently makes 60 kgs of hydrogen available for fueling. Sufficient loading of the station is critical to maintain thermal balances and station reliability, and efforts continue to bolster utilization.

This contract closed in October 2017 following completion of data reporting and program management of the station for a three-year period. As of the closing of this contract, the station had limited access due to public accessibility issues.

Results

To date FCEVs from GM, Hyundai, Honda, Mercedes-Benz, Volkswagen and Audi have fueled at the station. The station is capable of producing 1800 kilograms of hydrogen per month, enough to fuel hundreds of vehicles producing only water vapor emissions. This is consistent with projected performance results.

Table 1: Three-year fueling throughput

Period	# of Fueling Events	kg sold
Nov 2014-Oct 2015	742	1,682
Nov 2015-Oct 2016	779	1,722
Nov 2016-Oct 2017	716	1,523
Total	**2,237**	**4,927**

Benefits

While no emission credits were associated with the construction of this station, hydrogen fuel displaces more traditional fossil fuels in mobile sources, thus reducing NO_x and achieving co-benefits for GHG emission reductions.

Project Costs

Projected costs for this project were $4,565,110. Final costs by cosponsor were as follows:

Cosponsors	Funding Amount
The Ahmanson Foundation	$200,000
Auto Club of Southern California	$50,000
CARB	$2,700,000
CSULA	$560,588
Fran Morris-Rosman & Richard Rosman Trust	$180
Kenneth Brasher (62') Trust	$10,000
MSRC/AB 2766 Disc. Fund	$250,000
SCAQMD	$250,000
DOE	$475,000
Total	**$4,495,768**

Commercialization and Applications

The station remains in operation despite public accessibility issues. However, CSULA and SCAQMD are evaluating solutions so the station can be utilized to its full capacity. Additionally, the hydrogen station was incorporated into CSULA's public outreach, research and education mission.

SCAQMD Contract #16039 **April 2017**

Demonstrate Prototype Hydrogen Sensor and Electronics Package

Contractor

Lawrence Livermore National Laboratory (LLNL)
Subcontractor: Los Alamos National Laboratory (LANL)

Cosponsors

U.S. Department of Energy (DOE)
South Coast Air Quality Management District

Project Officer

Lisa Mirisola

Background

Hydrogen safety sensors, both for filling stations and vehicle monitoring, are an integral part of the overall development of a hydrogen economy. Department of Energy (DOE) workshops, held to review hydrogen safety sensor requirements, identified performance targets for a variety of applications, with a focus on hydrogen refueling infrastructure and on-board fuel cell vehicles. These workshops highlight the dearth of commercially available hydrogen sensors capable of meeting sensitivity, durability, reliability and operational requirements at a cost which can accommodate wide-scale deployment.

Project Objective

The objective of this project was to co-fund demonstration of the LLNL/LANL hydrogen safety sensor at two hydrogen refueling stations - one in Burbank and one in Chino - and acquire performance data over a planned six-month demonstration period. Testing was conducted at the Burbank station operated by Hydrogen Frontier with positive results reported at the 2015 DOE Annual Merit Review. This project was also to continue monitoring at Burbank, including system upgrades for improved sensor communication and addition of a weather monitoring station.

Technology Description

The hydrogen safety sensor demonstrated employs electrochemical principles, relying on yttria-stabilized zirconium oxide—the same solid electrolyte upon which the broadly successful oxygen lambda sensor is based. Unlike lambda sensors, which operate at high temperatures where electrode reactions are dominated by thermodynamics, this hydrogen sensor operates at far lower temperatures where electrode kinetics (rates of oxidation and reduction of reactants) generate a non-equilibrium potential that dominates its response. The non-equilibrium electrochemical potential (also called a "mixed potential") develops due to differences in the redox kinetics of hydrogen at dissimilar electrode/electrolyte gas interfaces.

Figure 1: A close-up of a sensor element (left). Hydrogen sensor prototypes were installed at fueling station in Burbank (right) and Chino to assess their performance and long-term stability.

The demonstrated hydrogen safety sensor is unique, not only due to the mixed potential electrochemical phenomena, but because it uses a unique combination of electrode materials and a patented sensor design (U.S. Patent No. 7,264,700) that results in achieving stable and reproducible hydrogen response characteristics. The result is a new, highly sensitive electrochemical hydrogen safety sensor, designed with low cross-sensitivity and ultra-stable baseline, requiring minimal calibration and intrinsically resistant to false alarms.

Status

The demonstrations at Burbank and Chino hydrogen fueling stations were completed in April 2017 and were summarized in a final report due May 2017. Four progress reports are on file and the major tasks have been completed.

These tasks include:

1) selection of the Hyundai/Hydrogen Frontier fueling station in Chino, CA for the second demonstration site,
2) purchase and preparation of sensor elements, electronics and equipment necessary for field installation of two hydrogen sensor units and
3) sensor field trials unit/weather station installation and continuous monitoring for performance analysis.

Results

Field demonstrations clearly indicate that the sensors experience: minimal baseline drift, H_2 spikes in accordance with logged station release events, good sensitivity/ability to measure small, normal H_2 releases during routine station operation, no false positives during the entire field trials program, fast response time in the laboratory (<<1 s), which translates to the ability to clearly distinguish between filling events which occur within 10 minutes of each other, and low cross-sensitivity to water vapor and CO_2.

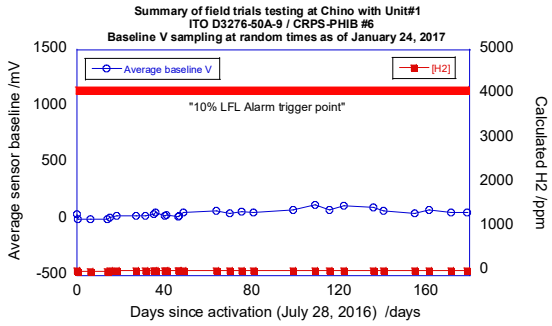

Figure 2: Sensor baseline voltage and corresponding H_2 measurement during prolonged exposure at the Chino fueling station over a 25-week period.

Benefits

This technology offers a solution for hydrogen emissions monitoring with minimal baseline drift, requiring infrequent calibrations/maintenance. The sensor responds rapidly to hydrogen releases with excellent sensitivity. Based on the performance recorded during this study, mixed potential sensors using an indium tin oxide electrode can meet U.S. DOE hydrogen safety sensor requirements.

Table 1: LANL/LLNL sensors meet U.S. DOE requirements

	EERE Table 3.7.2 [1]	LANL/LLNL sensor
Response time	< 1 s	<<1 s
Min detection limit	0.10%	10 ppm
Max detection limit	10%	5%
Accuracy	5% of full scale	<5% of full scale
Ambient temperature	-30 to 80 C	-30 to 125 C
Ambient humidity	10-98% RH	0-100% RH

[1] Buttner WJ, Post MB, Burgess R, Rivkin C (2011) International Journal of Hydrogen Energy 36(3):2462-2470

Project Costs

Project costs match projected spending. Of the SCAQMD funding allocated for this effort, $75,000 was applied to station selection, sensor installation, monitoring and analysis, and project management and reporting, $100,000 was used for sensor materials, deposition, construction, station selection, installation support and sensor monitoring/analysis. The total project costs were $350,000 with the U.S. DOE providing the remaining funding.

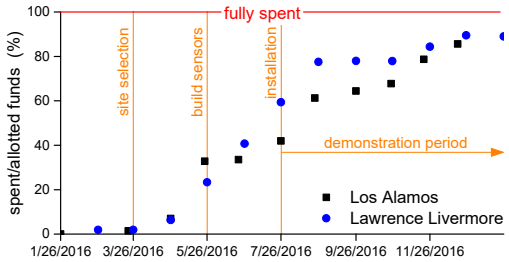

Figure 3: Expense over project duration, with milestone indicators.

Commercialization and Applications

This hydrogen safety sensor technology is an excellent candidate for commercial development to support hydrogen monitoring in fueling stations, hydrogen transportation vehicles, storage tanks and hydrogen fuel cell consumer vehicles. Efforts to optimize platform deposition and design for scale-up are underway. (If you wish to view the final report in its entirety, it has been assigned the release ID# LLNL-TR-725120.)

SCAQMD Contract #18118 **December 2017**

Participate in California Fuel Cell Partnership for CY 2017 and Provide Support for Regional Coordinator

Contractor
Frontier Energy

Cosponsors
7 Automakers
6 Public agencies
1 Technology provider
28 Associate members

Project Officer
Lisa Mirisola

Background
Established with eight members in 1999, the California Fuel Cell Partnership (CaFCP) is a collaboration in which private and public entities are independent participants. It is not a joint venture, legal partnership or unincorporated association. Therefore, each participant contracts with Frontier Energy (previously Bevilacqua-Knight, Inc./BKi) for their portion of CaFCP administration. SCAQMD joined the CaFCP in April 2000, and the CaFCP currently includes 42 organizations interested in demonstrating fuel cell vehicle and fueling infrastructure technology.

Project Objectives
Goals for 2017:
- Decrease hydrogen station development time lines and costs
- Identify technology challenges and information gaps within the state's hydrogen station network
- Coordinate and collaborate on consensus approaches to achieving first 100 hydrogen stations in California
- Identify new concepts & approaches to initiate exponential station network growth
- Communicate progress of Fuel Cell Electric Vehicles (FCEVs) and hydrogen to current and new stakeholder audiences.
- Facilitate implementation of two FCEB (Fuel Cell Electric Bus) Centers of Excellence (No. and So. Calif.)
- Increase awareness and market participation of fuel cell electric trucks, including supporting the deployment of funded pilot projects
- Coordinate nationally and internationally to share and align approaches

Status
The members of the CaFCP intend to continue their cooperative demonstration effort. This final report covers the SCAQMD for 2017 membership. This contract was completed on schedule.

Figure 1: CaFCP organized tours of the El Dorado manufacturing plant in Riverside in August 2017 to look at fuel cell buses under assembly.

Technology Description
The CaFCP members together or individually are demonstrating fuel cell passenger cars and transit buses and associated fueling infrastructure in California. The passenger cars include Honda's Clarity, Hyundai's Tucson, and Toyota's Mirai. The fuel cell transit buses include 13 placed at AC Transit and five placed at Sunline Transit, one placed with Orange County Transportation Authority and one placed with UC Irvine Student Transportation.

Results
Specific accomplishments include:
- More than 3,000 consumers and fleets have purchased or leased passenger category FCEVs since they entered the commercial market in 2015;
- Transit agency members have 20 fuel cell electric buses currently in operation and more than 30 funded in 2016;
- There are 31 retail and four other non-retail hydrogen fueling stations in operation in California and 34 in development.

- CaFCP staff and members continue to conduct outreach and education in communities throughout California;
- CaFCP, the Governor's Office of Business and Economic Development and the California Energy Commission, continue advising and responding to city staff across the state of California to optimize station permitting.
- CaFCP created and maintains the Station Operational Status System (SOSS) that more than 30 hydrogen stations in the U.S. use to report status. This data, in turn, feeds real-time information (address, availability, etc.) to consumers through a CaFCP mobile-friendly website and several other apps and systems that support consumers.

Benefits

Compared to conventional vehicles, fuel cell vehicles offer zero smog-forming emissions, reduced water pollution from oil leaks, higher efficiency and much quieter and smoother operation. When renewable fuels are used as a source for hydrogen, fuel cell vehicles also encourage greater energy diversity and lower greenhouse gas emissions (CO_2).

By combining efforts, the CaFCP can accelerate and improve the commercialization process for all categories of vehicles: passenger, bus, truck, etc. The members have a shared vision about the potential of fuel cells as a practical solution to many of California's environmental issues and similar issues around the world. The CaFCP provides a unique forum where infrastructure, technical and interface challenges can be identified early, discussed, and potentially resolved through cooperative efforts.

Project Costs

Auto members provide vehicles, and the staff and facilities to support them. Energy members engage in fueling infrastructure activities. The CaFCP's annual operating budget is about $2 million, and includes facility operating costs, program administration, joint studies and public outreach and education. Each full member makes an annual contribution of approximately $70,000 towards the common budget. Some government agencies contribute additional in-kind products and services. SCAQMD provides an additional $50,000 annually to support a Southern California Regional Coordinator and provides office space for additional staff in-kind at SCAQMD. SCAQMD's contribution for 2017 was $120,000.

Commercialization and Applications

While research by multiple entities will be needed to reduce the cost of fuel cells and improve fuel storage and infrastructure, the CaFCP has played a vital role in demonstrating fuel cell vehicle reliability and durability, fueling infrastructure and storage options and increasing public knowledge and acceptance of the vehicles and fueling.

CaFCP's goals relate to preparing for and supporting market launch through coordinated individual and collective effort. CaFCP members, individually or in groups, are focusing on the following important goals:

- Prepare for larger-scale manufacturing, which encompasses cost reduction, supply chain and production.
- Reduce costs of station equipment, increase supply of renewable hydrogen at lower cost, and develop new retail station approaches.
- Support cost reduction through incentives and targeted research, development and demonstration projects.
- Continue research, development and demonstration of advanced concepts in renewable and other low-carbon hydrogen.
- Provide education and outreach to the public and community stakeholders on the role of FCEVs and hydrogen in the evolution to electric drive.

In 2018, the primary goals are the same as the 2017 goals listed above.

SCAQMD Contract #15626 **July 2017**

Develop, Integrate and Demonstrate Ultra-Low Emission Natural Gas Engines for On-Road Heavy-Duty Vehicles

Contractor

Cummins Westport, Inc.

Cosponsors

California Energy Commission (CEC)
Southern California Gas Company
South Coast Air Quality Management District

Project Officer

Richard Carlson/Joseph Lopat

Background

Heavy-duty on-road diesel vehicles are currently one of the largest sources of NO_x emissions in the South Coast Air Basin. This source category is still projected to be one of the largest contributors to NO_x emissions, even as the legacy fleet of older and higher-polluting vehicles are retired from operation and replaced by the cleanest available vehicles meeting the most stringent emission levels required by 2010 U.S. EPA emissions standards. The development of ultra-low emissions natural gas engines would significantly reduce emissions from this on-road heavy-duty source category and assist the region in meeting federal ambient air quality standards in the future.

Project Objective

Cummins Westport Inc.'s (CWI) objectives for this project were to develop and demonstrate an 8.9 liter natural gas engine suitable for on-road heavy-duty vehicle applications such as buses, refuse service, goods movement, and/or drayage trucks. The 'production-intent' engines and associated exhaust after-treatment technologies must be commercially viable and capable of:

- Achieving emissions targets of 0.02 g/bhp-hr NOx, 0.01 g/bhp-hr PM, 0.14 g/bhp-hr NMHC, and 15.5 g/bhp-hr CO,
- Keeping exhaust NH_3 emissions as low as achievable while targeting 10 ppm,
- Being thermally and fuel efficient, to achieve minimal fuel economy penalties relative to 2010 U.S. EPA and CARB certified diesel engines in similar duty cycle, and
- Being certified by the U.S. EPA and CARB.

Technology Description

An extensive process was undertaken to evaluate hardware and software changes on the engine and aftertreatment in order to achieve the project goals while being conscious about the impact on product costs and time for commercial development.

The selected technology architecture consisted of:

- Addition of a closed crankcase ventilation (CCV) system with pressure sensor,
- Addition of mid-catalyst temperature sensor,
- Aftertreatment size increase and improved composition of washcoat and precious metals, and
- Implementation of improved software with various emission optimizing control strategies.

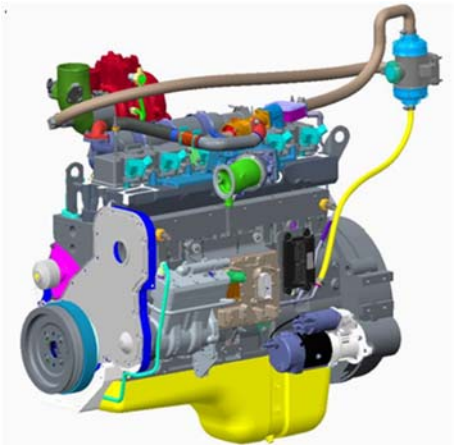

Figure 1: Cummins 8.9 liter ISL-G engine.

The CCV system consisted of a filter and hose assembly. The hoses route crankcase emissions to the filter where oil is separated and returned to the engine sump. The vapor is returned to the air intake where it mixes with intake air, fuel and EGR and enters the combustion chamber.

The additional CCV pressure sensor allows the control system to monitor pressure in the CCV system and alert the operator to issues as part of system diagnostics. The additional temperature sensor located mid-length on the catalyst allows the control

system to more quickly and accurately adjust fueling to minimize emissions. The combination of increased aftertreatment size and improved composition of washcoat and precious metals increases the overall conversion efficiency of the catalyst, thereby reducing emissions. The optimized control software targets high NO_x forming portions of the duty cycle and utilizes the above-mentioned hardware changes to reduce tailpipe emissions

Status

The project was successfully completed. While originally scheduled to be completed at the end of December 2016, the demonstration task was extended through to June 2017. The final report is on file with technical details of the project.

A variety of potential hardware and software changes were investigated early on in this project, resulting in the selection of engine and aftertreatment architecture. Prototype engines were built and tested in engine dynamometers and in engineering vehicles to further develop and validate the changes.

Full emissions certification testing was completed and submitted to CARB and U.S. EPA. In late 2015, CWI received emissions certification approvals from both CARB and U.S. EPA, meeting CARB's Optional Low NO_x 0.02g standard.

Thirteen pre-production engines were installed in seven refuse trucks and six transit buses and successfully operated in commercial service, accumulating over 560,000 miles and 61,000 hours of operation. Third-party chassis dynamometer testing of one of the demonstration refuse trucks was conducted by UC Riverside. The test showed the ISL G Near Zero "met and exceeded the target NO_x emissions of 0.02 g/bhp-hr and maintained those emissions during a full ration of duty cycles found in the South Coast Air Basin".

Results

The objectives of this project were achieved. Emissions certification was received from CARB and U.S. EPA to meet the CARB Optional Low NO_x 0.02g standard. While the stretch NH_3 target of 10 ppm was not achieved, ammonia emissions were reduced to less than 87 ppm measured in the cold hot emissions test cycle.

Thirteen demonstration vehicles successfully operated in commercial service accumulating 564,306 miles and 61,805 hours. Fuel efficiency was demonstrated on the transit demonstration vehicles at 3.39 to 3.83 mpdge (miles per diesel gallon equivalent), while UC Riverside estimated the fuel efficiency as 4.5 mpdge for the regional port cycle and

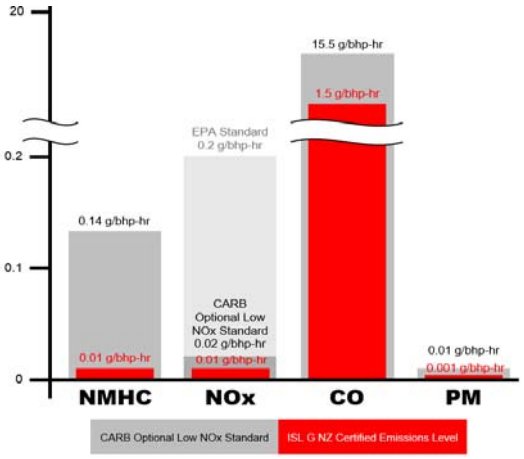

Figure 2: ISL-G emissions out-put

2.5 mpge for the CBD cycle. Notably, the technology development from this project initiated the commercial development of the ISL G NZ engine and aftertreatment.

Benefits

Parallel to this project, the ISL G NZ engine was commercialized and offered as a first-fit engine to vehicle OEMs covering refuse, transit and truck markets. The availability of an ultra-low emissions engine, specifically one that reduces NOx by over 90% from the current federal standard, enables air districts in North America to carry out their emissions reduction plans to meet ambient air quality goals, specifically reducing NOx emissions from heavy-duty on-road vehicles. To put the emissions reduction potential of vehicles powered by this ultra-low NOx engine into perspective, ten ISL G NZ powered buses produce the same NOx emissions as only one bus powered by a 2010 EPA-certified engine.

Project Costs

SCAQMD, CEC and SoCalGas contributed $3.5M. CWI's cost-share was approximately $3.7M, consistent with the expected project cost-share of $3,733,033. The total project cost was approximately $7.2M.

Commercialization and Applications

In parallel to this technology development and demonstration project, development of the ISL G NZ engine was successfully completed and the engine commercially launched in mid-2016. This engine is intended to be offered by the same wide range of vehicle OEMs and address the same applications as the current production ISL G engine. At project completion, the ISL G NZ powered vehicles were in commercial service in the transit and refuse service markets in California.

SCAQMD Contract #12028 **September 2017**

Demonstrate and Replace UPS Delivery Trucks with Zero Emission Medium-Duty Trucks

Contractor
Electric Vehicles International

Cosponsors
California Air Resources Board
United Parcel Service
South Coast Air Quality Management District

Project Officer
Joseph Impullitti

Background
Electric Vehicles International (EVI), United Parcel Service (UPS), SCAQMD and the California Air Resource Board (CARB) partnered together to create the Zero Emission Community-Level Goods Movement and Delivery Demonstration project in San Bernardino. This collaborative project provided funding for 40 zero emission vehicles at the San Bernardino UPS facility. As part of the project, the SCAQMD asked UPS to decommission one older diesel vehicle for every new zero emission vehicle.

Project Objective
EVI proposed to assemble and deliver 28 EVI walk-in medium- duty trucks to replace UPS diesel delivery trucks, which are located and operated in the City of San Bernardino. The replacement trucks will then be demonstrated in the UPS commercial fleet for a period of five years, during which UPS and EVI will collect data to evaluate performance, reliability, durability and emissions benefits of the EVI technology.

Shortly after the SCAQMD Board approved this project, CARB increased the incentive funding, which allowed an additional 12 vehicles to be delivered to San Bernardino for the same SCAQMD investment amount.

Technology Description
EVI, utilizing their signature all electric powertrain, worked with UPS to develop a zero emission, medium-duty and return-to-base delivery truck ideal for package delivery service providers. The new, class 6 vehicles use a Daimler Freightliner chassis with EVI's signature powertrain to create a zero emission, aerodynamic model of the walk-in vehicles that UPS drivers are accustomed to. The power system includes a 99 kWh lithium-iron magnesium-phosphate battery pack, which has a guaranteed battery life of 1,500 cycles, equivalent to five years of service in the UPS fleet.

Figure 1: Class 6 medium-duty return-to-base delivery vehicle

Status
As of May 2012, EVI delivered all vehicles to UPS in San Bernardino. Shortly after, a few of the initial vehicles returned to EVI for upgrades to increase durability. In early 2014, UPS placed all 40 electric vehicles into service at their San Bernardino facility.

As an integral part of this project, EVI and UPS continued to collect telematics from each vehicle for the five-year demonstration period. At the conclusion of this contract, EVI was required to submit a final report and two-page project synopsis including data on the five-year demonstration period.

Results
UPS placed the majority of the vehicles into service in mid-to-late 2013. EVI has calculated the

environmental benefits for calendar year 2013, with anticipated reductions in fuel usage and commensurate benefits for calendar years 2014-2017.

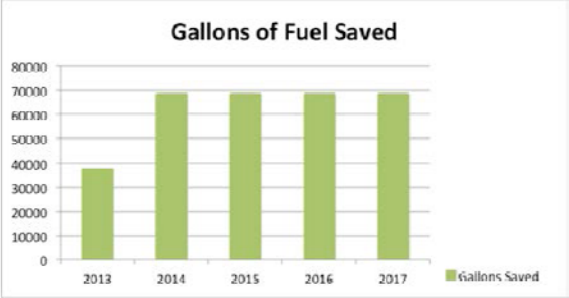

Figure 2: Fuel savings over reporting period

In 2013, over 300,000 zero emission miles were driven in San Bernardino. In 2013, UPS saved over 34,000 gallons of diesel fuel for a total dollar savings of roughly $145,000, which is estimated to be doubled over the remaining four years of the project.

Benefits

Estimates show this demonstration project will provide an annual reduction of 8.39 short tons of NO_x and .30 short tons of $PM_{2.5}$ per year.

Additionally, in terms of co-benefits for criteria pollutant reductions, it is anticipated that almost three million zero emission miles will be driven, resulting in a total CO_2 reduction of roughly seven million pounds through the term of this project, as summarized below.

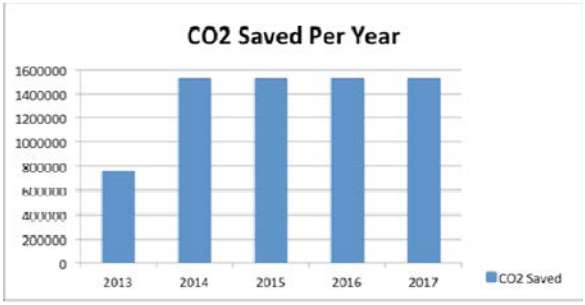

Figure 3: CO_2 savings over reporting period

Project Costs

The initial project cost for the 28-vehicle deployment was just over $4.8 million. The final project cost for the 40-vehicle demonstration deployment including the infrastructure funding for UPS San Bernardino facility was $7.4 million.

EVI's initial vehicle cost was just over $168,000 per truck. With the durability upgrades, the current vehicle price was approximately $186,000.

SCAQMD's initial investment of $1.4 million remained unchanged. The cost of the additional 12 vehicles added to the demonstration was provide by CARB.

Commercialization and Applications

Zero emission electric vehicles are on the brink of transforming the return-to-base delivery vehicle market, providing significant emission reductions.

One of the biggest obstacles to fleet commercialization is the higher vehicle incremental cost. With the right amount of incentive funding, however, it is anticipated that delivery fleets would be willing to transition away from diesel vehicles.

Additional large vehicle orders will also help manufactures lower vehicle costs, ultimately providing a more competitive vehicle cost compared to their gas or diesel counterparts.

SCAQMD Contract #13396 **September 2017**

Develop and Demonstrate Seven Class 8 Zero Emission Electric Trucks

Contractor

Transportation Power, Inc. (TransPower)

Cosponsors

California Energy Commission (CEC)
U.S. Department of Energy (DOE)
Port of Long Beach
Port of Los Angeles
South Coast Air Quality Management District

Project Officer

Brian Choe

Background

On-road heavy-duty diesel trucks are a significant source of diesel particulate matter and NO_x emissions with serious health effects. The impact on public health is more pronounced in the surrounding communities along the goods movement corridors near the Ports of Los Angeles and Long Beach, and next to major freeways in Southern California. Recognizing the significant impact diesel trucks have on air quality and public health, the SCAQMD has been working with other regional stakeholders, including the Ports of Los Angeles and Long Beach, to promote and support the development and deployment of advanced zero emission cargo transport technologies in the South Coast Air Basin. Deployment of zero emission trucks in this region may also be a future requirement for conforming to rules, regulations, and mandates of SCAQMD, CARB, EPA, and DOE, while also helping to foster economic development in the region.

Project Objective

The initial objective of this project was to develop, build, and demonstrate four zero emission Class 8 battery electric drayage trucks in real world drayage service operations to accelerate the introduction and penetration of electric transportation technologies into the cargo transport sector. This project was one of four zero emission drayage truck technologies funded by a grant from the Department of Energy under the Zero Emission Cargo Transport (ZECT) Demonstration program. The vehicles were intended to be demonstrated in real world drayage service for two years in partnership with Transportation Services, Inc. or other SCAQMD approved fleets in the Basin. This objective did not evolve significantly during the contracting procedure, but the technologies enabling this demonstration did evolve substantially, as discussed in the next section. In addition, the total size of the TransPower demonstration fleet was increased from four to seven trucks.

Figure 1: A demonstration vehicle equipped with Inverter-Charger Unit

Technology Description

The TransPower ElecTruck™ drive system uses a unique combination of two 150 kW permanent magnet motors that were originally developed for the Fisker Karma hybrid passenger car. The demonstration vehicles were equipped with Inverter-Charger Units (ICUs) that combine the functions of the vehicle inverter and battery charger. This innovation minimizes external charging infrastructure and charges each truck in less than 4 hours, providing operational flexibility and reducing capital costs. An Automated Manual Transmission uses proprietary software to control a transmission shift mechanism, enabling operation in multiple gears to maximize vehicle efficiency. High-energy battery modules using lithium iron phosphate cells were installed on all trucks, providing 70-100 miles of range under

normal operating conditions. A proprietary vehicle control system optimizes vehicle efficiency, maximizes battery life, and protects key components such as batteries and power electronics from excessive temperatures, voltage spikes, or current surges.

The ElecTruck™ principle of operation differed from other equipment available at the start of the ZECT project, but by the end of the project multiple competitors were offering electric drive options employing onboard chargers and AMT technology, which were demonstrated in Class 8 trucks for the first time on this project.

Status

The ZECT project was completed in September 2017. Testing of one of the ZECT trucks on a chassis dynamometer at the University of California, Riverside (UCR) in 2014 showed the ElecTruck™ technology to be nearly twice as efficient as competing electric drive technologies. The major unanticipated problem encountered during the project was the reluctance of fleet operators to use drayage trucks with the 70-100 mile range limitation. Despite this challenge, the seven trucks accumulated 43,000 miles of use during the project, far surpassing the number of miles accumulated on any other fleet of electric Class 8 trucks to date. On-going advances in battery technology are expected to address the range limitation issue, making electric trucks of this type attractive to an expanding array of users over the next several years.

Results

The UCR final report documenting the results of its dynamometer tests concluded that "The TransPower electric HDV [heavy-duty vehicle] was almost two times more energy efficient than an all-electric HDVs tested at UCR in 2011 over the same cycles. This suggests the current all-electric HDV is a significant improvement in the state of the art HDVs." This testing, along with in-service demonstrations, showed the practicality of zero-emission operation of Class 8 trucks. The UCR report also concluded "the all-electric HDV performed well on all the cycles and showed a very reliable operation from full to 20% SOC load," while concluding that the energy cost of operating the TransPower electric truck compared favorably with the costs of operating diesel trucks or competing electric trucks.

In this case, there were few performance tradeoffs. Achievement of emissions reductions, improved efficiency, and lower operating cost all worked hand in hand.

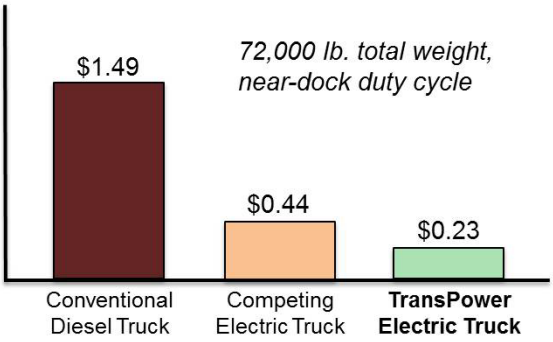

Figure 2: Energy Cost per mile - Class 8 On-Road truck

Benefits

The actual benefits of the ZECT project compare favorably with the benefits anticipated at the project's start. The technology can clearly reduce air pollutants while helping to address global warming because it offers a zero-emission solution for goods movement, one of the leading sources of criteria pollutants and carbon emissions.

Project Costs

The total cost of the ZECT project was approximately $5.1 million, of which the SCAQMD's funding contribution was just over $1.5 million, including $375,000 from the Clean Fuels Fund. These costs exceeded initial estimates due to expansion of the fleet from four to seven trucks and more intensive technology development.

Commercialization and Applications

Evidence is mounting that electrification of Class 8 trucks has great commercial potential, driven by reductions in battery costs and the market entry of major players such as Tesla and Cummins. Two months after the conclusion of the ZECT project, major OEM supplier Meritor made a significant investment in TransPower. The potential size of the U.S. electric Class 8 truck market is in the tens of thousands of trucks per year, and if long-haul trucks can eventually be addressed, as some believe, hundreds of thousands of trucks per year.

SCAQMD Contract #14224 **February 2017**

Develop and Demonstrate Long Range All-Electric Transit Bus

Contractor
Complete Coach Works (CCW)

Cosponsors
EV Grid
Denso
South Coast Air Quality Management District

Project Officer
Brian Choe

Background
Electrification of the current US transit is seen as a method of reducing one of the large contributors of greenhouse gas emissions in urban areas. Through the efforts in this project to further the technology in targeted areas, Complete Coach Works (CCW) hopes to expand the overall effectiveness of its all-electric transit busses.

By increasing the energy efficiency and improving the overall range of the bus, CCW gets closer to developing a product that can rival existing internal combustion engine vehicles.

Project Objective
Electric buses are transforming the transit industry. This project developed and deployed a third generation all-electric transit bus, increasing the range on a single charge, reducing the vehicle curb weight, and improving the vehicle efficiency. The bus will deploy an advanced high energy density battery to reduce the battery pack weight and improve the vehicle range from 120 to 150 miles.

Technology Description
In order to improve the overall efficiency of the existing all-electric transit bus, CCW targeted six specific areas; the propulsion, HVAC, auxiliary and lighting systems as well as focusing on weight reduction and low rolling resistance tires.

Propulsion System: Installing a 130 kW high efficiency, high power, liquid cooled drive system which improved the acceleration and speed performance of the electric bus. The new drive system also significantly improved the regenerative braking performance allowing longer range on a single charge.

HVAC System: Using direct DC 300V system instead of 240V AC system eliminated the DC to AC conversion requirement which in turn eliminated energy losses associated with this conversion.

Auxiliary Systems: Using 220V DC auxiliary systems such as power steering pump and air compressor improved the efficiency and performance of these systems.

Weight Reduction: Using higher energy density batteries and using light weight battery packaging is the key for achieving the balance between the range and the vehicle weight. After careful analysis and engineering design, CCW selected lithium ion NMC batteries. The new design batteries have almost twice the energy density of lithium iron phosphate batteries currently used.

Lighting System: Using advanced low power LED systems for interior and exterior lighting improved the rider experience and conserved energy.

Low Rolling Resistance Tires: Tire rolling resistance is a major aspect of the vehicle range. As the transit bus operates in the stop-and-go driving pattern, the average speed is less than 15 MPH. At these speed levels, road drag is higher than aerodynamic drag. CCW addressed this issue by using low rolling resistance tires, enhancing the range on a single charge and improving the energy efficiency of the vehicle.

Status
Complete Coach Works has completed the SCAQMD sponsored demonstration project for an all-electric repower package exclusively designed

for the transportation industry in February 2017. CCW has successfully operated from coast to coast with the transit bus, promoting CCW's electric bus conversion technology to various transit agencies, including Orange County Transportation Authority in Southern California.

Results

Through this project, CCW has been able to demonstrate an operating range of more than 150 miles on a single charge on this unit. Depending on the driver and environmental conditions, the goal of between 120-150 miles on a single charge is achievable.

Table 1: Comparison of Gen 2 and Gen 3 Buses

Description	*Gen 2 Bus*	*As Built Gen 3 Bus*
Launch Date	May 2013	Aug 2015
Bus Chassis	Low Floor 40 Foot	Gillig Low Floor 40 Foot
Battery Pack Size	242 KWh	311 KWh
Battery Chemistry	Lithium Iron Phosphate	Lithium ion NMC
BMS System	Voltage and temp monitoring	Voltage and temp monitoring with optical communication
Battery System Weight	5,900 lbs	3,800 lbs
Motor peak kW rating	150 kW	150 kW
Maximum Motor torque	2000 NM	2500 NM
On Board Charger	40 kW	50 kW
Charging input	480V	480V /208V

Benefits

Through significant weight reductions and efficiency gains wherever possible, CCW was able to increase the operating range for the Gen 3 Bus in an effort to reach comparable ranges with a conventional engine bus. It still needs further improvement, but CCW has shown that as the technology evolves, it is getting closer to provide sufficient ranges with these electric buses in commercial applications.

There are more than 4,000 transit buses operating in Southern California. If most of these units can be replaced with all-electric zero emission buses, a significant reduction in air pollution as well as greenhouse gases as co-benefit can be achieved for the region.

Project Costs

Total project cost was $1,039,649 and SCAQMD funded $395,000 with CCW cost sharing the remaining $644,649.

Commercialization and Applications

Demonstration projects help identify improvements in efficiencies around the climate in which the buses operate. For instance, a bus that operates perfectly in Palm Springs, California in the winter and summer time may not represent the same performance that will be expected in Central Washington. As CCW learns and identifies the expectations of agencies across the country, CCW can continue to fine tune its system. It will also continue to improve the vehicle efficiency by applying lessons learned from the past and on-going demonstrations.

As can be expected, cost essentially revolves around volume. Typically, the greater the volume, the more that the cost can be driven down. Cost effectiveness however comes with experience. CCW has had a steady stream of orders and continues to identify areas of improvement, while maintaining a cost parameter which is still about 40% less than what an agency can buy a new zero emission bus.

The North American Bus Market is roughly 6,500 buses sold per year, and Complete Coach Works' Zero Emission Propulsion System (ZEPS) is now commercially available. With that said, remanufactured vehicles do not fit every agencies business model or replacement cycle. As budget concerns loom with the new administration, agencies everywhere are looking for a more cost effective way to operate its fleets, and this is where CCW can fill a niche. The numbers are hard to predict, but CCW is in full force making transit authorities across the country aware of the electric repower option. On average a CCW ZEPS bus is on par with the cost of a new diesel product, so CCW is confident that agencies that would want to adopt electric buses will be able to do so.

SCAQMD Contract #07246 **June 2017**

Purchase and Install New LNG Storage Tank at Long Beach LNG Refueling Station

Contractor

USA Waste of California Inc., a subsidiary of Waste Management

Cosponsors

Waste Management
South Coast Air Quality Management District

Project Officer

Larry Watkins/Phil Barroca

Background

Waste Management (WM) owns and maintains a facility for waste hauling trucks located at 1970 E. 213th Street in Long Beach, CA 90810. WM is dedicated to doing business in sustainable ways possible, as well as offering its customers more ways to live green via the air quality benefits of natural gas heavy duty vehicles. Consequently, of the nearly 1,000 vehicles operating in WM's Los Angeles metropolitan territory, almost half are natural gas vehicles. In fact, WM has one of the largest fleets of heavy-duty natural gas trucks in North America. To fuel this natural gas fleet and to provide limited access to other public and private fleets, WM planned for the installation of an additional above-ground LNG 16,000 gallon storage tank at its Long Beach facility. WM applied for and received $200,000 co-funding from the SCAQMD as cost-share for the installation of the storage tank as well as related work for site improvements.

Project Objective

WM's objective was to add approximately 16,000 gallons of additional LNG storage capacity to an existing 16,000 gallons for a total capacity of approximately 32,000 gallons at its existing limited-access LNG fueling station in Long Beach. Proposed related work would include site improvements and process piping and controls related to the added storage capacity. Installation also would include services to survey, cut, saw and remove asphalt, change grade and install a new concrete pad in the fueling area.

The purpose of the project was to reduce emissions from heavy-duty refuse collection vehicles by expanding existing infrastructure to fuel extremely low-emission natural gas vehicles, as well as to provide the infrastructure needed in order to make alternative fuels like natural gas a commercially viable and preferable fueling option. WM would operate the expanded LNG station at its Long Beach facility.

Figure 1: LNG Tank Installation

Technology Description

Equipment to be installed includes one additional above-ground storage tank with a capacity of approximately 16,000 gallons, an offload pump/transfer pump and all associated civil work, and a 50 SCFM vapor compressor with associated hardware. All equipment meets AGA, ANSI, API, ASME, ASTM, NEC, NFPA, OSHA and SAE requirements.

Status

WM chose Northstar LNG as its contractor to procure and install the equipment including the additional LNG tank. The new station became operational in June 2012. No significant problems were encountered during the construction of the project. Waste Management will operate the expanded station for a minimum of five years and continue reporting to the SCAQMD during that period, as required under this contract.

Results

Now that the additional LNG storage installation and related work is complete, the station can adequately fuel its natural gas fleet plus offer limited access to other public and private fleets. The availability of natural gas fueling at the expanded station will result in cost savings due to the lower cost of natural gas as a fuel coupled with the air quality benefits achieved by displacing diesel fuel.

WM exceeded SCAQMD's required throughput of 1,000,000 DGE by the end of the third full year of operation. By the end of the full five years of reporting, cumulative DGE was 1,450,655 annually.

Table 1: Five-Year Fuel Throughput Snapshot

Period	WM LNG Usage	Third-Party LNG Usage
July 2012-June 2013	1,032,187	222,610
July 2013-June 2014	1,031,451	190,068
July 2014-June 2015	1,143,306	177,696
July 2015-June 2016	1,184,761	276,158
July 2017-June 2017	1,191,766	258,889
Total	**5,583,471**	**1,125,421**

Benefits

Natural gas (NG) is a clean, safe and abundant fuel that is domestically produced, with 99 percent of NG used in the U.S. coming from North America. The successful installation of this additional storage tank will provide increased fueling capacity to fuel natural gas vehicles operated by WM and other public and private fleets. Additionally, WM will continue to expand its natural gas fleet in Southern California in order to replace diesel fuel use in its operations.

In addition to cost savings realized with lower costs of natural gas (costing less per energy unit than diesel), natural gas contains less carbon than other fossil fuel and thus produces lower CO_2 and GHG emissions annually. In fact, natural gas vehicles produce 20-30 percent less GHG emissions than comparable diesel vehicles.

Project Costs

The anticipated cost of the tank installation and related site improvements was $440,000. Final project costs, however, were $822,604. While the $440,000 budget covered the cost of equipment, the additional costs over that amount included further site improvements that were necessary in order for WM to install the additional equipment. Specifically, the bulk of the additional costs were the result of installing the offload pump and all associated civil improvements.

Commercialization and Applications

This project will provide the additional infrastructure needed in order to make alternative fuels like natural gas a commercially available and preferable fueling option. Commercial fleet drivers and owners of LNG-equipped vehicles can now fuel at WM's newly upgraded Long Beach station.

Figure 2: Rear View of Tank Installation and New Equipment and Components

Additionally, public and private fleets may consider switching to natural gas as additional infrastructure is available, due to both the environmental and cost-savings benefits. This project is also beneficial to those vehicles subject to Rule 1193, which requires public and private solid waste collection fleets having exclusive contracts with public entities and greater than 15 trucks to purchase or replace existing vehicles with alternative fuel vehicles.

SCAQMD Contract #08098 **April 2017**

Purchase and Install New CNG Fueling Station

Contractor
Redlands Unified School District (RUSD)

Cosponsor
South Coast Air Quality Management District

Project Officer
Larry Watkins/Phil Barroca

Background
In 2003, the Redlands Unified School District (RUSD) initiated participation in the SCAQMD's Lower-Emission School Bus Replacement Program, desiring to replace its fleet of older diesel-powered school buses with alternative fueled vehicles. The first CNG-powered school buses acquired by the RUSD were fueled at the City of Redlands transportation yard. As additional CNG-powered school buses were acquired, the RUSD realized its fiduciary responsibility required installation of a permanent on-site time-fill CNG fueling facility. The RUSD applied for and received funding from the SCAQMD under its Clean Fuels Program to construct a CNG fueling station. At that time the RUSD had 11 CNG school buses in its fleet, with plans to add at least one additional CNG bus to its fleet every year.

Project Objective
The objective of this project was to construct a combination slow-fill and buffered fast-fill natural gas vehicle refueling facility for the RUSD to refuel its natural gas school buses on-site, both to meet present and projected future needs. The station would be located at 955 E. Citrus Ave. in Redlands, CA 92374. This objective was to be accomplished in two phases. The first phase, funded primarily by the SCAQMD through its Lower-Emission School Bus Replacement Program using AB 923 funds, was to install fueling posts and a temporary slow-fill fueling station. The second phase, primarily funded under this contract award, consisted of three parts:

1) electrical upgrades of the transportation facility;
2) installation of a permanent combination slow-fill and buffered fast-fill natural gas station; and
3) additional infrastructure improvements required by the City of Redlands.

Technology Description
The new station would be comprised of a compressor pad to mount equipment (east side of existing garage), two 100 SCFM Greenfield skid-mounted compressors, gas conditioning equipment, controls and all ancillary equipment, two 33.5 cubic feet CNG storage spheres, 9 new and 13 upgraded time-fill fueling posts, one buffered fast-fill dispenser, and installation of safety features including emergency shutdown devices. Subsequently, RUSD determined electrical upgrades would be required to meet electrical needs of the new station.

Figure 1: Skid-Mounted Compressors and CNG Storage Spheres

Status
The RUSD hired a consultant to develop station bid specifications. The job was publicly bid, with Allsup Corp. eventually awarded the contract in March 2010 to build the facility and FBA Engineering to design electrical upgrades for installation by Beaumont Electric. During preliminary construction, the City of Redlands moved to impose a Conditional Use Permit (CUP) process on the job, requiring the RUSD to submit construction documents for review.

While the RUSD was initially reluctant to accept the CUP because it would delay the work and increase costs, after considerable discussion, the RUSD agreed and contracted with Epic Engineering to assist. Construction plans as well as civil drawings were submitted for review. It took one year from the time the City of Redlands requested the RUSD submit a CUP application to the City issuing the CUP.

The City of Redlands, as a condition of approval, required the school district to construct curbing and sidewalks along Citrus Ave. and new drive approaches (ADA-compliant), as well as planting fast-growing vines along the exterior fence. Finally, the school district was required to grant the City unrestricted access to a storm drain which traverses the property. Phase II including the permanent combination station was completed in mid-February with RUSD Board of Education project approval on April 24, 2012. Within one year of the new station going online, the RUSD had added five new CNG school buses to its fleet, displacing five diesel school buses.

Figure 2: Bus Fueling with Slow-Fill Nozzle

This contract ended in April 2017, after RUSD provided five years of annual reporting on throughput and station status.

Table 1: Throughput for Five-Year Snapshot

Period	Throughput (Therms)
Mar 2012-Feb 2013	58,593
Mar 2013-Feb 2014	52,960
Mar 2014-Feb 2015	99,079
Mar 2015-Feb 2016	107,210
Feb 2016-Mar 2017	107,210

Results

For the first 11 months of operation, from February to December 2012, a total of 48,829 CCFs (hundred cubic feet) were consumed. Using a conversion formula of 1.2119205298 CCFs per gallon (U.S.) of gasoline, the CNG station saved 42,290 gallons of diesel fuel. In terms of NO_x and PM emissions, 5.1278 tons of NO_x were taken out of the air and PM has been reduced as well. These reductions will increase as RUSD replaces more of its diesel and gasoline school buses with CNG-fueled school buses.

Indeed, at the conclusion of this contract, the RUSD's fleet of 74 buses now comprises: Propane-6; CNG-33; Gasoline-12; and Diesel-23. And in 2017, RUSD added three dual-nozzle timefill posts to enable fueling of six more buses.

Benefits

In addition to the air quality benefits achieved (e.g., reduced NO_x and PM emissions) by switching from diesel to natural gas, construction of the fueling facility has allowed the RUSD's Transportation Services to significantly cut operational costs. In addition to a surcharge added to the fuel cost by the City of Redlands shortly after construction, the department was scheduling approximately 1,400 additional hours annually to fuel at the City's transportation yard. Within one year of station construction, fuel and labor cost savings to the school district equaled $35,000 annually.

Project Costs

Projected bid costs were anticipated at $657,918, including $26,103 for electrical work. Actual project costs were as follows:

Table 2: Actual Project Costs

Task	Cost
Development of bid specifications	$12,665
Electrical upgrades to the Transportation Facility	$37,755
Installation of slow-fill and buffered fast-fill NGV refueling station	$673,297
Facility upgrades imposed by the City of Redlands Conditional Use Permit	$98,186
TOTAL STATION COST	**$821,903**

Of this $821,903, the SCAQMD funded Phase II under this contract award in the amount of $525,000, with an additional $14,000 through the Lower-Emission School Bus Program. The RUSD contributed $282,903.

Commercialization and Applications

Of the 23 diesel-powered school buses still remaining in RUSD's fleet, 11 were manufactured prior to 1994. RUSD, however, recently applied for funding through SCAQMD's Lower-Emission School Bus Replacement Program to replace all 11 with new CNG-fueled school buses. Construction of the permanent on-site station allowed for the conversion of RUSD's fleet to alternative fuel and continues to reap benefits to the school district.

SCAQMD Contract #12135 **November 2017**

Upgrade CNG Fueling Station

Contractor

Placentia-Yorba Linda Unified School District (PYLUSD)

Cosponsors

Southern California Gas Company (SoCalGas)
South Coast Air Quality Management District

Project Officer

Larry Watkins/Phil Barroca

Background

Following the enactment in 2001 of SCAQMD's Rule 1195 – Clean On-Road School Busses, which requires school districts with 15 or more buses in their fleet to purchase alternative-fueled buses when adding or replacing buses in their fleet, Placentia-Yorba Linda Unified School District (PYLUSD) has been committed to achieving the environmental benefits available by transitioning to alternative-fueled school buses. However, at that time, of the 82 buses in the District's fleet, only six were eligible for replacement under the SCAQMD's Lower-Emission School Bus Replacement Program. Prior to the purchase of these six CNG buses, PYLUSD's fleet was fueled exclusively by diesel and unleaded gasoline.

In addition to assisting PYLUSD with the purchase of the six CNG-fueled school buses, the SCAQMD provided funding for a slow-fill fueling system which was installed at the district bus yard. Unfortunately, the fueling system, manufactured by Fuelmaker which later went bankrupt, barely met district needs and irreparably broke down in January 2010. This required PYLUSD to travel up to 40 miles per day to off-site fueling facilities. Furthermore, the capacity of the existing CNG compressor had limited the school district to the six existing CNG buses.

Project Objective

The primary objective of this project was to replace the existing natural gas compressor with a larger capacity compressor, enabling reliable on-site refueling as well as the capacity to enlarge PYLUSD's natural gas fleet. The project would also increase electrical supply and gas flow and add two more slow-fill posts to the existing four slow-fill posts. PYLUSD also wanted to ensure that parts would be available for future repairs from a variety of sources.

Technology Description

By upgrading compressor capacity from 8 SCFM to 25 SCFM, additional CNG-fueled vehicles could be added to the PYLUSD's fleet, displacing even more diesel-fueled vehicles from operation. The compressor installed was a reconditioned Bauer/P500 air-cooled high pressure unit at 3600 psi. New electrical equipment included a dedicated circuit (480 volt/3 phase/40 amp) coming from the main transformer.

Figure 1: PYLUSD Bauer/P500 Compressor

Status

PYLUSD initially hired Environmental Vehicle Services to determine the design output required to reliably fuel its existing six CNG buses yet have the capacity for growth in its natural gas fleet. The school district then solicited bids and awarded a contract to S-W Compressors to complete the project, which is now 100% completed. The electrical supply to the compressor pad was upgraded to 480v3 as of December 2011. The compressor unit was delivered in January 2012, with final start-up and testing in August 2012. SoCalGas also upgraded the gas meter to handle the additional throughput. Commissioning of the equipment occurred on September 4, 2012. There were no unanticipated problems during this project. Under the SCAQMD contract, the upgraded station must operate for a minimum of five years during

which annual reporting will be provided to the SCAQMD.

During the first seven months of operation, a total of 14,138 therms of natural gas were used to fuel the school district's fleet, averaging about 2,020 therms per month.

The following table shows throughput for the first five years of station operation as required under this contract:

Table 1: Throughput for Five-Year Period

Period	Therms
Sept 2012 - Aug 2013	18,505
Sept 2013 – Aug 2014	29,839
Sept 2014 – Aug 2015	35,662
Sept 2015 – Aug 2016	33,178
Sept 2016 – Aug 2017	18,531

Results

All objectives of this project were accomplished without any major problems from design phase to start-up. Additionally, the project was accomplished under budget. The overall project has successfully enabled PYLUSD to fuel its existing natural gas fleet on-site. In fact, another four CNG school buses were ordered soon after completion of the upgrade and it is anticipated that the upgraded station will be capable of fueling the new buses as well. As of the conclusion of this contract term, PYLUSD has 11 natural gas vehicles in its fleet.

Benefits

By re-establishing on-site fueling for the school district's CNG-fueled school buses, the benefits are substantial. It has allowed the PYLUSD to eliminate 8,000 miles of travel annually to and from off-site fueling facilities and reduced fueling costs because off-site NG stations were not passing on the 50 cent per gallon federal tax rebate plus adding a price markup as well. Combined, it is estimated this will result in a cost savings of $40,000 annually to PYLUSD.

The air quality benefits are also substantial. One study concluded CNG-fueled trucks produce 75% less CO, 49% less NO_x and 95% less PM than comparable diesel trucks. In such a heavily trafficked community, continuing this level of pollution was not a viable option for the school district. The cleaner NG school buses also provide a co-benefit in GHG emission reductions.

Project Costs

PLYUSD anticipated up to $60,000 in expenses for the replacement of its CNG compressor and related work. However, final costs came in under budget as follows:

Table 2: Actual Project Costs

Equipment	Cost
Electrical Upgrades	$4,305
Reconditioned Compressor (including labor)	$50,000
Total Project Costs	**$54,305**

The SCAQMD paid 100% of the project costs with PYLUSD simply providing in-kind costs to administer the project. As noted, however, SoCalGas provided in-kind services by upgrading the gas meter to handle higher output.

Commercialization and Applications

PYLUSD is located in the north east corridor of Orange County where there is significant traffic around the intersections of the 91, 55 and 57 freeways. The school district's school bus fleet is located at 1301 E. Orangethorpe Avenue, Placentia, CA 92870. PYLUSD owns the fueling station and will be responsible for its maintenance and operation. Maintenance and support have been contracted out and the new system has exceeded the school district's performance expectations. The upgraded on-site fueling station is benefitting the school district, its students and the surrounding community.

SCAQMD Contract #14311 **December 2017**

Construct CNG Fueling Station in Murrieta

Contractor

Southern California Gas Company (SoCalGas)

Cosponsors

California Energy Commission (CEC)
Mobile Source Air Pollution Reduction Review Committee (MSRC)
South Coast Air Quality Management District

Project Officer

Phil Barroca

Background

The widespread use of alternative fuel powered vehicles in the South Coast air basin play an important role in helping this region meet national ambient air quality standards for fine particulates and ozone. To support the local deployment and expansion of alternative fuel vehicles, the SCAQMD has leveraged its funds with other funding sources and fleet operators to increase the network of both public and private alternative fueling stations within the South Coast air basin. Under this project, the SCAQMD was awarded a grant from the CEC under AB 118 Program PON-11-602 to install a new public/private CNG station with the Southern California Gas Company (SoCalGas) located at their facility in Murrieta, CA.

Project Objective

This project with SoCalGas cost-shares the purchase of equipment for the installation and upgrade of a CNG fueling station located at their facility at 41376 Guava St. Murrieta, CA 92562. This station is positioned near the junction of the I-15 and I-215 freeways and is projected to provide greater accessibility to CNG fuel, which in turn will help foster greater deployment and expansion of CNG vehicles in this region. The station will serve the needs of SoCalGas's growing natural gas-powered vehicle fleet as well as the public and surrounding fleets. The station design is intended to easily accommodate large trucks and buses. The publicly accessible dispensers will be open 24 hours/day, seven days/week. The station hosts two dual-hose fast-fill dispensers and significant on-site storage will provide the 24/7 public access side of this facility with improved filling speed and increased reliability. The facility will also include 10 time-fill posts that can fill 36 vehicles concurrently.

Figure 1: Public Access Fast-Fill

Technology Description

This station includes a 125 horsepower, 500 standard cubic feet (scf) per minute compressor, two fast-fill dispensers and ten time-fill posts. Eight of the time-fill posts are equipped with four hoses and the other two posts have two hoses for a total of 36 hoses to provide simultaneous overnight fueling. The station includes a 34,000 scf compressed gas storage system. The public access portion of the station is located outside the SCG facility gate and consists of a new fueling island with two fast-fill dispensers each with two nozzles, rated at a minimum of five gasoline gallon equivalents (GGEs) per minute, a universal card reader and the capacity to add a second compressor in the future.

Status

The SoCalGas Murrieta CNG station was successfully commissioned and opened for business in September 2015. Throughput during Calendar Year 2016 was 53,767 GGE. Throughput for Calendar Year 2017 increased to 176,000 GGE, with public fueling accounting for 90% of total annual throughput. Assuming a 50:50 gasoline-diesel displacement and 176,000

GGE per year of CNG, the estimated GHG reductions are 400 metric tons/yr.[1]

Results

The primary goal of this project was to increase availability of CNG infrastructure, to enhance California's energy independence by reducing petroleum-based transportation fuel consumption, and to reduce criteria and toxic air pollutants and greenhouse gas emissions. The annual throughput projected in the proposal for this project was 210,000 GGE per year at full utilization (after three years). Original annual throughput projections were estimated based on the following key assumptions: the Riverside Transit Agency (RTA) indicated their intention to fuel ten transit buses at this station and SoCalGas had vehicle procurement plans to place 40 NGVs at the Murrieta base by 2015. From the time the original proposal was prepared and submitted (early 2012) to the time the station was deemed operational in late 2015, RTA built its own station in Hemet. Located 23 miles East Northeast of the Murrieta station. Furthermore, the growth of the SoCalGas fleet was curtailed because of the delays in station commissioning and a shift in corporate plans. With full commissioning, SoCalGas domiciles 16 NGVs and reported 176,000 GGE throughput in 2017. However, two local school districts use this facility as a back-up to their own fueling stations: Temecula Valley USD has a slow-fill, and Murrieta Valley USD has both slow and fast-fill operations. Murrieta Valley and SoCalGas have a Mutual Aid agreement for emergency fueling.

Figure 2: Time-fill Posts

Figure 3: Public Signage

Benefits

This CNG station project was commissioned in September 2015 and has been operating successfully and continuously for more than two years. The original projections placed throughput at 210,000 GGE/year. The annual throughput for 2017 totaled 176,000 GGE which equates to approximately 400 metric tons of CO_2e of GHG reduction. Although the station is not achieving the projected throughput yet, there is significant public usage. Most importantly, this publically accessible CNG station helps fill a critical gap in CNG fueling infrastructure as it is now the southern-most public access CNG fuel station in Riverside County since the Downs Energy-Temecula LCNG station closed business in 2017. Indeed, it is the only publicly accessible station along 60 miles of the I-15 corridor between Corona and San Marcos, CA.

Project Costs

Original project estimates were $878,200; final project costs, $1.6 million. The higher costs were due in part to the prolonged timeframe between project start and finish as well as the decision to add a second dispenser, additional infrastructure required by the City of Murrieta, and upgrading the facility to accommodate an additional compressor in the future. The SCAQMD administered the project, providing $217,000 in CEC pass-through funds, and cost-share of $150,000 was also provided by the MSRC.

Commercialization and Applications

The design and convenience of the new Murrieta station is expected to appeal to consumers based on location along an important transportation route in Riverside County, and its ability to handle large trucks and buses with ease. The facility is expected to provide heavy-duty vehicle operators with a great experience at the pump where they can fill very quickly, using a large enough compressor and making sure the station has enough space so that the large vehicles can easily maneuver. Other features that help provide an improved experience for customers include ergonomic fuel dispensing nozzles that swivel easily to attach to the vehicle, drought-tolerant landscaping and a well-lit canopy that covers the fueling dispensers day or night, rain or shine. Additionally, the station's monument sign clearly shows the price so people can see from the road how relatively inexpensive the fuel is relative to gasoline or diesel.

[1] ***Appendix D. Quantification Methodology for Determining Emission Reductions and Cost Effectiveness****, Low Carbon Transportation and Fuels Investments and the Air Quality Improvement Program, CARB May, 19 2017.*

SCAQMD Contract #10722 **September 2017**

Re-Establish Testing Facility and Quantify PM Emission Reductions from Charbroiling Operations

Contractor

University of California, Riverside, Center for Environmental Research and Technology (CE-CERT)

Cosponsors

U.S. Environmental Protection Agency
South Coast Air Quality Management District

Project Officer

Michael Laybourn

Background

The South Coast Air Quality Management District (SCAQMD) is classified as "serious" non-attainment area for $PM_{2.5}$. Studies have shown that PM emissions from the under-fired charbroiler process are primarily in the submicron range (greater than 85% by mass <1.0µm).

Recent Air Quality Management Plans (AQMPs) have included control measures intended to reduce $PM_{2.5}$ emissions from under-fired charbroilers at commercial restaurants. CE-CERT previously developed a testing protocol for chain-driven charbroilers and was selected to conduct a preliminary screening analysis to determine the effectiveness of several under-fired charbroiler control devices in reducing PM emissions.

Project Objective

The main project objective was to re-establish the testing facility at CE-CERT and provide additional funds to help defray testing costs for control device manufacturers. After completing the necessary test kitchen upgrades, CE-CERT evaluated promising commercial or near-commercial control technologies using established procedures. It should be noted that this effort represented initial screening tests of the control devices and more detailed "protocol" testing would be necessary to further document control device effectiveness in reducing PM emissions. The re-established test kitchen has also been used for subsequent CE-CERT testing with additional funds provided by SCAQMD, Bay Area AQMD and U.S. EPA.

Figure 1: CE-CERT Test Kitchen Facility

Technology Description

A total of three emissions control technologies were selected for initial testing. The first technology, InnovaTech, was an aerosol grease removal prototype that is based on a patented technology for particle (solid or liquid) separation from an incoming flow stream via Boundary Layer Momentum Transfer (BLMT) theory.

Figure 2: InnovaTech NovaMist™ Unit

The second technology, OdorStop™2000C developed by Green Kitchen Designs, featured three stages of progressively more efficient

filtration with additional screening tests conducted on modified systems.

The third technology was an electrostatic precipitator (ESP) developed by Airquest International, Inc. The technology removes particles, which range in size from 0.01 micron to 10 microns, with high efficiency.

Status

This program has been completed. The test kitchen was re-established and screening tests on three control technologies was performed according to the contract requirements. Final reports have been received. No anticipated problems were encountered during the screening tests, however, the contract was extended until June 2017 to conduct additional testing using supplemental funds provided by U.S. EPA and SCAQMD.

Results

Table 1 shows results from the screening tests performed on the following control technologies; InnovaTech, Green Kitchen, and Airquest. The screening tests showed that all three technologies resulted in large $PM_{2.5}$ reductions compared to baseline testing (i.e., without control technology). These reductions ranged from 59.6% to 93%.

Project results can be used in support of future efforts to reduce PM emissions from under-fired charbroilers. As noted, these results are from screening tests which are based on real-time air monitoring equipment. Protocol evaluations based on U.S. EPA method 5.1 and SCAQMD testing procedures are necessary to further evaluate control device effectiveness.

Table 1: Screening test results for PM emissions

	PM (mg/m3)	% PM Reduced
InnovaTech Screening Tests		
Baseline	250.5	
InnovaTech	101.2	59.60%
Green Kitchen Concepts Screening Tests		
Baseline 1	218.9	
HEPA Filter	18.6	91.5%
99% Filter	15.8	92.8%
95% Filter	26.3	88.0%
Baseline 2	581.5	
99% Filter	157.3	>72.9%
95% Filter w/fog	67.7	>88.3%
99% Filter w/PCO double pass	100.1	>82.8%
Airquest Screening Tests		
Baseline	161.9	
Airquest Single Pass	17.1	89.40%

Benefits

This program has helped to identify promising control technologies to reduce $PM_{2.5}$ emissions from under-fired charbroilers. This study will also support the efforts of other $PM_{2.5}$ non-attainment areas, such as the San Joaquin Valley, in efforts to identify cost-effective control technologies for this source category.

Project Costs

The total cost of this project was $321,700 with $60,000 funded by Clean Fuels. Approximately half of SCAQMD Clean Fuels project costs were allocated to test kitchen re-establishment and the other half to fund control device testing. Total project funding is summarized in the table below:

Table 2: Actual Project Costs

Cosponsor	Amount
U.S. EPA	$45,700
SCAQMD	
Fund 31-Clean Fuels	$60,000
Rule 1309.1 Priority Reserve Fund	$216,000
Total	**$321,700**

Commercialization and Applications

Testing conducted by CE-CERT and demonstration projects conducted in the San Joaquin Valley show control technology for under-fired charbroilers has continued to develop over the past few years. However, identification of affordable, commercially-available $PM_{2.5}$ control technologies, especially for retrofit projects at existing restaurants, remains elusive. The 2016 AQMP adopted by the SCAQMD Governing Board includes a contingency control measure to develop a regulation intended to reduce $PM_{2.5}$ emissions from under-fired charbroilers which could be implemented if necessary to meet Clean Air Act requirements, provided appropriate control devices can be identified. Results from this and other studies could be used in support of any potential rule development effort.

SCAQMD Contract #14162 **June 2017**

Utilize Fleet DNA Approach and Capabilities to Provide Vehicle Vocational Analysis within SCAQMD

Contractor
National Renewable Energy Laboratory (NREL)

Cosponsors
U. S. Department of Energy
South Coast Air Quality Management District

Project Officer
David Coel/Phil Barroca

Background
With highway transportation responsible for over half of the oil demand in the U.S., medium- and heavy-duty vehicles (MDVs and HDVs) consume a significant portion of on-road fuels annually and consequently contribute significantly to regional air pollution, particularly in the high vehicle populated and goods movement area of Southern California's South Coast basin. OEMs, commercial fleets and research organizations have identified a lack of usage data for MDVs and HDVs as a barrier to intelligent vehicle design and deployment. Compiling and analyzing in-use vehicle data helps identify average and extreme use patterns for various types of vehicle vocations as well as identifying similar use patterns across dissimilar vocations, potentially leading to more optimized and efficient designs that are appropriate for multiple uses.

The National Renewable Energy Laboratory (NREL) and U.S. Department of Energy (DOE) have been conducting research, development and demonstration projects to facilitate the deployment of advanced vehicle technology and alternative fuels into the marketplace in order to reduce petroleum use and enhance the reduction of mobile source emissions in California and the U.S. In a joint collaboration, NREL and the SCAQMD agreed to conduct a project to collect and analyze data on MDVs and HDVs in the South Coast air basin to analyze usage characteristics and develop an approach which could enable the SCAQMD to better understand vocational differences and associated vehicle performance.

Project Objective
The project objective was to acquire and analyze field data from MDVs and HDVs operating in the SCAQMD. NREL was to identify and work with local and regional commercial fleet operators and collect in-use data using NREL supplied hardware and personnel. The data collected is to be processed through NREL's Drive-Cycle Rapid Investigation, Visualization, and Evaluation (DRIVE) analysis software tool to add to the FleetDNA database that houses performance characteristics of multiple sets of vehicles operating throughout the country. SCAQMD data will be analyzed, compared, and reported back to the SCAQMD. Additional analysis will utilize NREL's Future Automotive Systems Technology Simulator (FASTSim) to explore and identify powertrain options and technologies that match the observed drive/duty cycles.

Figure 1: DRIVE™ Analysis Tool

Figure 2: FASTSim

Technology Description
NREL performed an assessment to categorize the medium- and heavy-duty (Class 3–8) on-road commercial vehicle vocations predominant in the SCAQMD. The size and age of the vehicle population was ascertained by acquiring and mining data from the R.L. POLK MDV and HDV registration database. Estimated annual vehicle miles travelled and estimated fuel usage were ascertained by leveraging the U.S. DOT's Vehicle In-Use Survey (VIUS) database, the Oak Ridge National Laboratory's Transportation Energy Data Book and CARB's EMFAC model. NO_x emissions from the various vehicle types, weight classes and model years were calculated by an NREL developed method that relates NO_x emissions from different engine emission certification levels to fuel economy. Data collected and developed were

inputted into NREL's Scenario Evaluation, Regionalization & Analysis (SERA) model to estimate the contribution of each vocational category to the total emissions inventory in the SCAQMD.

Status

Using fleets recommended by SCAQMD, from May to August 2015, NREL deployed data loggers to collect data from 60 Class 8 drayage and transfer vehicles within the SCAQMD. NREL also leveraged recent data logging activities within these vocations that took place within SCAQMD boundaries including data collected by NREL under the California Hybrid Truck and Bus Voucher Incentive Project (HVIP) and phase 1 of the DOE-funded Zero Emission Cargo Transport (ZECT 1) Project. In the HVIP, NREL collected 1 hertz (defined as one cycle per second) vehicle data between October 2012 and September 2013 from 62 delivery vehicles for 2 to 3 weeks, each including model year 2007-2013 vehicles from UPS, Aramark and FedEx. Data from the ZECT 1 project included data logging of drayage service from the TTSI fleet, including 149 days of conventional baseline vehicle operation on 2 trucks and 26 days of operation of the TransPower electrified drayage trucks.

Results

NREL modeled the effects of rolling resistance, aerodynamic drag, vehicle mass reduction, CNG engines and vehicle electrification. Over 2,100 real-world delivery truck (Class 3-7) trips were recorded. The results show that the stop-and-go nature of delivery trucks will benefit more from mass reduction than from rolling resistance reduction or aerodynamic improvements, saving fuel from reduced mass on every acceleration. Conversely, they do not typically drive enough miles for rolling resistance improvements to have the same impact and they do not drive enough at high speeds for aerodynamic improvements to save substantial amounts of energy. When routes are within the range of EV powertrains, large savings can be realized but payback due to the cost of batteries and electric rate structure must be considered on an individual site basis. Simulations of delivery truck routes showed EVs using significantly less energy than their diesel counterparts (approx. 1.3 kWh/mile EV vs. 4.4 kWh/mile diesel) The duty cycle data showed that approximately 80% of daily driving was less than 70 miles per day, which could be accomplished with a 100 kWh battery pack. CNG, while somewhat less efficient on an energy basis, may offer fuel cost savings when natural gas prices remain below diesel without negative emissions contribution. Refueling infrastructure costs and on-board storage limitations must also be considered when considering CNG vehicles.

Over 800 real-world transfer truck (Class 8) trips were also recorded. EVs were not considered because of the long daily driving distances–90% of the daily driving was over 100 miles. Transfer trucks will benefit more from mass reduction and rolling resistance reduction than from aero-dynamic improvements. While current EV technology cannot provide the range needed, CNG engines can provide the range needed and offer possible fuel cost savings when natural gas prices remain below diesel.

Over 1,800 real-world drayage truck (Class 8) trips were recorded. Drayage trucks will benefit more from mass reduction than from rolling resistance reduction or aerodynamic improvements and mass reduction on the tractor is the aspect most under the control of the fleet operator. CNG and EV powertrains offer advantages that are completely separate from the chassis and container designs. EV powertrains are a good fit for drayage vehicles if the daily driving distance is within the range of a specific vehicle design and battery usage can be maximized. CNG vehicles also work well and can provide the range needed for the full spectrum of drayage operations and offer possible fuel cost savings for the full spectrum of routes.

Benefits

An analysis and assessment of the drive and duty cycles of various commercial vehicles can provide insights into improving vehicle energy efficiencies that in turn translate into lower emissions or less energy needs. The study also provided analyses on the alternative fuel technologies available for these vehicle vocations that could further reduce emissions from the transportation sector.

Project Costs

Project costs totaled $199,985, with SCAQMD providing $174,985 and DOE in-kind of $25,000.

Commercialization and Applications

Vehicle use data can help with intelligent vehicle design and deployment and identify average and extreme use patterns for various types of vehicle vocations or similar use patterns across dissimilar vocations which could lead to more optimized and efficient designs that are appropriate to multiple uses.

SCAQMD Contract #15623 **March 2017**

Evaluate Ozone and SOA Formation from Gasoline and Diesel Components

Contractor

University of California, Riverside, College of Engineering Center for Environmental Research and Technology (CE-CERT)

Cosponsors

South Coast Air Quality Management District

Project Officer

Naveen Berry

Background

Direct evaporation from unburned gasoline and diesel fuels is an established source of ozone and secondary organic aerosol (SOA) forming precursors. As new vehicle control technologies continue to decrease primary organic aerosol and gas-phase emissions, whole fuel evaporation becomes a more significant potential source of ambient organic aerosol. Therefore, determining the SOA forming potential of whole gasoline and diesel vapor is of significant interest. While SOA formation from some gasoline components such as aromatics have been individually studied under controlled conditions, there are only a few studies on how these complex mixtures behave in the atmosphere.

Given changes in fuel formulations over time, it is important to revisit whole gasoline as an important SOA precursor, especially in light of increased knowledge on the impact of reactivity on aerosol formation and improved atmospheric chambers and instrumentation.

Project Objective

Objective 1: Evaporative Loss Study

a. Collect gasoline and diesel fuels from local fueling stations. (Ten samples each)
b. Evaluate the evaporative emissions for select diesel fuels using a modified version of CE-CERT evaporative chamber system.
c. Measure the vapor pressure of gasoline and diesel.

Objective 2 – Ozone and SOA Study – Gasoline and Diesel

a. Perform a series of environmental chamber experiments to evaluate the ozone and SOA formation from whole gasoline and diesel in the presence of a surrogate mixture. Follow standard environmental chamber operating procedures to measure and characterize particle formation and ozone generation.
b. Conduct detailed hydrocarbon analysis for gasoline sample.
c. Modify injection method for injection of whole diesel fuel using systems developed for (low vapor pressure-volatile organic compounds) LVP-VOC injection.

Technology Description

The UCR U.S. EPA chamber consists of two ~90,000-liter Teflon® reactors located inside a 16,000 cubic foot temperature-controlled "clean room" that is continuously flushed with purified air. The clean room design is employed in order to minimize background contaminants into the reactor due to permeation or leaks. The primary light source used in this study consists of 272 115W Sylvania 350BL blacklights. The interior of the enclosure is covered with reflective aluminum panels in order to maximize the available light intensity and to attain sufficient light uniformity, which is estimated to be ±10% or better in the portion of the enclosure where the reactors are located. The reactors are attached to a semi-flexible moveable framework that allows the reactors to be emptied between experiments and reduces the volume under positive pressure control to prevent dilution due to sampling or leaks during experiments. A high-volume mixing system with Teflon® pipes and Teflon®-coated flanges is used to mix the reactors and to exchange reactants between the reactors to achieve equal concentrations when desired.

An AADCO air purification system that provides dry purified air at flow rates up to 1500 liters min-1 is used to supply the air to flush the enclosure and to flush and fill the reactors between experiments. The air is further purified by passing it through cartridges filled with Purafil® and heated Carulite 300® which is a Hopcalite®-type catalyst and also through a filter to remove particulate matter. The measured NO_x, CO, and non-methane organic concentrations in the purified air were found to be less than the detection limits of the instrumentation employed.

The chamber enclosure is located on the second floor of a two-floor laboratory building that was designed and constructed specifically to house this facility. Analytical instrumentation (except for the PM instrumentation) is located on the ground floor beneath the chamber or on the second floor immediately adjacent to the chamber enclosure. The particle sizing instrumentation is located within the enclosure to ensure sizing is conducted at the same temperature as the experiment to prevent evaporation and/or condensation during analysis.

Status

The project was completed in December 2016. The final report is on file with complete technical details of the project.

Results

The SOA formation observed from the diesel fuel was 15 times higher than that of the gasoline samples. Trends of SOA formation with aromatic content are not observed, possibly because the surrogate mixture used is normalizing the reactivity of the system whereas in the previous work the aromatics were serving as both SOA precursors and as a source of increased system reactivity. Aromatic content of the diesel fuel cannot nearly explain the SOA formation observed for diesel and therefore other precursors (e.g., intermediate VOCs or LVP-VOCs) are much more significant contributors to SOA formation than previously observed.

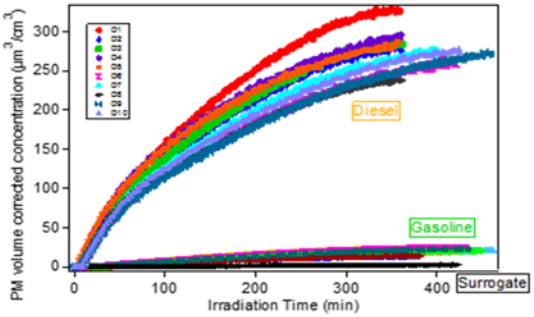

Figure 1: SOA formation from gasoline and diesel with surrogate and H_2O_2

Compared with ozone formation from the surrogate and H_2O_2 only run, the ozone formation from winter blend gasoline reduced the O_3 formed from the surrogate mixture. Similar trends were observed for diesel experiments; ozone formation from all the diesel samples was reduced with surrogate and H_2O_2. This may be attributed to larger changes in radical concentrations, NO_x loadings, etc. occurring within the environmental chamber than are expected to occur within the more complex ambient atmosphere with its more significant reservoir.

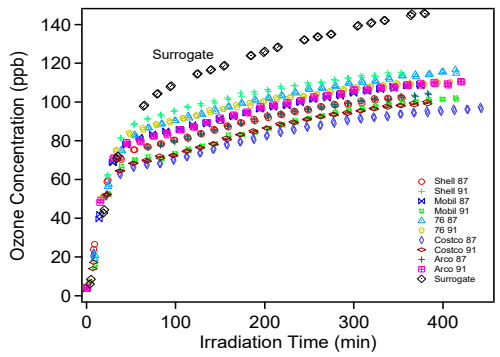

Figure 2: Ozone formation from individual winter blend gasoline with surrogate H_2O_2

The higher the NO_x concentration, the higher the ozone and SOA formed for both gasoline and diesel. This indicates that the fuels are likely acting within the environmental chamber system as a NO_x sink reducing the total reactivity of the system. Therefore, addition of greater quantities of NO_x are leading to greater consumption of SOA precursors than in systems with lower NO_x concentrations. However, in the atmosphere there are continued sources of NO_x, which allows the reactivity to be maintained. The trends here demonstrate the importance of NO_x but do not actually imply that lower NO_x levels in the atmosphere will actually lead to lower SOA formation.

The volatility for gasoline and diesel SOA decreased during the period of the experiments. Gasoline SOA was more volatile than diesel SOA. Both gasoline and diesel SOA are very hydrophobic. Compared with gasoline SOA, diesel SOA was not oxidized that much.

Benefits

The current work provides estimates of the relative SOA and ozone formation from whole evaporated gasoline and diesel fuels under reactive conditions similar to South Coast air basin needed to more accurately evaluate evaporated fuel impacts on SOA within the South Coast air basin. The work clearly demonstrates a far more significant role of non-aromatic IVOC precursors in SOA formation and provides preliminary analysis of the impacts of SOA formation from the whole fuel as NO_x loadings are reduced in the South Coast air basin.

Project Costs

The actual total project cost was $75,000.

Commercialization and Applications

The research conducted in this work provides fundamental ozone and SOA formation data from a variety of in-use diesel and gasoline fuels within the South Coast air basin. More accurate representation of the SOA formation of the whole evaporated fuel was determined by utilizing a surrogate atmospheric mixture designed for the South Coast air basin. VOC precursors beyond that of the simple monocyclic aromatics were identified as important SOA precursors suggesting the need for further evaluation of the impact of these VOCs from fuels and other sources on fine particulate pollution within the South Coast air basin. Preliminary results further suggests SOA formation dependence on atmospheric NO_x loadings that requires additional future research to best project changes in SOA formation as the South Coast air basin NO_x loadings are reduced. No new physical technology was developed for commercialization.

SCAQMD Contract #16198 **January 2017**

Study Opportunities and Benefits of Deploying Next Generation Heavy-Duty Natural Gas Vehicles Operating on Renewable Natural Gas

Contractor

Gladstein, Neandross & Associates (GNA)

Cosponsors

California Natural Gas Vehicle Partnership (CVGNP)
Pacific Gas & Electric (PG&E)
American Gas Association (AGA)
Clean Energy Fuels, Inc.
Southern California Gas Company (SoCalGas)
Agility Fuels Corporation
South Coast Air Quality Management Dstrict

Project Officer

Phil Barroca

Background

The SCAQMD, Southern California Gas Company (SoCalGas), Pacific Gas & Electric (PG&E), the American Gas Association (AGA), the California Natural Gas Vehicle Partnership (CNGVP), and Agility Fuels Corporation joined to cosponsor a white paper exploring the Opportunities and Benefits of Deploying Next Generation Heavy-Duty Natural Gas Vehicles Operating on Renewable Natural Gas (RNG). Next generation refers to the latest near-zero-emission (NZE) technology for heavy-duty vehicles (HDVs) recently certified by Cummins Westport, Inc. (CWI) to CARB's optional ultra-low NO_x standard of 0.02g/bhp-hr. The wide-scale use of NZE HDVs in the South Coast air basin would have significant air quality benefits relative to HDVs certified to the current NO_x standard (0.2g/bhp-hr). The emission benefits of NZE technology is complemented further by the use of RNG which has carbon intensity values far below conventional fuels and fossil-based natural gas resulting in significantly lower greenhouse gas (GHG) emissions.

Project Objective

The objective of this project was to prepare a major government-industry funded white paper that describes the opportunities, environmental benefits, challenges and costs associated with deploying NZE NO_x heavy-duty natural gas engines using increasing volumes of RNG. A specific objective of this study was to demonstrate how NZE engines in HDVs can help the South Coast air basin cost effectively attain federal ozone standards by key deadlines, while helping California meet aggressive State goals to reduce GHGs through the increased use of RNG to displace fossil-based conventional and natural gas fuels.

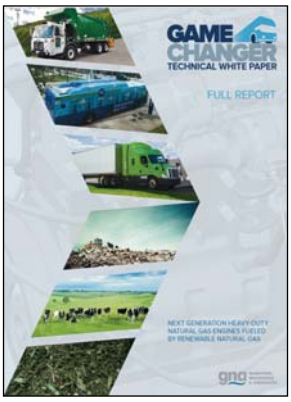

Figure 1: White paper completed in April 2016

Technology Description

In 2015, CWI introduced the world's first CARB-certified NZE heavy‑duty engine, the L9N. The L9N is an 8.9L spark-ignited natural gas-powered engine that employs a closed crankcase and larger three-way catalyst (TWC) system lowering tailpipe NO_x by more than 90% relative to the federal NO_x standard and tailpipe methane emissions by 70 percent to reduce this engine system's fuel-cycle GHG emissions and short-lived climate pollutants (SLCP). Complementing this system's lower GHG emission is the use of RNG as the engine fuel. RNG is produced from organic products such as disposed of green and food wastes that are collected in municipal refuse. These organic materials that would normally decompose and produce GHGs in a landfill are contained, converted, cleaned and compressed into CNG for use as a transportation fuel or for introduction to the natural gas pipeline system. CARB's Low Carbon Fuel Standard program (LCFS) and EPA's Renewable Fuel Standard program are designed to quantify and reduce the carbon intensity (CI) or GHGs of transportation fuels as well as the nation's dependency on petroleum-based fuels. These programs incentivize the production and use of renewable fuels through the issuance and tracking of LCFS and Renewable Identification Number (RIN) credits that can be traded in their respective markets. RNG has been identified as having some of the lowest CI values which result in higher credit value.

Status

The "Game Changer" white paper was completed in April 2016 and released at the ACT Expo 2016 conference in Long Beach. The paper has been widely cited by regulators like SCAQMD, clean transportation advocates, the heavy-duty NGV industry, providers of renewable fuels, and municipalities seeking to address environmental justice issues.

Results

With help from SCAQMD and the other project cosponsors, GNA was highly successful in widely disseminating the technical white paper. It has helped pave the way in California (and nationwide) for government clean-vehicle grant funding programs to identify new, larger streams of funding to deploy near-zero-emission heavy-duty NGVs, especially when using RNG. In sum, the paper is being used in the South Coast air basin and across the U.S. as an important tool to expand commercialization and deployment of HDVs powered by NZE natural gas engines and bring greater awareness of RNG.

Benefits

Near-zero-emission natural gas engines provide a commercially proven, broad−based and affordable strategy to immediately achieve major reductions in emissions of criteria pollutants, toxic air contaminants and GHGs from America's on-road HHDT sector. As documented in the report, the key to achieve National Ambient Air Quality Standards (NAAQS) for ozone and $PM_{2.5}$ in the South Coast air basin, and other air basins is to aggressively control NO_x from HHDTs. Analysis indicates that attaining the ozone NAAQS in the South Coast air basin will require rapid, very large NO_x reductions from HHDTs over the next five to 10 years. The report describes how heavy-duty NZE natural gas engines provide a major tool to achieve such large NO_x reductions, as rapidly and cost-effectively as possible.

Wide-scale use of RNG can provide major GHG reduction benefits. Moreover, the act of producing RNG can offer an array of localized environmental and economic benefits, including job creation, improved air quality, and a number of environmental waste stream management improvements. RNG production is a highly sustainable process via multiple pathways; various types of waste streams (that are otherwise environmental hazards requiring costly treatment or processing) are converted to energy-rich, locally-produced renewable energy sources that ultimately displace higher-pollution non-renewable fuels. This simultaneously generates significant economic value and multiple other benefits, as documented in the report.

Used together to replace conventional diesel HDVs, this fuel/engine technology can immediately and uniquely begin delivering 90 percent (or greater) reductions in NO_x emissions for the large U.S. fleet of on-road HDVs, while simultaneously proving GHG reductions of 80 percent or greater.

Project Costs

Total project costs are broken down by organization as follows:

Organization	Amount
American Gas Association	$50,000
CNGVP	$50,000
Clean Energy	$50,000
SoCal Gas	$50,000
Pacific Gas & Electric	$50,000
Agility Fuels Corporation	$10,000
SCAQMD	$50,000
Total	**$310,000**

Commercialization and Applications

Heavy-duty NGVs with NZE engines are already helping to transform America's diesel-dominated freight movement system. CWI's L9N engine is now commercially available in a broad range of HDV sectors that power freight movement and public transportation systems (transit buses, refuse haulers, and short-haul delivery trucks).

In 2018, CWI will certify and commercialize a NZE 11.9 liter natural gas powered engine, the ISX12N. This engine will expand on-road applications of NZE HDVs into HHDTs used in high-fuel-use goods movement applications, including for-hire long-haul trucking. CWI has also certified its 6.7-liter B6.7N engine to CARB's 50 percent optional low-NO_x standard (0.1 g/bhp-hr), and it is now commercially available for certain applications. Spurred on by CWI's achievement, other heavy-duty engine manufacturers are now working to certify and commercialize other near-zero-emission heavy-duty gaseous fuel engines.

Finally, production and use of RNG continues to grow in California, and across the U.S. Today, approximately 60% of the natural gas consumed in California transportation applications is RNG.

SCAQMD Contract #16254 **December 2017**

Evaluate Ozone and Secondary Aerosol Formation from Diesel Fuels

Contractor

University of California, Berkeley

Cosponsors

Gulf of Mexico Research Initiative
South Coast Air Quality Management District

Project Officer

Naveen Berry/Diana Thai

Background

Diesel vehicle exhaust and unburned diesel fuel are major sources of intermediate volatile organic compounds (IVOCs) and may contribute to the formation of urban ozone and secondary organic aerosol (SOA), which is an important component of fine particulate matter ($PM_{2.5}$). The characterization of IVOC emissions is critical in assessing ozone and SOA production rates in urban locations, such as the South Coast air basin.

Project Objective

Traditionally, laboratory measurements of IVOCs have been prohibitively difficult. For this project, novel experiments, measurements, and emissions modeling of several diesel blends under varying temperatures and wind speeds were used to determine potential ozone and SOA formation related to evaporative emissions, particularly in urban areas.

Technology Description

This project combines wind tunnel experiments with state of the art gas chromatography with mass spectrometry (GC-MS) quantification methods. These experiments and measurements verify and allow the application of a thermodynamic model of diesel evaporation that combines current knowledge of ozone and SOA formation to estimate pollutant production under varying conditions. The combination of cutting edge measurements and modeling with reliable wind tunnel experiments is a major advancement in prediction of pollutant formation from evaporation of complex mixtures containing IVOC, which include low-vapor pressure VOC.

Status

The project was completed in December 2017. Major project milestones were enhancing an existing wind tunnel apparatus to allow temperature control of the evaporating liquid. The next milestone was verifying agreement between our thermodynamic model and measurements for all 100+ species that showed significant evaporation under our experimental conditions. Finally, our model showed the importance of IVOC emissions from complex mixtures such as diesel to the formation of both ozone and SOA on timescales relevant to ambient air quality standards (8 hrs, 24 hrs). In addition to the initial goals, emissions and pollutant formation were modeled for 1 month time periods to show longer term effects.

An unanticipated problem was unreliable analysis of many diesel samples using our novel GC-MS methods. Our soft ionization source, which allows unprecedented detail in composition, did not initially provide results that were comparable from day to day. We worked extensively with the manufacturer to resolve this issue for our samples. After ensuring a sound data set for this work, several more days of intensive work revealed that we could modify the ionization voltage in the mass spectrometer to give not only reliable results but also the potential for enhanced composition information in future analyses.

Results

Key results from this work include:

1) Detailed composition of several diesel blends during evaporation experiments
2) Modeled ozone formation from evaporative emissions
3) Modeled SOA formation from evaporative emissions.

The compositions of several diesel blends were analyzed utilizing a new technique, gas chromatography with soft-electron-impact-ionization time-of-flight mass spectrometry (GC-SEI-MS), which gave unprecedented composition.

Commercially available blends had similar compositions, with about 25% aromatic content and aliphatic content that was dominated by branched, cyclic compounds. Two synthetic blends covered lower (15%) and higher (45%) aromatic content. Our model of evaporation accurately modeled the composition of all these blends during evaporation over 24 hours for all evaporation conditions spanning 1-3 m/s wind speed and 20-40˚C.

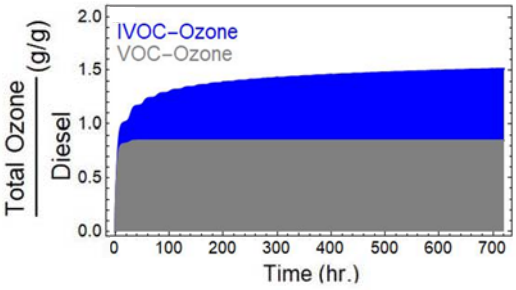

Figure 1: Ozone formation during1 month of diesel evaporation.

As illustrated in Figure 1, it is clear that IVOC are consistently an important part of ozone formation, culminating in 45% of ozone formation after 1 month of evaporation. The rest of the ozone formation is due to VOC emissions. Yields for the mixture presented here (Mobile) are also significant, ranging from 1 to 1.5 g-ozone/g-Diesel released.

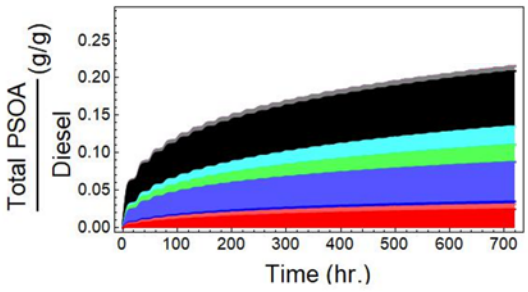

Figure 2: Potential SOA (PSOA) formation during 1 month of diesel evaporation. Aromatics are most important during the first 24 hours of evaporation.

As Figure 2 shows, for SOA the contribution of IVOC is always dominant, ranging from 55% after 24 hours to 85% after a month of evaporation. Yields for this mixture are also significant, ranging from 0.06 to 0.2 g-SOA/g-Diesel released.

The procedures and methods here require extensive characterization using GC-SEI-MS or a similar technique, which is currently not widely available. Verification of the model prediction of evaporation indicates that when composition analysis is needed, only the initial composition is required. Because commercial diesel blends appear to be fairly similar, the results here will be good first approximations for all refinery stream diesel blends.

Benefits

The project directly improves the ability to predict the rate of emissions from evaporative sources from very complex mixtures that include material with a wide range of volatilities. The detailed composition of our modeled emissions directly enables prediction of ozone and SOA formation. This model is easily updated as future laboratory experiments reveal new chemistry related to SOA and ozone formation. This model can also be incorporated into existing emissions models written for other computing platforms.

The results of this project directly inform the level of detail needed in emissions inventories and allow a clear assessment of current health risks associated with evaporative emissions. Most notably, we clearly show that evaporative emissions of IVOC are major contributors to both ozone and SOA from evaporative sources that span this volatility range. We are now able to more accurately assess the potential for both ozone and SOA formation from commercial products containing low-vapor pressure VOC or IVOC.

Project Costs

The project utilized the full contracted amount of $106,361 by the SCAQMD. Funds on the order of $1,000,000 from the Gulf of Mexico Research Initiative were used to develop and validate the research strategy.

Commercialization and Applications

The findings of this study are central to future strategies to improve air quality in urban areas. As vehicular emissions continue to be reduced, contributions from sources such as evaporation of complex mixtures like diesel will play a more significant role in pollutant formation. Our results may be applied as updates to emissions models in assessing impacts of evaporative emissions. The evident importance of IVOC emissions over long time periods shows the need for future work analyzing other types of complex mixtures containing material with a wide range of volatilities, such as coatings or solvents.

SCAQMD Contract #13408 **September 2017**

Demonstrate Building Integration of Electric Vehicles, Photovoltaics and Stationary Fuel Cells

Contractor

Advanced Power and Energy Program, UC Irvine

Cosponsors

California Energy Commission (CEC)
South Coast Air Quality Management District

Project Officer

Lisa Mirisola

Background

California's goal to grow the zero emission vehicle (ZEV) market to 1.5 million ZEVs by 2025 will require expanded charging infrastructure since most of these ZEVs will be plug-in electric vehicles (see Executive Order B-16-2012). In fact, limited charging infrastructure is among the barriers that have been cited as preventing wide- scale PEV adoption. Currently, most charging takes place at home, but there is an increasing number of commercial charging stations that are being installed. These stations will address issues of charging access away from home and increase PEV range. As more charging stations are installed at commercial areas, there is a need to develop pricing methods that are attractive to PEV owners and promote the use of newly installed charging infrastructure. Additionally, these pricing methods must also be economical to the owner and integrate with any existing or future distributed generation (DG) technologies.

Project Objective

The objective of this project was to investigate the interactions and optimization of PEV charging in combination with local photovoltaic solar power generation, distributed fuel cell electricity, and utility operation and pricing with goals of:

1) renewable PEV charging, and

2) reliable, transparent, and consistent system operation to facilitate PEV charging.

Technology Description

The technology modeled and demonstrated in this project consists of pricing methodologies for electric vehicle charging to support integrated building operation and distributed generation. Demonstration will occur at the Multi-Purpose Science and Technology Building (MSTB) at UC Irvine.

Status

This project was initiated in October 2013 and was completed in September 2017. Initial delays resulted from delayed installation of the chargers themselves, which occurred in November 2014. Additional delays in the project resulted from competition with other electric vehicle charging stations on the university campus. These charging stations were free, and therefore, attracted all potential customers on the campus. Implementing pricing on these chargers required transfer of ownership to the university since these chargers were a part of a previous research project (Irvine Smart Grid Demonstration). While this represented a delay and limited some of the pricing methodology testing, it reinforced the importance of competition from other lower-priced charging stations.

Figure 1: Demonstration project location

Results

The results from this research project originate from its modeling and demonstration phases. From the modeling phase, the MSTB charging station (6 charger ports) was determined to increase PEV trip feasibility on all-electric miles for a population of 800 vehicles in a scenario with no parking management and 2,000 vehicles in a scenario with a valet-type management. It was also found that in order to minimize utility costs the owner should integrate the building and chargers on the same commercial meter if the maximum demand of the chargers exceeds 20 kW. This is the case for the system installed at the MSTB which has a maximum possible demand of 39.6 kW. The presence of solar PV reduces overall utility costs but it does not change the decision-making process of whether to integrate or separately meter the building and charging load.

Level 3 charging was also investigated and findings indicated that it typically does not provide a benefit to the building by integration and potential tariff changes. The dynamics of a building's electricity consumption have a large effect on overall demand charge cost reductions. A high load factor building provides the least cost reduction potential.

Findings from the demonstration include: strong effect on usage from competition from nearby charging station with free charging; pricing effective in shaping load; pricing also effective in minimizing energy consumption per customer.

Benefits

The potential benefits of utilizing pricing to encourage use of on-site renewable electricity for charging electric vehicles could be significant for GHG emission and pollutant emission reductions. For 1.5 million ZEVs in California, assuming 50% of these within the SCAQMD, a GHG emission reduction potential of 8,370 tons per year (assuming 30 miles average daily travel, 25 mpg, and 100% renewable on-site electricity).

Project Costs

The MSTB charging station was funded by the California Energy Commission ($90,000). The PV system installed was funded by UCI. The SCAQMD funding for this research project to test pricing methods was $150,000.

Commercialization and Applications

The potential market size for these pricing methods is on the order of thousands of charging stations. The pricing strategies investigated here will be applied in another SCAQMD-supported project investigating smart charging of EVs on the UCI Microgrid in collaboration with Kia Motors and Hyundai America Technical Center.

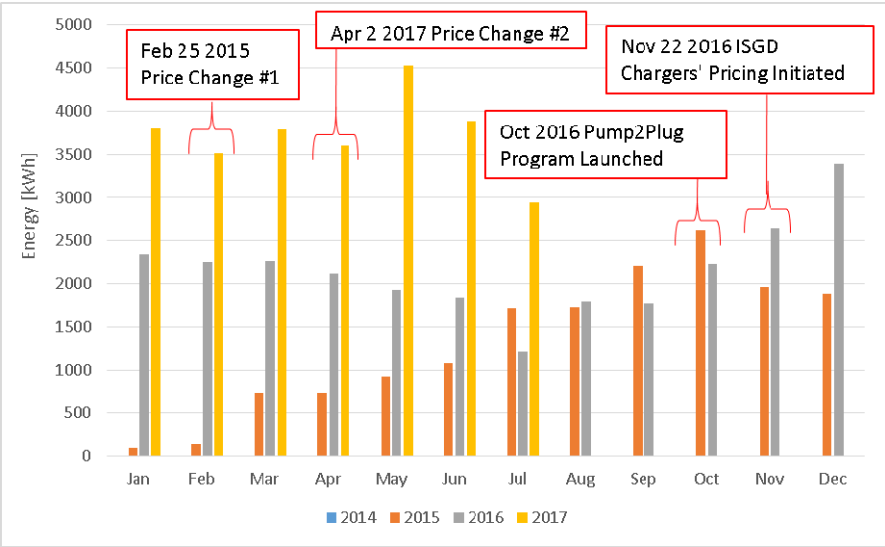

Figure 2: Energy consumption of MSTB charging station during demonstration

SCAQMD Contract #14171 **May 2017**

Study Air Pollution Health Effects on In-Utero Exposure to Traffic-Related Pollutants

Contractor

Southern California Research Center/Allergy and Asthma Associates of Southern California

Cosponsors

British Petroleum (PB)
South Coast Air Quality Management District

Project Officer

Dr. Jean Ospital

Background

This pilot project is one of the first to study the risk of asthma among children from in-utero exposure to in-vehicle traffic-related air pollutants. We also studied traffic-related air pollutants from multiple fixed locations. This study serves to lay the ground work for future investigations and validated analytic tools to be used in the field for further study, it is thus fundamental to the advancement of the study of asthma risk from traffic-related air pollutant exposure in-utero. Additionally, a preliminary finding was that in-utero residential exposure to CALINE4 (a dispersion model for predicting air pollutant concentrations near roadways) traffic-related air pollutants was associated with risk for asthma development but not in-vehicle CALINE4 exposure, despite that in-vehicle exposure was twice as high as residential exposure, which was within EPA standards. Note that residential exposure is far more sustained so cumulative exposure is much higher. This preliminary finding begs further study in the hope of providing recommendations for risk avoidance during pregnancy in order to decrease the development of asthma in children. Moreover, we hope the results of this project will inspire further investigations and funding opportunities in order to better understand the contributing role of traffic-related air pollutant exposure in-utero to the etiology of pediatric asthma.

Project Objective

The aim of this case-control study was to assess the risk of asthma among children living in Orange County from in-utero exposure to traffic-related air pollution.

Technology Description

This pilot project accomplished four tasks in order to study the association of in-utero exposure to traffic-related air pollutants and the risk of developing asthma in children. Particularly important was the development of the field procedures in Task 1 and the experience garnered.

Task 1: Produce an Asthma and Health Outcomes Dataset:

1. Comprehensive participant questionnaire packets were developed.
2. Secure electronic questionnaire packets were designed and implemented.
3. Participants were enrolled:
   a. 5,660 subjects were screened for enrollment.
   b. 533 subjects were enrolled in the study.
   c. 303 subjects completed the study questionnaires.
4. An Asthma and Health Outcomes Datasheet was produced.

Task 2: Estimate traffic-related air pollution exposures at fixed locations:

1. Spatially interpolated monthly concentrations of regionally distributed pollutants (PM_{10}, $PM_{2.5}$, NO_x, NO_2, O_3 and CO) from 1990 to 2013 were used for estimations at fixed locations.
2. A modified Gaussian line source dispersion model (CALINE4) was employed to estimate local traffic-generated air pollutants from traffic emissions.

Task 3: Estimate traffic-related air pollution exposures during times commuting in vehicles:

1. Concentrations were estimated of traffic-related pollutants [polycyclic aromatic hydrocarbon (PAH), particle number

concentration (PNC), NO_x, and $PM_{2.5}$] by roadway type based on our previous work that measured and modeled on-road concentrations of these pollutants.
2. Commuting time of the subjects were obtained by three different measures.
3. Average on-road pollutant concentrations for commuting were calculated by weighting pollutant concentration on each type of road by commuting time spent on the specific road for each individual subject.

Task 4: Evaluate the risk of asthma among children from in-utero exposure to traffic-related air pollution:

1. A case-control study design was used to compare exposures between asthma cases and controls without asthma.
2. Analyses were performed using unconditional logistic regression to model the odds of asthma diagnosis as a function of exposure to traffic-related air pollution near subject homes, work, and commute routes.
3. Models were adjusted for age, socioeconomic status (mother's education level), and the subject's recruitment source.

Status

Project completed in May 2017. Final report on file with complete details of the project.

Results

1. We found no associations of asthma risk with either GIS-estimated commute travel time during pregnancy or questionnaire-reported commute travel time during pregnancy.
2. There were also no associations with modeled in-vehicle exposures during pregnancy with all odds ratios less than 1.00.
3. In univariate models there were positive associations of increased asthma risk from exposure to both ambient residential exposures during pregnancy (except O_3) and CALINE4 traffic-related residential exposures during pregnancy.
4. Estimated daily 24-hour concentrations of $PM_{2.5}$ and PM_{10} at residential locations never exceeded EPA National Ambient Air Quality Standards of 35 µg/m3 and 150 µg/m3, respectively.
5. In-vehicle concentrations were around twice as high for NO_x and $PM_{2.5}$ compared with residential exposures, although this exposure would be for a much shorter duration of time.
6. Multivariate regression models that adjusted for all covariates except age showed that CALINE4 and ambient air pollution variables were still significantly associated with increased risk of asthma from exposure to traffic-related air pollution (NO_2, NO_x, CO).

Benefits

In conclusion, although we found little evidence for an association of asthma risk from air pollution exposure occurring during the pregnancy period, a preliminary finding was that in-utero residential exposure to CALINE4 traffic-related air pollutants was associated with risk for asthma development but not in-vehicle CALINE4 exposure, despite that in-vehicle exposure was twice as high as residential exposure, which was within EPA standards. It is hoped that findings from the present study will inform and energize plans to evaluate asthma risk from in utero air pollution exposure in future studies. Two of the main benefits sited by the study include:

1. Validated analytic tools to study asthma risk from traffic-related air pollutant exposure in-utero, and
2. Improved the understanding of the risk of asthma among children from in-utero exposure to in-vehicle and fixed location exposures to traffic-related air pollutants.

Project Costs

The total project cost was $317,119, on target with the projected budget. Of this, the SCAQMD funded $99,670 and BP funded $217,449 of the total project costs.

Commercialization and Applications

There were no commercial applications yielded by this project.

SCAQMD Contract #15610 **December 2017**

Conduct Engineering Services at SCAQMD Headquarters

Contractor
Goss Engineering, Inc.

Cosponsor
South Coast Air Quality Management District

Project Officer
Patricia Kwon

Background

Goss Engineering, Inc. was hired through a competitive RFP process to provide required engineering services in anticipation of a release of a RFP for installation of EV chargers. The SCAQMD planned to install 92 Level 2 electric vehicle (EV) charging ports at SCAQMD headquarters in Diamond Bar, CA 91765. Goss Engineering prepared construction plans to obtain a permit from the City of Diamond Bar, and assisted with engineering services as required during the installation of EV chargers in 2016-2017.

Project Objective

Goss Engineering assisted in the release of an RFP for installation services by performing the following services: field investigation, 30-day load testing of all electrical panels servicing areas of the parking lot to receive EV chargers, review of as-built drawings for the SCAQMD headquarters facility, preparation of a conceptual engineering design for the entire project, preparation of electrical specifications including sizing of transformers, electrical panels, conduit and wire, preparation of CAD electrical as-built drawings from contractor redlines, and preparation of 90% and 100% construction documents to be submitted to the City of Diamond Bar Plan Check department. Additional services included involvement and standard engineering technical assistance during all phases of construction including coordination of all plan check efforts, participation in the bidder's conference for installation contractors, review of installation bids, provide final punch list, and perform final job walk with SCAQMD staff and installation contractor.

Technology Description

Due to the wide range of cutting edge alternative fuel technologies that are demonstrated at the SCAQMD headquarters facility, even a moderately large scale construction project impacting six areas of the parking lot including upgrade and replacement of three transformers and seven electrical panels presents technical challenges. In addition, there was an inability to shut down power at the facility for even a short 30 minute interval due to the need to have continuous power at the facility for AQMP modeling runs and laboratory analyses for resolving toxics issues at metal processing plants in Paramount. Due to the need to comply with SCAQMD's Rule 1470 (prohibiting use of a backup natural gas generator to provide power during routine maintenance), replacement of the transformer in the main electrical room took place with the power still on through a "hot connect" procedure.

Figure 1: Aerial photo of SCAQMD headquarters denoting areas for EVSE upgrade

Status

Goss Engineering played a critical role in the completion of construction to install 92 Level 2 EV charging ports at SCAQMD headquarters. This project was completed in April 2017.

Results

The engineering services provided at key stages during the EV charger installation project such as the preparation of detailed engineering construction plans to accompany the RFP for installation services and construction documents (and required revisions) to the City of Diamond Bar Plan Check department enabled the construction project to be carried out successfully and with a minimum of delays despite technical challenges, delays in receiving equipment, and unprecedented heavy rainfall.

Figure 2: SCAQMD solar carport featuring upgraded EVSE

The most recent EV charging transaction report shows that there were over 1,329 charging sessions dispensing 15,309 kWh of electricity for EV chargers serving SCAQMD staff, visitors, and the general public.

Benefits

This project showcases the benefits of providing Level 2 charging for EVs at a large workplace to provide the ability for staff, visitors and the general public. On average, SCAQMD staff have a 20 mile one-way commute to work, with some staff having as much as a 45 mile one-way commute. Without workplace charging, staff would be unable to drive their EVs to work and be able to return home. This results in increased zero emission vehicle miles traveled, particularly during critical morning and evening commuting hours when congestion impacts are at their greatest.

Project Costs

Total project costs were $60,000, all funded by the SCAQMD from the Clean Fuels Fund. The initial contract was $50,000, with an additional $10,000 added through an amendment to cover unanticipated site plan and permitting expenses. Specifically, permitting requirements which were not anticipated included a site survey to address American with Disabilities Act requirements and a short circuit study to address National Electrical Code requirements.

Commercialization and Applications

The utilization of engineering services to define the installation phase of the project assisted greatly in allowing the installation to stay within budget and to be completed within the desired time frame. It is recommended that for the installation of workplace charging at large facilities such as SCAQMD headquarters that an engineering firm be available to provide the necessary technical assistance at key points during the project. In particular, engineering services were critical to define the load of existing panels and ensure proper specifications and upsizing of transformers, panels, conduit and wiring. This upsizing incorporated not only the planned installation of 92 EV charging ports but also anticipated future deployments of EV chargers that were likely to occur within the next 5-10 years to future proof the facility. This future proofing enabled staff to later serve as a site host for a new 50 kW DC fast charger with CHAdeMO and CCS connectors at the front lobby parking area to better serve EVs capable of fast charging.

Appendix D

Project Ranking

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Project Ranking

For each of the core technologies discussed earlier in this report, staff considers numerous factors that influence the proposed allocation of funds, ranging from overall Environment & Health Benefits, Technology Maturity and Compatibility, and Cost, summarized in the proposed ranking system.

Within the broad factors included above, staff has included sub-factors for each specific type of project that may be considered, as summarized below:

Environment and Health

Criteria Pollutant Emission Reduction potential continues to receive the highest priority for projects that facilitate the NOx reduction goals outlined in the 2016 AQMP. Technologies that provide co-benefits of Greenhouse Gas and Petroleum Reduction are also weighted favorably, considering the Clean Fuels Program is able to leverage funds available through several state and federal programs, as well as overall health benefits in reducing exposure to Ozone and PM2.5, especially along disadvantaged communities.

Technology Maturity & Compatibility

Numerous approaches have been used to evaluate technology maturity and risk that include an evaluation of potential uncertainty in real world operations. This approach can include numerous weighting factors based on assessed importance of a particular technology. Some key metrics that can be considered include Infrastructure Constructability that would evaluate the potential of fuel or energy for the technology and readiness of associated infrastructure, Technology Readiness that includes not only the research and development of the technology, but potential larger scale deployments that consider near-term implementation duty and operational compatibility for the end users. These combined factors can provide an assessment for market readiness of the technology.

Cost/Incentives

The long-term costs and performance of advanced technologies are highly uncertain, considering continued development of these technologies is likely to involve unforeseen changes in basic design and materials. Additionally, economic sustainability – or market driven – implementation of these technologies is another key factor for the technology research, development, demonstration and deployment projects. Therefore, in an effort to accelerate the demonstration and deployment, especially some pre-commercialization technologies, incentive programs such as those available from local, state and federal programs are key, but may be underfunded for larger scale deployments. As a part of the 2016 AQMP, staff has also included the Draft Financial Incentives Funding Action Plan to address the funding necessary for full implementation of the control measures included.

Staff has proposed a simplified approach to ranking the core technologies, especially some of the specific platforms and technologies discussed in the draft plan and annual report. The rankings below take into account experience with implementing the Clean Fuels Program for numerous years, as well as understanding the current development and deployment state of the technologies and associated infrastructure, and are based on the following "Consumer Reports" type approach:

● Excellent ◓ Good ○ Satisfactory ◒ Poor • Unacceptable

The table below summarizes staff ranking of the potential projects anticipated in the draft plan, and it is noted that technology developers, suppliers, and other experts may differ in their approach to ranking these projects. For example, staff ranks Electric/Hybrid Technologies and Infrastructure as Excellent or Good for Criteria Pollutant and GHG/Petroleum Reduction, but Poor to Good for Technology

Maturity & Compatibility, and Satisfactory to Unacceptable for Costs and Incentives to affect large scale deployment. It is further noted that the Clean Fuels Fund's primary focus remains on-road vehicles and fuels, and funds for off-road and stationary sources are limited.

This approach has been reviewed with the Clean Fuels and Technology Advancement Advisory Groups, as well as the Governing Board.

Technologies & Proposed Solutions	Environment & Health			Technology Maturity & Compatibility				Cost	
	Emissions Reduction	GHG/Petroleum Reduction	Health Benefits	Infrastructure Constructability	Technology Readiness	Near-Term Implementation/ Duty Cycle Fulfillment Capability	Operations Compatibility	Relative Cost & Economic Sustainability	Incentives Available
Electric/Hybrid Technologies & Infrastructure									
Plug-In Hybrid Heavy-Duty Trucks with Zero-Emission Range	◓	○	◓	●	○	◓	◓	◒	•
Heavy-Duty Zero-Emission Trucks	●	◓	●	◓	◒	◒	○	•	•
Medium-Duty Trucks	◓	◓	●	◓	○	◒	◒	◒	•
Medium- and Heavy-Duty Buses	●	◓	●	◓	○	◒	○	◒	•
Light-Duty Vehicles	◓	◓	●	◓	◓	◓	◓	◒	◒
Infrastructure	-	-	-	◓	◓	◓	◓	○	◒
Hydrogen & Fuel Cell Technologies & Infrastructure									
Heavy-Duty Trucks	●	◓	◓	○	◒	◒	◒	•	•
Heavy-Duty Buses	●	◓	◓	○	◒	◒	◒	•	•
Off-road – Locomotive/Marine	●	◓	◓	○	◒	◒	◒	•	•
Light-Duty Vehicles	●	◓	◓	○	◓	○	○	○	◒
Infrastructure – Production, Dispensing, Certification	-	-	-	○	○	◒	◒	•	◒
Engine Systems									
Ultra-Low emissions Heavy-Duty Engines	◓	◓	◓	●	○	○	●	◓	○
Alternative Fuel Medium- and Heavy-Duty Vehicles	◓	◓	◓	●	◓	◓	●	◓	○
Off-Road Applications	◓	◓	◓	●	◓	◓	●	◓	○
Fueling Infrastructure & Deployment									
Production of Renewable Natural Gas – Biowaste/Feedstock	◓	●	◓	●	◓	◓	◓	○	○
Synthesis Gas to Renewable Natural Gas	◓	●	◓	●	◓	◓	◓	○	○
Expansion of Infrastructure/Stations/Equipment/RNG Transition	◓	◓	◓	●	◓	◓	◓	◓	○
Stationary Clean Fuel Technologies									
Low-Emission Stationary & Control Technologies	◓	◓	◓	◓	○	○	◓	○	○
Renewable Fuels for Stationary Technologies	○	●	◓	◓	○	○	○	○	○
Vehicle-to-Grid or Vehicle-to-Building/Storage	●	●	◓	○	○	◒	○	○	◒
Emission Control Technologies									
Alternative/Renewable Liquid Fuels	◒	◓	◓	◓	○	○	●	◒	○
Advanced Aftertreatment Technologies	◓	○	◓	○	○	◓	◓	◓	○
Lower-Emitting Lubricant Technologies	○	○	●	-	◓	◓	◓	●	○

● Excellent ◓ Good ○ Satisfactory ◒ Poor • Unacceptable

Appendix E

List of Acronyms

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LIST OF ACRONYMS

AB—Assembly Bill
AC-absorption chiller
ADA—American with Disabilities Act
AER—all-electric range
AFRC—air/fuel ratio control
AFVs—Alternative Fuel Vehicles
APCD—Air Pollution Control District
AQMD—Air Quality Management District
AQMP—Air Quality Management Plan
ARB—Air Resources Board
ARRA—American Recovery & Reinvestment Act
AWMA—Air & Waste Management Association
BACT—Best Available Control Technology
BET—battery electric truck
BEV—battery electric vehicle
BSNOx—brake specific NOx
BMS—battery management system
CAAP—Clean Air Action Plan
CAFR—Comprehensive Annual Financial Report
CaFCP—California Fuel Cell Partnership
CARB—California Air Resources Board
CATI—Clean Air Technology Initiative
CBD-Central Business District (cycle) - a Dyno test cycle for buses
CCF—California Clean Fuels
CCHP—combined cooling, heat and power
CDFA/DMS—California Department of Food &Agriculture/Division of Measurement Standards
CEC—California Energy Commission
CE-CERT—College of Engineering – Center for Environmental Research and Technology
CEMS—continuous emission monitoring system
CEQA—The California Environmental Quality Act
CFCI—Clean Fuel Connection, Inc.
CFD—computational fluid dynamic
CHBC—California Hydrogen Business Council
CNG—compressed natural gas
CNGVP—California Natural Gas Vehicle Partnership
CO_2—carbon dioxide
CO—carbon monoxide
ComZEV—Commercial Zero-Emission Vehicle
CPA—Certified Public Accountant
CPUC—California Public Utilities Commission
CRDS—cavity ring-down spectroscopy
CRT—continuously regenerating technology
CVAG—Coachella Valley Association of Governments
CWI-Cummins Westport, Inc.
CY—calendar year
DC—direct connection
DCM—dichloromethane
DEG—diesel equivalent gallons
DGE—diesel gallon equivalents
DF—deterioration factor
DME—dimethyl ether
DMS—Division of Measurement Standards
DMV—Department of Motor Vehicles
DOC—diesel oxidation catalysts
DOE—Department of Energy
DOT—Department of Transportation
DPF—diesel particulate filters
DPT3-Local Drayage Port Truck (cycle) - where 3=local (whereas 2=near-dock, etc.)
DRC—Desert Resource Center
DRI—Desert Research Institute
ECM—emission control monitoring
EDD-electric drayage demonstration
EDTA—Electric Drive Transportation Association
EGR—exhaust gas recirculation
EIA-Energy Information Administration
EIN—Energy Independence Now
EMFAC-Emission FACtors
EPRI—Electric Power Research Institute
E-rEV—extended-range electric vehicles
ESD—emergency shut down
EV—electric vehicle
EVSE-electric vehicle supply equipment
FCV—fuel cell vehicle
FTA—Federal Transit Administration
FTP—federal test procedures
g/bhp-hr—grams per brake horsepower per hour
GC/MS—gas chromatography/mass spectrometry
GCW—gross combination weight
GDI—gasoline direct injection
GGE—gasoline gallon equivalents
GGRF—Greenhouse Gas Reduction Relief Fund
GHG—Greenhouse Gas
GNA—Gladstein, Neandross & Associates, LLC
GTL—gas to liquid
H&SC—California Health and Safety Code
HCCI—Homogeneous Charge Combustion Ignition
HCNG—hydrogen-compressed natural gas (blend)
HDDT—highway dynamometer driving schedule
HD-FTP—Heavy-Duty Federal Test Procedure
HDV—heavy-duty vehicle
HEV—Hybrid electric vehicle
HOA—Homeowners Association

LIST OF ACRONYMS (cont'd)

HQSA—hydrogen quality sampling adapter
HPDI—High Pressure Diesel Injection
HPLC—high-performance liquid chromatography
HT—high throughput
HTFCs-high-temperature fuel cells
H2NIP—Hydrogen Network Investment Plan
HTPH—high throughput pretreatment and enzymatic hydrolysis
HyPPO—Hydrogen Progress, Priorities and Opportunities report
Hz-Hertz
ICE—internal combustion engine
ICEV—internal combustion engine vehicle
ICU-inverter-charger unit
ICTC—Interstate Clean Transportation Corridor
IVOC—intermediate volatility organic compound
kg—kilogram
LACMTA—Los Angeles County Metropolitan Transit Authority
LADWP—Los Angeles Department of Water and Power
LCFS—Low Carbon Fuel Standard
Li—lithium ion
LIMS—Laboratory Information Management System
LLNL—Lawrence Livermore National Laboratory
LNG—liquefied natural gas
LPG—liquefied petroleum gas or propane
LSM-linear synchronous motor
LSV—low-speed vehicle
LUV—local-use vehicle
LVP—low vapor pressure
MATES—Multiple Air Toxics Exposure Study
MECA—Manufacturers of Emission Controls Association
MOA—Memorandum of Agreement
MPa—MegaPascal
MPFI—Multi-Port Fuel Injection
MPG—miles per gallon
MPGde-miles per gallon diesel equivalent
MSRC—Mobile Source Air Pollution Reduction Review Committee
MSW—municipal solid wastes
MY—model year
MTA—Metropolitan Transportation Authority (Los Angeles County "Metro")
NAAQS-National Ambient Air Quality Standards
NAFA—National Association of Fleet Administrators
NFPA—National Fire Protection Association
NCP—nonconformance penalty
NEV—neighborhood electric vehicles
NextSTEPS—Next Sustainable Transportation Energy Pathways
NG/NGV—natural gas/natural gas vehicle
NH3—ammonia
NHTSA—Natural Highway Traffic Safety Administration
NMHC—non-methane hydrocarbon
NO—nitrogen monoxide
NO_2—nitrogen dioxide
$NO + NO_2$—nitrous oxide
NOPA—Notice of Proposed Award
NOx—oxides of nitrogen
NRC—National Research Council
NREL—National Renewables Energy Laboratory
NSPS—New Source Performance Standard
NSR—New Source Review
NZ—near zero
OBD—On-Board Diagnostics
OCS—overhead catenary system
OCTA—Orange County Transit Authority
OEHHA—Office of Environmental Health Hazard Assessment
OEM—original equipment manufacturer
PAH—polyaromatic hydrocarbons
PbA—lead acid
PCM—powertrain control module
PEMFC—proton exchange membrane fuel cell
PEMS—portable emissions measurement system
PEV—plug-in electric vehicle
PHET—plug-in hybrid electric truck
PHEV—plug-in hybrid vehicle
PM—particulate matter
PM2.5—particulate matter ≤ 2.5 microns
PM10—particulate matter ≤ 10 microns
POS—point of sale
ppm—parts per million
ppb—parts per billion
PSI—Power Solutions International
PTR-MS—proton transfer reaction-mass spectrometry
RD&D-research, development and demonstration
RDD&D (or RD3)—research, development, demonstration and deployment
REC—renewable energy certificates
RFP—Request for Proposal
RFS—renewable fuel standards
RI—reactive intermediates
RNG—renewable natural gas
RPS—Renewable Portfolio Standard
RRC—rolling resistance co-efficient

LIST OF ACRONYMS (cont'd)

RTA—Riverside Transit Agency
RTP/SCS—Regional Transportation Plan/Sustainable Communities Strategy
SAE-Society of Automotive Engineers
SB—Senate Bill
SCAB—South Coast Air Basin or "Basin"
SCAQMD—South Coast Air Quality Management District
SCFM-standard cubic feet per minute
SCE—Southern California Edison
SCR—selective catalytic reduction
SHR—Steam Hydrogasification Reaction
SI—spark ignited
SI-EGR—spark-ignited, stoichiometric, cooled exhaust gas recirculation
SIP—State Implementation Plan
SJVAPCD—San Joaquin Valley Air Pollution Control District
SOAs—secondary organic aerosols
SoCalGas—Southern California Gas Company (A Sempra Energy Utility)
SULEV—super ultra-low emission vehicle
SUV—Sports Utility Vehicle
TAO—Technology Advancement Office
TAP-(Ports') Technology Advancement Program
TC—total carbon
TEMS—transportable emissions measurement system
THC—total hydrocarbons
TO—task order
tpd—tons per day
TRB—Transportation Research Board
TSI—Three Squares, Inc.
TTSI-Total Transportation Services, Inc.
TWC—three-way catalyst
UCR—University of California Riverside
UCLA—University of California Los Angeles
UDDS—urban dynamometer driving schedule
$\mu g/m^3$—microgram per cubic meter
ULEV—ultra low emission vehicle
UPS—United Postal Service
U.S.—United States
U.S.EPA—United States Environmental Protection Agency
V2B—vehicle-to-building
V2G—vehicle-to-grid
V2G/B-vehicle-to-building functionality
VMT—vehicle miles traveled
VOC—volatile organic compounds
WVU—West Virginia University
ZECT—Zero Emission Cargo Transport
ZEV—zero emission vehicle

South Coast Air Quality Management District

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BOARD MEETING DATE: March 2, 2018 AGENDA NO. 35

REPORT: Annual RECLAIM Audit Report for 2016 Compliance Year

SYNOPSIS: The annual report on the NOx and SOx RECLAIM program is prepared in accordance with Rule 2015 - Backstop Provisions. The report assesses emission reductions, availability of RECLAIM Trading Credits (RTCs) and their average annual prices, job impacts, compliance issues, and other measures of performance for the twenty-third year of this program. In addition, recent trends in trading future year RTCs are analyzed and presented in this report. Further, a list of facilities that did not reconcile their emissions for the 2016 Compliance Year is included with the report.

COMMITTEE: Stationary Source, February 16, 2018, Reviewed

RECOMMENDED ACTION:
Approve the attached annual report.

Wayne Nastri
Executive Officer

LT: DL

Background

The Board adopted the RECLAIM program in October 1993 to provide a more flexible compliance program than command-and-control for specific facilities, which represent SCAQMD's largest emitters of NOx and SOx. Although RECLAIM was developed as an alternative to command-and-control, it was designed to meet all state and federal Clean Air Act and other air quality regulations and program requirements, as well as a variety of performance criteria in order to ensure public health protection, air quality improvement, effective enforcement, and the same or lower implementation costs and job impacts. RECLAIM is what is commonly referred to as a "cap and trade" program. Facilities subject to the program were initially allocated declining annual balances of RECLAIM Trading Credits (RTCs, denominated in pounds of emissions in a specified year) based upon their historical production levels and upon emissions factors

established in the RECLAIM regulation. RECLAIM facilities are required to reconcile their emissions with their RTC holdings on a quarterly and annual basis (*i.e.*, hold RTCs equal to or greater than their emissions). These facilities have the flexibility to manage how they meet their emission goals by installing emission controls, making process changes or trading RTCs amongst themselves. RECLAIM achieves its overall emission reduction goals provided aggregate RECLAIM emissions are no more than aggregate allocations.

RECLAIM Rule 2015 - Backstop Provisions, requires staff to conduct annual program audits to assess various aspects of the program and to verify that program objectives are met. Staff has completed audits of facility records and completed the annual audit of the RECLAIM program for Compliance Year 2016 (which encompasses the time period for Cycle 1 from January 1, 2016 to December 31, 2016 and for Cycle 2 from July 1, 2016 to June 30, 2017). Based on audited emissions in this report and previous annual reports, staff has determined that RECLAIM met its emissions goals for Compliance Year 2016, as well as for all previous compliance years with the only exception of NOx emissions in Compliance Year 2000. For that year, NOx emissions exceeded programmatic allocations (by 11%) primarily due to emissions from electric generating facilities during the California energy crisis. For Compliance Year 2016, audited NOx emissions were 19% less than programmatic NOx allocations and audited SOx emissions were 29% less than programmatic SOx allocations.

Audit Findings

The audit of the RECLAIM Program's Compliance Year 2016 and trades of RTCs that occurred during calendar year 2017 show:

- ***Overall Compliance*** – Audited NOx and SOx emissions from RECLAIM facilities were significantly below programmatic allocations.

- ***Universe*** – The RECLAIM universe consisted of 268 facilities as of June 30, 2016. Three facilities were included, one facility was excluded, and eight facilities in the RECLAIM universe shut down during Compliance Year 2016. Thus, 262 facilities were in the RECLAIM universe on June 30, 2017, the end of the Compliance Year 2016.

  Three facilities were newly included in NOx RECLAIM. One facility was included because it reported NOx emissions from permitted sources in excess of four tons. Two other facilities were created through a change of operator; one was a partial change of operator of an existing RECLAIM facility (one facility was split in two), and the other was created through a complete change of operator from a previously shutdown RECLAIM facility. One facility was excluded from the NOx RECLAIM universe because its operation was taken over by another RECLAIM facility at the same location, and eight other facilities shut down. Of the eight facilities that shut down, one facility ceased operations, citing more attractive use of its land and

resources. Three facilities liquidated or consolidated their operations and moved their operation outside of the region. The fifth facility ceased operations citing the high cost of manufacturing, production, and raw materials. The sixth facility inactivated all of its permits and consolidated its operations with two other company-owned facilities, one within the region and one outside the country. The seventh facility sold its property to a new operator with no permitted equipment remaining onsite. The eighth facility shutdown due to declining demand for its products. Seven of the eight facilities permanently ceasing operations were in NOx RECLAIM and one facility was in both NOx and SOx RECLAIM. None of the eight RECLAIM facilities that shut down during Compliance Year 2016 cited RECLAIM as a contributing factor to the decision to shut down.

- ***Facility Compliance*** – The vast majority of RECLAIM facilities complied with their allocations during the 2016 compliance year (95% of NOx facilities and 97% of SOx facilities). Thirteen facilities (five percent of total facilities) exceeded their allocations (12 facilities exceeded their NOx allocations, and one facility exceeded its NOx and SOx allocations) during Compliance Year 2016. The 13 facilities that exceeded their NOx allocations had total NOx emissions of 278.6 tons and did not have adequate allocations to offset 8.3 of those tons. The exceedances represent 0.09% of total RECLAIM NOx universe allocations and 3.0% of total NOx emissions from the 13 facilities. The one SOx facility that exceeded its SOx allocation had total SOx emissions of 0.15 tons and did not have adequate allocations to offset 0.10 tons. This exceedance represents less than 0.01% of total RECLAIM SOx universe allocations and 66.7% of total SOx emissions from this facility. Pursuant to Rule 2010(b)(1)(A), all 13 facilities had their respective exceedances deducted from their annual allocations for the compliance year subsequent to SCAQMD's determination that the facilities exceeded their Compliance Year 2016 allocations.

- ***Job Impacts*** – Based on a survey of the RECLAIM facilities, the RECLAIM program had minimal impact on employment during the 2016 compliance year, which is consistent with previous years. RECLAIM facilities reported an overall net loss of 982 jobs, representing 0.88% of their total employment. None of the eight RECLAIM facilities that shut down during Compliance Year 2016 cited RECLAIM as a contributing factor to the decision to shut down. One facility reported a loss of 15 jobs due to RECLAIM, but they did not shut down operations. The job loss and job gain data are compiled strictly from reports submitted by RECLAIM facilities, and staff is not able to verify the accuracy of the reported job impacts data.

- ***Trading Activity*** – The RTC trading market activity during calendar year 2017 was lower in terms of number of trades (by 8%), lower with respect to volume (by 5%), and significantly lower with respect to total value (by 94%) when compared to calendar year 2016. A total of over $1.48 billion in RTCs has been traded since the

adoption of RECLAIM, of which $6.86 million occurred in calendar year 2017 (compared to $118.6 million in calendar year 2016), excluding swaps.

The annual average prices of discrete-year NOx and SOx RTCs for Compliance Years 2016, 2017, and 2018 and infinite-year block (IYB) NOx and SOx RTCs traded in calendar year 2017 were below the applicable review thresholds for average RTC prices. The annual average prices of RTCs traded during calendar years 2016 and 2017 are summarized and compared to the applicable thresholds in Tables 1 and 2 below:

Table 1 – Average Prices for Discrete-Year RTCs Traded during Calendar Years 2016 and 2017

	Average Price ($/ton)				Review Thresholds ($/ton)	
Year Traded	**2015 NOx RTC**	**2016 NOx RTC**	**2017 NOx RTC**	**2018 NOx RTC**	**Rule 2015 (b)(6)**	**Health and Safety Code §39616(f)**
2016	$1,626	$2,932	$6,606	None traded	$15,000	$44,070
2017		$2,203	$4,182	$10,639		
Year Traded	**2015 SOx RTC**	**2016 SOx RTC**	**2017 SOx RTC**	**2018 SOx RTC**	**Rule 2015 (b)(6)**	**Health and Safety Code §39616(f)**
2016	$540	$1,255	None traded	None traded	$15,000	$31,730
2017		$636	$1,386	None traded		

Table 2 – Average Prices for IYB RTCs Traded during Calendar Years 2016 and 2017

	Average Price ($/ton)		Review Threshold ($/ton)
RTCs	Traded in 2016	Traded in 2017	**[Health and Safety Code §39616(f)]**
NOx	$380,057	$39,673	$661,045
SOx	$50,000	$22,820	$475,952

- ***Role of Investors*** – Investors were active in the RTC market. Based on both overall trading values and volume of NOx trades with price, investors' involvement in 2017 was less when compared to calendar year 2016. However, with respect to value and volume of SOx trades with price, investors' involvement increased. Investors were involved in 128 of the 193 discrete NOx trades with price, and 6 of the 7 discrete SOx trades with price. With respect to IYB trades, investors' participation was significant and investors were involved with all six of the IYB NOx trades with price, and all four IYB SOx trade with price. Compared to calendar year 2016, investor holdings of total IYB NOx RTCs and IYB SOx RTCs increased from 3.1% to 3.3% for IYB NOx RTCs, and from 5.0% to 6.0% for IYB SOx RTCs at the end

of calendar year 2017. Investors purchase RTCs, but are not RECLAIM facilities or brokers. (Brokers typically do not purchase RTCs, but facilitate trades.)

- ***Other Findings*** – RECLAIM also met other applicable requirements including meeting the applicable federal offset ratio under New Source Review and having no significant seasonal fluctuation in emissions. Additionally, there is no evidence that RECLAIM resulted in any increase in health impacts due to emissions of air toxics. RECLAIM facilities and non-RECLAIM facilities are subject to the same requirements for controlling air toxic emissions.

Attachments

1. Annual RECLAIM Audit Report for 2016 Compliance Year
2. Board Meeting Presentation

ATTACHMENT 1

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Annual RECLAIM Audit Report for 2016 Compliance Year

March 2, 2018

Executive Officer
Wayne Nastri

Deputy Executive Officer
Engineering & Permitting
Laki Tisopulos, Ph.D., P.E.

Assistant Deputy Executive Officer
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SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

GOVERNING BOARD

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Speaker of the Assembly
Appointee

Vice Chairman: Dr. Clark E. Parker, Sr.
Senate Rules Committee
Appointee

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Supervisor, Fifth District
County of Riverside

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Mayor, Wildomar
Cities of Riverside County

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City of Los Angeles Representative

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Councilmember, South Pasadena
Cities of Los Angeles County/Eastern Region

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Governor's Appointee

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County of Orange

Dwight Robinson
Councilmember, Lake Forest
Cities of Orange County

Janice Rutherford
Supervisor, Second District
County of San Bernardino

Hilda L. Solis
Supervisor, First District
County of Los Angeles

EXECUTIVE OFFICER
Wayne Nastri

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LIST OF ABBREVIATIONS

AAQS	Ambient Air Quality Standards
ACEMS	Alternative Continuous Emissions Monitoring System(s)
AER	Annual Emission Report
APEP	Annual Permit Emissions Program
AQMP	Air Quality Management Plan
BACT	Best Available Control Technology
BARCT	Best Available Retrofit Control Technology
CAA	Clean Air Act
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCR	California Code of Regulations
CEMS	Continuous Emissions Monitoring System(s)
CEQA	California Environmental Quality Act
CGA	Cylinder Gas Audit
CPMS	Continuous Process Monitoring System(s)
DOGGR	Division of Oil, Gas, and Geothermal Resources
EDR	Electronic Data Reporting
EGF	Electricity Generating Facility
ERC	Emission Reduction Credit
IYB RTC	Infinite-Year Block RECLAIM Trading Credit
LAER	Lowest Achievable Emission Rate
LAP	Laboratory Approval Program
MDP	Missing Data Procedures
MRR	Monitoring, Reporting and Recordkeeping
MSERC	Mobile Source Emission Reduction Credit
NAAQS	National Ambient Air Quality Standards
NNI	No Net Increase
NOx	Oxides of Nitrogen
NSR	New Source Review
ODC	Ozone Depleting Compound
OEHHA	Office of Environmental Health Hazard Assessment
QCER	Quarterly Certification of Emissions Report
PPA	Purchase Power Agreement
RACT	Reasonably Available Control Technology
RATA	Relative Accuracy Test Audit
RECLAIM	REgional CLean Air Incentives Market
RTC	RECLAIM Trading Credit
RTU	Remote Terminal Unit
SCAQMD	South Coast Air Quality Management District
SIP	State Implementation Plan
SOx	Oxides of Sulfur
SOON	Surplus Off-Road Opt-In for NOx
SSC	Stationary Source Committee
TAC	Toxic Air Contaminant
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
WATERS	Web Access To Electronic Reporting System

EXECUTIVE SUMMARY

Introduction

The South Coast Air Quality Management District (SCAQMD) Governing Board adopted the REgional CLean Air Incentives Market (RECLAIM) program on October 15, 1993. The RECLAIM program represented a significant departure from traditional command-and-control regulations. RECLAIM's objective is to provide facilities with added flexibility in meeting emissions reduction requirements while lowering the cost of compliance. This is accomplished by establishing facility-specific emissions reduction targets without being prescriptive regarding the method of attaining compliance with the targets. Each facility may determine for itself the most cost-effective approach to reducing emissions, including reducing emissions at their facility, and/or purchasing RECLAIM Trading Credits (RTCs) from other RECLAIM facilities, or from other RTC holders.

Rule 2015 - Backstop Provisions includes provisions for annual program audits focusing on specific topics, as well as a one-time comprehensive audit of the program's first three years, to ensure that RECLAIM is meeting all state and federal requirements and other performance criteria. Rule 2015 also provides backstop measures if the specific criteria are not met. This report constitutes the Rule 2015 annual program audit report for Compliance Year 2016 (January 1 through December 31, 2016 for Cycle 1 and July 1, 2016 through June 30, 2017 for Cycle 2 facilities). This annual audit report covers activities for the twenty-third year of the program.

Chapter 1: RECLAIM Universe

When RECLAIM was adopted in October 1993, a total of 394 facilities were identified as the initial "universe" of sources subject to the requirements of RECLAIM. From program adoption through June 30, 2016, the overall changes in RECLAIM participants were 131 facilities included into the program, 70 facilities excluded from the program, and 187 facilities ceased operation. Thus, the RECLAIM universe consisted of 268 active facilities at the end of Compliance Year 2015 (December 31, 2015 for Cycle 1 facilities and June 30, 2016 for Cycle 2 facilities). During Compliance Year 2016 (January 1, 2016 through December 31, 2016 for Cycle 1 facilities and July 1, 2016 through June 30, 2017 for Cycle 2 facilities), three facilities were included into the RECLAIM universe, one facility was excluded, and eight facilities (one facility in both the NOx and SOx universes and seven in the NOx universe only) shut down and are no longer in the active RECLAIM universe. These changes resulted in a net decrease of six facilities in the universe, bringing the total number of active RECLAIM facilities to 262 as of the end of Compliance Year 2016.

Chapter 2: RTC Allocations and Trading

On November 5, 2010, the Governing Board adopted amendments to SOx RECLAIM to phase in SOx reductions beginning in Compliance Year 2013 and full implementation in Compliance Year 2019 and beyond. The amendments will result in an overall reduction of 48.4% (or 5.7 tons/day) in SOx allocations when

fully implemented (Compliance Year 2019 and beyond). For Compliance Year 2016, the fourth year of implementation, the SOx allocation supply was reduced by 34% (or 4.0 tons/day, which is the same reduction as the previous compliance year) to 2,839 tons. On December 4, 2015, the Governing Board adopted amendments to NOx RECLAIM to phase in additional NOx reductions which began in Compliance Year 2016 and continue through Compliance Year 2022. The amendment will result in an overall NOx reduction of 45% (or 12 tons/day) when fully implemented for Compliance Year 2022 and beyond. For Compliance Year 2016, the first year of implementation, the NOx allocation supply was reduced by 7.4 % (or 2 tons/day).

The overall NOx RTC supply increased by 24.3 tons and the SOx RTC supply decreased by 3.3 tons during Compliance Year 2016. These changes were due to allocation adjustments for clean fuel production pursuant to Rule 2002(c)(12), and also to an increase in initial allocation from a facility inclusion.

Since the inception of the RECLAIM program in 1994, a total value of over $1.48 billion dollars has been traded in the RTC trading market, excluding swap trades. During calendar year 2017, there were 303 RTC trade registrations with a total value of $6.86 million traded, excluding the values reported for swap trades. RTC trades are reported to SCAQMD as either discrete-year RTC trades or infinite-year block (IYB) trades (trades that involve blocks of RTCs with a specified start year and continuing into perpetuity). In terms of volume traded in calendar year 2017, a total of 2,556 tons of discrete-year NOx RTCs, 793 tons of discrete-year SOx RTCs, 218 tons of IYB NOx RTCs and 34 tons of IYB SOx RTCs were traded. The RTC trading market activity decreased during calendar year 2017 compared to calendar year 2016, in terms of number of trades (by 8%), in total volume excluding swaps (by 5%), and in total value excluding swaps (by 94%).

The annual average prices of discrete-year NOx RTCs traded during calendar year 2017 were $2,203, $4,182, and $10,639 per ton for Compliance Years 2016, 2017, and 2018 RTCs, respectively. The annual average prices for discrete-year SOx RTCs traded during the same period were $636, $1,386, $4,800, and $4,800 per ton for Compliance Years 2016, 2017, 2019 and 2020 RTCs, respectively. There were no discrete-year SOx RTCs for Compliance Year 2018 traded in calendar year 2017.

Prices for discrete-year NOx and SOx RTCs for all compliance years are still well below the $44,070 per ton of NOx and $31,730 per ton of SOx discrete-year RTCs pre-determined overall program review thresholds established by the Governing Board pursuant to Health and Safety Code §39616(f), as well as the $15,000 per ton threshold pursuant to Rule 2015(b)(6).

The annual average price during calendar year 2017 for IYB NOx RTCs was $39,673 per ton and the annual average price for IYB SOx RTCs was $22,820 per ton. Therefore, annual average IYB RTC prices did not exceed the $661,045 per ton of IYB NOx RTCs or the $475,952 per ton of IYB SOx RTCs pre-determined overall program review thresholds established by the Governing Board pursuant to Health and Safety Code §39616(f).

Investors were again active in the RTC market during calendar year 2017. They were involved in 128 of the 193 discrete-year NOx trade registrations and six of the seven discrete-year SOx trade registrations with price. Investors were also

involved in all six of the IYB NOx and all four of the IYB SOx trades with price. Investors were involved in 61% of total value and 60% of total volume for discrete-year NOx trades, and 94% of both total value and total volume for discrete-year SOx trades. At the end of calendar year 2017, investors' holdings of IYB NOx RTCs and IYB SOx RTCs were slightly higher at 3.3% and 6.0% of the total RECLAIM RTCs, respectively, compared to that of calendar year 2016.

Chapter 3: Emission Reductions Achieved

For Compliance Year 2016, aggregate NOx emissions were below total allocations by 19% and aggregate SOx emissions were below total allocations by 29%. No emissions associated with breakdowns were excluded from reconciliation with facility allocations in Compliance Year 2016. Accordingly, no mitigation is necessary to offset excluded emissions due to approved Breakdown Emission Reports. Therefore, based on audited emissions, RECLAIM achieved its targeted emission reductions for Compliance Year 2016. With respect to the Rule 2015 backstop provisions, Compliance Year 2016 aggregate NOx and SOx emissions were both well below aggregate allocations and, as such, did not trigger the requirement to review the RECLAIM program.

Chapter 4: New Source Review Activity

The annual program audit assesses New Source Review (NSR) activity from RECLAIM facilities in order to ensure that RECLAIM is complying with federal NSR requirements and state no net increase (NNI) in emissions requirements while providing flexibility to facilities in managing their operations and allowing new sources into the program. In Compliance Year 2016, a total of seven NOx RECLAIM facilities had NSR NOx emission increases, and no SOx RECLAIM facilities had an NSR SOx emission increase due to expansion or modification. Consistent with all prior compliance years, there were sufficient NOx and SOx RTCs available to allow for expansion, modification, and modernization by RECLAIM facilities.

RECLAIM is required to comply with federal NSR emissions offset requirements at a 1.2-to-1 offset ratio programmatically for NOx emission increases and a 1-to-1 offset ratio for SOx emission increases on a programmatic basis. In Compliance Year 2016, RECLAIM demonstrated federal equivalency with a programmatic NOx offset ratio of 60-to-1 based on the compliance year's total unused allocations and total NSR emission increases for NOx. There were no SOx emission increases during the compliance year. RECLAIM inherently complies with the federally-required 1-to-1 SOx offset ratio for any compliance year, provided aggregate SOx emissions under RECLAIM are lower than or equal to aggregate SOx allocations for that compliance year. As shown in Chapter 3, there was no programmatic SOx exceedance during Compliance Year 2016. In fact, there was a surplus of SOx RTCs. Therefore, RECLAIM more than complied with the federally-required SOx offset ratio and further quantification of the SOx offset ratio is unnecessary. Compliance with the federally-required offset ratio also demonstrates compliance with any applicable state NNI requirements for new or modified sources. In addition, RECLAIM requires application of, at a minimum, California Best Available Control Technology (BACT), which is at least as stringent as federal Lowest Achievable Emission Rate (LAER). The same BACT guidelines are used to determine applicable BACT to RECLAIM and non-RECLAIM facilities.

Chapter 5: Compliance

Of the 284 NOx RECLAIM facilities audited during Compliance Year 2016, a total of 271 facilities (95%) complied with their NOx allocations, and 32 of the 33 SOx facilities (97%) complied with their SOx allocations. Thirteen facilities exceeded their allocations (12 facilities exceeded their NOx allocations, and one facility exceeded its NOx and SOx allocations) during Compliance Year 2016. The 13 facilities that exceeded their NOx allocations had aggregate NOx emissions of 278.6 tons and did not have adequate allocations to offset 8.3 tons (or 3.0%) of their combined emissions. The facility that exceeded its SOx allocation had total SOx emissions of 0.15 tons and did not have adequate allocations to offset 0.10 tons (or 66.7%). The NOx and SOx exceedance amounts are relatively small compared to the overall NOx and SOx allocations for Compliance Year 2016 (0.09% of total NOx allocations and less than 0.01% of total SOx allocations). The exceedances from these facilities did not impact the overall RECLAIM emission reduction goals. Pursuant to Rule 2010(b)(1)(A), these facilities had their respective exceedances deducted from their annual allocations for the compliance year subsequent to the date of SCAQMD's determination that the facilities exceeded their Compliance Year 2016 allocations. The overall RECLAIM NOx and SOx emission reduction targets and goals were met for Compliance Year 2016 (*i.e.*, aggregate emissions for all RECLAIM facilities were well below aggregate allocations).

Chapter 6: Reported Job Impacts

This chapter compiles data as reported by RECLAIM facilities in their Annual Permit Emissions Program (APEP) reports. The analysis focuses exclusively on job impacts at RECLAIM facilities and determination if those job impacts were directly attributable to RECLAIM as reported by those facilities. Additional benefits to the local economy (*e.g.*, generating jobs for consulting firms, source testing firms and CEMS vendors) attributable to the RECLAIM program, as well as factors outside of RECLAIM (*e.g.*, the prevailing economic climate), impact the job market. However, these factors are not evaluated in this report. Also, job losses and job gains are strictly based on RECLAIM facilities' reported information. SCAQMD staff is not able to independently verify the accuracy of the reported job impact information.

According to the Compliance Year 2016 employment survey data gathered from APEP reports, RECLAIM facilities reported a net loss of 982 jobs, representing 0.88% of their total employment. None of the eight RECLAIM facilities that shut down or ceased operations during Compliance Year 2016 cited RECLAIM as a factor contributing to the decision to shutdown. One facility reported a loss of 15 jobs due to RECLAIM, but they did not shut down operations.

Chapter 7: Air Quality and Public Health Impacts

Audited RECLAIM emissions have been in an overall downward trend since the program's inception. Compliance Year 2016 NOx emissions increased slightly (1.1%) relative to Compliance Year 2015, and Compliance Year 2016 SOx emissions were 3.4% less than the previous year. Quarterly calendar year 2016 NOx emissions fluctuated within seven percent of the mean NOx emissions for the year. Quarterly calendar year 2016 SOx emissions fluctuated within seven percent of the year's mean SOx emissions. There was no significant shift in

seasonal emissions from the winter season to the summer season for either pollutant.

The California Clean Air Act (CCAA) required a 50% reduction in population exposure to ozone, relative to a baseline averaged over three years (1986 through 1988), by December 31, 2000. The Basin achieved the December 2000 target for ozone well before the deadline. In calendar year 2017, the per capita exposure to ozone (the average length of time each person is exposed) continued to be well below the target set for December 2000.

Air toxic health risk is primarily caused by emissions of certain volatile organic compounds (VOCs) and fine particulates, such as metals. RECLAIM facilities are subject to the same air toxic, VOC, and particulate matter regulations as other sources in the Basin. All sources are subject, where applicable, to the NSR rule for toxics (Rule 1401 and/or Rule 1401.1). In addition, new or modified sources with NOx or SOx emission increases are required to be equipped with BACT, which minimizes to the extent feasible the increase of NOx and SOx emissions. RECLAIM and non-RECLAIM facilities that emit toxic air contaminants are required to report those emissions to SCAQMD. Those emissions reports are used to identify candidates for the Toxics Hot Spots program (AB2588). This program requires emission inventories and, depending on the type and amount of emissions, facilities may be required to do public notice and/or prepare and implement a plan to reduce emissions. There is no evidence that RECLAIM has caused or allowed higher toxic risk in areas adjacent to RECLAIM facilities.

INTRODUCTION

The South Coast Air Quality Management District (SCAQMD) REgional CLean Air Incentives Market (RECLAIM) program was adopted in October 1993 and replaced certain command-and-control rules regarding oxides of nitrogen (NOx) and oxides of sulfur (SOx) with a new market incentives program for facilities that meet the inclusion criteria. The goals of RECLAIM are to provide facilities with added flexibility in meeting emissions reduction requirements while lowering the cost of compliance. The RECLAIM program was designed to meet all state and federal Clean Air Act (CAA) and other air quality regulations and program requirements, as well as various other performance criteria, such as equivalent or better air quality improvement, enforcement, implementation costs, job impacts, and no adverse public health impacts.

Since RECLAIM represents a significant change from traditional command-and-control regulations, RECLAIM rules include provisions for program audits in order to verify that the RECLAIM objectives are being met. The rules provide for a comprehensive audit of the first three years of program implementation and for annual program audits. The audit results are used to help determine whether any program modifications are appropriate. SCAQMD staff has completed the initial tri-annual program audit and each individual annual program audit report through the 2016 Compliance Year Audit.

This report presents the annual program audit and progress report of RECLAIM's twenty-third compliance year (January 1 through December 31, 2016 for Cycle 1 and July 1, 2016 through June 30, 2017 for Cycle 2 RECLAIM facilities), also known as Compliance Year 2016. As required by Rule 2015(b)(1) – Annual Audits, this audit assesses:

- Emission reductions;
- Per capita exposure to air pollution;
- Facilities permanently ceasing operation of all sources;
- Job impacts;
- Annual average price of each type of RECLAIM Trading Credit (RTC);
- Availability of RTCs;
- Toxic risk reductions;
- New Source Review permitting activity;
- Compliance issues, including a list of facilities that were unable to reconcile emissions for that compliance year;
- Emission trends/seasonal fluctuations;
- Emission control requirement impacts on stationary sources in the program compared to other stationary sources identified in the Air Quality Management Plan (AQMP); and
- Emissions associated with equipment breakdowns.

The annual program audit report is organized into the following chapters:

1. ***RECLAIM Universe***
   This chapter discusses summarizes changes to the universe of RECLAIM sources that occurred up until July 1, 2016 (covered under the Annual RECLAIM Audit Report for 2015 Compliance Year), then discusses changes to the RECLAIM universe of sources in detail through the end of Compliance Year 2016.
2. ***RTC Allocations and Trading***
   This chapter summarizes changes in emissions allocations in the RECLAIM universe, RTC supply and RTC trading activity, annual average prices, availability of RTCs, and market participants.
3. ***Emission Reductions Achieved***
   This chapter assesses emissions trends and progress towards emission reduction goals for RECLAIM sources, emissions associated with equipment breakdowns, and emissions control requirement impacts on RECLAIM sources compared to other stationary sources. It also discusses the latest amendments to the RECLAIM program.
4. ***New Source Review Activity***
   This chapter summarizes New Source Review (NSR) activities at RECLAIM facilities.
5. ***Compliance***
   This chapter discusses compliance activities and the compliance status of RECLAIM facilities. It also evaluates the effectiveness of SCAQMD's compliance program, as well as the monitoring, reporting, and recordkeeping (MRR) protocols for NOx and SOx.
6. ***Reported Job Impacts***
   This chapter addresses job impacts and facilities permanently ceasing operation of all emission sources.
7. ***Air Quality and Public Health Impacts***
   This chapter discusses air quality trends in the South Coast Air Basin, seasonal emission trends for RECLAIM sources, per capita exposure to air pollution, and the toxic impacts of RECLAIM sources.

CHAPTER 1
RECLAIM UNIVERSE

Summary

When RECLAIM was adopted in October 1993, a total of 394 facilities were identified as the initial "universe" of sources subject to the requirements of RECLAIM. From program adoption through June 30, 2016, the overall changes in RECLAIM participants were 131 facilities included into the program, 70 facilities excluded from the program, and 187 facilities ceased operation. Thus, the RECLAIM universe consisted of 268 active facilities at the end of Compliance Year 2015 (December 31, 2015 for Cycle 1 facilities and June 30, 2016 for Cycle 2 facilities). During Compliance Year 2016 (January 1, 2016 through December 31, 2016 for Cycle 1 facilities and July 1, 2016 through June 30, 2017 for Cycle 2 facilities), three facilities were included into the RECLAIM universe, one facility was excluded, and eight facilities (one facility in both the NOx and SOx universes and seven in the NOx universe only) shut down and are no longer in the active RECLAIM universe. These changes resulted in a net decrease of six facilities in the universe, bringing the total number of active RECLAIM facilities to 262 as of the end of Compliance Year 2016.

Background

The RECLAIM program replaced the traditional "command-and-control" rules for a defined list of facilities participating in the program (the RECLAIM "universe"). The criteria for inclusion in the RECLAIM program are specified in Rule 2001 – Applicability. Facilities are generally subject to RECLAIM if they have NOx or SOx reported emissions greater than or equal to four tons per year in 1990 or any subsequent year. However, certain facilities are categorically excluded from RECLAIM. The categorically excluded facilities include dry cleaners; restaurants; police and fire fighting facilities; construction and operation of landfill gas control, landfill gas processing or landfill gas energy facilities; public transit facilities, potable water delivery operations; facilities that converted all sources to operate on electric power prior to October 1993; and facilities, other than electric generating facilities established on or after January 1, 2001, located in the Riverside County portions of the Mojave Desert Air Basin or the Salton Sea Air Basin.

Other categories of facilities are not automatically included but do have the option to enter the program. These categories include electric utilities (exemption only for the SOx program); equipment rental facilities; facilities possessing solely "various locations" permits; schools or universities; portions of facilities conducting research operations; ski resorts; prisons; hospitals; publicly-owned municipal waste-to-energy facilities; publically-owned sewage treatment facilities operating consistent with an approved regional growth plan; electrical power generating systems owned and operated by the Cities of Burbank, Glendale, or Pasadena or their successors; facilities on San Clemente Island; agricultural facilities; and electric generating facilities that are new on or after January 1, 2001 and located in the Riverside County portions of the Mojave Desert Air Basin or the Salton Sea Air Basin. An initial universe of 394 RECLAIM

facilities was developed using the inclusion criteria initially adopted in the RECLAIM program based on 1990, 1991 and 1992 facility reported emissions data.

A facility that is not in a category that is specifically excluded from the program may voluntarily join RECLAIM regardless of its emission level. Additionally, a facility may be required to enter the RECLAIM universe if:

- It increases its NOx and/or SOx emissions from permitted sources above the four ton per year threshold; or
- It ceases to be categorically excluded and its reported NOx and/or SOx emissions are greater than or equal to four tons per year; or
- It is determined by SCAQMD staff to meet the applicability requirements of RECLAIM, but was initially misclassified as not subject to RECLAIM.

At the time of joining RECLAIM, each RECLAIM facility is issued an annually declining allocation of emission credits ("RECLAIM Trading Credits" or "RTCs") based on its historic production level (if the facility existed prior to January 1, 1993), external offsets it previously provided, and any Emission Reduction Credits (ERCs) generated at and held by the facility. Each RECLAIM facility's RTC holdings constitute an annual emissions budget. RTCs may be bought or sold as the facility deems appropriate (see Chapter 2 – RTC Allocations and Trading).

RECLAIM facilities that permanently go out of business are removed from the active emitting RECLAIM universe. Prior to an October 7, 2016 amendment of Rule 2002, facilities that shutdown were allowed to retain all of their RTC holdings and participate in the trading market. For NOx RECLAIM facilities listed in Tables 7 and 8 that shutdown on or after October 7, 2016, the Rule 2002 amendment established a BARCT-based RTC discounting methodology that is more closely aligned to ERC discounting methodology under command and control rules. A shutdown facility may trade future year RTCs that remain after the RTC adjustment is completed, if any. If the calculated reduction amount exceeds a facility's holdings for any future compliance year, the facility must purchase and surrender sufficient RTCs to fulfill the entire reduction requirement. This situation may result if the facility previously sold its future year allocations.

Staff has periodically initiated the process of reviewing past Annual Emission Reports (AERs) from non-RECLAIM facilities to determine applicability of RECLAIM pursuant to Rule 2001(b) – Criteria for Inclusion in RECLAIM. Commencing in 2012, an annual review process was implemented. This facility inclusion process begins with SCAQMD staff compiling a list of non-RECLAIM (pollutant-specific) facilities that emitted NOx or SOx emissions greater than or equal to four tons per year, as reported under the AER program, for potential inclusion into RECLAIM. This part of the process involves screening for emissions only from equipment that are subject to RECLAIM (*e.g.*, emissions from on-site, off-road mobile sources are not included). From this initial list, each facility's business activities/operations are evaluated based on SCAQMD's records for possible categorical exemption pursuant to Rule 2001(i). Facilities that qualify under these categorical exemptions are removed from the list. The remaining facilities are informed of their potential inclusion into RECLAIM and are given the opportunity to provide records to demonstrate why the facility should

not be included under RECLAIM. This may include additional information about the facility's operations that would qualify it for categorical exemption from RECLAIM pursuant to Rule 2001(i), or correcting their AER-reported emissions with supporting documentation. Once a facility has qualified for inclusion, a draft facility permit is prepared, sent to the facility for comments, finalized and issued.

Future Inclusions

As part of the adoption Resolution of the Final 2016 AQMP in March of 2017, staff was directed to modify Control Measure CMB-05 – Further NOx Reductions from RECLAIM Assessment to achieve an additional five tons per day NOx emission reductions as soon as feasible but no later than 2025, and to transition the RECLAIM program to a command-and-control regulatory structure requiring Best Available Retrofit Control Technology (BARCT) level controls as soon as practicable. Additionally, California State Assembly Bill (AB) 617, approved in July 2017, required an expedited schedule for implementing BARCT at cap-and-trade facilities, under which RECLAIM are also subject, and required that the implementation of BARCT be no later than December 31, 2023.

On January 5, 2018, the Governing Board amended two rules, Rule 2001 – Applicability, and Rule 2002 – Allocations for Oxides of Nitrogen (NOx) and Oxides of Sulfur (SOx), to initiate the transition of the NOx and SOx RECLAIM program to a command-and-control regulatory structure as soon as practicable. As further discussed in Chapter 3 of this report, amended Rule 2001 commenced the initial steps of this transition by ceasing any future inclusions of facilities as of January 5, 2018 into NOx and SOx RECLAIM, whereas amended Rule 2002 established notification procedures for RECLAIM facilities for their transition out of the program and addressed the RTC holdings for the initial group of facilities that will be exited from RECLAIM. Staff has identified an initial group of 38 facilities that can potentially exit the NOx RECLAIM program because:

- The facility has no NOx emissions; or
- The facility's NOx emissions are solely from the combination of equipment exempt from obtaining a written permit pursuant to Rule 219 (unless the equipment would be subject to a command-and-control rule that it cannot reasonably comply with); or
- The facility has only various locations permits that are subject to command-and-control requirements; or
- The facility has NOx emitting equipment that meet current command-and-control BARCT rules.

Staff is continuing its efforts on transitioning all NOx RECLAIM sources to a command-and-control regulatory structure. Currently, the goal is to complete the transition by the first quarter of 2019.

Universe Changes

In the early years of the RECLAIM program, facilities initially identified for inclusion were excluded upon determination that they did not meet the criteria for inclusion (*e.g.*, some facilities that had reported emissions from permitted sources above four tons in a year were determined to have over-reported their emissions and subsequently submitted corrected emissions reports reflecting

emissions from permitted sources below four tons per year). Additionally, facilities that were not part of the original universe were subsequently added to the program based on the original inclusion criteria mentioned above. The overall changes to the RECLAIM universe from the date of adoption (October 15, 1993) through June 30, 2016 (the last day of Compliance Year 2015 for Cycle 2 facilities) were: the inclusion of 131 facilities (including 34 facilities created by partial change of operator of existing RECLAIM facilities), the exclusion of 70 facilities, and the shutdown of 187 facilities. Thus, the net change in the RECLAIM universe from October 15, 1993 through June 30, 2016 was a decrease of 126 facilities from 394 to 268 facilities. In Compliance Year 2016 (January 1, 2016 through December 31, 2016 for Cycle 1 facilities and July 1, 2016 through June 30, 2017 for Cycle 2 facilities), three facilities were included, one facility was excluded, and eight facilities shut down. These changes brought the total number of facilities in the RECLAIM universe to 262 facilities. The Compliance Year 2016 RECLAIM universe includes 232 NOx-only, no SOx-only, and 30 both NOx and SOx RECLAIM facilities. The list of active facilities in the RECLAIM universe as of the end of Compliance Year 2016 is provided in Appendix A.

Facility Inclusions and Exclusions

Three facilities were newly included into RECLAIM during Compliance Year 2016. One facility was included in NOx RECLAIM pursuant to Rule 2001(b) – Criteria for Inclusion in RECLAIM. This facility was included because it reported NOx emissions from permitted sources in excess of four tons a year. The two remaining facilities were included through change of operator; one facility created through a partial change of operator of an existing RECLAIM facility (one facility was split into two), and the second facility created through a complete change of operator from a previously shutdown RECLAIM facility. Appendix B lists these three facilities and the reasons for their inclusion.

One facility was excluded as a result of two adjacent facilities merging into one during Compliance Year 2016. Operations of the excluded facility were taken over by another RECLAIM facility operating at the same location.

Facilities Permanently Ceasing Operations

Eight RECLAIM facilities permanently ceased operations in Compliance Year 2016. One facility ceased operations, citing more attractive use of its land and resources. Three facilities liquidated or consolidated their operations and moved their operation outside of the region. The fifth facility ceased operations citing the high cost of manufacturing, production, and raw materials. The sixth facility inactivated all of its permits and consolidated its operations with two other company-owned facilities, one within the region and one outside the country. The seventh facility sold its property to a new operator with no permitted equipment remaining onsite. The eighth facility shutdown due to declining demand for its products. Seven of the eight facilities permanently ceasing operations were in NOx RECLAIM and one facility was in both NOx and SOx RECLAIM. Appendix C lists these facilities and provides brief descriptions of the reported reasons for their closures.

The above mentioned changes to the RECLAIM universe resulted in a net decrease of six facilities in the RECLAIM universe during Compliance Year 2016.

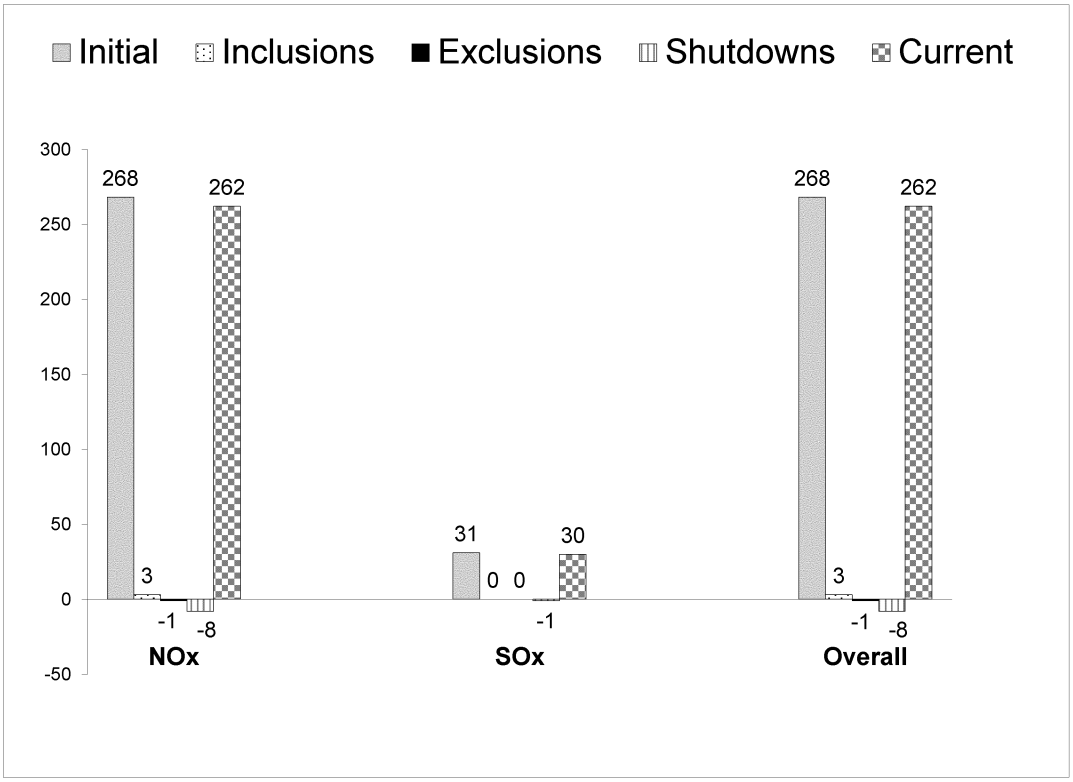
Table 1-1 summarizes overall changes in the RECLAIM universe between the start of the program and end of Compliance Year 2016 (December 31, 2016 for Cycle 1 facilities and June 30, 2017 for Cycle 2 facilities). Changes to the RECLAIM universe that occurred in Compliance Year 2016 are illustrated in Figure 1-1.

Table 1-1
RECLAIM Universe Changes

	NOx Facilities	SOx Facilities	Total* Facilities
Universe – October 15, 1993 (Start of Program)	392	41	394
Inclusions – October 15, 1993 through Compliance Year 2015	131	13	131
Exclusions – October 15, 1993 through Compliance Year 2015	-69	-4	-70
Shutdowns – October 15, 1993 through Compliance Year 2015	-186	-19	-187
Universe – June 30, 2016	268	31	268
Inclusions – Compliance Year 2016	3	0	3
Exclusions – Compliance Year 2016	-1	0	-1
Shutdowns – Compliance Year 2016	-8	-1	-8
Universe – End of Compliance Year 2016	262	30	262

* "Total Facilities" is not the sum of NOx and SOx facilities due to the overlap of some facilities being in both the NOx and SOx universes.

Figure 1-1
Universe Changes in Compliance Year 2016



CHAPTER 2
RTC ALLOCATIONS AND TRADING

Summary

On November 5, 2010, the Governing Board adopted amendments to SOx RECLAIM to phase in SOx reductions beginning in Compliance Year 2013 and full implementation in Compliance Year 2019 and beyond. The amendments will result in an overall reduction of 48.4% (or 5.7 tons/day) in SOx allocations when fully implemented (Compliance Year 2019 and beyond). For Compliance Year 2016, the fourth year of implementation, the SOx allocation supply was reduced by 34% (or 4.0 tons/day, which is the same reduction as the previous compliance year) to 2,839 tons. On December 4, 2015, the Governing Board adopted amendments to NOx RECLAIM to phase in additional NOx reductions which began in Compliance Year 2016 and continue through Compliance Year 2022. The amendment will result in an overall NOx reduction of 45% (or 12 tons/day) when fully implemented for Compliance Year 2022 and beyond. For Compliance Year 2016, the first year of implementation, the NOx allocation supply was reduced by 7.4 % (or 2 tons/day).

The overall NOx RTC supply increased by 24.3 tons and the SOx RTC supply decreased by 3.3 tons during Compliance Year 2016. These changes were due to allocation adjustments for clean fuel production pursuant to Rule 2002(c)(12), and also to an increase in initial allocation from a facility inclusion.

Since the inception of the RECLAIM program in 1994, a total value of over $1.48 billion dollars has been traded in the RTC trading market, excluding swap trades. During calendar year 2017, there were 303 RTC trade registrations with a total value of $6.86 million traded, excluding the values reported for swap trades. RTC trades are reported to SCAQMD as either discrete-year RTC trades or infinite-year block (IYB) trades (trades that involve blocks of RTCs with a specified start year and continuing into perpetuity). In terms of volume traded in calendar year 2017, a total of 2,556 tons of discrete-year NOx RTCs, 793 tons of discrete-year SOx RTCs, 218 tons of IYB NOx RTCs and 34 tons of IYB SOx RTCs were traded. The RTC trading market activity decreased during calendar year 2017 compared to calendar year 2016, in terms of number of trades (by 8%), in total volume excluding swaps (by 5%), and in total value excluding swaps (by 94%).

The annual average prices of discrete-year NOx RTCs traded during calendar year 2017 were $2,203, $4,182, and $10,639 per ton for Compliance Years 2016, 2017, and 2018 RTCs, respectively. The annual average prices for discrete-year SOx RTCs traded during the same period were $636, $1,386, $4,800, and $4,800 per ton for Compliance Years 2016, 2017, 2019 and 2020 RTCs, respectively. There were no discrete-year SOx RTCs for Compliance Year 2018 traded in calendar year 2017.

Prices for discrete-year NOx and SOx RTCs for all compliance years are still well below the $44,070 per ton of NOx and $31,730 per ton of SOx discrete-year RTCs pre-determined overall program review thresholds established by the

Governing Board pursuant to Health and Safety Code §39616(f), as well as the $15,000 per ton threshold pursuant to Rule 2015(b)(6).

The annual average price during calendar year 2017 for IYB NOx RTCs was $39,673 per ton and the annual average price for IYB SOx RTCs was $22,820 per ton. Therefore, annual average IYB RTC prices did not exceed the $661,045 per ton of IYB NOx RTCs or the $475,952 per ton of IYB SOx RTCs pre-determined overall program review thresholds established by the Governing Board pursuant to Health and Safety Code §39616(f).

Investors were again active in the RTC market during calendar year 2017. They were involved in 128 of the 193 discrete-year NOx trade registrations and six of the seven discrete-year SOx trade registrations with price. Investors were also involved in all six of the IYB NOx and all four of the IYB SOx trades with price. Investors were involved in 61% of total value and 60% of total volume for discrete-year NOx trades, and 94% of both total value and total volume for discrete-year SOx trades. At the end of calendar year 2017, investors' holdings of IYB NOx RTCs and IYB SOx RTCs were slightly higher at 3.3% and 6.0% of the total RECLAIM RTCs, respectively, compared to that of calendar year 2016.

Background

SCAQMD issues each RECLAIM facility emissions allocations for each compliance year, according to the methodology specified in Rule 2002 – Allocations for Oxides of Nitrogen (NOx) and Oxides of Sulfur (SOx). For facilities that existed prior to January 1, 1993, the allocation is calculated based on each facility's historic production levels as reported to SCAQMD in its annual emission reports (AERs), NOx emission factors listed in Tables 1, 3, and 6 of Rule 2002 or SOx emission factors in Tables 2 and 4 of Rule 2002 for the appropriate equipment category, any qualified[1] external offsets previously provided by the facility, and any unused Emission Reduction Credits (ERCs) generated at and held by the facility. Facilities entering RECLAIM after 1994 are issued allocations, if eligible, for the compliance year of entry and all years after, and Compliance Year 1994 allocations (also known as the facility's "Starting Allocation") for the sole purpose of establishing New Source Review trigger level.

These allocations are issued as RTCs, denominated in pounds of NOx or SOx with a specified 12-month term. Each RTC may only be used for emissions occurring within the term of that RTC. The RECLAIM program has two staggered compliance cycles—Cycle 1 with a compliance period of January 1 through December 31 of each year, and Cycle 2 with a compliance period of July 1 of each year through June 30 of the following year. Each RECLAIM facility is assigned to either Cycle 1 or Cycle 2 and the RTCs it is issued (if any) have corresponding periods of validity.

The issuance of allocations for future years provides RECLAIM facilities guidance regarding their future emission reduction requirements. Facilities can plan their compliance strategies by reducing actual emissions or securing needed RTCs through trade registrations (or a combination of the two), based on their operational needs.

[1] Only external offsets provided at a one-to-one offset ratio after the base year used for allocation quantification purposes.

RECLAIM facilities may acquire RTCs issued for either cycle through trading and apply them to emissions, provided that the RTCs are used for emissions occurring within the RTCs' period of validity and the trades are made during the appropriate time period. RECLAIM facilities have until 30 days after the end of each of the first three quarters of each compliance year to reconcile their quarterly and year-to-date emissions, and until 60 days after the end of each compliance year to reconcile their last quarter and total annual emissions by securing adequate RTCs. Please note that, although other chapters in this report present and discuss Compliance Year 2016 data, RTC trading and price data discussed in this chapter are for calendar year 2017.

RTC Allocations and Supply

The methodology for determining RTC allocations is established by Rule 2002. According to this rule, allocations may change when the universe of RECLAIM facilities changes, emissions associated with the production of re-formulated gasoline increase or decrease, reported historical activity levels are updated, or emission factors used to determine allocations are changed. In addition to these SCAQMD-allocated RTCs, RTCs may have been generated by conversion of emissions reduction credits from mobile and area sources pursuant to approved protocols. The total RTC supply in RECLAIM is made up of all RECLAIM facilities' allocations, conversions of ERCs owned by RECLAIM and non-RECLAIM facilities[2], emissions associated with the production of re-formulated gasoline, and conversion of emission reduction credits from mobile sources and area sources pursuant to approved protocols. As discussed in Chapter 3, Rule 2002 was amended in October 2016, to provide a BARCT-based discounting methodology for facilities that shutdown after the amendment. The SCAQMD Governing Board may adopt additional rules that affect RTC supply. Changes in the RTC supply during Compliance Year 2016 are discussed below.

Allocations Adjustments Due to Inclusion and Exclusion of Facilities

Facilities existing prior to October 1993 and entering RECLAIM after 1994 may receive allocations just like facilities that were included at the beginning of the program. However, allocations issued for these facilities are only applicable for the compliance year of entry and forward. In addition, these facilities are issued allocations and Non-tradable/Non-usable Credits for Compliance Year 1994 for the sole purpose of establishing their starting allocation to ensure compliance with offset requirements under Rule 2005 - New Source Review for RECLAIM and the trading zone restriction to ensure net ambient air quality improvement within the sensitive zone established by Health and Safety Code §40410.5. These Compliance Year 1994 credits are not allowed to be used to offset current emissions because they have expired. Similarly, if an existing facility that was previously included in RECLAIM is subsequently excluded because it is determined to be categorically excluded or exempt pursuant to Rule 2001(i) or to not have emitted four tons or more of NOx or SOx in a year, any RTCs it was issued upon entering RECLAIM are removed from the market upon its exclusion.

[2] The window of opportunity to convert ERCs to RTCs other than during the process of a non-RECLAIM facility entering the program closed June 30, 1994.

Of the three NOx facilities included in Compliance Year 2016, only one was issued allocations. A total of 1.1 tons per year of NOx allocations was issued to this facility entering RECLAIM in Compliance Year 2016.

Allocations Adjustments Due to Clean Fuel Production

Rule 2002(c)(12) – Clean Fuel Adjustment to Starting Allocation, provides refineries with RTCs to compensate for their actual emissions increases caused by the production of California Air Resources Board (CARB) Phase II reformulated gasoline. The amount of these RTCs is based on actual emissions for the subject compliance year and historical production data. The quantities of such clean fuels RTCs needed were projected based on the historical production data submitted, and qualifying refineries were issued in 2000 an aggregate baseline of 86.5 tons of NOx and 42.3 tons of SOx for Compliance Year 1999, 101.8 tons of NOx and 41.4 tons of SOx for Compliance Year 2000, and 98.4 tons of NOx and 40.2 tons of SOx for each subsequent Compliance Year on the basis of those projections. These refineries are required to submit, at the end of each compliance year in their Annual Permit Emissions Program (APEP) report, records to substantiate actual emission increases due solely to the production of reformulated gasoline. If actual emission increases for a subject year are different than the projected amount, the RTCs issued are adjusted accordingly (*i.e.*, excess RTCs issued are deducted if emissions were less than projected; conversely, additional RTCs are issued if emissions were higher than projected).

As a result of the amendment to Rule 2002 in January 2005 to further reduce RECLAIM NOx allocations, the NOx historical baseline Clean Fuel Adjustments for Compliance Year 2007 and subsequent years held by the facility were also reduced by the appropriate factors as stated in Rule 2002(f)(1)(A). On the other hand, Rule 2002(c)(12) provides refineries a Clean Fuels adjustment based on actual emissions. Therefore, each refinery is subject to an adjustment at the end of each compliance year equal to the difference between the amount of actual emission increases due solely to production of reformulated gasoline at each refinery and the amount of credits it was issued in 2000 after discounting by the factors for the corresponding compliance year. For Compliance Year 2016, the overall effect of adjusting NOx allocations to account for these differences was a total of 23.2 tons of NOx RTCs (0.26% of total NOx allocation for Compliance Year 2016) added to, and 3.3 tons of SOx RTCs (0.11% of total SOx allocation for Compliance Year 2016) deducted from, refineries' Compliance Year 2016 holdings.

Changes in RTC Allocations Due to Activity Corrections

RECLAIM facilities' allocations are determined by their reported historical activity levels (*e.g.*, fuel usage, material usage, or production) in their AERs. In the case where a facility's AER reported activity levels are updated within five years of the AER due date, its allocation is adjusted accordingly[3]. There were no changes in RTC allocations due to activity corrections in Compliance Year 2016.

[3] Pursuant to Rule 2002(b)(5) as amended on December 4, 2015, any AERs (including corrections) submitted more than five years after the original due date are not considered in the RTC quantification process.

Conversions of Other Types of Emission Reduction Credits

Conversions of Mobile Source Emission Reduction Credits (MSERCs) and other types of emission reduction credits, other than regular stationary source ERCs issued under Regulation XIII – New Source Review, to RTCs are allowed under Rule 2008 – Mobile Source Credits, and several programs under Regulation XVI – Mobile Source Offset Programs and Regulation XXV – Intercredit Trading. Conversion of these credits to RTCs is allowed based on the respective approved protocol specified in each rule. Currently, Rules 1610 – Old-Vehicle Scrapping and 1612 – Credits for Clean On-Road Vehicles allow the creation of MSERCs. However, there are no State Implementation Plan (SIP) approved protocols for conversion of MSERCs to RTCs. No new RTCs were issued by conversion of other types of emission reduction credits in Compliance Year 2016.

Net Changes in RTC Allocations

The changes to RTC supplies described in the above sections resulted in a net increase of 24.3 tons of NOx RTCs (0.27% of the total) and a decrease of 3.3 tons of SOx RTCs (0.11% of the total) for Compliance Year 2016. Table 2-1 summarizes the changes in NOx and SOx RTC supplies that occurred in Compliance Year 2016 pursuant to Rule 2002.

Table 2-1
Changes in NOx and SOx RTC Supplies during Compliance Year 2016 (tons/year)

Source	NOx	SOx
Universe changes	1.1	0
Clean Fuel/Reformulated Gasoline	23.2	-3.3
Activity corrections	0	0
MSERCs	0	0
Net change	**24.3**	**-3.3**

Note: The data in this table represents the changes that occurred over the course of Compliance Year 2016 to the Compliance Year 2016 aggregate NOx and SOx RTC supplies originally issued pursuant to Rule 2002, not the difference between 2016 aggregate RTC supply and that for any other compliance year.

Allocation Reduction Resulting from BARCT Review

Pursuant to California Health and Safety Code §40440, SCAQMD is required to monitor the advancement in BARCT and periodically re-assess the RECLAIM program to ensure that RECLAIM achieves equivalent emission reductions to the command-and-control BARCT rules it subsumes. This assessment is done periodically as part of AQMP development. This process resulted in 2003 AQMP Control Measure #2003 CMB-10 – Additional NOx Reductions for RECLAIM (NOx) calling for additional NOx reductions from RECLAIM sources. SCAQMD staff started the rule amendment process in 2003, including a detailed analysis of control technologies that qualified as BARCT for NOx, and held lengthy discussions with stakeholders—including regulated industry, environmental groups, the California Air Resources Board (CARB), and the United States Environmental Protection Agency (USEPA). On January 7, 2005, the Governing Board implemented CMB-10 by adopting changes to the RECLAIM program that resulted in a 22.5% reduction of NOx allocations from all RECLAIM facilities.

The reductions were phased in commencing in Compliance Year 2007 and have been fully implemented since Compliance Year 2011.

On November 5, 2010, the Governing Board adopted changes to the RECLAIM program implementing the 2007 AQMP Control Measure CMB-02 – Further SOx Reductions for RECLAIM (SOx). These amendments resulted in a BARCT-based overall reduction of 5.7 tons SOx per day when fully implemented in Compliance Year 2019 (the reductions are being phased in from Compliance Year 2013 through Compliance Year 2019: 3.0 tons per day in 2013; 4.0 tons per day in years 2014, 2015, and 2016; 5.0 tons per day in 2017 and 2018; and 5.7 tons per day starting in 2019 and continuing thereafter). This reduction in SOx is an essential part of the South Coast Air Basin's effort in attaining the federal 24-hour average PM2.5 standard by the year 2020.

Similarly, the 2012 AQMP adopted by the Governing Board in 2012, included Control Measure CMB-01- Further NOx Reductions for RECLAIM that identified a new group of RECLAIM NOx emitting equipment that should be reviewed for new BARCT. The rulemaking process for the amendment to the NOx RECLAIM program implementing CMB-01 started in 2012. On December 4, 2015, the Governing Board adopted amendments to the RECLAIM rules that resulted in an additional reduction of 12 tons of NOx per day (45% reduction) when fully implemented in Compliance Year 2022. The reductions are being phased-in with 2 tons per day in Compliance Year 2016 and 2017, 3 tons per day in Compliance Year 2018, 4 tons per day in Compliance Year 2019, 6 tons per day in Compliance Year 2020, 8 tons per day in Compliance Year 2021 and 12 tons per day in Compliance Year 2022 and thereafter.

Figure 2-1 illustrates the total NOx RTC supply through the end of Compliance Year 2023 incorporating all the changes discussed above. Figure 2-2 illustrates the total SOx RTC supply through the end of Compliance Year 2020 incorporating the changes discussed.

Figure 2-1
NOx RTC Supply

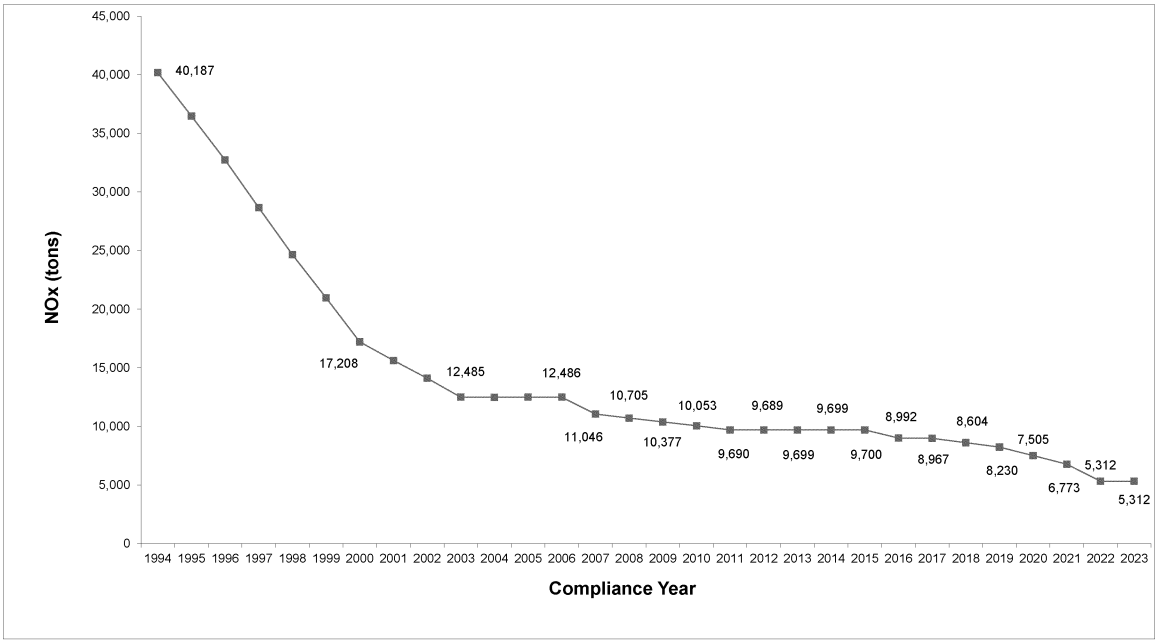
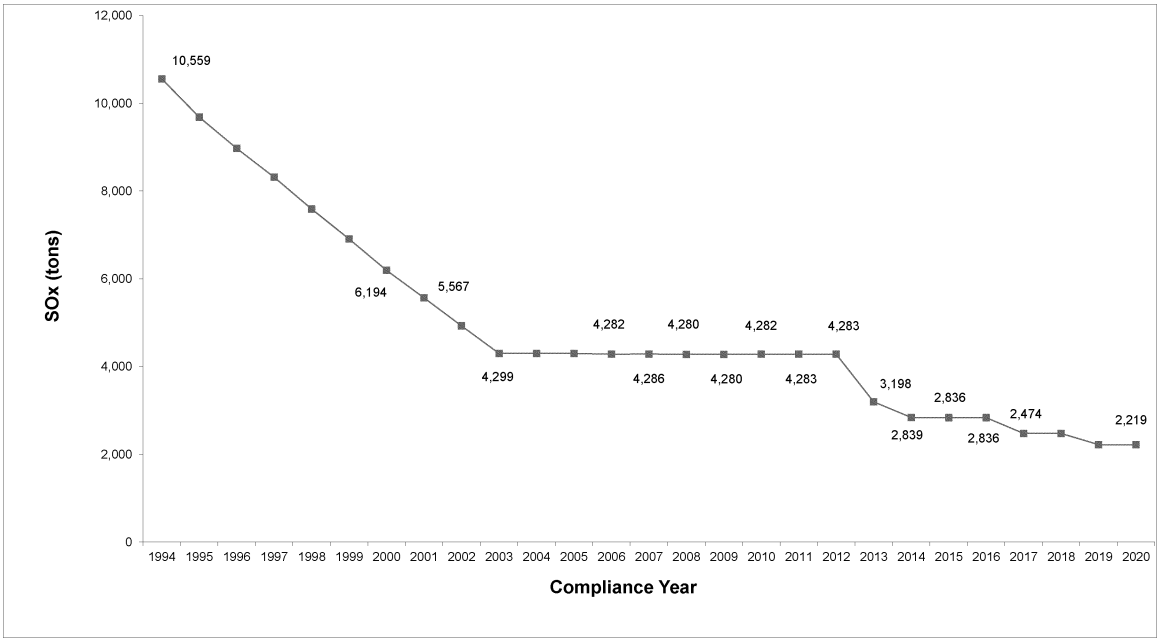


Figure 2-2
SOx RTC Supply



RTC Trades

RTC Price Reporting Methodology

RTC trades are reported to SCAQMD as one of two types: discrete-year RTC transactions or infinite-year block (IYB) transactions (trades that involve blocks of RTCs with a specified start year and continuing into perpetuity). Prices for discrete-year trades are reported in terms of dollars per pound and prices for IYB trades are reported as total dollar value for total amount of IYB RTCs traded. In addition, the trading partners are required to identify any swap trades. Swap trades occur when trading partners exchange different types of RTCs. These trades maybe of equal value or different values, in which case some amount of money or credits are also included in swap trades (additional details on swap trades are discussed later in this chapter). Prices reported for swap trades are based on the agreed upon value of the trade by the participants, and do not involve exchange of funds for the total value agreed upon. As such, the reported prices for swap trades can be somewhat arbitrary, and are therefore excluded from the calculation of annual average prices. Annual average prices for discrete-year RTCs are determined by averaging prices of RTCs for each compliance year, while the annual average price for IYB RTCs are determined based on the amount of IYB RTCs (*i.e.,* the amount of RTCs in the infinite stream) regardless of the start year.

RTC Price Thresholds for Program Review

Rule 2015(b)(6) specifies that, if the annual average price of discrete-year NOx or SOx RTCs exceeds $15,000 per ton, the Executive Officer will conduct an evaluation and review of the compliance and enforcement aspects of RECLAIM. The Governing Board has also established average RTC price overall program review thresholds pursuant to Health and Safety Code §39616(f). Unlike the $15,000 per ton threshold for review of the compliance and enforcement aspects of RECLAIM, these overall program review thresholds are adjusted by CPI each year. In addition, according to Rule 2002(f)(1)(S), if the annual average price of discrete-year SOx RTCs for any compliance year from 2017 through 2019 exceeds $50,000 per ton, the Governing Board has the discretion to convert facilities' Nontradable/Nonusable RTCs to Tradable/Usable RTCs. Similarly, Rule 2002(f)(1)(H) specifies that in the event that the NOx RTC prices exceed $22,500 per ton (current compliance year credits) based on the 12-month rolling average, or exceed $35,000 per ton (current compliance year credits) based on the 3-month rolling average calculated pursuant to subparagraph (f)(1)(E), the Executive Officer will report the determination to the Governing Board. If the Governing Board finds that the 12-month rolling average RTC price exceeds $22,500 per ton or the 3-month rolling average RTC price exceeds $35,000 per ton, then the Non-tradable/Non-usable NOx RTCs, as specified in subparagraphs (f)(1)(B) and (f)(1)(C) valid for the period in which the RTC price is found to have exceeded the applicable threshold, shall be converted to Tradable/Usable NOx RTCs upon Governing Board concurrence. For RTC trades occurring in calendar year 2017, the overall program review thresholds in 2017 dollars, pursuant to Health and Safety Code §39616(f), are $44,070 per ton of discrete-year NOx RTCs, $31,730 per ton of discrete-year SOx RTCs, $661,045 per ton of IYB NOx RTCs, and $475,952 per ton of IYB SOx RTCs.

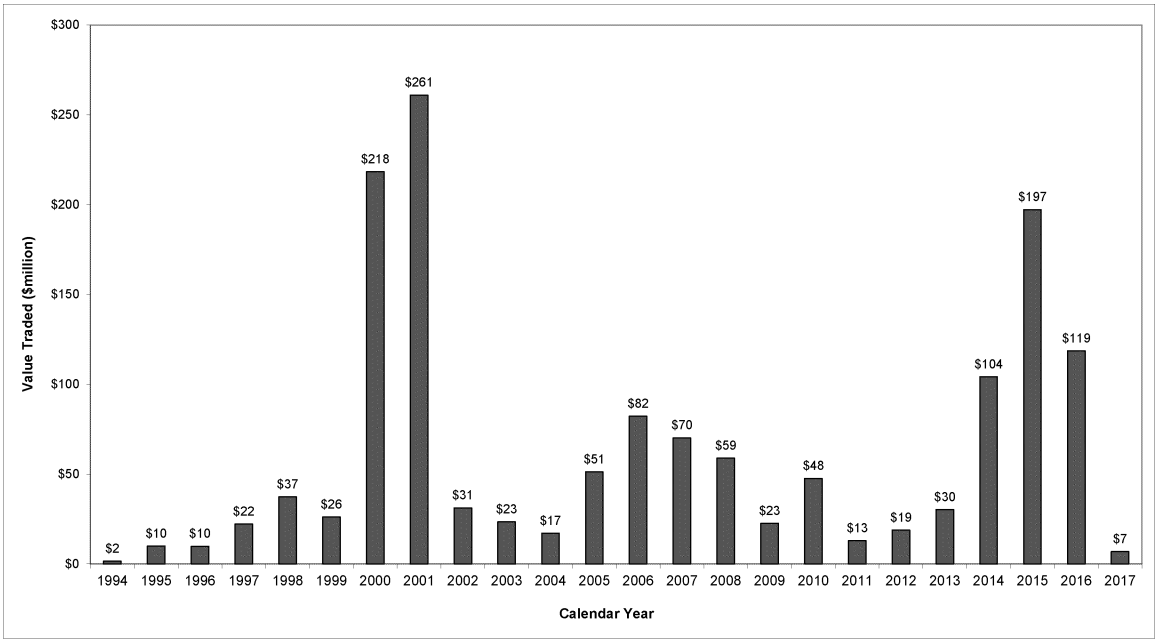
RTC Trading Activity Excluding Swaps

Overall Trading Activity

RTC trades include discrete-year and IYB RTCs traded with prices, discrete-year and IYB RTC transfers with zero price, and discrete-year and IYB RTC swap trades. The RTC market activity in calendar year 2017 was slightly lower (decreased by eight percent) when compared to the market activity in calendar year 2016 in terms of the number of trades. The calendar year 2017 trading activity—303 total registered trades (277 NOx trades and 26 SOx trades)—was slightly lower than the number of trades in calendar year 2016 (329 total registered trades; 305 NOx trades and 24 SOx trades).

In comparison to calendar year 2016, the value traded in calendar year 2017 was substantially lower (decreased by 94%). Excluding swap trades, a total value of $6.86 million was traded in calendar year 2017 ($6.01 million for NOx and $0.85 million for SOx)—considerably lower than the total value of $118.6 million traded in calendar year 2016 ($118.4 million for NOx and $0.21 million for SOx). Figure 2-3 illustrates the annual value of RTCs traded in RECLAIM since the inception of the program.

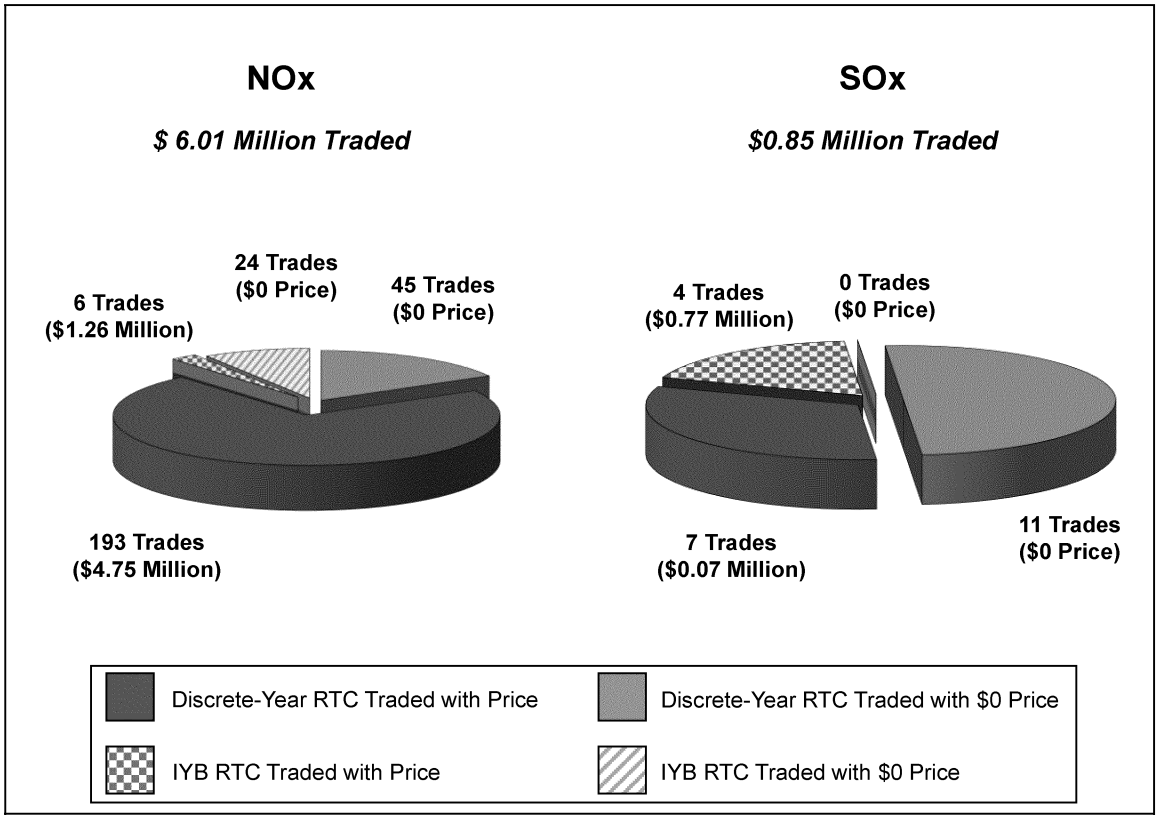
Figure 2-3
Annual Trading Values for NOx and SOx (Excluding Swaps)



With respect to total volume traded (excluding swap trades), 3,601 tons were traded in calendar year 2017, which is 5% less than the 3,795 tons traded in calendar year 2016. For discrete-year RTCs (also excluding swap trades) volume traded in calendar year 2017, the 3,350 tons were greater than the 2,790 tons of discrete-year RTCs traded in calendar year 2016. In calendar year 2017, there were 1,533 tons of discrete-year NOx RTCs and 65 tons of discrete-year SOx RTCs traded with price, and 1,023 tons of discrete-year NOx RTCs and 728 tons of discrete-year SOx RTCs traded without price. In addition, the 252 tons of IYB RTCs traded in calendar year 2017 were much lower than the 1,005 tons of

IYB RTCs traded in 2016. There were 32 tons of IYB NOx RTCs and 34 tons of IYB SOx RTCs traded with price and 186 tons of IYB NOx RTCs traded with zero price and 0 tons of IYB SOx RTCs traded with zero price. Figure 2-4 summarizes overall trading activity (excluding swaps) in calendar year 2017 by pollutant. Additional information on the discrete-year and IYB trading activities, value, and volume are discussed later in this chapter.

Figure 2-4
Calendar Year 2017 Overall Trading Activity (Excluding Swaps)



There were 80 trades with zero price in calendar year 2017. RTC transfers with zero price generally occur when a seller transfers or escrows RTCs to a broker pending transfer to the purchaser with price, when there is a transfer between facilities under common operator, when a facility is retiring RTCs for a settlement agreement or pursuant to variance conditions, or when there is a transfer between facilities that have gone through a change of operator. Trades with zero price also occur when the trading parties have mutual agreements where one party provides a specific service (*e.g.,* providing steam or other process components) for the second party. In return, the second party will transfer the RTCs necessary to offset emissions generated from the service. In calendar year 2017, the majority of trades with zero price were transfers between facilities under common ownership and facilities that underwent a change of operator.

Discrete-Year RTC Trading Activity

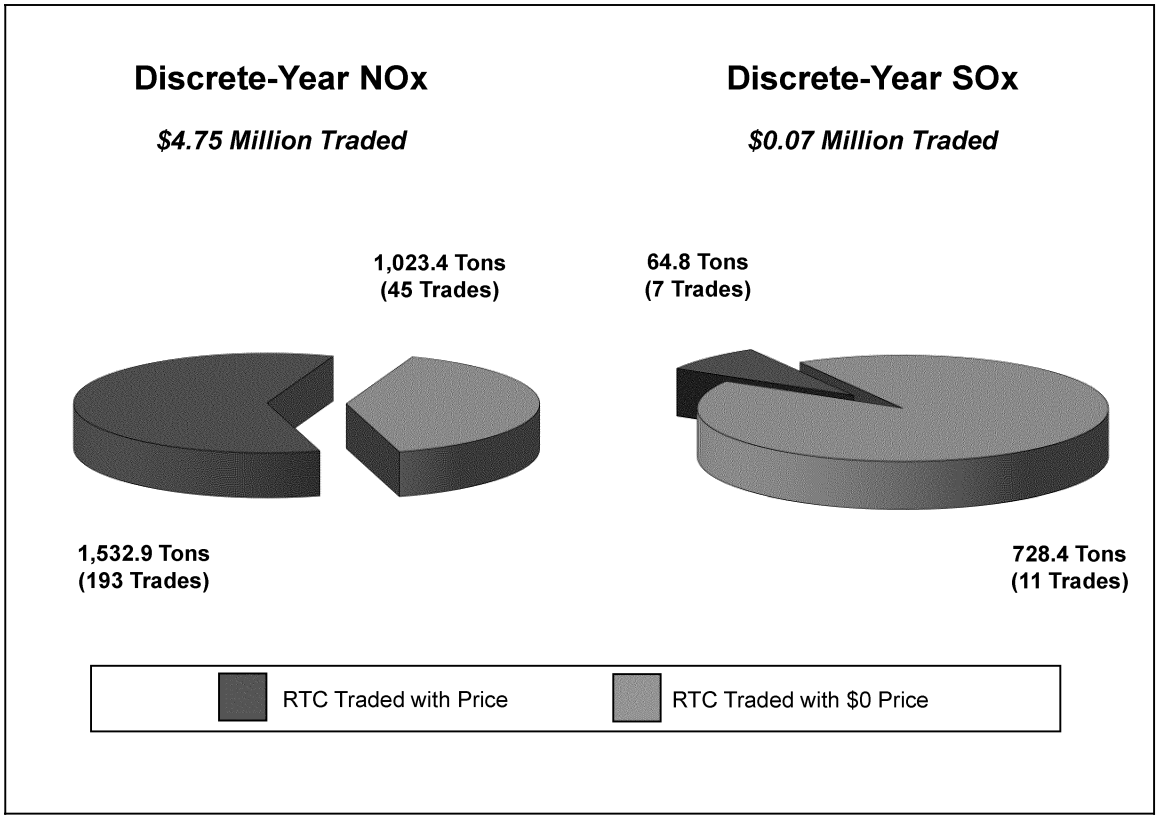
In calendar year 2017, there were a total of 238 discrete-year NOx RTC trades (193 trades with price and 45 trades with zero price) and 18 discrete-year SOx

RTC trades (seven trades with price and 11 trades with zero price), excluding swap trades. The trading of discrete-year NOx RTCs included RTCs for Compliance Years 2016 through 2018. The trading of discrete-year SOx RTCs included RTCs for Compliance Years 2016, 2017, 2019 and 2020.

Total discrete-year RTC trading values increased in calendar year 2017. The 193 NOx trades with price totaled $4.75 million in value, up from $3.7 million in calendar year 2016. However, the seven discrete-year SOx trades with price totaled $0.07 million in value, which is less than the $0.08 million traded in calendar year 2016.

In calendar year 2017, the overall quantities of discrete-year NOx RTCs traded were 2,556 tons which is higher than the 2,173 tons of NOx RTCs traded in calendar year 2016. The 793 tons of discrete-year SOx RTC traded in calendar year 2017 was higher than the 617 tons traded in calendar year 2016. There were 1,533 tons of discrete-year NOx RTCs traded with price in calendar year 2017, a slight increase (6%) from the 1,449 tons of NOx in 2016. However, the 65 tons of discrete-year SOx RTCs traded in 2017 is much less (51%) than the 134 tons of SOx RTCs traded in 2016. In addition, there were 1,023 tons of discrete-year NOx RTCs traded with zero price (increased from 724 tons of NOx in 2016) and 728 tons of discrete-year SOx RTCs traded with zero price (an increase from 483 tons of SOx in 2016). Figure 2-5 illustrates the trading activity of discrete-year RTCs (excluding swaps) for calendar year 2017.

Figure 2-5
Calendar Year 2017 Trading Activity for Discrete-Year RTCs (Excluding Swaps)



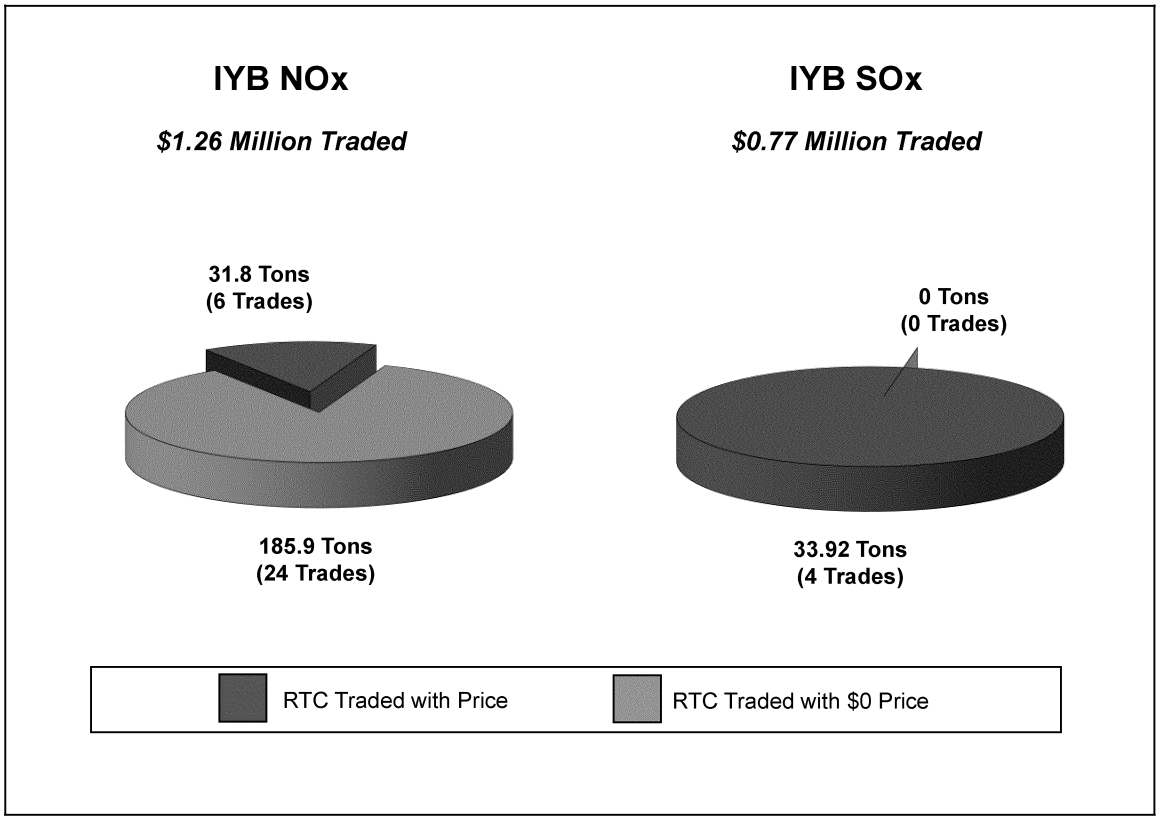
IYB RTC Trading Activity

In calendar year 2017, there were 30 IYB NOx trades and four IYB SOx trades, excluding swaps. The IYB NOx trades included RTCs with Compliance Years 2017, 2018, and 2019 as start years, while the IYB SOx trades had RTCs with Compliance Years 2018 and 2019 as start years. Of the 30 IYB NOx trades, six trades were with price and 24 trades were with zero price. All four IYB SOx trades were with price, and there were none with zero price.

The six IYB NOx trades with price totaling $1.26 million in calendar year 2017 were significantly lower in value than the $114.7 million in 2016. The four IYB SOx RTC trades with price with total value of $0.77 million traded in calendar year 2017 was higher than the value of $0.13 million traded in 2016.

The total quantity of 218 tons of IYB NOx RTCs traded in calendar year 2017 was significantly lower than the 613 tons traded in calendar year 2016. The quantity traded with price in calendar year 2017 was 32 tons, which was also significantly lower than the 302 tons traded with price in calendar year 2016. The total quantity of 34 tons of IYB SOx RTCs traded in calendar year 2017 was significantly less than the 392 tons of IYB SOx RTCs traded in calendar year 2016. The quantity traded with price in calendar year 2017 was 34 tons, which was higher than the 2.5 tons of IYB SOx RTCs traded with price in calendar year 2016. In calendar year 2017, there were also 186 tons of IYB NOx RTCs traded without price (decreased from 311 tons of NOx in 2016), while there were no IYB SOx RTCs traded without price (a decrease from 390 tons of SOx in 2016). As described earlier, the majority of these transfers were between facilities under common ownership and facilities that had a change of operator. Figure 2-6 illustrates the calendar year 2017 IYB RTC trading activity excluding swap trades.

Figure 2-6
Calendar Year 2017 Trading Activity for IYB RTCs (Excluding Swaps)



Prior to the amendment of Rule 2007 – Trading Requirements in May 2001, swap information and details of discrete-year and IYB trades were not required to be provided by trade participants. In compiling data for calendar years 1994 through part of 2001, any trade registration involving IYB RTCs was considered as a single IYB trade and swap trades were assumed to be nonexistent. Trading activity since inception of the RECLAIM program is illustrated in Figures 2-7 through 2-10 (discrete-year NOx trades, discrete-year SOx trades, IYB NOx trades, and IYB SOx trades, respectively) based on the trade reporting methodology described earlier in this report.

Figure 2-7
Discrete-Year NOx RTC Trades (Excluding Swaps)

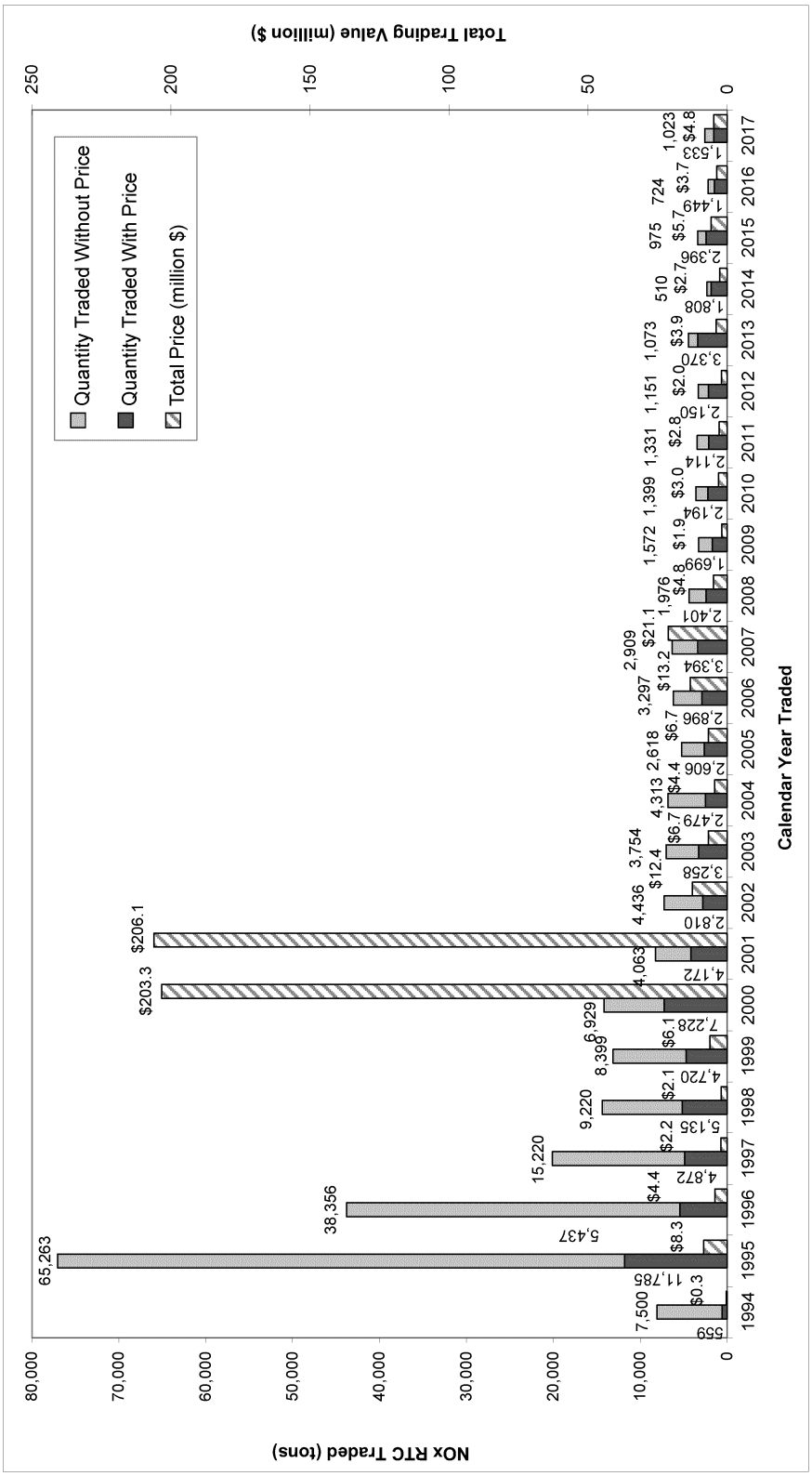


Figure 2-8
Discrete-Year SOx RTC Trades (Excluding Swaps)

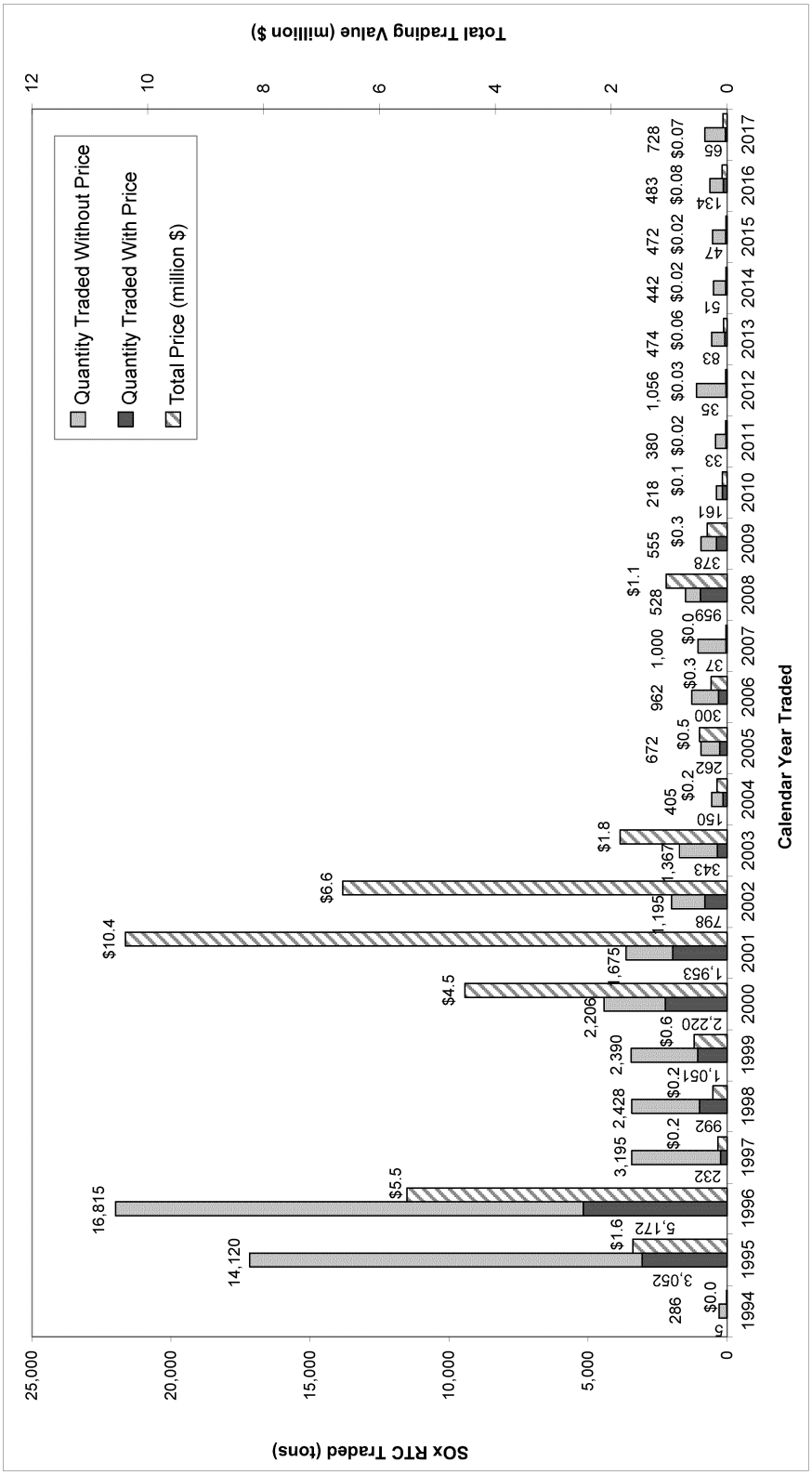


Figure 2-9
IYB NOx RTC Trades (Excluding Swaps)

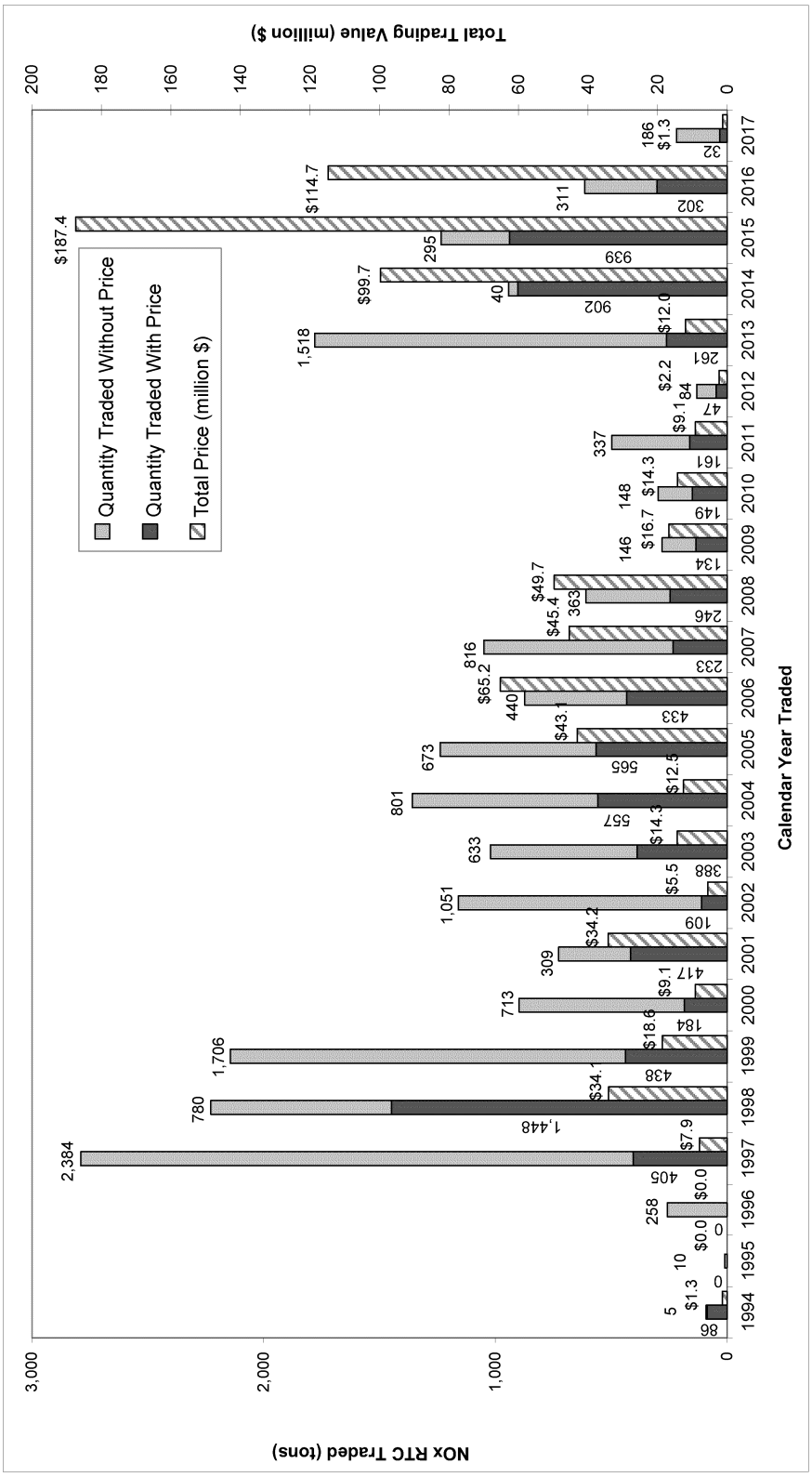
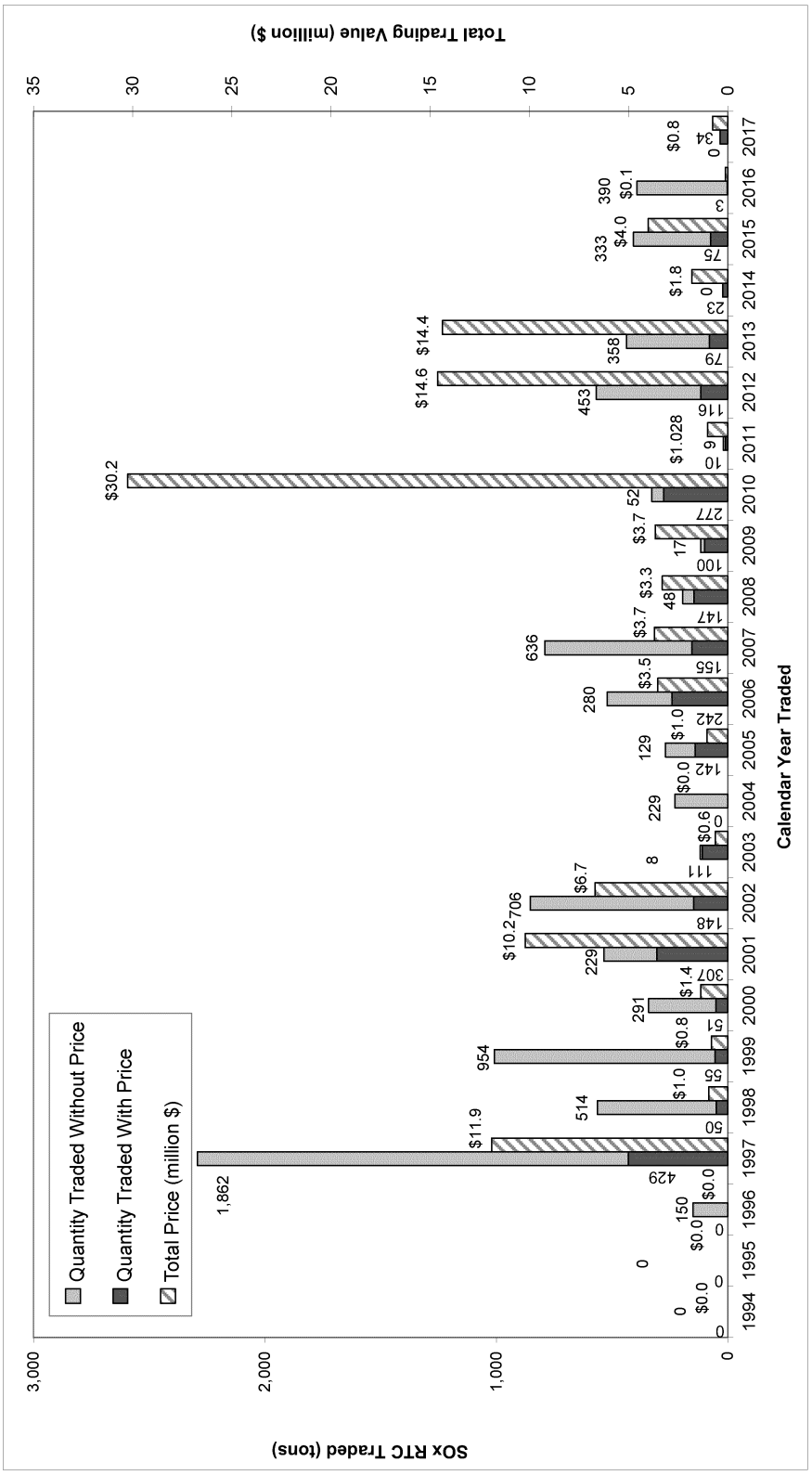


Figure 2-10
IYB SOx RTC Trades (Excluding Swaps)



Swap Trades

In addition to traditional trades of RTCs for a price, RTC swaps also occurred between trading partners. Most of the swap trades were exchanges of RTCs with different zones, cycles, expiration years, and/or pollutants. Some swaps involved a combination of RTCs and cash payment as a premium. There were also swaps of RTCs for ERCs. Trading parties swapping RTCs were required to report the agreed upon price of RTCs for each trade even though, with the exception of the above-described premiums, no money was actually exchanged. Almost $1.6 million in total value was reported from RTCs that were swapped in calendar year 2017, of which two trades involved swapping IYB NOx RTCs for IYB SOx RTCs and were collectively valued at a total of $0.625 million. The swap values are based on the prices reported on the RTC trade registrations. Since RTC swap trades occur when two trading partners exchange RTCs, values reported on both trades involved in the exchange are included in the calculation of the total value reported. However, in cases where commodities other than RTCs are involved in the swap, these commodity values are not included in the above reported total value (*e.g.,* in the case of a swap of NOx RTCs valued at $10,000 for another set of RTCs valued at $8,000 together with a premium of $2,000, the value of such a swap would have been reported at $18,000 in Table 2-2).

For calendar years that have swap trades with large values (*e.g.,* 2009) the inclusion of swap trades in the average trade price calculations would have resulted in calculated annual average prices dominated by swap trades, and therefore, potentially not representative of market prices actually paid for RTCs. Prices of swap trades are excluded from analysis of average trade prices because the values of the swap trades are solely based upon prices agreed upon between trading partners and do not reflect actual funds transferred. Tables 2-2 and 2-3 present the calendar years' 2001 through 2017 RTC swaps for NOx and SOx, respectively.

Table 2-2
NOx Registrations Involving Swaps*

Year	Total Value ($ millions)	IYB RTC Swapped with Price (tons)	Discrete-Year RTC Swapped with Price (tons)	Number of Swap Registrations with Price	Total Number of Swap Registrations
2001	$24.29	6.0	612.2	71	78
2002	$14.31	64.3	1,701.7	94	94
2003	$7.70	69.9	1,198.1	64	64
2004	$3.74	0	1,730.5	90	90
2005	$3.89	18.7	885.3	53	53
2006	$7.29	14.8	1,105.9	49	49
2007	$4.14	0	820.0	43	49
2008	$8.41	4.5	1,945.8	48	50
2009	$55.76	394.2	1,188.4	37	42
2010	$3.73	18.2	928.5	25	31
2011	$2.00	0	775.5	25	32
2012	$1.29	0	928.1	36	36
2013	$2.41	11.6	1,273.5	44	44
2014	$3.24	28.5	489.6	25	25
2015	$6.77	31.0	317.0	15	15
2016	$2.18	1.8	622.8	22	22
2017	$0.87	3.6	31.0	9	9

* Swaps without price are strictly transfers of RTCs between trading partners and their respective brokers. Information regarding swap trades was not required prior to May 9, 2001.

Table 2-3
SOx Registrations Involving Swaps*

Year	Total Value ($ millions)	IYB RTC Swapped with Price (tons)	Discrete-Year RTC Swapped with Price (tons)	Number of Swap Registrations with Price	Total Number of Swap Registrations
2001	$1.53	18.0	240.0	3	4
2002	$6.11	26.6	408.4	30	30
2003	$5.88	20.9	656.0	32	32
2004	$0.39	0	161.8	13	13
2005	$2.16	43.5	227.8	13	14
2006	$0.02	0	24.4	2	2
2007	$0.00	0	0	0	0
2008	$0.40	0	197.0	5	8
2009	$3.63	55.3	401.3	9	10
2010	$6.89	79.4	417.0	16	18
2011	$0.25	0	228.5	3	4
2012	$27.01	100.0	7.5	4	4
2013	$0.33	3.1	5.5	2	2
2014	$0.01	0.0	14.8	1	1
2015	$0	0.0	0	0	0
2016	$3.68	39.6	44.2	3	3
2017	$0.73	5.0	5.9	4	4

* Swaps without price are strictly transfers of RTCs between trading partners and their respective brokers. Information regarding swap trades was not required prior to May 9, 2001.

RTC Trade Prices (Excluding Swaps)

Discrete-Year RTC Prices

Tables 2-4 and 2-5 list the annual average prices for discrete-year NOx and SOx RTCs traded from calendar years 2012 through 2017. The table shows that all annual average prices for discrete-year NOx and SOx RTCs were well below the $44,070 per ton of NOx and $31,730 per ton of SOx discrete-year RTCs pre-determined overall program review thresholds established by the Governing Board pursuant to Health and Safety Code §39616(f), and as well as, the $15,000 threshold specified under Rule 2015(b)(6) for reviews of the compliance aspects of the program.

Table 2-4
Annual Average Prices for Discrete-Year NOX RTCs during Calendar Years 2012 through 2017 (Price per ton)

RTC Compliance Year	Calendar Year during which RTCs Traded					
	2012	2013	2014	2015	2016	2017
2011	577.50					
2012	1,162.20	548.92				
2013	4,053.49	1,080.49	1,064.97			
2014		1,880.92	1,909.69	1,038.82		
2015		1,000.00	3,779.00	1,642.05	1,625.75	
2016		1,500.00		2,833.39	2,926.90	2,202.90
2017		3,000.00		4,019.76	6,606.21	4,181.75
2018		3,800.00		6,006.11		10,639.19
2019				8,066.67		

Table 2-5
Annual Average Prices for Discrete-Year SOX RTCs during Calendar Years 2012 through 2017 (Price per ton)

RTC Compliance Year	Calendar Year during which RTCs Traded					
	2012	2013	2014	2015	2016	2017
2011	450.27					
2012	759.32	291.40				
2013		485.05	377.75			
2014			400.00	483.40		
2015		900.00		380.00	540.29	
2016		900.00			1,254.55	635.83
2017						1,385.71
2018						
2019						4,800.00
2020						4,800.00

Rolling Average NOx and SOx RTCs Price Report

On December 4, 2015, the Governing Board amended Rule 2002 to change the 12-month rolling average price of NOx RTCs for all trades for the current compliance year, excluding RTC trades reported at no price and swap transactions to a $22,500 per ton threshold. It also established a new $35,000 per ton threshold for the three-month rolling average price of current compliance year NOx RTCs and a $200,000 per ton "price-floor" threshold for the twelve-month rolling average price of IYB NOx RTCs that will become effective in 2019. The reporting of the three-month rolling average prices for current compliance year's NOx RTCs and the twelve-month rolling average prices of IYB NOx RTCs started on May 1, 2016.

The December 2015 amendments directed the Executive Officer to report to the Governing Board if (a) the cost of current compliance year NOx RTCs exceeds $22,500 per ton based on the twelve-month rolling average price, or (b) $35,000 per ton based on the three-month rolling average price. If either (a) or (b) above occurs, the Governing Board may convert the Non-tradable/Non-usable NOx

RTCs valid for the period in which the RTC price(s) exceeded an applicable threshold to Tradable/Usable NOx RTCs pursuant to Rule 2002(f)(1)(H). Additionally, the Executive Officer's report to the Governing Board will include a "commitment and schedule to conduct a more rigorous control technology implementation, emission reduction, cost-effectiveness, market analysis, and socioeconomic impact assessment of the RECLAIM program." Furthermore, Rule 2002 (f)(1)(I) requires the Executive Officer to calculate the twelve-month rolling average price of IYB NOx RTCs. Beginning in Compliance Year 2019, the Executive Officer needs to report to the Governing Board when the price of IYB NOx RTCs falls below $200,000 per ton.

Starting January 2017, the Executive Officer is calculating and reporting the twelve-month rolling average prices for current compliance year SOx RTCs as required by the November 5, 2010 amendment to Rule 2002. The amendment established the $50,000 per ton of SOx RTC threshold. In the event that the SOx RTC price threshold is exceeded, the Governing Board will decide whether or not to convert any portion of the Non-tradable/Non-usable SOx RTCs to Tradable/Usable SOx RTCs.

Tables 2-6 through 2-9 list the various rolling average prices described above. The average NOx and SOx RTC prices have all remained well below the applicable reporting thresholds. The IYB NOx price descended below the $200,000 per ton "price-floor" threshold starting with the September 2017 report, which covered the period of September 2016 through August 2017. For this report, a large volume trade valued at $250,000 per ton made in August 2016 was no longer included in the September 2017 twelve-month rolling average price report. The IYB NOx twelve-month rolling average price then remained constant until the January 2018 report, which covered the period of January 2017 through December 2017. A low volume trade priced at $310,000 per ton made in December 2016 also was no longer included in the January 2018 twelve-month rolling average price report, while all remaining trades made in calendar year 2017 were priced at $150,000 per ton and below. Additionally, a large volume of IYB NOx RTCs were purchased by an investor in December 2017 for only $11,000 per ton, further dropping the January 2018 price per ton twelve-month rolling average. It is likely this trend will continue due to an ongoing rulemaking initiative to transition the NOx RECLAIM program to a command-and-control regulatory structure, and therefore, increase the uncertainty over the future utility of NOx RTCs.

Table 2-6
Twelve-Month Rolling Average Prices of Calendar Year 2017 Discrete-Year NOx RTCs

Reporting Month	12-Month Period	Average Price ($/ton)
January 2017	January 2016 through December 2016	$6,606
February 2017	February 2016 through January 2017	$6,446
March 2017	March 2016 through February 2017	$6,970
April 2017	April 2016 through March 2017	$6,581
May 2017	May 2016 through April 2017	$6,519
June 2017	June 2016 through May 2017	$6,519
July 2017	July 2016 through June 2017	$6,450
August 2017	August 2016 through July 2017	$6,355
September 2017	September 2016 through August 2017	$6,351
October 2017	October 2016 through September 2017	$6,323
November 2017	November 2016 through October 2017	$5,324
December 2017	December 2016 through November 2017	$5,155
January 2018	January 2017 through December 2017	$4,182

Table 2-7
Three-Month Rolling Average Prices of Calendar Year 2017 Discrete-Year NOx RTCs

Reporting Month	12-Month Period	Average Price ($/ton)
January 2017	October 2016 through December 2016	$7,561
February 2017	November 2016 through January 2017	$6,971
March 2017	December 2016 through February 2017	$6,962
April 2017	January 2017 through March 2017	$5,897
May 2017	February 2017 through April 2017	$5,847
June 2017	March 2017 through May 2017	$5,847
July 2017	April 2017 through June 2017	$6,051
August 2017	May 2017 through July 2017	$5,753
September 2017	June 2017 through August 2017	$5,828
October 2017	July 2017 through September 2017	$5,468
November 2017	August 2017 through October 2017	$3,981
December 2017	September 2017 through November 2017	$3,689
January 2018	October 2017 through December 2017	$3,233

Table 2-8
Twelve-Month Rolling Average Prices of Calendar Year 2017 IYB NOx RTCs

Reporting Month	12-Month Period	Average Price ($/ton)
January 2017	January 2016 through December 2016	$380,057
February 2017	February 2016 through January 2017	$254,172
March 2017	March 2016 through February 2017	$239,491
April 2017	April 2016 through March 2017	$239,491
May 2017	May 2016 through April 2017	$238,223
June 2017	June 2016 through May 2017	$237,266
July 2017	July 2016 through June 2017	$234,802
August 2017	August 2016 through July 2017	$213,249
September 2017	September 2016 through August 2017	$152,598
October 2017	October 2016 through September 2017	$152,598
November 2017	November 2016 through October 2017	$152,598
December 2017	December 2016 through November 2017	$152,598
January 2018	January 2017 through December 2017	$39,673

Table 2-9
Twelve-Month Rolling Average Prices of Calendar Year 2017 Discrete-Year SOx RTCs

Reporting Month	12-Month Period	Average Price ($/ton)
January 2017	January 2016 through December 2016	-
February 2017	February 2016 through January 2017	-
March 2017	March 2016 through February 2017	-
April 2017	April 2016 through March 2017	-
May 2017	May 2016 through April 2017	-
June 2017	June 2016 through May 2017	-
July 2017	July 2016 through June 2017	-
August 2017	August 2016 through July 2017	$1,100
September 2017	September 2016 through August 2017	$1,386
October 2017	October 2016 through September 2017	$1,386
November 2017	November 2016 through October 2017	$1,386
December 2017	December 2017 through November 2017	$1,386
January 2018	January 2017 through December 2017	$1,386

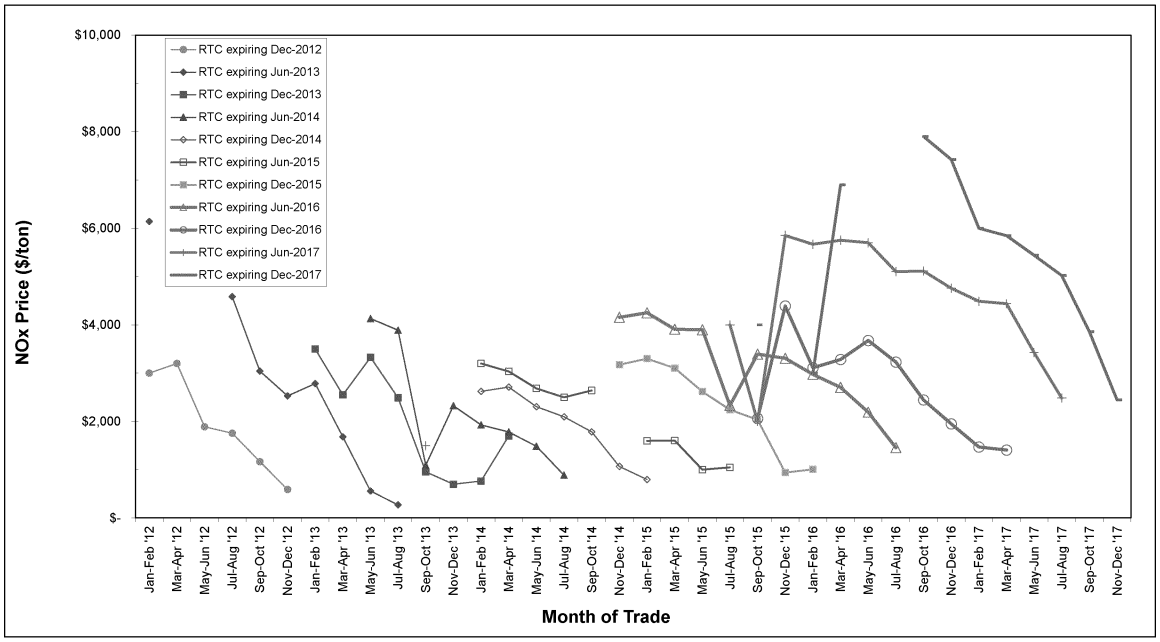
Average Price for NOx RTCs Nearing Expiration

Generally, RTC prices decrease as their expiration dates approach and during the sixty days after their expiration dates during which they can be traded. RTC

prices are usually lowest during the 60 day-period following their expiration date during which facilities are allowed to trade and obtain RTCs to cover their emissions. This general trend has been repeated every year since 1994 except for Compliance Years 2000 and 2001 (during the California energy crisis), when NOx RTC prices increased as the expiration dates approached because the power plants' NOx emissions increased significantly, causing a shortage of NOx RTCs. Prices for NOx RTCs that expired in calendar year 2017 followed the general trend of RTC prices declining over the course of the compliance year and the sixty-day trading period thereafter.

The bi-monthly average price for these near-expiration NOx RTCs is shown in Figure 2-11 to illustrate the general price trend for these RTCs. The general declining trend of RTC prices nearing and just past expiration indicates that there was an adequate supply to meet RTC demand during the final reconciliation period following the end of the compliance years. A similar analysis is not performed for the price of SOx RTCs nearing expiration because there are not enough SOx trades over the course of the year to yield meaningful data. For calendar year 2017, there were only seven discrete-year SOx trades with price for Compliance Years' 2016, 2017, 2019, and 2020 RTCs. These prices ranged from $400 per ton to $4,800 per ton throughout the year.

Figure 2-11
Bi-Monthly Average Price for NOx RTCs near Expiration



Note: Data is presented for a limited number of RTC expiration dates for graphical clarity.

IYB RTC Prices

The annual average price for IYB NOx RTCs traded in calendar year 2017 was $39,673 per ton, which is significantly lower than the annual average price of $380,057 per ton traded in calendar year 2016. This is expected due to the uncertainty over the future of the NOx RECLAIM program. The annual average price for IYB SOx RTCs traded in calendar year 2017 was $22,820 per ton,

which is much lower than the $50,000 per ton traded in calendar year 2016. There were four IYB SOx trades with price totaling 33.92 tons in 2017, compared to the one IYB SOx trade and 2.5 tons traded in 2016. Data regarding IYB RTCs traded with price (excluding swap trades) for NOx and SOx RTCs and their annual average prices since 1994 are summarized in Tables 2-10 and 2-11, respectively. In calendar year 2017, the annual average IYB RTC prices did not exceed the $661,045 per ton of NOx RTCs or the $475,952 per ton of SOx RTCs program review thresholds established by the Governing Board for IYB RTCs pursuant to California Health and Safety Code §39616(f).

Table 2-10
IYB NOx Pricing (Excluding Swaps)

Calendar Year	Total Reported Value ($ millions)	IYB RTC Traded with Price (tons)	Number of IYB Registrations With Price	Average Price ($/ton)
1994*	$1.3	85.7	1	$15,623
1995*	$0.0	0	0	N/A
1996*	$0.0	0	0	N/A
1997*	$7.9	404.6	9	$19,602
1998*	$34.1	1,447.6	23	$23,534
1999*	$18.6	438.3	19	$42,437
2000*	$9.1	184.2	15	$49,340
2001*	$34.2	416.9	25	$82,013
2002	$5.5	109.5	31	$50,686
2003	$14.3	388.3	28	$36,797
2004	$12.5	557.0	52	$22,481
2005	$43.1	565.3	71	$76,197
2006	$65.2	432.9	50	$150,665
2007	$45.4	233.5	25	$194,369
2008	$49.7	245.6	27	$202,402
2009	$16.7	134.2	14	$124,576
2010	$14.3	149.0	13	$95,761
2011	$9.1	160.7	29	$56,708
2012	$2.2	46.6	13	$48,146
2013	$12.0	260.9	17	$45,914
2014	$99.7	902.2	49	$110,509
2015	$187.4	938.5	47	$199,685
2016	$114.7	301.9	20	$380,057
2017	$1.26	31.8	6	$39,673

* No information regarding swap trades was reported until May 9, 2001.

Table 2-11
IYB SOx Pricing (Excluding Swaps)

Calendar Year	Total Reported Value ($ millions)	IYB RTC Traded with Price (tons)	Number of IYB Registrations With Price	Average Price ($/ton)
1994*	$0.0	0	0	N/A
1995*	$0.0	0	0	N/A
1996*	$0.0	0	0	N/A
1997*	$11.9	429.2	7	$27,738
1998*	$1.0	50.0	1	$19,360
1999*	$0.8	55.0	3	$14,946
2000*	$1.4	50.6	5	$27,028
2001*	$10.2	306.8	8	$33,288
2002	$6.7	147.5	5	$45,343
2003	$0.6	110.9	1	$5,680
2004	$0.0	0.0	0	N/A
2005	$1.0	141.5	3	$7,409
2006	$3.5	241.7	12	$14,585
2007	$3.7	155.2	5	$23,848
2008	$3.3	146.8	5	$22,479
2009	$3.7	100.0	4	$36,550
2010	$30.2	277.0	10	$109,219
2011	$1.03	10.0	2	$102,366
2012	$14.6	116.2	4	$125,860
2013	$14.4	79.2	4	$181,653
2014	$1.8	22.5	4	$80,444
2015	$4.0	74.8	4	$53,665
2016	$0.13	2.5	1	$50,000
2017	$0.77	33.92	4	$22,820

* No information regarding swap trades was reported until May 9, 2001.

Recent Program Amendments' Effect on Trading Trend

The SCAQMD Governing Board directed staff in March 2017 to transition the RECLAIM program to a command-and-control regulatory structure (see discussion in Chapter 3 under Program Amendments). Staff then initiated this effort and a tentative schedule has been suggested to complete the transition by the first quarter of 2019. This rulemaking effort may have had a significant impact on RTC trading activity and prices in 2017. Both the total value and the volume of discrete NOx RTCs traded increased in 2017 compared to 2016 (see Figure 2-7). These increases may also have been due to the reduction in RTC supply (2 tons/day in Compliance Year 2016) enacted by the Governing Board in December 2015. In contrast to the discrete NOx trading activity, both the total value and the volume of IYB NOx RTCs decreased dramatically (the total value decreased from $114.7 million in 2016 to only $1.3 million in 2017). According to the current implementation schedule under discussions, transition from the RECLAIM program is scheduled to be completed by the first quarter of 2019, after which NOx RTCs would cease to have value. This reduces the utility of IYB

RTCs, and minimizes the time horizon to possibly recoup the future year investments.

Like discrete NOx RTCs, discrete SOx RTCs also increased in price during calendar year 2017. The SOx RTC supply was shaved starting with Compliance Year 2013, and continued to full implementation in Compliance Years 2019 and after. This reduced RTC supply would theoretically lead to higher prices, although no additional SOx RTCs have been removed from the market since Compliance Year 2014. The SOx RTC supply was further reduced starting with Compliance Year 2017, and will be reduced again in Compliance Year 2019. The price of Compliance Years 2019 and 2020 RTCs traded this year were significantly higher than the prices of Compliance Years 2016 and 2017 RTCs traded. The price of IYB SOx RTCs also decreased in lockstep with the price of IYB NOx RTCs. This could be due to investor uncertainty over the modifications to CMB-05 of the Final 2016 Air Quality Management Plan, even though the current effort is only focused on NOx RECLAIM. Furthermore, California State Assembly Bill 617 will require RECLAIM facilities that are also in the California Greenhouse Cap and Trade Program to possibly replace older devices or retrofit them to meet newer and lower BARCT emission limits. This could have the added co-benefit of reducing SOx emissions and future SOx RTC demand.

Other Types of RTC Transactions and Uses

Another type of RTC trade, besides traditional trading and swapping activities, is a trade involving the contingent right (option) to purchase RTCs. In those trades, one party pays a premium for the contingent right (option) to purchase RTCs owned by the other party at a pre-determined price within a certain time period. Until RTCs are transferred from seller to buyer, prices for options are not reported, because the seller is not paid for the actual RTCs, but only for the right to purchase the RTCs at a future date. These rights may or may not actually be exercised. RTC traders are obligated to report options to SCAQMD within five business days of reaching an agreement. These reports are posted on SCAQMD's website. There were no reported trades involving the contingent right to buy or sell RTCs in calendar year 2017.

In addition to mitigating emissions at RECLAIM facilities, RTCs were also used by facilities to satisfy variance conditions. During calendar year 2017, two RECLAIM facilities and one non-RECLAIM facility retired a total of 28.1 tons of NOx RTCs for this purpose. These consisted of discrete-year NOx RTCs for Compliance Years 2016 and 2017. Additionally, one RECLAIM facility retired a total of 0.51 tons of discrete SOx RTCs for Compliance Year 2017.

Market Participants

RECLAIM market participants have traditionally included RECLAIM facilities, brokers, commodity traders, and private investors. Starting in calendar year 2004, mutual funds joined the traditional participants in RTC trades. Market participation expanded further in 2006, when foreign investors started participating in RTC trades. However, foreign investors have not participated in any RTC trades since calendar year 2008 and foreign investors do not hold any current or future RTCs at this time.

RECLAIM facilities are the primary users of RTCs and they hold the majority of RTCs as allocations. They usually sell their surplus RTCs by the end of the compliance year or when they have a long-term decrease in emissions. Brokers match buyers and sellers, and usually do not purchase or own RTCs. Commodity traders and private investors actually invest in and own RTCs in order to seek profits by trading them. They do not need RTCs to offset or reconcile any emissions. For purposes of discussion in this report, "investors" include all parties who hold RTCs other than RECLAIM facility permit holders and brokers. Brokers typically do not actually purchase RTCs, but only facilitate trades.

Investor Participation

In 2017, investors were actively involved in 128 of the 193 discrete-year NOx RTC trades with price, six of the seven discrete-year SOx RTC trades with price, and all six of the IYB NOx trades with price. Investors were also involved in all four IYB SOx trade with price.

Investors' involvement in discrete-year NOx and SOx trades registered with price in calendar year 2017 is illustrated in Figures 2-12 and 2-13. Figure 2-12 is based on total value of discrete-year NOx and SOx RTCs traded, and shows that investors were involved in 61% and 94%, respectively, of the discrete-year NOx and SOx trades reported by value. Figure 2-13 is based on volume of discrete-year RTCs traded with price and shows that investors were involved in 60% and 94% of the discrete-year NOx and SOx trades by volume, respectively. Figures 2-14 and 2-15 provide similar data for IYB NOx and SOx trades, and show that investors were involved in all IYB NOx trades and all IYB SOx trades with price in calendar year 2017.

Figure 2-12
Calendar Year 2017 Investor-Involved Discrete-Year NOx and SOx Trades Based on Value Traded

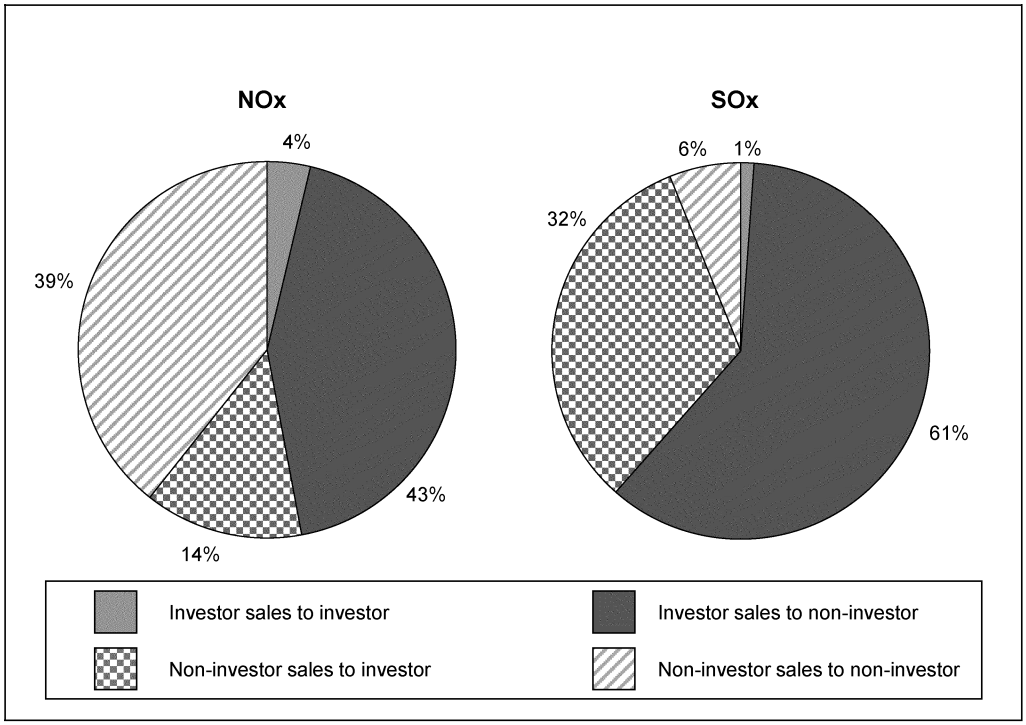


Figure 2-13
Calendar Year 2017 Investor-Involved Discrete-Year NOx and SOx Trades Based on Volume Traded with Price

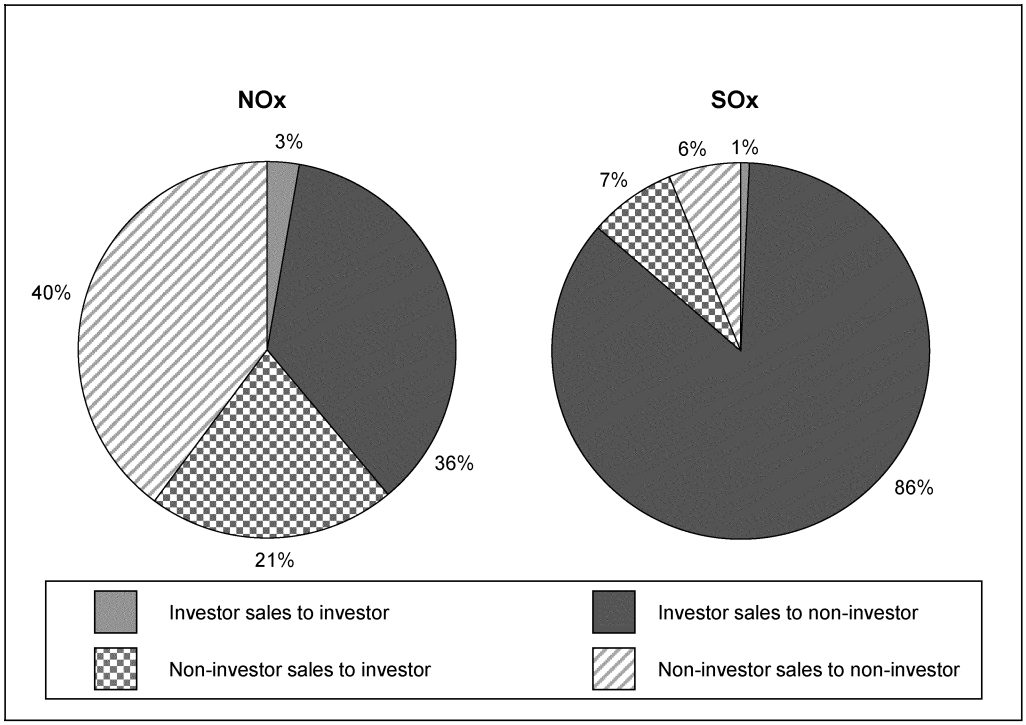


Figure 2-14
Calendar Year 2017 Investor-Involved IYB NOx and SOx Trades Based on Value Traded

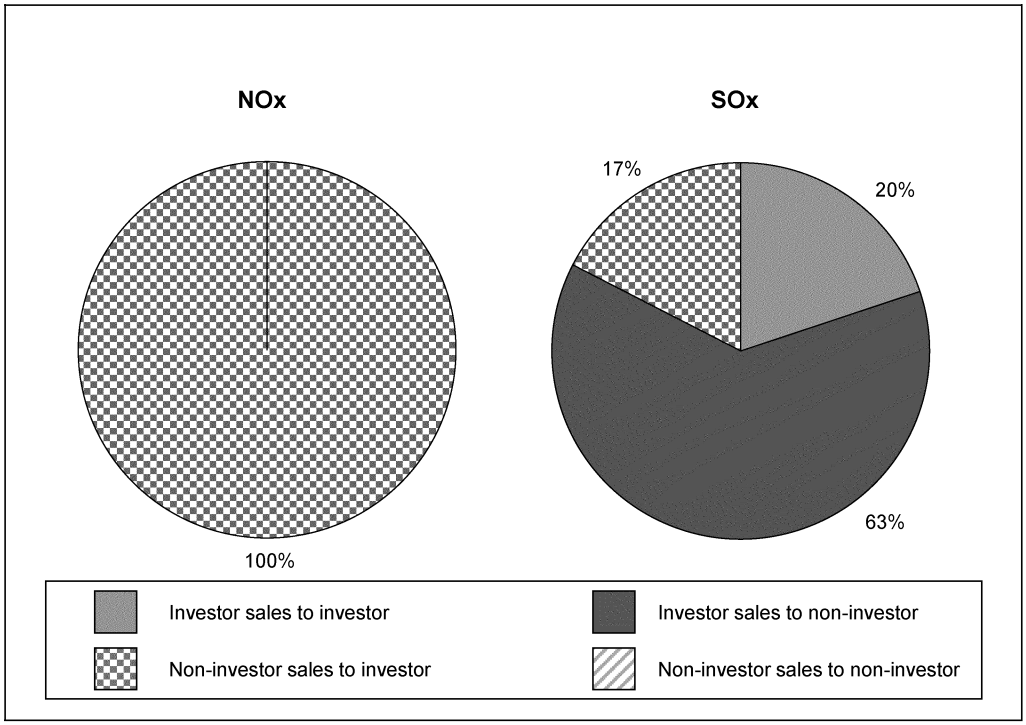
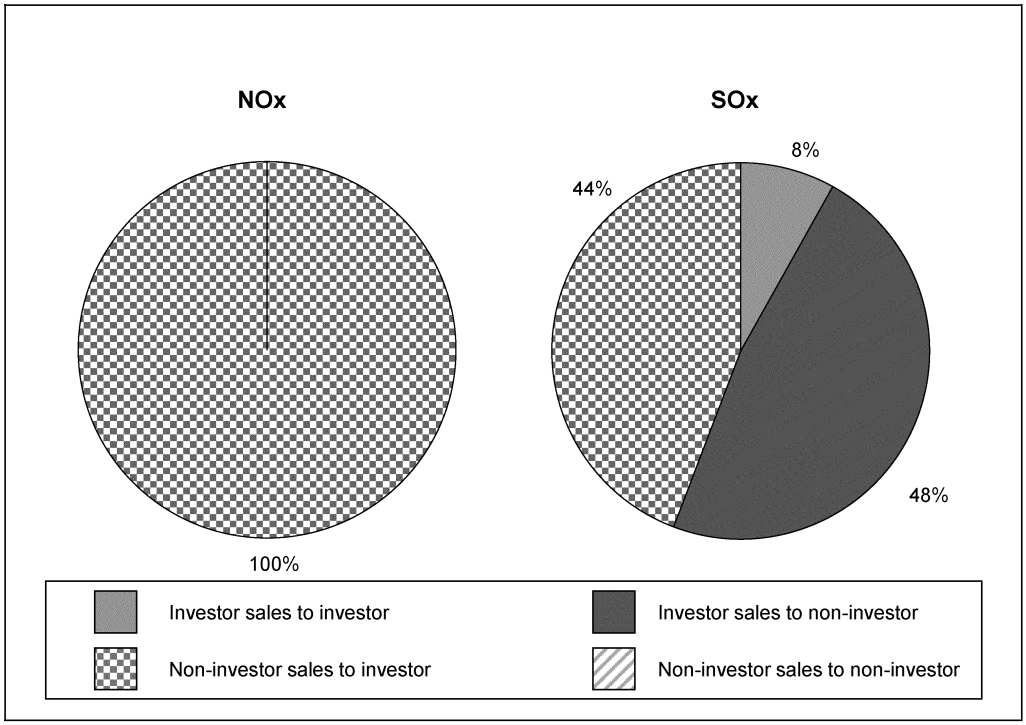


Figure 2-15
Calendar Year 2017 Investor-Involved IYB NOx and SOx Trades Based on Volume Traded with Price



As of the end of calendar year 2017, investors' holding of IYB NOx RTCs had slightly increased to 3.3% compared to 3.1% at the end of calendar year 2016. Mutual fund investors are no longer holders of IYB NOx RTCs, down from a high of 3.3% at the end of calendar year 2011 and 1.4% at the end of calendar year 2014. Investors' holding of IYB SOx RTCs increased to 6.0% at the end of calendar year 2017 from 5.0% at the end of calendar year 2016. No IYB SOx RTCs are currently held by mutual fund investors.

The available supply of IYB RTCs are generally from facilities that have permanently reduced emissions through the installation of control equipment, the modification or replacement of old equipment, or equipment and/or facility shutdowns. There were eight RECLAIM facilities that shut down during Compliance Year 2016. These eight facilities all participated in the NOx RECLAIM program and held a total of 7.6 tons of IYB NOx RTCs. The one facility also participating in the SOx RECLAIM program held a total of 0.98 tons of IYB SOx. Currently, these facilities hold a total of 2.3 tons of IYB NOx RTCs and zero tons of IYB SOx RTCs. All IYB NOx and SOx RTCs sales from these shutdowns occurred prior to calendar year 2013, except 3.3 tons of IYB NOx (44% of sold IYB NOx) was sold by two facilities in calendar year 2017.

Investor Impacts on RTC Market

Theoretically, the role of investors in this market is to provide capital for installing air pollution control equipment that costs less than the market value of credits. In addition, investors can also improve price competitiveness. This market theory may not fully apply to RECLAIM due to the uniqueness of the program because RECLAIM facility operators have no substitute for RTCs, and short of curtailing operations, pollution controls cannot be implemented within a short time period. That is, there is no alternative source of credits available to RECLAIM facilities when RTC prices increase (they do not have the option to switch to another source of credits when RTCs become expensive). Therefore, RECLAIM facility operators may be at the mercy of owners of surplus or investor-owned RTCs in the short term, particularly during times of rapid price increases, as evidenced in 2000 and 2001 during the California energy crisis.

Generally, RECLAIM facilities hold back additional RTC's for each year as a compliance margin to ensure that they do not inadvertently find themselves exceeding their allocations (failing to reconcile by securing sufficient RTCs to cover their emissions) if their reported emissions increase as the result of any problems or errors discovered by SCAQMD staff during annual facility audits. Facilities have indicated to staff in the past that this compliance margin is approximately 10% of their emissions. For Compliance Year 2016, the total RECLAIM NOx emissions were 7,328 tons, while the total NOx RTC allocation was 8,992 tons. This NOx RTC surplus of 1,664 tons (19% of allocation) is well above the 10% compliance margin reportedly held by RECLAIM facilities. If the future total NOx emissions stay constant, the difference between the NOx RTC allocation and NOx emissions would not decrease below 10% until Compliance Year 2020.

In past annual audit reports, staff made comparisons between emissions and future available RTC supplies to highlight the potential of a seller's market for

NOx RTCs if adequate emissions controls were not implemented in a timely manner. The probability of this scenario has diminished because of current efforts to transition to a command and control framework. The schedule, currently under discussion, is to complete this effort by the first quarter of 2019. If this is successfully implemented according to schedule, RTCs will no longer be the compliance demonstration tool beyond 2019. Barring a sudden and significant surge in NOx emissions during 2018 Compliance Year, it is expected that there will be adequate RTCs available to reconcile with RECLAIM NOx emissions despite investor IYB holdings of 3.3 percent.

CHAPTER 3
EMISSION REDUCTIONS ACHIEVED

Summary

For Compliance Year 2016, aggregate NOx emissions were below total allocations by 19% and aggregate SOx emissions were below total allocations by 29%. No emissions associated with breakdowns were excluded from reconciliation with facility allocations in Compliance Year 2016. Accordingly, no mitigation is necessary to offset excluded emissions due to approved Breakdown Emission Reports. Therefore, based on audited emissions, RECLAIM achieved its targeted emission reductions for Compliance Year 2016. With respect to the Rule 2015 backstop provisions, Compliance Year 2016 aggregate NOx and SOx emissions were both well below aggregate allocations and, as such, did not trigger the requirement to review the RECLAIM program.

Background

One of the primary objectives of the annual RECLAIM program audits is to assess whether RECLAIM is achieving its targeted emission reductions. Those targeted emission reductions are embodied in the annual allocations issued to RECLAIM facilities. In particular, the annual allocations reflect required emission reductions initially from the subsumed command-and-control rules and control measures, as well as from subsequent reductions in allocations as a result of BARCT implementation. In January 2005 and December 2015, the Board adopted amendments to Rule 2002 to further reduce aggregate RECLAIM NOx allocations through implementation of the latest BARCT. The 2005 amendments resulted in cumulative NOx allocation reductions of 22.5% (2,811 tons/year, or 7.7 tons/day) from all RECLAIM facilities by Compliance Year 2011, with the biggest single-year reduction of 11.7% in Compliance Year 2007. The 2015 amendments will reduce NOx allocations by 45.2% (4,380 tons/year, or 12.0 tons/day) by Compliance Year 2022. The reductions are phased-in from Compliance Year 2016 through Compliance Year 2022.

The Board also amended Rule 2002 in November 2010 to implement BARCT for SOx. Specifically, the November 2010 amendments called for certain facilities' RECLAIM SOx allocations to be adjusted to achieve a 48% (2,081 tons/year, or 5.7 tons/day) overall reduction, with the reductions phased-in from Compliance Year 2013 through Compliance Year 2019. About 1,460 tons/year, or 4.0 tons/day (approximately 70% of the scheduled reduction), of SOx allocations were reduced by Compliance Year 2014. The next increment of reduction will be in Compliance Year 2017 and the last increment will be in 2019.

Emissions Audit Process

Since the inception of the RECLAIM program, SCAQMD staff has conducted annual program audits of the emissions data submitted by RECLAIM facilities to ensure the integrity and reliability of RECLAIM emission data. The process includes reviews of APEP reports submitted by RECLAIM facilities and audits of field records and emission calculations. The audit process is described in further detail in Chapter 5 – Compliance.

SCAQMD staff adjusts the APEP-reported emissions based on audit results, as necessary. Whenever SCAQMD staff finds discrepancies, they discuss the findings with the facility operators and provide the operators an opportunity to review changes resulting from facility audits and to present additional data or information in support of the data stated in their APEP reports.

This rigorous audit process, although resource intensive, reinforces RECLAIM's emissions monitoring and reporting requirements and enhances the validity and reliability of the final emissions data. The audited emissions are used to determine if a facility complied with its allocations. The most recent five compliance years' audited NOx emissions for each facility are posted on SCAQMD's web page after the audits are completed. All emissions data presented in this annual RECLAIM audit report are compiled from audited facility emissions.

Emission Trends and Analysis

RECLAIM achieves its emission reduction goals on an aggregate basis by ensuring that annual emissions are below total RTCs. It is important to understand that the RECLAIM program is successful at achieving these emission reduction goals even when some individual RECLAIM facilities exceed their RTC account balances, provided aggregate RECLAIM emissions do not exceed aggregate RTCs issued. Therefore, aggregate audited NOx or SOx emissions from all RECLAIM sources are the basis for determining whether the programmatic emission reduction goals for that emittant are met each year.

Table 3-1 and Figure 3-1 show aggregate audited NOx emissions for Compliance Years 1994 through 2016. No facility audits for Compliance Years 1994 through 2015 were reopened during the past year so the aggregate audited NOx and SOx emissions for these years are unchanged from the previous annual report. Programmatically, there were excess NOx RTCs remaining after accounting for audited NOx emissions for every compliance year since 1994, except for Compliance Year 2000 when NOx emissions exceeded the total allocations due to the California energy crisis. Unused NOx RTCs in Compliance Year 2016 fell below 20% of the aggregate NOx allocations for the first time since 2004 as aggregate NOx allocations for Compliance Year 2016 were reduced by 708 tons from Compliance Year 2015 levels due to the 2015 BARCT related amendment of Rule 2002. Annual NOx emissions remained within a narrow range (between 7,302 tons and 7,691 tons annually) since Compliance Year 2011. Specifically, Compliance Year 2016 NOx emissions were below total allocations by 19%. The reduction in excess RTCs compared to Compliance Year 2015 is a result of the additional NOx reduction enacted by the Governing Board in December 2015 and a slight increase (1%) in emissions in Compliance Year 2016.

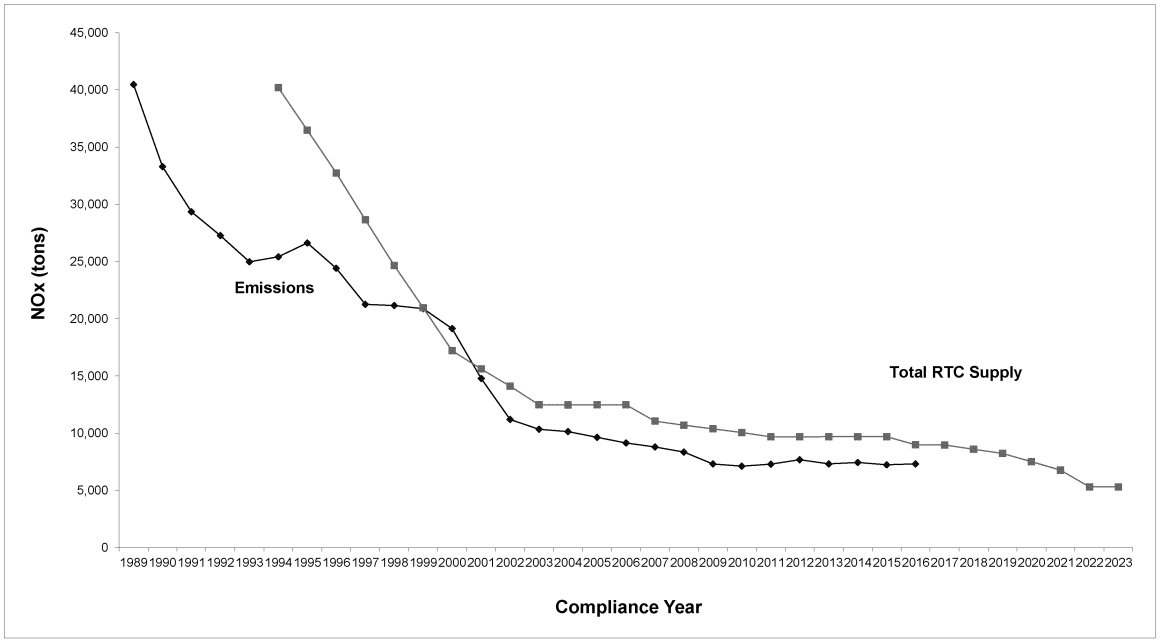
Table 3-1
Annual NOx Emissions for Compliance Years 1994 through 2016

Compliance Year	Audited Annual NOx Emissions[1] (tons)	Audited Annual NOx Emissions Change from 1994 (%)	Total NOx RTCs[2] (tons)	Unused NOx RTCs (tons)	Unused NOx RTCs (%)
1994	25,420	0%	40,187	14,767	37%
1995	26,632	4.8%	36,484	9,852	27%
1996	24,414	-4.0%	32,742	8,328	25%
1997	21,258	-16%	28,657	7,399	26%
1998	21,158	-17%	24,651	3,493	14%
1999	20,889	-18%	20,968	79	0.38%
2000	19,148	-25%	17,208	-1,940	-11%
2001	14,779	-42%	15,617	838	5.4%
2002	11,201	-56%	14,111	2,910	21%
2003	10,342	-59%	12,485	2,143	17%
2004	10,134	-60%	12,477	2,343	19%
2005	9,642	-62%	12,484	2,842	23%
2006	9,152	-64%	12,486	3,334	27%
2007	8,796	-65%	11,046	2,250	20%
2008	8,349	-67%	10,705	2,356	22%
2009	7,306	-71%	10,377	3,071	30%
2010	7,121	-72%	10,053	2,932	29%
2011	7,302	-71%	9,690	2,388	25%
2012	7,691	-70%	9,689	1,998	21%
2013	7,326	-71%	9,699	2,373	24%
2014	7,447	-71%	9,699	2,252	23%
2015	7,246	-71%	9,700	2,454	25%
2016	7,328	-71%	8,992	1,664	19%

[1] The RECLAIM universe is divided into two cycles with compliance schedules staggered by six months. Compliance years for Cycle 1 facilities run from January 1 through December 31 and Cycle 2 compliance years are from July 1 through June 30.

[2] Total RTCs = Allocated RTCs + RTCs from ERC conversion.

Figure 3-1
NOx Emissions and Available RTCs



Similar to Table 3-1 and Figure 3-1 for NOx, Table 3-2 presents aggregate annual SOx emissions data for each compliance year based on audited emissions, and Figure 3-2 compares these audited aggregate annual SOx emissions with the aggregate annual SOx RTC supply. As shown in Table 3-2 and Figure 3-2, RECLAIM facilities have not exceeded their SOx allocations on an aggregate basis in any compliance year since program inception. For Compliance Year 2016, SOx emissions were below total allocations by 29%. The unused SOx RTCs from Compliance Year 2008 and on has remained in excess of 20%. The data indicates that RECLAIM met its programmatic SOx emission reduction goals and demonstrated equivalency in SOx emission reductions compared to the subsumed command-and-control rules and control measures. Based on audited emission data, annual SOx emissions decreased by 72 tons (3.4%) in Compliance Year 2016 compared to SOx emissions in Compliance Year 2015.

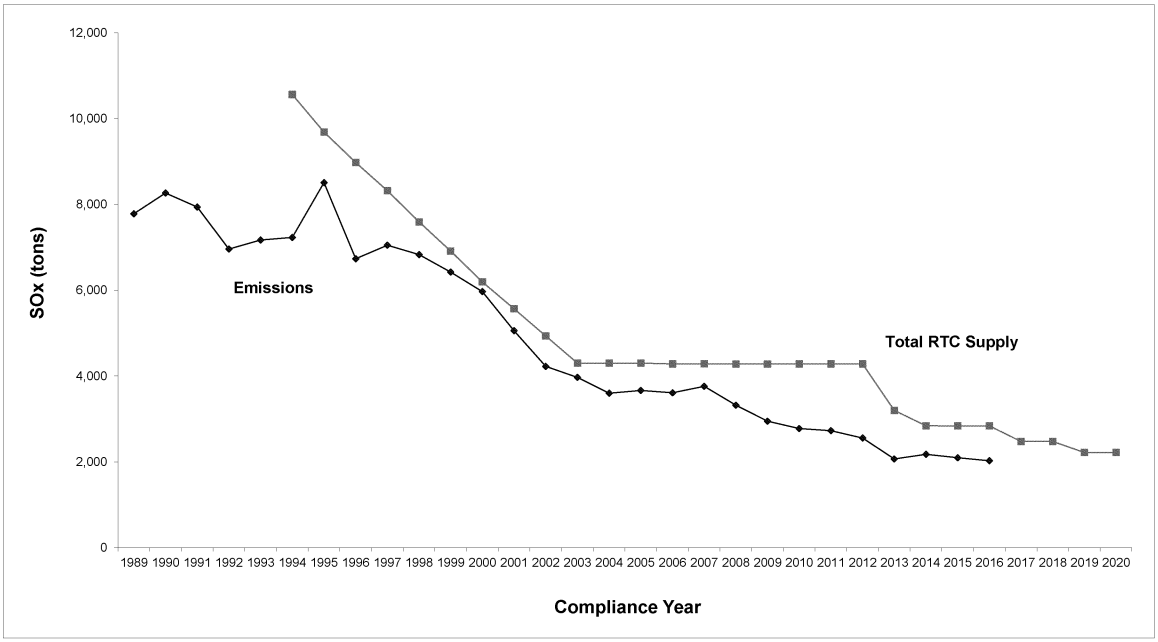
Table 3-2
Annual SOx Emissions for Compliance Years 1994 through 2016

Compliance Year	Audited Annual SOx Emissions[1] (tons)	Audited Annual SOx Emissions Change from 1994 (%)	Total SOx RTCs[2] (tons)	Unused SOx RTCs (tons)	Unused SOx RTCs (%)
1994	7,230	0%	10,559	3,329	32%
1995	8,508	18%	9,685	1,177	12%
1996	6,731	-6.9%	8,976	2,245	25%
1997	7,048	-2.5%	8,317	1,269	15%
1998	6,829	-5.5%	7,592	763	10%
1999	6,420	-11%	6,911	491	7.1%
2000	5,966	-17%	6,194	228	3.7%
2001	5,056	-30%	5,567	511	9.2%
2002	4,223	-42%	4,932	709	14%
2003	3,968	-45%	4,299	331	7.7%
2004	3,597	-50%	4,299	702	16%
2005	3,663	-49%	4,300	637	15%
2006	3,610	-50%	4,282	672	16%
2007	3,759	-48%	4,286	527	12%
2008	3,319	-54%	4,280	961	22%
2009	2,946	-59%	4,280	1,334	31%
2010	2,775	-62%	4,282	1,507	35%
2011	2,727	-62%	4,283	1,556	36%
2012	2,552	-65%	4,283	1,731	40%
2013	2,066	-71%	3,198	1,132	35%
2014	2,176	-70%	2,839	663	23%
2015	2,096	-71%	2,836	740	26%
2016	2,024	-72%	2,836	812	29%

[1] The RECLAIM universe is divided into two cycles with compliance schedules staggered by six months. Compliance years for Cycle 1 facilities run from January 1 through December 31 and Cycle 2 compliance years are from July 1 through June 30.

[2] Total RTCs = Allocated RTCs + RTCs from ERC conversion.

Figure 3-2
SOx Emissions and Available RTCs



Comparison to Command-and-Control Rules

RECLAIM subsumed a number of command-and-control rules[1] and sought to achieve reductions equivalent to these subsumed rules that continue to apply to non-RECLAIM facilities. RECLAIM facilities are exempt from the subsumed rules' requirements that apply to SOx or NOx emissions once the facilities comply with the applicable monitoring requirements of Rules 2011 – Requirements for Monitoring, Reporting, and Recordkeeping for Oxides of Sulfur (SOx) Emissions or 2012 – Requirements for Monitoring, Reporting, and Recordkeeping for Oxides of Nitrogen (NOx) Emissions, respectively.

Two RECLAIM subsumed rules were amended during Compliance Year 2016. Rule 1302 – Definitions and Rule 1325 – Federal PM2.5 New Source Review Program were amended on November 4, 2016. Appropriate major stationary source thresholds for direct PM2.5 and PM2.5 precursors, including VOC and ammonia, were established in Rule 1325 to align the rule with the recent reclassification of the South Coast Basin from a "moderate" PM2.5 nonattainment area to a "serious" nonattainment area and with U.S. EPA's Fine Particulate Matter National Ambient Air Quality Standards implementation rule. Amendments to Rule 1302 include modification of major source SOx threshold definitions and editorial revisions to improve rule clarity and consistency.

These amendments to Rules 1302 and 1325, which are administrative in nature, were intended to facilitate SIP approval of the regulations and do not result in any limitations on NOx or SOx sources at non-RECLAIM facilities. Since Rule 2001 only exempts those provisions in identified rules applicable to NOx and SOx

[1] See Tables 1 and 2 of Rule 2001.

emissions at RECLAIM facilities, these amendments do not result in disproportionate impacts between RECLAIM and non-RECLAIM sources.

Other rules amended or adopted during Compliance Year 2016, but not subsumed by RECLAIM include Regulation IX – Standards of Performance for New Stationary Sources (NSPS), Rule 219 – Equipment Not Requiring a Written Permit Pursuant to Regulation II, Rule 222 – Filing Requirements for Specific Emission Sources Not Requiring a Written Permit Pursuant to Regulation II, and Rule 1147 - NOx Reductions from Miscellaneous Sources.

On October 7, 2016, Regulations IX – Standards of Performance for New Stationary Sources (NSPS) was amended to incorporate new or amended federal standards that had been enacted by U.S. EPA for stationary sources. Historically, the Governing Board adopted NSPS (40 CFR 60) and NESHAPS (40 CFR 61) into Regulations IX and X, by reference, to provide stationary sources with a single source of information for determining which federal and local requirements apply to their specific operations. Actions by U.S. EPA, from January 1, 2015 to June 15, 2016 incorporated into Regulation IX, included new performance standards for additional oil and natural gas source categories, new residential hydronic heaters and forced-air furnaces; and electric utility steam generating units and stationary combustion turbines, as well as amendments to existing provisions of five NSPS. Regulation X was not amended as there were no delegable NESHAP actions adopted by the U.S. EPA for the same time period. The amendments to Regulation IX incorporated these U.S. EPA NSPS actions into SCAQMD's regulations.

On May 5, 2017, both Rule 219 – Equipment Not Requiring a Written Permit Pursuant to Regulation II and Rule 222 – Filing Requirements for Specific Emission Sources Not Requiring a Written Permit Pursuant to Regulation II were amended. The Rule 219 amendment exempts certain categories of equipment from the requirement to obtain a written permit and removes existing exemptions for equipment that the SCAQMD learned may not be able to demonstrate compliance with all SCAQMD rules. It also provided clarification for sources or processes not currently covered under the existing rule. Rule 222 added additional categories to the streamlined filing/registration program. Both amendments further facilitated the streamlining of the District's permitting system.

On June 2, 2017, an amendment to Rule 1147 - NOx Reductions from Miscellaneous Sources was presented to the Governing Board. The proposed amendments were discussed and continued to the next Governing Board meeting on July 7, 2017 when the following amendments were adopted. The amendments to Rule 1147:

- Exempt sources with total rated heat input less than 325,000 Btu per hour from the Rule 1147 NOx emission limit;
- Exempt units with emissions less than one pound per day from complying with the NOx emission limit when an entire facility is relocated;
- Exempt equipment with direct-fired infrared burners from the requirement to conduct an emissions test;
- Delay compliance for existing in-use heated process tanks, evaporators and parts washers from the NOx emission limit until such time the combustion system or tank is modified or replaced;

- Delay compliance with the NOx emission limit for existing in-use spray booths until the unit is replaced, becomes 30 years old, or the heating system is modified (affecting the heat input rating) or replaced;
- Delay compliance with the NOx emission limit for existing in-use units with actual NOx emission of one pound per day or less until the combustion system is modified (affecting the heat input rating), replaced, or becomes 30 years old;
- Provide an option for small units with heat input equal to or less than 2 million Btu/hr to demonstrate compliance with an emission limit through a burner manufacturer's warranty; and
- Change the NOx emission limit from 30 ppm to 60 ppm NOx for the primary chamber of all burn-off ovens, burnout furnaces and incinerators.

The amendments also provided options to demonstrate compliance and made other minor changes to improve clarity. Rule 1147(g)(1)(B) explicitly exempted the provisions of this rule for units located at RECLAIM facilities.

As a result, these changes and exemptions are expected to result in less than 0.03 tons/day of NOx emissions reductions forgone associated with the less than 325,000 Btu per hour exemption, and excluding 0.02 tons per day NOx emissions reductions that will begin to be recaptured starting in 2017 when existing units are replaced and upgraded over time. With the efforts of transitioning RECLAIM sources to a command-and-control structure, Rule 1147 has been identified as one of the rule that needs to be amended as a "landing" rule for sources exiting the RECLAIM program. As such, the amended rule and any resulting companion rules will be equally applicable to all sources after a possible interim period. .

In contrast to Rules 1302 and 1325, Regulation IX – Standards of Performance for New Stationary Sources (NSPS), Rule 219, and Rule 222, were not subsumed under RECLAIM and contained no exemptions from their applicability for RECLAIM NOx or SOx sources. Since the requirements of these amended rules apply equally to both RECLAIM and non-RECLAIM facilities, there are no differential impacts in emissions when comparing the applicability of amended rule requirements to NOx and SOx sources under RECLAIM with NOx and SOx sources of non-RECLAIM facilities.

Consequently, amendments to rules during Compliance Year 2016, both subsumed by RECLAIM and rules not subsumed by RECLAIM, did not result in any disparate impacts between NOx and SOx sources at RECLAIM and NOx and SOx sources at non-RECLAIM facilities.

Program Amendments

The Governing Board amended Regulation XX on December 4, 2015 to implement the 2012 AQMP Control Measure CMB-01 and adopted a programmatic 12 ton per day NOx RECLAIM trading credit (RTC) reduction (shave) from Compliance Years 2016 through 2022. The incremental shave schedule is 2 tons per day in 2016, 0 tons per day in 2017, 1 ton per day in 2018, 1 ton per day in 2019, 2 tons per day in 2020, 2 tons per day in 2021, and 4 tons per day in 2022.

The 2012 AQMP Control Measure CMB-01 sought to comply with California Health and Safety Code (H&SC) §40440 in regards to implementation of BARCT

and to bring the Basin into attainment with the federal 24-hour PM2.5 standard by 2019 and the federal ozone ambient air quality standards by 2023 and 2031.

As part of the same adopted December 4, 2015 Board package, a provision of Rule 2012, allowing the use of certified emissions values for Rule 219 equipment emission reporting, was presented and adopted, even though the staff report had stated in error that this amendment would not be included. Additionally, Rule 2011 and 2012 protocol provisions clarifying the calculation of missing data consistent with current practice and other minor clarifications were presented and adopted. Finally, amendments to Rules 2011 and 2012 to clarify a definition for "Standard Gas Conditions", though included in the October, 2015 Set Hearing package, were inadvertently not included in the December 4, 2015 Board package. Although, these amendments were legally adopted, staff believed the public should be given a clear opportunity to comment on these amendments. As a result, these amendments were re-introduced on February 5, 2016 and the Governing Board adopted the resolution to affirm these amendments to Regulation XX.

The proposed amendments to Regulation XX, presented to the Governing Board on December 4, 2015, included a provision to address retirement of NOx RTCs due to a facility shutdown or due to equipment shutdowns that represent 25% or more of a facility's emissions for any quarter within the previous two compliance years. The objective of these shutdown provisions was to prevent NOx RTCs held by a shutdown facility from entering the market and potentially delaying the installation of pollution controls at other RECLAIM facilities. The Board did not adopt the proposed shutdown provisions and directed staff to return to the Board, after further analysis and discussion with RECLAIM stakeholders, with a proposal that would allow a closer alignment of shutdown credits in the RECLAIM program to requirements under command and control programs.

Shutdown provisions were proposed to, and adopted by, the Governing Board on October 7, 2016. The adopted shutdown provisions apply to facilities that are listed in Tables 7 and 8 of Rule 2002 and were issued initial NOx allocations by the SCAQMD. These facilities held over 90% of the total RTC supply. The shutdown provisions include a BARCT-based RTC discounting methodology for shutdown facilities that is more closely aligned to ERC discounting under command and control. When a subjected facility shuts down, it will be required to surrender the amount of NOx RTCs equivalent to the difference between: (a) the average of actual NOx emissions for the highest two of the last five years from equipment that is operated at a level greater than BARCT; and (b) the average NOx emissions from the same equipment that would have occurred if the equipment was operated at BARCT. The total RTC reduction is limited to the adjusted initial allocation issued to the shutdown facility by SCAQMD. If the calculated RTC reduction exceeds the facility's future year NOx RTC holdings (but less than the original allocation issued by SCAQMD), the owner or operator of the shutdown facility is required to purchase and surrender a sufficient quantity of RTCs to fulfill the entire reduction requirement. Generally, this shortage would be a result of previous sales of future RTCs, or deductions of future year RTCs due to exceedances. The amendments also incorporated exclusions from the surrendering of RTCs provisions for facilities under the same ownership as of September 22, 2015 who have submitted a written declaration by November 7, 2016 identifying the facilities under the same ownership. Four facilities submitted

written documentation declaring same ownership. Facilities under the declared same ownership will be allowed to use RTCs held by the shutdown facility under certain conditions. In addition, a provision was included to allow for planned non-operation for up to five years for facilities that met specific criteria.

On April 14, 2016, the U.S. Environmental Protection Agency (U.S. EPA) disapproved the Reasonably Available Control Measures (RACM)/Reasonably Available Control Technology (RACT) demonstration for the 2006 24-hour PM2.5 standard (81 FR 22025). On November 3, 2016, U.S. EPA proposed to partially approve and partially disapprove (81 FR 76547) the 2016 AQMP RACT SIP based on the finding that the 2010 RECLAIM program does not meet RACT. In response to these disapprovals, a supplemental (RACM)/(RACT) analysis was prepared by SCAQMD to demonstrate that the NOx allocations in the RECLAIM program are at least equivalent, in the aggregate, to emission levels that would result from direct application of RACT on affected sources in South Coast and Coachella Valley. In September 2017, EPA issued a final rule determining that the revised RECLAIM rules – as amended in December 2015 and October 2016 – satisfy the Clean Air Act Requirements for ozone RACT SIPs in the South Coast ozone nonattainment areas (82 FR 43176). On February 12, 2018, EPA issued a final rule determining that the SCAQMD had corrected the SIP deficiency for PM2.5 RACM/RACT (83 FR 5923).

On March 3, 2017, the Governing Board adopted a resolution during the adoption of the 2016 AQMP that directed staff to modify Control Measure CMB-05 – Further NOx Reductions from RECLAIM Assessment to achieve an additional five tons per day NOx emission reductions as soon as feasible but no later than 2025, and require Best Available Retrofit Control Technology (BARCT) level controls as soon as practicable. Additionally, California State Assembly Bill (AB) 617 was approved in July 2017, requiring an expedited schedule for implementing BARCT at RECLAIM facilities no later than December 31, 2023.

To further this effort, staff held monthly working group meetings to discuss the transition of facilities in the RECLAIM program to a command-and-control regulatory structure and to discuss key policy issues. RECLAIM working group meetings for Proposed Amended Rules 2001 and 2002 were held on June 8, July 13, September 14, October 12, November 8, and December 14, 2017. In addition, staff has also met individually with numerous facility operators and industry groups regarding the transition. A public consultation meeting was held on November 8, 2017, with the comment period closing on November 22, 2017.

As a result, on January 5, 2018, the Governing Board amended Rule 2001 – Applicability and 2002 – Allocations for Oxides of Nitrogen (NOx) and Oxides of Sulfur (SOx) to initiate the transition of the NOx and SOx RECLAIM program to a command-and-control regulatory structure. Amended Rule 2001 precluded new or existing facilities from entering the NOx and SOx RECLAIM programs as of January 5, 2018. Amended Rule 2002 contained notification procedures for facilities that will be transitioned out of RECLAIM and addressed the RTC holding for these facilities that will be transitioned out or that elect to exit RECLAIM. Under amended Rule 2002, the Executive Officer will provide an initial determination notification to a RECLAIM facility for potential exit to a command-and-control regulatory structure with requirements for the facility to identify all NOx-emitting equipment. The RECLAIM facility then has 45 days from the date of the notification to identify all NOx-emitting equipment. Failure to provide this

information to AQMD will result in a freeze on RTC uses, trades, or transfers until the requested information is submitted. If the RECLAIM facility is deemed ready for transition after Executive Officer review, it will receive a final determination notification that will require its exit from RECLAIM and will become subject to command-and-control regulations. If the RECLAIM facility is deemed as not ready for the transition, it will be notified that it will remain in NOx RECLAIM until a later time. Upon exiting RECLAIM, the facility's future compliance year RTCs cannot be sold or transferred and only RTCs in that current compliance year can be used.

Staff has identified an initial group of 38 facilities that can potentially exit the NOx RECLAIM program because they have no facility NOx emissions, or have NOx emissions solely from the combination of equipment exempt from obtaining a written permit pursuant to Rule 219 (unless the equipment would be subject to a command-and-control rule that it cannot reasonably comply with), various locations permits, or unpermitted equipment and/or RECLAIM equipment that meet current command-and-control BARCT rules.

Monthly working group meetings are being continued to further discuss steps for transitioning the remaining RECLAIM facilities to a command-and-control structure and to develop necessary rule amendments to implement BARCT for the exiting RECLAIM facilities. Because the RECLAIM universe includes many different industries, separate working groups are being formed to address and develop these different BARCT "landing" rules. As part of the planning effort, staff has tentatively targeted the first quarter in 2019 to complete the transition. However, discussions on individual rules may alter this tentative schedule.

Breakdowns

Pursuant to Rule 2004(i) – Breakdown Provisions, a facility may request that emission increases due to a breakdown not be counted towards the facility's allocations. In order to qualify for such exclusion, the facility must demonstrate that the excess emissions were the result of a fire or a mechanical or electrical failure caused by circumstances beyond the facility's reasonable control. The facility must also take steps to minimize emissions resulting from the breakdown, and mitigate the excess emissions to the maximum extent feasible. Applications for exclusion of unmitigated breakdown emissions from a facility's total reported annual RECLAIM emissions must be approved or denied by SCAQMD in writing. In addition, facilities are required to quantify unmitigated breakdown emissions for which an exclusion request has been approved in their APEP report.

As part of the annual program audit report, Rule 2015(d)(3) requires SCAQMD staff to determine whether excess emissions approved to be excluded from RTC reconciliation have been programmatically offset by unused RTCs within the RECLAIM program. If the breakdown emissions exceed the total unused RTCs within the program, any excess breakdown emissions must be offset by either: (1) deducting the amount of emissions not programmatically offset from the RTC holdings for the subsequent compliance year from facilities that had unmitigated breakdown emissions, proportional to each facility's contribution to the total amount of unmitigated breakdown emissions; and/or (2) RTCs obtained by the Executive Officer for the compliance year following the completion of the annual program audit report in an amount sufficient to offset the unmitigated breakdown emissions.

As shown in Table 3-3, a review of APEP reports for Compliance Year 2016 found that no facilities requested to exclude breakdown emissions from being counted against their allocations. Thus, for Compliance Year 2016, no additional RTCs are required to offset breakdown emissions pursuant to Rule 2015(d)(3).

Table 3-3
Breakdown Emission Comparison for Compliance Year 2016

Emittant	Compliance Year 2016 Unused RTCs (tons)	Unmitigated Breakdown Emissions[1] (tons)	Remaining Compliance Year 2016 RTCs (tons)
NOx	1,664	0	1,664
SOx	812	0	812

[1] Data for unmitigated breakdown emissions (not counted against Allocation) as reported under APEP reports.

Impact of Changing Universe

As discussed in Chapter 1, two facilities were included into and one facility was excluded from the NOx universe, no facilities were included or excluded from the SOx universe, and eight facilities (seven NOx only facilities and one NOx and SOx facility) shut down in Compliance Year 2016. Changes to the universe of RECLAIM facilities have the potential to impact emissions and the supply and demand of RTCs, and therefore, may impact RECLAIM emission reduction goals.

Existing facilities (defined by Rule 2000 as those with valid SCAQMD Permits to Operate issued prior to October 15, 1993 and that continued to be in operation or possess valid SCAQMD permits on October 15, 1993) that are not categorically excluded pursuant to Rule 200(i)(1) may choose to enter the program even though they do not meet the inclusion criteria. Existing facilities that are neither categorically excluded nor exempt pursuant to Rule 2001(i)(2) may also be included by SCAQMD if their facility-wide emissions increase to four tons or more per year of NOx or SOx or both. When one of these existing facilities enters the program, they are issued RTC allocations based on their operational history pursuant to the methodology prescribed in Rule 2002. Inclusions of existing facilities may affect demand more than supply because even though these facilities are issued RTCs based on their operational history, the amount may not be sufficient to offset their current or future operations. Overall, inclusions shift the accounting of emissions from the universe of non-RECLAIM sources to the universe of RECLAIM sources without actually changing the overall emissions inventory within the South Coast Air Basin. Finally, inclusions change the rules and requirements that apply to the affected facilities. In Compliance Year 2016, no existing facility elected to opt into the RECLAIM universe. However, one was included into the RECLAIM universe based on the Rule 2001 threshold of actual NOx and/or SOx emissions greater than or equal to four tons per year. The other facility that was included was created through the partial change of operator of an already existing RECLAIM facility.

Facilities that received all SCAQMD Permits to Operate on or after October 15, 1993 are defined by Rule 2000 as new facilities. Except as described above for categorically excluded and exempt facilities, new facilities can choose to enter RECLAIM or can be included due to actual NOx or SOx emissions in excess of four tons or more per year. New facilities are not issued RTCs based on operational history, but any external offsets provided by the facility are converted to RTCs. For Compliance Year 2016, no new facilities elected to opt into the RECLAIM universe or was included into the RECLAIM universe pursuant to the Rule 2001 threshold. When a new facility joins the RECLAIM universe, it is required to obtain sufficient RTCs to offset its NOx or SOx emissions. These RTCs must be obtained through the trading market and are not issued by SCAQMD to the facility (any external offsets previously provided by the facility are converted to RTCs). Such facilities increase the overall demand for the fixed supply of RTCs because they increase total RECLAIM emissions without increasing the total supply of RTCs.

The shutdown of a RECLAIM facility results in a reduction in actual emissions. Prior to the October 7, 2016 amendment of Rule 2002, shutdown facilities could retain its RTC holdings as an investment, transfer to another facility under common ownership, or trade on the market. Therefore, although the facility was no longer emitting, its RTCs could be used at another facility. Shutdown facilities had the opposite effect on the RTC market as did new facilities: the overall demand for RTCs was reduced while the supply remained constant. As reported in Chapter 1, eight RECLAIM facilities (seven NOx-only facilities and one NOx/ and SOx facility) shut down permanently in Compliance Year 2016.

A facility is excluded from the RECLAIM universe if SCAQMD staff determines that the facility was included in the program in error. In such cases, both the emissions and the RTCs that were issued to the facility for future years are withdrawn, thereby having a neutral impact on the RTC supply. Exclusions have the reverse effect of inclusions, in that the accounting of emissions is shifted from the RECLAIM universe of sources to the non-RECLAIM universe of sources.

Compliance Year 2016 NOx and SOx audited emissions and initial Compliance Year 2016 allocations for facilities that were shut down, excluded, or included into the program during Compliance Year 2016 are summarized in Tables 3-4 and 3-5.

Table 3-4
NOx Emissions Impact from the Changes in Universe (Tons)

Category	Compliance Year 2016 NOx Emissions (tons)	Initial Compliance Year 2016 NOx Allocations (tons)
Shutdown Facilities	2.88	17.87
Excluded Facilities	0.0	0.0
Included Facilities	4.04	1.14
RECLAIM Universe	7,328	8,992

Table 3-5
SOx Emissions Impact from the Changes in Universe (Tons)

Category	Compliance Year 2016 SOx Emissions (tons)	Initial Compliance Year 2016 SOx Allocations (tons)
Shutdown Facilities	0.0	.98
Excluded Facilities	Not applicable	Not applicable
Included Facilities	Not applicable	Not applicable
RECLAIM Universe	2,024	2,836

Backstop Provisions

Rule 2015 requires that SCAQMD review the RECLAIM program and implement necessary measures to amend it whenever aggregate emissions exceed the aggregate allocations by five percent or more. Compliance Year 2016 aggregate NOx and SOx emissions were both below aggregate allocations as shown in Figures 3-1 and 3-2. Therefore, there is no need to initiate a program review due to emissions exceeding aggregate allocation in Compliance Year 2016.

CHAPTER 4
NEW SOURCE REVIEW ACTIVITY

Summary

The annual program audit assesses New Source Review (NSR) activity from RECLAIM facilities in order to ensure that RECLAIM is complying with federal NSR requirements and state no net increase (NNI) in emissions requirements while providing flexibility to facilities in managing their operations and allowing new sources into the program. In Compliance Year 2016, a total of seven NOx RECLAIM facilities had NSR NOx emission increases, and no SOx RECLAIM facilities had an NSR SOx emission increase due to expansion or modification. Consistent with all prior compliance years, there were sufficient NOx and SOx RTCs available to allow for expansion, modification, and modernization by RECLAIM facilities.

RECLAIM is required to comply with federal NSR emissions offset requirements at a 1.2-to-1 offset ratio programmatically for NOx emission increases and a 1-to-1 offset ratio for SOx emission increases on a programmatic basis. In Compliance Year 2016, RECLAIM demonstrated federal equivalency with a programmatic NOx offset ratio of 60-to-1 based on the compliance year's total unused allocations and total NSR emission increases for NOx. There were no SOx emission increases during the compliance year. RECLAIM inherently complies with the federally-required 1-to-1 SOx offset ratio for any compliance year, provided aggregate SOx emissions under RECLAIM are lower than or equal to aggregate SOx allocations for that compliance year. As shown in Chapter 3, there was no programmatic SOx exceedance during Compliance Year 2016. In fact, there was a surplus of SOx RTCs. Therefore, RECLAIM more than complied with the federally-required SOx offset ratio and further quantification of the SOx offset ratio is unnecessary. Compliance with the federally-required offset ratio also demonstrates compliance with any applicable state NNI requirements for new or modified sources. In addition, RECLAIM requires application of, at a minimum, California Best Available Control Technology (BACT), which is at least as stringent as federal Lowest Achievable Emission Rate (LAER). The same BACT guidelines are used to determine applicable BACT to RECLAIM and non-RECLAIM facilities.

Background

Emissions increases from the construction of new or modified stationary sources in non-attainment areas are regulated by both federal NSR and state NNI requirements to ensure that progress toward attainment of ambient air quality standards is not hampered. RECLAIM is designed to comply with federal NSR

and state NNI requirements without hindering facilities' ability to expand or modify their operations[1].

Title 42, United States Code §7511a, paragraph (e), requires major sources in extreme non-attainment areas to offset emission increases of extreme non-attainment pollutants and their precursors at a 1.5-to-1 ratio based on potential to emit. However, if all major sources in the extreme non-attainment area are required to implement federal BACT, a 1.2-to-1 offset ratio may be used. Federal BACT is comparable to California's BARCT. SCAQMD requires all major sources to employ federal BACT/California BARCT at a minimum and, therefore, is eligible for a 1.2-to-1 offset ratio for ozone precursors (*i.e.*, NOx and VOC). The federal offset requirement for major SO_2 sources is at least a 1-to-1 ratio, which is lower than the aforementioned 1.2-to-1 ratio. Even though the Basin is in attainment with SO_2 standards, SOx is a precursor to PM2.5. The Basin is in Serious Non-attainment with 2006 Federal 24-hours standard and 2012 Federal annual standard for PM2.5. The applicable offset ratio for PM2.5 is at least 1-to-1, thus, the applicable offset ratio for SOx is 1-to-1. Health and Safety Code §40920.5 requires "no net increase in emissions from new or modified stationary sources of non-attainment pollutants or their precursors" (*i.e.*, a 1-to-1 offset ratio on an actual emissions basis). All actual RECLAIM emissions are offset at a 1-to-1 ratio provided there is not a programmatic exceedance of aggregate allocations, thus satisfying the federal offset ratio for SOx and state NNI requirements for both SOx and NOx. Annual RTC allocations follow a programmatic reduction to reflect changes in federal BACT/California BARCT and thereby comply with federal and state offset requirements.

RECLAIM requires, at a minimum, California BACT for all new or modified sources with increases in hourly potential to emit of RECLAIM pollutants. SCAQMD uses the same BACT guidelines in applying BACT to RECLAIM and non-RECLAIM facilities. Furthermore, BACT for major sources is at least as stringent as LAER (LAER is not applicable to minor facilities as defined in Rule 1302(t)). Thus, RECLAIM complies with both state and federal requirements regarding control technologies for new or modified sources. In addition to offset and BACT requirements, RECLAIM subjects RTC trades that are conducted to mitigate emissions increases over the sum of the facility's starting allocation and non-tradable/non-usable credits to trading zone restrictions to ensure net ambient air quality improvement within the sensitive zone established by Health and Safety Code §40410.5. Furthermore, facilities with actual RECLAIM emissions that exceed their initial allocation by 40 tons per year or more are required to analyze the potential impact of their emissions increases through air quality modeling.

Rule 2005 – New Source Review for RECLAIM requires RECLAIM facilities to provide (hold), prior to the start of operation, sufficient RTCs to offset the annual increase in potential emissions for the first year of operation at a 1-to-1 ratio.

[1] Federal NSR applies to federal major sources (sources with the potential to emit at least 10 tons of NOx or 100 tons of SOx per year for the South Coast Air Basin) and state NNI requirements apply to all NOx sources and to SOx sources with the potential to emit at least 15 tons per year in the South Coast Air Basin. RECLAIM's NSR provisions apply to all facilities in the program, including those not subject to federal NSR or state NNI. (Although the threshold for RECLAIM inclusions is four tons per year of NOx or SOx emissions, some RECLAIM facilities have actual emissions much less than 4 tons per year).

The same rule also requires all new RECLAIM facilities[2] and all other RECLAIM facilities that increase their annual allocations above the level of their starting allocations plus non-tradable/non-usable credits to provide sufficient RTCs to offset the annual potential emissions increase from new or modified source(s) at a 1-to-1 ratio at the commencement of each compliance year after the start of operation of the new or modified source(s). Although RECLAIM allows a 1-to-1 offset ratio for emissions increases, RECLAIM complies with the federal 1.2-to-1 offset requirement for NOx on an aggregate basis. This annual program audit report assesses NSR permitting activities for Compliance Year 2016 to verify that programmatic compliance of RECLAIM with federal and state NSR requirements has been maintained.

NSR Activity

Evaluation of NSR data for Compliance Year 2016 shows that RECLAIM facilities were able to expand and modify their operations while complying with NSR requirements. During Compliance Year 2016, a total of seven NOx RECLAIM facilities (two in Cycle 1 and five in Cycle 2) were issued permits to operate, which resulted in a total of 28.11 tons per year of NOx emission increases from starting operations of new or modified sources. There were no SOx NSR emission increases that resulted from starting operations of new or modified permitted sources. These emission increases were calculated pursuant to Rule 2005(d) – Emission Increase. As in previous years, there were adequate unused RTCs (NOx: 1,664 tons, SOx: 812 tons; see Chapter 3) in the RECLAIM universe available for use to offset emission increases at the appropriate offset ratios.

NSR Compliance Demonstration

RECLAIM is designed to programmatically comply with the federal NSR offset requirements. Meeting the NSR requirement (offset ratio of 1.2-to-1 for NOx and at least 1-to-1 for SOx) also demonstrates compliance with the state NNI requirements. Section 173 (c) of the federal Clean Air Act (CAA) states that only emissions reductions beyond the requirements of the CAA, such as federal Reasonably Available Control Technology (RACT), shall be considered creditable as emissions reductions for offset purposes. Since the initial allocations (total RTC supply in Compliance Year 1994) already met federal RACT requirements when the program was initially implemented, any emissions reductions beyond the initial allocations are available for NSR offset purposes until RACT becomes more stringent. The programmatic offset ratio calculations presented in the Annual RECLAIM Audit Reports for Compliance Years 1994 through 2004 relied upon aggregate Compliance Year 1994 allocations as representing RACT. However, staff recognizes that RACT may have become more stringent in the intervening years, so it may no longer be appropriate to calculate the programmatic offset ratio based upon aggregate 1994 allocations.

Aggregate allocations for each compliance year represent federal BACT, which is equivalent to local BARCT. Federal BACT is more stringent than federal RACT (*i.e.*, the best available control technology is more stringent than what is reasonably available), so staff started using current allocations (federal BACT) as a surrogate for RACT as the basis for calculating programmatic NOx and SOx

[2] New facilities are facilities that received all District Permits to Construct on or after October 15, 1993.

offset ratios in the annual program audit report for Compliance Year 2005 and is continuing to do so for NOx in this report. This is a more conservative (*i.e.*, more stringent) approach than using actual RACT and is much more conservative than using aggregate Compliance Year 1994 allocations. The advantage of this approach is that, as long as the calculated NOx offset ratio is at least 1.2-to-1, it provides certainty that RECLAIM has complied with federal and state offset requirements without the need to know exactly what RACT is for RECLAIM facilities. However, if this very conservative approach should ever fail to demonstrate that the aggregate NOx offset ratio for any year is at least 1.2-to-1, that will not necessarily mean RECLAIM has not actually complied with the federally required 1.2-to-1 NOx offset ratio. Rather it will indicate that further analysis is required to accurately identify RACT so that the actual offset ratio can be calculated and a compliance determination made.

Provided aggregate RECLAIM emissions do not exceed aggregate allocations, all RECLAIM emissions are offset at a ratio of 1-to-1. This leaves all unused allocations available to provide offsets beyond the 1-to-1 ratio for NSR emission increases. Unused allocations are based on all Cycle 1 and Cycle 2 RTCs of a given compliance year and the aggregate RECLAIM emissions for the selected time period. The NSR emission increase is the sum of emission increases due to permit activities at all RECLAIM facilities during the same compliance year. The aggregate RECLAIM offset ratios are expressed by the following formula:

$$\text{Offset Ratio} = \left(1 + \frac{\text{compliance year's total unused allocations}}{\text{total NSR emission increases}}\right)\text{-to-1}$$

As stated in the previous section under the title of "NSR Activity", permits to operate issued to seven RECLAIM facilities resulted in 28.11 tons of NOx emission increase pursuant to Rule 2005(d). Additionally, as identified in Table 3-2 (Annual NOx Emissions for Compliance Years 1994 through 2016), 1,664 tons of Compliance Year 2016 NOx RTCs remained unused. Therefore, the Compliance Year 2016 NOx programmatic offset ratio calculated from this methodology is 60-to-1 as shown below:

$$\text{NOx Offset Ratio} = \left(1 + \frac{1{,}664 \text{ tons}}{28.11 \text{ tons}}\right)\text{-to-1}$$

$$60\text{-to-}1$$

RECLAIM continues to generate sufficient excess emission reductions to provide a NOx offset ratio greater than the 1.2-to-1 required by federal law. This compliance with the federal offset requirements is built into the RECLAIM program through annual reductions of the allocations assigned to RECLAIM facilities and the subsequent allocation adjustments adopted by the Governing Board to implement BARCT. The required offset ratio for SOx is 1-to-1. Since RECLAIM facilities are required to secure, at a minimum, adequate RTCs to cover their actual emissions, the SOx 1-to-1 offset ratio is met automatically

provided there is no programmatic exceedance of aggregate SOx allocations for that compliance year. As stated earlier in Chapter 3, there were 812 tons of excess (unused) SOx RTCs for Compliance Year 2016. Since there were no SOx emission increases during the compliance year, there is certainty that both the federally required SOx offset ratio and the California NNI requirement for SOx were satisfied.

BACT and modeling are also required for any RECLAIM facility that installs new equipment or modifies sources if the installation or modification results in an increase in emissions of RECLAIM pollutants. Furthermore, the RTC trading zone restrictions in Rule 2005 – New Source Review for RECLAIM, limit trades conducted to offset emission increases over the sum of the facility's starting allocation and non-tradable/non-usable credits to ensure net ambient air quality improvement within the sensitive zone, as required by state law.

The result of the review of NSR activity in Compliance Year 2016 shows that RECLAIM is in compliance with both state NNI and federal NSR requirements. SCAQMD staff will continue to monitor NSR activity under RECLAIM in order to assure continued progress toward attainment of ambient air quality standards without hampering economic growth in the Basin.

Modeling Requirements

Rule 2004, as amended in May 2001, requires RECLAIM facilities with actual NOx or SOx emissions exceeding their initial allocation in Compliance Year 1994 by 40 tons per year or more to conduct modeling to analyze the potential impact of the increased emissions. The modeling analysis is required to be submitted within 90 days of the end of the compliance year. For Compliance Year 2016, three RECLAIM facilities were subject to the 40 ton modeling requirement; two facilities for NOx emissions, and one for SOx emissions.

This modeling is performed with an EPA approved air dispersion model to assess the impact of a facilities NOx or SOx emission increase on compliance with all applicable state and federal ambient air quality standards (AAQS). Air dispersion modeling submitted by each facility is reviewed by staff and revised as necessary to comply with SCAQMD's air dispersion modeling procedures including use of appropriate meteorological data for the facility location. Per Rule 2004 (q)(3), the modeling submitted by a facility must include source parameters and emissions for every major source located at the facility. For comparison against applicable state and federal AAQS, the predicted modeling impacts due to a facilities NOx or SOx emission increases are added to the highest background NOx or SOx concentration measured at the nearest ambient air monitoring station during the previous three years. Modeling runs are performed with worst-case emissions data for averaging periods that coincide with the averaging period of each applicable AAQS (*e.g.*, 1-hr, 24-hr, annual).

The SOx facility, which had an initial SOx allocation in 1994 and exceed this initial allocation by more than 40 tons in Compliance Year 2016, submitted modeling that demonstrated that SOx emissions from their major sources during 2016 will not cause an exceedance of any state or federal SO_2 AAQS. One of the NOx facilities had an initial NOx allocation in 1994 and exceeded this initial allocation by more than 40 tons in Compliance Year 2016. This facility submitted modeling that demonstrated that NOx emissions from their major sources during

2016 will not cause an exceedance of any state or federal NO_2 AAQS. The other NOx facility, which had no initial allocation in Compliance Year 1994 and whose NOx emissions were above the 40 ton per year threshold, modeled NOx emissions at a much higher emission level prior to its initial commissioning. This initial modeling determined that the annual NOx emission increase would not cause an exceedance of state or federal NO_2 AAQS. Since the initial modeling was conducted at a much higher emission level than what the facility emitted in 2016, no additional modeling analysis is required (*i.e.*, the fact that modeling conducted during the permitting process demonstrated that emissions at the potential to emit level would not cause an exceedance of the state or federal AAQS for NO_2 provides certainty that the much lower actual emissions level would not cause such an exceedance).

CHAPTER 5
COMPLIANCE

Summary

*Of the 284 NOx RECLAIM facilities audited during Compliance Year 2016, a total of 271 facilities (95%) complied with their NOx allocations, and 32 of the 33 SOx facilities (97%) complied with their SOx allocations. Thirteen facilities exceeded their allocations (12 facilities exceeded their NOx allocations, and one facility exceeded its NOx and SOx allocations) during Compliance Year 2016. The 13 facilities that exceeded their NOx allocations had aggregate NOx emissions of 278.6 tons and did not have adequate allocations to offset 8.3 tons (or 3.0%) of their combined emissions. The facility that exceeded its SOx allocation had total SOx emissions of 0.15 tons and did not have adequate allocations to offset 0.10 tons (or 66.7%). The NOx and SOx exceedance amounts are relatively small compared to the overall NOx and SOx allocations for Compliance Year 2016 (0.09% of total NOx allocations and less than 0.01% of total SOx allocations). The exceedances from these facilities did not impact the overall RECLAIM emission reduction goals. Pursuant to Rule 2010(b)(1)(A), these facilities had their respective exceedances deducted from their annual allocations for the compliance year subsequent to the date of SCAQMD's determination that the facilities exceeded their Compliance Year 2016 allocations. The overall RECLAIM NOx and SOx emission reduction targets and goals were met for Compliance Year 2016 (*i.e.*, aggregate emissions for all RECLAIM facilities were well below aggregate allocations).*

Background

RECLAIM facilities have the flexibility to choose among compliance options to meet their annual allocations by reducing emissions, trading RTCs, or a combination of both. However, this flexibility must be supported by standardized emission MRR requirements to ensure the reported emissions are real, quantifiable, and enforceable. As a result, detailed MRR protocols are specified in the RECLAIM regulation to provide accurate and verifiable emission reports.

The MRR requirements were designed to provide accurate and up-to-date emission reports. Once facilities install and complete certification of the required monitoring and reporting equipment, they are relieved from command-and-control rule limits and requirements subsumed under Rule 2001. Mass emissions from RECLAIM facilities are then determined directly by monitoring and reporting equipment for some sources and from data generated by monitoring equipment for others. If monitoring equipment fails to produce quality-assured data or the facility fails to file timely emissions reports, RECLAIM rules require emissions be determined by a rule-prescribed methodology known as Missing Data Procedures or "MDP." Depending on past performance of the monitoring equipment (*i.e.*, availability of quality-assured data) and the duration of the missing data period, MDP use a tiered approach to calculate emissions. As availability of quality-assured data increases, the MDP-calculated emissions become more representative of the actual emissions, but when the availability of

quality-assured data is low, MDP calculations become more conservative and approach, to some extent, “worst case” assessments.

Allocation Compliance

Requirements

At the beginning of the RECLAIM program in 1994 or at the time a facility is included in the RECLAIM program, each RECLAIM facility is issued an annual allocation for each compliance year pursuant to methodology prescribed in Rule 2002. For a facility in existence prior to October 1993, it is issued allocations by SCAQMD based on its historical production rate. A facility without an operating history prior to 1994 receives no allocation and must purchase enough RTCs to cover the emissions for their operations, except facilities that have provided ERCs to offset emission increases prior to entering RECLAIM are issued RTCs generated by converting the surrendered ERCs to RTCs. Additionally, all facilities entering RECLAIM holding any ERCs generated at and held by the individual facility itself have those ERCs converted to RTCs and added to their allocated RTCs. Knowing their emission goals, RECLAIM facilities have the flexibility to manage their emissions in order to meet their allocations in the most cost-effective manner. Facilities may employ emission control technology or process changes to reduce emissions, buy RTCs, or sell unneeded RTCs.

Facilities may buy RTCs or sell excess RTCs at any time during the year in order to ensure that their emissions are covered. There is a thirty day reconciliation period commencing at the end of each of the first three quarters of each compliance year. In addition, after the end of each compliance year, there is a 60-day reconciliation period (instead of 30 days as at the end of the first three quarters) during which facilities have a final opportunity to buy or sell RTCs for that compliance year. These reconciliation periods are provided for facilities to review and correct their emission reports as well as securing adequate allocations. Each RECLAIM facility must hold sufficient RTCs in its allocation account to cover (or reconcile with) its quarterly as well as year-to-date emissions for the compliance year at the end of each reconciliation period. By the end of each quarterly and annual reconciliation period, each facility is required to certify the emissions for the preceding quarter and/or compliance year by submitting its Quarterly Certification of Emissions Reports (QCERs) and/or APEP report, respectively.

Compliance Audit

Since the beginning of the program, SCAQMD staff has conducted annual audits of each RECLAIM facility’s emission reports to ensure their integrity and reliability. The audit process includes conducting field inspections to check process equipment, monitoring devices, and operational records. Additionally, emissions calculations are performed in order to verify emissions reported electronically to SCAQMD or submitted in QCERs and APEP reports. For Compliance Year 2016, these inspections revealed that some facilities did not obtain or record valid monitoring data, were unable to substantiate reported emissions with valid records, failed to submit emission reports when due, made errors in quantifying their emissions (*e.g.*, arithmetic errors), used incorrect emission and adjustment factors (*e.g.*, bias adjustment factors), failed to correct fuel usage to standard conditions, used emission calculation methodologies not

allowed under the rules, or used MDP inappropriately. Appropriate compliance actions are also taken based on audit findings.

Whenever an audit revealed a facility's emissions to be in excess of its annual allocation, the facility was provided an opportunity to review the audit and to present additional data to further refine audit results. This extensive and rigorous audit process ensures valid and reliable emissions data.

Compliance Status

During this compliance year, a total of 13 RECLAIM facilities failed to reconcile their emissions (12 NOx-only facilities and one NOx-and-SOx facility that exceeded both its NOx and SOx allocations). Ten of the 13 facilities with reported NOx exceedances failed to secure sufficient RTCs during either the quarterly or annual reconciliation periods to cover their reported emissions. The other two facilities had audited NOx exceedances solely because they under-reported their emissions and didn't hold sufficient RTCs to reconcile their audited emissions. The remaining facility failed to report NOx emissions for any of the four quarters during Compliance Year 2016. As a result, the facility was issued notices of violation (NOV) for failure to submit required emission reports and for exceeding its allocations as it held no RTCs.

Four of the 10 facilities with reported NOx emission exceedances, and the facility with a reported SOx emission exceedance, had additional exceedances because they under-reported their emissions and didn't hold sufficient RTCs to reconcile their audited emissions. Reasons for under-reported NOx emissions include one or more of the following:

- mathematical errors,
- failure to properly correct measured fuel flow to standard conditions defined as one atmosphere of pressure and a temperature of 60°F or 68°F provided that the same temperature is used throughout the facility,
- failure to use correct mass conversion factor when fuel flow is corrected to 60°F for process units and large sources with concentration limits,
- failure to use fuel flow commensurate with maximum rated equipment capacity when using timer-based fuel flow determination, and
- failure to apply missing data procedures during periods of invalid fuel flow measurement(s).

Overall, the Compliance Year 2016 allocation compliance rates for facilities are 95% (271 out of 284 facilities) for NOx RECLAIM and 97% (32 out of 33 facilities) for SOx RECLAIM. For purposes of comparison, the allocation compliance rates for Compliance Year 2015 were 94% and 97% for NOx and SOx RECLAIM facilities, respectively. In Compliance Year 2016, the 13 facilities that had NOx emissions in excess of their individual NOx allocations had 278.6 tons of NOx emissions and did not have adequate RTCs to cover 8.3 of those tons (or 3.0%). The SOx facility that exceeded its SOx allocation and had total SOx emissions of 0.15 tons did not have adequate allocations to offset 0.10 tons (or 66.7%). The NOx and SOx exceedance amounts are relatively small compared to the overall allocations for Compliance Year 2016 (0.09% of aggregate NOx allocations and less than 0.01% of aggregate SOx allocations). Pursuant to Rule 2010(b)(1)(A), all 13 facilities had their respective NOx or SOx Allocation exceedances

deducted from their annual emissions allocations for the compliance year subsequent to SCAQMD's determination that the facilities exceeded their Compliance Year 2016 allocations.

Impact of Missing Data Procedures

MDP was designed to provide a method for determining emissions when an emission monitoring system does not yield valid emissions. For major sources, these occurrences may be caused by failure of the monitoring systems, the data acquisition and handling systems, or by lapses in the Continuous Emissions Monitoring System (CEMS) certification period. Major sources are also required to use MDP for determining emissions whenever daily emissions reports are not submitted by the applicable deadline. When comparing actual emissions with a facility's use of substituted MDP emissions, the range of MDP emissions can vary from "more representative" to being overstated to reflect a "worst case"[1] scenario. For instance, an MDP "worst case" scenario may occur for major sources that fail to have their CEMS certified in a timely manner, and therefore, have no valid CEMS data that can be used for substitution. In other cases, where prior CEMS data is available, MDP is applied in tiers depending on the duration of missing data periods and the historical availability of monitoring systems. As the duration of missing data periods gets shorter and the historical availability of monitoring systems gets higher, the substitute data yielded by MDP becomes more representative of actual emissions[2].

In addition to MDP for major sources, RECLAIM rules also define MDP for large sources and process units. These procedures are applicable when a process monitoring device fails or when a facility operator fails to record fuel usage or other monitored data (*e.g.*, hours of operation). The resulting MDP emissions reports are reasonably representative of the actual emissions because averaged or maximum emissions from previous operating periods may be used. However, for extended missing data periods (more than two months for large sources or four quarters or more for process units) or when emissions data for the preceding year are unavailable, large source and process unit MDP are also based on maximum operation or worst case assumptions.

Based on APEP reports, 91 NOx facilities and 14 SOx facilities used MDP in reporting portions of their annual emissions during Compliance Year 2016. In terms of mass emissions, 3.9% of the total reported NOx emissions and 6.2% of the total reported SOx emissions in the APEP reports were calculated using MDP for Compliance Year 2016. Table 5-1 compares the impact of MDP on reported annual emissions for the last few compliance years to the second compliance year, 1995 (MDP was not fully implemented during Compliance Year 1994).

[1] Based on uncontrolled emission factor at maximum rated capacity of the source and 24 hours per day.

[2] Based on averaged emissions during periods before and after the period for which data is not available.

Table 5-1
MDP Impact on Annual Emissions

Year	Percent of Reported Emissions Using Substitute Data*	
	NOx	SOx
1995	23.0% (65 / 6,070)	40.0% (12 / 3,403)
2010	7.0% (93 / 488)	6.1% (23 / 168)
2011	6.2% (94 / 435)	12.4% (19 / 328)
2012	7.5% (95 / 560)	4.5% (13 / 114)
2013	3.9% (107 / 287)	5.6% (15 / 113)
2014	3.3% (97 / 247)	3.0% (13 / 66)
2015	6.9% (98 / 502)	10.9% (14 / 229)
2016	3.9% (91 / 288)	6.2% (14 / 125)

* Numbers in parenthesis that are separated by a slash represent the number of facilities that reported use of MDP in each compliance year and tons of emissions based on MDP.

Most of the issues associated with CEMS certifications were resolved prior to Compliance Year 1999. Since then, very few facilities have had to submit emissions reports based on the worst case scenario under MDP, which may considerably overstate the actual emissions from major sources. As an example, most facilities that reported emissions using MDP in 1995 did so because they did not have their CEMS certified in time to report actual emissions. Since their CEMS had no prior data, MDP called for an application of the most conservative procedure to calculate substitute data by assuming continuous uncontrolled operation at the maximum rated capacity of the facility's equipment, regardless of the actual operational level during the missing data periods. As a result, the calculations yielded substitute data that may have been much higher than the actual emissions. In comparison to the 65 NOx facilities implementing MDP in Compliance Year 1995, 91 facilities reported NOx emissions using MDP in Compliance Year 2016. Even though the number of facilities is higher than in 1995, the percentage of emissions reported using MDP during Compliance Year 2016 is much lower than it was in 1995 (4% compared to 23%). Additionally, in terms of quantity, NOx emissions determined by the use of MDP in Compliance Year 2016 were about 5% of those in Compliance Year 1995 (288 tons compared to 6,070 tons). Since most CEMS were certified and had been reporting actual emissions by the beginning of Compliance Year 2000, facilities that had to calculate substitute data were able to apply less conservative methods of calculating MDP for systems with high availability and shorter duration missing data periods. Therefore, the substitute data they calculated for

their missing data periods were more likely to be representative of the actual emissions.

It is important to note that portions of annual emissions attributed to MDP include actual emissions from the sources as well as the possibility of overestimated emissions. As shown in Table 5-1, approximately 4% of reported NOx annual emissions were calculated using MDP in Compliance Year 2016. MDP may significantly overestimate emissions from some of the sources that operate intermittently and have low monitoring system availability, and/or lengthy missing data periods. Even though a portion of the 4% may be overestimated emissions due to conservative MDP, a significant portion (or possibly all) of it could have also been actual emissions from the sources. Unfortunately, the portion that represents the actual emissions cannot be readily estimated because the extent of this effect varies widely, depending on source categories and operating parameters, as well as the tier of MDP applied. For Compliance Year 2016, a significant portion of NOx MDP emissions data (58%) and majority of SOx MDP emissions data (94%) were reported by refineries, which tend to operate near maximum capacity for 24 hours per day and seven days per week, except for scheduled shutdowns for maintenance and barring major breakdowns or other unforeseeable circumstances. Missing data emissions calculated using the lower tiers of MDP (*i.e.*, 1N Procedure or 30-day maximum value) for facilities such as refineries that have relatively constant operation near their maximum operation are generally reflective of actual emissions because peak values are close to average values for these operations.

Emissions Monitoring

Overview

The reproducibility of reported RECLAIM facility emissions (and the underlying calculations)—and thereby the enforceability of the RECLAIM program—is assured through a tiered hierarchy of MRR requirements. A facility's equipment falls into an MRR category based on the kind of equipment it is and on the level of emissions produced or potentially produced by the equipment. RECLAIM divides all NOx sources into major sources, large sources, process units, and equipment exempt from obtaining a written permit pursuant to Rule 219. All SOx sources are divided into major sources, process units, and equipment exempt from obtaining a written permit pursuant to Rule 219. Table 5-2 shows the monitoring requirements applicable to each of these categories.

Table 5-2
Monitoring Requirements for RECLAIM Sources

Source Category	Major Sources (NOx and SOx)	Large Sources (NOx only)	Process Units and Rule 219 Equipment (NOx and SOx)
Monitoring Method	Continuous Emissions Monitoring System (CEMS) or Alternative CEMS (ACEMS)	Fuel Meter or Continuous Process Monitoring System (CPMS)	Fuel Meter, Timer, or CPMS
Reporting Frequency	Daily	Monthly	Quarterly

Continuous Emissions Monitoring System (CEMS)

Requirements

CEMS represent both the most accurate and the most reliable method of calculating emissions because they continuously monitor all of the parameters necessary to directly determine mass emissions of NOx and SOx. They are also the most costly method. These attributes make CEMS the most appropriate method for the largest emission-potential equipment in the RECLAIM universe, major sources.

Alternative Continuous Emissions Monitoring Systems (ACEMS) are alternatives to CEMS that are allowed under the RECLAIM regulation. These are devices that do not directly monitor NOx or SOx mass emissions; instead, they correlate multiple process parameters to arrive at mass emissions. To be approved for RECLAIM MRR purposes, ACEMS must be determined by SCAQMD to be equivalent to CEMS in relative accuracy, reliability, reproducibility, and timeliness

Even though the number of major sources monitored by either CEMS or ACEMS represent 19% and 65% of all permitted RECLAIM NOx and SOx sources during Compliance Year 2016, respectively, reported emissions for Compliance Year 2016 revealed that 76% of all RECLAIM NOx emissions and 97% of all RECLAIM SOx emissions were determined by CEMS or ACEMS.

Compliance Status

By the end of calendar year 1999, almost all facilities that were required to have CEMS had their CEMS certified or provisionally approved. The only remaining uncertified CEMS are for sources that recently became subject to major source reporting requirements and sources that modified their CEMS. Typically, there will be a few new major sources each year. Therefore, there will continue to be a small number of CEMS in the certification process at any time.

Semiannual and Annual Assessments of CEMS

RECLAIM facilities conduct their Relative Accuracy Test Audit (RATA) of certified CEMS using private sector testing laboratories approved under SCAQMD's Laboratory Approval Program (LAP). These tests are conducted either

semiannually or annually, depending on the most recent relative accuracy value (the sum of the average differences and the confidence coefficient) for each source. The interval is annual only when all required relative accuracies obtained during an audit are 7.5% or less (*i.e.*, more accurate).

To verify the quality of CEMS, the RATA report compares the CEMS data to data taken simultaneously, according to approved testing methods (also known as reference methods), by a LAP-approved source testing contractor. In order to have a passing RATA, each of the following relative accuracy performance criteria must be met: The relative accuracy of the CEMS results relative to the reference method results must be within ±20% for pollutant concentration, ±15% for stack flow rate, and ±20% for pollutant mass emission rate. The RATAs also determine whether CEMS data must be adjusted for low readings compared to the reference method (bias adjustment factor), and by how much. The RATA presents two pieces of data, the CEMS bias (how much it differs from the reference method on the average) and the CEMS confidence coefficient (how variable that bias or average difference is).

Tables 5-3 and 5-4, respectively, summarize the 2016 and 2017 calendar years' passing rates for submitted RATAs of certified CEMS for NOx and SOx concentration, total sulfur in fuel gas concentrations, stack flow rate (in-stack monitors and F-factor based calculations), and NOx and SOx mass emissions. However, the tables do not include SOx mass emissions calculated from total sulfur analyzer systems because such systems serve numerous devices, and therefore are not suitable for mass emissions-based RATA testing. As noted in the footnotes for each table, the calendar year 2016 and 2017 passing rates are calculated from RATA data submitted before January 5, 2017 and January 9, 2018, respectively, and may exclude some RATA data from the fourth quarter of each year.

Table 5-3
Passing Rates Based on RATAs of Certified CEMS in 2016[1]

Concentration						Stack Flow Rate				Mass Emissions			
NOx		SO_2		Total[2] Sulfur		In-Stack Monitor		F-Factor Based Calc.		NOx		SOx[3]	
No.	% Pass	No.	% Pass	No.	% Pass	No.	% Pass	No.	% Pass	No.	% Pass	No.	% Pass
366	100	101	100	15	100	50	100	361	100	366	99.7	93	100

[1] The calculation of passing rates includes all RATAs submitted by January 5, 2017.

[2] Includes Cylinder Gas Audit (CGA) tests.

[3] Does not include SOx emissions calculated from total sulfur analyzers.

Table 5-4
Passing Rates Based on RATAs of Certified CEMS in 2017

Concentration						Stack Flow Rate				Mass Emissions			
NOx		SO_2		Total[2] Sulfur		In-Stack Monitor		F-Factor Based Calc.		NOx		SOx[3]	
No.	% Pass	No.	% Pass	No.	% Pass	No.	% Pass	No.	% Pass	No.	% Pass	No.	% Pass
346	100	87	100	15	100	43	100	336	100	346	100	78	100

[1] The calculation of passing includes all RATAs submitted by January 9, 2018.

[2] Includes Cylinder Gas Audit (CGA) tests.

[3] Does not include SOx emissions calculated from total sulfur analyzers.

As indicated in Tables 5-3 and 5-4, the passing rates for NOx/SO_2 concentration, stack flow rate, and mass emissions were at or near 100%. Since the inception of RECLAIM there have been significant improvements with respect to the availability of reliable calibration gas, the reliability of the reference method, and an understanding of the factors that influence valid total sulfur analyzer data.

Electronic Data Reporting of RATA Results

Facilities operating CEMS under RECLAIM are required to submit RATA results to SCAQMD. An electronic reporting system, known as Electronic Data Reporting (EDR), was set up to allow RATA results to be submitted electronically using a standardized format in lieu of the traditional formal source test reports in paper form. This system minimizes the amount of material the facility must submit to SCAQMD and also expedites reviews. Ninety-nine percent of RATA results for calendar year 2017 were submitted via EDR.

Non-Major Source Monitoring, Reporting, and Recordkeeping

Emissions quantified for large sources are primarily based on concentration limits or emission rates specified in the Facility Permit. Other variables used in the calculation of large source emissions are dependent on the specific process of the equipment, but generally include fuel usage, applicable dry F-factor, and the higher heating value of the fuel used, which are collectively used to calculate stack flow rate. RECLAIM requires large sources to be source tested within defined three-year windows in order to validate fuel meter accuracy and the equipment's concentration limit or emission rate. Since emissions quantification is fuel-based, the monitoring equipment required to quantify emissions is a non-resettable fuel meter that must be corrected to standard temperature and pressure. Large source emission data must be submitted electronically on a monthly basis.

Process unit emission calculations are similar to those of large sources in that emissions are quantified using the fuel-based calculations for either a concentration limit or an emission factor specified in the Facility Permit. Similar to large sources, variables used in emission calculations for process units are dependent on the equipment's specific process, but generally include fuel usage, applicable dry F-factor, and the higher heating value of the fuel used. Process units that are permitted with concentration limits are also required to be source-tested, but within specified five-year windows rather than three-year windows.

Emissions for equipment exempt from obtaining a written permit pursuant to Rule 219 are quantified using emission factors and fuel usage. No source testing is required for such exempt equipment. Since emissions calculations are fuel-based for both process units and exempt equipment, the monitoring equipment required to quantify emissions is a non-resettable fuel meter, corrected to standard temperature and pressure. Alternately, a timer may be used to record operational time. In such cases, fuel usage is determined based on maximum rated capacity of the source. Process units and exempt equipment must submit emission reports electronically on a quarterly basis.

Emissions Reporting

Requirements

RECLAIM uses electronic reporting technology to streamline reporting requirements for both facilities and SCAQMD, and to help automate compliance tracking. Under RECLAIM, facilities report their emissions electronically on a per device basis to SCAQMD's Central Station computer as follows:

- Major sources must use a Remote Terminal Unit (RTU) to telecommunicate emission data to SCAQMD's Central Station. The RTU collects data, performs calculations, generates the appropriate data files, and transmits the data to the Central Station. This entire process is required to be performed by the RTU on a daily basis without human intervention.
- Emission data for all equipment other than major sources may be transmitted via RTU or compiled manually and transmitted to the Central Station via modem. Alternatively, operators of non-major sources may use SCAQMD's internet based application, Web Access To Electronic Reporting System (WATERS) to transmit emission data for non-major sources via internet connection. The data may be transmitted directly by the facility or through a third party.

Compliance Status

The main concern for emission reporting is the timely submittal of accurate daily emissions reports from major sources. If daily reports are not submitted by the specified deadlines, RECLAIM rules may require that emissions from CEMS be ignored and the emissions be calculated using MDP. Daily emission reports are submitted by the RTU of the CEMS to SCAQMD's Central Station via telephone lines. Often communication errors between the two points are not readily detectable by facility operators. Undetected errors can cause facility operators to believe that daily reports were submitted when they were not received by the Central Station. In addition to providing operators a means to confirm the receipt of their reports, the WATERS application can also display electronic reports that were submitted to, and received by, the Central Station. This system helps reduce instances where MDP must be used for late or missing daily reports, because the operators can verify that the Central Station received their daily reports, and can resubmit them if there were communication errors.

Protocol Review

Even though review of MRR protocols was only required by Rule 2015(b)(1) for the first three compliance years of the RECLAIM program, staff continues to review the effectiveness of enforcement and MRR protocols. Based on such review, occasional revisions to the protocols may be needed to achieve improved measurement and enforcement of RECLAIM emission reductions, while minimizing administrative costs to RECLAIM facilities and SCAQMD.

Since the RECLAIM program was adopted, staff has produced rule interpretations and implementation guidance documents to clarify and resolve specific concerns about the protocols raised by RECLAIM participants or observed by SCAQMD staff. In situations where staff could not interpret existing rule requirements to adequately address the issues at hand, the protocols and/or rules have been amended.

CHAPTER 6
REPORTED JOB IMPACTS

Summary

*This chapter compiles data as reported by RECLAIM facilities in their Annual Permit Emissions Program (APEP) reports. The analysis focuses exclusively on job impacts at RECLAIM facilities and determination if those job impacts were directly attributable to RECLAIM as reported by those facilities. Additional benefits to the local economy (*e.g.*, generating jobs for consulting firms, source testing firms and CEMS vendors) attributable to the RECLAIM program, as well as factors outside of RECLAIM (*e.g.*, the prevailing economic climate), impact the job market. However, these factors are not evaluated in this report. Also, job losses and job gains are strictly based on RECLAIM facilities' reported information. SCAQMD staff is not able to independently verify the accuracy of the reported job impact information.*

According to the Compliance Year 2016 employment survey data gathered from APEP reports, RECLAIM facilities reported a net loss of 982 jobs, representing 0.88% of their total employment. None of the eight RECLAIM facilities that shut down or ceased operations during Compliance Year 2016 cited RECLAIM as a factor contributing to the decision to shutdown. One facility reported a loss of 15 jobs due to RECLAIM, but they did not shut down operations.

Background

The APEP reports submitted by RECLAIM facilities include survey forms that are used to evaluate the socioeconomic impacts of the program. Facilities were asked to indicate the number of jobs at the beginning of Compliance Year 2016 and any changes in the number of jobs that took place during the compliance year in each of three categories: manufacturing, sale of products, and non-manufacturing. The numbers of jobs gained and lost reported by facilities in each category during the compliance year were tabulated.

Additionally, APEP reports ask facilities that shut down during Compliance Year 2016 to provide the reasons for their closure. APEP reports also allow facilities to indicate whether the RECLAIM program led to the creation or elimination of jobs during Compliance Year 2016.

Since data regarding job impacts and facility shutdowns are derived from the APEP reports, the submittal of these reports is essential to assessing the influence that the RECLAIM program has on these issues. The following discussion represents data obtained from APEP reports submitted to SCAQMD for Compliance Year 2016 and clarifying information collected by SCAQMD staff. SCAQMD staff is not able to verify the accuracy of the reported job impact information.

Job Impacts

Table 6-1 summarizes job impact data gathered from Compliance Year 2016 APEP reports and follow-up contacts with facilities. A total of 125 facilities reported 7,144 job gains, while 133 facilities reported a total of 8,126 job losses.

Net job losses were reported in two of the three categories: manufacturing (42), and non-manufacturing (953), whereas a net job gain was reported in the remaining category: sales of products (13). Table 6-1 shows a total net loss of 982 jobs, which represents a net jobs decrease of 0.88% at RECLAIM facilities during Compliance Year 2016.

Table 6-1
Job Impacts at RECLAIM Facilities for Compliance Year 2016

Description	Manufacture	Sales of Products	Non-Manufacture	Total[1]
Initial Jobs	40,215	948	70,278	111,441
Overall Job Gain	2,321	72	4,751	7,144
Overall Job Loss	2,363	59	5,704	8,126
Final Jobs	40,173	961	69,325	110,459
Net Job Change	-42	13	-953	-982
Percent (%) Job Change	-0.10%	1.37%	-1.36%	-0.88%
Facilities Reporting Job Gains	85	26	74	125
Facilities Reporting Job Losses	94	17	87	133

[1] The total number of facilities reporting job gains or losses does not equal the sum of the number of facilities reporting job changes in each category (*i.e.*, the manufacture, sales of products, and non-manufacture categories) due to the fact that some facilities may report changes under more than one of these categories.

Data in Table 6-1 include eight RECLAIM facilities that were reported to have shut down or ceased operations in Compliance Year 2016 as listed in Appendix C. One facility claimed a more attractive utility of land and resources, and three other facilities were liquidated or consolidated their operations and moved out of state. The fifth facility stated the cost of manufacturing, production and raw materials was too high. The sixth facility inactivated all of its permits and consolidated its operations with two company-owned facilities, one within the region and one outside the country. The seventh facility sold its property to a new operator with no permitted equipment remaining onsite. The eighth facility shutdown due to declining demand for its products. The last two facilities had no operations for many years and finally surrendered their permits in 2016. These shutdowns led to a total loss of 272 jobs (240 manufacturing jobs, 6 sales jobs, and 26 non-manufacturing jobs, according to the submitted APEP reports.

One facility that did not shut down, attributed 15 jobs lost to RECLAIM due to increased cost of operation for compliance, and permitting fees (refer to Appendix E). No other RECLAIM facilities attributed job gains or losses to RECLAIM for Compliance Year 2016.

The analysis in this report only considers job gains and losses at RECLAIM facilities. It should be noted that this analysis of socioeconomic impacts based on APEP reports and follow-up interviews is focused exclusively on changes in employment that occurred at RECLAIM facilities. The effect of the program on the local economy outside of RECLAIM facilities, including consulting and source testing jobs, is not considered.

It is not possible to compare the impact of the RECLAIM program on the job market *vis-à-vis* a scenario without RECLAIM. This is because factors other than RECLAIM (*e.g.*, the prevailing economic climate), also impact the job market. Furthermore, there is no way to directly compare job impacts attributed to RECLAIM to job impacts attributed to command-and-control rules that would have been adopted in RECLAIM's absence, because these command-and-control rules do not exist for these facilities. As mentioned previously, the effect of the RECLAIM program on the local economy outside of RECLAIM facilities (*e.g.*, generating jobs for consulting firms, source testing firms and CEMS vendors) is also not considered in this report.

CHAPTER 7
AIR QUALITY AND PUBLIC HEALTH IMPACTS

Summary

Audited RECLAIM emissions have been in an overall downward trend since the program's inception. Compliance Year 2016 NOx emissions increased slightly (1.1%) relative to Compliance Year 2015, and Compliance Year 2016 SOx emissions were 3.4% less than the previous year. Quarterly calendar year 2016 NOx emissions fluctuated within seven percent of the mean NOx emissions for the year. Quarterly calendar year 2016 SOx emissions fluctuated within seven percent of the year's mean SOx emissions. There was no significant shift in seasonal emissions from the winter season to the summer season for either pollutant.

The California Clean Air Act (CCAA) required a 50% reduction in population exposure to ozone, relative to a baseline averaged over three years (1986 through 1988), by December 31, 2000. The Basin achieved the December 2000 target for ozone well before the deadline. In calendar year 2017, the per capita exposure to ozone (the average length of time each person is exposed) continued to be well below the target set for December 2000.

Air toxic health risk is primarily caused by emissions of certain volatile organic compounds (VOCs) and fine particulates, such as metals. RECLAIM facilities are subject to the same air toxic, VOC, and particulate matter regulations as other sources in the Basin. All sources are subject, where applicable, to the NSR rule for toxics (Rule 1401 and/or Rule 1401.1). In addition, new or modified sources with NOx or SOx emission increases are required to be equipped with BACT, which minimizes to the extent feasible the increase of NOx and SOx emissions. RECLAIM and non-RECLAIM facilities that emit toxic air contaminants are required to report those emissions to SCAQMD. Those emissions reports are used to identify candidates for the Toxics Hot Spots program (AB2588). This program requires emission inventories and, depending on the type and amount of emissions, facilities may be required to do public notice and/or prepare and implement a plan to reduce emissions. There is no evidence that RECLAIM has caused or allowed higher toxic risk in areas adjacent to RECLAIM facilities.

Background

RECLAIM is designed to achieve the same, or higher level of, air quality and public health benefits as would have been achieved from implementation of the control measures and command-and-control rules that RECLAIM subsumed. Therefore, as a part of each annual program audit, SCAQMD staff evaluates per capita exposure to air pollution, toxic risk reductions, emission trends, and seasonal fluctuations in emissions. SCAQMD staff also generates quarterly emissions maps depicting the geographic distribution of RECLAIM emissions. These maps are generated and posted quarterly on SCAQMD's website[1], and

[1] The quarterly emission maps can be found at: http://www.aqmd.gov/home/programs/business/about-reclaim/quarterly-emission-maps.

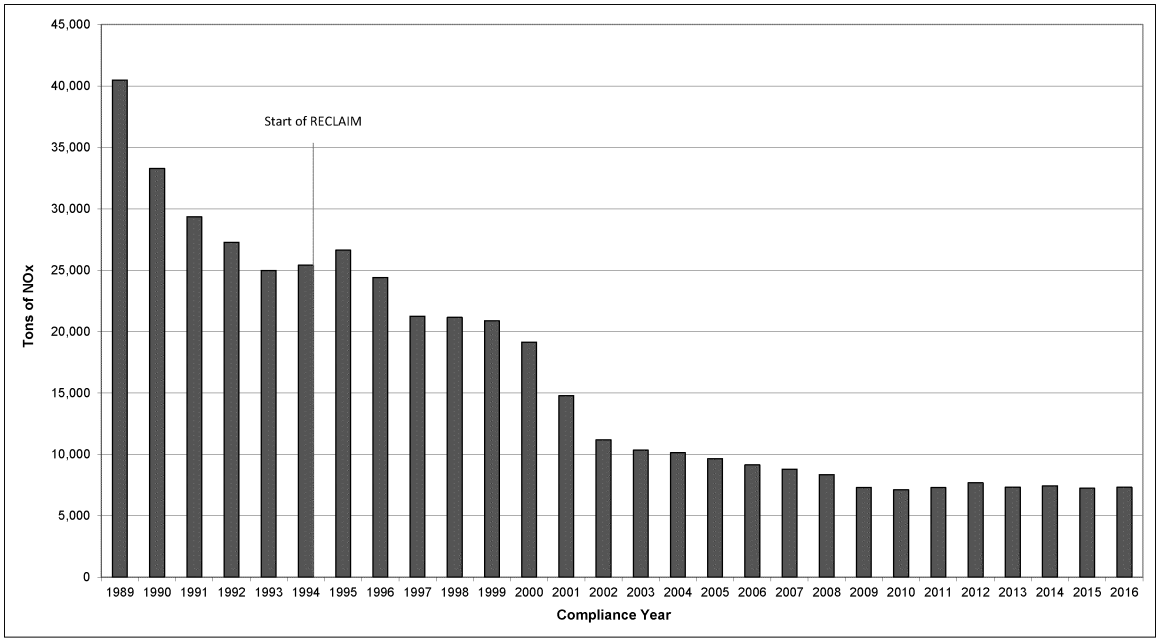
include all the quarterly emissions maps presented in previous annual program audit reports. This chapter addresses:

- Emission trends for RECLAIM facilities;
- Seasonal fluctuations in emissions;
- Per capita exposure to air pollution; and
- Toxics impacts.

Emission Trends for RECLAIM Sources

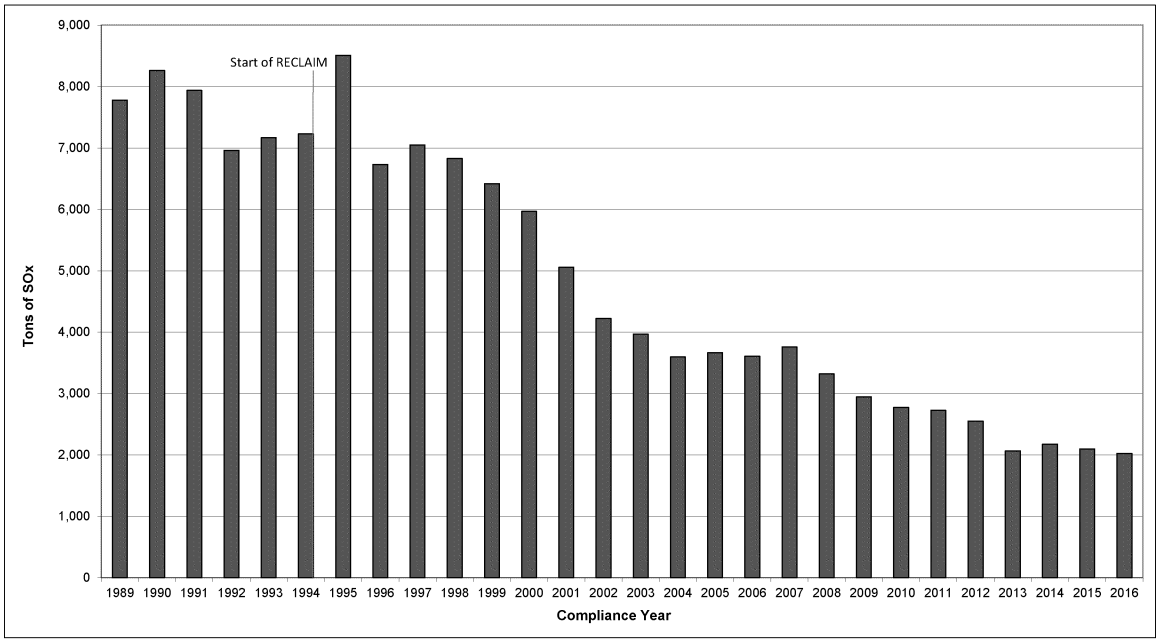
Concerns were expressed during program development that RECLAIM might cause sources to increase their aggregate emissions during the early years of the program due to perceived over-allocation of emissions. As depicted in Figures 7-1 and 7-2, which show NOx and SOx emissions from RECLAIM sources since 1989, the analysis of emissions from RECLAIM sources indicates that overall, RECLAIM emissions have been in a downward trend since program inception, and the emission increases during early years of RECLAIM that were anticipated by some did not materialize.

Figure 7-1
NOx Emission Trend for RECLAIM Sources



Note: 1989-1993 emissions presented in this figure are the emissions from the facilities in the 1994 NOx universe.

Figure 7-2
SOx Emission Trend for RECLAIM Sources



Note: 1989-1993 emissions presented in this figure are the emissions from the facilities in the 1994 SOx universe.

NOx emissions decreased every year from Compliance Year 1995 through Compliance Year 2009, and the emissions from Compliance Year 2009 to Compliance Year 2016 have fluctuated within a narrow range (7,121 – 7,691 ton/yr, or < ± 4% of the mid-point). Since Compliance Year 1995, annual SOx emissions have also followed a general downward trend, except for slight increases in Compliance Years 1997, 2005, 2007, and 2014 compared to each respective previous compliance year. As discussed in Chapter 3, NOx and SOx emissions are much lower than the programmatic goals (see Figures 3-1 and 3-2).

The increase in NOx and SOx emissions from Compliance Year 1994 to 1995 can be attributed to the application of MDP at the onset of RECLAIM implementation. RECLAIM provides for emissions from each major source's first year in the program to be quantified using an emission factor and fuel throughput (interim reporting) while they certify their CEMS. However, at the beginning of the program (Compliance Year 1994), many facilities had difficulties certifying their CEMS within this time frame, and consequently reported their Compliance Year 1995 emissions using MDP. As discussed in Chapter 5, since CEMS for these major sources had no prior data, MDP required the application of the most conservative procedure to calculate substitute data. As a result, the application of MDP during this time period yielded substitute data that may have been much higher than the actual emissions. In addition, emissions after Compliance Year 1995 decreased steadily through 2000. Thus, RECLAIM facilities did not increase their actual aggregate emissions during the early years of the program.

Seasonal Fluctuation in Emissions for RECLAIM Sources

Another concern during program development was that RECLAIM might cause facilities to shift emissions from the winter season into the summer ozone season and exacerbate poor summer air quality since RECLAIM emission goals are structured on an annual basis. To address this concern, "seasonal fluctuations" were added as part of the analysis required by Rule 2015. Accordingly, SCAQMD staff performed a two-part analysis of the quarterly variation in RECLAIM emissions:

1. In the first part, staff qualitatively compared the quarterly variation in Compliance Year 2016 RECLAIM emissions to the quarterly variation in emissions from the RECLAIM universe prior to the implementation of RECLAIM.
2. In the second part, staff analyzed quarterly audited emissions during calendar year 2016 and compared them with quarterly audited emissions for prior years to assess if there had been such a shift in emissions. This analysis is reflected in Figures 7-3 through 7-6.[2]

Quarterly emissions data from the facilities in RECLAIM before they were in the program is not available. Therefore, a quantitative comparison of the seasonal variation of emissions from these facilities while operating under RECLAIM with their seasonal emissions variation prior to RECLAIM is not feasible. However, a qualitative comparison has been conducted, as follows:

- NOx emissions from RECLAIM facilities are dominated by refineries and power plants.
- SOx emissions from RECLAIM facilities are especially dominated by refineries.
- Prior to RECLAIM, refinery production was generally highest in the summer months because more people travel during summer; thus, increasing demand for gasoline and other transportation fuels.
- Electricity generation prior to RECLAIM was generally highest in the summer months because of increased demand for electricity to drive air conditioning units.

Emissions from refineries (NOx and SOx) and from power plants (NOx) are typically higher in the summer months, which was the trend prior to implementation of RECLAIM for the reasons described above. Therefore, provided a year's summer quarter RECLAIM emissions do not exceed that year's quarterly average emissions by a substantial amount, it can be concluded that, for that year, RECLAIM has not resulted in a shift of emissions to the summer months relative to the pre-RECLAIM emission pattern.

Figure 7-3 shows the 2016 mean quarterly NOx emission level, which is the average of the aggregate audited emissions for each of the four quarters, and the 2016 audited quarterly emissions. Figure 7-4 compares the 2016 quarterly NOx emissions with the quarterly emissions from 2005 through 2015. During calendar year 2016, quarterly NOx emissions varied from seven percent below the mean

[2] Data used to generate these figures were derived from audited data. Similar figures for calendar years 1994 through 2007 in previous annual reports were generated from a combination of audited and reported data available at the time the reports were written.

in the first quarter (January through March) to about seven percent above the mean in the third quarter (July through September). Figure 7-4 shows that the calendar year 2016 quarterly emissions profile is consistent with previous years under RECLAIM, with calendar year 2013 being the only notable exception. Figures 7-3 and 7-4, along with the qualitative analysis performed above, show that in calendar year 2016 there has not been a significant shift in NOx emissions from the winter months to the summer months.

Figure 7-3
Calendar Year 2016 NOx Quarterly Emissions

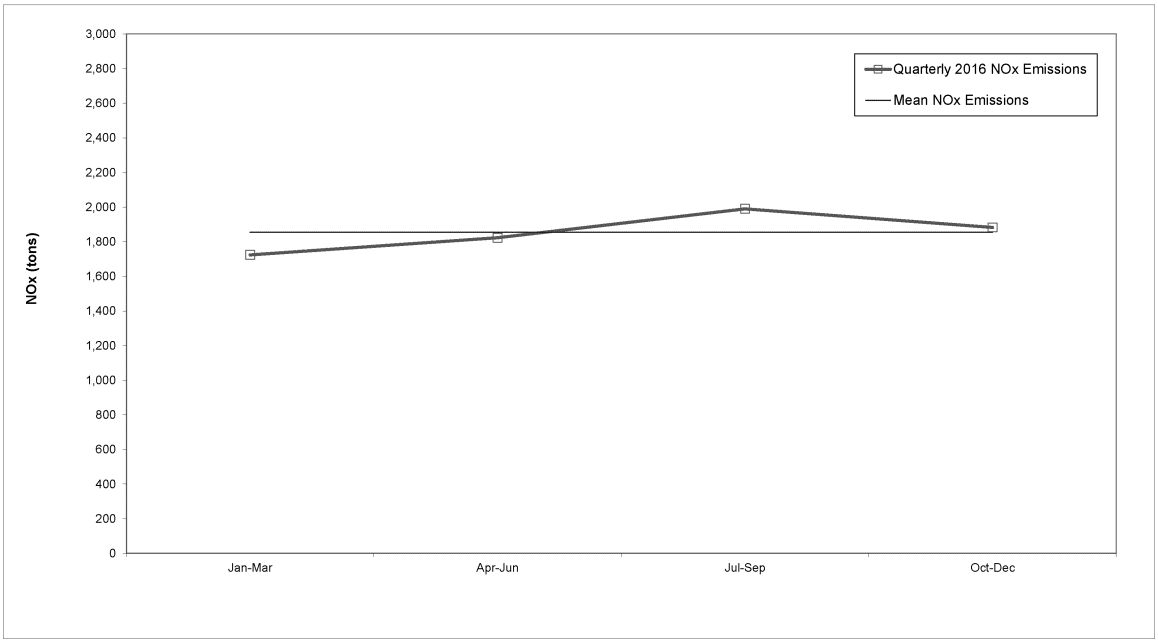
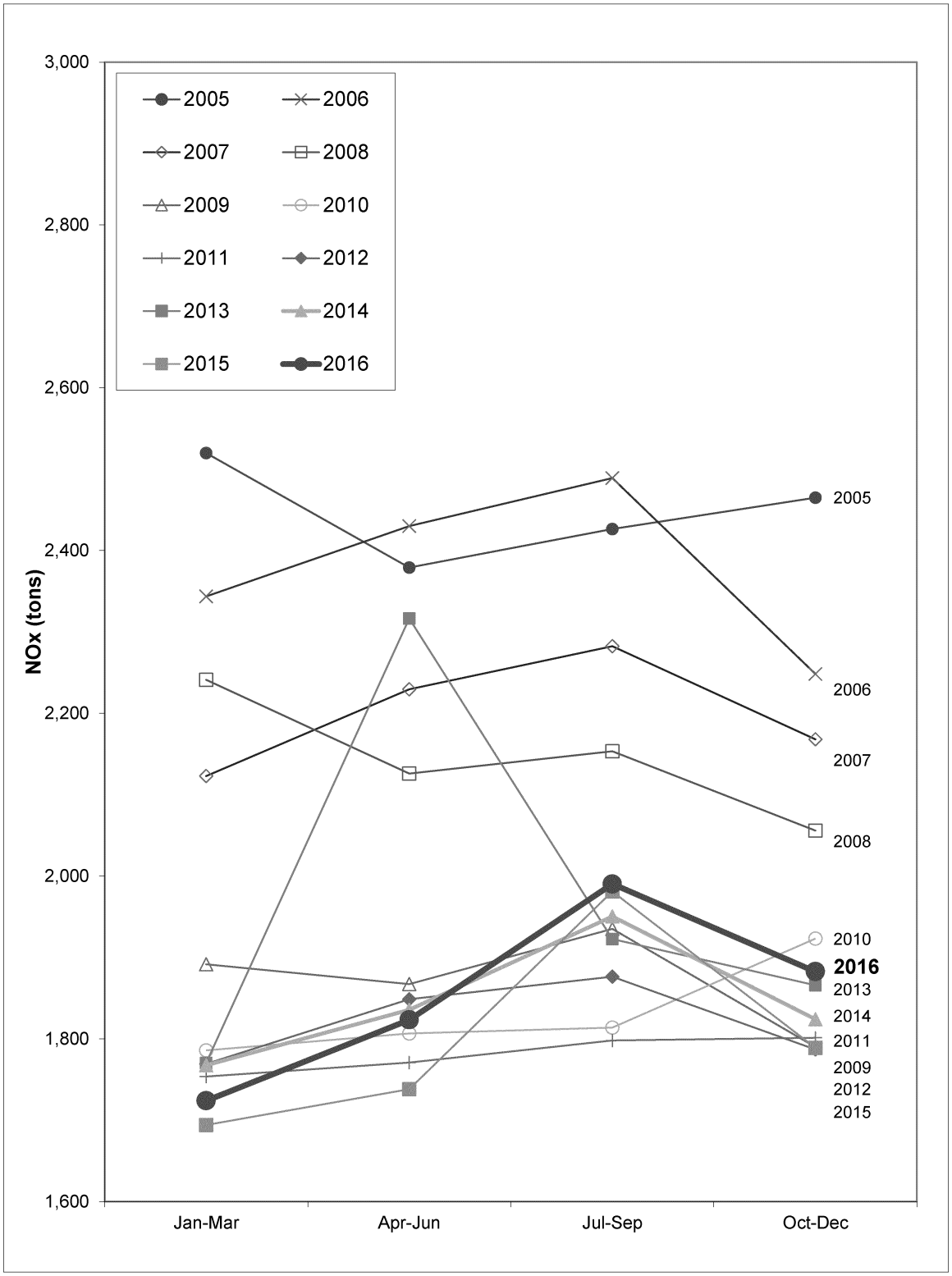


Figure 7-4
Quarterly NOx Emissions from Calendar Years 2005 through 2016



Similar to Figure 7-3 and 7-4 for NOx quarterly emissions, Figure 7-5 presents the 2016 mean quarterly SOx emissions and the 2016 audited quarterly emissions, while Figure 7-6 compares the 2016 quarterly SOx emissions with the quarterly emissions from 2005 through 2015. Figure 7-5 shows that quarterly SOx emissions during calendar year 2016 varied from seven percent below the mean in the first quarter (January to March) to about five percent above the mean in the third quarter (July to September). Figure 7-6 shows that the calendar year 2016 quarterly emissions profile is roughly consistent with previous years under RECLAIM. Both Figures 7-5 and 7-6, along with the qualitative analysis performed above, show that in calendar year 2016 there was not a significant shift in SOx emissions from the winter months to the summer months.

Figure 7-5
Calendar Year 2016 SOx Quarterly Emissions

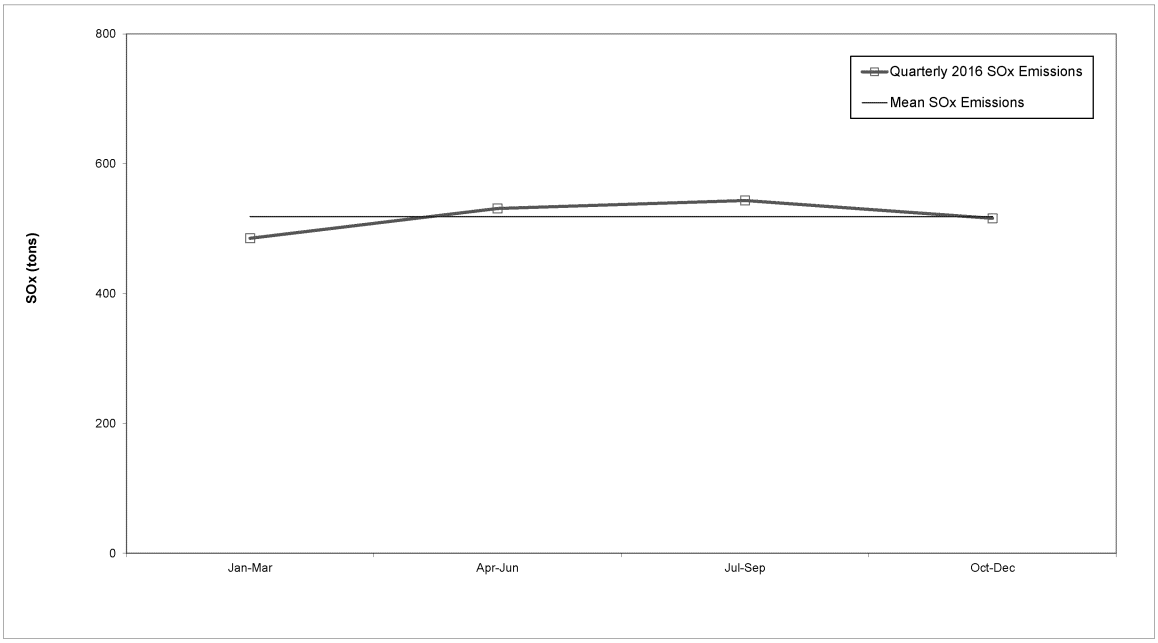
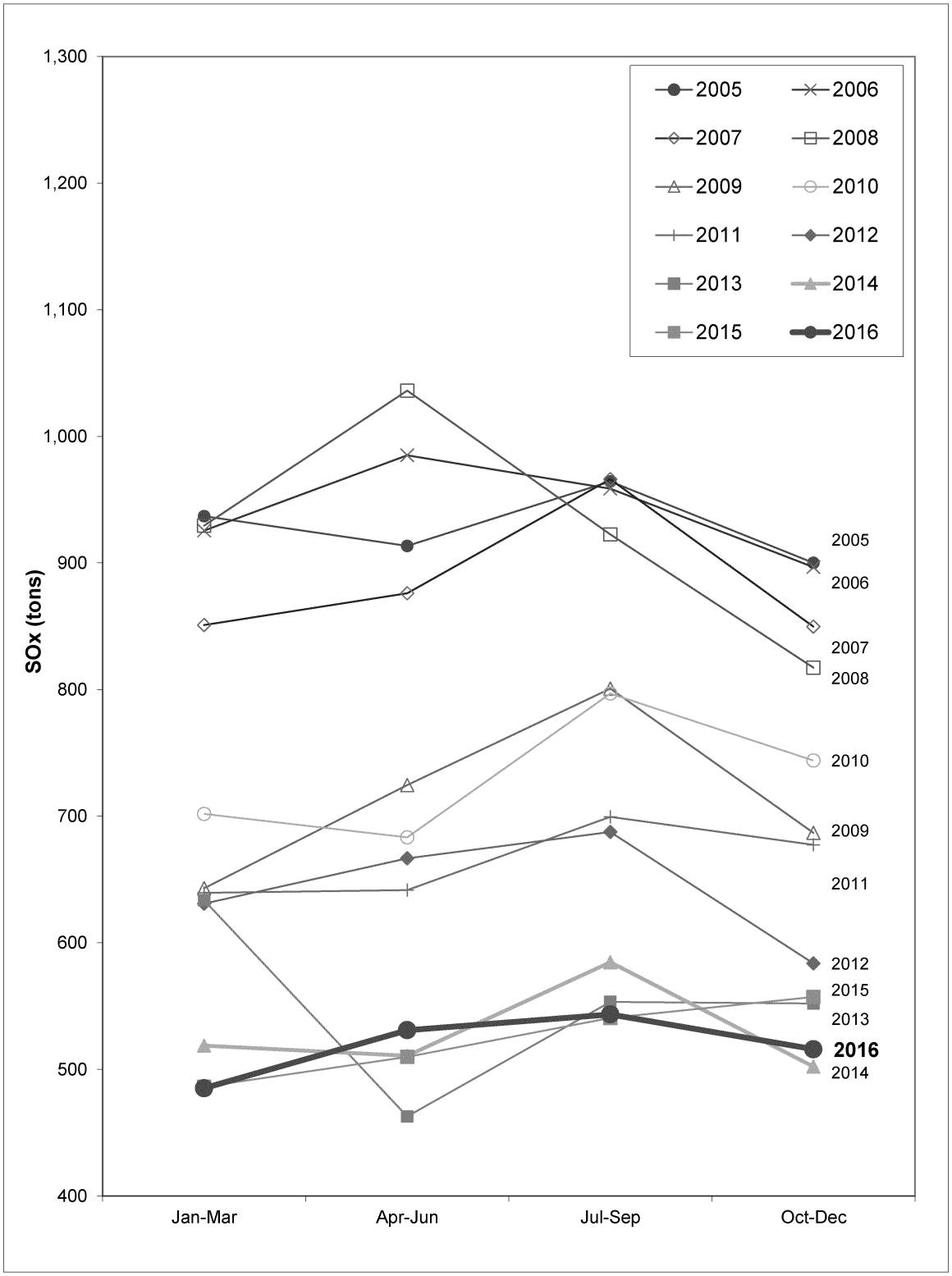


Figure 7-6
Quarterly SOx Emissions from Calendar Years 2005 through 2016



Per Capita Exposure to Pollution

The predicted effects of RECLAIM on air quality and public health were thoroughly analyzed through modeling during program development. The results were compared to the projected impacts from continuing traditional command-and-control regulations and to implementing control measures in the 1991 AQMP. One of the criteria examined in the analysis was per capita population exposure.

Per capita population exposure reflects the length of time each person is exposed to unhealthful air quality. The modeling performed in the program development analysis projected that the reductions in per capita exposure under RECLAIM in calendar year 1994 would be nearly identical to the reductions projected for implementation of the control measures in the 1991 AQMP, and the reductions resulting from RECLAIM would be greater in calendar years 1997 and 2000. As reported in previous annual reports, actual per capita exposures to ozone for 1994 and 1997 were below the projections.

As part of the Children's Environmental Health Protection Act that was passed in 1999, and in consultation with the OEHHA, CARB is to "review all existing health-based ambient air quality standards to determine whether these standards protect public health, including infants and children, with an adequate margin of safety." As a result of that requirement, CARB adopted a new 8-hour ozone standard (0.070 ppm), which became effective May 17, 2006, in addition to the 1-hour ozone standard (0.09 ppm) already in place. Table 7-1 shows the number of days that both the state 8-hour ozone standard of 0.070 ppm and the 1-hour standard of 0.09 ppm were exceeded.

In July 1997, the USEPA established an ozone National Ambient Air Quality Standard (NAAQS) of 0.085 ppm based on an 8-hour average measurement. As part of the Phase I implementation that was finalized in June 2004, the federal 1-hour ozone standard (0.12 ppm) was revoked effective June 2005. Effective May 27, 2008, the 8-hour NAAQS for ozone was reduced to 0.075 ppm. Table 7-1 shows monitoring results based on this 8-hour federal standard. Effective December 28, 2015, the 8-hour NAAQS for ozone was further reduced to 0.070 ppm, the level of the current California Ambient Air Quality Standard. Table 7-1 shows that the Basin exceeded both the newer 8-hour federal 0.07 ppm standard and the state 0.07 ppm standard by 145 and 150 days, respectively, in 2017. The number of days in exceedance of the federal and state standards were the same last year, though not this year. This difference could occur again in the future due to the differing language and methods for deriving exceedance days in the federal and state rules.

Table 7-1 summarizes ozone data for calendar years 2001 through 2017 in terms of the number of days that exceeded the state's 1-hour and 8-hour ozone standards, the 2008 and 2015 federal ambient 8-hour ozone standard, and both the Basin's maximum 1-hour and 8-hour ozone concentrations in each calendar year. This table shows that the number of days that exceeded the 1-hour state and the older 8-hour federal ambient ozone standards in calendar year 2017 increased when compared to 2016. The data shows the number of days in exceedance of most of these standards has grown since 2015 after a drop from 2014. Table 7-1 also shows, however, that while the Basin Maximum 8-hour

ozone concentration has gone up, the Basin Maximum 1-hour ozone concentration dropped relative to last year.

Table 7-1
Summary of Ozone Data

Year	Days exceeding state 1-hour standard (0.09 ppm)	Days exceeding state 8-hour standard (0.07 ppm)	Days exceeding old federal 8-hour standard (0.075 ppm)	Days exceeding new federal 8-hour standard (0.07 ppm)	Basin Maximum 1-hour ozone concentration (ppm)	Basin Maximum 8-hour ozone concentration (ppm)
2001	121	156	132	N/A	0.191	0.146
2002	118	149	135	N/A	0.169	0.148
2003	133	161	141	N/A	0.216	0.200
2004	110	161	126	N/A	0.163	0.148
2005	111	142	116	N/A	0.163	0.145
2006	102	121	114	N/A	0.175	0.142
2007	99	128	108	N/A	0.171	0.137
2008	98	136	121	N/A	0.176	0.131
2009	100	131	113	N/A	0.176	0.128
2010	83	128	109	N/A	0.143	0.123
2011	94	127	107	N/A	0.160	0.136
2012	97	140	111	N/A	0.147	0.112
2013	92	123	106	N/A	0.151	0.122
2014	76	134	93	N/A	0.142	0.114
2015	72	116	83	113	0.144	0.127
2016	85	132	105	132	0.164	0.122
2017	109	150	122	145	0.158	0.136

The CCAA, which was enacted in 1988, established targets for reducing overall population exposure to severe non-attainment pollutants in the Basin—a 25% reduction by December 31, 1994, a 40% reduction by December 31, 1997, and a 50% reduction by December 31, 2000 relative to a calendar years' 1986-88 baseline. These targets are based on the average number of hours a person is exposed ("per capita exposure"[3]) to ozone concentrations above the state 1-hour standard of 0.09 ppm. Table 7-2 shows the 1986-88 baseline per capita exposure, the actual per capita exposures each year since 1994 (RECLAIM's initial year), and the 1997 and 2000 targets set by the CCAA for each of the four counties in the district and the Basin overall. As shown in Table 7-2, the CCAA

[3] SCAQMD staff divides the air basin into a grid of square cells and interpolates recorded ozone data from ambient air quality monitors to determine ozone levels experienced in each of these cells. The total person-hours in a county experiencing ozone higher than the state ozone standard is determined by summing over the whole county the products of the number of hours exceeding the state ozone standard per grid cell with the number of residents in the corresponding cell. The per capita ozone exposures are then calculated by dividing the sum of person-hours by the total population within a county. Similar calculations are used to determine the Basin-wide per capita exposure by summing and dividing over the whole Basin.

reduction targets were achieved as early as 1994 (actual 1994 Basin per capita exposure was 37.6 hours, which is below the 2000 target of 40.2 hours). The per capita exposure continues to remain much lower than the CCAA targets. For calendar year 2017, the actual per capita exposure for the Basin was 4.94 hours, which represents a 93.9% reduction from the 1986-88 baseline level.

Table 7-2
Per Capita Exposure to Ozone above the State One-Hour Standard of 0.09 ppm (hours)

Calendar Year	Basin	Los Angeles	Orange	Riverside	San Bernardino
1986-88 baseline[1]	80.5	75.8	27.2	94.1	192.6
1994 actual	37.6	26.5	9	71.1	124.9
1995 actual	27.7	20	5.7	48.8	91.9
1996 actual	20.3	13.2	4	42.8	70
1997 actual	5.9	3	0.6	13.9	24.5
1998 actual	12.1	7.9	3.1	25.2	40.2
2000 actual	3.8	2.6	0.7	8.5	11.4
2001 actual	1.73	0.88	0.15	6	5.68
2002 actual	3.87	2.16	0.13	11.12	12.59
2003 actual	10.92	6.3	0.88	20.98	40.21
2004 actual	3.68	2.26	0.50	6.82	12.34
2005 actual	3.11	1.43	0.03	6.06	12.54
2006 actual	4.56	3.08	0.68	8.02	13.30
2007 actual	2.90	1.50	0.35	4.65	10.53
2008 actual	4.14	2.04	0.26	7.50	14.71
2009 actual	2.87	1.54	0.08	3.88	10.54
2010 actual	1.18	0.38	0.11	2.45	4.48
2011 actual	2.10	0.85	0.02	3.46	8.13
2012 actual	2.37	1.05	0.05	2.59	9.78
2013 actual	1.31	0.52	0.07	1.61	5.50
2014 actual	1.84	1.26	0.29	1.47	6.02
2015 actual	1.96	0.76	0.10	2.14	8.47
2016 actual	2.64	1.14	0.07	2.19	11.56
2017 actual	4.94	2.90	0.14	4.01	18.78
1997 target[2]	48.3	45.5	16.3	56.5	115.6
2000 target[3]	40.2	37.9	13.6	47	96.3

[1] Average over three years, 1986 through 1988.

[2] 60% of the 1986-88 baseline exposures.

[3] 50% of the 1986-88 baseline exposures.

Table 7-2 shows that actual per capita exposures during all the years mentioned were well under the 1997 and 2000 target exposures limits. It should also be noted that air quality in the Basin is a complex function of meteorological conditions and an array of different emission sources, including mobile, area, RECLAIM stationary sources, and non-RECLAIM stationary sources. Therefore, the reduction of per capita exposure beyond the projected level is not necessarily wholly attributable to implementation of the RECLAIM program in lieu of the command-and-control regulations.

Toxic Impacts

Based on a comprehensive toxic impact analysis performed during program development, it was concluded that RECLAIM would not result in any significant impacts on air toxic emissions. Nevertheless, to ensure that the implementation of RECLAIM does not result in adverse toxic impacts, each annual program audit is required to assess any increase in the public health exposure to air toxics potentially caused by RECLAIM.

One of the safeguards to ensure that the implementation of RECLAIM does not result in adverse air toxic health impacts is that RECLAIM sources are subject to the same air toxic statutes and regulations (*e.g.*, SCAQMD Regulation XIV, State AB 2588, State Air Toxics Control Measures, Federal National Emissions Standards for Hazardous Air Pollutants, etc.) as other sources in the Basin. Additionally, air toxic health risk is primarily caused by emissions of VOCs and fine particulates such as certain metals. VOC sources at RECLAIM facilities are subject to source-specific command-and-control rules the same way as are non-RECLAIM facilities, in addition to the toxics requirements described above. Sources of fine particulates and toxic metal emissions are also subject to the above-identified regulations pertaining to toxic emissions. Moreover, new or modified RECLAIM sources with NOx or SOx emission increases are also required to be equipped with BACT, which minimizes to the extent feasible NOx and SOx emissions, which are precursors to particulate matter.

There have been concerns raised that trading RTCs could allow for higher production at a RECLAIM facility, which may indirectly cause higher emissions of toxic air contaminants, and thereby make the health risk in the vicinity of the facility worse. Other SCAQMD rules and programs for toxic air contaminants apply to facilities regardless of them being in RECLAIM or under traditional command and control rules. Emission increases at permit units are subject to new source review. RECLAIM facilities must also comply with any applicable Regulation XIV rules for toxics. Permits generally include limiting throughput conditions for new source review or applicable source specific rules. AB2588 and Rule 1402 could also be triggered based on risk, which would require the facility to take appropriate risk reduction measures.

Under the AER program, facilities that emit either: 1) four tons per year or more of VOC, NOx, SOx, or PM, or 100 tons per year or more of CO; or 2) any one of 24 toxic air contaminants (TACs) and ozone depleting compounds (ODCs) emitted above specific thresholds (Rule 301 Table IV), are required to report their emissions annually to SCAQMD. Beginning with the FY 2000-01 reporting cycle, toxics emission reporting for the AB2588 Program was incorporated into SCAQMD's AER Program. The data collected in the AER program is used to determine which facilities will be required to take further actions under the AB2588 Hot Spots Program.

Facilities in the AB2588 Program are required to submit a comprehensive toxics inventory, which is then prioritized using Board-approved procedures[4] into one of three categories: low, intermediate, or high priority. Facilities ranked with low priority are exempt from future reporting. Facilities ranked with intermediate

[4] The toxics prioritization procedures can be found at: http://www.aqmd.gov/home/regulations/compliance/toxic-hot-spots-ab-2588

priority are classified as District tracking facilities, which are then required to submit a complete toxics inventory once every four years. In addition to reporting their toxic emissions quadrennially, facilities designated as high priority are required to submit a health risk assessment (HRA) to determine their impacts to the surrounding community.

According to SCAQMD's 2016 Annual Report on the AB2588 Air Toxics "Hot Spots" program[5], staff has reviewed and approved 341 facility HRAs as of the end calendar year 2016. About 95% of the facilities have cancer risks below 10 in a million and 96% of the facilities have acute and chronic non-cancer hazard indices less than 1. Facilities with cancer risks above 10 in a million or a non-cancer hazard index above 1 are required to issue public notices informing the community. A public meeting is held during which SCAQMD discusses the health risks from the facility. SCAQMD has conducted such public notification meetings for 55 facilities under the AB2588 Program.

The Board has also established the following action risk levels in Rule 1402 – Control of Toxic Air Contaminants from Existing Sources: a cancer burden of 0.5, a cancer risk of 25 in a million, and a hazard index of 3.0. Facilities above any of the action risk levels must reduce their risks below the action risk levels within three years. To date, 26 facilities have been required to reduce risks and all of these facilities have reduced risks well below the action risk levels mandated by Rule 1402.

The impact of the above rules and measures are analyzed in Multiple Air Toxic Exposure Studies (MATES), which SCAQMD staff conducts periodically to assess cumulative air toxic impacts to the residents and workers of southern California. The fourth version of MATES (*i.e.*, MATES IV) was conducted over a one year period from July 2012 to June 2013, and the final MATES IV report was released on May 1, 2015[6]. Monitoring conducted at that time indicated that the basin-wide population-weighted air toxics exposure was reduced by 57% since MATES III (conducted from April 2004 to March 2006). The results of these recent MATES studies continue to show that the region-wide cumulative air toxic impacts on residents and workers in southern California have been declining. Therefore, staff has not found any evidence that would suggest that the substitution of NOx and SOx RECLAIM for the command-and-control rules and the measures RECLAIM subsumes caused a significant increase in public exposure to air toxic emissions relative to what would have happened if the RECLAIM program was not implemented. SCAQMD has initiated a MATES V study and has begun to measure regional air toxics in January 2018. Additional flight measurements, mobile monitoring and sensor networks will soon be deployed to find potential hot-spots and to demonstrate real-time and continuous facility and community monitoring. Efforts will focus on refineries, as well as other industrial sources. Modeling will be performed once all data is compiled.

Staff will continue to monitor and assess toxic impacts as part of future annual program audits.

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[5] The 2016 AB2588 Annual Report can be found at: http://www.aqmd.gov/docs/default-source/planning/risk-assessment/ab2588_annual_report_2016.pdf?sfvrsn=4

[6] The Final MATES IV Report can be found at: http://www.aqmd.gov/docs/default-source/air-quality/air-toxic-studies/mates-iv/mates-iv-final-draft-report-4-1-15.pdf

APPENDIX A
RECLAIM UNIVERSE OF SOURCES

The RECLAIM universe of active sources as of the end of Compliance Year 2016 is provided below.

Facility ID	Cycle	Facility Name	Program
800088	2	3M COMPANY	NOx
23752	2	AEROCRAFT HEAT TREATING CO INC	NOx
115394	1	AES ALAMITOS, LLC	NOx
115389	2	AES HUNTINGTON BEACH, LLC	NOx/SOx
115536	1	AES REDONDO BEACH, LLC	NOx
148236	2	AIR LIQUIDE LARGE INDUSTRIES U.S., LP	NOx/SOx
3417	1	AIR PROD & CHEM INC	NOx
101656	2	AIR PRODUCTS AND CHEMICALS, INC.	NOx
5998	1	ALL AMERICAN ASPHALT	NOx
114264	1	ALL AMERICAN ASPHALT	NOx
3704	2	ALL AMERICAN ASPHALT, UNIT NO.01	NOx
176708	2	ALTAGAS POMONA ENERGY INC.	NOx
800196	2	AMERICAN AIRLINES, INC.	NOx
156722	1	AMERICAN APPAREL KNIT AND DYE	NOx
21598	2	ANGELICA TEXTILE SERVICES	NOx
74424	2	ANGELICA TEXTILE SERVICES	NOx
16642	1	ANHEUSER-BUSCH LLC., (LA BREWERY)	NOx/SOx
117140	2	AOC, LLC	NOx
124619	1	ARDAGH METAL PACKAGING USA INC.	NOx
174406	1	ARLON GRAPHICS LLC	NOx
12155	1	ARMSTRONG FLOORING INC	NOx
122666	2	A'S MATCH DYEING & FINISHING	NOx
183832	2	AST TEXTILE GROUP, INC.	NOx
181510	1	AVCORP COMPOSITE FABRICATION, INC	NOx
117290	2	B BRAUN MEDICAL, INC	NOx
800016	2	BAKER COMMODITIES INC	NOx
800205	2	BANK OF AMERICA NT & SA, BREA CENTER	NOx
40034	1	BENTLEY PRINCE STREET INC	NOx
166073	1	BETA OFFSHORE	NOx
155474	2	BICENT (CALIFORNIA) MALBURG LLC	NOx

Facility ID	Cycle	Facility Name	Program
132068	1	BIMBO BAKERIES USA INC	NOx
1073	1	BORAL ROOFING LLC	NOx
150201	2	BREITBURN OPERATING LP	NOx
174544	2	BREITBURN OPERATING LP	NOx
25638	2	BURBANK CITY, BURBANK WATER & POWER	NOx
128243	1	BURBANK CITY,BURBANK WATER & POWER,SCPPA	NOx
800344	1	CALIFORNIA AIR NATIONAL GUARD, MARCH AFB	NOx
22607	2	CALIFORNIA DAIRIES, INC	NOx
138568	1	CALIFORNIA DROP FORGE, INC	NOx
800181	2	CALIFORNIA PORTLAND CEMENT CO	NOx/SOx
148896	2	CALIFORNIA RESOURCES PRODUCTION CORP	NOx
148897	2	CALIFORNIA RESOURCES PRODUCTION CORP	NOx
151899	2	CALIFORNIA RESOURCES PRODUCTION CORP	NOx
46268	1	CALIFORNIA STEEL INDUSTRIES INC	NOx
107653	2	CALMAT CO	NOx
107654	2	CALMAT CO	NOx
107655	2	CALMAT CO	NOx
107656	2	CALMAT CO	NOx
153992	1	CANYON POWER PLANT	NOx
94930	1	CARGILL INC	NOx
22911	2	CARLTON FORGE WORKS	NOx
118406	1	CARSON COGENERATION COMPANY	NOx
141555	2	CASTAIC CLAY PRODUCTS, LLC	NOx
14944	1	CENTRAL WIRE, INC.	NOx/SOx
42676	2	CES PLACERITA INC	NOx
148925	1	CHERRY AEROSPACE	NOx
800030	2	CHEVRON PRODUCTS CO.	NOx/SOx
56940	1	CITY OF ANAHEIM/COMB TURBINE GEN STATION	NOx
172077	1	CITY OF COLTON	NOx
129810	1	CITY OF RIVERSIDE PUBLIC UTILITIES DEPT	NOx
139796	1	CITY OF RIVERSIDE PUBLIC UTILITIES DEPT	NOx
164204	2	CITY OF RIVERSIDE, PUBLIC UTILITIES DEPT	NOx
14502	2	VERNON PUBLIC UTILITIES	NOx
16978	2	CLOUGHERTY PACKING LLC/HORMEL FOODS CORP	NOx
182561	1	COLTON POWER, LP	NOx
182563	1	COLTON POWER, LP	NOx

Facility ID	Cycle	Facility Name	Program
38440	2	COOPER & BRAIN - BREA	NOx
68042	2	CORONA ENERGY PARTNERS, LTD	NOx
126536	1	CPP – POMONA	NOx
50098	1	D&D DISPOSAL INC,WEST COAST RENDERING CO	NOx
63180	1	DARLING INGREDIENTS INC.	NOx
3721	2	DART CONTAINER CORP OF CALIFORNIA	NOx
7411	2	DAVIS WIRE CORP	NOx
143738	2	DCOR LLC	NOx
143739	2	DCOR LLC	NOx
143740	2	DCOR LLC	NOx
143741	1	DCOR LLC	NOx
47771	1	DELEO CLAY TILE CO INC	NOx
800037	2	DEMENNO-KERDOON DBA WORLD OIL RECYCLING	NOx
125579	1	DIRECTV	NOx
800189	1	DISNEYLAND RESORT	NOx
142536	2	DRS SENSORS & TARGETING SYSTEMS, INC	NOx
178639	1	ECO SERVICES OPERATIONS LLC	NOx/SOx
800264	2	EDGINGTON OIL COMPANY	NOx/SOx
115663	1	EL SEGUNDO POWER, LLC	NOx
800372	2	EQUILON ENTER. LLC, SHELL OIL PROD. US	NOx/SOx
124838	1	EXIDE TECHNOLOGIES	NOx/SOx
95212	1	FABRICA	NOx
11716	1	FONTANA PAPER MILLS INC	NOx
175154	2	FREEPORT-MCMORAN OIL & GAS	NOx
346	1	FRITO-LAY, INC.	NOx
2418	2	FRUIT GROWERS SUPPLY CO	NOx
142267	2	FS PRECISION TECH LLC	NOx
176934	1	GI TC IMPERIAL HIGHWAY, LLC	NOx
124723	1	GREKA OIL & GAS	NOx
137471	2	GRIFOLS BIOLOGICALS INC	NOx
156741	2	HARBOR COGENERATION CO, LLC	NOx
157359	1	HENKEL ELECTRONIC MATERIALS, LLC	NOx
123774	1	HERAEUS PRECIOUS METALS NO. AMERICA, LLC	NOx
113160	2	HILTON COSTA MESA	NOx
800066	1	HITCO CARBON COMPOSITES INC	NOx
2912	2	HOLLIDAY ROCK CO INC	NOx

Facility ID	Cycle	Facility Name	Program
800003	2	HONEYWELL INTERNATIONAL INC	NOx
124808	2	INEOS POLYPROPYLENE LLC	NOx/SOx
129816	2	INLAND EMPIRE ENERGY CENTER, LLC	NOx
157363	2	INTERNATIONAL PAPER CO	NOx
16338	1	KAISER ALUMINUM FABRICATED PRODUCTS, LLC	NOx
21887	2	KIMBERLY-CLARK WORLDWIDE INC.-FULT. MILL	NOx/SOx
1744	2	KIRKHILL - TA COMPANY	NOx
800335	2	LA CITY, DEPT OF AIRPORTS	NOx
800170	1	LA CITY, DWP HARBOR GENERATING STATION	NOx
800074	1	LA CITY, DWP HAYNES GENERATING STATION	NOx
800075	1	LA CITY, DWP SCATTERGOOD GENERATING STN	NOx
800193	2	LA CITY, DWP VALLEY GENERATING STATION	NOx
61962	1	LA CITY, HARBOR DEPT	NOx
550	1	LA CO., INTERNAL SERVICE DEPT	NOx
173904	2	LAPEYRE INDUSTRIAL SANDS, INC	NOx
141295	2	LEKOS DYE AND FINISHING, INC	NOx
144455	2	LIFOAM INDUSTRIES, LLC	NOx
83102	2	LIGHT METALS INC	NOx
151394	2	LINN OPERATING INC	NOx
151532	2	LINN OPERATING, INC	NOx
180367	1	LINN OPERATING, INC.	NOx
152054	1	LINN WESTERN OPERATING INC	NOx
151415	2	LINN WESTERN OPERATING, INC	NOx
115314	2	LONG BEACH GENERATION, LLC	NOx
17623	2	LOS ANGELES ATHLETIC CLUB	NOx
58622	2	LOS ANGELES COLD STORAGE CO	NOx
800080	2	LUNDAY-THAGARD CO DBA WORLD OIL REFINING	NOx/SOx
38872	1	MARS PETCARE U.S., INC.	NOx
14049	2	MARUCHAN INC	NOx
3029	2	MATCHMASTER DYEING & FINISHING INC	NOx
182970	1	MATRIX OIL CORP	NOx
2825	1	MCP FOODS INC	NOx
173290	1	MEDICLEAN	NOx
176952	2	MERCEDES-BENZ WEST COAST CAMPUS	NOx
94872	2	METAL CONTAINER CORP	NOx
155877	1	MILLERCOORS USA LLC	NOx

Facility ID	Cycle	Facility Name	Program
12372	1	MISSION CLAY PRODUCTS	NOx
11887	2	NASA JET PROPULSION LAB	NOx
115563	1	NCI GROUP INC., DBA, METAL COATERS OF CA	NOx
40483	2	NELCO PROD. INC	NOx
172005	2	NEW- INDY ONTARIO, LLC	NOx
12428	2	NEW NGC, INC.	NOx
131732	2	NEWPORT FAB, LLC	NOx
18294	1	NORTHROP GRUMMAN SYSTEMS CORP	NOx
800408	1	NORTHROP GRUMMAN SYSTEMS	NOx
800409	2	NORTHROP GRUMMAN SYSTEMS CORPORATION	NOx
112853	2	NP COGEN INC	NOx
115315	1	NRG CALIFORNIA SOUTH LP, ETIWANDA GEN ST	NOx
89248	2	OLD COUNTRY MILLWORK INC	NOx
47781	1	OLS ENERGY-CHINO	NOx
183564	2	ONNI TIMES SQUARE LP	NOx
183415	2	ONTARIO INTERNATIONAL AIRPORT AUTHORITY	NOx
35302	2	OWENS CORNING ROOFING AND ASPHALT, LLC	NOx/SOx
7427	1	OWENS-BROCKWAY GLASS CONTAINER INC	NOx/SOx
45746	2	PABCO BLDG PRODUCTS LLC,PABCO PAPER, DBA	NOx/SOx
17953	1	PACIFIC CLAY PRODUCTS INC	NOx
59618	1	PACIFIC CONTINENTAL TEXTILES, INC.	NOx
2946	1	PACIFIC FORGE INC	NOx
130211	2	NOVIPAX, INC	NOx
800183	1	PARAMOUNT PETR CORP	NOx/SOx
800168	1	PASADENA CITY, DWP	NOx
171107	2	PHILLIPS 66 CO/LA REFINERY WILMINGTON PL	NOx/SOx
171109	1	PHILLIPS 66 COMPANY/LOS ANGELES REFINERY	NOx/SOx
137520	1	PLAINS WEST COAST TERMINALS LLC	NOx
800416	1	PLAINS WEST COAST TERMINALS LLC	NOx
800417	2	PLAINS WEST COAST TERMINALS LLC	NOx
800419	2	PLAINS WEST COAST TERMINALS LLC	NOx
800420	2	PLAINS WEST COAST TERMINALS LLC	NOx
168088	1	POLYNT COMPOSITES USA INC	NOx
11435	2	PQ CORPORATION	NOx/SOx
7416	1	PRAXAIR INC	NOx
42630	1	PRAXAIR INC	NOx

Facility ID	Cycle	Facility Name	Program
136	2	PRESS FORGE CO	NOx
105903	1	PRIME WHEEL	NOx
179137	1	QG PRINTING II LLC	NOx
8547	1	QUEMETCO INC	NOx/SOx
19167	2	R J. NOBLE COMPANY	NOx
3585	2	R. R. DONNELLEY & SONS CO, LA MFG DIV	NOx
20604	2	RALPHS GROCERY CO	NOx
114997	1	RAYTHEON COMPANY	NOx
115172	2	RAYTHEON COMPANY	NOx
800371	2	RAYTHEON SYSTEMS COMPANY - FULLERTON OPS	NOx
20203	2	RECONSERVE OF CALIFORNIA-LOS ANGELES INC	NOx
180410	2	REICHHOLD LLC 2	NOx
52517	1	REXAM BEVERAGE CAN COMPANY	NOx
61722	2	RICOH ELECTRONICS INC	NOx
800113	2	ROHR, INC.	NOx
4242	2	SAN DIEGO GAS & ELECTRIC	NOx
161300	2	SAPA EXTRUDER, INC	NOx
155221	2	SAVE THE QUEEN LLC (DBA QUEEN MARY)	NOx
15504	2	SCHLOSSER FORGE COMPANY	NOx
14926	1	SEMPRA ENERGY (THE GAS CO)	NOx
152707	1	SENTINEL ENERGY CENTER LLC	NOx
184301	1	SENTINEL PEAK RESOURCES CALIFORNIA, LLC	NOx
800129	1	SFPP, L.P.	NOx
37603	1	SGL TECHNIC INC, POLYCARBON DIVISION	NOx
131850	2	SHAW DIVERSIFIED SERVICES INC	NOx
117227	2	SHCI SM BCH HOTEL LLC, LOEWS SM BCH HOTE	NOx
16639	1	SHULTZ STEEL CO	NOx
54402	2	SIERRA ALUMINUM COMPANY	NOx
85943	2	SIERRA ALUMINUM COMPANY	NOx
101977	1	SIGNAL HILL PETROLEUM INC	NOx
119596	2	SNAK KING CORPORATION	NOx
43201	2	SNOW SUMMIT INC	NOx
4477	1	SO CAL EDISON CO	NOx
5973	1	SO CAL GAS CO	NOx
800127	1	SO CAL GAS CO	NOx
800128	1	SO CAL GAS CO	NOx

Facility ID	Cycle	Facility Name	Program
8582	1	SO CAL GAS CO/PLAYA DEL REY STORAGE FAC	NOx
169754	1	SO CAL HOLDING, LLC	NOx
14871	2	SONOCO PRODUCTS CO	NOx
160437	1	SOUTHERN CALIFORNIA EDISON	NOx
800338	2	SPECIALTY PAPER MILLS INC	NOx
1634	2	STEELCASE INC, WESTERN DIV	NOx
126498	2	STEELSCAPE, INC	NOx
105277	2	SULLY MILLER CONTRACTING CO	NOx
19390	1	SULLY-MILLER CONTRACTING CO.	NOx
3968	1	TABC, INC	NOx
18931	2	TAMCO	NOx/SOx
174591	1	TESORO REF & MKTG CO LLC,CALCINER	NOx/SOx
174655	2	TESORO REFINING & MARKETING CO, LLC	NOx/SOx
151798	1	TESORO REFINING AND MARKETING CO, LLC	NOx/SOx
800436	1	TESORO REFINING AND MARKETING CO, LLC	NOx/SOx
96587	1	TEXOLLINI INC	NOx
16660	2	THE BOEING COMPANY	NOx
115241	1	THE BOEING COMPANY	NOx
800067	1	THE BOEING COMPANY	NOx
800038	2	THE BOEING COMPANY - C17 PROGRAM	NOx
148340	2	THE BOEING COMPANY-BUILDING 800 COMPLEX	NOx
14736	2	THE BOEING CO-SEAL BEACH COMPLEX	NOx
11119	1	THE GAS CO./ SEMPRA ENERGY	NOx
153199	1	THE KROGER CO/RALPHS GROCERY CO	NOx
97081	1	THE TERMO COMPANY	NOx
109914	1	THERMAL REMEDIATION SOLUTIONS, LLC	NOx
800330	1	THUMS LONG BEACH	NOx
129497	1	THUMS LONG BEACH CO	NOx
800325	2	TIDELANDS OIL PRODUCTION CO	NOx
68118	2	TIDELANDS OIL PRODUCTION COMPANY ETAL	NOx
171960	2	TIN, INC. DBA INTERNATIONAL PAPER	NOx
137508	2	TONOGA INC, TACONIC DBA	NOx
181667	1	TORRANCE REFINING COMPANY LLC	NOx/SOx
182049	2	TORRANCE VALLEY PIPELINE CO LLC	NOx
182050	1	TORRANCE VALLEY PIPELINE CO LLC	NOx
182051	1	TORRANCE VALLEY PIPELINE CO LLC	NOx

Facility ID	Cycle	Facility Name	Program
53729	1	TREND OFFSET PRINTING SERVICES, INC	NOx
165192	2	TRIUMPH AEROSTRUCTURES, LLC	NOx
43436	1	TST, INC.	NOx
800026	1	ULTRAMAR INC	NOx/SOx
9755	2	UNITED AIRLINES INC	NOx
800149	2	US BORAX INC	NOx
800150	1	US GOVT, AF DEPT, MARCH AIR RESERVE BASE	NOx
800393	1	VALERO WILMINGTON ASPHALT PLANT	NOx
9053	1	ENWAVE LOS ANGELES INC.	NOx
11034	2	ENWAVE LOS ANGELES INC.	NOx
14495	2	VISTA METALS CORPORATION	NOx
146536	1	WALNUT CREEK ENERGY, LLC	NOx/SOx
42775	1	WEST NEWPORT OIL CO	NOx/SOx
17956	1	WESTERN METAL DECORATING CO	NOx
51620	1	WHEELABRATOR NORWALK ENERGY CO INC	NOx
127299	2	WILDFLOWER ENERGY LP/INDIGO GEN., LLC	NOx

APPENDIX B
FACILITY INCLUSIONS

As discussed in Chapter 1, three facilities were added to the RECLAIM universe in Compliance Year 2016. The included facilities are identified below, and the reasons for inclusion are also provided.

Facility ID	Cycle	Facility Name	Market	Date	Reason
126536	1	CPP - POMONA	NOx	01-Jan-16	Reported emissions from permitted sources exceeded four tons in a year.
181510	1	AVCORP COMPOSITE FABRICATION, INC	NOx	07-Jun-16	Partial change of operator from an existing facility.
183832	2	AST TEXTILE GROUP, INC.	NOx	24-Mar-17	A new operator took over the operation of a previously shutdown facility and applied for a permit as a change of operator.

APPENDIX C
RECLAIM FACILITIES CEASING OPERATION OR EXCLUDED

SCAQMD staff is aware of the following RECLAIM facilities that permanently shut down all operations, inactivated all their RECLAIM permits, or were excluded from the RECLAIM universe during Compliance Year 2016. The reasons for shutdowns and exclusions cited below are based on the information provided by the facilities and other information available to SCAQMD staff.

Facility ID	18455
Facility Name	Royalty Carpet Mills, Inc.
City and County	Irvine, Orange County
SIC	2273
Pollutant(s)	NOx
1994 Allocation	14,076 lbs.
Reason for Shutdown	The facility stated more attractive utility of land or resources as the reason for shutdown.

Facility ID	152501
Facility Name	Precision Specialty Metals, Inc.
City and County	Los Angeles, Los Angeles County
SIC	3312
Pollutant(s)	NOx
1994 Allocation	12,420 lbs.
Reason for Shutdown	The facility stated that it was liquidated and their equipment was destroyed or sold, then moved to Monterey, Mexico.

Facility ID	153033
Facility Name	Georgia Pacific Corrugated LLC
City and County	Buena Park, Orange County
SIC	2679
Pollutant(s)	NOx
1994 Allocation	2,082 lbs.
Reason for Shutdown	The company stated the reason for the shutdown was that the manufacturing, production, and raw material cost were too high.

Facility ID	169678
Facility Name	ITT Cannon, LLC
City and County	Santa Ana, Orange County
SIC	3643
Pollutant(s)	NOx
1994 Allocation	3,683 lbs.
Reason for Shutdown	The facility indicated a complete shutdown of this location. Their permits were inactivated, and operations were consolidated and relocated with operations at other ITT facilities, located in Irvine, California and Nogales, Mexico.

Facility ID	151601
Facility Name	California Resources Production Corporation
City and County	La Habra Heights, Los Angeles County
SIC	1311
Pollutant(s)	NOx
1994 Allocation	14,602 lbs.
Reason for Shutdown	This facility has had no equipment requiring permits or RECLAIM emissions in over 10 years. They did file their Rule 219 exempt equipment under Rule 222 as required. When the property was sold to a new owner, no permitted equipment remained on the property.

Facility ID	2083
Facility Name	Superior Industries International, Inc.
City and County	Van Nuys, Los Angeles County
SIC	3714
Pollutant(s)	NOx
1994 Allocation	38,948 lbs.
Reason for Shutdown	Facility operations were consolidated and the corporate offices were moved to Southfield, Michigan. The production volumes were moved to Chihuahua, Mexico and the building was sold.

Facility ID	132071
Facility Name	Dean Foods Co. of California
City and County	Buena Park, Orange County
SIC	2026
Pollutant(s)	NOx
1994 Allocation	7,558 lbs.
Reason for Shutdown	The facility stated that they had moved to Utah and consolidated with an existing ice cream plant there for logistical benefits.

Facility ID	119104
Facility Name	Calmat Co
City and County	Saugus, Los Angeles
SIC	2951
Pollutant(s)	NOx / SOx
1994 Allocation	NOx = 40,270 lbs.; SOx = 3,760 lbs.
Reason for Shutdown	The facility stated that due to a market downturn all production ceased and no RECLAIM emissions had been produced since 2009. In December of 2016, it was decided that it would not be feasible to re-open the facility for production, finding no market demand had existed for many years. All permits were cancelled in 2016.

Facility ID	181505
Facility Name	American Airlines Inc.
City and County	Los Angeles, Los Angeles County
SIC	4512
Pollutant(s)	NOx
1994 Allocation	25,340 lbs.
Reason for Shutdown	This facility was merged with facility #800196, another RECLAIM facility, who assumed operation of all existing equipment. (This facility was categorized as an exclusion in Chapter 1.)

APPENDIX D
FACILITIES THAT EXCEEDED THEIR ANNUAL ALLOCATION FOR COMPLIANCE YEAR 2016

The following is a list of facilities that did not have enough RTCs to cover their NOx and/or SOx emissions in Compliance Year 2016 based on the results of audits conducted by SCAQMD staff.

Facility ID	Facility Name	Compliance Year	Emittant
136	Press Forge Co.	2016	NOx
3029	Matchmaster Dyeing and Finishing Inc.	2016	NOx
7411	Davis Wire Corp.	2016	NOx
7427	Owens-Brockway Glass Container Inc.	2016	NOx
16338	Kaiser Aluminum Fabricated Products, LLC	2016	NOx
17956	Western Metal Decorating Co.	2016	NOx
118406	Carson Cogeneration Company	2016	NOx
124723	Greka Oil & Gas	2016	NOx
157359	Henkel Electronic Materials, LLC	2016	NOx
179137	QG Printing II, LLC	2016	NOx
182050	Torrance Valley Pipeline Co., LLC	2016	NOx
800181	California Portland Cement Co.	2016	NOx/SOx
800416	Plains West Coast Terminals, LLC	2016	NOx

APPENDIX E
REPORTED JOB IMPACTS ATTRIBUTED TO RECLAIM

Each year, RECLAIM facility operators are asked to provide employment data in their APEP reports. The report asks company representatives to quantify job increases and/or decreases, and to report the positive and/or negative impacts of the RECLAIM program on employment at their facilities. This appendix is included in each Annual RECLAIM Audit Report to provide detailed information for facilities reporting that RECLAIM contributed to job gains or losses.

Facilities with reported job gains or losses attributed to RECLAIM:

Facility ID:	123774
Facility Name:	Heraeus Precious Metals No. America, LLC
City and County:	Riverside, Riverside County
SIC:	3341
Pollutant(s):	NOx
Cycle:	1
Job Gain:	24
Job Loss:	33
Comments:	The facility claims 15 jobs lost due to RECLAIM because of “increased cost of operation for compliance, [and] permitting fees”.

ATTACHMENT 2

Annual RECLAIM Audit Report for 2016 Compliance Year

South Coast Air Quality Management District
Governing Board Meeting
March 2, 2018

RECLAIM

REgional Clean Air Incentives Market (RECLAIM) program:

- A cap and trade program adopted in October 1993
- Objective is to meet emission reduction requirements and enhance emission monitoring while providing additional flexibility to lower compliance costs
- Includes largest NOx and SOx sources
- Specifies facility declining annual emissions caps
- Allows options to reduce emissions or buy RECLAIM Trading Credits (RTCs)

Compliance Year (CompYr) 2016 is the 23rd year of the program (started in 1994)

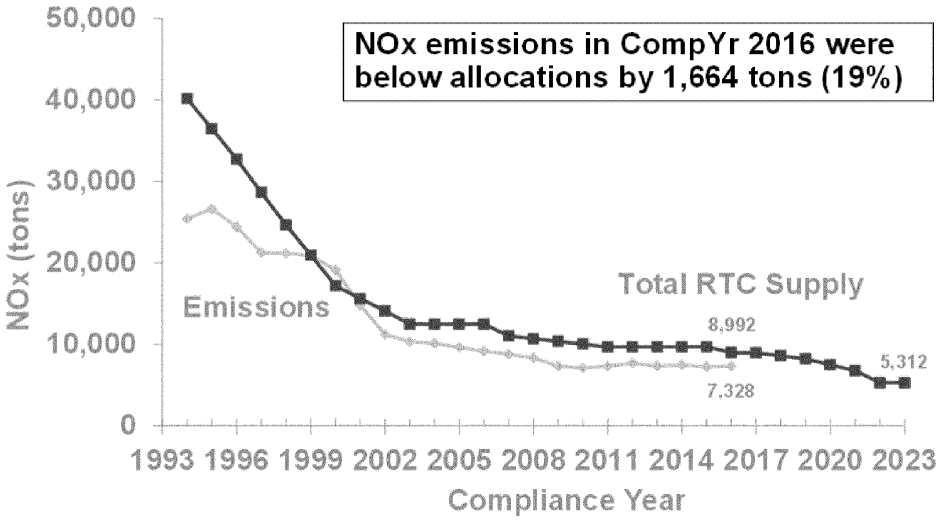
RECLAIM Annual Audit

- RECLAIM (Rule 2015) requires an annual audit of the program
- Annual RECLAIM Audit Report for Compliance Year 2016
  - Cycle 1: Jan 1, 2016 – Dec 31, 2016
  - Cycle 2: Jul 1, 2016 – Jun 30, 2017
- RECLAIM had 262 facilities at the end of CompYr 2016 (268 at end of CompYr 2015)

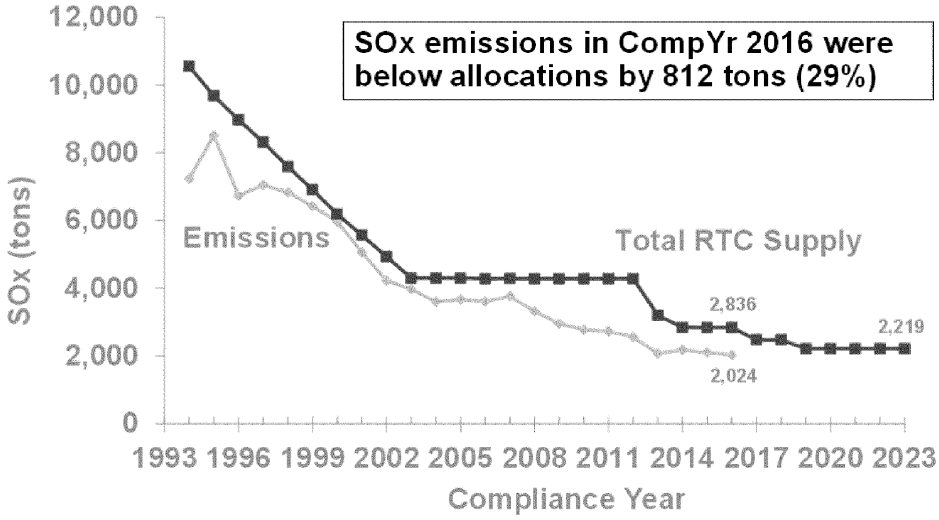
2016 Annual RECLAIM Audit Findings Compliance

- RECLAIM met overall NOx and SOx emissions goals:
  - NOx emissions **19%** below allocations
  - SOx emissions **29%** below allocations
- Allocation Shave
  - NOx Shave of 22.5% adopted January 2005 and implemented in 2007 - 2011
  - SOx Shave of 48.4% adopted November 2010 and implemented in 2013 - 2019
  - Additional NOx Shave of 45.2% adopted in December 2015 and implemented in 2016 - 2022

RECLAIM
NOx Emissions vs. Allocations Trends



RECLAIM
SOx Emissions vs. Allocations Trends



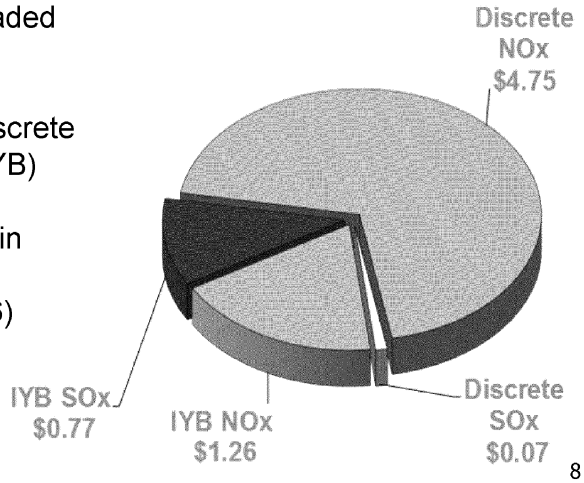
2016 Annual RECLAIM Audit Findings Compliance

- RECLAIM had a high rate of facility compliance:
  - NOx Facilities – **95%**
  - SOx Facilities – **97%**
- Facilities exceeding their allocations
  - NOx – 13 facilities exceeded by 8.3 tons (0.09% of total allocations)
  - SOx – one facility exceeded by 0.10 tons (less than 0.01% of total allocations)

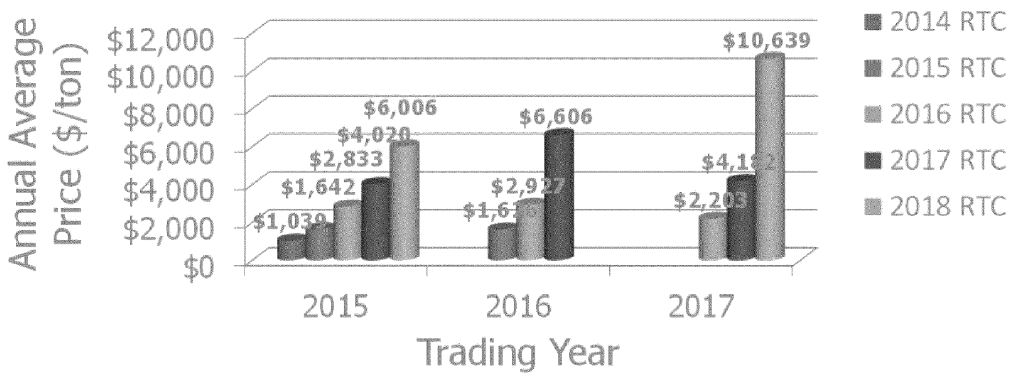
2016 Annual RECLAIM Audit Findings Credit Trading and Prices

- Over $1.48 billion of RTCs traded since program inception
- RTCs are traded as either Discrete Year or Infinite-Year Block (IYB)
- $6.86 million of RTCs traded in Calendar Year (CalYr) 2017 ($ 118.6 million in CalYr 2016)

Value Traded in CalYr 2017 (Million $)



2016 Annual RECLAIM Audit Findings
Average Discrete Year NOx RTC Prices

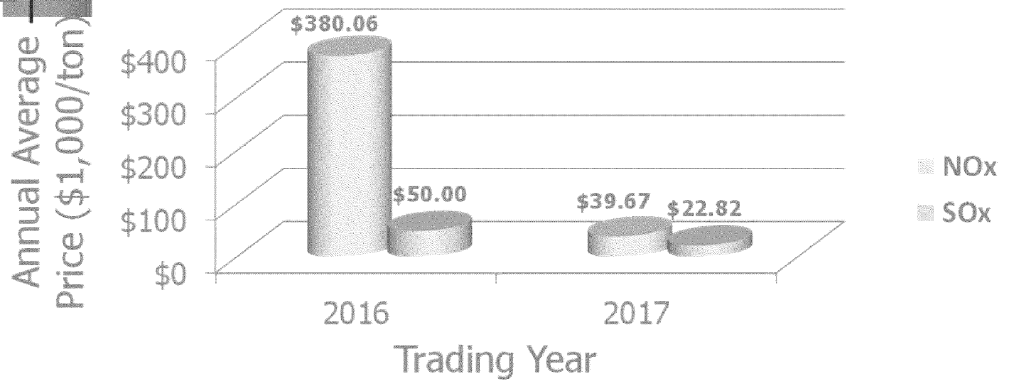


- Average prices in CalYr 2017 below program review thresholds:
  - $15,000/ton [Rule 2015]
  - $44,070/ton [Health and Safety Code]

2016 Annual RECLAIM Audit Findings
Average Discrete Year SOx RTC Prices

- Average prices in CalYr 2017 below program review thresholds:
  - $15,000/ton [Rule 2015]
  - $31,730/ton [Health and Safety Code]

2016 Annual RECLAIM Audit Findings Average IYB RTC Prices



- 2017 IYB RTC average prices remain below program review thresholds [Health and Safety Code]
  - NOx = $661,045/ton
  - SOx = $475,952/ton

2016 Annual RECLAIM Audit Findings Investor Participation during CalYr 2017

- Investors are RTC holders who are <u>not</u> RECLAIM facility operators
- Investor participation remained active in CalYr 2017 trades.

RTC Type	Value		Volume	
	NOx	SOx	NOx	SOx
Discrete	61%	94%	60%	94%
IYB	100%	100%	100%	100%

- Investors' holdings at the end of CalYr 2016
  - 3.3% of IYB NOx RTCs (up from 3.1 % in CalYr 2016)
  - 6.0% of IYB SOx RTCs (up from 5.0 % in CalYr 2016)

2016 Annual RECLAIM Audit Findings RECLAIM Transition

- On January 5, 2018, Board amended Rule 2001 – Applicability, and Rule 2002 – Allocations for Oxides of Nitrogen (NOx) and Oxides of Sulfur (SOx) to initiate the transition of the RECLAIM program to a command-and-control regulatory structure
- Staff has identified an initial group of 38 facilities that can potentially exit the NOx RECLAIM program
- Targeted the first quarter of 2019 to complete this transition

2016 Annual RECLAIM Audit Findings

- RECLAIM facilities overall employment loss of 0.88% (net loss of 982 jobs)
- Met federal NSR offset ratios
- No significant shift in seasonal emissions
- No evidence of increased health risk due to RECLAIM

2016 Annual RECLAIM Audit Findings Summary/Recommendations

Summary:

- Programmatic compliance achieved (NOx and SOx emissions were 19% and 29% below allocations, respectively)
- Individual facility compliance rate remained high (95% & 97% for NOx and SOx, respectively)
- RTC prices stayed far below program review thresholds
- RECLAIM met all other requirements

Recommendation:

- Approve the Annual RECLAIM Audit Report for 2016 Compliance Year