



South Coast Air Quality Management District

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BOARD MEETING DATE: September 3, 2021

AGENDA NO. 32

REPORT: Report to Legislature and CARB on South Coast AQMD
Regulatory Activities for Calendar Year 2020

SYNOPSIS: South Coast AQMD is required by law to submit a report to the Legislature and CARB on its regulatory activities for the preceding calendar year. The report is to include a summary of each rule and rule amendment adopted by South Coast AQMD, number of permits issued, denied, or cancelled, emission offset transactions, budget and forecast, and an update on the Clean Fuels program. Also included is the Annual RECLAIM Audit Report, as required by RECLAIM Rule 2015 - Backstop Provisions.

COMMITTEE: No Committee Review

RECOMMENDED ACTION:

Receive and file the attached report and direct staff to forward the final report to the Legislature and CARB.




Wayne Natri
Executive Officer

Background

South Coast AQMD is subject to several internal and external reviews of its air quality programs. These include an annual review of South Coast AQMD's proposed operating budget for the upcoming fiscal year and compliance program audits.

In 1990, the Legislature directed South Coast AQMD to provide an annual review of its regulatory activities (SB 1928, Presley), and specified the type of information required (Health and Safety Code § 40452). Many of the required elements overlap with other requirements of separate legislation. For example, information on South Coast AQMD's

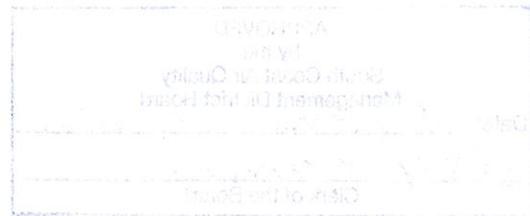
Clean Fuels Program is a requirement of this report but is also a separate requirement under legislation passed in 1999 (SB 98, Alarcón). The purpose of this report is to provide additional data needed to compile a comprehensive regulatory overview. Most of the information included in this report is not new but is a compilation of information previously seen by the Board. For example, Chapter I lists all the rules and rule amendments adopted by the Board during 2020. The Annual RECLAIM Audit Report, which the Board approved on March 5, 2021, is also required to be submitted to the Legislature by Rule 2015 - Backstop Provisions.

The specific requirements of this report include:

- A summary of each major rule and rule amendment adopted by the Board;
- The number of permits to operate or permits to construct that were issued, denied, cancelled or not renewed;
- Data on emission offset transactions and applications during the previous year;
- The budget and forecast of staff increases or decreases for the following fiscal year;
- An identification of the source of all revenues used to finance the South Coast AQMD's activities;
- An update on the South Coast AQMD's Clean Fuels program; and
- The annual RECLAIM Audit Report.

Attachment

Report to the Legislature on the Regulatory Activities of the South Coast AQMD for Calendar Year 2020.¹



¹ Due to the bulk of these materials, chapters III, IV and V of the report can be found online at <http://www.aqmd.gov/home/research/documents-reports>. Anyone who would like to obtain a hard copy of these materials may do so by contacting South Coast AQMD's Public Information Center at (909) 396-2001.

**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)**



September 2021
Cleaning the Air that We Breathe...

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

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Wayne Natri
Executive Officer

TABLE OF CONTENTS

	<u>PAGE No.</u>
EXECUTIVE SUMMARY	1
CHAPTER I	
RULE DEVELOPMENT, CEQA, AND SOCIOECONOMIC IMPACT ANALYSES	
• Rule Adoptions and Amendments in 2020 and CEQA Alternatives	8
• Socioeconomic Impact Analyses	13
CHAPTER II	
ENGINEERING AND PERMITTING ACTIVITIES	
• Engineering and Permitting	17
• Annualized Emissions Reduction Credit (ERC) and Short-Term Emission Reduction Credit (STERC) Transactions for Fiscal Year 2019-2020 (California Health and Safety Code Section 40452)	50
CHAPTER III	
BUDGET AND WORK PROGRAM FISCAL YEAR 2021-2022 (Attachment as a link)	54
CHAPTER IV	
CLEAN FUELS PROGRAM 2020 ANNUAL REPORT AND 2021 PLAN UPDATE (Attachment as a link)	55
CHAPTER V	
ANNUAL RECLAIM AUDIT REPORT FOR 2019 COMPLIANCE YEAR (Attachment as a link)	56

EXECUTIVE SUMMARY

Introduction

South Coast Air Quality Management District (South Coast AQMD) is subject to internal and external reviews of its air quality programs. These include annual reviews of South Coast AQMD's budget, forecast and proposed operating budget for the upcoming fiscal year, and compliance program audits. In addition, South Coast AQMD 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 (CY). 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 Development Projects Approved in 2020 and CEQA Alternatives

This section contains a summary of each rule adoption, amendment, rescission, and other projects approved by the South Coast AQMD Governing Board in the preceding CY 2020. Each summary contains 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.

South Coast AQMD operates under a regulatory program certified by the Secretary for Resources pursuant to Public Resources Code Section 21080.5 and CEQA Guidelines Section 15251(l) and implemented pursuant to South Coast AQMD Rule 110. The adoption, amendment, or rescission of South Coast AQMD rules and regulations are subject to our certified CEQA program. The adoption, amendment, or rescission of plans, such as the Air Quality Management Plan (AQMP) are not subject to CEQA. Having a certified regulatory program means that South Coast AQMD can incorporate its environmental analyses into CEQA documents other than environmental impact reports (EIRs), negative declarations (NDs), or mitigated NDs (MNDs) without being subject to specific CEQA requirements identified in Public Resources Code Section 21080.5. Instead, all CEQA documents prepared by South Coast AQMD pursuant to its certified regulatory program are either called an Environmental Assessment (EA), or some variant of an EA such as a Subsequent or Supplemental EA, or Addendum to an EA.

In 2020, the South Coast AQMD Governing Board adopted or amended the following major rules and regulations for which a public workshop was conducted: Rule 1179.1 (adopted), Rules 445, 1107, 1111, 1117, 1146, and 1178), and Regulations XIII, XX, and XXX (amended).

Refer to Chapter 1 for more details regarding these approved major rule/regulation projects.

Socioeconomic Impact Assessments

Health and Safety Code Section 40440.8 requires that South Coast AQMD perform socioeconomic impact assessments for its rules and regulations that will significantly affect air quality or emissions limitations. Prior to implementing the requirements of Health and Safety Code Section 40440.8, South Coast AQMD staff had been evaluating the socioeconomic impacts of its actions pursuant to a 1989 Governing Board Resolution. Additionally, South Coast AQMD staff assesses socioeconomic impacts of CEQA alternatives analyzed for 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, South Coast AQMD staff uses an economic model developed by Regional Economic Models, Inc. (REMI) to analyze the potential direct and indirect socioeconomic impacts of South Coast AQMD rules on Los Angeles, Riverside, Orange, and San Bernardino Counties. These impacts include, but are not limited to, employment and competitiveness.

In 2020, South Coast AQMD identified and analyzed potential socioeconomic impacts of one new rule (Rule 1179.1), amendments to six rules (Rules 445, 1107, 1111, 1117, 1146, and 1178), and amendments to three regulations (Regulations XIII, XX, and XXX). No significant socioeconomic impacts were identified for any of these projects. Additionally, this section includes a summary of the associated socioeconomic impacts of Rule 320 because it contains a requirement for an automatic annual California Consumer Price Index (CPI) adjustment that has associated socioeconomic impacts even though the amendments to this rule were considered and foregone by the South Coast AQMD Governing Board in 2020.

Refer to Chapter 1 for details regarding the socioeconomic impact assessments.

Engineering and Permitting

Background

Section 40452 of the California Health and Safety Code requires that South Coast AQMD 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, South Coast AQMD Rule 2015 requires submittal of the annual Regional Clean Air Incentives Market (RECLAIM) Audit Report for the 2019 Compliance Year to the Legislature.

The following paragraphs provide a brief summary for each report.

Permitting Data – Calendar Year 2020

During calendar year 2020, South Coast AQMD dispositioned a total of 7,452 applications. Most of these applications were for Permits to Operate (2,920), Area Sources & Certified/ Registrations (795), and Changes of Operators (1,164). Seven permits were denied. Also, 1,436 permits were not renewed. This data is summarized in Table 1.

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 five NAICS codes were 447110/447190 – Gasoline Service Stations, 811121 - Automotive Body, Paint, and Interior Repair and Maintenance, 445110 – Supermarkets and Other Grocery, 324110 – Petroleum Refineries, and 812320 – Dry Cleaning and Laundry Services (except Coin-Operated).

Emission Offset Transactions Data – Fiscal Year 2019-2020

During fiscal year 2019-2020, a total of 60 emission offset transactions were completed, which included 21 transactions for reactive organic gases (ROG), 19 transactions for oxides of nitrogen (NOx), 11 transactions for oxides of sulfur (SOx), and 9 transactions for particulate matter with an aerodynamic diameter less than 10 microns (PM10). There were no transactions for carbon monoxide (CO). The amounts of emissions offsets transferred, by pollutant, include 736 pounds per day of ROG, 461 pounds per day of NOx, 181 pounds per day of SOx, and 23 pounds of PM10 (see Table 3). 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 a permit for a new source because of the unavailability of emission offsets.

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, South Coast AQMD 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-fourth 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 the audit report (see Chapter V), a total of 246 facilities were in the RECLAIM program at the end of Compliance Year 2019. Total NOx emissions from RECLAIM facilities were 20 percent less than the aggregate NOx allocations, and SOx emissions were 23 percent less than the aggregate SOx allocations for the program. The vast majority of RECLAIM facilities complied with their allocations during the 2019 compliance year (95 percent of NOx facilities and 97 percent of SOx facilities).

A total of over \$1.54 billion in RTCs has been traded since the adoption of RECLAIM, of which \$18.2 million occurred in CY 2020 compared to \$34.2 million in CY 2019, excluding swaps. RTCs for NOx and SOx traded in calendar years 2019 and 2020 were all below the applicable review thresholds for initiating program review.

In Compliance Year 2019, RECLAIM facilities reported a net loss of 4,167 jobs, representing 4.0 percent of their total employment. The RECLAIM program also met other applicable requirements including meeting the 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 “Annual RECLAIM Audit Report for 2019.”

Budget and Work Program

Refer to Chapter III for the Fiscal Year 2021-2022 Budget Report.

Clean Fuels Programs

2020 Annual Report

In CY 2020, the South Coast AQMD Clean Fuels Program executed 24 new contracts, projects or studies and modified 11 continuing projects adding dollars toward research, development, demonstration and deployment projects as well as technology assessment and transfer of alternative fuel and clean fuel technologies. The South Coast AQMD Clean Fuels Program contributed nearly \$4.1 million in partnership with other governmental organizations, private industry, academia and research institutes, and interested parties, with total project costs of approximately \$28.9 million. The \$4.1 million includes nearly \$500,000 recognized into the Clean Fuels Fund as pass-through funds from project partners to facilitate project administration by the Clean Fuels Program. Additionally, in CY 2020, the Clean Fuels Program continued to leverage outside funding opportunities, securing awards totaling \$45.8 million from federal, state and local funding opportunities. The significant project scope of a few key contracts executed in 2020 resulted in higher than average leveraging of Clean Fuels dollars. Typical historical leveraging is \$4 for every \$1 in Clean Fuels funding. In 2020, South Coast AQMD leveraged nearly \$7 leveraged for every \$1 in Clean Fuels funds. Leveraging dollars and aggressively pursuing funding opportunities is critical given the magnitude of funding identified in the 2016 AQMP to achieve federal ozone air quality standards.

The projects or studies executed in 2020 included a diverse mix of advanced technologies. The following core areas of technology advancement for 2020 executed contracts (in order of funding percentage) include:

1. Engine Systems/Technologies (emphasizing alternative and renewable fuels for truck and rail applications);
2. Hydrogen and Mobile Fuel Cell Technologies and Infrastructure;
3. Technology Assessment and Transfer/Outreach;
4. Electric and Hybrid Vehicle Technologies and Related Infrastructure (emphasizing electric and hybrid electric trucks developed by OEMs and container transport technologies with zero emission operations); and
5. Fueling Infrastructure and Deployment (natural gas (NG)/ renewable natural gas (RNG)).

During CY 2020, South Coast AQMD supported a variety of projects and technologies, ranging from near-term to long-term research, development, demonstration and deployment activities. This “technology portfolio” strategy provides South Coast AQMD the ability to leverage state and federal funding while also addressing the specific needs of the 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 near-zero and zero emissions goods movement industry; development, demonstration and deployment of large displacement natural gas and ultra-low emissions engines; demonstration of emissions control technologies for heavy-duty engines; and natural gas and renewable natural gas deployment and support.

In 2020, 22 research, development, demonstration and deployment projects or studies and eight technology assessment and transfer contracts were completed. As of January 1, 2021, there were 106 open contracts in the Clean Fuels Program.

In accordance with California H&SC Section 40448.5.1(d), this annual report was submitted to the state legislature by March 31, 2021, after approval by the South Coast AQMD Board.

2021 Plan Update

Staff's re-evaluation of the Clean Fuels Program to develop the annual Plan Update is based on a reassessment of the technology progress and direction for the agency. The Program continually seeks to support the development and deployment of cost-effective clean fuel technologies with increased collaboration with OEMs to achieve large scale deployment. The design and implementation of the Clean Fuels Program Plan must balance the needs of the various technology sectors with technology readiness on the path to commercialization, emission reduction potential and cofunding opportunities. For several years, the state has focused a great deal of attention on climate change and petroleum reduction goals, but South Coast AQMD has remained committed to developing, demonstrating, and commercializing technologies that reduce criteria pollutants, specifically NO_x and toxic air contaminants (TACs). These technologies address the Basin's need for NO_x and TAC reductions and garner reductions in greenhouse gases (GHG) and petroleum use. Due to these co-benefits, South Coast AQMD has been successful in partnering with the state and public/private partnerships to extensively leverage its Clean Fuels funding.

South Coast AQMD engages in outreach and networking efforts to identify technology and project opportunities where funding can make a significant difference in deploying cleaner technologies in the Basin. These activities range from close involvement with state and federal collaboratives, partnerships and industrial coalitions, to the issuance of Program Opportunity Notices (PONs) to solicit project ideas and concepts and Requests for Information (RFIs) to determine the current state of various technologies and their development and commercialization challenges. Additionally, unsolicited proposals from OEMs and other clean fuel technology developers are regularly received and reviewed. Potential development, demonstration, and certification projects resulting from these outreach and networking efforts are included conceptually within the Draft 2021 Plan Update. In accordance with Assembly Bill (AB) 617, which requires reduced exposure to communities most impacted by air pollution, TAO conducted additional outreach to AB 617 communities regarding available zero and near-zero emission technologies and incentives to accelerate cleaner technologies. Cleaner technologies such as zero emission heavy-duty trucks are now included in the Community Emission Reduction Plans (CERPs) for these AB 617 communities. CARB adopted two critical milestone regulations for reducing emissions from heavy-duty mobile sources in 2020, the Advanced Clean Truck (ACT) regulation which mandates percent zero emission truck (ZET) sales starting in 2024 and the Omnibus Low NO_x regulation which requires lower NO_x standard heavy-duty engines starting in 2022. Despite these two major efforts, the expected NO_x reduction will still fall short of the 2023 and 2031 attainment target.

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 emission reductions 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 and container movement, and other technologies, including demonstration and deployment of zero emission drayage trucks;
- Developing and demonstrating ultra-low NO_x, gaseous and liquid renewable fueled, large

- displacement/high efficiency engines and zero emission heavy-duty vehicles;
- Developing, demonstrating and deploying advanced natural gas and propane engines as well as near-zero and zero emission technologies for high horsepower applications;
- Mitigating criteria pollutant emissions from renewable fuels, such as renewable natural gas, diesel and hydrogen as well as other renewable fuels and waste streams;
- Producing transportation fuels and energy from renewable and waste stream sources;
- Developing and demonstrating electric-drive (fuel cell, battery, plug-in hybrid and non-plug-in hybrid) technologies across light-, medium- and heavy-duty platforms;
- Establishing large-scale hydrogen refueling and EV charging infrastructure to support light-, medium- and heavy-duty zero emission vehicles; and
- Developing and demonstrating advanced zero emission microgrids for energy storage and demand to support transportation electrification, goods movement, and freight handling activities.

Potential projects across nine core technologies by funding priority:

1. Hydrogen/Mobile Fuel Cell Technologies and Infrastructure (especially large-scale refueling and production facilities) and stations that support medium and heavy-duty vehicles;
2. Engine Systems/Technologies (emphasizing alternative and renewable fuels for truck and rail applications);
3. Electric/Hybrid Vehicle Technologies and Infrastructure (emphasizing electric and hybrid electric trucks and container transport technologies with zero emission operations);
4. Fueling Infrastructure and Deployment (predominantly renewable natural gas and renewable fuels);
5. Stationary Clean Fuel Technologies (including microgrids that support electric vehicle (EV) and Hydrogen infrastructure and renewables);
6. Fuel and Emission Studies;
7. Emission Control Technologies that support low-emitting diesel engines;
8. Health Impact Studies within disadvantaged communities; and
9. Technology Transfer/Assessment and Outreach.

These potential projects for 2021 total \$17.9 million, with anticipated leveraging of more than \$4 for every \$1 of Clean Fuels funding for total project costs of \$120 million. Some of the proposed projects may also be funded by revenue sources other than the Clean Fuels Program, through state and federal grants, incentive programs such as AB 617 Community Air Protection (CAP) funding, Volkswagen Mitigation, Carl Moyer, and Prop 1B.

CHAPTER I
RULE DEVELOPMENT, CEQA, and SOCIOECONOMIC IMPACT ANALYSES

RULE DEVELOPMENT PROJECTS APPROVED IN 2020 AND CEQA ALTERNATIVES

This section contains a summary of each rule adoption, amendment, and rescission projects approved by the South Coast AQMD Governing Board in the preceding calendar year (2020). Each summary provides 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 South Coast AQMD must first be reviewed to determine if they are considered a “project” as defined by CEQA. For any proposal that is either not a “project” or 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 being adopted, or existing rules being amended or rescinded typically 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 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. However, if the CEQA document concludes that no significant adverse environmental impacts would be generated by a proposed project, neither the identification of feasible mitigation measures nor an analysis of CEQA alternatives to the project is required. However, even if a project is determined not to have significant environmental impacts, the CEQA document will contain a focused analysis of the potential environmental impacts.

South Coast AQMD operates under a regulatory program certified by the Secretary for Resources pursuant to Public Resources Code Section 21080.5 and CEQA Guidelines Section 15251(l) and implemented pursuant to South Coast AQMD Rule 110. The adoption, amendment, or rescission of South Coast AQMD rules and regulations are subject to South Coast AQMD’s certified CEQA program, while the adoption, amendment or rescission of plans such as the AQMP are not. Having a certified regulatory program means that South Coast AQMD can incorporate its environmental analyses into CEQA documents other than environmental impact reports (EIRs), negative declarations (NDs), or mitigated NDs (MNDs) without being subject to a limited number of specific CEQA requirements identified in Public Resources Code Section 21080.5. Instead, all CEQA documents prepared by South Coast AQMD pursuant to its certified regulatory program are either called an Environmental Assessment (EA), or some variant of an EA such as a Subsequent or Supplemental EA, or Addendum to an EA.

The following section identifies all major rules/regulations and rule/regulation amendments that were adopted by the South Coast AQMD Governing Board in 2020, in sequential order according to the month of project approval. Alternatives are summarized only for those projects identified as having potentially significant impacts requiring an alternatives analysis pursuant to CEQA.

FEBRUARY 7, 2020

One project was approved by the South Coast AQMD Governing Board in February:

- 1. Amended Rule 1107 – Coating of Metal Parts and Products:** Rule 1107 was amended to be consistent with Reasonably Available Control Technology requirements as recommended in U.S. EPA’s Control Techniques Guidelines for Miscellaneous Metal and Plastic Parts Coatings (September 2008). Amendments to Rule 1107 reduced Volatile Organic Compound (VOC) limits for baked metallic and baked camouflage coatings from 420 grams/liter (g/L) to 360 g/L as requested by California Air Resources Board. Other amendments to Rule 1107 addressed work practices for coating-related activities, updated test methods, and removed obsolete provisions. The South Coast AQMD Governing Board determined that the project was exempt from CEQA, therefore, no alternatives analysis was required.

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

JUNE 5, 2020

Two projects were approved by the South Coast AQMD Governing Board in June:

- 1. Amended Rule 445 – Wood-Burning Devices:** Rule 445 was amended to satisfy U.S. EPA PM_{2.5} contingency measure requirements and Control Measure BCM-09 from the 2016 AQMP. The threshold for no-burn days was incrementally lowered automatically for each subsequent final determination by the U.S. EPA of a failure to meet an applicable Clean Air Act milestone. The adopted amendments were crafted to also reduce ambient PM_{2.5} by expanding the criteria for Basin-wide wood-burning curtailments. Other minor amendments to Rule 445 included additional definitions for terms used in the rule, and revisions to improve rule implementation and clarify existing requirements. The South Coast AQMD Governing Board determined that the project was exempt from CEQA, therefore, no alternatives analysis was required.

Estimated Emission Reductions: Ranges from 186.0 tons of PM_{2.5} per year at the current threshold of 29 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) to 239.8 at the lowest threshold of 26 $\mu\text{g}/\text{m}^3$. *Cost-Effectiveness:* Not required. *CEQA Alternatives:* Not required. *Socioeconomic Impact:* Minimal impact, see Socioeconomic Impacts Assessment section. *Source(s) of Funding:* Other, e.g. civil penalty funds.

- 2. Amended Rule 1117 – Emissions from Container Glass Melting and Sodium Silicate Furnaces:** Rule 1117 was amended to establish NO_x and SO_x emission standards for container glass melting and sodium silicate furnaces at container glass and sodium silicate production facilities, update monitoring, reporting, and recordkeeping requirements,

establish provisions for idling, startup, and shutdown of these furnaces, and remove obsolete provisions. Amendments to Rule 1117 also included NOx emission limits for auxiliary combustion equipment associated with container glass melting operations. The South Coast AQMD Governing Board determined that the project was exempt from CEQA, therefore, no alternatives analysis was required.

Estimated Emission Reductions: 0.57 ton of NOx per day. *Cost-Effectiveness:* \$22,700 per ton of NOx reduced per day. *CEQA Alternatives:* Not required. *Socioeconomic Impact:* Not required. *Source(s) of Funding:* AB 617, Permit Fees, Emission Fees and Annual Operating Fees.

SEPTEMBER 4, 2020

One project was approved by the South Coast AQMD Governing Board in September:

- 1. Amended Rule 1111 – Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces, and Revisions to Clean Air Furnace Rebate Program:** Rule 1111 was amended to establish a NOx emission limit of 14 nanograms per Joule (ng/J) for residential and commercial gas furnaces. Amended Rule 1111 also extended the mitigation fee alternative compliance option from October 1, 2020 to September 30, 2021 for weatherized furnaces and extended the exemption from October 1, 2020, to September 30, 2021, for high-altitude furnaces. The amendment also included an exemption for gas-electric dual fuel systems with low-NOx furnaces (40 ng/J) installed at high altitudes until September 30, 2022. Amended Rule 1111 modified the Clean Air Furnace Rebate program to increase funding and consumer rebates. The South Coast AQMD Governing Board determined that the project was exempt from CEQA, therefore, no alternatives analysis was required.

Estimated Emission Reductions: None. *Cost-Effectiveness:* Not required. *CEQA Alternatives:* Not required. *Socioeconomic Impact:* No impact, see Socioeconomic Impacts Assessment section. *Source(s) of Funding:* Emission Fees and Annual Operating Fees.

OCTOBER 4, 2020

One project was approved by the South Coast AQMD Governing Board in October:

- 1. Rule 1179.1 – NOx Emission Reductions from Combustion Equipment at Publicly Owned Treatment Works Facilities:** Rule 1179.1 was adopted to establish nitrogen oxides (NOx), volatile organic compound (VOC), and carbon monoxide (CO) emission limits for boilers, process heaters, engines, and turbines at Publicly Owned Treatment Works (POTW) facilities. Rule 1179.1 consolidated requirements from existing source-specific rules and incorporated new requirements for turbines, which were previously exempt from existing source-specific rules. Rule 1179.1 also included provisions for starting up and shutting down equipment, and monitoring, reporting, and recordkeeping. A Final EA was prepared for the project and the analysis concluded that there would be no significant adverse environmental impacts, no alternatives analysis was were required. *Estimated Emission Reductions:* 0.05 ton of NOx per day. *Cost-Effectiveness:* \$50,000 per ton of NOx reduced. *CEQA Alternatives:* Not required. *Socioeconomic Impact:* Yes,

see Socioeconomic Impact Assessments section. *Source(s) of Funding:* AB 617, Permit Fees, Emission Fees and Annual Operating Fees.

OCTOBER 27, 2020

One project was approved by the South Coast AQMD Governing Board at a special meeting held on October 27, 2020:

- 1. Amended Rule 445 – Wood-Burning Devices:** Rule 445 was amended to establish contingency measures for ozone standards to satisfy the U.S. EPA requirement to submit a Reasonable Further Progress contingency measure that provides for additional ozone National Ambient Air Quality Standards emission reductions in the event that the South Coast Air Basin fails to comply with an applicable Clean Air Act milestone. Specifically Amended Rule 445: 1) established an automatic Basin-wide No-Burn day that is triggered when the daily maximum 8-hour ozone air quality is forecast to exceed 80 parts per billion (ppb) in any Source Receptor Area; 2) automatically reduced the ozone threshold to 75 ppb and 70 ppb if the U.S. EPA makes a secondary and tertiary finding, respectively, of a failure to comply with a milestone or attainment requirement by the applicable due date; and 3) added contingent ozone No-Burn days to the definition of wood-burning season (currently November, December, January, and February) to include additional months (September, October, March, and April). Other minor amendments included additional definitions of terms used in the rule, and revisions to improve rule implementation and clarify existing requirements. The South Coast AQMD Governing Board determined that the project was exempt from CEQA, therefore, no alternatives analysis was required.

Estimated Emission Reductions: 22.38, 46.10, and 88.43 tons of VOC per year at the 80 ppb, 75 ppb and 70 ppb ozone standard, respectively. *Cost-Effectiveness:* Not required. *CEQA Alternatives:* Not required. *Socioeconomic Impact:* Minimal impact, see Socioeconomic Impact Assessments section. *Source(s) of Funding:* Other, e.g. civil penalty funds.

NOVEMBER 6, 2020

One project was approved by the South Coast AQMD Governing Board in November:

- 1. Amended Rule 1178 – Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities:** Rule 1178 was amended to establish requirements to control VOC emissions from storage tanks at petroleum facilities. Amendments to Rule 1178 addressed safety concerns related to the enclosure of external floating roof tanks that store sour water. Amended Rule 1178 reinstated an expired provision that allows operators to accept a permit condition to limit the vapor pressure of organic liquid stored for external floating roof tanks that store sour water. The South Coast AQMD Governing Board determined that the project was exempt from CEQA, therefore, no alternatives analysis was required.

Estimated Emission Reductions: Up to 2.4 pounds VOC per day foregone. *Cost-Effectiveness:* Not required. *CEQA Alternatives:* Not required. *Socioeconomic Impact:* Not required. *Source(s) of Funding:* Permit Fees, Emission Fees and Annual Operating Fees.

DECEMBER 4, 2020

Two projects were approved by the South Coast AQMD Governing Board in December:

- 1. Amended Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters:** To prevent conflicts with applying the existing ammonia emission limits in Regulation XIII during the permitting process, Rule 1146 was amended by removing the ammonia concentration limit of five parts per million (ppm). Based on the review of recently approved permits, an ammonia concentration limit of five ppm has been imposed as Best Available Control Technology (BACT); therefore, removal of the five ppm limit from Rule 1146 was determined to not cause any significant adverse impacts. The South Coast AQMD Governing Board determined that the project was exempt from CEQA, therefore, no alternatives analysis was required.

Estimated Emission Reductions: None. *Cost-Effectiveness:* Not required. *CEQA Alternatives:* Not required. *Socioeconomic Impact:* Not required. *Source(s) of Funding:* AB 617, Permit Fees, Emission Fees and Annual Operating Fees.

- 2. Amended Regulation XIII – New Source Review, Regulation XX Regional Clean Air Incentives Market (RECLAIM), and Regulation XXX – Title V Permits:** Due to the reclassification of the Coachella Valley from Severe to Extreme nonattainment for the 1997 8-hour ozone standard, amendment to rules within Regulation XIII, Regulation XX and Regulation XXX were necessary to reflect the Coachella Valley's new attainment status. The amendments to Regulations XIII, XX, and XXX lowered the major source thresholds for VOC and NOx, which are ozone precursors, in the Coachella Valley from 25 tons per year to 10 tons per year and lowered the major modification thresholds for VOC and NOx in the Coachella Valley from 25 tons per year to one pound per day. Additional amendments corrected rule references and improved rule clarity by adding California Code of Regulation references for the definitions of the Riverside County portion of the Salton Sea Air Basin and the non-Palo Verde, Riverside County portion of the Mojave Desert Air Basin. The South Coast AQMD Governing Board determined that the project was exempt from CEQA, therefore, no alternatives analysis was required.

Estimated Emission Reductions: None. *Cost-Effectiveness:* Not required. *CEQA Alternatives:* Not required. *Socioeconomic Impact:* Not required. *Source(s) of Funding:* AB 617, Permit Fees, Emission Fees and Annual Operating Fees.

SOCIOECONOMIC IMPACT ASSESSMENTS

Health and Safety Code Section 40440.8 requires that South Coast AQMD perform socioeconomic impact assessments for its rules and regulations that will significantly affect air quality or emissions. Prior to implementing the requirements of Health and Safety Code Section 40440.8, South Coast AQMD staff had been evaluating the socioeconomic impacts of its actions pursuant to a 1989 resolution of its Governing Board. Additionally, South Coast AQMD 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, South Coast AQMD staff uses a state-of-the-art economic model developed by Regional Economic Models, Inc. (REMI) to analyze the potential direct and indirect socioeconomic impacts of South Coast AQMD rules on Los Angeles, Riverside, Orange, and San Bernardino Counties. These impacts include but are not limited to employment and competitiveness.

In 2020, South Coast AQMD identified and analyzed potential socioeconomic impacts of one new rule (Rule 1179.1), amendments to six rules (Rules 445, 1107, 1111, 1117, 1146, and 1178), and amendments to three regulations (Regulations XIII, XX, and XXX). No significant socioeconomic impacts were identified for any of these projects. Additionally, this section includes a summary of the associated socioeconomic impacts of Rule 320 because it contains a requirement for an automatic annual California Consumer Price Index (CPI) adjustment that has associated socioeconomic impacts even though the amendments to this rule were considered and foregone by the South Coast AQMD Governing Board in 2020.

RULE DEVELOPMENT PROJECTS WITHOUT SIGNIFICANT SOCIOECONOMIC IMPACTS

No proposed or amended rules assessed in 2020 were found to have significant socioeconomic impacts as a result of required provisions from adopted rules. However, the adoption of Rule 1179.1 had cost impacts which are described below:

Rule 1179.1 – NOx Emission Reductions from Combustion Equipment at Publicly Owned Treatment Works Facilities (Adopted October 2, 2020)

Rule 1179.1 was adopted on October 2, 2020, to establish Best Available Retrofit Control Technology (BARCT) requirements for combustion equipment located at POTWs using digester gas. During the rule development process in the 2018 amendments to the Rule 1146 Series, staff recognized the need for separate provisions for combustion equipment at POTWs due to differences in the fuel source which contains a contaminant called siloxanes and more limited financial resources at POTWs as compared to other facilities regulated under Rule 1146. The requirements of Rule 1179.1 align NOx limits for boilers, engines, and turbines already meeting the NOx limits established in Rule 1110.2 (amended November 2019), and lower NOx emission limits for turbines greater than 0.3 megawatts (MW).

Rule 1179.1 is expected to affect 30 POTW facilities with a total of 86 biogas-fueled boilers, turbines, and engines. The total cost for three turbines greater than 0.3 MW was approximately \$430,000 per year as a result of increased water injection, and permit modifications for all affected facilities total about \$24,000 annually. The total annual cost of Rule 1179.1 is estimated at \$454,000 amongst 30 facilities. The result of the emission limits in Rule 1179.1 is expected to reduce NOx emissions by about 0.05 ton per day, and the overall cost-effectiveness of the rule is \$50,000 per ton of NOx reduced. Job impacts as a result of Rule 1179.1 are expected to be minimal.

EXISTING RULES WITH ONGOING SOCIOECONOMIC IMPACTS

Ongoing Implementation of Rule 320 - Automatic Adjustment Based on Consumer Price Index (CPI) for Regulation III Fees

Pursuant to the October 29, 2010, South Coast AQMD Governing Board Resolution, Rule 320 is required to undergo an annual assessment of the increase in fee rates based on the previous year's CPI by March 15. Rule 320 does not affect air quality or emission limits and as such no socioeconomic and cost-effectiveness analyses are required by statute. However, a socioeconomic impact assessment was conducted to assess the cost impacts of the fee increase and to provide background information, such as historical trends of South Coast AQMD revenues from various fees and sectoral distributions of these fees. The 2020 annual assessment of Rule 320 resulted in an across-the-board 2.8-percent increase in fee rates (equivalent to the change in the California CPI from December 2018 to December 2019) which went into effect on July 1, 2020. The fee increase was applied to most fees in Rules 301, 303, 304, 304.1, 306, 307.1, 308, 309, 311, 313, 314, and 315. However, the South Coast AQMD Governing Board voted in the May 1, 2020, Public Hearing to credit back the 2020 automatic CPI increase due to the economic effects of the COVID-19 pandemic on facilities regulated by South Coast AQMD. Future CPI adjustments would be applied on top of the 2.8 percent increase in 2020 despite the foregone increase to facilities during COVID-19 state-ordered shutdowns.

Nearly all the facilities regulated by South Coast AQMD would be affected by the 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 across-the-board CPI-based fee rate increase was estimated to bring additional revenue totaling \$2.65 million to South Coast AQMD. Based on the fee categories examined in the analysis, the manufacturing sector was shown to experience the largest increase in fees (approximately \$1.21 million for about 3,600 facilities), followed by the services sector (approximately \$0.47 million for about 10,600 facilities), and the retail trade sector (approximately \$0.36 million for about 4,100 facilities). Within the manufacturing sector, the petroleum and coal products manufacturing industry, mostly comprised of refineries, was estimated to experience an increase of approximately \$0.51 million.

CHAPTER II
ENGINEERING AND PERMITTING ACTIVITIES

Engineering and Permitting

During calendar year 2020, South Coast AQMD dispositioned a total of 7,452 applications. Most of these applications were for Permits to Operate (2,920), Area Sources & Certified/Registrations (795), and Changes of Operators (1,164). Seven applications were denied. Also, 1,436 permits were not renewed. This data, broken down into nine different categories, is summarized in Table 1 below.

TABLE - 1	
Permit Applications Completed Between 01/01/2020 and 01/01/2021	
Type	Count
Permits to Construct	280
Permits to Operate (PO)*	2,920
Changes of Operator (C/O)	1,164
Denials	7
Cancellations	398
Emission Reduction Credits (ERCs)	64
Plans	1,602
RECLAIM/Title V (TV)	222
Area Sources & Certified/Registrations	795
Total	7,452
<i>Permits Not Renewed</i>	1,436

*This includes 1,894 applications for Permit to Construct that were issued as Permits to Construct/Operate.

Table 2, on the following pages, 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 five NAICS codes were 447110/447190 – Gasoline Service Stations, 811121 – Automotive Body, Paint, and Interior Repair and Maintenance, 445110 – Supermarkets and Other Grocery, 324110 – Petroleum Refineries, and 812320 – Dry Cleaning and Laundry Services (except Coin-Operated).

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
111150	Corn Farming								1		1
111320	Citrus (except Orange) Groves								2		2
111332	Grape Vineyards							4			4
111920	Cotton Farming							1			1
111998	All Other Miscellaneous Crop Farming			1				1		2	4
112120	Dairy Cattle and Milk Production	1	1						3		5
112990	All Other Animal Production	1						1			2
115114	Postharvest Crop Activities (except Cotton Ginning)						1		4		5
115116	Farm Management Services		1								1
115210	Support Activities for Animal Production		5					1	2		8
211111	Crude Petroleum and Natural Gas Extraction – crude petroleum extraction	1		1		2	4	4	14	3	29
211120	Crude Petroleum Extraction	8	11			1		1	3		24
212312	Crushed and Broken Limestone Mining and Quarrying								3		3
212319	Other Crushed and Broken Stone Mining and Quarrying	1									1
212321	Construction Sand and Gravel Mining								2		2
213112	Support Activities for Oil and Gas Operations	1					1		3		5
221112	Fossil Fuel Electric Power Generation	1		1			2		11	9	24
221114	Solar Electric Power Generation								1		1
221118	Other Electric Power Generation	2	8	9			13	10	9	9	60

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
221121	Electric Bulk Power Transmission and Control							1			1
221122	Electric Power Distribution							2	13		15
221210	Natural Gas Distribution	3		7			7	2		1	20
221310	Water Supply and Irrigation Systems	6					3	22	30	1	62
221320	Sewage Treatment Facilities	3		12			4	15	31	3	68
221330	Steam and Air-Conditioning Supply							1	4	2	7
236115	New Single-Family Housing Construction (except For-Sale Builders)	9	6	1				9	8		33
236116	New Multifamily Housing Construction (except For-Sale Builders)							3	4		7
236118	Residential Remodelers	1						1	1		3
236220	Commercial and Institutional Building Construction	1					3	8	44		56
237120	Oil and Gas Pipeline and Related Structures Construction	3	7								10
237210	Land Subdivision	2	1					22	8		33
237310	Highway, Street, and Bridge Construction	1	9	1		1		1	4		17
237990	Other Heavy and Civil Engineering Construction	2									2
238110	Poured Concrete Foundation and Structure Contractors								3		3
238130	Framing Contractors	2		1					4		7
238160	Roofing Contractors	17									17
238210	Electrical Contractors and Other Wiring Installation Contractors	21						1	1		23

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
238220	Plumbing, Heating, and Air-Conditioning Contractors							4			4
238310	Drywall and Insulation Contractors	4									4
238320	Painting and Wall Covering Contractors	3	3						5		11
238340	Tile and Terrazzo Contractors								2		2
238350	Finish Carpentry Contractors		1								1
238390	Other Building Finishing Contractors			1					3		4
238910	Site Preparation Contractors	31						7			38
238990	All Other Specialty Trade Contractors	76	1					2	8		87
311211	Flour Milling								5		5
311412	Frozen Specialty Food Manufacturing	1									1
311421	Fruit and Vegetable Canning	5									5
311423	Dried and Dehydrated Food Manufacturing							1			1
311511	Fluid Milk Manufacturing		20	1			2		6	1	30
311513	Cheese Manufacturing							1			1
311611	Animal (except Poultry) Slaughtering	3		1			2	1	3	2	12
311612	Meat Processed from Carcasses						2		1		3
311613	Rendering and Meat Byproduct Processing			4			4		4	5	17
311811	Retail Bakeries		1								1
311812	Commercial Bakeries						3	2	4	1	10
311824	Dry Pasta, Dough, and Flour Mixes Manufacturing from Purchased Flour		1					1	1		3
311830	Tortilla Manufacturing						2		18		20

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
311919	Other Snack Food Manufacturing			4			4		3		11
311920	Coffee and Tea Manufacturing		6					2	2		10
311930	Flavoring Syrup and Concentrate Manufacturing								1		1
311941	Mayonnaise, Dressing, and Other Prepared Sauce Manufacturing							1	1		2
311942	Spice and Extract Manufacturing	12	41						2		55
311991	Perishable Prepared Food Manufacturing	1					4				5
311999	All Other Miscellaneous Food Manufacturing	8	2	2		1			6		19
312111	Soft Drink Manufacturing								2		2
312120	Breweries			7			10	1	3	3	24
312130	Wineries								2		2
312230	Tobacco Manufacturing		1						4		5
313210	Broadwoven Fabric Mills								4		4
313310	Textile and Fabric Finishing Mills			1			7		19	2	29
313320	Fabric Coating Mills			2			3		2		7
314110	Carpet and Rug Mills			3			7			2	12
314999	All Other Miscellaneous Textile Product Mills								1		1
315220	Men's and Boys' Cut and Sew Apparel Manufacturing	1						1			2
315990	Apparel Accessories and Other Apparel Manufacturing								3		3
321114	Wood Preservation								10		10
321211	Hardwood Veneer and Plywood Manufacturing								2		2

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
321911	Wood Window and Door Manufacturing								1		1
321912	Cut Stock, Resawing Lumber, and Planing								3		3
321918	Other Millwork (including Flooring)								9		9
321999	All Other Miscellaneous Wood Product Manufacturing								1		1
322121	Paper (except Newsprint) Mills	1	3	3			4			3	14
322130	Paperboard Mills		9					2	8	2	21
322211	Corrugated and Solid Fiber Box Manufacturing								1		1
322212	Folding Paperboard Box Manufacturing						1	1	1	1	4
322220	Paper Bag and Coated and Treated Paper Manufacturing		1				1		2		4
323111	Commercial Printing (except Screen and Books)	1	9				2	3	7	1	23
323113	Commercial Screen Printing			3					3		6
324110	Petroleum Refineries	1		17		6	44	26	34	38	166
324121	Asphalt Paving Mixture and Block Manufacturing		3	3		1	3		12	3	25
324122	Asphalt Shingle and Coating Materials Manufacturing			1		2	4	2	17	8	34
324191	Petroleum Lubricating Oil and Grease Manufacturing	2	1					1	5	1	10
325110	Petrochemical Manufacturing		1					1	7		9
325120	Industrial Gas Manufacturing	1		4			5	1	3	6	20
325180	Other Basic Inorganic Chemical Manufacturing			1				1	7	3	12
325193	Ethyl Alcohol Manufacturing								3		3

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
325199	All Other Basic Organic Chemical Manufacturing								1		1
325211	Plastics Material and Resin Manufacturing			4			2		41	2	49
325212	Synthetic Rubber Manufacturing		1						40	2	43
325311	Nitrogenous Fertilizer Manufacturing								12		12
325411	Medicinal and Botanical Manufacturing	4							2	2	8
325412	Pharmaceutical Preparation Manufacturing	2	24	1			1	4	15		47
325414	Biological Product (except Diagnostic) Manufacturing	1									1
325510	Paint and Coating Manufacturing						2	1	11		14
325520	Adhesive Manufacturing						3				3
325611	Soap and Other Detergent Manufacturing								1		1
325612	Polish and Other Sanitation Good Manufacturing								3		3
325620	Toilet Preparation Manufacturing		46					1	32		79
325991	Custom Compounding of Purchased Resins								1		1
325998	All Other Miscellaneous Chemical Product and Preparation Manufacturing								8		8
326111	Plastics Bag and Pouch Manufacturing								2		2
326112	Plastics Packaging Film and Sheet (including Laminated) Manufacturing			2			1		2		5
326113	Unlaminated Plastics Film and Sheet (except Packaging) Manufacturing			1				1	2		4

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
326122	Plastics Pipe and Pipe Fitting Manufacturing			1					11		12
326130	Laminated Plastics Plate, Sheet (except Packaging), and Shape Manufacturing			2			1				3
326140	Polystyrene Foam Product Manufacturing	2							4	2	8
326150	Urethane and Other Foam Product (except Polystyrene) Manufacturing						3				3
326160	Plastics Bottle Manufacturing								1		1
326191	Plastics Plumbing Fixture Manufacturing						4		4		8
326199	All Other Plastics Product Manufacturing	1	4			1	1		21		28
326291	Rubber Product Manufacturing for Mechanical Use			3					2		5
327110	Pottery, Ceramics, and Plumbing Fixture Manufacturing		13								13
327120	Clay Building Material and Refractories Manufacturing								9		9
327212	Other Pressed and Blown Glass and Glassware Manufacturing			1						1	2
327213	Glass Container Manufacturing							1		1	2
327215	Glass Product Manufacturing Made of Purchased Glass								1		1
327310	Cement Manufacturing			12				2	6		20
327320	Ready-Mix Concrete Manufacturing		6				1		20		27

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
327331	Concrete Block and Brick Manufacturing								4		4
327390	Other Concrete Product Manufacturing								3		3
327410	Lime Manufacturing								6		6
327910	Abrasive Product Manufacturing								2		2
327992	Ground or Treated Mineral and Earth Manufacturing	1							1	1	3
331110	Iron and Steel Mills and Ferroalloy Manufacturing	1		5				1	3	3	13
331210	Iron and Steel Pipe and Tube Manufacturing from Purchased Steel			6							6
331221	Rolled Steel Shape Manufacturing								2		2
331222	Steel Wire Drawing			2					2		4
331315	Aluminum Sheet, Plate, and Foil Manufacturing		2	1							3
331318	Other Aluminum Rolling, Drawing, and Extruding	4	12	1				1	1	2	21
331410	Nonferrous Metal (except Aluminum) Smelting and Refining			1					2		3
331492	Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)			2			1		10	2	15
331512	Steel Investment Foundries							2			2
331523	Nonferrous Metal Die-Casting Foundries			1							1
331524	Aluminum Foundries (except Die-Casting)			3					3	1	7
332111	Iron and Steel Forging			1			2		5	1	9
332112	Nonferrous Forging	1		22			4	1	41	6	75

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
332117	Powder Metallurgy Part Manufacturing								3		3
332311	Prefabricated Metal Building and Component Manufacturing	1							4		5
332321	Metal Window and Door Manufacturing			1			2		2		5
332322	Sheet Metal Work Manufacturing			1			2		23		26
332323	Ornamental and Architectural Metal Work Manufacturing								1		1
332431	Metal Can Manufacturing		2	4				5			11
332510	Hardware Manufacturing								2		2
332710	Machine Shops		2						6		8
332721	Precision Turned Product Manufacturing							2	4	1	7
332722	Bolt, Nut, Screw, Rivet, and Washer Manufacturing			5				1	19		25
332811	Metal Heat Treating								15	2	17
332812	Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers		5	2			3	1	16	1	28
332813	Electroplating, Plating, Polishing, Anodizing, and Coloring	4	8	26			14	4	52	2	110
332911	Industrial Valve Manufacturing								1		1
332912	Fluid Power Valve and Hose Fitting Manufacturing								1		1
332919	Other Metal Valve and Pipe Fitting Manufacturing			1							1

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
332994	Small Arms, Ordnance, and Ordnance Accessories Manufacturing		32	2							34
332996	Fabricated Pipe and Pipe Fitting Manufacturing						2	1	2	1	6
332999	All Other Miscellaneous Fabricated Metal Product Manufacturing								2		2
333111	Farm Machinery and Equipment Manufacturing								5		5
333120	Construction Machinery Manufacturing								14	3	17
333241	Food Product Machinery Manufacturing							2	2		4
333314	Optical Instrument and Lens Manufacturing						2				2
333318	Other Commercial and Service Industry Machinery Manufacturing		14						1		15
333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing	1							2		3
333514	Special Die and Tool, Die Set, Jig, and Fixture Manufacturing			1							1
333517	Machine Tool Manufacturing								2		2
333612	Speed Changer, Industrial High-Speed Drive, and Gear Manufacturing							1	1		2
333613	Mechanical Power Transmission Equipment Manufacturing								1		1
333922	Conveyor and Conveying Equipment Manufacturing			1					2		3

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/ Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
333924	Industrial Truck, Tractor, Trailer, and Stackers Machinery Manufacturing						2	1	9		12
333994	Industrial Process Furnace and Oven Manufacturing								10		10
333996	Fluid Power Pump and Motor Manufacturing	3									3
333999	All Other Miscellaneous General Purpose Machinery Manufacturing		1						1		2
334118	Computer Terminal and Other Computer Peripheral Equipment Manufacturing							1			1
334220	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing		5				1	9	2		17
334290	Other Communications Equipment Manufacturing								1		1
334412	Bare Printed Circuit Board Manufacturing		19								19
334413	Semiconductor and Related Device Manufacturing	1	2	1				5	10	1	20
334417	Electronic Connector Manufacturing								1		1
334418	Printed Circuit Assembly (Electronic Assembly) Manufacturing		8	1				2	8		19
334419	Other Electronic Component Manufacturing	1	3						2		6
334510	Electromedical and Electrotherapeutic Apparatus Manufacturing	1	1					3	3		8
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical	1	23	3					2	2	31

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
	System and Instrument Manufacturing										
334513	Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables								1		1
334516	Analytical Laboratory Instrument Manufacturing						1				1
334519	Other Measuring and Controlling Device Manufacturing								1		1
334614	Software and Other Prerecorded Compact Disc, Tape, and Record Reproducing							1			1
335122	Commercial, Industrial, and Institutional Electric Lighting Fixture Manufacturing		2								2
335311	Power, Distribution, and Specialty Transformer Manufacturing							1	2		3
335313	Switchgear and Switchboard Apparatus Manufacturing		7	2					2		11
335911	Storage Battery Manufacturing							1	26		27
335991	Carbon and Graphite Product Manufacturing			19					1		20
335999	All Other Miscellaneous Electrical Equipment and Component Manufacturing		34						5		39
336111	Automobile Manufacturing		2						1		3
336211	Motor Vehicle Body Manufacturing		1						1		2

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
336214	Travel Trailer and Camper Manufacturing								1		1
336390	Other Motor Vehicle Parts Manufacturing			1			1	1	7	1	11
336411	Aircraft Manufacturing			5			6	3	13	2	29
336412	Aircraft Engine and Engine Parts Manufacturing			6			6	3	10	4	29
336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing		1	11			6	2	12		32
336414	Guided Missile and Space Vehicle Manufacturing			9					17		26
336415	Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing				1						1
336419	Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment Manufacturing	1		1			3	1	1	1	8
336991	Motorcycle, Bicycle, and Parts Manufacturing							1	1		2
337110	Wood Kitchen Cabinet and Countertop Manufacturing								1		1
337121	Upholstered Household Furniture Manufacturing						1		3		4
337122	Non-upholstered Wood Household Furniture Manufacturing								1		1
337127	Institutional Furniture Manufacturing								4		4
337212	Custom Architectural Woodwork and Millwork Manufacturing								2		2

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/ Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
337215	Showcase, Partition, Shelving, and Locker Manufacturing								6	1	7
339112	Surgical and Medical Instrument Manufacturing	2	2	1				3	5		13
339113	Surgical Appliance and Supplies Manufacturing	4	3						1		8
339114	Dental Equipment and Supplies Manufacturing			2					4		6
339115	Ophthalmic Goods Manufacturing	1					1	1			3
339950	Sign Manufacturing		2				2		1		5
339991	Gasket, Packing, and Sealing Device Manufacturing								1		1
339992	Musical Instrument Manufacturing								2		2
339999	All Other Miscellaneous Manufacturing								3		3
423110	Automobile and Other Motor Vehicle Merchant Wholesalers							1	11		12
423120	Motor Vehicle Supplies and New Parts Merchant Wholesalers		1					1	5		7
423130	Tire and Tube Merchant Wholesalers			9					4		13
423140	Motor Vehicle Parts (Used) Merchant Wholesalers								4		4
423210	Furniture Merchant Wholesalers						1		2		3
423220	Home Furnishing Merchant Wholesalers		12	1					4		17
423310	Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers								1		1

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
423320	Brick, Stone, and Related Construction Material Merchant Wholesalers	1	8			1		1	5		16
423430	Computer and Computer Peripheral Equipment and Software Merchant Wholesalers							1	2		3
423440	Other Commercial Equipment Merchant Wholesalers								2		2
423450	Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers		1				4		5		10
423490	Other Professional Equipment and Supplies Merchant Wholesalers							1			1
423510	Metal Service Centers and Other Metal Merchant Wholesalers	7	22	5			2		2	2	40
423520	Coal and Other Mineral and Ore Merchant Wholesalers							1			1
423610	Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers	1							2		3
423690	Other Electronic Parts and Equipment Merchant Wholesalers	1						4	2	1	8
423710	Hardware Merchant Wholesalers			1							1
423740	Refrigeration Equipment and Supplies Merchant Wholesalers								1		1

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
423810	Construction and Mining (except Oil Well) Machinery and Equipment Merchant Wholesalers	27							5		32
423830	Industrial Machinery and Equipment Merchant Wholesalers			1				1	3		5
423840	Industrial Supplies Merchant Wholesalers	3		2					9		14
423860	Transportation Equipment and Supplies (except Motor Vehicle) Merchant Wholesalers			2				1			3
423910	Sporting and Recreational Goods and Supplies Merchant Wholesalers								1		1
423920	Toy and Hobby Goods and Supplies Merchant Wholesalers						1				1
423930	Recyclable Material Merchant Wholesalers			1					7		8
423990	Other Miscellaneous Durable Goods Merchant Wholesalers		1					2	7	1	11
424210	Drugs and Druggists' Sundries Merchant Wholesalers	2									2
424320	Men's and Boys' Clothing and Furnishings Merchant Wholesalers							1			1
424340	Footwear Merchant Wholesalers								1		1
424410	General Line Grocery Merchant Wholesalers	1						2			3
424430	Dairy Product (except Dried or Canned) Merchant Wholesalers								1		1

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
424450	Confectionery Merchant Wholesalers								1		1
424480	Fresh Fruit and Vegetable Merchant Wholesalers		1								1
424490	Other Grocery and Related Products Merchant Wholesalers							3	2		5
424690	Other Chemical and Allied Products Merchant Wholesalers			1					28		29
424710	Petroleum Bulk Stations and Terminals		21	4		2	2	4	8	1	42
424720	Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals)		6					2	23	2	33
424810	Beer and Ale Merchant Wholesalers								6		6
424910	Farm Supplies Merchant Wholesalers								2		2
424950	Paint, Varnish, and Supplies Merchant Wholesalers								5		5
424990	Other Miscellaneous Nondurable Goods Merchant Wholesalers	1	18	2			2	2	3	2	30
441110	New Car Dealers	1	6					1	9		17
441120	Used Car Dealers							1	2		3
441210	Recreational Vehicle Dealers								2		2
441228	Motorcycle, ATV, and All Other Motor Vehicle Dealers		2						2		4
441310	Automotive Parts and Accessories Stores		3					2	2		7
441320	Tire Dealers							1	1		2
442110	Furniture Stores								6		6

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
442210	Floor Covering Stores			5							5
442299	All Other Home Furnishings Stores	1							2		3
443141	Household Appliance Stores								1		1
443142	Electronics Stores		1					7	1		9
444110	Home Centers	1							2	1	4
444120	Paint and Wallpaper Stores		2						1		3
444190	Other Building Material Dealers							2	11		13
444220	Nursery, Garden Center, and Farm Supply Stores			1					2		3
445110	Supermarkets and Other Grocery (except Convenience) Stores	4	7	1			5	391	30	5	443
445120	Convenience Stores		4	1			1	14	34		54
445210	Meat Markets	1									1
445291	Baked Goods Stores	1							1		2
445299	All Other Specialty Food Stores								1		1
446110	Pharmacies and Drug Stores							16	1		17
446120	Cosmetics, Beauty Supplies, and Perfume Stores	1									1
446191	Food (Health) Supplement Stores	2							1		3
447110	Gasoline Stations with Convenience Stores		84	3	1		5	1	212	1	307
447190	Other Gasoline Stations	1	109	9	3		7	3	261	2	395
448120	Women's Clothing Stores							1	1		2
448140	Family Clothing Stores	1	1					2	1		5
448150	Clothing Accessories Stores							1			1
448190	Other Clothing Stores								2		2
448210	Shoe Stores								1		1
448310	Jewelry Stores	1	1								2

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
451110	Sporting Goods Stores			1					1		2
452111	Department Stores (except Discount Department Stores)							3			3
452112	Discount Department Stores – insignificant perishable grocery sales								1		1
452210	Department Stores	3						18	3		24
452311	Warehouse Clubs and Supercenters	4				1	3		34		42
453110	Florists	2	4					3	2		11
453210	Office Supplies and Stationery Stores		2						2		4
453310	Used Merchandise Stores								1		1
453910	Pet and Pet Supplies Stores								1		1
453920	Art Dealers								1		1
453998	All Other Miscellaneous Store Retailers (except Tobacco Stores)	1	4	1				4	2		12
454110	Electronic Shopping and Mail-Order Houses		1								1
454310	Fuel Dealers		2						5		7
454390	Other Direct Selling Establishments								3		3
481111	Scheduled Passenger Air Transportation							1			1
481112	Scheduled Freight Air Transportation			1					1		2
482111	Line-Haul Railroads	1							1		2
484110	General Freight Trucking, Local	1	1						2		4
484121	General Freight Trucking, Long-Distance, Truckload								2		2
485113	Bus and Other Motor Vehicle Transit Systems	6						1	3		10

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
485310	Taxi Service	1						2	4		7
485410	School and Employee Bus Transportation								1		1
485510	Charter Bus Industry	1									1
486110	Pipeline Transportation of Crude Oil	34				1	1	3	4	5	48
486210	Pipeline Transportation of Natural Gas	3					2	2		4	11
486910	Pipeline Transportation of Refined Petroleum Products			6		2	2			1	9
488111	Air Traffic Control	1									1
488119	Other Airport Operations	3						1	1		5
488190	Other Support Activities for Air Transportation			4				3	13	7	27
488210	Support Activities for Rail Transportation							1			1
488310	Port and Harbor Operations		2						2		4
488320	Marine Cargo Handling	1									1
488410	Motor Vehicle Towing		4								4
488510	Freight Transportation Arrangement	1	1						6		8
488999	All Other Support Activities for Transportation	2		3				6	4	2	17
491110	Postal Service							2	1		3
492110	Couriers and Express Delivery Services								2		2
493110	General Warehousing and Storage	26	2	3				6	42		79
493120	Refrigerated Warehousing and Storage		2					1			3
493190	Other Warehousing and Storage							3	5	1	9
511110	Newspaper Publishers	1	2					1			4
511130	Book Publishers							1			1
511999	All Other Publishers		3								3

Table 2 - Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
511210	Software Publishers		1					3			4
512110	Motion Picture and Video Production	4						15	2		21
512120	Motion Picture and Video Distribution			1					9		10
512191	Teleproduction and Other Postproduction Services								2		2
512199	Other Motion Picture and Video Industries							1			1
512240	Sound Recording Studios							1			1
515111	Radio Networks								1		1
515112	Radio Stations			4							4
515120	Television Broadcasting		1					2	1		4
515210	Cable and Other Subscription Programming							3			3
517110	Wired Telecommunications Carriers							12			12
517312	Wireless Telecommunications Carriers (except Satellite)	7		1				48			56
517410	Satellite Telecommunications								1		1
517911	Telecommunications Resellers							95	5		100
517919	All Other Telecommunications	1	1					9			11
518210	Data Processing, Hosting, and Related Services	1									1
519120	Libraries and Archives							6			6
521110	Monetary Authorities-Central Bank								1		1
522110	Commercial Banking	1						8	1		10
522120	Savings Institutions							1			1
522130	Credit Unions	1	4					4	1	1	11
522292	Real Estate Credit							1			1

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
522298	All Other Non-depository Credit Intermediation							1			1
522310	Mortgage and Nonmortgage Loan Brokers		2					4			6
522320	Financial Transactions Processing, Reserve, and Clearinghouse Activities		1								1
522390	Other Activities Related to Credit Intermediation							1			1
523120	Securities Brokerage		4					5			9
523130	Commodity Contracts Dealing	1									1
523910	Miscellaneous Intermediation	2	4						1		7
523920	Portfolio Management							3			3
523930	Investment Advice	3						1	2		6
523999	Miscellaneous Financial Investment Activities		1					1			2
524113	Direct Life Insurance Carriers							1			1
524114	Direct Health and Medical Insurance Carriers							3			3
524126	Direct Property and Casualty Insurance Carriers		1								1
524128	Other Direct Insurance (except Life, Health, and Medical) Carriers								1		1
524210	Insurance Agencies and Brokerages		2					5			7
525920	Trusts, Estates, and Agency Accounts	1		3							4
525990	Other Financial Vehicles	1									1
531110	Lessors of Residential Buildings and Dwellings	1	8	1				17	10		37

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
531120	Lessors of Nonresidential Buildings (except Miniwarehouses)	2	1					11	6		20
531130	Lessors of Miniwarehouses and Self-Storage Units	5									5
531190	Lessors of Other Real Estate Property		1	5				3	3		12
531210	Offices of Real Estate Agents and Brokers	5	4	1			1	30	11		52
531311	Residential Property Managers							1			1
531312	Nonresidential Property Managers	1	5				2	5	13		26
532111	Passenger Car Rental								1		1
532120	Truck, Utility Trailer, and RV (Recreational Vehicle) Rental and Leasing								2		2
532289	All Other Consumer Goods Rental								1		1
532299	All Other Consumer Goods Rental							2			2
532411	Commercial Air, Rail, and Water Transportation Equipment Rental and Leasing							1	1		2
532412	Construction, Mining, and Forestry Machinery and Equipment Rental and Leasing	2	1						1		4
532490	Other Commercial and Industrial Machinery and Equipment Rental and Leasing		3					1	8		12
541110	Offices of Lawyers	4						6	2		12
541211	Offices of Certified Public Accountants		2						1		3

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
541213	Tax Preparation Services					1			2		3
541219	Other Accounting Services							1	1		2
541310	Architectural Services							5			5
541330	Engineering Services			1			2	8	2		13
541380	Testing Laboratories							2	2		4
541410	Interior Design Services	1							2		3
541490	Other Specialized Design Services								6		6
541511	Custom Computer Programming Services							3			3
541512	Computer Systems Design Services	1						2			3
541513	Computer Facilities Management Services	4	3								7
541611	Administrative Management and General Management Consulting Services	13		1				1	25		40
541612	Human Resources Consulting Services							1			1
541613	Marketing Consulting Services		1	4		42			2		49
541618	Other Management Consulting Services		2	1				2	5		10
541620	Environmental Consulting Services	62	1	1				6	27		97
541690	Other Scientific and Technical Consulting Services	4						2	3		9
541712	Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology) – nanotechnology research and experimental development laboratories	2						1	6		9

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
541714	Research and Development in Biotechnology (except Nanobiotechnology)	1									1
541715	Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology)	1	1								2
541810	Advertising Agencies							1			1
541860	Direct Mail Advertising							1	4		5
541910	Marketing Research and Public Opinion Polling							1	1		2
541921	Photography Studios, Portrait							1			1
541940	Veterinary Services		3						2		5
541990	All Other Professional, Scientific, and Technical Services		2					8	8		18
551111	Offices of Bank Holding Companies							2			2
551112	Offices of Other Holding Companies		1					1	2		4
561110	Office Administrative Services		4					11	13	1	29
561210	Facilities Support Services	17							2		19
561311	Employment Placement Agencies		5					4	4		13
561320	Temporary Help Services								1		1
561421	Telephone Answering Services							2			2
561440	Collection Agencies	1						1			2
561499	All Other Business Support Services	2	6	1	1			7	18		35
561520	Tour Operators								1		1

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/ Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
561612	Security Guards and Patrol Services							1			1
561622	Locksmiths							1	1		2
561710	Exterminating and Pest Control Services							1	1	3	5
561720	Janitorial Services	4	3					11	3		21
561730	Landscaping Services								2		2
561740	Carpet and Upholstery Cleaning Services		1								1
561790	Other Services to Buildings and Dwellings	2	1					1	4		8
561910	Packaging and Labeling Services								3		3
561920	Convention and Trade Show Organizers								1		1
561990	All Other Support Services	6	2					7	6	1	22
562211	Hazardous Waste Treatment and Disposal	2						4	5		11
562212	Solid Waste Landfill	1	9	1				6	12		29
562219	Other Nonhazardous Waste Treatment and Disposal								4		4
562910	Remediation Services	45							1		46
562920	Materials Recovery Facilities	12							10		22
611110	Elementary and Secondary Schools	1		3				46	7		57
611210	Junior Colleges	5						7	4		16
611310	Colleges, Universities, and Professional Schools	7	2					25	14	1	49
611519	Other Technical and Trade Schools								11		11
611620	Sports and Recreation Instruction								1		1
611699	All Other Miscellaneous Schools and Instruction							1			1

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
621111	Offices of Physicians (except Mental Health Specialists)	2	1					9	3		15
621210	Offices of Dentists						1	6	1		8
621310	Offices of Chiropractors							1			1
621330	Offices of Mental Health Practitioners (except Physicians)							1	1		2
621340	Offices of Physical, Occupational and Speech Therapists, and Audiologists							1			1
621410	Family Planning Centers							2			2
621491	HMO Medical Centers		1					3	5		9
621492	Kidney Dialysis Centers								1		1
621498	All Other Outpatient Care Centers								1		1
621511	Medical Laboratories									1	1
621512	Diagnostic Imaging Centers		1								1
621610	Home Health Care Services							1			1
621910	Ambulance Services	1									1
621999	All Other Miscellaneous Ambulatory Health Care Services		1					2	5		8
622110	General Medical and Surgical Hospitals	5						36	27	1	69
622210	Psychiatric and Substance Abuse Hospitals			1			1	1		1	4
622310	Specialty (except Psychiatric and Substance Abuse) Hospitals							3		1	4
623110	Nursing Care Facilities (Skilled Nursing Facilities)		1					2	5		8
623311	Continuing Care Retirement Communities								1		1

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
623990	Other Residential Care Facilities	1									1
624110	Child and Youth Services							1	2		3
624120	Services for the Elderly and Persons with Disabilities								1		1
624190	Other Individual and Family Services							3			3
624310	Vocational Rehabilitation Services		2								2
624410	Child Day Care Services							4			4
711190	Other Performing Arts Companies								1		1
711211	Sports Teams and Clubs							2	2		4
711212	Racetracks		1								1
711310	Promoters of Performing Arts, Sports, and Similar Events with Facilities							1	1		2
711510	Independent Artists, Writers, and Performers		1						1		2
712110	Museums							5			5
713110	Amusement and Theme Parks	9						1	22	1	33
713910	Golf Courses and Country Clubs	3	4					1	2		10
713920	Skiing Facilities								1	1	2
713940	Fitness and Recreational Sports Centers							3			3
713990	All Other Amusement and Recreation Industries								1		1
721110	Hotels (except Casino Hotels) and Motels	7	6					23	3		39
721191	Bed-and-Breakfast Inns								5	1	6
721211	RV (Recreational Vehicle) Parks and Campgrounds	1						2	1		4

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
722410	Drinking Places (Alcoholic Beverages)	1						2			3
722511	Full-Service Restaurants	29	2	1				3	6		41
722513	Limited-Service Restaurants	24						3	12		39
722514	Cafeterias, Grill Buffets, and Buffets							1			1
811111	General Automotive Repair	15	9	3	1		1	3	25		57
811112	Automotive Exhaust System Repair								1		1
811118	Other Automotive Mechanical and Electrical Repair and Maintenance		2						4		6
811121	Automotive Body, Paint, and Interior Repair and Maintenance		146	5				5	91		247
811192	Car Washes		2					2	10		14
811198	All Other Automotive Repair and Maintenance		2					1	1		4
811219	Other Electronic and Precision Equipment Repair and Maintenance			1					20		21
811310	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance			1					7		8
811412	Appliance Repair and Maintenance	9	4	11				2	6		32
811420	Reupholstery and Furniture Repair		1					1	5		7
812199	Other Personal Care Services							1			1
812210	Funeral Homes and Funeral Services		3						6		9
812220	Cemeteries and Crematories		17	1				3	2		23

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
812310	Coin-Operated Laundries and Drycleaners	1		1					5		7
812320	Dry Cleaning and Laundry Services (except Coin-Operated)	1	16	1				1	104		123
812331	Linen Supply								1		1
812332	Industrial Launderers								4		4
812910	Pet Care (except Veterinary) Services							1	1		2
812921	Photofinishing Laboratories (except One-Hour)							1			1
812930	Parking Lots and Garages							3			3
813110	Religious Organizations	1						12	1		14
813312	Environment, Conservation and Wildlife Organizations							1			1
813410	Civic and Social Organizations							4	5		9
813910	Business Associations		1					3			4
813920	Professional Organizations							2			2
813930	Labor Unions and Similar Labor Organizations		1								1
813990	Other Similar Organizations (except Business, Professional, Labor, and Political Organizations)	1	1	1				7	3		13
921110	Executive Offices	21		1				17	17		56
921120	Legislative Bodies							1			1
921140	Executive and Legislative Offices, Combined							1			1
921190	Other General Government Support	5						15	11		31
922110	Courts	1						16			17
922120	Police Protection	1						7	1	2	11
922130	Legal Counsel and Prosecution							1			1

Table 2- Calendar Year 2020-Disposition Type by NAICS Code

NAICS Code	NAICS Code Description	Area Source/Registration	C/O	Cancelled	Denial	ERC	Permit to Construct	Plans	PO	RECLAIM/TV	Grand Total
922140	Correctional Institutions	1						2	1		4
922150	Parole Offices and Probation Offices							2			2
922160	Fire Protection	1	6						4		11
922190	Other Justice, Public Order, and Safety Activities	1						1			2
923110	Administration of Education Programs							2			2
923120	Administration of Public Health Programs							1			1
923130	Administration of Human Resource Programs (except Education, Public Health, and Veterans' Affairs Programs)							2	1		3
924110	Administration of Air and Water Resource and Solid Waste Management Programs	2						7	2	1	12
924120	Administration of Conservation Programs	1									1
925120	Administration of Urban Planning and Community and Rural Development								1		1
926120	Regulation and Administration of Transportation Programs	1		1				3	5		10
926130	Regulation and Administration of Communications, Electric, Gas, and Other Utilities	13					2	4	2	5	26
927110	Space Research and Technology							2			2
928110	National Security	2	3					7	11	2	25

Annual Publication of Emission Reduction Credit (ERC) and Short-Term Emission Reduction Credit (STERC) Transactions and Applications for Fiscal Year 2019-20

Table 5: Emission Offset Transaction Summary – Fiscal Year 2019-20
Sorted by Pollutant and Amount

South Coast AQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
SC1920-001	ROG	69	12.6	ERC	N/A	N/A
SC1920-002	ROG	1	0.2	ERC	N/A	N/A
SC1920-003	ROG	10	1.8	ERC	N/A	N/A
SC1920-004	ROG	37	6.8	ERC	N/A	N/A
SC1920-005	ROG	1	0.2	ERC	N/A	N/A
SC1920-006	ROG	12	2.2	ERC	N/A	N/A
SC1920-007	ROG	0	0	STERC	2019	2019
SC1920-008	ROG	0	0	STERC	2020	2020
SC1920-009	ROG	25	4.6	STERC	2021	9999
SC1920-010	ROG	12	2.2	ERC	N/A	N/A
SC1920-011	ROG	3	0.5	ERC	N/A	N/A
SC1920-012	ROG	3	0.5	ERC	N/A	N/A
SC1920-013	ROG	3	0.5	ERC	N/A	N/A
SC1920-014	ROG	3	0.5	ERC	N/A	N/A
SC1920-015	ROG	3	0.5	ERC	N/A	N/A
SC1920-016	ROG	3	0.5	ERC	N/A	N/A
SC1920-017	ROG	0	0	STERC	2020	2020
SC1920-018	ROG	7	1.3	STERC	2021	9999
SC1920-019	ROG	3	0.5	ERC	N/A	N/A
SC1920-020	ROG	5	0.9	ERC	N/A	N/A
SC1920-021	ROG	11	2	ERC	N/A	N/A
SC1920-022	ROG	412	75.2	ERC	N/A	N/A
SC1920-023	ROG	100	18.3	ERC	N/A	N/A
SC1920-024	ROG	13	2.4	ERC	N/A	N/A
Total		736	134.2		N/A	

Table 5, Continued

South Coast AQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
SC1920-025	NOX	53	9.7	ERC	N/A	N/A
SC1920-026	NOX	1	0.2	ERC	N/A	N/A
SC1920-027	NOX	1	0.2	ERC	N/A	N/A
SC1920-028	NOX	3	0.5	ERC	N/A	N/A
SC1920-029	NOX	3	0.5	ERC	N/A	N/A
SC1920-030	NOX	5	0.9	ERC	N/A	N/A
SC1920-031	NOX	13	2.4	ERC	N/A	N/A
SC1920-032	NOX	40	7.3	ERC	N/A	N/A
SC1920-033	NOX	77	14.1	ERC	N/A	N/A

Annual Publication of Emission Reduction Credit (ERC) and Short-Term Emission Reduction Credit (STERC) Transactions and Applications for Fiscal Year 2019-20

South Coast AQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
SC1920-034	NOX	1	0.2	ERC	N/A	N/A
SC1920-035	NOX	5	0.9	ERC	N/A	N/A
SC1920-036	NOX	6	1.1	ERC	N/A	N/A
SC1920-037	NOX	14	2.6	ERC	N/A	N/A
SC1920-038	NOX	17	3.1	ERC	N/A	N/A
SC1920-039	NOX	21	3.8	ERC	N/A	N/A
SC1920-040	NOX	44	8	ERC	N/A	N/A
SC1920-041	NOX	3	0.5	ERC	N/A	N/A
SC1920-042	NOX	137	25	ERC	N/A	N/A
SC1920-043	NOX	17	3.1	ERC	N/A	N/A
Total		461	84.1		N/A	

Table 5, Continued

South Coast AQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
SC1920-044	SOX	75	13.7	ERC	N/A	N/A
SC1920-045	SOX	47	8.6	ERC	N/A	N/A
SC1920-046	SOX	10	1.8	ERC	N/A	N/A
SC1920-047	SOX	10	1.8	ERC	N/A	N/A
SC1920-048	SOX	5	0.9	ERC	N/A	N/A
SC1920-049	SOX	1	0.2	ERC	N/A	N/A
SC1920-050	SOX	1	0.2	ERC	N/A	N/A
SC1920-051	SOX	1	0.2	ERC	N/A	N/A
SC1920-052	SOX	3	0.5	ERC	N/A	N/A
SC1920-053	SOX	22	4	ERC	N/A	N/A
SC1920-054	SOX	6	1.1	ERC	N/A	N/A
Total		181	33		N/A	

Table 5, Continued

South Coast AQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
N/A	CO	No Applications				
Total		0	0		N/A	

Annual Publication of Emission Reduction Credit (ERC) and Short-Term Emission Reduction Credit (STERC) Transactions and Applications for Fiscal Year 2019-20

Table 5, Continued

South Coast AQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
SC1920-055	PM10	7	1.3	STERC	2014	9999
SC1920-056	PM10	1	0.2	ERC	N/A	N/A
SC1920-057	PM10	2	0.4	ERC	N/A	N/A
SC1920-058	PM10	2	0.4	ERC	N/A	N/A
SC1920-059	PM10	1	0.2	STERC	2015	9999
SC1920-060	PM10	1	0.2	ERC	N/A	N/A
SC1920-061	PM10	4	0.7	ERC	N/A	N/A
SC1920-062	PM10	4	0.7	ERC	N/A	N/A
SC1920-063	PM10	1	0.2	ERC	N/A	N/A
Total		23	4.3	N/A		

**Table 6: Emission Offset Application Summary – Fiscal Year 2019-20
Sorted by Pollutant and Amount**

South Coast AQMD NO.	POLLUTANT	AMOUNT ¹⁰ (LB/DAY)	AMOUNT ¹⁰ (TON/YR)	TYPE	START YEAR	END YEAR
N/A	No Applications					
Total		N/A	N/A	N/A		

¹⁰ To avoid over counting, only long-term emission offsets, those that have an ending year of 9999, are quantified.

**CHAPTER III
FISCAL YEAR 2021-2022 BUDGET**

Due to the bulk of these material, Chapter III is available online at www.aqmd.gov/docs/default-source/finance-budgets/fy-2021-22/adopted-fy-2021-22-budget.pdf. Anyone who would like to obtain a hard copy may do so by contacting South Coast AQMD's Public Information Center at (909)396-2001.

CHAPTER IV
CLEAN FUELS PROGRAM 2020 ANNUAL REPORT AND 2021 PLAN UPDATE

Due to the bulk of these material, Chapter IV is available online at www.aqmd.gov/docs/default-source/technology-research/annual-reports-and-plan-updates/2020-annual-report-2021-plan-update.pdf. Anyone who would like to obtain a hard copy may do so by contacting South Coast AQMD's Public Information Center at (909)396-2001.

**CHAPTER V
ANNUAL RECLAIM AUDIT REPORT
FOR 2019 COMPLIANCE YEAR**

Due to the bulk of these material, Chapter V is available online at [2019-reclaim-report.pdf](https://www.aqmd.gov/2019-reclaim-report.pdf) ([aqmd.gov](https://www.aqmd.gov)). Anyone who would like to obtain a hard copy may do so by contacting South Coast AQMD's Public Information Center at (909)396-2001.



Budget

Fiscal Year
2021-2022

South Coast
Air Quality
Management District





SOUTH COAST

AIR QUALITY MANAGEMENT DISTRICT

BUDGET
FISCAL YEAR 2021-2022

Prepared by Finance
Sujata Jain, Chief Financial Officer



SOUTH COAST
AIR QUALITY MANAGEMENT DISTRICT

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TABLE OF CONTENTS

Page No.

INTRODUCTORY SECTION

Governing Board	i
Letter of Transmittal	ii
Government Finance Officers Association Distinguished Budget Presentation Award	v
Organizational Chart	vi

SUMMARY

1

FUND BALANCE AND REVENUES

Summary of Fiscal Year 2021-22 Adopted Budget	25
Analysis of Projected June 30, 2021 Fund Balance	26
Schedule of Available Financing and Projected FY 2021-22 Reserves and Designations	27
Analysis of Projected June 30, 2022 Fund Balance	28
Revenue Comparison	29
Explanation of Revenue Sources	30

EXPENDITURES

Line Item Expenditure	38
Salaries & Employee Benefits	39
Services & Supplies	41
Capital Outlays, Building Remodeling & Transfers Out	52

GOALS AND PRIORITY OBJECTIVES AND WORK PROGRAM

Goals and Priority Objectives	54
Program Categories	57
Revenue Categories	62
Work Program Overview	63
Work Program by Category	64
Work Program Glossary	78
Work Program Acronyms	94

OFFICE BUDGETS

GOVERNING BOARD

Program Statement	95
Line Item Expenditure	96

EXECUTIVE OFFICE

Program Statement and Organizational Chart	97
Work Program	100
Line Item Expenditure	101

TABLE OF CONTENTS

Page No.

DISTRICT GENERAL

Program Statement	102
Line Item Expenditure	103

ADMINISTRATIVE & HUMAN RESOURCES

Program Statement and Organizational Chart	104
Work Program	109
Line Item Expenditure	110

CLERK OF THE BOARDS

Program Statement and Organizational Chart	111
Work Program	113
Line Item Expenditure	114

COMPLIANCE & ENFORCEMENT

Program Statement and Organizational Chart	115
Work Program	119
Line Item Expenditure	120

ENGINEERING & PERMITTING

Program Statement and Organizational Chart	121
Work Program	127
Line Item Expenditure	129

FINANCE

Program Statement and Organizational Chart	130
Work Program	133
Line Item Expenditure	134

INFORMATION MANAGEMENT

Program Statement and Organizational Chart	135
Work Program	142
Line Item Expenditure	143

LEGAL

Program Statement and Organizational Chart	144
Work Program	148
Line Item Expenditure	149

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE

Program Statement and Organizational Chart	150
Work Program	165
Line Item Expenditure	166

TABLE OF CONTENTS

Page No.

PLANNING, RULE DEVELOPMENT & AREA SOURCES

Program Statement and Organizational Chart	167
Work Program	176
Line Item Expenditure	178

SCIENCE & TECHNOLOGY ADVANCEMENT

Program Statement and Organizational Chart	179
Work Program	188
Line Item Expenditure	191

APPENDICES

Quick Facts	192
Operating Indicators by Function	193
Financial Policies	194
Budget Glossary	199

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SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

GOVERNING BOARD

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

BEN BENOIT
Vice Chairman
Cities of Riverside County Representative

LISA BARTLETT
County of Orange Representative

JOE BUSCAINO
City of Los Angeles Representative

MICHAEL A. CACCIOTTI
Cities of Los Angeles County Representative
Eastern Region

VANESSA DELGADO
Senate Rules Committee Appointee

GIDEON KRACOV
Governor's Appointee

SHEILA KUEHL
County of Los Angeles Representative

LARRY McCALLON
Cities of San Bernardino County Representative

V. MANUEL PEREZ
County of Riverside Representative

REX RICHARDSON
Cities of Los Angeles County Representative
Western Region

CARLOS RODRIGUEZ
Cities of Orange County Representative

JANICE RUTHERFORD
County of San Bernardino Representative

WAYNE NASTRI
Executive Officer

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South Coast Air Quality Management District

21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

May 7, 2021

South Coast Air Quality Management District Board and Stakeholders

Transmittal of the Executive Officer's Fiscal Year 2021-22 Budget and Work Program

This document represents South Coast Air Quality Management District's (South Coast AQMD) proposed General Fund Budget and Work Program for FY 2021-22. The budget was developed in accordance with statutory requirements and in consultation with South Coast AQMD's executive and program staff.

The greatest uncertainties facing South Coast AQMD's budgetary outlook stem from the continued major economic disruption due to the COVID-19 global pandemic. In these challenging times, we recognize the hardships that many are experiencing. We are making accommodations in many program areas and remain committed to protecting public health and helping business. South Coast AQMD staff will monitor the financial impacts and, in the event, that there are major changes in the economic landscape, we would make adjustments to the FY 2021-22 budget being proposed.

This budget includes a multi-year financial summary of all revenues, expenditures and staffing used by each of South Coast AQMD's programs in the delivery of essential services to clean the air and to protect the health of all residents in the South Coast Air District through practical and innovative strategies. The proposed budget for FY 2021-22 is a balanced budget with expenditures and revenues of \$179.9 million and 957 positions.

The proposed FY 2021-22 level of expenditures, up four percent from the FY 2020-21 adopted budget, includes increased costs for retirement, salaries associated with new positions, expenditures for professional and special services, and capital outlay projects. There is a net increase of 11 FTEs from the FY 2020-21 adopted budget. This includes the previously approved FY 2020-21 mid-year actions adding two positions in the

Executive Office, two positions in the Legislative and Public Affairs/Media Office and deleting one position in the Science and Technology Advancement Office.

The FY 2021-22 proposed revenue budget of \$179.9 million, up four percent from the FY 2020-21 adopted budget, includes steady progress on South Coast AQMD's implementation of the Volkswagen Mitigation Action, AB 617 programs, and AB 134 programs. At \$100.1 million or 55.7 percent of the projected revenue budget, stationary source revenues account for the largest source of revenue, and in light of the continued COVID-19 impact, could be precarious. 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 45.2 percent from \$66.8 million in FY 1991-92 to \$97 million (estimated) in FY 2020-21. When adjusted for inflation however, stationary source revenues have decreased by 13 percent over this same period.

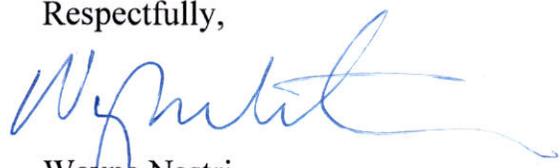
While significant efforts are put forth to develop a detailed budget for the next fiscal year, including a five-year projection, uncertain political and economic issues create challenges. These challenges include global economic impacts and uncertainty sparked by the COVID-19 outbreak and resulting fluctuations in the financial market which will determine the performance of South Coast AQMD's retirement investments and thus impact pension liability; changes in federal and state grant revenue funding levels; increased infrastructure costs due to an aging headquarters building; and Penalties and Settlement revenue that varies annually. South Coast AQMD staff will monitor 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 38 percent of FY 2021-22 revenues to provide a reasonable financial safety net.

The public and the business community have multiple opportunities to participate in the budget development process. This includes 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 and emails to permitted facilities and other stakeholders, print media, and through the South Coast AQMD website.

In summary, I am proposing a balanced budget for FY 2021-22 that allows South Coast AQMD programs to operate efficiently, transparently, and in a manner sensitive to public agencies, businesses and the public, while providing continued emission reductions and health benefit improvements. The proposed FY 2021-22 Budget and Work Program serves to ensure the continued strength and stability of the South Coast

AQMD as we make progress toward attaining the federal and state clean air mandates and further protect public health.

Respectfully,



Wayne Natri,
Executive Officer

SJ:JK

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GOVERNMENT FINANCE OFFICERS ASSOCIATION

*Distinguished
Budget Presentation
Award*

PRESENTED TO

**South Coast Air Quality Management District
California**

For the Fiscal Year Beginning

July 1, 2020

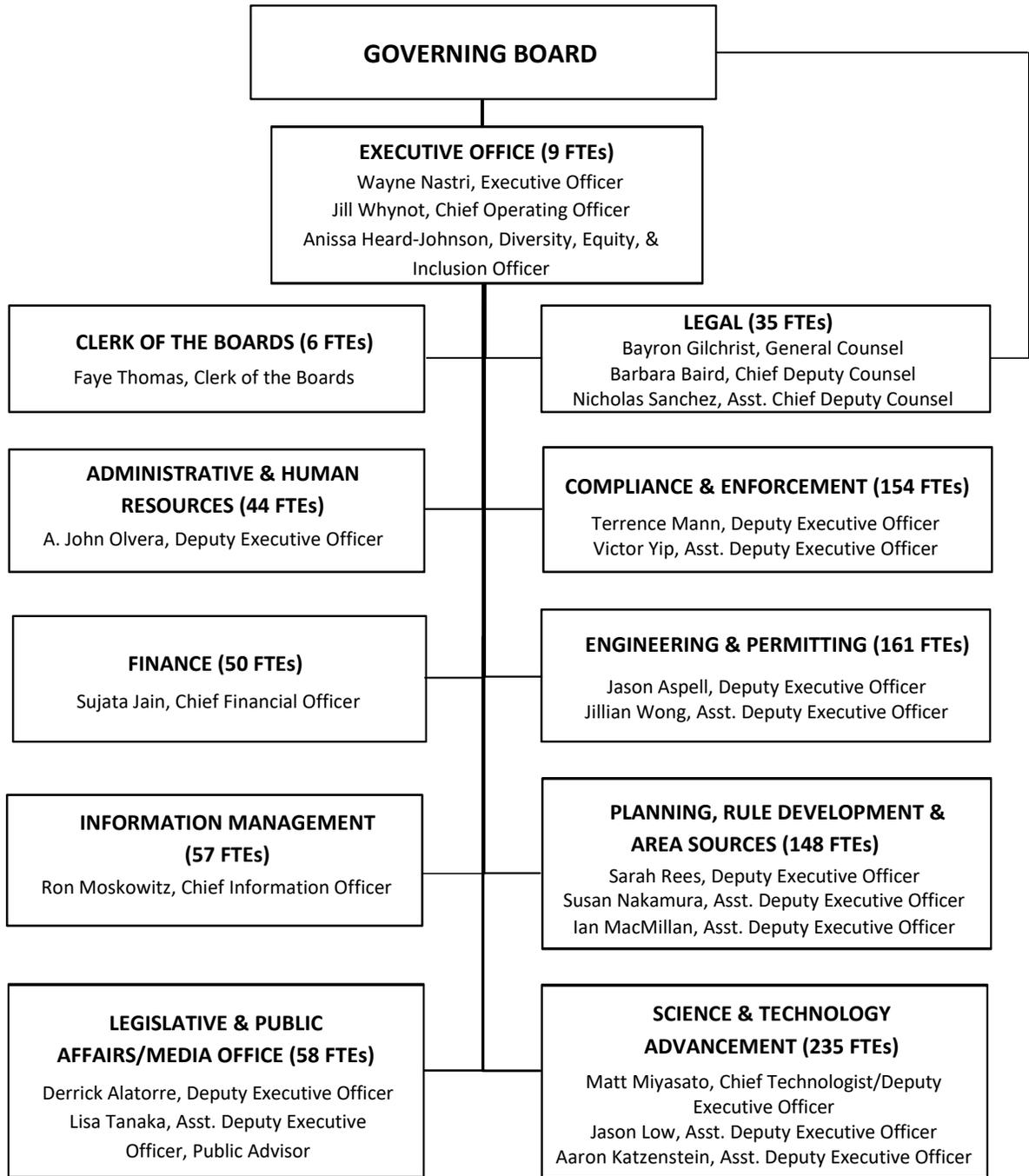
Christopher P. Morill

Executive Director

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, 2020. In order to receive this award, a government unit must publish a budget document that meets program criteria as a policy document, as a financial plan, as an operations guide, 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
(957 FTEs)**



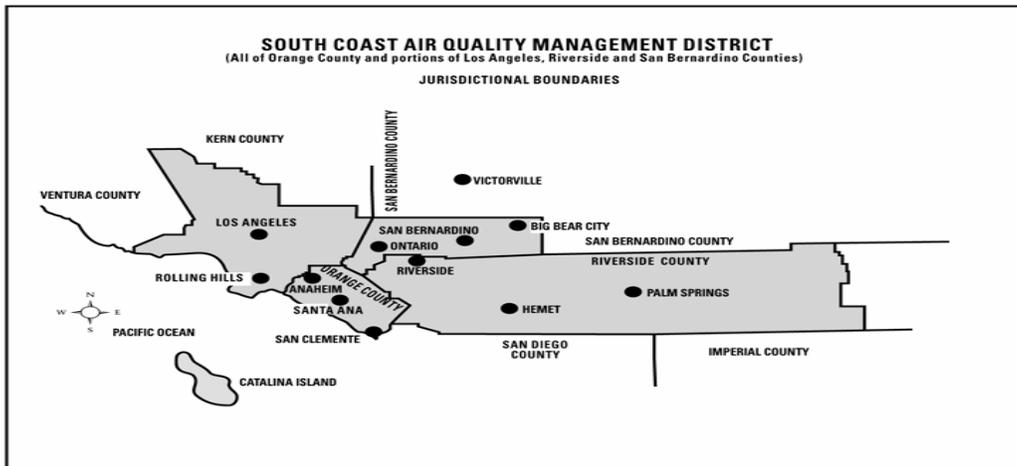
SUMMARY

Preface

This document represents the adopted FY 2021-22 Budget and Work Program of the South Coast Air Quality Management District (South Coast AQMD). The proposed budget was available for public review and comment during the month of April. A public consultation meeting was held to discuss the proposed budget and proposed fees changes on April 6, 2021. In addition, a workshop for the Governing Board was held on April 9, 2021. A final Proposed Budget and Work Program, which may include changes based on input from the public and Board, was presented for adoption at a public hearing on May 7, 2021.

Introduction

The South Coast Air Quality Management District (South Coast AQMD) 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 South Coast AQMD 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 South Coast AQMD Governing Board is composed of 13 members, including four members appointed by the Boards of Supervisors of the four counties in South Coast AQMD's jurisdiction, six members appointed by cities in the South Coast AQMD'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.



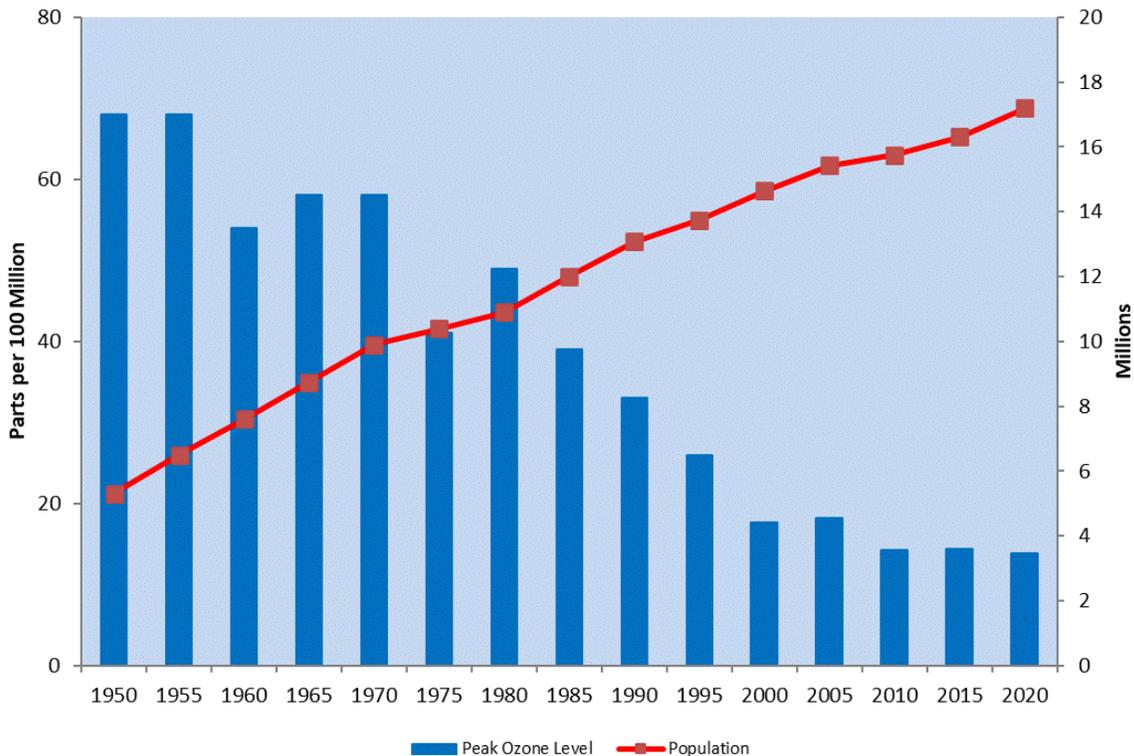
Air Quality History

The South Coast Air Basin (Basin) has suffered unhealthy 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 70-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 2020, the region's population has more than tripled from 4.8 million to 17.2 million; the number of motor vehicles has increased more than six-fold from 2.3 million to 14.1 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.

70 Years of Progress in Reducing Ozone Levels



Mission

South Coast AQMD'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 South Coast AQMD 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, South Coast AQMD develops a set of Goals and Priority Objectives which are evaluated and revised annually and presented as part of the budget proposal. The following adopted goals have been identified as being critical to meeting South Coast AQMD's Mission for FY 2021-22:

- 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 South Coast AQMD's Work Program categories. Each goal is supported by multiple activities, which target specific areas of program performance.

Air Quality

Overview

South Coast AQMD has jurisdiction over an area that includes the majority of Los Angeles, Riverside, San Bernardino, and Orange counties. There are three air basins within this region: the South Coast Air Basin, the Riverside County portion of the Salton Sea Air Basin (Coachella Valley), and the Riverside County portion of the Mojave Desert Air Basin. The South Coast Air Basin (Basin) and the Coachella Valley has some of the highest air pollution levels in the United States. The federal government has designated seven pollutants that are pervasive enough to warrant federal health standards, called National Ambient Air Quality Standards (NAAQS). Known as "criteria pollutants," these are: ozone (O₃); nitrogen dioxide (NO₂); particulates (PM₁₀); fine particulates (PM_{2.5}); carbon monoxide (CO); lead (Pb); and sulfur dioxide (SO₂).

In addition, the State of California sets ambient air quality standards for these same pollutants through the California Air Resources Board (CARB). California's standards are in some cases tighter than the U.S. Environmental Protection Agency's (U.S. EPA) standards, which strengthens the public health protection. 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 minor 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 2020, the 2015 8-hour ozone NAAQS was exceeded in the Basin on 161 days and the former 1997 ozone NAAQS was exceeded on 102 days. The 2015 ozone NAAQS was exceeded in the Basin on 128 days in 2019 and 141 days in 2018. Note that all the air quality values for 2020 in this report are preliminary values that are subject to change during the validation process. Though the trend in ozone exceedance days has been decreasing over the past few decades, year-to-year variability can mask the underlying trends when focusing on short time periods. Year-to-year variability can be caused by enhanced photochemical ozone formation due to persistent weather patterns that limit vertical mixing and warm the lower atmosphere. Changes in the relative emissions of volatile organic compounds (VOCs) or oxides of nitrogen (NO_x) can also affect the chemistry of ozone formation and lead to marginal short-term increases in ozone concentrations as NO_x is reduced. While the ozone control strategy continued to reduce precursor emissions from man-made sources in the Basin, emissions of natural ozone precursors are not controllable. Ozone-forming emissions transported from frequent summer wildfires throughout California and year-to-year changes in the VOC emissions from vegetation resulting from dry and wet rainy-seasons affect ozone concentrations. The maximum observed ozone levels also show some year-to-year variability but have generally decreased up until the last decade where ozone concentrations have generally remained constant. The highest 8-hour ozone level in the 2020 data was 139 ppb, compared to 117 ppb in 2019 and 125 ppb in 2018. 2020 ozone was elevated due to persistent and intense heat waves, stagnant weather conditions, emissions from the most intense wildfire season on record in the State, and possibly the influence of shifting NO_x and VOC emissions from the COVID-19 pandemic.

PM_{2.5} levels have decreased dramatically in the Basin since 1999. Effective March 18, 2013, U.S. EPA strengthened the annual average PM_{2.5} standard from 15.0 µg/m³ to 12.0 µg/m³, while retaining the 24-hour PM_{2.5} NAAQS of 35 µg/m³. In 2019, the 24-hour PM_{2.5} NAAQS was exceeded on 9 days in the South Coast Air Basin. In 2020, there were 34 exceedance days, based on preliminary continuous PM_{2.5} measurements. Because the highest PM_{2.5} concentrations typically occur during the rainy-season, design values are heavily dependent on the frequency of wintertime storm systems, which increase ventilation and remove PM when rainfall is present. PM_{2.5} concentrations are also significantly influenced by wildfire smoke, which can be transported across wide distances. Smoke from historically large wildfires throughout California in the summer and fall of 2020 contributed to the majority of the exceedances of the 24-hour standard all throughout the South Coast Air Basin. When removing the influence of events that are likely to be considered exceptional by U.S. EPA and with preliminary 2020 data, the 2017-2020 24-hour design value of 35 µg/m³, measured at the Mira Loma station, meets the federal standard for the first time. The Basin's peak annual average PM_{2.5} level in 2020, 14.4 µg/m³ (preliminary data) at the Ontario-60 near road site was higher than the 2019 value, 12.8 µg/m³, which occurred at the same site. It is likely that an increased background PM_{2.5} from fires in the Western United States enhanced the annual average in 2020. Events with only a small influence on PM_{2.5} concentrations are difficult to identify and remove as small changes from these events

cannot be separated from the effects of meteorology, which typically drives day to day changes in air quality.

In 2006, the U.S. EPA rescinded the annual federal standard for PM₁₀ but retained the 24-hour standard. The U.S. EPA re-designated the Basin as attainment of the health-based standard for PM₁₀, effective July 26, 2013. Apart from a handful of dust events caused by high winds, ambient levels of PM₁₀ in the Basin have continued to meet the federal 24-hour PM₁₀ NAAQS through 2020 based on preliminary data.

In November 2008, the U.S. EPA revised the lead NAAQS from a 1.5 µg/m³ quarterly average to a rolling 3-month average of 0.15 µg/m³ and added new near-source monitoring requirements. The Basin has been designated non-attainment for lead due to monitored concentrations near one facility in Los Angeles County prior to the 2012-2014 3-year design value period. However, starting with the 2012-2014 design value, the entire Basin has met the lead standard through 2019. 2020 concentrations are yet not available at the time of publication. A re-designation request to the 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, the 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, the U.S. EPA revised the NO₂ 1-hour standard to a level of 100 ppb and the SO₂ 1-hour standard to a level of 75 ppb. In 2020, the NO₂ 1-hour standard was exceeded at two near-road sites, those by the 710 and the 60, with a maximum value of 103 ppb. However, since the 1-hour standard is based on the 98th percentile daily maximum value, the Basin still attains the standard based on preliminary data. All sites in the Basin remained in attainment of the SO₂ standard based on preliminary data.

Mandates

South Coast AQMD is governed and directed by a comprehensive federal law (Federal Clean Air Act) and several state laws that provide the regulatory framework for air quality management in the Basin. These laws require South Coast AQMD to take prescribed steps to improve air quality.

South Coast AQMD is responsible for stationary sources such as factories. CARB and U.S. EPA are primarily responsible for motor vehicles. South Coast AQMD and CARB share responsibilities with respect to area sources. South Coast AQMD 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 are shared by U.S. EPA, CARB and South Coast AQMD. 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.

The following is a more specific summary of the laws governing South Coast AQMD.

Federal Law:

Federal Clean Air Act (CAA): The CAA requires attainment of National Ambient Air Quality Standards (NAAQS) for criteria air pollutants, i.e. pollutants causing human health impacts due to their release from numerous sources. The following criteria pollutants have been identified: ozone, particulate matter (PM10), carbon monoxide, lead, nitrogen dioxide, and sulfur dioxide. Current deadlines vary by pollutant and severity of pollution in the region.

State Implementation Plans: The CAA requires each state to develop a State Implementation Plan (SIP) to attain the NAAQS by the applicable attainment deadlines. SIPs must be approved by U.S. EPA as containing sufficient measures to timely attain NAAQS and meet other requirements described below. SIPs must contain air pollution measures in adopted, "regulatory" form within one year after approval by U.S. EPA. Upon approval by U.S. EPA, SIP requirements can be enforced against regulated sources by U.S. EPA and by any citizen. South Coast AQMD must develop and submit to CARB for review, followed by submittal to U.S. EPA, an element of the SIP referred to as the South Coast AQMD Air Quality Management Plan (AQMP) demonstrating how the Basin will achieve the NAAQS.

Among the numerous other CAA requirements are: a mandate that the region achieve a three percent annual reduction in emissions of ozone precursors (VOC and NOx); a requirement that new sources over 10 tons per year of VOC or NOx, and modifications to such sources, achieve lowest achievable emission rate and offset their emission increases by equal reductions elsewhere in the region and transportation control measures to reduce vehicle trips.

To date, the South Coast AQMD's Governing Board has adopted AQMPs in 1989, 1991, 1994, 1997, 1999 (amendments to the plan adopted in 1997), 2003, 2007, 2012 and 2017. The 2016 AQMP was approved in March 2017.

Sanctions, Federal Implementation Plans, and Conformity Findings: The CAA mandates that sanctions be imposed on an area if a suitable SIP 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 South Coast AQMD'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 South Coast AQMD.

Motor Vehicle Emission Controls: The CAA initially required U.S. EPA to adopt emission limitations for motor vehicles. The 1990 Amendments require U.S. EPA to adopt regulations to achieve further reductions in emissions from motor vehicles, as well as from other mobile sources such as locomotives. States are preempted from adopting emission limitations for motor vehicles and certain other mobile sources. Exception: California can adopt motor vehicle standards, and standards for some --but not all-- other mobile sources, and other states can adopt the California standards.

Hazardous Air Pollutants: In addition to criteria pollutants, the CAA regulates "hazardous air pollutants," i.e., those which can cause cancer or other severe localized health effects due to emissions from a single facility. U.S. EPA is required to adopt regulations mandating that new and existing sources emitting 10 tons per year or more of such pollutants employ Maximum Achievable Control Technology (MACT) according to specified schedules. U.S. EPA is to consider further reductions in the future to eliminate any remaining unacceptable residual risk.

California Law:

The California Clean Air Act (CCAA): The CCAA establishes numerous requirements for Air District air quality plans to attain state ambient air quality standards for criteria air contaminants. For example, a plan must contain measures adequate to achieve five percent per year emission reductions or must contain all feasible measures and an expeditious adoption schedule. For Air Districts with serious air pollution, its attainment plan should include the following: no net increase in emissions from new and modified stationary sources; and best available retrofit technology for existing sources.

Toxic Air Contaminants: The Air Toxic Hot Spots Act (Health & Safety Code §§ 44300, et seq.) requires facilities emitting specified quantities of pollutants to conduct risk assessments describing the health impacts to neighboring communities created by their emissions of numerous specified hazardous compounds. If an Air District determines the health impact to be significant, neighbors must be notified. In addition, state law requires the facility to develop and implement a plan to reduce the health impacts to below significance, generally within five years. Additional control requirements for hazardous emissions from specific industries are established by the state and enforced by Air Districts.

AB 617: A requirement for Air Districts to conduct air monitoring and adopt a Community Emissions Reduction Plan for communities designated by CARB under the AB 617 statewide program.

State law also includes the following measures:

- 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;
- Authority for South Coast AQMD to adopt a command-and-control regulatory structure requiring Best Available Retrofit Control Technology (BARCT);
- A requirement for South Coast AQMD to establish an expedited schedule for implementing BARCT at pre-determined greenhouse cap and trade facilities;
- A requirement for South Coast AQMD to establish a program to encourage voluntary participation in projects to increase the use of clean-burning fuels; and

- A requirement for South Coast AQMD to adopt and enforce rules to ensure no net emission increases from stationary sources.

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. South Coast AQMD 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: South Coast AQMD, 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, South Coast AQMD 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 South Coast AQMD's AQMP for use in developing the necessary control strategies.

Air Quality Modeling: Using air quality, meteorological and emissions models, South Coast AQMD 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 (NO₂) and react in sunlight to form ozone; similarly, nitrogen oxide gases from tailpipes and smokestacks can be transformed into nitrates or particulates (PM_{2.5} and PM₁₀). The planners thus must consider 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 South Coast AQMD 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 South Coast AQMD 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. South Coast AQMD 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 standards and control programs are

developed primarily by CARB and EPA. South Coast AQMD also has limited authority over mobile sources (e.g. public fleets, indirect sources).

Once a plan of emission controls to achieve the NAAQS is outlined, South Coast AQMD is required to hold multiple public meetings to present the proposed control strategies and receive public input. South Coast AQMD also conducts a socioeconomic analysis of the strategies. South Coast AQMD 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. The next AQMP will address the 2015 8-hour ozone NAAQS, with an anticipated adoption in the 2022 timeframe. Five working groups have been established to support the development of control strategies for the 2022 AQMP. South Coast AQMD will continue to improve the emissions inventories and modeling techniques for the 2022 AQMP.

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 South Coast AQMD’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: South Coast AQMD 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, South Coast AQMD 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 near-zero and zero 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 South Coast AQMD with \$1.20 going to South Coast AQMD for mobile source emissions reductions, \$1.60 subvended 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: South Coast AQMD'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, South Coast AQMD 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

South Coast AQMD'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 2021-2022 budget is from July 1, 2021 to June 30, 2022. 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, quantifiable 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 South Coast AQMD'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.

South Coast AQMD 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. South Coast AQMD's Comprehensive Annual Financial Report includes the General Fund and Special Revenue Funds.

Budget Process

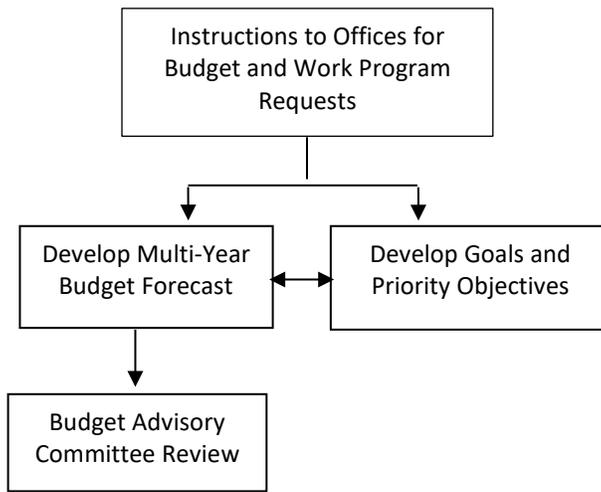
The South Coast AQMD budget process begins with the Chief Financial Officer issuing instructions and guidelines to the Offices. Under the guidance of the Executive Officer, the Chief Operating Officer, and the Chief Financial Officer, the Offices also begin establishing Goals and Priority Objectives for the fiscal year. The proposed annual budget and multi-year forecast is then developed by the Offices, Finance, Executive Council, the 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 Capital Outlay accounts. 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.
- One public consultation meeting to discuss the automatic CPI increase
- A public hearing on the Proposed Budget and Work Program

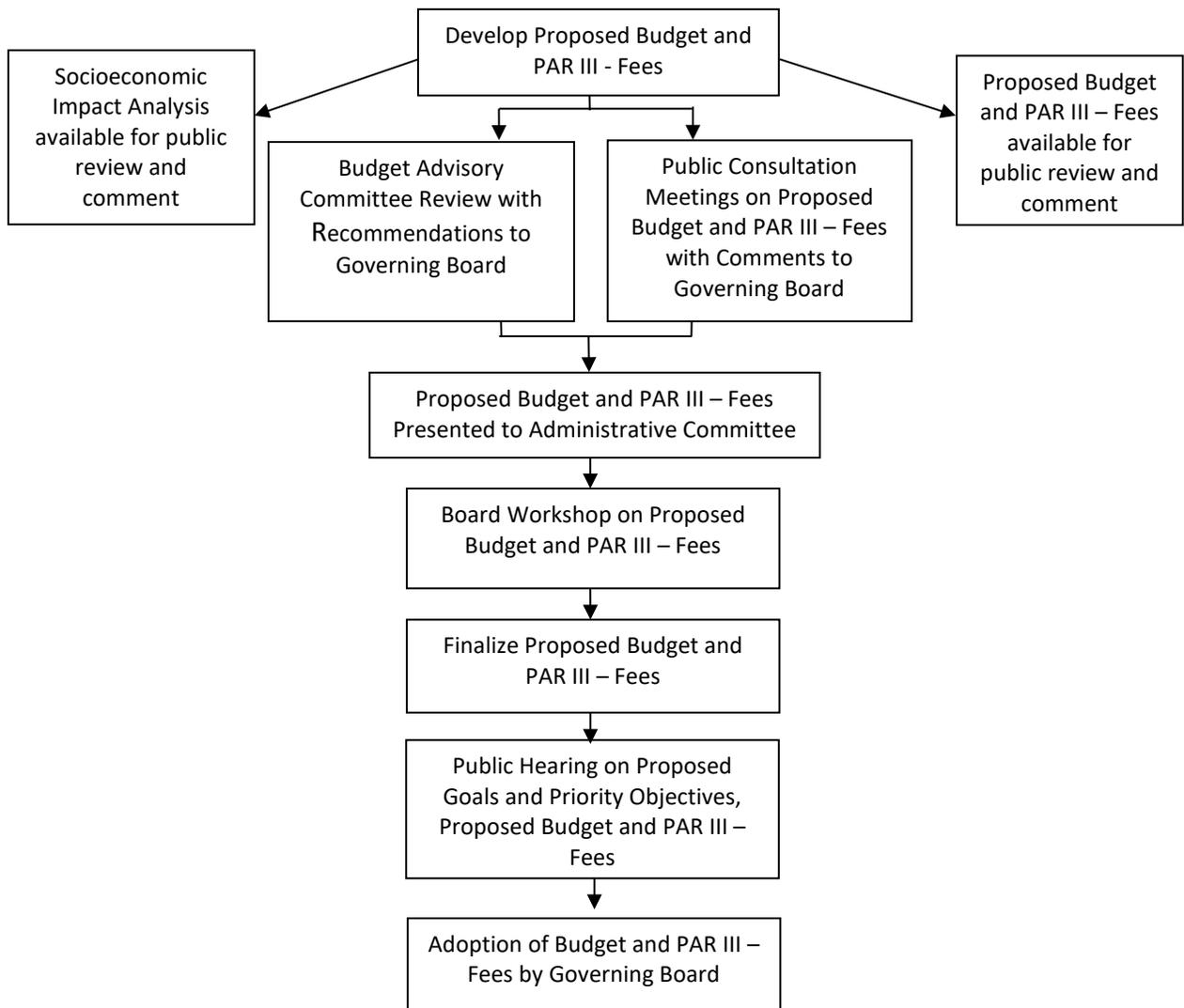
The proposed budget is presented to South Coast AQMD's Governing Board at a budget workshop and to South Coast AQMD's Administrative Committee. Any public comments and Budget Advisory Committee recommendations are submitted to the Governing Board by April 15 of each year. The proposed budget is adopted 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 typical major milestones and budget processes that take place in developing South Coast AQMD's annual budget.

Preliminary Budget Process



Annual Budget Process



FY 2022 Budget Timeline	
Budget submissions received from Offices	Jan 15, 2021
Budget Advisory Committee meeting	Jan 15, 2021
Proposed budget available for public review	April 1, 2021
Budget Advisory Committee meeting on proposed budget	April 2, 2021
Public Workshop on proposed budget	April 6, 2021
Proposed budget presented to Administrative Committee	April 9, 2021
Governing Board Special Meeting	April 9, 2021
Public comments and Budget Advisory Committee recommendations submitted to Governing Board	April 15, 2021
Public Hearing & Governing Board adoption of budget	May 7, 2021

Adopted Budget & Work Program

Budget Overview

The adopted budget for FY 2021-22 is a balanced budget with revenues/transfers in and expenditures/transfers out of \$179.9 million. To compare against prior years, the following table shows South Coast AQMD's amended budget and actual expenditures for FY 2019-20, adopted and amended budgets for FY 2020-21 and adopted budget for FY 2021-22.

Description	FY 2019-20 Amended	FY 2019-20 Actual	FY 2020-21 Adopted	FY 2020-21 Amended¹	FY 2021-22 Adopted
Staffing	946	-	946	949	957
Revenue/Transfers In	\$186.0	\$188.9	\$173.0	\$176.2	\$179.9
Expenditures/Transfers Out	\$192.6	\$176.7	\$173.0	\$178.2	\$179.9

¹ Includes Board approved changes through February 2021

The FY 2021-22 adopted budget reflects an increase of \$1.7 million in expenditures/transfers out from the FY 2020-21 amended budget and an increase of \$6.9 million in expenditures/transfers out from the FY 2020-21 adopted budget. The increase in expenditures/transfers out from the FY 2020-21 adopted budget can be attributed to increases in staffing, retirement costs, Services and Supplies, and Capital Outlays. The FY 2021-22 adopted budget of 957 positions has a net increase of eight positions over the FY 2020-21 amended budget.

Expenditures

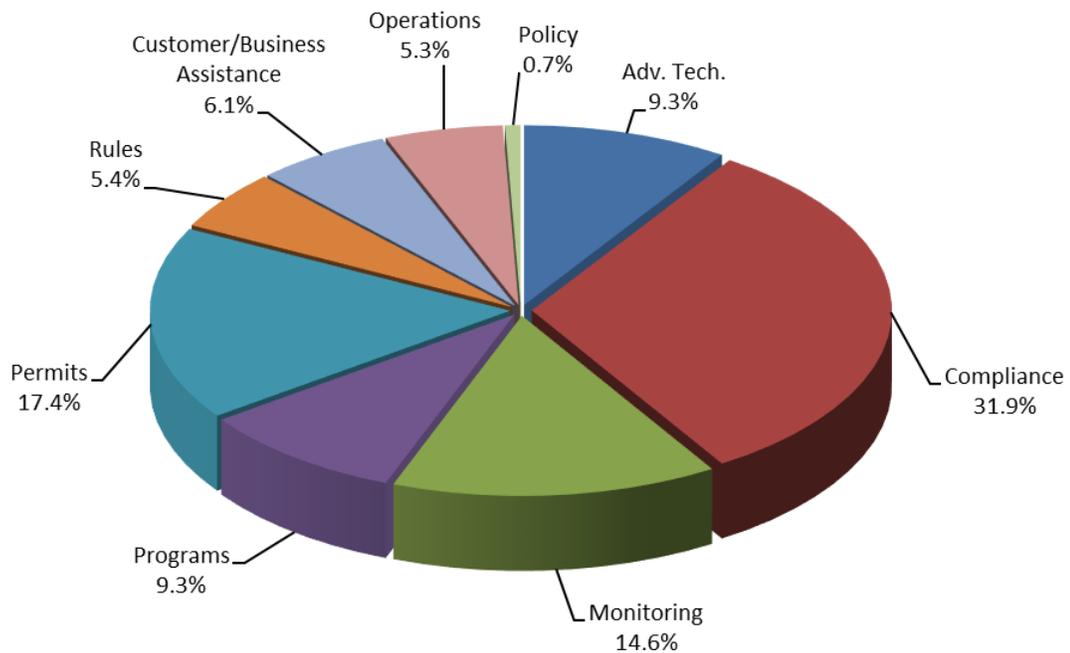
Work Program

South Coast AQMD 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 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 sorted by program is included in the Goals and Priority Objectives and Work Program section. The following pie chart represents the budgeted expenditures by Program Category for FY 2021-22.

Work Program Category Expenditures



The following table compares South Coast AQMD Work Program expenditures by category for the FY 2020-21 adopted budget and FY 2021-22 adopted budget.

Work Program Categories	FY 2020-21 Adopted Budget	FY 2021-22 Adopted Budget
Advance Clean Air Technology	\$14,581,483	\$16,662,843
Customer Service and Business Assistance	12,035,187	10,903,032
Develop Programs to Achieve Clean Air	13,561,091	16,722,332
Develop Rules to Achieve Clean Air	9,871,502	9,713,071
Ensure Compliance with Clean Air Rules	56,299,951	57,377,234
Monitoring Air Quality	25,853,696	26,336,839
Operational Support	9,037,236	9,569,399
Policy Support	1,174,207	1,259,631
Timely Review of Permits	30,574,628	31,339,022
Total	\$172,988,981	\$179,883,403

Note: Fully burdened expenditures based on the Cost Allocation Schedule

Account Categories

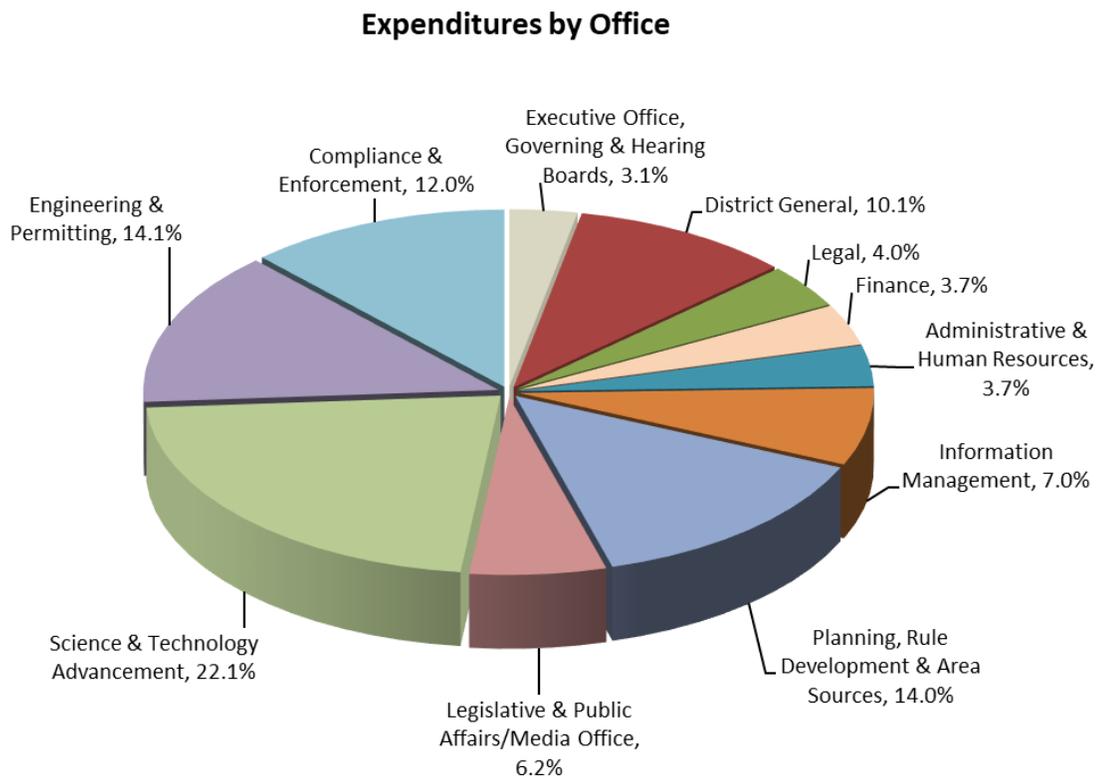
The following table compares the FY 2020-21 adopted budget and the FY 2020-21 amended budget to the adopted budget for FY 2021-22 by account category. The FY 2020-21 amended budget includes the Board-approved mid-year adjustments through February 2021.

Account Description	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget¹	FY 2021-22 Adopted Budget
Salaries/Benefits	\$140,750,642	\$140,763,607	\$146,228,481
Insurance	1,449,140	1,474,140	1,449,140
Rents	805,123	1,088,640	804,123
Supplies	3,265,442	3,746,065	3,302,458
Contracts and Services	10,656,863	13,150,445	11,145,047
Maintenance	1,813,343	2,270,010	1,837,949
Travel/Auto Expense	945,323	1,107,325	916,823
Utilities	1,989,620	1,869,630	1,967,620
Communications	907,800	949,865	898,884
Capital Outlays	926,000	1,702,487	1,850,000
Other	1,444,783	1,586,319	1,448,283
Debt Service	7,193,549	7,193,549	7,193,242
Transfers Out	841,353	1,276,989	841,353
Total	\$172,988,981	\$178,179,071	\$179,883,403

¹ Includes Board approved changes through February 2021

As mentioned previously, the adopted budget for FY 2021-22 represents an approximately \$1.7 million increase in expenditures from the FY 2020-21 amended budget. The FY 2020-21 amended budget includes mid-year increases associated with the following: monitoring equipment and vehicles for the implementation of the Rule 1180 Community and Enhanced Monitoring Program, legal counsel for specialized, environmental, and other litigation, outreach efforts for the elementary school education program, staff, services and supplies and capital outlays for critical projects and programs, and grant-related expenditures offset by revenue.

The following pie chart represents budgeted expenditures by Office for FY 2021-22.

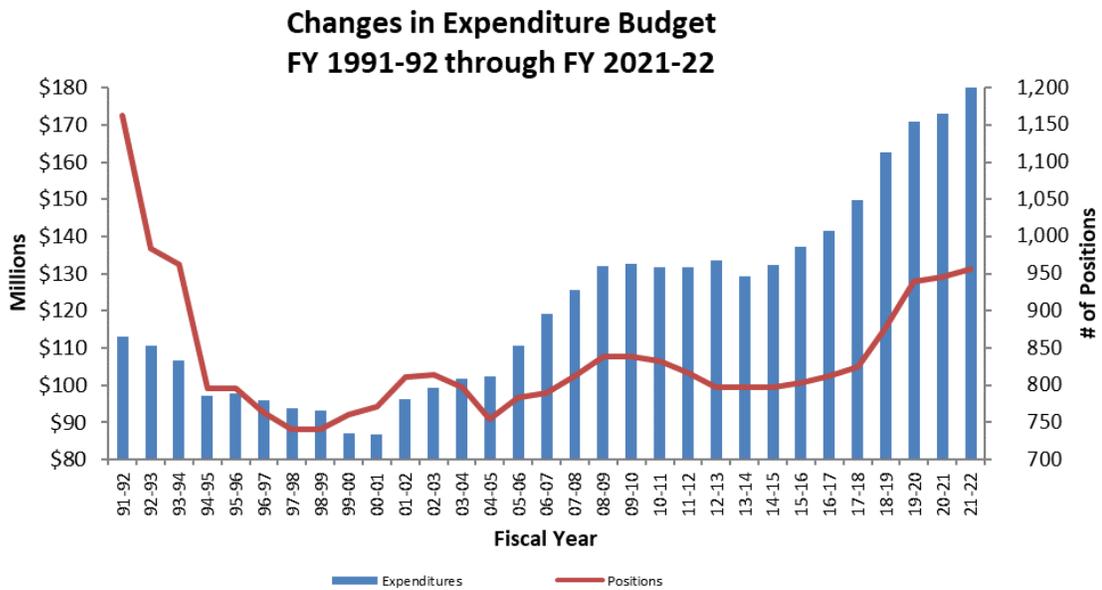


Budget Strategy

Over the years, South Coast AQMD 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, and continues to be, on reducing or maintaining expenditure levels 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 whenever possible. In FY 2017-18, South Coast AQMD began to receive funding from the California Air Resources Board under AB 617 to reduce exposure in neighborhoods most impacted by air pollution as well as funding under the AB 134 Community Air Protection Fund. In FY 2019-20, South Coast AQMD began receiving funding through the California Air Resources Board under the Volkswagen Mitigation Settlement Agreement. These new programs, resulting in additional funding sources, has increased South Coast AQMD’s workload substantially.

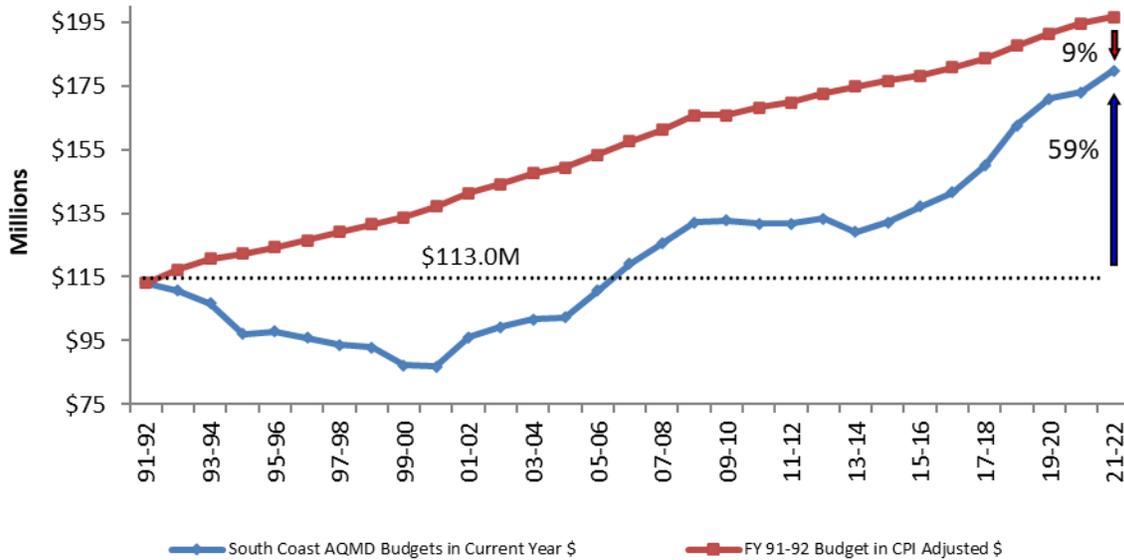
Nonetheless, South Coast AQMD continues to focus on the efficient use of its resources. South Coast AQMD performs an on-going review of revenues, expenditures, and staffing levels and regularly presents results to the Board. The adopted vacancy rate for FY 2021-22 is 13%, which remains the same as the rate for the FY 2020-21 amended budget.

The following charts show South Coast AQMD’s staffing and budget levels starting in FY 1991-92 when staffing was at 1,163 FTEs. The adopted budget for FY 2021-22 reflects a staffing level of 957 FTEs. This staffing level is 18% (206 FTEs) below the FY 1991-92 level.



The FY 2021-22 adopted budget is 59% 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 29 years, the FY 2021-22 adopted budget is 9% lower.

Inflation Impact on South Coast AQMD Budgets FY 1991-92 through FY 2021-22



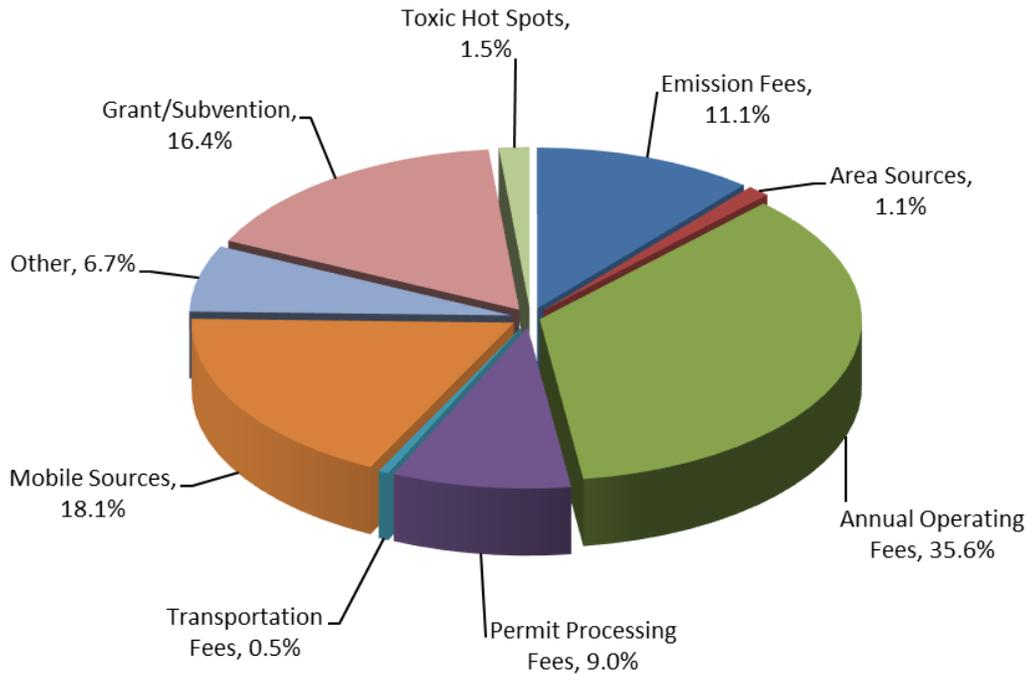
Note: CPI adjustment based on California Consumer Price Index for the preceding Calendar Year

Revenues

Revenue Categories

Each year, in order to meet its financial needs, the South Coast AQMD 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 2021-22, these fees are projected to generate approximately \$106.5 million or 59% of South Coast AQMD revenues; of this \$106.5 million, \$100.1 million or 56% of South Coast AQMD’s projected revenues are from stationary sources. Other sources, which include penalties/settlements, Hearing Board fees, interest, and miscellaneous income, are projected to generate approximately 6% of total revenues in FY 2021-22. The remaining 35% of revenue is projected to be received in the form of federal and state grants, California Air Resources Board (CARB) subvention, and California Clean Air Act motor vehicle fees. Beginning in Fiscal Year 1978-79, the South Coast AQMD became a fee supported agency no longer receiving financial support from property taxes. The following pie chart represents revenues by Major Category for the adopted FY 2021-22 budget.

Revenues by Major Category



The following table compares the FY 2020-21 adopted revenue budget and the FY 2020-21 amended revenue budget to the adopted revenue budget for FY 2021-22. The FY 2020-21 amended revenue budget includes Board-approved mid-year changes through February 2021.

Revenue Description	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget ¹	FY 2021-22 Adopted Budget
Annual Operating Emission Fees	\$ 20,300,062	\$ 20,300,062	\$ 19,955,890
Annual Operating Permit Renewal Fees	60,881,370	60,881,370	64,041,550
Permit Processing Fees	19,744,260	19,744,260	16,141,800
Portable Equipment Registration Program	1,000,000	1,000,000	1,000,000
Area Sources	2,000,000	2,000,000	2,056,000
Grants/Subvention	24,706,150	26,549,604	29,534,960
Mobile Sources	29,489,697	29,489,697	32,470,096
Transportation Programs	950,500	950,500	934,900
Toxic Hot Spots	2,891,580	2,891,580	2,750,170
Other ²	7,847,962	7,847,962	6,790,637
Transfers In	3,177,400	4,528,400	4,207,400
Total	\$172,988,981	\$176,183,435	\$179,883,403

¹ Includes Board approved changes through February 2021

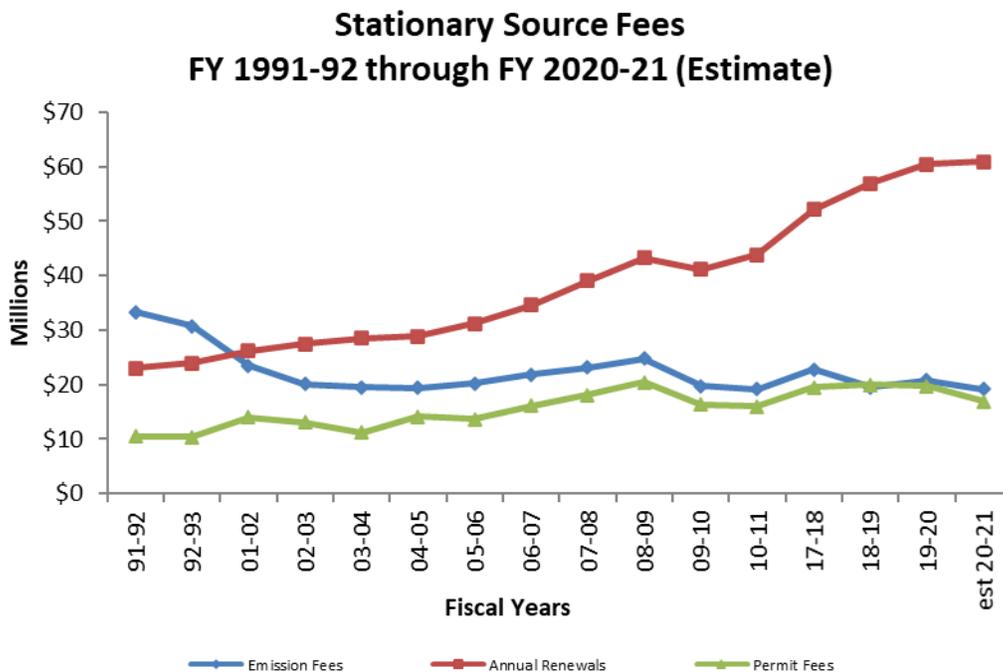
²Includes revenues from Interest, Lease Income, Source Testing, Hearing Board, Penalties/Settlements, Subscriptions, and Other

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 45% from \$66.8 million in FY 1991-92 to \$97.0 million (estimated) in FY 2020-21. When adjusted for inflation however, stationary source revenues have decreased by 13% over this same period.

Mobile source revenues that are subvended to the South Coast AQMD by the Department of Motor Vehicles (DMV) are projected to increase from the FY 2020-21 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, Prop 1B, VW Mitigation and AB 134) 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 increase in FY 2021-22 from FY 2020-21 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 for FY 2021-22. Finally, the AB 617 Community Air Protection Program implementation funding from CARB is projected to increase from the FY 2020-21 budget.

The following graph tracks actual stationary source revenues by type of fee from FY 1991-92 (when CPI limits were placed on South Coast AQMD fee authority) to estimated revenues for FY 2020-21.



Debt Structure

Pension Obligation Bonds

These bonds were issued jointly by the County of San Bernardino and the South Coast AQMD in December 1995. In June 2004 the South Coast AQMD 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
2022	4,006,881	3,186,361	7,193,242
2023	3,780,000	348,736	4,128,736
2024	4,010,000	118,897	4,128,897
Total	\$11,796,881	\$3,653,994	\$15,450,875

Fund Balance

South Coast AQMD is projecting an Unreserved (Unassigned) Fund Balance for June 30, 2022 of \$62,096,338 in addition to the following Reserved and Unreserved Designated Fund Balances for FY 2021-22.

Classification	Reserves/Unreserved Designations	Amount
Committed	Reserve for Encumbrances	\$ 13,200,000
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	234,159
Assigned	For Self-Insurance	2,000,000
Assigned	For Unemployment Claims	80,000
Total Reserved & Unreserved Designations		\$ 19,429,673

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. South Coast AQMD is self-insured for general liability, workers' compensation, automobile liability, premises liability, and unemployment.

Long-Term Projection

South Coast AQMD continues to face a number of challenges in the upcoming years, including the economic impact from the COVID-19 pandemic, continued higher operating costs, the need for major information technology and building infrastructure improvement projects with the aging of our headquarters building, and growing program commitments while meeting air quality goals and permit processing targets. Recruiting, training and retaining the high level of technical staffing expertise necessitated by the Community Air Protection Program established in 2017 under AB 617, the Volkswagen Mitigation Settlement Projects, the Refinery Fenceline Air Monitoring Plans under Rule 1180, and additional incentive funding under AB 134, as well as for South Coast AQMD's ongoing projects and programs, will continue to be a challenge further complicated by COVID-19 and the retirement of current, long-term staff.

Increasing retirement costs and any future actions SBCERA may take due to financial market fluctuations which could significantly impact South Coast AQMD's level of expenditures remains a primary uncertainty. Any legislative action that may impact the level of federal and state funding from grant awards, particularly AB 617 funding, and subvention funds is another unknown that must be considered as South Coast AQMD plans for the future. Cost recovery within the constraints of Proposition 26 is an additional uncertainty as South Coast AQMD strives to balance program operating expenses with revenues collected from fees.

In order to face these challenges, South Coast AQMD 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 table, outlining South Coast AQMD'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 South Coast AQMD boundaries and remaining sensitive to business. Starting in FY 2023-24, South Coast AQMD will realize a \$3.1M savings in Pension Obligation Bond payments.

**Fiscal 2020-21 Estimate and Five Year Projection
(\$ in Millions)**

	FY 20-21 Estimate	FY 21-22 Adopted	FY 22-23 Projected	FY 23-24 Projected	FY 24-25 Projected	FY 25-26 Projected
STAFFING	949	957	957	957	957	957
REVENUES/TRANSFERS IN*	\$171.3	\$179.9	\$178.8	\$183.0	\$182.9	\$182.4
EXPENDITURES/TRANSFERS OUT	\$175.2	\$179.9	\$187.5	\$188.2	\$192.1	\$191.1
Change in Fund Balance	(\$3.9)	-	(\$8.7)	(\$5.2)	(\$9.2)	(\$8.7)
UNRESERVED FUND BALANCE (at year-end)	\$68.2	\$68.2	\$59.5	\$54.3	\$45.1	\$36.4
% of REVENUE	39%	38%	33%	30%	25%	20%

* FY 2020-21 does not include a projected CPI fee increase of 2.8% due to COVID-19; FY 2021-22 has a projected CPI increase of 1.7% and restoration of the FY 2020-21 CPI fee increase; CPI fee increases are projected as follows: FY 2022-23 – 2.8%, FY 2023-24 – 3.2%, FY 2024-25 – 3.1%, and 2025-26 – 3.0%.

As part of the Five-Year Projection, South Coast AQMD 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.

GENERAL FUND POTENTIAL BUILDING MAINTENANCE and CAPITAL OUTLAY PROJECTS FY 2021-22 through 2025-26
Child Care Building Roof Replacement
Patio Crack and Joint Sealing
Carpet Installation 3rd Floor
Atrium and Building Expansion Joint Waterproofing
Concrete Repair in East Courtyard & Pedestrian Areas
Guard Shack Replacement
Cafeteria Exhaust Equipment Upgrade/Replacement
Fire Life Safety System Upgrade
Air Handler Mechanical Systems Upgrade/Fan Wall Installation
Irrigation System Renovation
Building Window and Structural Joint Sealing
Saw Tooth Lab Roof Refurbishment
Parking Lot Repair and Reseal
Leibert AC Units Replacement/Data Center Enhancements
Pneumatic Controls to DDC (Direct Digital Control) Conversion
Roofing Surface Recoat
Child Care Playground Renovation
Restroom and Copy/Coffee Sink and Counter Tops Replacement
Landscape Renovation
Automatic Transfer Switch Upgrade
Building Lighting Controls Upgrade
Retrofit Fluorescent Down Lighting (LED)
Door Replacement 2 North (Administration)
Restroom Panels Refurbishment/Replacement
Conference Center Paint and Wallpaper
Computer Room UPS System Upgrade
Parking Lot Lights to LED Conversion
Aging Kitchen Equipment Replacement
Building Interior Repaint
VCT Tiles Replacement (Various Areas)
Vinyl Wall Covering Replacement (Various Areas)
Emergency Generator Upgrade
Building Energy Management System Upgrade

SUMMARY OF FISCAL YEAR 2021-22 ADOPTED BUDGET

	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget ¹	FY 2020-21 Estimate ²	FY 2021-22 Adopted
Funding Sources				
Revenue	\$ 169,811,581	\$ 171,825,035	\$ 168,826,643	\$ 175,676,003
Transfers-In	3,177,400	4,358,400	2,441,213	4,207,400
Total Funding Sources	\$ 172,988,981	\$ 176,183,435	\$ 171,267,856	\$ 179,883,403
Funding Uses				
Salaries & Employee Benefits	\$ 140,750,642	\$ 140,763,607	\$ 138,733,607	\$ 146,228,481
Services & Supplies	30,470,986	34,435,988	33,465,988	30,963,569
Capital Outlays	926,000	1,702,487	1,702,487	1,850,000
Transfers-Out	841,353	1,276,989	1,276,989	841,353
Total Funding Uses	\$ 172,988,981	\$ 178,179,071	\$ 175,179,071	\$ 179,883,403

Fund Balances - Reserves & Unreserved Designations	Classification	Projected June 30, 2021	Projected June 30, 2022
Reserve for Encumbrances	Committed	\$ 12,900,000	\$ 13,200,000
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	234,159	234,159
Designated for Self-Insurance	Assigned	2,000,000	2,000,000
Designated for Unemployment Claims	Assigned	80,000	80,000
Total Reserves & Unreserved Designations		\$ 19,129,673	\$ 19,429,673
Unassigned Fund Balance	Unassigned	\$ 62,096,338	\$ 62,096,338
Total Fund Balances		\$ 81,226,011	\$ 81,526,011

¹ The FY 20-21 Amended Budget includes mid-year changes through February 2021.

² Includes estimated encumbrances of \$8,100,000 which will be applicable to the fiscal year ending June 30, 2021.

ANALYSIS OF PROJECTED JUNE 30, 2021 FUND BALANCE

Fund Balances as of June 30, 2020	
Reserves	\$ 12,430,552
Designated	6,149,673
Unassigned	65,957,001
Total Fund Balances, June 30, 2020	\$ 84,537,226
Add Excess Fiscal Year 2020-21 Revenues over Expenditures	
Revenues	\$ 171,267,856
Expenditures ¹	167,079,071
Sub-Total	\$ 4,188,785
Deduct Decrease in Encumbrances Open on June 30, 2021	(7,500,000)
Total Projected Fund Balances, June 30, 2021	\$ 81,226,011
Fund Balances (Projected) at June 30, 2021	
Reserve for Encumbrances	\$ 12,900,000
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	234,159
Designated for Self-Insurance	2,000,000
Designated for Unemployment Claims	80,000
Unassigned	62,096,338
Total Projected Fund Balances, June 30, 2021	\$ 81,226,011
Note: This analysis summarizes the estimated amount of funds that will be carried into FY 2021-22.	
¹ Expenditures do not include estimated \$8,100,000 encumbrances for the Fiscal Year ended June 30, 2021.	

**SCHEDULE OF AVAILABLE FINANCING AND PROJECTED FISCAL YEAR 2021-
22 RESERVES AND DESIGNATIONS**

Fund Balances	\$ 81,226,011	
Emission Fees	19,955,890	
Annual Renewal Fees	64,041,550	
Permit Processing Fees	16,141,800	
Portable Equipment Registration Program	1,000,000	
State Subvention	3,944,730	
State Grant	19,324,580	
Federal Grant	6,265,650	
Interest Revenue	509,290	
Lease Revenue	168,800	
Source Test/Analysis Fees	591,100	
Hearing Board Fees	213,000	
Penalties and Settlements	4,600,000	
Area Sources	2,056,000	
Transportation Programs	934,900	
Mobile Sources/Clean Fuels	32,470,096	
Air Toxics "Hot Spots"	2,750,170	
Other Revenues/Transfers In	4,915,847	
Total Funds		\$ 261,109,414
Less Projected Fiscal Year 2020-21 Reserves and Designations		
Reserve for Encumbrances	\$ 13,200,000	
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	234,159	
Designated for Self-Insurance	2,000,000	
Designated for Unemployment Claims	80,000	
Total Projected Reserves and Designations		\$ 19,429,673
Available Financing		\$ 241,679,741

ANALYSIS OF PROJECTED JUNE 30, 2022 FUND BALANCE

Fund Balances as of June 30, 2021	
Reserves	\$ 12,980,000
Designated	6,149,673
Unassigned	62,096,338
Total Fund Balances, June 30, 2021	\$ 81,226,011
Add Excess Fiscal Year 2021-22 Revenues over Expenditures	
Revenues	\$ 179,883,403
Expenditures ¹	171,783,403
Sub-Total	\$ 8,100,000
Deduct Decrease in Encumbrances Open on July 1, 2021	(7,800,000)
Total Projected Fund Balances, June 30, 2022	\$ 81,526,011
Fund Balances (Projected) Fiscal Year 2021-22	
Reserve for Encumbrances	\$ 13,200,000
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	234,159
Designated for Self-Insurance	2,000,000
Designated for Unemployment Claims	80,000
Unassigned	62,096,338
Total Projected Fund Balances, June 30, 2022	\$ 81,526,011
¹ Expenditures do not include estimated \$8,100,000 encumbrances for the Fiscal Year ended June 30, 2022.	

Revenue Comparison				
Revenue Account	FY 2019-20 Actual	FY 2020-21 Adopted	FY 2020-21 Estimated	FY 2021-22 Adopted
Emission Fees	\$ 20,781,427	\$ 20,300,062	\$ 19,228,500	\$ 19,955,890
Annual renewal Fees	59,034,753	60,881,370	60,881,731	64,041,550
Permit Processing Fees	19,666,600	19,744,260	16,885,880	16,141,800
Portable Equipment Registration Program	1,415,811	1,000,000	1,521,800	1,000,000
State Subvention	3,939,219	3,939,220	3,944,728	3,944,730
State Grant	19,953,072	14,685,000	16,580,625	19,324,580
Federal Grant	7,630,779	6,081,930	7,905,083	6,265,650
Interest Revenue	1,791,178	871,330	404,179	509,290
Lease Revenue	150,164	169,480	129,842	168,800
Source Test/Analysis Fees	427,852	730,000	175,023	591,100
Hearing Board Fees	357,937	210,000	241,139	213,000
Penalties and Settlements	12,178,184	4,750,000	4,575,971	4,600,000
Area Sources	1,859,185	2,000,000	2,000,000	2,056,000
Transportation Programs	1,069,607	950,500	856,097	934,900
Mobile Sources/Clean Fuels	26,842,990	29,489,697	29,605,708	32,470,096
Air Toxics "Hot Spots"	2,906,530	2,891,580	2,467,957	2,750,170
Other Revenues/Transfers In	8,863,522	4,294,552	3,863,592	4,915,847
Total Revenue	\$ 188,868,811	\$ 172,988,981	\$ 171,267,856	\$ 179,883,403

EXPLANATION OF REVENUE SOURCES

Annual Operating Emissions Fees

The Lewis-Presley Air Quality Management Act (Health & Safety Code Section 40400-40540) authorizes the South Coast AQMD to collect fees for permitted sources to recover the costs of District programs related to these sources. (Health & Safety Code 40410(b)). South Coast AQMD 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 ozone depleters (ammonia, chlorofluorocarbons, 1,1,1 trichloroethane) over thresholds as well as base toxics fees, device fees, and cancer-potency weighted fees for the following toxic air contaminants: 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; and diesel particulate. The rates are set forth in South Coast AQMD Rule 301.

FY 2021-22 Adopted Budget: The non-RECLAIM emissions are based on Annual Emission Report (AER) data for Calendar Year 2019. The RECLAIM NOx and SOx 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. The adopted budget includes a 1.7% CPI fee increase and restoration of the FY 2020-21 CPI fee increase of 2.8% that was credited to fee payers at the time of billing.

Annual Operating Permit Renewal

State law authorizes South Coast AQMD 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 South Coast AQMD 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 South Coast AQMD 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 South Coast AQMD's compliance program, planning, rule making, monitoring, testing, source education, public outreach, civil enforcement, including the South Coast AQMD's Hearing Board, and stationary and area source research projects. Also included in this category are the Refinery Related Community Air Monitoring System Annual Operating and Maintenance Fees (Rule 301(aa)).

EXPLANATION OF REVENUE SOURCES

FY 2021-22 Adopted Budget: The projection is based on an estimated number of permits at the various equipment fee schedules as well as the Refinery Related Community Air Monitoring System Annual Operating and Maintenance Fees (Rule 301(aa)). The adopted budget includes a 1.7% CPI fee increase and restoration of the FY 2020-21 CPI fee increase of 2.8% that was credited to fee payers at the time of billing.

Permit Processing Fees

Under the Health & Safety Code 42300, South Coast AQMD may adopt and implement a program requiring that a permit be obtained from South Coast AQMD to construct or operate any equipment which emits or controls air pollution in South Coast AQMD's jurisdictional boundaries before the construction or operation of the equipment. South Coast AQMD has adopted rules requiring such permits, to ensure that equipment in South Coast AQMD's jurisdictional boundaries is in compliance with South Coast AQMD 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 the RECLAIM program in accordance with the South Coast AQMD's Governing Board resolution. Currently, RECLAIM facilities, including both Title V and non-Title V facilities, are subject to a South Coast AQMD-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 permits, with case-by-case analysis of each device (piece of equipment) for incorporation of Non-RECLAIM regulatory limits, monitoring, recordkeeping and reporting requirements, emission factors, emission limits, and removing permit conditions and requirements related to RECLAIM that are no longer applicable. This is a one-time fee for the proposed transition process associated with exiting the RECLAIM program.

FY 2021-22 Adopted Budget: The projection is based on the anticipated number and type of applications that will be processed. The adopted budget includes a 1.7% CPI fee increase and restoration of the FY 2020-21 CPI fee increase of 2.8% that was credited to fee payers at the time of billing.

EXPLANATION OF REVENUE SOURCES

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 South Coast AQMD field staff are collected by CARB at the time of registration and passed through to South Coast AQMD on an annual basis. Fees for inspection of all other PERP-registered equipment are billed at an hourly rate set forth in South Coast AQMD Rule 301, as determined by CARB and collected by South Coast AQMD at the time the inspection is conducted.

FY 2021-22 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. South Coast AQMD 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 South Coast AQMD's jurisdiction. This revenue allows South Coast AQMD to recover the costs of staff working on compliance, laboratory support, architectural coatings emissions data, rule development, and architectural coatings revenue collection.

FY 2021-22 Adopted Budget: Fees are based on the annual quantity and emissions of architectural coatings distributed or sold into or within and for use in South Coast AQMD's jurisdiction for the previous calendar year. Emissions are decreasing while sales volume is increasing. The adopted budget includes a 1.7% CPI fee increase and restoration of the FY 2020-21 CPI fee increase of 2.8% that was credited to fee payers at the time of billing.

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. South Coast AQMD has received subvention funds since its inception beginning in 1977.

FY 2021-22 Adopted Budget: The current amount of \$3.9 million is included in the FY 2021-22 adopted budget.

State Grant

Under AB 617, recently adopted by the state legislature, CARB funding is distributed to air districts to implement the Community Air Protection Program which includes monitoring and developing emissions reductions plans in disadvantaged communities with high cumulative exposure to air toxics.

EXPLANATION OF REVENUE SOURCES

FY 2021-22 Adopted Budget: The adopted 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

South Coast AQMD receives funding from EPA Section 103 and 105 grants to help support the South Coast AQMD in its administration of active air quality control and monitoring programs where the South Coast AQMD 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 2021-22 Adopted Budget: The revenue projection is based on funding levels from current federal grants.

Interest

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

FY 2021-22 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 South Coast AQMD's Headquarters facility.

FY 2021-22 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 2021-22 Adopted Budget: The revenue projection is based on the anticipated number of tests and analyses. The adopted budget includes a 1.7% CPI fee increase and restoration of the FY 2020-21 CPI fee increase of 2.8% that was credited to fee payers at the time of billing.

EXPLANATION OF REVENUE SOURCES

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 South Coast AQMD; therefore, there are no Hearing Board fees/revenue related to these proceedings.

FY 2021-22 Adopted Budget: The estimate is based on the projected number of hearings to be held and cases to be heard. The adopted budget includes a 1.7% CPI fee increase and restoration of the FY 2020-21 CPI fee increase of 2.8% that was credited to fee payers at the time of billing.

Penalties/Settlements

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

FY 2021-22 Adopted Budget: It is anticipated that revenue in this category will be approximately \$4.6 million.

Mobile Sources

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

AB2766:

Section 9250.17 of the Vehicle Code gives the Department of Motor Vehicles (DMV) the authority and responsibility to collect and forward to South Coast AQMD four dollars for every vehicle registered in South Coast AQMD's jurisdictional boundaries. Thirty percent of the money (\$1.20 per vehicle) collected is recognized in South Coast AQMD'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 South Coast AQMD 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 South Coast AQMD 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

EXPLANATION OF REVENUE SOURCES

reimbursements from the Carl Moyer Fund for staff time and other program implementation/administration costs up to specified limits.

CAPP Incentives:

CAPP Incentive increases funding for the Carl Moyer program. The General Fund will receive reimbursements from the CAPP Incentive 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.

Volkswagen Environmental Mitigation Trust:

The Volkswagen Mitigation Trust was established as part of a settlement with Volkswagen for their role in utilizing illegal defeat devices in certain 2.0- and 3.0-liter VW vehicles that resulted in excess emissions. South Coast AQMD has been identified by CARB as the administrator of two project funding categories: Zero Emission Class 8 Freight and Port Drayage Trucks; and Combustion Freight and Marine Projects. The General Fund receives reimbursements from the Volkswagen Environmental Mitigation Fund for staff time and other program implementation/administration costs up to specified limits.

FY 2021-22 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, CAPP Incentives, Prop 1B, MSRC and Volkswagen Environmental Mitigation Trust 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 South Coast AQMD 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 South Coast

EXPLANATION OF REVENUE SOURCES

AQMD's jurisdictional boundaries, forwarded to South Coast AQMD, 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 2021-22 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, South Coast AQMD'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 2021-22 Adopted Budget: The projection is based on the anticipated number of registrations. The adopted budget includes a 1.7% CPI fee increase and restoration of the FY 2020-21 CPI fee increase of 2.8% that was credited to fee payers at the time of billing.

Toxic "Hot Spots"

Health and Safety Code Section 44380 requires South Coast AQMD to assess and collect fees from facilities that emit toxic compounds. Fees collected are used to recover state and South Coast AQMD 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. 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.

EXPLANATION OF REVENUE SOURCES

FY 2021-22 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 South Coast AQMD renders to other agencies, reimbursements from special revenue funds (non-mobile source), vanpool revenue, fees from fitness center memberships, and Public Records Act requests.

FY 2021-22 Adopted Budget: The revenue projections are based on historical trend information and anticipated receipts.

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SCAQMD						
Line Item Expenditure						
Major Object / Account # / Account Description	FY 2019-20 Actuals	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate *	FY 2021-22 Adopted Budget	
Salary & Employee Benefits						
51000-52000	Salaries	\$ 84,842,382	\$ 87,848,897	\$ 87,856,082	\$ 86,698,082	\$ 90,535,521
53000-55000	Employee Benefits	48,453,855	52,901,746	52,907,525	52,035,525	55,692,960
Sub-total Salary & Employee Benefits		\$ 133,296,238	\$ 140,750,642	\$ 140,763,607	\$ 138,733,607	\$ 146,228,481
Services & Supplies						
67250	Insurance	\$ 1,059,265	\$ 1,449,140	\$ 1,474,140	\$ 1,424,140	\$ 1,449,140
67300	Rents & Leases Equipment	229,986	\$ 212,280	278,017	278,017	212,280
67350	Rents & Leases Structure	481,671	592,843	810,623	810,623	591,843
67400	Household	784,529	877,195	879,195	879,195	907,195
67450	Professional & Special Services	8,161,610	8,340,974	10,394,041	10,024,041	8,796,501
67460	Temporary Agency Services	966,097	766,048	1,125,348	1,125,348	772,048
67500	Public Notice & Advertising	379,553	510,966	584,159	563,157	507,623
67550	Demurrage	79,282	161,680	167,702	167,702	161,680
67600	Maintenance of Equipment	1,172,398	810,864	1,213,239	1,213,239	815,470
67650	Building Maintenance	1,162,094	1,002,479	1,056,771	1,056,771	1,022,479
67700	Auto Mileage	139,982	110,627	198,134	170,042	106,127
67750	Auto Service	517,429	470,000	471,500	288,167	470,000
67800	Travel	220,475	364,696	437,691	437,691	340,696
67850	Utilities	1,429,880	1,989,620	1,869,630	1,769,630	1,967,620
67900	Communications	821,323	907,800	949,865	949,865	898,884
67950	Interest Expense	3,503,983	3,353,106	3,353,106	3,353,106	3,186,361
68000	Clothing	103,393	53,508	70,228	70,228	78,508
68050	Laboratory Supplies	451,773	557,000	600,827	537,607	557,000
68060	Postage	327,566	468,158	502,708	472,708	432,158
68100	Office Expense	2,354,600	1,514,905	1,649,340	1,599,340	1,538,421
68200	Office Furniture	77,540	24,000	98,621	98,621	48,000
68250	Subscriptions & Books	262,797	178,574	291,036	291,036	179,074
68300	Small Tools, Instruments, Equipment	286,310	177,276	271,284	271,284	177,276
68400	Gas and Oil	193,824	292,021	262,021	189,896	292,021
69500	Training/Conference/Tuition/ Board Exp.	870,142	995,807	954,392	952,164	992,807
69550	Memberships	169,136	71,428	246,428	246,428	76,428
69600	Taxes	16,493	59,000	66,131	66,131	64,500
69650	Awards	37,319	69,023	79,023	79,023	69,023
69700	Miscellaneous Expenses	166,887	249,525	240,345	240,345	245,525
69750	Prior Year Expense	(26,739)	-	-	-	-
69800	Uncollectable Accounts Receivable	578,246	-	-	-	-
89100	Principal Repayment	2,686,641	3,840,443	3,840,443	3,840,443	4,006,881
Sub-total Services & Supplies		\$ 29,665,485	\$ 30,470,986	\$ 34,435,988	\$ 33,465,988	\$ 30,963,569
77000	Capital Outlays	\$ 11,172,630	\$ 926,000	\$ 1,702,487	\$ 1,702,487	\$ 1,850,000
79050	Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
99950	Transfers Out	\$ 2,525,592	\$ 841,353	\$ 1,276,989	\$ 1,276,989	\$ 841,353
Total Expenditures		\$ 176,659,945	\$ 172,988,981	\$ 178,179,071	\$ 175,179,071	\$ 179,883,403

* Estimates based on July 2020 through February 2021 actual expenditures and February 2021 budget amendments.

SALARIES & EMPLOYEE BENEFITS

Acct. #	Account Description	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate	FY 2021-22 Adopted Budget	Increase/ (Decrease) ^(a)
51000-52000	SALARIES	\$87,848,897	\$87,856,082	\$86,698,082	\$90,535,521	\$2,686,625
<p>These accounts include salaries and special pays such as: Call-Back, Hazard, Night Shift, Rideshare, Skill-Based, Stand-By and Overtime. The FY 2021-22 Adopted Budget reflects a 13 percent vacancy rate (actual vacant positions are currently at 14.9 percent). The FY 2021-22 Adopted 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 main reason for the increase from the FY 2020-21 Adopted Budget is the adopted personnel actions.</p>						
53000	EMPLOYEE BENEFITS	\$3,748,101	\$3,748,101	\$3,675,176	\$3,936,136	\$188,035
<p>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.</p>						
54000	RETIREMENT	\$36,740,786	\$36,740,786	\$36,143,573	\$39,352,693	\$2,611,907
<p>This account includes the employer's share of the employee retirement system contributions. The increase from the FY 2020-21 Adopted Budget is based on the contribution rates provided by the San Bernardino County Retirement Association (SBCERA) and the adopted personnel actions.</p>						
55000	INSURANCE	\$12,412,859	\$12,418,638	\$12,216,776	\$12,404,131	(\$8,728)
<p>This account includes employer's share of health, life, dental, vision care and accident insurance.</p>						

^(a) FY 2021-22 Adopted Budget vs. FY 2020-21 Adopted Budget.

SALARIES & EMPLOYEE BENEFITS

South Coast AQMD Personnel Summary – Authorized/Funded Positions						
Positions as of	Mid-Year Adjustments		Positions as of	FY 2021-22 Request		Positions as of
June 30, 2020	Add	Delete	June 30, 2021	Add	Delete	July 1, 2021
946	6	(3)	949	16	(8)	957

Fiscal Year 2020-21 Mid-Year Changes in Authorized/Funded Positions				
Office	Position	Add	Delete	Total
Executive Office	Diversity, Equity & Inclusion Officer	1	-	1
Executive Office	Senior Administrative Secretary	1	-	1
Legislative & Public Affairs/Media Office	Secretary	1	-	1
Legislative & Public Affairs/Media Office	Senior Public Affairs Manager	1	-	1
Science & Technology Advancement	Air Quality Instrument Specialist II	-	(2)	(2)
Science & Technology Advancement	Air Quality Specialist	2	-	2
Science & Technology Advancement	Senior Air Quality Instrument Specialist	-	(1)	(1)
Total Mid-Year Changes		6	(3)	3

Fiscal Year 2021-22 Adopted Personnel Actions				
Office	Position	Add	Delete	Total
Administrative and Human Resources	Human Resources Technician	1	-	1
Compliance and Enforcement	Air Quality Inspector II	-	(1)	(1)
Compliance and Enforcement	Air Quality Inspector III	1	-	1
Compliance and Enforcement	Office Assistant	-	(5)	(5)
Compliance and Enforcement	Senior Office Assistant	3	-	3
Compliance and Enforcement	Supervising Office Assistant	1	-	1
Executive Office	Senior Public Information Specialist	2	-	2
Finance	Financial Analyst	1	-	1
Science & Technology Advancement	Air Quality Chemist	-	(2)	(2)
Science & Technology Advancement	Air Quality Inspector II	1	-	1
Science & Technology Advancement	Air Quality Specialist	1	-	1
Science & Technology Advancement	Director Monitoring & Analysis	1	-	1
Science & Technology Advancement	Program Supervisor	2	-	2
Science & Technology Advancement	Senior Public Affairs Manager	1	-	1
Science & Technology Advancement	Staff Specialist	1	-	1
Total Fiscal Year 2021-22 Adopted Personnel Actions		16	(8)	8

SERVICES & SUPPLIES

Acct. #	Account Description	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate	FY 2021-22 Adopted Budget	Increase/ (Decrease) ^(a)
67250	INSURANCE	\$1,449,140	\$1,474,140	\$1,424,140	\$1,449,140	\$0
<p>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. South Coast AQMD 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 South Coast AQMD's insurance deductibles, and liability claim payments.</p>						
67300	RENTS & LEASES EQUIPMENT	\$212,280	\$278,017	\$278,017	\$212,280	\$0
<p>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.</p>						
67350	RENTS & LEASES STRUCTURE	\$592,843	\$810,623	\$810,623	\$591,843	(\$1,000)
<p>This account is for expenditures associated with structures and lot leases, and off-site storage rentals: Long Beach field office - \$316,543; Conference and meeting rooms - \$9,000; Air monitoring sites/Wind Stations - \$239,000; Public Meetings - \$8,000; and Bay Area office space - \$19,300 Free and low-cost public facilities are used whenever possible for public workshops and informational meetings. The FY 2021-22 Adopted Budget does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.</p>						
67400	HOUSEHOLD	\$877,195	\$879,195	\$879,195	\$907,195	\$30,000
<p>This account is used for trash disposal, landscape maintenance, parking lot maintenance, janitorial supplies, and janitorial contracts. The increase from the FY 2020-21 Adopted Budget is due to unavoidable costs relating to COVID-19.</p>						
67450	PROFESSIONAL & SPECIAL SERVICES	\$8,340,974	\$10,394,041	\$10,024,041	\$8,796,501	\$455,527
<p>This account is for services rendered to South Coast AQMD by outside contractors. The FY 2021-22 Professional & Special Services supporting detail is located at the end of this section. The increase from the FY 2020-21 Adopted Budget is a result of expenditures related to legislative consulting and outreach and to develop a Diversity, Equity, & Inclusion program. The FY 2021-22 Adopted Budget also does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.</p>						

^(a)FY 2021-22 Adopted Budget vs. FY 2020-21 Adopted Budget.

SERVICES & SUPPLIES

Acct. #	Account Description	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate	FY 2021-22 Adopted Budget	Increase/ (Decrease)^(a)
67460	TEMPORARY AGENCY SERVICES	\$766,048	\$1,125,348	\$1,125,348	\$772,048	\$6,000
<p>Funds budgeted in this account are used for specialized temporary services that supplement staff in support of South Coast AQMD 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 increase from the FY 2020-21 Adopted Budget reflects an anticipated increase in the use of temporary services. The FY 2021-22 Adopted Budget does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.</p>						
67500	PUBLIC NOTICE & ADVERTISING	\$510,966	\$584,159	\$563,157	\$507,623	(\$3,343)
<p>This account is used for legally required publications such as Requests for Proposals, Requests for Quotations, personnel recruitment, public outreach, advertisement of South Coast AQMD Governing Board and Hearing Board meetings, and public notification of South Coast AQMD rulemaking activities.</p>						
67550	DEMURRAGE	\$161,680	\$167,702	\$167,702	\$161,680	\$0
<p>This account is for various freight and cylinder charges as well as workspace reconfigurations and personnel moves. The FY 2021-22 Adopted Budget does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.</p>						
67600	MAINTENANCE OF EQUIPMENT	\$810,864	\$1,213,239	\$1,213,239	\$815,470	\$4,606
<p>This account is for maintenance costs of South Coast AQMD equipment such as: mainframe computer hardware, phone switch, air monitoring equipment, print shop equipment, copiers, and audio-visual equipment. The increase from the FY 2020-21 Adopted Budget is due to a one-time project budgeted in FY 2021-22. The FY 2021-22 Adopted Budget also does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.</p>						
67650	BUILDING MAINTENANCE	\$1,002,479	\$1,056,771	\$1,056,771	\$1,022,479	\$20,000
<p>This account reflects expenditures for maintaining South Coast AQMD offices and air monitoring stations. The account also includes the following: a contingency amount for unplanned repairs; Gateway Association dues; elevator maintenance; energy management; and compressor services. The FY 2021-22 Adopted Budget does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.</p>						

^(a)FY 2021-22 Adopted Budget vs. FY 2020-21 Adopted Budget.

SERVICES & SUPPLIES

Acct. #	Account Description	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate	FY 2021-22 Adopted Budget	Increase/ (Decrease)^(a)
67700	AUTO MILEAGE	\$110,627	\$198,134	\$170,042	\$106,127	(\$4,500)
<p>This account is used to reimburse employees for the cost of using personal vehicles while on South Coast AQMD 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 South Coast AQMD-related business, conferences, and seminars and to attend various community, business and intergovernmental events. The decrease from the FY 2020-21 Adopted Budget is a result of less travel to in-person events. The FY 2021-22 Adopted Budget also does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.</p>						
67750	AUTO SERVICE	\$470,000	\$471,500	\$288,167	\$470,000	\$0
<p>This account is used for the maintenance, towing, repair, and expired CNG tank replacement of South Coast AQMD fleet vehicles.</p>						
67800	TRAVEL	\$364,696	\$437,691	\$437,691	\$340,696	(\$24,000)
<p>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 decrease from the FY 2020-21 Adopted Budget is due to the decreased number of in-person legislative hearings and meetings as a result of the COVID-19 pandemic. The FY 2021-22 Adopted Budget does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.</p>						
67850	UTILITIES	\$1,989,620	\$1,869,630	\$1,769,630	\$1,967,620	(\$22,000)
<p>This account is used to pay gas, water, and electricity costs at the South Coast AQMD's headquarters building, the Long Beach field office, and air monitoring stations. The decrease from the FY 2020-21 Adopted Budget reflects the anticipated level of expenditures for FY 2021-22.</p>						
67900	COMMUNICATIONS	\$907,800	\$949,865	\$949,865	\$898,884	(\$8,916)
<p>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 decrease from the FY 2020-21 Adopted Budget reflects the anticipated level of expenditures for FY 2021-22. The FY 2021-22 Adopted Budget also does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.</p>						
67950	INTEREST EXPENSE	\$3,353,106	\$3,353,106	\$3,353,106	\$3,186,361	(\$166,745)
<p>This account is for the interest due on the 1995 and 2004 Pension Obligation Bonds. The decrease from the FY 2020-21 Adopted Budget reflects scheduled payments for FY 2021-22.</p>						

^(a)FY 2021-22 Adopted Budget vs. FY 2020-21 Adopted Budget.

SERVICES & SUPPLIES

Acct. #	Account Description	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate	FY 2021-22 Adopted Budget	Increase/ (Decrease)^(a)
68000	CLOTHING	\$53,508	\$70,228	\$70,228	\$78,508	\$25,000
<p>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 2020-21 Adopted Budget reflects the anticipated level of expenditures for FY 2021-22.</p>						
68050	LABORATORY SUPPLIES	\$557,000	\$600,827	\$537,607	\$557,000	\$0
<p>This account is used to purchase various supplies such as chemicals, calibration gases and glassware for laboratory services. The FY 2021-22 Adopted Budget reflects no change in anticipated needs. The FY 2021-22 Adopted Budget also does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.</p>						
68060	POSTAGE	\$468,158	\$502,708	\$472,708	\$432,158	(\$36,000)
<p>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 decrease from the FY 2020-21 Adopted Budget reflects the anticipated level of expenditures for FY 2021-22.</p>						
68100	OFFICE EXPENSE	\$1,514,905	\$1,649,340	\$1,599,340	\$1,538,421	\$23,516
<p>This account is used for the purchase of office supplies, computer hardware and software under \$5,000, photocopier supplies, print shop and graphic art supplies, and stationery and forms. The increase from the FY 2020-21 Adopted Budget reflects an increase in PeopleSoft maintenance license fee. The FY 2021-22 Adopted Budget does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.</p>						
68200	OFFICE FURNITURE	\$24,000	\$98,621	\$98,621	\$48,000	\$24,000
<p>This account is for office furniture under \$5,000. The increase in the FY 2021-22 Adopted Budget reflects an anticipated increase in needs due to staffing changes.</p>						
68250	SUBSCRIPTIONS & BOOKS	\$178,574	\$291,036	\$291,036	\$179,074	\$500
<p>This account is used to purchase reference materials, magazine subscriptions, books, and on-line database legal research services. The increase in the FY 2021-22 Adopted Budget reflects an anticipated increase in needs due to staffing changes.</p>						

^(a)FY 2021-22 Adopted Budget vs. FY 2020-21 Adopted Budget.

SERVICES & SUPPLIES

Acct. #	Account Description	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate	FY 2021-22 Adopted Budget	Increase/ (Decrease)^(a)
68300	SMALL TOOLS, INSTRUMENTS, EQUIPMENT	\$177,276	\$271,284	\$271,284	\$177,276	\$0
<p>This account covers the purchase of small tools and equipment for air monitoring stations, laboratory, and headquarters building maintenance. The FY 2021-22 Adopted Budget also does not include amounts for federally funded grant programs. Expenditure appropriations will occur mid-year for these programs.</p>						
68400	GAS & OIL	\$292,021	\$262,021	\$189,896	\$292,021	\$0
<p>This account is for the purchase of gasoline, oil, and alternative fuels for the South Coast AQMD fleet. The FY 2021-22 Adopted Budget reflects no change in anticipated needs.</p>						
69500	TRAINING/CONF/ TUITION/BOARD EXP	\$995,807	\$954,392	\$952,164	\$992,807	(\$3,000)
<p>This account is used for tuition reimbursement, conference and training registrations, certain costs associated with South Coast AQMD's Governing and Hearing Boards and advisory groups, and training-related travel expenditures. The FY 2020-21 Adopted Budget reflects a decrease for offsite meetings and per-diem.</p>						
69550	MEMBERSHIPS	\$71,428	\$246,428	\$246,428	\$76,428	\$5,000
<p>This account provides for South Coast AQMD membership in scientific, clean fuels, advanced technology, and related environmental business/policy organizations. Membership costs are anticipated to increase from the FY 2020-21 Adopted Budget.</p>						
69600	TAXES	\$59,000	\$66,131	\$66,131	\$64,500	\$5,500
<p>This account is for unsecured property and use taxes, fuel taxes, and sales taxes. The FY 2021-22 Adopted Budget reflects the increase in expenditures for necessary licenses and permits fees.</p>						
69650	AWARDS	\$69,023	\$79,023	\$79,023	\$69,023	\$0
<p>This account covers employee service awards for continuous service, employee recognition programs, plaques/awards the South Coast AQMD may present to individuals/businesses/community groups for outstanding contributions towards air quality goals, and promotional items for community events. The FY 2021-22 Adopted Budget reflects no change in the anticipated level of expenditures.</p>						
69700	MISCELLANEOUS EXPENSES	\$249,525	\$240,345	\$240,345	\$245,525	(\$4,000)
<p>This account is to record expenditures that do not fall in any other account such as South Coast AQMD advisory group per diems, meeting and event expenses, and sponsorships. The decrease from the FY 2020-21 Adopted Budget reflects the anticipated level of expenditures for FY 2021-22.</p>						

^(a)FY 2021-22 Adopted Budget vs. FY 2020-21 Adopted Budget.

SERVICES & SUPPLIES

Acct. #	Account Description	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate	FY 2021-22 Adopted Budget	Increase/ (Decrease) ^(a)
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.						
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	\$3,840,443	\$3,840,443	\$3,840,443	\$4,006,881	\$166,438
This account reflects the principal due on the 1995 and 2004 pension obligation bonds. The increase from the FY 2020-21 Adopted Budget reflects scheduled payments for FY 2021-22.						

^(a)FY 2021-22 Adopted Budget vs. FY 2020-21 Adopted Budget.

SERVICES & SUPPLIES

Fiscal Year 2021-22 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	200,000
	Dist. General Overhead	Health Reimbursement Arrangement Plan Administration	5,000
	Dist. General Overhead	Insurance Brokerage	52,000
	Dist. General Overhead	LACERA OPEB Actuary Services	20,000
	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	2,168
	Dist. General Overhead	Security Guard Services	565,114
	Dist. General Overhead	Wellness Program	35,312
	Sub-total District General		\$1,273,089
Governing Board	Operational Support	Board Member Assistant/Consultants	\$807,784
	Sub-total Governing Board		\$807,784
Executive Office	Develop Programs	Professional & Special Services	\$75,000
	Develop Programs	Diversity, Equity, & Inclusion Programs	100,000
	Sub-total Executive Office		\$175,000
Finance	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	E-Check Fee	3,000
	Operational Support	Financial Audit	57,956
	Operational Support	Financial Consultant for Treasury Management	23,000
	Operational Support	LA County Treasurer Office - PGP Maintenance	1,650
	Sub-total Finance		\$160,606
Legal	Ensure Compliance	Experts/Court Reporters/Attorney Services	\$30,000
	Ensure Compliance	Litigation Counsel	126,001
	Ensure Compliance	Software Maintenance & Licensing	40,000
	Operational Support	Specialized Legal Services	50,000
	Sub-total Legal		\$246,001

SERVICES & SUPPLIES

Fiscal Year 2021-22 Professional & Special Services Detail by Office (cont.)			
Office	Program	Contract Description	Amount
Administrative & Human Resources	Operational Support	In-house Training Classes	\$4,000
	Operational Support	Medical Services Provider	24,250
	Operational Support	NEOGOV Multiple Contracts	65,907
	Operational Support	Occupational Health Services	23,844
	Operational Support	Test Development	15,000
	Operational Support	Third-Party Claims Administrator for Workers Compensation	21,792
	Operational Support	Expand Respiratory program	43,356
	Sub-total Administrative & Human Resources		
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		
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 (MailShield) 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/DPO Maintenance	10,000
	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	

SERVICES & SUPPLIES

Fiscal Year 2021-22 Professional & Special Services Detail by Office (cont.)			
Office	Program	Contract Description	Amount
Information Management (cont.)	Operational Support	Internet Filtering (SmartFilter) 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
	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	South Coast AQMD Web App Modifications	20,000
	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		

SERVICES & SUPPLIES

Fiscal Year 2021-22 Professional & Special Services Detail by Office (cont.)			
Office	Program	Contract Description	Amount
Planning, Rule Development, & Area Sources	Ensure Compliance	AB 2588 Printing and Mailing	\$7,000
	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	25,000
	Monitoring Air Quality	Maintain Wind Stations and Analyze Data	60,000
	Monitoring Air Quality	MATES V	20,000
	Monitoring Air Quality	Meteorological Data Services	15,000
	Develop Rules	Mobile Source Related Data Licenses and Subscriptions	125,000
	Develop Rules	PM and Ozone Model Consulting	90,000
	Develop Programs	Rule 2202 Computer System Maintenance	15,000
	Develop Programs	Rule 2202 EMovers System Maintenance	15,000
	Ensure Compliance	Rules 1118 and 1118.1 Notifications	30,000
	Develop Programs	SIP, AQMP and Rule Printing	16,000
	Develop Programs	Software, Data Products, and Technical Support for Economic Modeling	150,000
	Develop Rules	Strategic and Logistical Support for Partnership Building in China	35,000
	Develop Rules	Technical Assessment in of Regional Modeling	75,000
	Ensure Compliance	Technology Assessment Studies	20,000
	Develop Rules	Shipping Data Licenses and Subscriptions	14,200
	Ensure Compliance	AB 2588 Public Notification Meeting Interpretive Services	3,500
	Develop Programs	Shipping Special Studies	50,000
Ensure Compliance	Language Interpretation/Translation Services	5,000	
Sub-total Planning, Rule Development & Area Sources			\$1,020,700
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	367,005
	Policy Support	Graphics & Printing	33,616
	Policy Support	Graphics, Printing & Outreach Materials	4,000
	Policy Support	Legislative Advocacy - Sacramento	465,000
	Policy Support	Legislative Advocacy - Washington DC	665,130
	Policy Support	Legislative Computer Services	10,000

SERVICES & SUPPLIES

Fiscal Year 2021-22 Professional & Special Services Detail by Office (cont.)			
Office	Program	Contract Description	Amount
Legislative & Public Affairs/Media Office (cont.)	Customer Service & Business Assistance	Multi-Lingual Translation - Public Participation	\$20,000
	Policy Support	News Release Services	9,000
	Policy Support	Photographic and Video Services	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		\$1,705,851
Science & Technology Advancement	Ensure Compliance	Laboratory Analytical Services	\$15,000
	Ensure Compliance	Rule 1180	250,000
	Ensure Compliance	Source Testing Services	30,000
	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	300,000
	Develop Programs	Technical Assistance, Expert Consultation, Outreach/Education – Prop 1B	75,000
	Ensure Compliance	Technical Support for Air Monitoring and Community Complaint Resolution	35,000
	Sub-total Science & Technology Advancement		\$1,705,000
Engineering & Permitting	Operational Support	Workspace Reconfiguration	\$2,500
	Sub-total Engineering & Permitting		\$2,500
Compliance & Enforcement	Ensure Compliance	Compliance Notice Printing	\$4,000
	Ensure Compliance	Lab Analysis Services for R1176 and other air samples	5,000
	Operational Support	Workspace Reconfiguration	3,500
	Sub-total Compliance & Enforcement		\$12,500
Total Professional & Special Services			\$8,796,501

CAPITAL OUTLAYS, BUILDING REMODELING & TRANSFERS OUT

Acct. #	Account Description	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate	FY 2021-22 Adopted Budget	Increase/ (Decrease) ^(a)
77000	CAPITAL OUTLAYS	\$926,000	\$1,702,487	\$1,702,487	\$1,850,000	\$924,000

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 FY 2021-22 Adopted Budget reflects projects that are either offset by revenue or critical for operational support. Depending on funding availability, budget will be requested mid-year for additional projects. The FY 2021-22 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 2021-22 is provided at the end of this section.

^(a)FY 2021-22 Adopted Budget vs. FY 2020-21 Adopted Budget.

Acct. #	Account Description	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate	FY 2021-22 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 FY 2021-22.

^(a)FY 2021-22 Adopted Budget vs. FY 2020-21 Adopted Budget.

Acct. #	Account Description	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate	FY 2021-22 Adopted Budget	Increase/ (Decrease) ^(a)
99950	TRANSFERS OUT	\$841,353	\$1,276,989	\$1,276,989	\$841,353	\$0

The FY 2021-22 Adopted Budget includes a transfer to the Health Effects Research Fund, pursuant to Governing Board policy.

^(a)FY 2021-22 Adopted Budget vs. FY 2020-21 Adopted Budget.

CAPITAL OUTLAYS, BUILDING REMODELING & TRANSFERS OUT

Fiscal Year 2021-22 Capital Outlays Detail				
Office	Program	Category	Description	Amount
Compliance & Enforcement	Ensure Compliance	New	Portable Toxic Vapor Analyzer (TVA)/Flame Ionization Detectors (FIDs)	\$27,000
	Sub-total Compliance & Enforcement			\$27,000
District General	Operational Support	N/A	<u>Unbudgeted Capital Outlay</u> - This amount is set aside for unanticipated needs or emergency situations to avoid interruption of operations.	\$75,000
	Operational Support	N/A	Phone system hardware upgrade	100,000
Sub-total District General			\$175,000	
Information Management	Operational Support	New	Misc. telecommunication upgrade/enhancement	\$35,000
	Operational Support	New	Mobile app enhancements	90,000
	Operational Support	New	IVR system upgrade	50,000
	Operational Support	New	Migrate CLASS Compliance to web-based application	200,000
Sub-total Information Management			\$375,000	
Planning, Rule Development & Area Sources	Develop Programs	New	AB 2766 annual report online submittal portal	\$70,000
	Sub-total Planning, Rule Development & Area Sources			\$70,000
Science & Technology Advancement	Advance Clean Air Technology	New	Advanced technology vehicles and infrastructure	\$285,000
	Monitoring Air Quality	New	Replacement instruments for gaseous and particulate measurements	328,000
	Ensure Compliance	New	Gas Chromatograph equipped with Mass Spectrometers	400,000
	Monitoring Air Quality	New	Source-level SCD for speciated sulfur analysis	85,000
	Monitoring Air Quality	New	Karl Fisher auto-titrator unit with analytical balance and PC	70,000
	Ensure Compliance	New	Automated Wilhelmy Plate Tensiometer	35,000
Sub-total Science & Technology Advancement			\$1,203,000	
Total Capital Outlays			\$1,850,000	

**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
ADOPTED GOALS AND PRIORITY OBJECTIVES
FOR FY 2021-2022**

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 South Coast AQMD’s Mission in Fiscal Year 2021-22.

GOAL I. Achieve Clean Air Standards.

Priority Objective		Performance Indicator	Performance Measurement
1	Development and Implementation of Air Quality Management Plans	Adherence to development, adoption and implementation schedules for rules related to Air Quality Management Plans.	Complete six rule adoptions and/or actions that result in achievements towards 2016 AQMP emissions reductions. Hold at least four AQMP advisory group meetings for 2022 AQMP development. Issue draft 2022 AQMP by Fall 2021.
2	Secure Incentive Funding for Emissions Reduction	Dollar amount of new funding sources for pollution reduction projects.	Secure \$250 million of new funding sources.
3	Implementation of AB 617 in Designated Communities	Develop air monitoring and emissions reduction plans for the 2020-designated community. Implement plans for each of the five communities designated in 2018 and 2019.	Implementation of air monitoring and emissions reduction plans for the five communities designated in 2018 and 2019, and development of these plans for the one new community.
4	Ensure Efficient Air Monitoring and Laboratory Operations	Achieve acceptable completion of valid data points out of the scheduled measurements in the South Coast AQMD 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 100% 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 at or near 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	Incentive Programs	% of grant money executed in contracts.	50% of grant money contracted within six months after receipt of funds.

GOAL I. Achieve Clean Air Standards. (continued)

Priority Objective		Performance Indicator	Performance Measurement
9	Complete Final Report for the fifth Multiple Air Toxics Exposure Study (MATES V) and implementation of the MATES V Advanced Monitoring projects.	Complete written report of fixed-site monitoring data, emission inventory and health risk modeling. Complete implementation of the remaining three Advanced Monitoring projects.	Complete written report of fixed-site monitoring data, emission inventory and health risk modeling. Complete implementation of the remaining three Advanced Monitoring projects.

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	Number of large community outreach events conducted in each County and effective information distribution for South Coast AQMD programs that achieve clean air.	Conduct/participate in one large community outreach event per quarter, including one in each County, starting six months after it is safe to have large gatherings. Develop and implement SOPs to provide information to the public as quickly and accurately as possible.
3	Timely Investigation of Community Complaints	Initiate complaint investigation within two hours of complaint receipt.	During normal South Coast AQMD business hours, contact 90% of complainants within two hours of complaint receipt. Post widespread complaints on social media.
4	Social Media Efforts	Percentage increase in number of social media followers as well as increase audience engagement through impressions (views) of shared information via outreach on South Coast AQMD events, programs and major incidents. Contract with an outside consultant to form an internal committee to develop social media recommendations for Board approval.	15% to 20% increase in social media followers. Continue efforts to increase impressions and engagement on posts and/or campaigns with a monthly average goal of 2,400 Instagram impressions /8,000 Facebook impressions/48,000 Twitter impressions on posts. Present recommendations to the Board.
5	School Educational Outreach	Number of classrooms participating in the air quality education program in environmental justice communities. Develop materials for other grade levels.	Provide curriculums to 300 high schools, 100 middle schools, and 20 elementary schools throughout the four Counties in environmental justice communities and teach at schools as requested when schools are back in session. Develop air quality teaching materials for schools. Develop curriculum that can be used by any school.

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 prior to the meeting.	100% of Stakeholder and Working Group meeting agendas with materials made available to the public three days prior to the meeting. Address the ability to know meeting participants.
3	Maintain a Well Informed Staff	Number of staff information sessions offered and conducted.	Conduct 12 equity related events and six information sessions/training sessions on other topics for all staff.
4	Partner with Public Agencies, Stakeholder Groups, & Business Community	Number of meetings with Permit Streamlining Task Force subcommittee and stakeholders.	Conduct 2 meetings of the Permit Streamlining Task Force subcommittee and stakeholders.
5	Timely Financial Monitoring	Timely budgetary financial reporting.	Submit quarterly budgetary financial reports to the Governing Board within six working days of the end of the quarter for quarters 1-3. Submit the 4 th quarter report within six working days of the end of July.
6	Employee Affinity Groups	Support Employee Affinity Groups.	Establishment of Employee Affinity Groups; development of goals and objectives of these groups in alignment with agency priorities.
7	Training and Development	Develop job related equity professional development training that increases staff's awareness and cultural competency.	Conduct one training/activity per quarter.

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 South Coast AQMD'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 analyses 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 South Coast AQMD rules for existing major and small stationary sources.

- (A) Verify compliance with South Coast AQMD 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 Notices 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 South Coast AQMD 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 access and input into the regulatory and policy processes of South Coast AQMD.
- (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 and 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-related 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 South Coast AQMD 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.

PROGRAM CATEGORIES

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 South Coast AQMD'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.

PROGRAM CATEGORIES

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), 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 South Coast AQMD offices to function properly. Services include facility administration, human resources and financial services.
- (B) Provide information management services in support of all South Coast AQMD operations, including automation of permitting and compliance records, systems analysis and design, computer programming and operations, records management, and library services.
- (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).

PROGRAM CATEGORIES

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 and federal legislation.

- (A) Track changes to the state and federal budgets that may affect South Coast AQMD.
- (B) Respond to Congressional and Senatorial inquiries regarding South Coast AQMD programs, policies or initiatives.
- (C) Assist South Coast AQMD consultants in identifying potential funding sources and securing funding for South Coast AQMD 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, various Rule working groups, as well as ad hoc committees established from time to time.

REVENUE CATEGORIES

I. **Allocatable**

A portion of South Coast AQMD revenue offsets operational support costs of the South Coast AQMD.

1a Allocatable South Coast AQMD: 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)**

XX. **State Grant**

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 based on Full-Time Equivalents (FTEs). 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 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 adopted changes (+/-), and the adopted 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, adopted changes (+/-) and the adopted 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 2020-21	+/-	FTEs FY 2021-22	Expenditures FY 2020-21	+/-	Expenditures FY 2021-22	Revenue Categories
1	08 001	I	LEG	AB2766/Mob Src/Legal Advice	AB2766 Leg Adv: Trans/Mob Source	0.05	0.00	0.05	\$ 10,777	\$ 38	\$ 10,815	IX
2	04 003	III	FIN	AB2766/MSRC	MSRC Program Administration	0.35	0.00	0.35	51,582	187	51,769	IX
3	08 003	I	LEG	AB2766/MSRC	Legal Advice: MSRC Prog Admin	0.10	0.00	0.10	21,553	76	21,630	IX
4	44 003	I	STA	AB2766/MSRC	Mob Src Review Comm Prog Admin	0.50	0.00	0.50	84,528	2,499	87,027	IX
5	44 004	I	STA	Advisory Group/Small Business	AB2766 Admin Discretionary Prog	3.00	0.00	3.00	507,166	14,993	522,160	IX
6	44 012	I	STA	AQMP/Control Tech Assessment	Tech Supp: Quantify Cost Effec	1.00	-0.15	0.85	169,055	(21,110)	147,945	VIII
7	44 019	I	STA	AB617-Prog Develop	AB617-Program Development	0.00	39.60	39.60	-	6,892,507	6,892,507	IX
8	04 030	I	FIN	AB134	AB134	2.00	0.00	2.00	294,755	1,068	295,823	IX
9	08 030	I	LEG	AB134	AB134	1.50	-0.25	1.25	323,299	(52,929)	270,370	IX
10	44 030	I	STA	AB134	AB134	5.00	-1.00	4.00	845,277	(149,064)	696,213	IX
11	60 030	I	CE	AB134	AB134	0.25	0.00	0.25	38,329	1,195	39,524	IX
12	44 039	I	STA	Admin/Office Mgt/Tech Adv	Admin Support/Coordination	0.77	0.00	0.77	130,173	3,848	134,021	VIII
13	44 048	I	STA	Admin/Prog Mgmt/Tech Advance	Overall TA Program Mgmt/Coord	1.55	0.00	1.55	262,036	7,747	269,782	VIII
14	44 086	I	STA	Airshed FC Bus	Airshed FC Bus	0.00	0.25	0.25	-	43,513	43,513	V
15	44 087	I	STA	Airshed OGV	Airshed OGV	0.00	0.25	0.25	-	43,513	43,513	V
16	44 088	II	STA	Aliso Canyon SEP	Aliso Cyn Air Filtration SEP	0.00	0.25	0.25	-	43,513	43,513	XVII
17	44 095	I	STA	CA Natural Gas Veh Partnership	CA Natural Gas Veh Partnership	0.10	-0.05	0.05	16,906	(8,203)	8,703	VIII
18	44 096	I	STA	CAPP Year 2-SB 856	CAPP Year 2-SB 856	0.00	7.75	7.75	-	1,343,066	1,343,066	IX
19	44 097	I	STA	CAPP Year 3-AB 74	CAPP Year 3-AB 74	0.00	3.00	3.00	-	522,160	522,160	IX
20	44 121	I	STA	China Cln Shipping	China Partnership Cleaner Shpng	0.90	-0.50	0.40	152,150	(82,529)	69,621	IX
21	04 130	III	FIN	Clean Fuels/Contract Admin	Clean Fuels Contract Admin/Monitor	0.15	0.00	0.15	22,107	80	22,187	VIII
22	44 130	I	STA	Clean Fuels/Contract Admin	Admin/Project Supp for TA Cont	3.90	-0.90	3.00	659,316	(137,156)	522,160	VIII
23	08 131	I	LEG	Clean Fuels/Legal Advice	Legal Advice: Clean Fuels	0.15	0.00	0.15	32,330	114	32,444	VIII
24	44 132	I	STA	Clean Fuels/Mobile Sources	Dev/Impl Mobile Src Proj/Demo	1.00	5.00	6.00	1,454,055	940,319	2,394,374	VIII
25	44 134	I	STA	Clean Fuels/Stationary Combust	Dev/Demo Clean Combustion Tech	0.30	-0.10	0.20	50,717	(15,906)	34,811	VIII
26	44 135	I	STA	Clean Fuels/Stationary Energy	Dev/Demo Alt Clean Energy	0.55	0.00	0.55	92,980	2,749	95,729	VIII
27	44 136	I	STA	Clean Fuels/Tech Transfer	Disseminate Low Emiss CF Tech	1.80	-0.80	1.00	304,300	(130,246)	174,053	VIII
28	44 187	I	STA	DERA Sch Bus Repl	DERA Sch Bus Repl Admin/Impl	0.10	-0.10	0.00	16,906	(16,906)	-	V
29	44 188	I	STA	DERA FY 13 Veh Repl	DERA Vehicle Repl Admin/Impl	0.10	-0.10	0.00	16,906	(16,906)	-	XVII
30	44 191	I	STA	DERA FY16 Locomotive	DERA FY16_LOCOM	0.00	0.05	0.05	-	8,703	8,703	V
31	44 194	I	STA	DERA FY18 Dray Trck	DERA FY18 Dray Trck	0.00	0.10	0.10	-	17,405	17,405	XVII
32	44 196	I	STA	DERA FY20 TRU	DERA FY20 TRU Electrification	0.00	0.45	0.45	-	78,324	78,324	V
33	44 203	I	STA	EFMP Program Support	EFMP Program Support	5.00	0.00	5.00	845,277	24,989	870,266	XVII
34	44 258	I	STA	FARMER Grant	Fund Ag Replacement Measures	1.50	0.00	1.50	253,583	7,497	261,080	XVII
35	44 272	I	STA	FY19 TAG Volvo	FY 19 TAG Volvo Switch-On	0.00	0.25	0.25	-	43,513	43,513	V
36	44 356	I	STA	GGRF ZEDT Demo	GGRF ZEDT Demo Admin	1.10	-0.70	0.40	185,961	(116,340)	69,621	XVII
37	44 369	I	STA	In Use Em Testing	In Use Em Testing	0.00	0.30	0.30	-	52,216	52,216	XVII
38	44 453	I	STA	Mob Src: Emiss Inven Method	Rvw CARB/US EPA emissions inven methodology	1.50	-1.50	0.00	253,583	(253,583)	-	VIII,IX
39	04 457	III	FIN	Mobile Source/Moyer Adm	Carl Moyer: Contract/Fin Admin	1.02	0.00	1.02	150,325	545	150,870	IX
40	08 457	I	LEG	Mob Src/C Moyer/Leg Advice	Moyer/implm/Program Dev	0.10	0.00	0.10	21,553	76	21,630	IX
41	16 457	I	AHR	MS/Carl Moyer Admin	C Moyer/Contractor Compliance	0.03	0.00	0.03	5,018	(105)	4,913	IX
42	44 457	I	STA	Mob Src/C Moyer Adm/Outreach	Carl Moyer: impl/Admin Grant	13.90	-6.00	7.90	2,649,870	(974,849)	1,675,020	IX
43	44 459	I	STA	Mob Src/C Moyer/impl/Prg Dev	Moyer/implm/Program Dev	4.00	0.25	4.25	676,222	83,300	759,522	IX
44	44 460	I	STA	VIP Admin	VIP Admin/Outreach/impl	0.50	0.00	0.50	84,528	2,499	87,027	IX
45	44 489	I	STA	One Stop Shop Proj	One Stop Shop Pilot Proj	0.00	0.10	0.10	-	17,405	17,405	IX
46	44 533	I	STA	POLB AMECS Demo	POLB AMECS Demo-Admin/Impl	0.10	0.00	0.10	16,906	500	17,405	XVII

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.

Advance Clean Air Technology (Cont.)
Work Program by Category

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2020-21	+/-	FTEs FY 2021-22	Expenditures FY 2020-21	+/-	Expenditures FY 2021-22	Revenue Categories
47	04 542	I	FIN	Prop 1B:Goods Movement	Contracts/Finance Admin	0.50	0.00	0.50	73,689	267	73,956	IX
48	16 542	I	AHR	Prop 1B:Goods Movement	Prop 1B: Goods Movement	0.03	0.00	0.03	5,018	(105)	4,913	IX
49	04 544	I	FIN	Prop 1B:Low Emiss Sch Bus	Grants/Finance Admin	0.05	0.00	0.05	7,369	27	7,396	IX
50	44 677	I	STA	School Bus/Lower Emission Prog	School Bus Program Oversight	2.00	0.20	2.20	338,111	44,806	382,917	IX
51	44 734	I	STA	Air Shed Volvo	Targeted Air Shed Volvo Admin	0.00	0.25	0.25	-	43,513	43,513	V
52	44 737	I	STA	Air Shed Daimler	Targeted Air Shed Daimler Admin	0.00	0.40	0.40	-	69,621	69,621	V
53	44 738	I	STA	Target Air Shed EPA	Targeted Air Shed Admin/Impl	0.50	0.00	0.50	84,528	2,499	87,027	V,XVII
54	44 740	I	STA	Tech Adv/Commercialization	Assess CFs/Adv Tech Potential	0.25	0.00	0.25	42,264	1,249	43,513	VIII
55	44 741	I	STA	Tech Adv/Non-Combustion	Dev/Demo Non-Combustion Tech	0.60	-0.40	0.20	101,433	(66,623)	34,811	VIII
56	44 816	I	STA	Transportation Research	Transport Research/Adv Systems	0.10	0.00	0.10	16,906	500	17,405	VIII
57	44 827	I	STA	VW-General Admin	VW-General Admin	2.00	0.75	2.75	338,111	131,234	469,344	XVII
58	44 840	I	STA	VW-ZE Trucks-South Coast	VW-ZE Trucks-South Coast	1.00	0.00	1.00	169,055	4,998	174,053	XVII
59	44 841	I	STA	VW-Combustion-South Coast	VW-Combustion-South Coast	1.00	0.00	1.00	169,055	4,998	174,053	XVII
60	44 856	I	STA	ZANZEFF Volvo	ZANZEFF Volvo	0.00	0.40	0.40	-	69,621	69,621	XVII

Total Advance Clean Air Technology	61.90	47.05	108.95	\$ 12,045,564	\$ 8,530,932	\$ 20,576,496
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**Customer Service and Business Assistance
Work Program by Category**

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2020-21 +/-	FTEs FY 2021-22 +/-	Expenditures FY 2020-21	Expenditures FY 2021-22 +/-	Revenue Categories		
1	04	002	III	FIN	AB2766/Mobile Source	Prog Admin: Monitor/Dist/Audit	0.10	0.00	\$ 24,738	\$(9,947)	\$ 14,791	IX
2	35	019	I	LPA	AB617-Program Develop	AB617-Program Development	0.00	6.00	-	929,485	929,485	IX
3	35	037	I	LPA	AB617-Outreach	AB617-Outreach	5.00	-5.00	881,700	(881,700)	-	IX
4	50	038	I	EP	Admin/Office Management	Dev/Coord Goals/Policies/Overs	3.00	0.00	520,251	8,493	528,743	lb
5	60	038	III	CE	Admin/Office Budget	Dev/Coord Goals/Policies/Overs	6.00	-1.00	919,901	(12,583)	907,318	lb
6	35	046	III	LPA	Admin/Prog Mgmt	Admin Office/Units/SuppCoord Staff	5.02	1.00	885,226	47,976	933,203	lb
7	50	047	I	EP	Admin/Operations Support	Budget/Contracts/Reports/Projects	3.00	0.00	522,751	8,493	531,243	lb
8	60	047	I	CE	Admin/Operations Support	Budget/Contracts/Reports/Projects	3.00	0.00	463,450	14,338	477,788	lb
9	35	126	II	LPA	Clean Air Connections	Coord of region-wide community group	1.00	0.00	176,340	9,557	185,897	II,IX
10	04	170	I	FIN	Billing Services	Answer/Resp/Resolv Prob & Inq	8.00	0.00	1,194,519	8,272	1,202,791	II,III,IV
11	50	200	I	EP	Economic Dev/Bus Retention	Perm Proc/Public Participation	0.10	0.00	17,342	283	17,625	III
12	35	205	II	LPA	Environmental Education	Curriculum Dev/Project Coord	0.25	0.00	44,085	2,389	46,474	II,IX,XV
13	35	240	I	LPA	Environmental Justice	Impl Board's EJ Pgrms/Policies	3.00	0.00	529,020	28,671	557,691	II,IV
14	04	260	III	FIN	Fee Review	Cmte Mtg/Fee-Related Complaint	0.10	0.00	14,738	53	14,791	II,III,IV,XV
15	35	260	III	LPA	Fee Review	Cmte Mtg/Fee-Related Complaint	0.50	0.00	88,170	4,779	92,948	II,III,IV,XV
16	50	260	III	EP	Fee Review	Fee Review Committee	0.45	0.00	78,038	1,274	79,312	II,III,IV
17	04	355	III	FIN	Grants Management	Grant Anlyz/Eval/Negot/Acc/Rpt	1.00	0.00	147,377	534	147,911	IV,V,XV
18	35	381	III	LPA	Interagency Liaison	Interact Gov Agns/Promote SCAQMD	0.15	0.00	26,451	1,434	27,885	la,XV
19	35	390	I	LPA	Intergov/Geographic Deployment	Dev/Impl Local Govt Outreach	10.50	0.00	1,889,569	100,349	1,989,918	II,IX
20	50	425	I	EP	Lobby Permit Services	Supp Perm Proc/Customer Svc	1.00	0.00	173,417	2,831	176,248	III
21	27	481	III	IM	New System Development	Dev sys in supp of Dist-wide	1.25	0.00	274,580	2,635	277,214	la,III
22	03	490	II	EO	Outreach	Publ Awareness Clean Air Prog	0.97	0.00	305,407	22,802	328,209	la
23	35	491	II	LPA	Outreach/Business	Chambers/Business Meetings	1.00	0.00	176,340	9,557	185,897	II,IV
24	35	492	II	LPA	Public Education/Public Events	Pub Events/Conf/Rideshare Fair	2.00	0.00	629,685	109,114	738,799	II,V,IX,XV
25	60	492	II	CE	Outreach/Business	Pub Events/Conf/Rideshare Fair	0.10	0.00	15,332	478	15,810	IX
26	35	496	II	LPA	Outreach/Visiting Dignitary	Tours/Briefings-Dignitary	0.25	0.00	44,085	2,389	46,474	la
27	35	514	I	LPA	Permit: Expired Permit Program	Assist w Permit Reinstatement	0.30	0.00	52,902	2,867	55,769	IV
28	50	520	I	EP	Perm Proc/Pre-Appl Mig Outreac	Pre-App Mtgs/Genl Prescreening	1.00	0.00	173,417	2,831	176,248	III
29	16	540	III	AHR	Print Shop	Printing/Collating/Binding	5.00	0.00	836,282	(17,523)	818,759	la
30	35	555	II	LPA	Public Information Center	Inform public of unhealthy air	1.00	0.00	266,340	9,557	275,897	II,V,IX
31	03	565	III	EO	Public Records Act	Comply w/ Public Req for Info	0.01	0.00	3,149	235	3,384	la
32	04	565	I	FIN	Public Records Act	Comply w/ Public Rec Requests	0.02	0.00	2,948	11	2,958	la
33	08	565	III	LEG	Public Records Act	Comply w/ Public Rec Requests	1.50	0.00	323,299	1,145	324,444	la
34	16	565	III	AHR	Public Records Act	Comply w/ Public Rec Requests	0.03	0.00	5,018	(105)	4,913	la
35	17	565	III	CB	Public Records Act	Comply w/ Public Rec Requests	0.02	0.00	4,786	(57)	4,729	la
36	26	565	III	PRA	Public Records Act	Comply w/ Public Rec Requests	0.79	0.00	140,587	2,924	143,511	la
37	27	565	III	IM	Public Records Act	Comply w/ Public Req for Info	4.75	0.00	961,303	10,013	971,315	la
38	35	565	III	LPA	Public Records Act	Comply w/ Public Req for Info	0.10	0.00	17,634	956	18,590	la

Customer Service and Business Assistance (Cont.) Work Program by Category												
#	Program Code	Goal	Office	Program	Activities	FTEs FY 2020-21 +/-	FTEs FY 2021-22 +/-	Expenditures FY 2020-21	Expenditures FY 2021-22 +/-	Revenue Categories		
39	44	565	III	STA	Public Records Act	Public Req for Info	0.62	0.00	104,814	\$ 3,099	107,913	la
40	50	565	III	EP	Public Records Act	Public Req for Info	0.25	0.00	43,354	708	44,062	la
41	60	565	III	CE	Public Records Act	Public Req for Info	0.30	0.00	45,995	1,434	47,429	la
42	04	631	III	FIN	Cash Mgmt/Refunds	Research/Doc/Prep/Proc Refunds	0.30	0.00	44,213	160	44,373	III,IV,XI
43	35	679	III	LPA	Small Business Assistance	Small Business/Financial Assistance	1.00	0.00	176,340	9,557	185,897	III
44	08	681	III	LEG	Small Business/Legal Advice	Legal Advice: SB/Fee Review	0.05	0.00	10,777	38	10,815	II,III
45	50	690	I	EP	Source Education	Prov Tech Asst To Industries	2.80	0.00	485,567	7,927	493,494	III,IV,V,XV
46	60	690	I	CE	Source Education	Prov Tech Asst To Industries	0.20	0.00	30,663	956	31,619	III,IV,V,XV
47	44	701	I	STA	Source Testing/Customer Svc	Conduct ST/Prov Data/Cust Svc	0.05	0.00	8,453	250	8,703	VI
48	35	710	I	LPA	Speakers Bureau	Coordinate/conduct speeches	0.10	0.00	17,634	956	18,590	la
49	16	720	I	AHR	Subscription Services	Rule & Gov Board Materials	0.70	0.00	117,079	(2,453)	114,626	IV,XVII
50	26	788	I	PRA	AB2588 Mailing/Venue	AB2588 Mailing/Venue	0.00	0.50	-	101,330	101,330	XVII
51	35	791	I	LPA	Toxics/AB2588	Outreach/AB 2588 Air Toxics	0.01	0.00	1,763	96	1,859	X
52	26	833	II	PRA	Rule 2202 ETC Training	Rule 2202 ETC Training	2.15	0.00	392,610	(2,041)	390,569	XI
Total Customer Service & Business Assistance							79.79	1.50	14,309,436	\$ 546,825	\$ 14,856,261	

**Develop Programs
Work Program by Category**

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2020-21 +/-	FTEs FY 2021-22 +/-	Expenditures FY 2020-21	Expenditures FY 2021-22 +/-	Revenue Categories
1	26 002	I	PRA	AB2766/Mobile Source	AB2766 Mobile Source Outreach	3.20	0.05	\$ 569,466	\$ 90,929	IX
2	44 009	I	STA	AB 1318 Mitigation	AB 1318 Projects Admr/Impl	0.05	0.00	8,453	250	XVII
3	03 010	I	EO	AQMP	Develop/Implement AQMP	0.05	0.00	15,743	1,175	II,IX
4	08 010	I	LEG	AQMP	AQMP Revision/CEQA Review	0.10	0.20	21,553	43,335	II,IV,IX
5	26 010	I	PRA	AQMP	AQMP Special Studies	2.80	0.00	514,283	10,365	IV,V,IX,XV
6	50 019	I	EP	AB617-Prog Develop	AB617-Program Development	0.00	1.00	-	176,248	IX
7	03 028	I	EO	Admin/SCAQMD Policy	Dev/Coord Goals/Policies/Overs	0.44	0.00	213,535	10,343	la
8	26 033	I	PRA	AB617-Em Reduc Plns	AB617-Em Reduc Plns	3.00	-3.00	533,874	(533,874)	IX
9	26 034	I	PRA	AB617-Emission Reduction Plans	AB617-Emission Reduction Plans	10.10	-10.10	1,797,377	(1,797,377)	IX
10	26 038	I	PRA	Admin/Office Management	Coordinate Off/Admin Activities	5.30	0.00	963,178	19,620	lb
11	26 068	II	PRA	SCAQMD Projects	Prepare Environmental Assessments	4.35	0.00	949,118	16,103	II,IV,IX
12	44 069	I	STA	AQIP Evaluation	AQIP Contract Admr/Evaluation	0.10	0.00	16,906	500	IX
13	26 102	II	PRA	CEQA Document Projects	Review/Prepare CEQA Comments	3.75	0.00	667,343	13,882	II,IX
14	26 104	I	PRA	CEQA Policy Development	ID/Develop/Impl CEQA Policy	0.50	0.00	113,979	1,851	IV,IX
15	26 121	I	PRA	China Cln Shipping	China Partnership Cleaner Shong	1.00	0.00	212,958	72,902	IX
16	26 217	I	PRA	Emissions Inventory Studies	AER Hotline/Support	0.75	0.00	133,469	2,776	II,V,IX,XV
17	26 218	I	PRA	AQMP/Emissions Inventory	Dev Emiss Inv: Forecasts/RFPs	1.25	0.00	222,448	4,627	II,IX
18	26 368	I	PRA	Incentive RFP Emiss Red Projs	Incentive Projects Admr	1.00	0.00	177,958	3,702	XVII
19	44 368	I	STA	Incentive RFP Emiss Red Projs	Incentive Projects Admr	3.00	-2.75	507,166	(463,653)	XVII
20	44 396	I	STA	Lawnmower Exchange	Lawm Mower Admr/Impl/Outreach	0.30	0.00	50,717	1,499	XVII
21	26 397	II	PRA	Lead Agency Projects	Prep Envrmt Assmts/Perm Proj	2.50	-0.50	444,895	(81,575)	III
22	26 451	I	PRA	Mob Src/CARB/EPA Monitoring	CARB/US EPA Mob Src Fuel Policies	0.40	0.00	71,183	1,481	IX
23	26 452	I	PRA	Mob Src/CEC/US DOE Monitoring	CEC/US DOE Mob Src rulemaking proposals	0.20	0.00	35,592	740	IX,XVII
24	44 458	I	STA	Mobile Source Strategies	Implement Fleet Rules	1.00	0.00	169,055	4,998	VIII
25	26 503	I	PRA	PM Strategies	PM10 Plan/Analyze/Strategy Dev	2.00	-0.80	355,916	(137,924)	II,V,XV
26	44 542	I	STA	Prop 18:Goods Movement	Prop 18:Goods Movement	2.00	0.95	413,111	195,143	IX
27	35 560	I	LPA	Public Notification	Public notif of rules/hearings	0.50	0.00	108,170	4,779	II,IV,IX
28	26 685	I	PRA	Socio-Economic	Apply econ models/Socio-econ	4.50	0.00	950,812	16,659	II,IV
29	44 702	I	STA	ST Methods Development	Eval ST Methods/Validate	0.95	0.00	160,603	4,748	II
30	44 705	I	STA	ST Sample Analysis/Air Program	Analyze ST Samples/Air Prgms	0.25	0.00	42,264	1,249	II
31	26 745	I	PRA	Rideshare	Dist Rideshare/Telecommute Prog	0.55	0.00	97,877	2,036	IX
32	26 816	I	PRA	Transportation Regional Progs	Dev AQMP Meas/Coord w/Reg Agn	0.75	0.00	133,469	2,776	V,IX
33	26 834	I	PRA	Rule 2202 Implement	Rule 2202 Proc/Sub Plans/Tech Eval	1.86	0.40	331,002	79,550	XI
34	26 836	I	PRA	Rule 2202 Support	R2202 Supt/Cmpt/Maint/WebSubmt	1.99	0.00	384,137	7,367	V,XI

Total Develop Programs	60.49	(14.55)	45.94	\$ 11,387,609	\$ (2,222,770)	\$ 9,164,838
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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 2020-21	+/-	FTEs FY 2021-22	Expenditures FY 2020-21	+/-	Expenditures FY 2021-22	Revenue Categories
1	26 019	I	PRA	AB617-Prog Develop	AB617-Program Development	0.00	29.20	29.20	\$ -	\$ 5,304,473	\$ 5,304,473	IX
2	26 031	I	PRA	AB617-BARCT Rulemaking	AB617-BARCT Rulemaking	11.95	-11.95	0.00	2,126,600	(2,126,600)	-	IX
3	50 035	I	EP	AB617-General	AB617-General	1.00	-1.00	0.00	173,417	(173,417)	-	IX
4	26 035	I	PRA	AB617-General	AB617-General	4.15	-4.15	0.00	738,526	(738,526)	-	IX
5	44 043	I	STA	Admin/Office Mgmt/Rules	Rules: Assign/Manage/Supp	0.15	0.00	0.15	25,358	750	26,108	lb
6	26 050	I	PRA	Admin/Rule Dev/PRA	Admin: Rule Development	1.10	0.00	1.10	195,754	4,072	199,826	lb
7	26 071	I	PRA	Arch Ctgs - Admin	Rdev/Aud/DB/TA/SCAQMD/Rpts/AER	0.50	0.00	0.50	88,979	1,851	90,830	XVIII
8	26 074	I	PRA	AB 197	AB 197	0.00	0.10	0.10	-	18,166	18,166	XVIII
9	26 077	I	PRA	Area Sources/Rulemaking	Dev/Eval/Impl Area Source Prog	0.25	0.00	0.25	44,490	925	45,415	II,IX
10	26 106	II	PRA	CEQA Resp Agy Proj	Review CEQA Docs/Perm Proj	0.00	0.50	0.50	-	90,830	90,830	II,III,IX
11	26 165	I	PRA	Conformity	Monitor Transp. Conformity	0.25	0.00	0.25	44,490	925	45,415	V,IX
12	26 216	I	PRA	AER Admin/Maint	AER Administration/Maintenance	0.00	1.00	1.00	-	181,660	181,660	II
13	26 257	I	PRA	Fac Based Mob Src	Facility Based Mobile Src Meas	8.25	-1.00	7.25	1,593,155	(151,119)	1,442,035	IX
14	26 362	II	PRA	Health Effects	Study Health Effect/Toxicology	0.70	-0.20	0.50	124,571	(33,741)	90,830	II,III,IX
15	26 385	I	PRA	Criteria Pollutants/Mob Srcs	Dev/Impl Intercredit Trading	0.20	0.00	0.20	35,592	740	36,332	IV,IX
16	26 449	I	PRA	Mob Src/SCAQMD Rulemaking	Prepare SCAQMD Mob Src rulemaking proposals	1.00	0.00	1.00	177,958	3,702	181,660	IX
17	44 456	I	STA	MS & AQMP Control Strategies	AQMP Control Strategies	0.30	0.00	0.30	50,717	1,499	52,216	VIII
18	26 460	I	PRA	Regional Modeling	Rule Impact/Analyses/Model Dev	5.00	0.00	5.00	959,791	113,509	1,073,300	II,V,IX
19	26 646	I	PRA	R1180 Community Mon	R1180 Comm Monitoring Refinery	0.20	0.00	0.20	35,592	740	36,332	XVII
20	50 650	I	EP	Rulemaking	Dev/Amend/Impl Rules	0.25	0.00	0.25	43,354	708	44,062	II,XV
21	08 651	I	LEG	Rules/Legal Advice	Legal Advice: Rules/Draft Regs	1.20	0.00	1.20	258,639	916	259,555	II
22	44 653	I	STA	Rulemaking/BACT	Dev/Amend BACT Guidelines	1.50	0.00	1.50	253,583	7,497	261,080	II
23	26 654	I	PRA	Rulemaking/NOX	Rulemaking/NOX	0.90	2.45	3.35	160,162	448,399	608,561	II,IV,XV
24	26 655	I	PRA	NSR/Adm Rulemaking	Amend/Develop NSR & Admin Rules	0.90	2.00	2.90	160,162	366,652	526,814	II,IV,V,XV
25	26 656	I	PRA	Rulemaking/VOC	Dev/Amend VOC Rules	0.50	0.70	1.20	88,979	129,013	217,992	II,IV,XV
26	44 657	I	STA	Rulemaking/Support PRA	Assist PRA w/ Rulemaking	1.20	0.00	1.20	202,866	5,997	208,864	II
27	50 657	I	EP	Rulemaking/Support PRA	Provide Rule Development Supp	0.25	0.00	0.25	43,354	708	44,062	II,XV
28	60 657	I	CE	Rulemaking/Support PRA	Provide Rule Development Supp	0.75	0.35	1.10	114,988	58,918	173,906	IV,XV
29	26 659	I	PRA	Rulemaking/Toxics	Develop/Amend Air Toxic Rules	11.40	-1.25	10.15	2,028,723	(184,873)	1,843,849	II,XV
30	08 661	I	LEG	Rulemaking/RECLAIM	RECLAIM Legal Adv/Related Iss	0.50	0.00	0.50	107,766	382	108,148	II
31	26 661	I	PRA	Rulemaking/RECLAIM	RECLAIM Amend Rules/Related Is	1.50	-0.80	0.70	266,937	(139,775)	127,162	II
32	44 706	I	STA	ST Sample Analysis/Air Program	Analyze ST Samples/Rules	0.25	0.00	0.25	42,264	1,249	43,513	II
33	44 708	I	STA	VOC Sample Analysis/Rules	VOC Analysis & Rptg/Rules	0.25	0.00	0.25	42,264	1,249	43,513	II,XV
34	50 752	I	EP	Title III Rulemaking	Title III Dev/Implement Rules	0.25	0.00	0.25	43,354	708	44,062	II,V,XV
35	50 773	I	EP	Title V & NSR Rulemaking-Supp	Title V Rules Dev/Amend/Impl	0.25	0.00	0.25	43,354	708	44,062	II
36	26 796	I	PRA	AB2588/Support	AB2588/Support	0.00	0.50	0.50	-	90,830	90,830	X
Total Develop Rules						56.85	16.45	73.30	\$ 10,315,738	\$ 3,289,725	\$ 13,605,464	

**Ensure Compliance
Work Program by Category**

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2020-21 +/-	FTEs FY 2021-22 +/-	Expenditures FY 2020-21	Expenditures FY 2021-22 +/-	Revenue Categories
1	44 015	I	STA	Acid Rain Program	Acid Rain CEMS Eval/Cert	0.20	0.00	\$ 33,811	\$ 1,000	II,IV
2	60 019	I	CE	AB617-Prog Develop	AB617-Program Development	0.00	5.10	-	806,289	IX
3	60 032	I	CE	AB617-Meetings	AB617-Meetings	1.00	-1.00	153,317	(153,317)	IX
4	60 033	I	CE	AB617-Inspections	AB617-Inspections	3.00	-3.00	459,950	(459,950)	IX
5	60 034	I	CE	AB617-CERP	AB617-CERP	0.10	-0.10	15,332	(15,332)	IX
6	60 036	I	CE	AB617-Complaints	AB617-Complaints	1.00	-1.00	153,317	(153,317)	IX
7	44 042	I	STA	Admin/Office Mgmt/Compliance	Compliance: Assign/Manage/Supp	0.37	0.00	62,550	1,849	lb
8	60 070	I	CE	CARB PERP Program	CARB Audits/Statewide Equip Reg	6.00	6.00	919,901	28,675	XIX
9	08 072	I	LEG	Arch Ctgs - End User	Case Dispo/Rvw, Track, Prep NOV's	0.05	0.00	10,777	38	XVIII
10	26 072	I	PRA	Arch Ctgs - End User	Compliance/Rpts/Rule Implementation	0.75	0.00	133,469	2,776	XVIII
11	44 072	I	STA	Arch Ctgs - End User	Sample Analysis/Rpts	2.00	2.00	338,111	9,996	XVIII
12	08 073	I	LEG	Arch Ctgs - Other	Case Dispo/Rvw, Track, Prep NOV's	0.05	0.00	10,777	38	XVIII
13	26 073	I	PRA	Arch Ctgs - Other	Compliance/Rpts/Rule Implementation	1.00	1.00	177,958	3,702	XVIII
14	26 076	I	PRA	Area Sources/Compliance	Area Source Compliance	4.50	4.50	820,812	16,659	III,IV,V,IX,XV
15	16 080	III	AHR	Auto Services	Vehicle/Radio Repair & Maint	4.00	4.00	669,026	(14,018)	la
16	60 093	I	CE	CARB Oil & Gas Reg.	GHG EM Stds Oil/NG Facilities	4.00	4.00	613,267	19,117	XVII
17	44 105	I	STA	CEMS Certification	CEMS Review/Approval	5.00	0.00	845,277	24,989	II,III,VI
18	35 111	II	LPA	Call Center/CUT SMOG	Smoking Vehicle Complaints	8.00	8.00	1,410,719	76,456	IX,XV
19	08 115	I	LEG	Case Disposition	Trial/Dispo-Civil Case/Injunct	4.75	0.00	1,023,780	3,625	II,IV,V,VII,XV
20	60 152	III	CE	Compliance/IM Related Activiti	Assist IM: Design/Review/Test	0.20	0.00	34,663	(3,044)	IV
21	08 154	I	LEG	Compliance/NOV Administration	Review/Track/Prep NOV's/MSAs	0.75	0.00	161,649	572	IV
22	60 155	I	CE	Compliance Guidelines	Procedures/Memos/Manuals	0.25	0.00	38,329	1,195	IV
23	50 156	I	EP	Perm Proc/Info to Compliance	Prov Permit Info to Compliance	3.00	0.00	520,251	8,493	III,IV,XV
24	60 157	I	CE	Compliance/Special Projects	Prog Audits/Data Req/Brd Supp	4.00	4.00	613,267	19,117	II
25	60 158	I	CE	Compliance Testing	R461/Combustion Equip Testing	0.50	0.00	81,658	29,390	IV
26	44 175	I	STA	DB/Computerization	Develop Systems/Database	0.44	0.00	74,384	2,199	II,IV,VI
27	08 185	I	LEG	Database Management	Support IM/Dev Tracking System	1.00	0.00	255,533	763	IV
28	26 215	I	PRA	AER Gen/Rev/Am/Aud	AER General/Review/Amend/Audit	11.00	-2.30	1,964,540	(384,097)	II,V
29	08 235	I	LEG	Enforcement Litigation	Maj Prosecutions/Civil Actions	2.00	0.00	431,065	1,526	IV
30	50 240	I	EP	Environmental Justice	R461/Combustion Equip Testing	0.50	0.00	86,708	1,415	II,IV,XV
31	26 358	I	PRA	GHG Rules-Compl	Green House Gas Rules-Compliance	1.00	0.00	177,958	3,702	IV
32	17 364	I	CB	Hearing Board/Abatement Orders	Attnd/Recrd/Monitr Mtgs	0.10	0.00	23,928	(285)	IV
33	17 365	I	CB	Hearing Board/Variations/Appeal	Attnd/Recrd/Monitr HB Mtgs	3.20	0.00	850,905	(9,130)	IV,V,VII
34	50 365	I	EP	Hearing Bd/Variations	Variations/Orders of Abatement	0.75	0.00	130,063	2,123	VII
35	60 365	I	CE	Hearing Bd/Variations	Variations/Orders of Abatement	0.25	0.00	38,329	1,195	VII
36	08 366	I	LEG	Hearing Board/Legal	Hear/Disp-Varian/Appeal/Rev	3.00	3.00	646,598	2,289	IV,V,XV
37	60 375	I	CE	Inspections	Compliance/Inspection/Follow-up	85.00	0.00	13,031,926	410,229	II,V,XV
38	50 377	I	EP	Inspections/RECLAIM Audits	Audit/Compliance Assurance	6.00	0.00	1,040,501	16,986	II,IV
39	60 377	I	CE	Inspections/RECLAIM Audits	Audit/Compliance Assurance	16.00	0.00	2,453,068	76,467	II,IV
40	08 380	I	LEG	Interagency Coordination	Coordinate with Other Agencies	0.20	0.00	43,107	153	II,V
41	08 403	III	LEG	Legal Rep/Litigation	Prep/Hearing/Disposition	3.50	0.00	910,365	2,671	la,II
42	44 450	I	STA	Microscopic Analysis	Asbestos/PM/Metals Analysis	3.00	0.00	507,166	14,993	VI
43	08 465	I	LEG	Mutual Settlement	Mutual Settlement Program	1.50	0.00	323,299	1,145	IV
44	50 492	I	EP	Customer Service	Compliance/Inspection/Follow-up	0.50	0.00	86,708	1,415	II,V,IX,XV
45	44 500	I	STA	PM2.5 Program	Esty/Operate/Maint PM2.5 Network	10.30	0.00	1,741,271	51,478	II,V,IX
46	60 539	I	CE	Procedure 5 Review	Evaluate Proc 5 Asbestos Plans	3.00	0.00	459,950	14,338	XVII

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 (Cont.)
Work Program by Category**

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2020-21	+/-	FTEs FY 2021-22	Expenditures FY 2020-21	+/-	Expenditures FY 2021-22	Revenue Categories	
47	60	II	CE	Public Complaints/Breakdowns	Compltresp/Invlwup/Resolutn	10.00	0.00	10.00	\$ 1,533,168	\$	47,792	\$ 1,580,959	II,IV,V,XV
48	50	I	EP	RECLAIM/Admin Support	Admin/Policy/Guidelines	6.50	0.00	6.50	1,127,210		18,401	1,145,611	II,III,IV,XV
49	60	I	CE	RECLAIM/Admin Support	Admin/Policy/Guidelines	0.25	0.00	0.25	38,329		1,195	39,524	II,III,IV,XV
50	26	I	PRA	Refinery Pilot Project	Refinery Pilot Project	2.80	-1.70	1.10	559,283	(329,457)		229,826	II
51	26	I	PRA	Rule 1610 Plan Verification	Rule 1610 Plan Verification	0.50	0.00	0.50	88,979		1,851	90,830	V,IX
52	50	I	EP	School Siting	Identify Haz. Emission Sources near Schools	0.25	0.00	0.25	43,354		708	44,062	II
53	60	I	CE	School Siting	Identify Haz. Emission Sources near Schools	0.75	-0.65	0.10	114,988	(99,178)		15,810	IV
54	50	I	EP	Small Business Assistance	Asst sm bus w/ Permit Process	0.50	0.00	0.50	86,708		1,415	88,124	III,IV
55	44	I	STA	Source Testing/Compliance	Conduct ST/Prov Data/Compl	2.25	0.00	2.25	410,375		11,245	421,620	VI
56	44	I	STA	ST/Sample Analysis/Compliance	Analyze ST Samples/Compliance	4.00	0.00	4.00	676,222		19,991	696,213	VI
57	44	I	STA	VOC Sample Analysis/Compliance	VOC Analysis & Rptg/Compliance	6.50	0.00	6.50	1,135,860		467,486	1,603,346	IV,XV
58	44	I	STA	Special Monitoring	Rule 403 Compliance Monitoring	2.20	0.00	2.20	406,922		10,995	417,917	III,IV,IX,XV
59	60	I	CE	Title V	Title V Compl/Inspect/Follow Up	4.50	0.00	4.50	689,925		21,506	711,432	II,IV
60	04	III	FIN	Toxics/AB2588	AB2588 Toxics HS Fee Collection	0.15	0.00	0.15	37,107		80	37,187	X
61	08	I	LEG	Toxics/AB2588	AB2588 Legal Advice: Plan & Impl	0.05	0.00	0.05	10,777		38	10,815	X
62	27	III	IM	Toxics/AB2588	AB2588 Database Software Supp	0.50	0.00	0.50	140,191		1,054	141,246	X
63	50	I	EP	Toxics/AB2588	AB2588 Rev Rpts/Risk Redplans	0.25	0.00	0.25	43,354		708	44,062	X
64	26	I	PRA	Toxics/AB2588	AB2588/Toxics	13.00	-1.20	11.80	2,313,456	(169,867)		2,143,588	X
65	44	I	STA	Toxics/AB2588	Eval Protocols/Methods/ST	2.00	0.00	2.00	338,111		9,996	348,106	X
66	44	I	STA	Toxics/Engineering	R1401 Toxics/HRA Prot/Rpt Eval	1.30	0.00	1.30	219,772		6,497	226,269	VI,X
67	08	III	LEG	Training	Continuing Education/Training	0.75	0.00	0.75	161,649		572	162,222	lb

Total Ensure Compliance

265.71	(5.85)	259.86	\$ 44,755,079	\$ 489,601	\$ 45,244,680
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**Monitoring Air Quality
Work Program by Category**

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2020-21	+/-	FTEs FY 2021-22	Expenditures FY 2020-21	+/-	Expenditures FY 2021-22	Revenue Categories
1	44 035	I	STA	AB617-General	AB617-General	0.50	-0.50	0.00	\$ 84,528	\$ (84,528)	\$ -	IX
2	44 036	I	STA	AB617-Monitoring	AB617-Monitoring	39.00	-39.00	0.00	6,593,160	(6,593,160)	-	IX
3	44 038	I	STA	Admin/Office Mgmt/Monitoring	Overall Program Mgmt/Coord	0.90	0.00	0.90	152,150	4,498	156,648	lb
4	44 046	I	STA	Admin/Program Management	STA Program Administration	2.00	0.00	2.00	350,111	9,996	360,106	lb
5	26 061	I	PRA	Air Quality Evaluation	Air Quality Evaluation	2.00	0.75	2.75	355,916	143,649	499,565	IX
6	44 063	I	STA	Ambient Air Analysis	Analyze Criteria/Tox/Pollutants	8.91	-2.00	6.91	1,506,284	(288,771)	1,217,512	II,V,IX
7	44 064	I	STA	Ambient Network	Air Monitoring/Toxics Network	20.55	1.00	21.55	3,581,688	734,744	4,316,433	II,IV,V,IX
8	44 065	I	STA	Air Quality Data Management	AM Audit/Validation/Reporting	1.00	0.00	1.00	169,055	4,998	174,053	II,V,IX
9	44 067	II	STA	Ambient Lead Monitoring	Lead Monitoring/Analysis/Reporting	0.50	0.00	0.50	84,528	2,499	87,027	IV
10	44 073	I	STA	Arch Ctgs - Other	Sample Analysis/Rpts	2.00	0.00	2.00	338,111	79,996	418,106	XVIII
11	44 079	II	STA	AQ SPEC	AQ SPEC	6.19	0.00	6.19	1,046,453	30,937	1,077,389	XVII
12	44 081	I	STA	Air Filtration EPA	Air Filtration EPA/Admn/Impl	0.15	-0.05	0.10	25,358	(7,953)	17,405	V
13	44 082	I	STA	Air Filtration Other	Air Filtration Other/Admn/Impl	0.10	0.10	0.20	16,906	17,905	34,811	XVII
14	60 210	II	CE	Emergency Response	Emerg Tech Asst to Public Saf	0.10	0.00	0.10	15,332	478	15,810	IV,XV
15	44 248	I	STA	EPA Community Scale AQ-SPEC	EPA Community Scale AQ-SPEC	1.00	0.00	1.00	169,055	4,998	174,053	V,XVII
16	26 443	I	PRA	MATES V	MATES V	1.20	-1.05	0.15	233,550	(186,301)	47,249	XVII
17	26 444	I	PRA	MATES V Refinery	MATES V Refinery	0.10	0.00	0.10	17,796	370	18,166	XVII
18	26 445	I	PRA	Meteorology	ModelDev/Data Analysis/Forecast	2.00	0.00	2.00	480,916	7,404	488,320	II,V,IX
19	44 468	I	STA	NATTS(Natl Air Tox Trends Sta)	NATTS (Natl Air Tox Trends)	1.00	0.00	1.00	169,055	4,998	174,053	II,V,IX
20	44 505	I	STA	PM Sampling Program (DHS)	PM Sampling Program - Addition	8.41	0.00	8.41	1,421,756	42,032	1,463,788	V
21	44 507	I	STA	PM Sampling Spec	PM Sampling Special Events	0.10	0.00	0.10	16,906	500	17,405	V
22	44 530	I	STA	Photochemical Assessment	Photochemical Assess & Monitor	3.00	0.00	3.00	507,166	14,993	522,160	V,IX
23	44 585	I	STA	Quality Assurance	Quality Assurance Branch	6.00	0.00	6.00	1,014,332	29,987	1,044,319	II,V,IX
24	44 646	I	STA	R1180 Community Mon	R1180 Comm Monitoring Refinery	14.00	-1.00	13.00	3,147,775	(635,084)	2,512,692	XVII
25	44 663	I	STA	Salton Sea Monit	Mon/Analyze Hydrogen Sulfide	0.25	0.00	0.25	42,264	1,249	43,513	XVII
26	44 715	II	STA	Spec Monitoring/Emerg Response	Emergency Response	0.50	0.00	0.50	84,528	87,499	172,027	II

Total Monitoring Air Quality	121.46	(41.75)	79.71	\$ 21,624,679	\$ (6,572,068)	\$ 15,052,611
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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 2020-21 +/-	FTEs FY 2021-22 +/-	Expenditures FY 2020-21	Expenditures FY 2021-22 +/-	Revenue Categories
1	08 019	I	LEG	AB617-Prog Develop	AB617-Program Development	0.00	2.50	\$ -	\$ 540,739	IX
2	04 020	III	FIN	Admin/SCAQMD Budget	Analyze/Prepare/Impl/Track WP	2.71	1.00	399,393	171,242	IX
3	04 021	III	FIN	Admin/SCAQMD Contracts	Contract Admin/Monitor/Process	3.20	0.00	471,608	1,709	IX
4	04 023	III	FIN	Admin/SCAQMD Capital Assets	FA Rep/Reconcile/Inv/Acct	0.70	0.00	103,164	374	IX
5	17 024	III	CB	Admin/SCAQMD/GB/HB Mgmt	Admin Governing/Hearing Brds	1.25	0.00	299,103	46,434	IX,VI,XV
6	08 025	III	LEG	Admin/SCAQMD-Legal Research	Legal Research/Staff/Exec Mgmt	1.20	0.00	258,639	916	IX
7	16 026	III	AHR	SCAQMD Mail	Posting/Mailing/Delivery	2.30	0.00	384,690	(8,061)	IX
8	04 035	I	FIN	AB617-Support	AB617-Support	0.50	0.00	73,689	267	IX
9	08 035	I	LEG	AB617-General	AB617-General	2.50	-2.50	538,832	(538,832)	IX
10	16 035	I	AHR	AB617-Support	AB617-Support	4.00	0.00	669,026	(14,018)	IX
11	17 035	I	IM	AB617-Support	AB617-Support	8.00	0.00	1,619,036	16,864	IX
12	03 038	III	EO	Admin/Office Management	Budget/Program Management	1.00	0.00	314,853	25,423	IX
13	04 038	III	FIN	Admin/Office Management	Fin Mgmt/Oversee Activities	2.75	0.00	405,288	1,469	IX
14	08 038	III	LEG	Admin/Office Management	Attorney Timekeeping/Perf Eval	3.50	0.00	761,614	764,285	IX
15	16 038	III	AHR	Admin/Office Management	Reports/Proj/Budget/Contracts	6.00	0.00	1,020,538	60,078	IX
16	27 038	III	IM	Admin/Office Management	Overall Direction/Coord of IM	2.00	0.00	404,759	4,216	IX
17	04 045	III	FIN	Admin/Office Budget	Office Budget/Prep/Imp/Track	0.05	0.00	7,369	27	IX
18	16 060	III	AHR	Equal Employment Opportunity	Program Dev/Monitor/Reporting	0.05	0.00	8,363	(175)	IX
19	04 071	I	FIN	Arch Ctgs - Admin	Cost Analysis/Payments	0.04	0.00	5,895	21	IX
20	08 071	I	LEG	Arch Ctgs - Admin	Rule Dev/TA/Reinterpretations	0.05	0.00	10,777	38	IX
21	27 071	I	IM	Arch Ctgs - Admin	Database Dev/Maintenance	0.25	0.00	50,595	527	IX
22	04 085	III	FIN	Building Corporation	Building Corp Acct/Fin Reports	0.02	0.00	2,948	11	IX
23	16 090	III	AHR	Building Maintenance	Repairs & Preventative Maint	8.00	0.00	1,338,051	(28,037)	IX
24	16 092	III	AHR	Business Services	Building Services Admin/Contracts	2.69	0.00	449,920	(9,427)	IX
25	08 102	II	LEG	CEQA Document Projects	CEQA Review	0.75	0.00	161,649	572	IX,III,IX
26	27 160	III	IM	Computer Operations	Oper/Manage Host Computer Sys	5.25	0.00	1,487,992	(50,433)	IX
27	27 173	III	IM	CyberSecurity	CyberSecurity	1.00	0.00	202,379	2,108	IX
28	27 184	III	IM	Database Information Support	Ad Hoc Reports/Bulk Data Update	1.00	0.00	216,408	2,108	IX
29	27 185	III	IM	Database Management	Dev/Maintain Central Database	2.25	0.00	455,354	4,743	IX
30	27 215	I	IM	Annual Emission Reporting	System Enhancements for GHG	0.50	0.00	101,190	1,054	IX,XVII
31	16 225	III	AHR	Employee Benefits	Benefits Analysis/Orient/Records	2.50	0.00	418,141	(8,761)	IX
32	16 226	III	AHR	Classification & Pay	Class & Salary Studies	0.32	0.00	53,522	(1,121)	IX
33	08 227	III	LEG	Employee/Employment Law	Legal Advice: Employment Law	0.50	0.00	107,766	382	IX
34	16 228	III	AHR	Recruitment & Selection	Recruit Candidates for SCAQMD	2.30	1.00	435,690	172,588	IX
35	16 232	III	AHR	Position Control	Track Positions/Workforce Anlys	0.20	0.00	33,451	(701)	IX
36	04 233	III	FIN	Employee Relations	Assist HR/Interpret Salary Res	0.10	0.00	14,738	53	IX
37	16 233	III	AHR	Employee Relations	Meet/Confer/Labor-Mgmt/Grievance	1.50	0.00	250,885	(5,257)	IX
38	16 255	III	AHR	Facilities Services	Phones/Space/Keys/Audio-Visual	1.00	0.00	167,256	(3,505)	IX
39	04 265	III	FIN	Financial Mgmt/Accounting	Record Accts Rec & Pay/Rpts	7.27	0.00	1,129,962	6,310	IX
40	04 266	III	FIN	Financial Mgmt/Fin Analysis	Fin/SCAQMD Stat Analysis & Audit	0.80	0.00	117,902	427	IX
41	04 267	III	FIN	Financial Mgmt/Treasury Mgmt	Treas Mgt Anlyz/Trk/Proj/Invst	1.00	0.00	232,027	534	IX
42	04 268	III	FIN	Financial Systems	CLASS/Rev/Act/PR/Sys Anlyze	0.10	0.00	14,738	53	IX
43	02 275	II	GB	Governing Board	Rep of Dist Meet/Conf/Testimony	0.00	0.00	1,660,230	-	IX
44	08 275	III	LEG	Governing Board	Legal Advice:Attend Board/Cmte Mtgs	1.00	0.00	215,533	763	IX
45	17 275	III	CB	Governing Board	Attend/Record/Monitor Meetings	1.40	0.00	334,996	(3,994)	IX
46	35 350	III	LPA	Graphic Arts	Graphic Arts	2.00	0.00	352,680	19,114	IX

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 2020-21 +/-	FTEs FY 2021-22 +/-	Expenditures FY 2020-21	Expenditures FY 2021-22 +/-	Revenue Categories
47	27 370	III	IM	Information Technology Svcs	Enhance Oper Effic/Productivity	2.75	0.00	\$ 579,294	\$ 5,797	la
48	08 401	III	LEG	Legal Advice/SCAQMD Programs	General Advice: Contracts	2.00	0.00	481,065	1,526	la
49	27 420	III	IM	Library	General Library Svcs/Archives	0.25	0.00	58,945	527	la
50	16 446	III	AHR	Mentorship Program	Mentorship Program	0.10	0.00	16,726	(350)	la
51	04 447	I	FIN	Mobile Sources/Accounting	Record Act Rec & Pay/Special Funds	0.65	0.00	95,795	347	IX
52	27 470	III	IM	Network Operations/Telecomm	Operate/Maintain/Implem SCAQMD	8.25	0.00	1,956,979	78,890	la
53	27 480	III	IM	New System Development	Dev sys for special oper needs	2.00	0.00	456,431	344,216	II,IV
54	04 493	II	FIN	Outreach/SB/MB/DVBE	Outreach/Incr SB/DVBE Partic	0.05	0.00	7,369	27	la
55	04 510	III	FIN	Payroll	Ded/Ret Rpts/PR/St & Fed Rpts	4.10	0.00	651,747	2,189	la
56	04 570	III	FIN	Purchasing	Purch/Track Svcs & Supplies	2.50	0.00	368,444	1,335	la
57	04 571	III	FIN	Purchasing/Receiving	Receive/Record SCAQMD Purchases	1.20	0.00	176,853	641	la
58	04 572	III	FIN	Purchasing-Receiving/Stockroom	Track/Monitor SCAQMD Supplies	1.00	0.00	147,377	534	la
59	27 615	III	IM	Records Information Mgmt Plan	Plan/Impl/Dir/Records Mgmt plan	1.25	0.00	296,615	2,635	la
60	27 616	III	IM	Records Services	Records/Documents processing	3.75	0.00	903,923	7,905	la,III,IV
61	04 630	III	FIN	Cash Mgmt/Revenue Receiving	Receive/Post Pymts/Reconcile	5.25	0.00	773,731	2,804	II,III,IV,XI
62	16 640	III	AHR	Risk Management	Liabl/Property/Wk Comp/Selfins	2.25	0.00	477,077	(2,593)	la
63	27 735	III	IM	Systems Maintenance	Maintain Existing Software Prog	4.50	0.00	1,355,911	34,486	II,III,IV
64	27 736	III	IM	Systems Implementation/Peoples	Fin/HR PeopleSoft Systems Impl	1.50	0.00	303,569	3,162	la
65	04 805	III	FIN	Training	Continuing Education/Training	0.20	0.00	29,475	107	lb
66	26 805	III	PRA	Training	Training	0.54	0.46	96,097	85,563	lb
67	50 805	III	EP	Training	Dist/Org Unit Training	3.10	0.00	537,592	8,776	lb
68	60 805	III	CE	Training	Dist/Org Unit Training	4.00	0.00	613,267	19,117	lb
69	04 825	III	FIN	Union Negotiations	Official Labor/Mgmt Negotiate	0.02	0.00	2,948	11	la
70	26 825	III	PRA	Union Negotiations	Official Labor/Mgmt Negotiate	0.04	0.01	7,118	1,965	la
71	35 825	III	LPA	Union Negotiations	Official Labor/Mgmt Negotiate	0.01	0.00	1,763	96	la
72	44 825	III	STA	Union Negotiations	Labor/Mgmt Negotiations	0.05	0.00	8,453	250	la
73	50 825	III	EP	Union Negotiations	Official Labor/Mgmt Negotiate	0.05	0.00	8,671	142	la
74	60 825	III	CE	Union Negotiations	Official Labor/Mgmt Negotiate	0.10	0.00	15,332	478	la
75	04 826	III	FIN	Union Steward Activities	Rep Employees in Grievance Act	0.01	0.00	1,474	5	la
76	26 826	III	PRA	Union Steward Activities	Rep Employees in Grievance Act	0.08	0.22	14,237	40,261	la
77	35 826	III	LPA	Union Steward Activities	Union Steward Activities	0.01	0.00	1,763	96	la
78	44 826	III	STA	Union Steward Activities	Rep Employees in Grievance Act	0.05	0.00	8,453	250	la
79	50 826	III	EP	Union Steward Activities	Rep Employees in Grievance Act	0.05	0.00	8,671	142	la
80	60 826	III	CE	Union Steward Activities	Rep Employees in Grievance Act	0.10	0.00	15,332	478	la
81	04 827	I	FIN	VW-General Admin	VW-General Admin	1.00	0.00	147,377	534	XVII
82	27 827	I	IM	VW-General Admin	VW-General Admin	1.00	0.00	202,379	2,108	XVII
83	08 827	I	LEG	VW-General Admin	VW-General Admin	0.00	0.05	-	10,815	XVII
84	03 855	II	EO	Web Tasks	Create/edit/review web content	0.03	0.00	9,446	705	la
85	04 855	II	FIN	Web Tasks	Create/edit/review web content	0.02	0.00	2,948	1,371	la
86	17 855	II	CB	Web Tasks	Create/edit/review web content	0.03	0.00	7,178	(86)	la
87	26 855	II	PRA	Web Tasks	Create/edit/review web content	0.05	1.16	8,898	210,911	la

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 2020-21	+/-	FTEs FY 2021-22	Expenditures FY 2020-21	+/-	Expenditures FY 2021-22	Revenue Categories	
88	27	855	II	IM	Web Tasks	Create/edit/review web content	3.25	0.00	3.25	939,951	6,851	946,802	la
89	35	855	II	LPA	Web Tasks	Create/edit/review web content	0.40	0.00	0.40	70,536	3,823	74,359	la
90	50	855	II	EP	Web Tasks	Creation/Update of Web Content	0.25	0.00	0.25	43,354	708	44,062	la
91	60	855	II	CE	Web Tasks	Creation/Update of Web Content	0.10	0.30	0.40	15,332	47,907	63,238	la
92	103	880	III	EO	Inclusion/Equity	Inclusion/Diversity/Equity	0.00	4.00	4.00	-	792,052	792,052	la

Total Operational Support	143.39	8.20	151.59	\$ 29,688,534	\$ 2,131,023	\$ 31,819,557
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**Policy Support
Work Program by Category**

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2020-21 +/-	FTEs FY 2021-22 +/-	Expenditures FY 2020-21	Expenditures FY 2021-22 +/-	Revenue Categories
1	44	041	I	STA	Admin/Office Mgmt/Policy Supp	0.49	0.00	\$ 82,837	\$ 2,449	lb
2	03	083	II	EO	Hlth Effects Air Pollution Fou	0.01	0.00	3,149	235	la
3	04	083	II	FIN	Hlth Effects Air Pollution Fou	0.02	0.00	2,948	11	la
4	26	083	II	PRA	Hlth Effects Air Pollution Fou	0.10	0.00	17,796	370	la,II,IV
5	26	148	I	PRA	Climate/Energy/Incentives	0.50	0.00	88,979	1,851	IV,XVII
6	50	148	I	EP	Climate/Energy/Incentives	0.50	0.00	86,708	1,415	II,IX
7	03	275	I	EO	Governing Board	1.72	0.00	541,547	40,432	la
8	26	276	I	PRA	Advisory Group/Home Rule	0.50	0.00	88,979	1,851	la
9	44	276	I	STA	Advisory Group/Technology Adva	0.10	-0.05	16,906	(8,203)	VIII
10	50	276	I	EP	Board Committees	0.25	0.00	43,354	708	la
11	60	276	I	CE	Board Committees	0.10	0.00	15,332	478	la
12	26	277	I	PRA	Advisory Group/AQMP	0.50	0.00	88,979	1,851	II,IX
13	26	278	I	PRA	Advisory Group/Sci,Tech,Model	0.40	0.00	71,183	1,481	II,IX
14	35	280	I	LPA	Advisory Group/Ethnic Comm	0.40	0.00	70,536	3,823	II,IX
15	35	281	I	LPA	Advisory Group/Small Business	0.50	0.00	88,170	4,779	IV,IX
16	35	283	I	LPA	Governing Board Policy	0.55	0.00	96,987	5,256	la
17	35	345	II	LPA	Goods Mvmt&Financial Incentive	1.00	0.00	176,340	9,557	IX
18	03	381	I	EO	Interagency Liaison	0.71	0.00	223,545	16,690	la,IX
19	08	404	I	LEG	Legal Rep/Legislation	0.25	0.00	53,883	191	II,IX
20	03	410	I	EO	Legislation	0.03	0.00	9,446	705	la,IX
21	44	410	I	STA	Legislation	0.50	0.00	84,528	2,499	IX
22	35	412	I	LPA	Legislation/Federal	0.25	0.00	709,215	2,389	la
23	35	413	I	LPA	Legislation/Exec Office Support	0.25	0.00	44,085	2,389	la
24	35	414	I	LPA	Legislation-Effects	0.80	0.00	151,072	107,646	la,IX
25	03	416	I	EO	Legislative Activities	0.03	0.00	9,446	705	la
26	08	416	I	LEG	Legislative Activities	0.10	0.00	21,553	76	la
27	26	416	I	PRA	Legislative Activities	0.50	0.00	88,979	1,851	la
28	35	416	I	LPA	Legislative Activities	0.50	0.00	453,170	4,779	la
29	50	416	I	EP	Legislative Activities	0.25	0.00	43,354	708	la
30	35	494	I	LPA	Outreach/Collateral/Media	5.60	0.00	1,152,220	53,520	la
31	08	717	II	LEG	Student Interns	0.10	0.00	21,553	76	la
32	26	717	II	PRA	Student Interns	0.50	0.00	88,979	1,851	la
33	35	717	II	LPA	Student Interns	0.10	0.00	17,634	956	la
34	60	717	II	CE	Student Interns	0.10	0.00	15,332	478	la

18.21	(0.05)	18.16	\$ 4,768,722	\$ 265,852	\$ 5,034,574
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Total Policy Support

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 2020-21	+/-	FTEs FY 2021-22	Expenditures FY 2020-21	+/-	Expenditures FY 2021-22	Revenue Categories
1	50 120	I	EP	Certification/Registration Pro	Certification/Registration Prog	1.00	0.00	1.00	\$ 173,417	\$	2,831	III
2	50 253	I	EP	ERC Appl Processing	Process ERC Applications	3.50	0.00	3.50	606,959		9,908	III
3	50 367	I	EP	Hearing Board/Appeals	Appeals: Permits & Denials	0.25	0.00	0.25	43,354		708	III
4	26 461	I	PRA	Permit & CEQA Modeling Review	Review Model Permit/Risk Assmt	1.00	0.00	1.00	202,958		3,702	III
5	50 475	I	EP	NSR Implementation	Implement NSR/Allocate ERCs	2.50	0.00	2.50	433,542		7,077	II,III,V,XV
6	50 476	I	EP	NSR Data Clean Up	Edit/Update NSR Data	0.50	0.00	0.50	86,708		1,415	II
7	50 515	I	EP	Perm Proc/Non TV/Non RECLAIM	PP: Non Title V/Title III/RECLAIM	50.25	0.00	50.25	8,770,198		146,256	III,XV
8	08 516	I	LEG	Permit Processing/Legal	Legal Advice: Permit Processing	0.10	0.00	0.10	21,553		76	III
9	50 517	I	EP	Permit Services	Facility Data-Create/Edit	12.50	0.00	12.50	2,167,711		35,387	III,XV
10	50 518	I	EP	RECLAIM Non-Title V	Process RECLAIM Only Permits	4.00	0.00	4.00	693,667		11,324	III,IV,XV
11	50 519	I	EP	Perm Proc/Title III (Non TV)	Process Title III Permits	1.00	0.00	1.00	173,417		2,831	III
12	50 521	I	EP	Perm Proc/Expedited Permit	Proc Expedited Permits (301OT)	4.00	0.00	4.00	693,667		11,324	III
13	27 523	III	IM	Permit Streamlining	Permit Streamlining	0.25	0.00	0.25	50,595		527	III
14	50 523	I	EP	Permit Streamlining	Permit Streamlining	4.75	0.00	4.75	823,730		13,447	III
15	44 545	I	STA	Protocols/Reports/Plans	Eval Test Protocols/Cust Svc	0.10	0.00	0.10	16,906		500	III,IV
16	44 546	I	STA	Protocols/Reports/Plans	Eval Test Protocols/Compliance	6.15	0.00	6.15	1,039,691		30,737	IV,VI
17	50 607	I	EP	RECLAIM & Title V	Process RECLAIM & TV Permits	18.40	0.00	18.40	3,190,870		52,090	III
18	50 643	I	EP	Rule 222 Filing Program	Rule 222 Filing Program	0.50	0.00	0.50	86,708		1,415	IV
19	35 680	I	LPA	Small Business/Permit Streamlin	Asst sm bus to comply/SCAQMD req	3.95	0.00	3.95	696,543		37,750	II,III,IV,V,XV
20	44 725	I	STA	Permit Processing/Support E&C	Assist EAC w/ Permit Process	0.35	0.00	0.35	59,169		1,749	III
21	50 728	I	EP	Perm Proc/JIM Programming	Assist JM: Design/Review/Test	2.55	0.00	2.55	442,213		7,219	II,III,IV
22	08 770	I	LEG	Title V	Leg Advice: Title V Prog/Perm Dev	0.05	0.00	0.05	10,777		38	II,IV
23	27 770	I	IM	Title V	Dev/Maintain Title V Program	1.50	0.00	1.50	303,569		3,162	III
24	08 772	I	LEG	Title V Permits	Leg Advice: New Source Title V Permit	0.05	0.00	0.05	10,777		38	III
25	50 774	I	EP	TV/Non-RECLAIM	Process Title V Only Permits	18.00	0.00	18.00	3,121,504		50,958	III
26	50 775	I	EP	Title V - Admin	Title V Administration	1.00	0.00	1.00	173,417		2,831	III

Total Timely Review of Permits

138.20	-	138.20	\$ 24,093,620	\$ 435,301	\$ 24,528,921
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Total South Coast AQMD

946.00	11.00	957.00	\$ 172,988,981	\$ 6,894,422	\$ 179,883,403
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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 – under the Community Air Protection Program, funding from CARB is distributed to air districts for the implementation of projects pursuant to the Carl Moyer Memorial Air Quality Standards Attainment 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 South Coast AQMD'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 fees. 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 subvended to local governments; and performing South Coast AQMD 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/South Coast AQMD - supporting the administration of South Coast AQMD. Examples are tracking fixed assets, operating the mailroom, preparing and reviewing contracts, conducting oversight of South Coast AQMD activities, developing District-wide policies and procedures, preparing the South Coast AQMD budget, providing legal advice on South Coast AQMD programs and other activities, and performing activities in support of South Coast AQMD as a whole.

Admin/South Coast AQMD Capital Assets (Asset Management) – tracking of acquisitions, disposals/retirements and reconciliation of capital assets to the Capital Outlays 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 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.

WORK PROGRAM GLOSSARY

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.

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 South Coast AQMD's air monitoring network and localized monitoring at landfill sites as well as conducting specialized monitoring in response to public nuisance situations. South Coast AQMD monitoring stations also collect samples which are analyzed by South Coast AQMD's laboratory. Also see Special Monitoring.

Ambient Lead Monitoring – maintaining 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 South Coast AQMD's AER program by conducting workshops, resolving fee-related issues, and responding to questions.

AQIP Evaluation – provides incentive funding for projects to meet VOC, NO_x, 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 and/or sell their manufactured architectural coatings within South Coast AQMD for use in South Coast AQMD's jurisdiction 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 South Coast AQMD's jurisdiction.

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

WORK PROGRAM GLOSSARY

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

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

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 AQMD Building Corporation. The Building Corporation issued Installment Sale Revenue Bonds in conjunction with the construction of South Coast AQMD's Diamond Bar headquarters facility.

Building Maintenance - maintaining and repairing the Diamond Bar headquarters facility and South Coast AQMD 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 South Coast AQMD headquarters and the public/field staff.

CARB Oil & Gas - Memorandum of Agreement (MOA) with CARB to coordinate the enforcement of CARB's Oil and Natural Gas Regulation for the implementation and enforcement of greenhouse gas emission standards for crude oil and natural gas facilities pursuant to California Health and Safety Code section 40701.

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

WORK PROGRAM GLOSSARY

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 South Coast AQMD inspectors. This includes preparing both civil and criminal cases and administering South Coast AQMD's Mutual Settlement Agreement Program.

Cash Management – receiving revenue, posting of payments, processing of refunds associated with South Coast AQMD 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 South Coast AQMD 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 South Coast AQMD to ensure that it meets all applicable requirements.

China Partnership for Cleaner Shipping - initiative with China to encourage cleaner ships to come to the Ports.

Classification and Pay – maintaining the classification plan and conducting job analyses to ensure South Coast AQMD 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 South Coast AQMD's programs and goals by developing and nurturing a region-wide group of community members with an interest in air quality issues.

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/Energy/Incentives – 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 public.

WORK PROGRAM GLOSSARY

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 South Coast AQMD's computer resources. These resources support South Coast AQMD'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 South Coast AQMD'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 South Coast AQMD's enterprise databases.

Database Management - developing and supporting the data architecture framework, data modeling, database services, and the ongoing administration of South Coast AQMD'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) – a U.S. EPA funded program to modernize diesel fleets by retrofitting and replacing diesel engines/vehicles with cleaner, more efficient options.

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

WORK PROGRAM GLOSSARY

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 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 South Coast AQMD’s benefit plans, including medical, dental, vision, and life insurance, as well as State Disability Insurance, Section 125 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 Memorandum Of Understanding (MOU’s), preparing disciplinary documents, and administering South Coast AQMD’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.

Enhanced Fleet Modernization Program (Replace Your Ride) Admin Support – CARB-funded voluntary car retirement and replacement incentive program. The goal is to incentivize lower-income motorists to scrap their older, high-emitting cars and replace them with newer, cleaner, and more fuel-efficient cars to reduce smog-forming pollutants.

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,

WORK PROGRAM GLOSSARY

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.

FARMER (Funding Agricultural Replacement Measures For Emission Reductions) - CARB funding for projects that will reduce agricultural sector emissions by providing grants, rebates, and other financial incentives for agricultural harvesting equipment, heavy-duty trucks, agricultural pump engines, tractors, and other equipment used in agricultural operations.

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

Financial Management - managing the financial aspects of the South Coast AQMD. This includes cash management, treasury/investment, accounting, and program and financial audits. It also includes maintaining South Coast AQMD’s permit-related financial and accounting records as well as maintaining and enhancing South Coast AQMD'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 South Coast AQMD. 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 South Coast AQMD's air pollution program and financial activities relating to grants, including U.S. EPA, DOE, CEC, and DHS grants and CARB Subvention.

WORK PROGRAM GLOSSARY

Graphics Arts - designing and producing presentation materials and South Coast AQMD publications.

Green House Gas Reporting (GHG) - many of the businesses and facilities within South Coast AQMD'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 projects to demonstrate zero emission 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 South Coast AQMD'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.

Incentive RFP Emissions Reduction Projects – the Board released an RFP to solicit stationary and mobile source projects that will result in emissions reductions of NO_x, VOC, and PM in accordance with the approved control strategy in the 2016 AQMP. Project funding comes from existing special revenue funds related to mitigation fees, settlements, or grants from other agencies.

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.

WORK PROGRAM GLOSSARY

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 – South Coast AQMD permitting and rule development projects where a CEQA document is prepared and the South Coast AQMD is the lead agency.

Legal - providing legal support to South Coast AQMD 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 South Coast AQMD'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 South Coast AQMD’s Diamond Bar headquarters.

MATES V (Fifth Multiple Air Toxics Exposure Study) – this study provides unique information on air toxics and their associated health risks based on long-term monitoring at ten fixed locations throughout the South Coast Air Basin (Basin) and a detailed emissions inventory and modeling analysis.

Mentorship Program - program is designed to connect people from across the South Coast AQMD organization, to allow staff to share and learn valuable knowledge and skills, and to provide an opportunity for employees to take a proactive role in their career development.

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

Microscopic Analysis - analyzing, identifying, and quantifying asbestos for compliance with South Coast AQMD, 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 & Scrapage 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.

WORK PROGRAM GLOSSARY

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 South Coast AQMD lab and reported to U.S. EPA where the data is used to determine toxic trends.

Near Roadway (NO₂) Monitoring – federal monitoring requirement that calls for state and local air monitoring agencies to install near-road NO₂ monitoring stations at locations where peak hourly NO₂ concentrations are expected to occur within the near-road environment in larger urban areas.

Network Operations/Telecommunications – installing, maintaining, and providing operational support of South Coast AQMD's PC, voice, data, image, and radio networks; planning, designing, and implementing new network systems or services in response to South Coast AQMD'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 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 NSR programs. These programs streamline the evaluation of permit renewal and emissions reporting.

Outreach - increasing public awareness of South Coast AQMD's programs, goals, permit requirements, and employment opportunities; interacting, providing technical assistance, and acting as liaison between South Coast AQMD 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 South Coast AQMD's outreach and public opinion on South Coast AQMD rules and activities. This also includes responding to media calls for informational background material on South Coast AQMD news stories.

Payroll - paying salaries and benefits to South Coast AQMD 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.

WORK PROGRAM GLOSSARY

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 South Coast AQMD 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.

Procedure 5 Review – evaluation of asbestos plans which are required for the clean-up any disturbed asbestos containing materials.

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 South Coast AQMD 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.

WORK PROGRAM GLOSSARY

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 South Coast AQMD information materials.

Public Notification – providing timely and adequate notification to the public of South Coast AQMD 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 South Coast AQMD 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 South Coast AQMD regulatory, scientific and administrative decisions.

RECLAIM/Admin Support – developing and implementing rules and monitoring 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. The RECLAIM program will transition to a command and control regulatory structure.

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 South Coast AQMD.

Records Services – maintaining South Coast AQMD'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 South Coast AQMD's Records Retention Policy.

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

WORK PROGRAM GLOSSARY

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 South Coast AQMD's Rule 2202 Trip Reduction Plan.

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

Rule 1180 - adopted in December 2017, this rule requires real-time fenceline air monitoring systems and establishes a fee schedule to fund refinery-related community air monitoring systems that will provide air quality information to the public about levels of various criteria air pollutants, volatile organic compounds, metals and other compounds at or near the property boundaries of petroleum refineries and in nearby communities.

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 South Coast AQMD.

Rulemaking/Rules – developing new rules and evaluating existing South Coast AQMD 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.

South Coast AQMD Mail – processing and delivering all incoming and outgoing mail.

WORK PROGRAM GLOSSARY

South Coast AQMD Projects – South Coast AQMD permitting and rule development projects where a California Environmental Quality Act (CEQA) document is prepared and the South Coast AQMD 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 South Coast AQMD'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 South Coast AQMD Rules. Additionally, data submitted by facilities is reviewed for protocol approval, CEMS certification, or test data acceptance.

Speaker's Bureau - training South Coast AQMD 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 South Coast AQMD 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 South Coast AQMD.

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

WORK PROGRAM GLOSSARY

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 South Coast AQMD'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 South Coast AQMD 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 South Coast AQMD'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.

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 South Coast AQMD 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.

WORK PROGRAM GLOSSARY

Volkswagen (VW) Environmental Mitigation Trust – The Beneficiary Mitigation Plan for the Volkswagen (VW) Environmental Mitigation Trust identifies five funding categories for funded projects intended to mitigate the excess NOx emissions caused by VW vehicles.

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 South Coast AQMD’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	Carl Moyer Program
DERA	Diesel Emission Reduction Act
EFMP	Enhanced Fleet Modernization Program
ERC	Emission Reduction Credit
FARMER	Funding Agricultural Replacement Measures For Emissions Reductions
GGRF	Greenhouse Gas Reduction Fund
MATES	Multiple Air Toxics Exposure Study
MS	Mobile Sources Program
NSR	New Source Review
PERP	Portable Equipment Registration Program
PR	Public Records Act
QA	Quality Assurance
RECLAIM	REgional CLEAN Air Incentives Market
SOON	Surplus Off-Road Opt-In for NO _x
ST	Source Test
Title III	Federally Mandated Toxics Program
Title V	Federally Mandated Permit Program
VIP	Voucher Incentive Program
VW	Volkswagen

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
AQ-SPEC	Air Quality Sensor Performance Evaluation Center
AVR	Average Vehicle Ridership
BARCT	Best Available Retrofit Control Technology
CLASS	Clean Air Support System
CNG	Compressed Natural Gas
DB	Database
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
ISR	Indirect Source Rules
LAER	Lowest Achievable Emissions Rate
LEV	Low Emission Vehicle
LNG	Liquefied Natural Gas
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
NSPS	New Source Performance Standards
OEHHA	Office of Environmental Health Hazard Assessment
PAMS	Photochemical Assessment Monitoring System
PAR	Proposed Amended Rule
PE	Program Evaluations
PEV	Plug-In Electric Vehicle
PHEV	Plug-In Hybrid Electric Vehicle
PR	Proposed Rule
RFP	Request for Proposal
RFQ	Request for Quotations
RFQQ	Request for Qualifications and Quotations
RTC	RECLAIM Trading Credit
SBA	Small Business Assistance
SIP	State Implementation Plan
ST	Source Testing
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

POLLUTANTS

CO	Carbon Monoxide
NO _x	Oxides of Nitrogen
O ₃	Ozone
PM _{2.5}	Particulate Matter <2.5 microns
PM ₁₀	Particulate Matter ≤ 10 microns
ROG	Reactive Organic Gases
SO _x	Oxides of Sulfur
VOC	Volatile Organic Compound

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GOVERNING BOARD

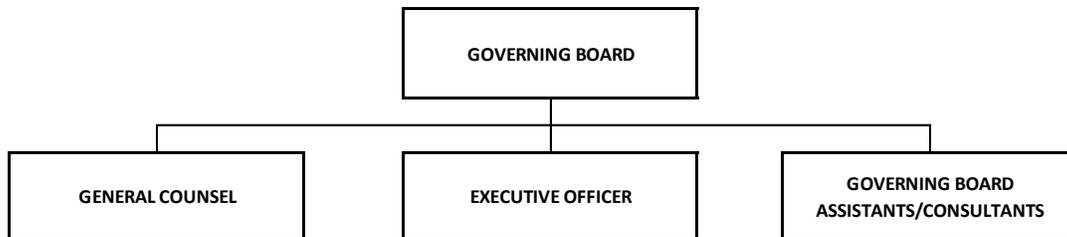
At a Glance:	
FY 2020-21 Adopted Budget	\$1.7M
FY 2021-22 Adopted Budget	\$1.7M
% of FY 2021-22 Adopted Budget	0.9%
Total FTEs FY 2021-22 Adopted Budget	N/A

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 South Coast AQMD 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 2019-20 Actuals	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate *	FY 2021-22 Adopted Budget	
Salary & Employee Benefits						
51000-52000 Salaries	\$ 132,696	\$ 359,073	\$ 359,073	\$ 341,073	\$ 359,073	
53000-55000 Employee Benefits	11,381	237,073	237,074	225,074	237,073	
Sub-total Salary & Employee Benefits	\$ 144,077	\$ 596,146	\$ 596,147	\$ 566,147	\$ 596,146	
Services & Supplies						
67250 Insurance	\$ -	\$ -	\$ -	\$ -	\$ -	
67300 Rents & Leases Equipment	-	-	-	-	-	
67350 Rents & Leases Structure	-	-	-	-	-	
67400 Household	-	-	-	-	-	
67450 Professional & Special Services	1,170,655	807,784	807,784	762,784	807,784	
67460 Temporary Agency Services	-	-	-	-	-	
67500 Public Notice & Advertising	34,108	-	-	-	-	
67550 Demurrage	-	-	-	-	-	
67600 Maintenance of Equipment	-	-	-	-	-	
67650 Building Maintenance	-	-	-	-	-	
67700 Auto Mileage	9,869	10,000	10,000	10,000	10,000	
67750 Auto Service	-	-	-	-	-	
67800 Travel	24,091	64,800	64,800	64,800	64,800	
67850 Utilities	-	-	-	-	-	
67900 Communications	10,734	20,000	20,000	20,000	20,000	
67950 Interest Expense	-	-	-	-	-	
68000 Clothing	-	-	-	-	-	
68050 Laboratory Supplies	-	-	-	-	-	
68060 Postage	1,264	10,000	10,000	10,000	10,000	
68100 Office Expense	5,977	4,000	4,000	4,000	4,000	
68200 Office Furniture	-	-	-	-	-	
68250 Subscriptions & Books	-	-	-	-	-	
68300 Small Tools, Instruments, Equipment	-	-	-	-	-	
68400 Gas and Oil	-	-	-	-	-	
69500 Training/Conference/Tuition/ Board Exp.	102,308	132,500	132,500	132,500	132,500	
69550 Memberships	-	-	-	-	-	
69600 Taxes	-	-	-	-	-	
69650 Awards	-	-	-	-	-	
69700 Miscellaneous Expenses	30,853	15,000	15,000	15,000	15,000	
69750 Prior Year Expense	-	-	-	-	-	
69800 Uncollectable Accounts Receivable	-	-	-	-	-	
89100 Principal Repayment	-	-	-	-	-	
Sub-total Services & Supplies	\$ 1,389,860	\$ 1,064,084	\$ 1,064,084	\$ 1,019,084	\$ 1,064,084	
77000 Capital Outlays	\$ -	\$ -	\$ -	\$ -	\$ -	
79050 Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -	
Total Expenditures	\$ 1,533,937	\$ 1,660,230	\$ 1,660,231	\$ 1,585,231	\$ 1,660,230	

* Estimates based on July 2020 through February 2021 actual expenditures and February 2021 budget amendments.

EXECUTIVE OFFICE

**WAYNE NASTRI
EXECUTIVE OFFICER**

At a Glance:	
FY 2020-21 Adopted Budget	\$1.6M
FY 2021-22 Adopted Budget	\$2.4M
% of FY 2021-22 Adopted Budget	1.4%
Total FTEs FY 2021-22 Adopted Budget	9

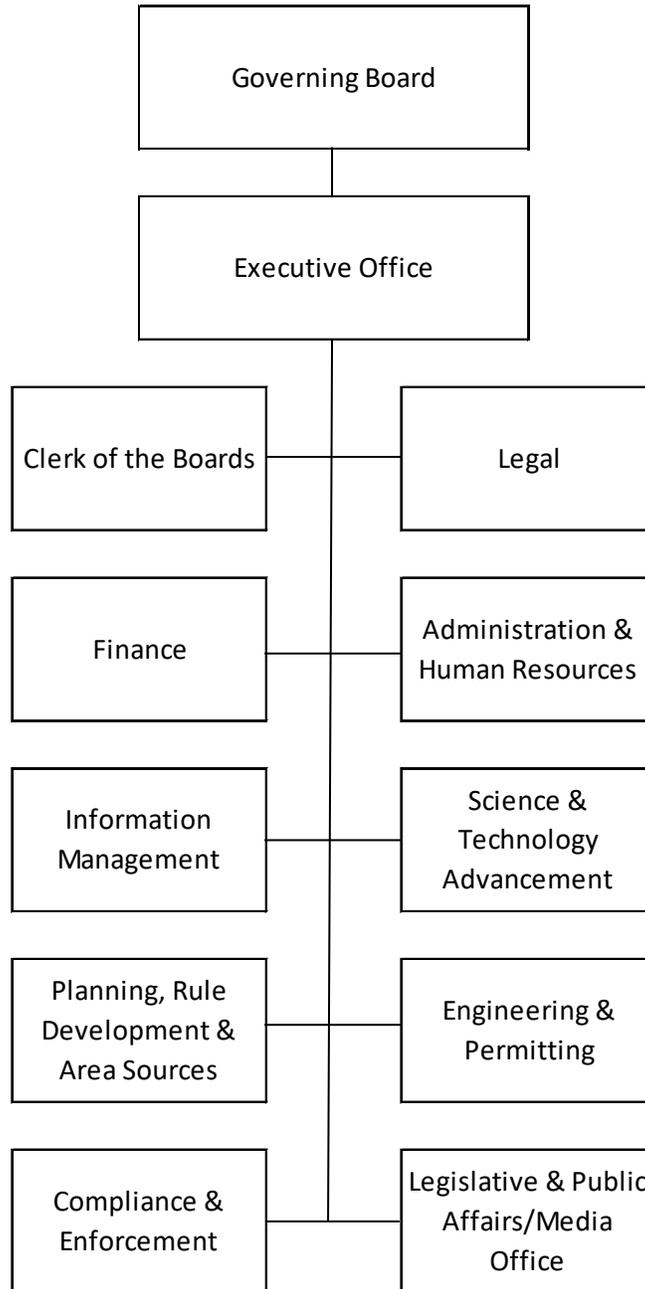
DESCRIPTION OF MAJOR SERVICES:

The Executive Office is responsible for the comprehensive management of the South Coast AQMD 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 consists of the Executive Officer, Chief Operating Officer, Diversity, Equity, & Inclusion Officer, and six 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.

EXECUTIVE OFFICE (cont.)

ORGANIZATIONAL CHART:



EXECUTIVE OFFICE (cont.)

POSITION SUMMARY: 9 FTEs

Executive Office Unit	Amended FY 2020-21	Change	Budget FY 2021-22
Administration	7	2	9

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
1	Chief Operating Officer
1	Diversity, Equity & Inclusion Officer
1	Executive Officer
3	Executive Secretary
1	Senior Administrative Secretary
<u>2</u>	Senior Public Information Specialist
9	Total FTEs

Executive Office Work Program by Office											
#	Program Code	Program Category	Program	Activities	FTEs FY 2020-21	+/-	FTEs FY 2021-22	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	1.00	0.00	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			
12	03 880	Operational Support	Inclusion/Equity	Inclusion/Diversity/Equity	0.00	4.00	4.00	Ia			

5.00	4.00	9.00
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Total Executive Office

Executive Office Line Item Expenditure					
Major Object / Account # / Account Description	FY 2019-20 Actuals	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate *	FY 2021-22 Adopted Budget
Salary & Employee Benefits					
51000-52000 Salaries	\$ 853,910	\$ 839,752	\$ 833,973	\$ 833,973	\$ 1,459,799
53000-55000 Employee Benefits	497,601	476,993	482,773	482,773	647,190
Sub-total Salary & Employee Benefits	\$ 1,351,511	\$ 1,316,745	\$ 1,316,746	\$ 1,316,746	\$ 2,106,988
Services & Supplies					
67250 Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300 Rents & Leases Equipment	-	-	-	-	-
67350 Rents & Leases Structure	-	-	-	-	-
67400 Household	-	-	-	-	-
67450 Professional & Special Services	140,707	75,000	75,000	-	175,000
67460 Temporary Agency Services	-	-	-	-	-
67500 Public Notice & Advertising	-	7,500	7,500	7,500	7,500
67550 Demurrage	-	-	-	-	-
67600 Maintenance of Equipment	301	400	400	400	400
67650 Building Maintenance	-	-	-	-	-
67700 Auto Mileage	493	800	800	800	800
67750 Auto Service	-	-	-	-	-
67800 Travel	31,368	77,000	77,000	77,000	77,000
67850 Utilities	-	-	-	-	-
67900 Communications	4,720	6,500	6,500	6,500	6,500
67950 Interest Expense	-	-	-	-	-
68000 Clothing	-	-	-	-	-
68050 Laboratory Supplies	-	-	-	-	-
68060 Postage	91	7,000	7,000	7,000	7,000
68100 Office Expense	3,167	6,300	6,300	6,300	6,300
68200 Office Furniture	-	-	-	-	3,000
68250 Subscriptions & Books	-	5,000	5,000	5,000	5,000
68300 Small Tools, Instruments, Equipment	-	-	-	-	-
68400 Gas and Oil	-	-	-	-	-
69500 Training/Conference/Tuition/ Board Exp.	2,415	1,000	1,000	1,000	1,000
69550 Memberships	25,000	26,000	26,000	26,000	26,000
69600 Taxes	-	-	-	-	-
69650 Awards	1,800	-	10,000	10,000	-
69700 Miscellaneous Expenses	3,462	25,000	15,000	15,000	25,000
69750 Prior Year Expense	(44)	-	-	-	-
69800 Uncollectable Accounts Receivable	-	-	-	-	-
89100 Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies	\$ 213,480	\$ 237,500	\$ 237,500	\$ 162,500	\$ 340,500
77000 Capital Outlays	\$ -	\$ -	\$ -	\$ -	\$ -
79050 Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures	\$ 1,564,991	\$ 1,554,245	\$ 1,554,246	\$ 1,479,246	\$ 2,447,488

* Estimates based on July 2020 through February 2021 actual expenditures and February 2021 budget amendments.

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DISTRICT GENERAL

At a Glance:	
FY 2020-2021 Adopted Budget	\$18.0M
FY 2021-22 Adopted Budget	\$18.1M
% of FY 2021-22 Adopted Budget	10.1%
Total FTEs FY 2021-22 Adopted Budget	N/A

Accounts associated with general operations of the South Coast AQMD 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 2019-20 Actuals	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate *	FY 2021-22 Adopted Budget	
Salary & Employee Benefits						
51000-52000	Salaries	\$ -	\$ 1,785,964	\$ 1,729,371	\$ 1,729,371	\$ 1,785,964
53000-55000	Employee Benefits	176,985	480,000	480,000	480,000	480,000
Sub-total Salary & Employee Benefits		\$ 176,985	\$ 2,265,964	\$ 2,209,371	\$ 2,209,371	\$ 2,265,964
Services & Supplies						
67250	Insurance	\$ 1,059,265	\$ 1,449,140	\$ 1,449,140	\$ 1,399,140	\$ 1,449,140
67300	Rents & Leases Equipment	104,493	117,000	147,000	147,000	117,000
67350	Rents & Leases Structure	11,790	19,300	41,595	41,595	19,300
67400	Household	773,254	869,261	839,261	839,261	869,261
67450	Professional & Special Services	976,923	1,273,089	1,415,591	1,415,591	1,273,089
67460	Temporary Agency Services	-	-	-	-	-
67500	Public Notice & Advertising	22,656	25,000	25,000	25,000	25,000
67550	Demurrage	-	100,000	80,000	80,000	100,000
67600	Maintenance of Equipment	369,123	403,654	403,654	403,654	410,760
67650	Building Maintenance	949,489	831,479	783,738	783,738	851,479
67700	Auto Mileage	-	-	-	-	-
67750	Auto Service	-	-	-	-	-
67800	Travel	-	-	-	-	-
67850	Utilities	1,427,208	1,959,620	1,833,630	1,733,630	1,937,620
67900	Communications	175,955	150,900	151,400	151,400	151,400
67950	Interest Expense	3,503,983	3,353,106	3,353,106	3,353,106	3,186,361
68000	Clothing	-	-	-	-	-
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	10,029	17,083	17,083	17,083	17,083
68100	Office Expense	142,522	288,200	208,200	208,200	313,200
68200	Office Furniture	29,396	14,000	36,447	36,447	14,000
68250	Subscriptions & Books	-	-	-	-	-
68300	Small Tools, Instruments, Equipment	-	-	-	-	-
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	-	-	-	-	-
69550	Memberships	-	-	-	-	-
69600	Taxes	12,223	56,000	57,348	57,348	57,500
69650	Awards	11,987	17,342	17,342	17,342	17,342
69700	Miscellaneous Expenses	19,345	10,625	8,625	8,625	10,625
69750	Prior Year Expense	(15,578)	-	-	-	-
69800	Uncollectable Accounts Receivable	578,246	-	-	-	-
89100	Principal Repayment	2,686,641	3,840,443	3,840,443	3,840,443	4,006,881
Sub-total Services & Supplies		\$ 12,848,948	\$ 14,795,242	\$ 14,708,603	\$ 14,558,603	\$ 14,827,041
77000	Capital Outlays	\$ 1,517,766	\$ 75,000	\$ 58,158	\$ 58,158	\$ 175,000
79050	Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
99950	Transfers Out	\$ 2,525,592	\$ 841,353	\$ 1,276,989	\$ 1,276,989	\$ 841,353
Total Expenditures		\$ 17,069,291	\$ 17,977,559	\$ 18,253,121	\$ 18,103,121	\$ 18,109,358
* Estimates based on July 2020 through February 2021 actual expenditures and February 2021 budget amendments.						

ADMINISTRATIVE & HUMAN RESOURCES

**A. JOHN OLVERA
DEPUTY EXECUTIVE OFFICER**

At a Glance:	
FY 2020-21 Adopted Budget	\$6.5M
FY 2021-22 Adopted Budget	\$6.6M
% of FY 2021-22 Adopted Budget	3.7%
Total FTEs FY 2021-22 Adopted Budget	44

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 programs to maximize hiring, retention, and development of the highly-qualified employees necessary to meet South Coast AQMD’s air quality goals. Risk Management is responsible for programs aimed at ensuring a healthful and safe work environment, including security, emergency preparedness, and business continuity programs as well as programs to reduce liability and accident-related costs. Business Services oversees the administration of the South Coast AQMD headquarters facility services, its leases, the maintenance of fleet vehicles, and the management of the Print Shop and Mail/Subscription services. Building Services is responsible for the maintenance and repair of the South Coast AQMD headquarters building, childcare center, field offices, air monitoring stations, and meteorological stations.

ACCOMPLISHMENTS:

RECENT:

- Administered employee benefits programs including virtual open enrollment with personal zoom meetings for employees, expanded options in the 457 deferred compensation plan, expanded wellness education programs, and expanded supervisor and manager training opportunities.
- Conducted successful recruitment efforts for promotional opportunities and new hires, including the recruitment, hiring, and onboarding of a Diversity, Equity, and Inclusion Officer.
- Completed several reclassification studies.
- Provided support and direction to management and staff with respect to adherence to relevant state and federal laws and South Coast AQMD policies, procedures and

ADMINISTRATIVE & HUMAN RESOURCES (cont.)

Memoranda of Understanding, including COVID-19-related legislation, regulations, policies and directives.

- Supported South Coast AQMD's Succession Planning program through the Executive Office.
- Implemented Administrative Directive, *COVID -19 Directive No. 1b, Expanded Teleworking Program*, which supplements Directive No. 1. Directive No. 1b provides direction and guidelines regarding the expansion of South Coast AQMD's Teleworking Program for employees.
- Conducted ergonomic workspace evaluations and other safety training programs.
- Expanded the Teleworking Program for employees enabling 80% of staff to telework.
- Held trainings on sexual harassment prevention and anti-bullying policies, as well as programs for career development and workforce education.
- Negotiated a one-year MOU for Teamsters, and one-year contract for unrepresented groups.
- Completed a Continuity of Operations Plan and Emergency Operations Plan and conducted training.
- Completed the Elevator Modernization project.
- Completion of new Central Chiller Plant utilizing emerging technology and demonstration of low environmental impact refrigerant.
- Retrofit of Ground Floor North office lighting with energy saving controls and LED fixtures.
- Completed drought-resistant landscaping and water-saving irrigation installation along the building frontage.
- Retrofit all building restrooms with water saving, automated touch-free faucets.
- Retrofit of air conditioning and fume hood exhaust controls in main chemistry laboratory.
- Completed workspace design and reconfiguration on several floors.
- Completed construction of new offices and various office renovations on 4th floor.
- Installation of new carpet and coffee/copy room flooring on 4th floor.
- Completed expansion of the Long Beach Office space.
- Installation of hand-sanitizing devices/stations, protective screens, and signage throughout headquarters and LBO field office.

ANTICIPATED:

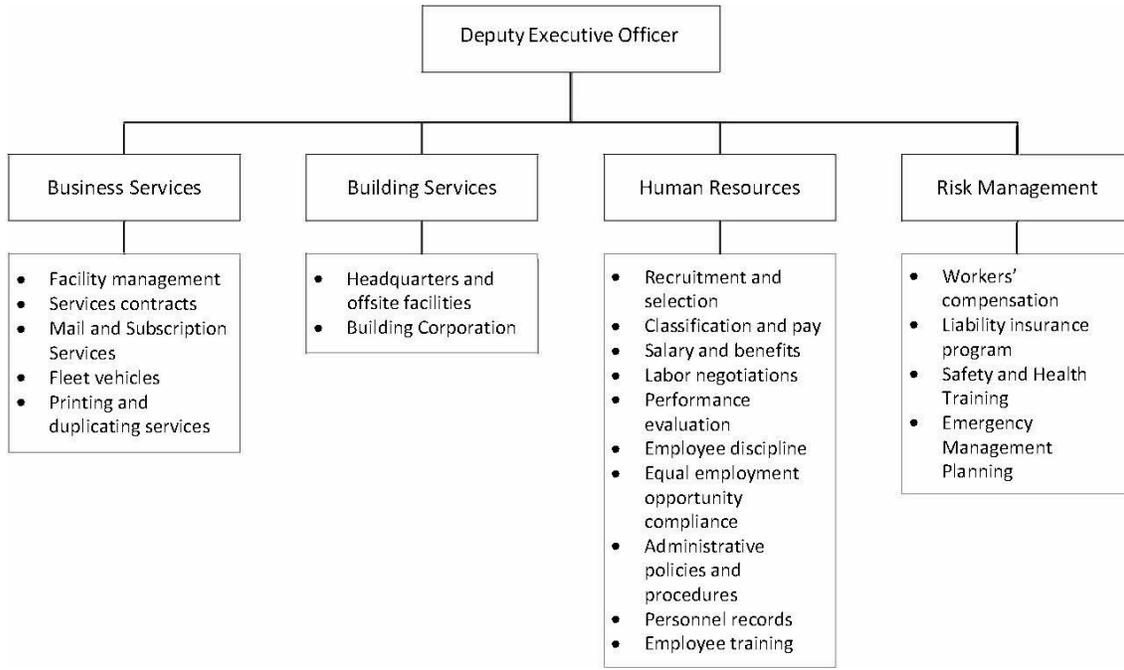
- Continue to provide support and direction to management and staff with respect to adherence to relevant state and federal laws and South Coast AQMD policies, procedures and Memoranda of Understanding, including COVID-19-related legislation, regulations, policies and directives.
- Continue to provide virtual financial, health, and mental wellness education for all employees.
- Continue recruitment and selection efforts and conduct classification studies.
- Provide training workshops for supervisors and managers.
- Continue to implement the Continuity of Operations Plan and Emergency Operations Plan program.

ADMINISTRATIVE & HUMAN RESOURCES (cont.)

- Continue to implement the mentorship program.
- Conduct emergency preparedness drills.
- Conduct training on emergency preparedness programs, including COOP/EOP.
- Continue to implement new training programs (supervisor skills, safety), using new Learning Management Software system.
- Continue updates and implementation of South Coast AQMD's Succession Planning program.
- Continue to plan for significant turnover of fleet vehicles due to CNG tank expiration.
- COVID-specific Air Handler Filter Retrofit.
- Complete lab area retrofit and service connections for AQSPEC Environmental Testing Chamber.
- Design completion for optimized Data Center Air Conditioning.
- Replenish water softener system resin tank beds.
- Child Care Building roof replacement.
- Upgrade / Replacement of Cafeteria Exhaust Equipment.

ADMINISTRATIVE & HUMAN RESOURCES (cont.)

ORGANIZATIONAL CHART:



POSITION SUMMARY: 44 FTEs

Administrative & Human Resources Units	Amended FY 2020-21	Change	Budget FY 2021-22
Office Administration	2	-	2
Business Services	14	-	14
Building Services	8	-	8
Career Development Interns	6	-	6
Classification & Pay/Recruitment & Selection	5	-	5
Employee & Labor Relations/Benefits & Records	6	1	7
Risk Management	2	-	2
Total	43	1	44

ADMINISTRATIVE & HUMAN RESOURCES (cont.)

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
1	Building Maintenance Manager
1	Building Supervisor
1	Business Services Manager
6	Career Development Intern
1	Deputy Executive Officer/Administrative & Human Resources
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
3	Human Resources Technician
2	Mail Subscription Services Clerk
1	Mail Subscription Services Supervisor
1	Office Assistant
1	Offset Press Operator
2	Print Shop Duplicator
1	Print Shop Supervisor
1	Risk Manager
2	Secretary
1	Senior Administrative Secretary
2	Senior Office Assistant
<u>1</u>	Staff Specialist
44	Total FTEs

**Administrative & Human Resources
Work Program by Office**

#	Program Code	Program Category	Program	Activities	FTEs FY 2020-21	+/-	FTEs FY 2021-22	Revenue Categories
1	16 026	Operational Support	SCAQMD Mail	Posting/Mailing/Delivery	2.30	0.00	2.30	la
2	16 035	Operational Support	AB617-Support	AB617-Support	4.00	0.00	4.00	IX
3	16 038	Operational Support	Admin/Office Management	Reports/Proj/Budget/Contracts	6.00	0.00	6.00	lb
4	16 060	Operational Support	Equal Employment Opportunity	Program Dev/Monitor/Reporting	0.05	0.00	0.05	la
5	16 080	Ensure Compliance	Auto Services	Vehicle/Radio Repair & Maint	4.00	0.00	4.00	la
6	16 090	Operational Support	Building Maintenance	Repairs & Preventative Maint	8.00	0.00	8.00	la
7	16 092	Operational Support	Business Services	Building Services Admin/Contracts	2.69	0.00	2.69	la
8	16 225	Operational Support	Employee Benefits	Benefits Analysis/Orient/Records	2.50	0.00	2.50	la
9	16 226	Operational Support	Classification & Pay	Class & Salary Studies	0.32	0.00	0.32	la
10	16 228	Operational Support	Recruitment & Selection	Recruit Candidates for SCAQMD	2.30	1.00	3.30	la
11	16 232	Operational Support	Position Control	Track Positions/Workforce Anlys	0.20	0.00	0.20	la
12	16 233	Operational Support	Employee Relations	Meet/Confer/Labor-Mgmt/Grievance	1.50	0.00	1.50	la
13	16 255	Operational Support	Facilities Services	Phones/Space/Keys/Audio-Visual	1.00	0.00	1.00	la
14	16 446	Operational Support	Mentorship Program	Mentorship Program	0.10	0.00	0.10	la
15	16 457	Advance Clean Air Technology	MS/Carl Moyer Admin	C Moyer/Contractor Compliance	0.03	0.00	0.03	IX
16	16 540	Customer Service and Business Assistance	Print Shop	Printing/Collating/Binding	5.00	0.00	5.00	la
17	16 542	Advance Clean Air Technology	Prop 1B:Goods Movement	Prop 1B: Goods Movement	0.03	0.00	0.03	IX
18	16 565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Rec Requests	0.03	0.00	0.03	la
19	16 640	Operational Support	Risk Management	Liabl/Property/Wk Comp/SelfIns	2.25	0.00	2.25	la
20	16 720	Customer Service and Business Assistance	Subscription Services	Rule & Gov Board Materials	0.70	0.00	0.70	IV,XVII

Total Administrative & Human Resources	43.00	1.00	44.00
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Administrative & Human Resources Line Item Expenditure						
Major Object / Account # / Account Description		FY 2019-20 Actuals	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate *	FY 2021-22 Adopted Budget
Salary & Employee Benefits						
51000-52000	Salaries	\$ 3,314,015	\$ 3,200,293	\$ 3,203,874	\$ 3,114,938	\$ 3,219,185
53000-55000	Employee Benefits	2,117,810	2,154,045	2,154,044	2,086,952	2,122,518
Sub-total Salary & Employee Benefits		\$ 5,431,825	\$ 5,354,338	\$ 5,357,918	\$ 5,201,890	\$ 5,341,703
Services & Supplies						
67250	Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300	Rents & Leases Equipment	42,160	41,600	41,600	41,600	41,600
67350	Rents & Leases Structure	-	-	-	-	-
67400	Household	9,756	5,284	35,284	35,284	35,284
67450	Professional & Special Services	160,007	151,750	181,750	181,750	198,149
67460	Temporary Agency Services	49,542	17,000	17,000	17,000	15,000
67500	Public Notice & Advertising	6,422	9,066	9,066	9,066	6,023
67550	Demurrage	-	-	-	-	-
67600	Maintenance of Equipment	4,287	5,500	5,500	5,500	5,500
67650	Building Maintenance	32,208	-	39,141	39,141	-
67700	Auto Mileage	5,547	4,200	4,200	4,200	4,200
67750	Auto Service	509,213	470,000	470,000	286,667	470,000
67800	Travel	3,247	2,500	2,500	2,500	2,500
67850	Utilities	-	-	-	-	-
67900	Communications	17,616	21,900	21,900	21,900	21,900
67950	Interest Expense	-	-	-	-	-
68000	Clothing	40,376	10,808	22,808	22,808	35,808
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	2,377	5,469	5,469	5,469	5,469
68100	Office Expense	100,060	111,300	72,901	72,901	111,300
68200	Office Furniture	-	-	26,111	26,111	21,000
68250	Subscriptions & Books	-	2,520	2,025	2,025	2,520
68300	Small Tools, Instruments, Equipment	5,392	5,030	5,030	5,030	5,030
68400	Gas and Oil	193,824	292,021	262,021	189,896	292,021
69500	Training/Conference/Tuition/ Board Exp.	20,580	15,062	15,062	15,062	10,062
69550	Memberships	3,834	6,265	8,265	8,265	11,265
69600	Taxes	2,418	-	5,783	5,783	4,000
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	3,065	12,000	5,000	5,000	8,000
69750	Prior Year Expense	(370)	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		\$ 1,211,563	\$ 1,189,275	\$ 1,258,416	\$ 1,002,958	\$ 1,306,631
77000	Capital Outlays	\$ -	\$ -	\$ -	\$ -	\$ -
79050	Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures		\$ 6,643,388	\$ 6,543,613	\$ 6,616,334	\$ 6,204,848	\$ 6,648,334

* Estimates based on July 2020 through February 2021 actual expenditures and February 2021 budget amendments.

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CLERK OF THE BOARDS

**FAYE THOMAS
CLERK OF THE BOARDS**

At a Glance:	
FY 2020-21 Adopted Budget	\$1.4M
FY 2021-22 Adopted Budget	\$1.4M
% of FY 2020-21 Adopted Budget	0.8%
Total FTEs FY 2020-21 Adopted Budget	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 South Coast AQMD staff and state and federal agencies.

ACCOMPLISHMENTS:

RECENT

- Received and processed 67 subpoenas, public/administrative records requests, and claims against the South Coast AQMD.
- Provided support for 11 Governing Board meetings, including: preparing an agenda and minutes for each meeting; preparation, distribution, and publication of 25 meeting and public hearing notices; preparation of 27 Board Resolutions.
- Provided support for 91 hearings, pre-hearing conferences, and general meetings held by the Hearing Board, including: processing 105 petitions; preparation, distribution, and publication of 75 meeting and public hearing notices; preparation of 98 Minute Orders, Findings & Decisions, Pre-hearing Memoranda, and General Meeting Reports of Actions; and preparation and distribution of 153 daily agendas and monthly case calendars.

ANTICIPATED:

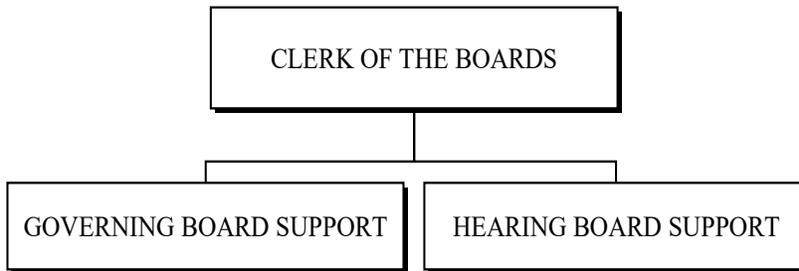
- Provide support for approximately 80 hearings, pre-hearing conferences, and general meetings held by the Hearing Board, including: processing approximately 90 petitions; preparation, distribution, and publication of approximately 100 meeting and public

CLERK OF THE BOARDS (cont.)

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 120 daily agendas and monthly case calendars.

- Provide support for 12 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 2020-21	Change	Budget FY 2021-22
Governing/Hearing Board Support	6	-	6

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
1	Clerk of the Board
3	Deputy Clerk/Transcriber
1	Office Assistant
<u>1</u>	Senior Deputy Clerk
6	Total FTEs

**Clerk of the Boards
Work Program by Office**

#	Program Code	Program Category	Program	Activities	FTEs FY 2020-21	+/-	FTEs FY 2021-22	Revenue Categories
1	17 024	Operational Support	Admin/SCAQMD/GB/HB Mgmt	Admin Governing/Hearing Brds	1.25	0.00	1.25	la,VII,XV
2	17 275	Operational Support	Governing Board	Attnd/Recrd/Monitor Meetings	1.40	0.00	1.40	la
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/Variences/Appeal	Attnd/Recrd/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	la
6	17 855	Operational Support	Web Tasks	Create/edit/review web content	0.03	0.00	0.03	la

Total Clerk of the Boards

6.00	-	6.00
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Clerk of the Boards Line Item Expenditure					
Major Object / Account # / Account Description	FY 2019-20 Actuals	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate *	FY 2021-22 Adopted Budget
Salary & Employee Benefits					
51000-52000 Salaries	\$ 432,333	\$ 409,056	\$ 409,056	\$ 392,886	\$ 387,899
53000-55000 Employee Benefits	298,423	278,098	278,098	265,899	281,502
Sub-total Salary & Employee Benefits	\$ 730,756	\$ 687,154	\$ 687,154	\$ 658,785	\$ 669,401
Services & Supplies					
67250 Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300 Rents & Leases Equipment	-	-	-	-	-
67350 Rents & Leases Structure	-	-	-	-	-
67400 Household	-	-	-	-	-
67450 Professional & Special Services	15,300	85,200	45,200	45,200	85,200
67460 Temporary Agency Services	-	-	-	-	-
67500 Public Notice & Advertising	62,755	40,000	80,000	80,000	90,000
67550 Demurrage	-	-	-	-	-
67600 Maintenance of Equipment	-	200	200	200	200
67650 Building Maintenance	-	-	-	-	-
67700 Auto Mileage	-	100	100	100	100
67750 Auto Service	-	-	-	-	-
67800 Travel	146	200	200	200	200
67850 Utilities	-	-	-	-	-
67900 Communications	192	500	500	500	500
67950 Interest Expense	-	-	-	-	-
68000 Clothing	-	-	-	-	-
68050 Laboratory Supplies	-	-	-	-	-
68060 Postage	725	1,200	1,200	1,200	1,200
68100 Office Expense	1,425	6,600	6,600	6,600	6,600
68200 Office Furniture	-	-	-	-	-
68250 Subscriptions & Books	-	-	-	-	-
68300 Small Tools, Instruments, Equipment	-	-	-	-	-
68400 Gas and Oil	-	-	-	-	-
69500 Training/Conference/Tuition/ Board Exp.	562,612	584,920	584,920	584,920	584,920
69550 Memberships	-	300	300	300	300
69600 Taxes	-	-	-	-	-
69650 Awards	-	-	-	-	-
69700 Miscellaneous Expenses	-	500	500	500	500
69750 Prior Year Expense	-	-	-	-	-
69800 Uncollectable Accounts Receivable	-	-	-	-	-
89100 Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies	\$ 643,155	\$ 719,720	\$ 719,720	\$ 719,720	\$ 769,720
77000 Capital Outlays	\$ -	\$ -	\$ -	\$ -	\$ -
79050 Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures	\$ 1,373,911	\$ 1,406,874	\$ 1,406,874	\$ 1,378,505	\$ 1,439,121

* Estimates based on July 2020 through February 2021 actual expenditures and February 2021 budget amendments.

COMPLIANCE & ENFORCEMENT

TERRENCE MANN DEPUTY EXECUTIVE OFFICER

At a Glance:	
FY 2020-21 Adopted Budget	\$20.8M
FY 2020-21 Adopted Budget	\$21.5M
% of FY 2020-21 Adopted Budget	12.0%
Total FTEs FY 2020-21 Adopted Budget	154

DESCRIPTION OF MAJOR SERVICES:

Compliance and Enforcement (C&E) ensures public health by conducting unannounced field inspections to verify compliance with South Coast AQMD, 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 South Coast AQMD Hearing Board, and conducting training classes for the public and regulated community.

ACCOMPLISHMENTS:

RECENT:

- Completed 198 inspections of chrome plating facilities (quarterly inspections of 99 facilities).
- Completed 159 Title V facility inspections.
- Completed 205 RECLAIM facility audits.
- Completed inspections of 1,786 other permitted stationary source facilities.
- Completed inspections of 2,421 PERP-registered engines/equipment.
- Completed 12 "Blue Sky" team inspections at refineries.
- Responded to 5,535 complaints (98% of those received).
- Responded to 331 breakdown notifications (77% of those received).
- Issued 883 Notices to Comply and 446 Notices of Violation (NOVs).
- Conducted 18 training classes for members of the public and the regulated community.

COMPLIANCE & ENFORCEMENT (cont.)

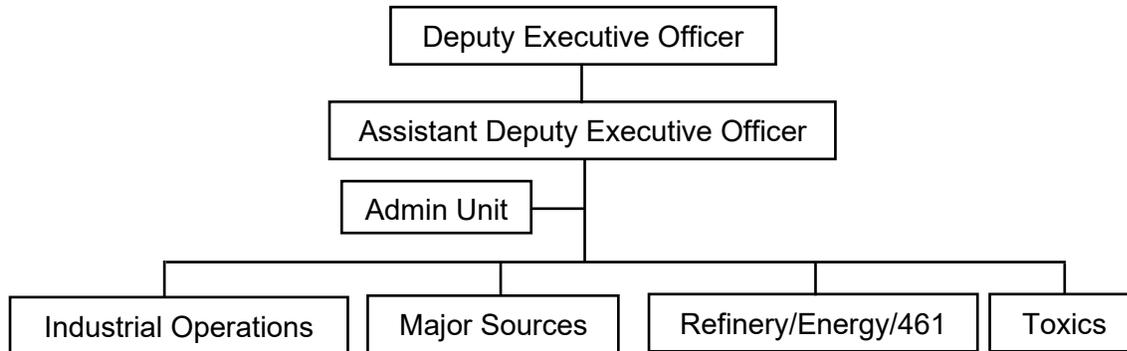
ANTICIPATED:

- Asbestos Strike Force
 - Due to the current global health crisis, we will attempt to maintain the number of asbestos notification inspections at 1,200.
- Marine Vessel & Terminal Inspection Program: Operation Sea Force (Community Emissions Reduction Plan [CERP Action])
 - Perform surveillance and track marine vessels in the South Coast AQMD waters that vent emissions into the atmosphere without notification or due to poor maintenance.
 - Attempt to board and inspect two marine oil tankers per week for Rule 1142 compliance.
- Complaint Prioritization
 - Improve timelines of complaint response by meeting the first contact complaint response time goal of two hours for an average of at least 85 % of the time.
- Inspection Prioritization
 - Due to the current global health crisis, we will attempt to maintain the number of non-Title V/non-RECLAIM inspections at 7,000 annually.
- Oil and Gas Inspections (CERP Action)
 - Coordinate efforts with the Monitoring team to conduct inspections of oil wells that have elevated pollutants during mobile platform surveys.
- Idling Truck Program (CERP Action)
 - Conduct quarterly sweeps in three AB 617 communities, including at locations identified by community members.
 - Work with CARB and Legislative & Public Affairs/Media Office (LPAM) to have “No Idling Signage” installed in AB 617 communities and schools.
- Rendering Plants (CERP Action)
 - Continue responding to rendering odor complaints and update complainants on a timely basis.
 - Conduct inspections to evaluate compliance with Rule 415.
- Rule 1180 - Refinery Community and Fenceline Monitoring Response
 - Respond to public complaints and investigate emission exceedances of pollutants which exceed pre-determined thresholds.
- Work with Planning, Rule Development and Area Sources staff on continued rule development to ensure clear and enforceable rules and effective notification systems.
- Conduct additional multi-agency inspection sweeps to identify and confirm possible sources of excess Cr6 emissions in other communities.
- Reduce paperwork and streamline the report writing process to increase inspection efficiencies.
- Efficiently move 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.

COMPLIANCE & ENFORCEMENT (cont.)

- Update policies and procedures governing enforcement actions.

ORGANIZATIONAL CHART:



POSITION SUMMARY: 154 FTEs

Office of Compliance and Enforcement Units	Amended FY 2020-21	Change	Budget FY 2021-22
Major Sources	22	-	22
Industrial Operations	52	-	52
Refinery/Energy/461	38	(1)	37
Toxics	35	-	35
Senior Admin/Staff	8	-	8
Total	155	-	154

COMPLIANCE & ENFORCEMENT (cont.)

STAFFING DETAIL:

<u>FTEs</u>	<u>Title</u>
6	AQ Analysis & Compliance Supervisor
90	AQ Inspector II
16	AQ Inspector III
1	Assistant Deputy Executive Officer
1	Deputy Executive Officer
5	Office Assistant
2	Secretary
2	Senior Administrative Secretary
4	Senior Enforcement Manager
5	Senior Office Assistant
1	Staff Assistant
3	Staff Specialist
17	Supervising AQ Inspector
<u>1</u>	Supervising Office Assistant
154	Total FTEs

**Compliance & Enforcement
Work Program by Office**

#	Program Code	Program Category	Program	Activities	FTEs FY 2020-21	+/-	FTEs FY 2021-22	Revenue Categories
1	60 019	Ensure Compliance	AB617-Prog Develop	AB617-Program Development	0.00	5.10	5.10	IX
2	60 030	Advance Clean Air Technology	AB134	AB134	0.25	0.00	0.25	IX
3	60 032	Ensure Compliance	AB617-Meetings	AB617-Meetings	1.00	-1.00	0.00	IX
4	60 033	Ensure Compliance	AB617-Inspections	AB617-Inspections	3.00	-3.00	0.00	IX
5	60 034	Ensure Compliance	AB617-CERP	AB617-CERP	0.10	-0.10	0.00	IX
6	60 036	Ensure Compliance	AB617-Complaints	AB617-Complaints	1.00	-1.00	0.00	IX
7	60 038	Customer Service and Business Assistance	Admin/Office Budget	Dev/Coord Goals/Policies/Overs	6.00	-1.00	5.00	lb
8	60 047	Customer Service and Business Assistance	Admin/Operations Support	Budget/Contracts/Reports/Projects	3.00	0.00	3.00	lb
9	60 070	Ensure Compliance	CARB PERP Program	CARB Audits/Staterwide Equip Reg	6.00	0.00	6.00	XIX
10	60 093	Ensure Compliance	CARB Oil & Gas Reg.	GHG EM Stds Oil/NG Facilities	4.00	0.00	4.00	XVII
11	60 152	Ensure Compliance	Compliance/IM Related Activiti	Assist IM: Design/Review/Test	0.20	0.00	0.20	IV
12	60 155	Ensure Compliance	Compliance Guidelines	Procedures/Memos/Manuals	0.25	0.00	0.25	IV
13	60 157	Ensure Compliance	Compliance/Special Projects	Prog Audits/Data Reg/Brd Supp	4.00	0.00	4.00	II
14	60 158	Ensure Compliance	Compliance Testing	R461/Combustion Equip Testing	0.50	0.00	0.50	IV
15	60 210	Monitoring Air Quality	Emergency Response	Emerg Tech Asst to Public Saf	0.10	0.00	0.10	IV,XV
16	60 276	Policy Support	Board Committees	Admin/Stationary Source Committee	0.10	0.00	0.10	la
17	60 365	Ensure Compliance	Hearing Bd/Variations	Variations/Orders of Abatement	0.25	0.00	0.25	VII
18	60 375	Ensure Compliance	Inspections	Compliance/Inspection/Follow-up	85.00	0.00	85.00	II,V,XV
19	60 377	Ensure Compliance	Inspections/RECLAIM Audits	Audit/Compliance Assurance	16.00	0.00	16.00	II,IV
20	60 492	Customer Service and Business Assistance	Outreach/Business	Pub Events/Conf/Rideshare Fair	0.10	0.00	0.10	IX
21	60 539	Ensure Compliance	Procedure 5 Review	Evaluate Proc 5 Asbestos Plans	3.00	0.00	3.00	XVII
22	60 550	Ensure Compliance	Public Complaints/Breakdowns	Compltresp/Invfiwup/Resolutn	10.00	0.00	10.00	II,IV,V,XV
23	60 565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Req for info	0.30	0.00	0.30	la
24	60 605	Ensure Compliance	RECLAIM/Admin Support	Admin/Policy/Guidelines	0.25	0.00	0.25	II,III,IV,XV
25	60 657	Develop Rules	Rulemaking/Support PRA	Provide Rule Development Supp	0.75	0.35	1.10	IV,XV
26	60 678	Ensure Compliance	School Siting	Identify Haz. Emission Sources near Schools	0.75	-0.65	0.10	IV
27	60 690	Customer Service and Business Assistance	Source Education	Prov Tech Asst To Industries	0.20	0.00	0.20	III,IV,V,XV
28	60 717	Policy Support	Student Interns	Gov Board/Student Intern Program	0.10	0.00	0.10	la
29	60 771	Ensure Compliance	Title V	Title V Compl/Inspect/Follow Up	4.50	0.00	4.50	II,IV
30	60 805	Operational Support	Training	Dist/Org Unit Training	4.00	0.00	4.00	lb
31	60 825	Operational Support	Union Negotiations	Official Labor/Mgmt Negotiate	0.10	0.00	0.10	la
32	60 826	Operational Support	Union Steward Activities	Rep Employees in Grievance Act	0.10	0.00	0.10	la
33	60 855	Operational Support	Web Tasks	Creation/Update of Web Conten	0.10	0.30	0.40	la

Total Compliance & Enforcement

155.00	(1.00)	154.00
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Compliance & Enforcement Line Item Expenditure						
Major Object / Account # / Account Description		FY 2019-20 Actuals	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate *	FY 2021-22 Adopted Budget
Salary & Employee Benefits						
51000-52000	Salaries	\$ 12,432,737	\$ 12,720,909	\$ 12,716,888	\$ 12,458,165	\$ 12,901,656
53000-55000	Employee Benefits	6,969,264	7,694,758	7,694,758	7,499,581	8,197,222
Sub-total Salary & Employee Benefits		\$ 19,402,001	\$ 20,415,666	\$ 20,411,646	\$ 19,957,745	\$ 21,098,877
Services & Supplies						
67250	Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300	Rents & Leases Equipment	-	-	-	-	-
67350	Rents & Leases Structure	111,110	111,543	111,543	111,543	111,543
67400	Household	-	-	-	-	-
67450	Professional & Special Services	8,228	12,500	12,500	12,500	12,500
67460	Temporary Agency Services	-	-	-	-	-
67500	Public Notice & Advertising	-	-	-	-	-
67550	Demurrage	-	-	-	-	-
67600	Maintenance of Equipment	14,722	22,000	22,000	22,000	22,000
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	660	1,000	1,000	1,000	1,000
67750	Auto Service	-	-	-	-	-
67800	Travel	9,437	15,000	15,000	15,000	15,000
67850	Utilities	-	-	-	-	-
67900	Communications	91,349	117,350	117,350	117,350	117,350
67950	Interest Expense	-	-	-	-	-
68000	Clothing	44,752	31,000	31,000	31,000	31,000
68050	Laboratory Supplies	5,503	12,000	12,000	12,000	12,000
68060	Postage	14,437	14,000	14,000	14,000	14,000
68100	Office Expense	98,574	40,000	40,000	40,000	40,000
68200	Office Furniture	-	2,000	2,000	2,000	2,000
68250	Subscriptions & Books	-	457	457	457	457
68300	Small Tools, Instruments, Equipment	5,334	8,000	8,000	8,000	8,000
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	16,074	25,000	25,000	25,000	25,000
69550	Memberships	-	-	-	-	-
69600	Taxes	-	-	-	-	-
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	862	3,500	3,500	3,500	3,500
69750	Prior Year Expense	(2,028)	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		\$ 419,017	\$ 415,350	\$ 415,350	\$ 415,350	\$ 415,350
77000	Capital Outlays	\$ -	\$ -	\$ -	\$ -	\$ 27,000
79050	Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures		\$ 19,821,017	\$ 20,831,016	\$ 20,826,996	\$ 20,373,095	\$ 21,541,227

* Estimates based on July 2020 through February 2021 actual expenditures and February 2021 budget amendments.

ENGINEERING & PERMITTING

JASON ASPELL
DEPUTY EXECUTIVE OFFICER

At a Glance:	
FY 2020-21 Adopted Budget	\$24.9M
FY 2021-22 Adopted Budget	\$25.4M
% of FY 2021-22 Adopted Budget	14.1%
Total FTEs FY 2021-22 Adopted Budget	161

DESCRIPTION OF MAJOR SERVICES:

Engineering & Permitting (E&P) is responsible for processing applications for Permits to Construct & Operate, and special services. The permit processing activities involve approximately 360 major facilities that have been issued Title V Federal Operating permits, about 250 facilities in the RECLAIM program, and over 27,000 large and small business operations. In addition, staff also participates in activities with other agencies, assists with Economic Development and Business Retention programs, provides engineering support to other divisions, and evaluates and implements permit backlog reduction and permit streamlining activities, including automation and other permit processing modernization efforts.

ACCOMPLISHMENTS:

RECENT:

- Since the commencement of the backlog reduction effort in July 2016, reduced and maintained reduction of total pending applications by over 50%, from more than 7,300 to less than 3,500 pending applications.
- Continued permit streamlining efforts by:
 - Processing almost 2,400 Permits to Construct and 7,401 applications for Permits, Plans, and ERC during FY 2019-20;
 - Focusing on reducing last remaining aged permit applications to extent possible; and
 - Continuing to focus on reducing pending applications beyond targets established in 2016 Action Plan to establish a cushion to help address additional incoming permit applications anticipated from RECLAIM program phase-out over the next one to three years.
- Met the 2,250 – 2,500 (less RECLAIM transition applications) target for FY 2020-21 by maintaining pending application inventory at less than 2,500 (excluding Permits to Construct issued).

ENGINEERING & PERMITTING (cont.)

- Achieved and maintained the timely completion rate for new permit applications by processing over 76 percent of new permit applications within 180 days of being deemed complete.
- Issued over 170 Title V renewal and modification permits in calendar year 2020.
- Continued program to recognize top performing individuals and teams to help maintain high morale and acknowledge performance.
- Continued development of Online Permit Processing tools and other automation efforts. Deployed online registration tool for the three most frequently registered equipment categories, while continuing to support online permitting for dry cleaning equipment, gasoline dispensing facilities and automotive refinishing spray booths.
- Maintained Division's Permit Streamlining goal of application delivery to Permitting Teams within 4 business days.
- Continued implementation of EPA Title V Program Audit Findings Action Plan.
- Posted all newly issued Title V permits to the internet for online public access on an ongoing basis.
- Participated in public meetings to address public concerns regarding high toxic risks and emissions.
- Assisted in developing and amending South Coast AQMD Rules and Regulations such as Reg. III, Reg. XI, Reg. XIV, and other amendments called for under AB 617, including Reg. XX, and incorporating updated Best Available Retrofit Control Technology (BARCT).
- Provided Pre- and Post-application conferences to help permit applicants.
- Participated, reviewed and provided permit remedies to permit holders throughout Calendar Year 2020 from Fee Review cases.
- Provided technical support to IM to test and troubleshoot CLASS programs issues.
- Successfully provided engineering support and/or expert testimony in Hearing Board cases throughout calendar year 2020.
- Organized and administered the annual Certified Permit Processing Professional (CPP) exam for 24 participants. Certified nine new CPP holders as well as provided support to 163 existing CPP holders.
- Prepared Federal New Source Review (NSR) Equivalency Determination Reports pursuant to Rule 1315.
- Prepared annual report on the NOx and SOx RECLAIM Program in accordance with Rule 2015.

ANTICIPATED:

- Continue progress in reducing the permit applications inventory by maintaining pending permit applications inventory excluding Permits to Construct issued and RECLAIM transition applications at or near 3,000, and total pending applications inventory to below 3,500.
- Continue to maintain the timely completion rate for new permit applications by processing 75 to 80 percent of new permit applications within 180 days of being deemed complete.
- Monitor and reduce average permit application residence times.

ENGINEERING & PERMITTING (cont.)

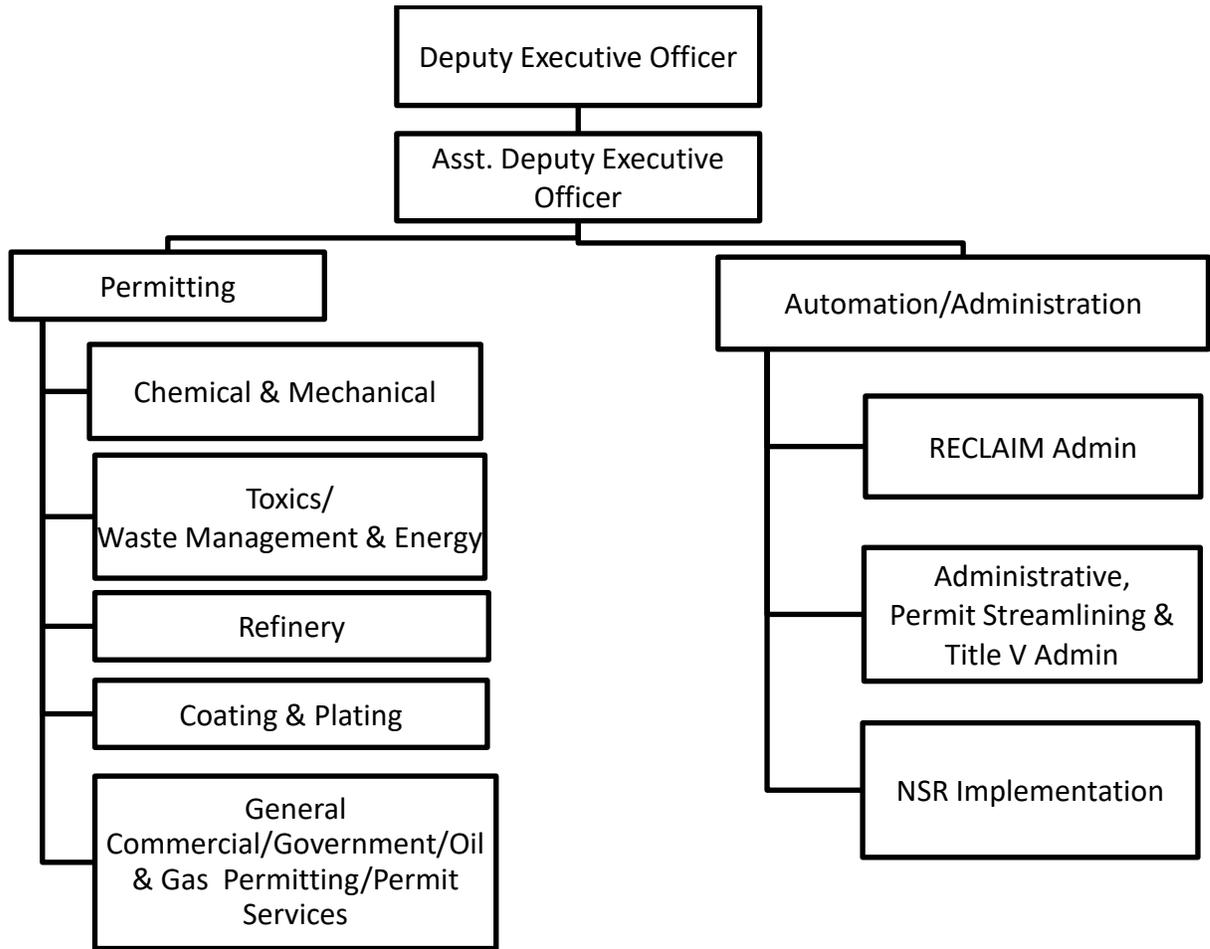
- Continue to complete timely renewal of Title V permits.
- Continue to implement action plan to further improve Title V program pursuant to EPA's recommendations:
 - a) Continue to prepare expanded Statement of Basis (SOB) for all initial Title V permits, at least 10 percent of Title V renewals, and all De-Minimis and Significant Title V revisions,
 - b) Continue efforts to develop automated capability to publish Title V permits online,
 - c) Provide more detailed accounts of applicable federal requirements in Title V permits,
 - d) Provide public with online access to all issued Title V permits, and
 - e) Develop formal policy for sources exiting the Title V program.
- Continue efforts to streamline and expedite permit issuance through:
 - a) Equipment certification/registration programs
 - b) Streamlined standard permits
 - c) Enhancement of permitting systems (including electronic permitting)
 - d) Expedited Permit Processing Program
 - e) Maintaining adequate staff resources
 - f) Improved training
 - g) Revisiting policies and rules.
- Expand the outreach of the of online permitting and permit automation tools for dry cleaning, gasoline dispensing facilities and automotive spray booths.
- Continue the development and deployment of Phase II Online Permitting efforts:
 - a) On-line Dashboard 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 through 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 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) Standardizing time and processing status metrics for monitoring permit applications through completion.

ENGINEERING & PERMITTING (cont.)

- Continue soliciting stakeholder input on permit application backlog reduction and permit streamlining efforts through Permit Streamlining Task Force subcommittee meetings.
- Continue certification of Certified Permitting Professionals (CPPs).
- Continue to improve customer services and public outreach by:
 - a) Providing public education by attending public meetings and addressing public concerns,
 - b) Aiding permit applicants through pre- and post-conferences, and
 - c) Providing permitting information for Public Record requests.
- Continue to evaluate the optional Expedited Permitting Program and propose improvements if warranted.
- Update and expand the Permit Processing Handbook.
- Review and comment on Rule 1402 Risk Reduction Plans.
- Continue to provide critical input in developing and amending South Coast AQMD Rules.
- Continue to provide critical input to Compliance & Enforcement in enforcing South Coast AQMD Rules.
- Continue to provide support in Fee Review cases and Hearing Board cases.
- Continue to prepare Federal NSR Equivalency Determination Reports pursuant to Rule 1315.
- Continue to prepare annual report on the NO_x and SO_x RECLAIM Program in accordance with Rule 2015.
- Develop a plan to re-issue permits to facilities that are opting out of NO_x RECLAIM program.
- Continue to provide critical guidance to PRDAS in developing a streamlined NSR process for facilities exiting the RECLAIM program.

ENGINEERING & PERMITTING (cont.)

ORGANIZATIONAL CHART:



POSITION SUMMARY: 161 FTEs

Engineering & Permitting	Amended FY 2020-21	Change	Budget FY 2021-22
Administration	4	-	4
Engineering	130	-	130
Operations	27	-	27
Total	161	-	161

ENGINEERING & PERMITTING (cont.)

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
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	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
<u>2</u>	Supervising Office Assistant
161	Total FTEs

**Engineering & Permitting
Work Program by Office**

#	Program Code	Program Category	Program	Activities	FTEs		+/-	Revenue Categories
					FY 2020-21	FY 2021-22		
1	50 019	Develop Programs	AB617-Prog Develop	AB617-Program Development	0.00	1.00	1.00	IX
2	50 035	Develop Rules	AB617-General	AB617-General	1.00	-1.00	0.00	IX
3	50 038	Customer Service and Business Assistance	Admin/Office Management	Dev/Coord Goals/Policies/Overs	3.00	0.00	3.00	lb
4	50 047	Customer Service and Business Assistance	Admin/Operations Support	Budget/Contracts/Reports/Projects	3.00	0.00	3.00	lb
5	50 120	Timely Review of Permits	Certification/Registration Pro	Certification/Registration Prog	1.00	0.00	1.00	III
6	50 148	Policy Support	Climate/Energy/Incentives	GHG/Climate Change Support	0.50	0.00	0.50	II,IX
7	50 156	Ensure Compliance	Perm Proc/Info to Compliance	Prov Permit Info to Compliance	3.00	0.00	3.00	III,IV,XV
8	50 200	Customer Service and Business Assistance	Economic Dev/Bus Retention	Perm Proc/Public Participation	0.10	0.00	0.10	III
9	50 240	Ensure Compliance	Environmental Justice	R461/Combustion Equip Testing	0.50	0.00	0.50	II,IV,XV
10	50 253	Timely Review of Permits	ERC Appl Processing	Process ERC Applications	3.50	0.00	3.50	III
11	50 260	Customer Service and Business Assistance	Fee Review	Fee Review Committee	0.45	0.00	0.45	II,III,IV
12	50 276	Policy Support	Board Committees	Admin/Stationary Source Committees	0.25	0.00	0.25	la
13	50 365	Ensure Compliance	Hearing Bd/Variations	Variations/Orders of Abatement	0.75	0.00	0.75	VII
14	50 367	Timely Review of Permits	Hearing Board/Appeals	Appeals: Permits & Denials	0.25	0.00	0.25	III
15	50 377	Ensure Compliance	Inspections/RECLAIM Audits	Audit/Compliance Assurance	6.00	0.00	6.00	II,IV
16	50 416	Policy Support	Legislative Activities	Legislative Activities	0.25	0.00	0.25	la
17	50 425	Customer Service and Business Assistance	Lobby Permit Services	Supp Perm Proc/Customer Svc	1.00	0.00	1.00	III
18	50 475	Timely Review of Permits	NSR Implementation	Implement NSR/Allocate ERCs	2.50	0.00	2.50	II,III,IV,XV
19	50 476	Timely Review of Permits	NSR Data Clean Up	Edit/Update NSR Data	0.50	0.00	0.50	II
20	50 492	Ensure Compliance	Customer Service	Compliance/Inspection/Follow-up	0.50	0.00	0.50	II,V,IX,XV
21	50 515	Timely Review of Permits	Perm Proc/Non TV/Non RECLAIM	PP: Non TitIV/TitIII/RECLAIM	50.25	0.00	50.25	III,XV
22	50 517	Timely Review of Permits	Permit Services	Facility Data-Crete/Edit	12.50	0.00	12.50	III,XV
23	50 518	Timely Review of Permits	RECLAIM Non-Title V	Process RECLAIM Only Permits	4.00	0.00	4.00	III,IV,XV
24	50 519	Timely Review of Permits	Perm Proc/Title III (Non TV)	Process Title III Permits	1.00	0.00	1.00	III
25	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
26	50 521	Timely Review of Permits	Perm Proc/Expedited Permit	Proc Expedited Permits (301OT)	4.00	0.00	4.00	III
27	50 523	Timely Review of Permits	Permit Streamlining	Permit Streamlining	4.75	0.00	4.75	III
28	50 565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Req for Info	0.25	0.00	0.25	la
29	50 605	Ensure Compliance	RECLAIM/Admin Support	Admin/Policy/Guidelines	6.50	0.00	6.50	II,III,IV,XV
30	50 607	Timely Review of Permits	RECLAIM & Title V	Process RECLAIM & TV Permits	18.40	0.00	18.40	III
31	50 643	Timely Review of Permits	Rule 222 Filing Program	Rule 222 Filing Program	0.50	0.00	0.50	IV
32	50 650	Develop Rules	Rulemaking	Dev/Amend/Impl Rules	0.25	0.00	0.25	II,XV
33	50 657	Develop Rules	Rulemaking/Support PRA	Provide Rule Development Supp	0.25	0.00	0.25	II,XV
34	50 678	Ensure Compliance	School Siting	Identify Haz. Emission Sources near Schools	0.25	0.00	0.25	II
35	50 680	Ensure Compliance	Small Business Assistance	Asst sm bus w/ Permit Process	0.50	0.00	0.50	III,IV
36	50 690	Customer Service and Business Assistance	Source Education	Prov Tech Asst To Industries	2.80	0.00	2.80	III,IV,V,XV
37	50 728	Timely Review of Permits	Perm Proc/IM Programming	Assist IM: Design/Review/Test	2.55	0.00	2.55	II,III,IV
38	50 752	Develop Rules	Title III Rulemaking	Title III Dev/Implement Rules	0.25	0.00	0.25	II,V,XV

**Engineering & Permitting (Cont.)
Work Program by Office**

#	Program Code	Program Category	Program	Activities	FTEs		Revenue Categories	
					FY 2020-21	+/-		
39	50 773	Develop Rules	Title V & NSR Rulemaking-Supp	Title V Rules Dev/Amend/impl	0.25	0.00	0.25	II
40	50 774	Timely Review of Permits	TV/Non-RECLAIM	Process Title V Only Permits	18.00	0.00	18.00	III
41	50 775	Timely Review of Permits	Title V – Admin	Title V Administration	1.00	0.00	1.00	III
42	50 791	Ensure Compliance	Toxics/AB2588	AB2588 Rev Rprts/Risk Redplans	0.25	0.00	0.25	X
43	50 805	Operational Support	Training	Dist/Org Unit Training	3.10	0.00	3.10	lb
44	50 825	Operational Support	Union Negotiations	Official Labor/Mgmt Negotiate	0.05	0.00	0.05	la
45	50 826	Operational Support	Union Steward Activities	Rep Employees in Grievance Act	0.05	0.00	0.05	la
46	50 855	Operational Support	Web Tasks	Creation/Update of Web Content	0.25	0.00	0.25	la
Total Engineering & Permitting					161.00	-	161.00	

Engineering & Permitting Line Item Expenditure						
Major Object / Account # / Account Description		FY 2019-20 Actuals	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate *	FY 2021-22 Adopted Budget
Salary & Employee Benefits						
51000-52000	Salaries	\$ 15,576,889	\$ 15,450,276	\$ 15,470,248	\$ 15,227,695	\$ 15,513,148
53000-55000	Employee Benefits	8,398,452	9,099,404	9,099,404	8,916,425	9,479,429
Sub-total Salary & Employee Benefits		\$ 23,975,341	\$ 24,549,681	\$ 24,569,652	\$ 24,144,120	\$ 24,992,577
Services & Supplies						
67250	Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300	Rents & Leases Equipment	-	8,000	8,000	8,000	8,000
67350	Rents & Leases Structure	-	8,000	8,000	8,000	8,000
67400	Household	-	-	-	-	-
67450	Professional & Special Services	4,507	2,500	2,500	2,500	2,500
67460	Temporary Agency Services	53,442	56,000	56,000	56,000	60,000
67500	Public Notice & Advertising	111,494	116,000	116,000	94,998	116,000
67550	Demurrage	-	250	250	250	250
67600	Maintenance of Equipment	-	-	-	-	-
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	28,412	35,000	35,000	6,908	35,000
67750	Auto Service	-	-	-	-	-
67800	Travel	4,791	18,433	18,433	18,433	14,433
67850	Utilities	-	-	-	-	-
67900	Communications	12,494	6,450	13,450	13,450	6,450
67950	Interest Expense	-	-	-	-	-
68000	Clothing	2,903	4,500	4,500	4,500	4,500
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	16,612	37,000	37,000	37,000	37,000
68100	Office Expense	41,138	59,296	59,296	59,296	59,296
68200	Office Furniture	1,179	3,500	3,500	3,500	3,500
68250	Subscriptions & Books	-	400	400	400	400
68300	Small Tools, Instruments, Equipment	-	-	-	-	-
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	5,639	5,500	5,500	5,500	5,500
69550	Memberships	-	1,500	1,500	1,500	1,500
69600	Taxes	-	-	-	-	-
69650	Awards	-	2,000	2,000	2,000	2,000
69700	Miscellaneous Expenses	1,207	5,000	5,000	5,000	5,000
69750	Prior Year Expense	-	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		\$ 283,817	\$ 369,329	\$ 376,329	\$ 327,235	\$ 369,329
77000	Capital mutlays	\$ -	\$ -	\$ 16,842	\$ 16,842	\$ -
79050	Building Remmdeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures		\$ 24,259,158	\$ 24,919,010	\$ 24,962,823	\$ 24,488,197	\$ 25,361,906

* Estimates based on July 2020 through February 2021 actual expenditures and February 2021 budget amendments.

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FINANCE

**SUJATA JAIN
CHIEF FINANCIAL OFFICER**

At a Glance:	
FY 2020-21 Adopted Budget	\$6.5M
FY 2021-22 Adopted Budget	\$6.7M
% of FY 2021-22 Adopted Budget	3.7%
Total FTEs FY 2021-22 Adopted Budget	50

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/analysis. 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:

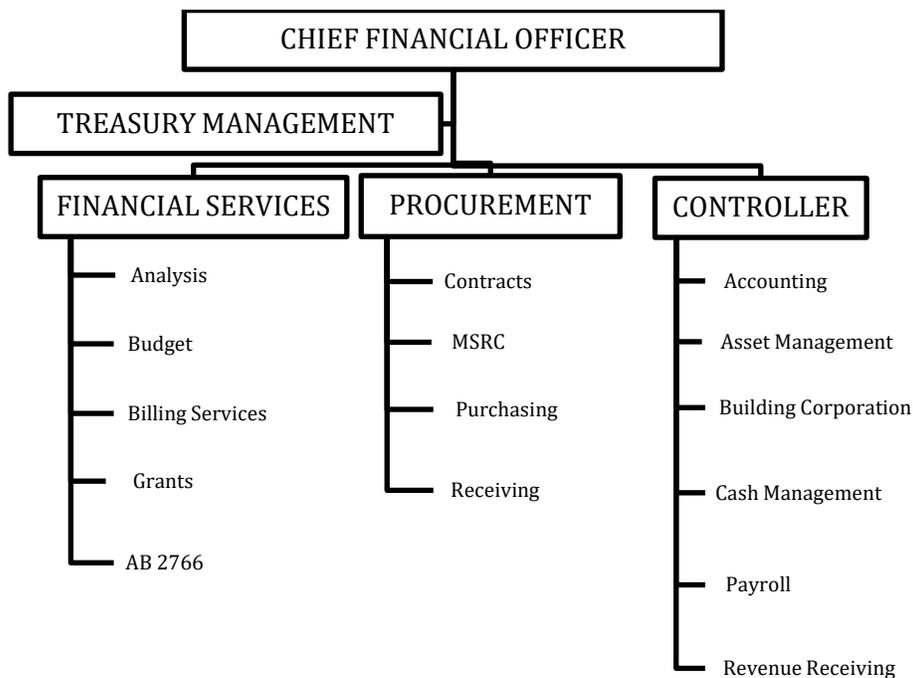
- Continued to expand electronic payment options to include Permit Processing Fee payments for asbestos, dry cleaners, spray booths, gas stations, and a portion of Rule 222 registrations.
- Processed 671 contracts and modifications, issued 27 Request for Proposals/Quotes, and processed 121 proposals/quotations. Processed 1,519 purchase orders and 500 CalCard orders.
- Received the Government Finance Officer’s Association’s (GFOA) awards for the Annual Budget, Comprehensive Annual Financial Report, and Popular Annual Financial Report for the most recent fiscal year.
- Improved the process to track grant receipts and expenditures within PeopleSoft.
- Published South Coast AQMD’s FY 2020-21 Budget, which includes goals and priority objectives and a multiyear financial summary of all revenues, expenditures and staffing used by each of South Coast AQMD’s divisions.
- Completed FY 2019-20 audited financial statements. These required statements offer short-term and long-term financial information about South Coast AQMD. The statement of net position provides information about the nature and amounts of investments in resources (assets) and obligations (liabilities) at the close of the fiscal year. The financial statements are prepared on the accrual basis in accordance with U.S. Generally Accepted Accounting Principles.

FINANCE (cont.)

ANTICIPATED:

- Continue to receive GFOA Awards for the Annual Budget, Comprehensive Annual Financial Report, and Popular Annual Financial Report to ensure South Coast AQMD's financial reports meet the highest professional standards.
- Ensure compliance with all AB 617, Community Air Protection Program, and VW Mitigation Settlement guidelines for financial reporting and tracking of revenue and expenditures.
- Implement the new lease accounting standards required by Governmental Accounting Standards Board (GASB) Statement Number 87 for recognizing certain lease assets and liabilities for leases that were operating leases previously, which will impact South Coast AQMD starting with FY 2021-22.
- Continue to identify and implement additional opportunities for electronic payments.

ORGANIZATIONAL CHART:



FINANCE (cont.)

POSITION SUMMARY: 50 FTEs

Finance Units	Amended FY 2020-21	Change	Budget FY 2021-22
Office Administration	3	-	3
Controller	20	-	20
Financial Services	16	1	17
Procurement	10	-	10
Total	49	1	50

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
2	Accounting Technician
1	Chief Financial Officer
2	Contracts Assistant
1	Controller
1	District Storekeeper
6	Financial Analyst
1	Financial Services Manager
7	Fiscal Assistant
1	Payroll Supervisor
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
<u>1</u>	Supervising Office Assistant
50	Total FTEs

**Finance
Work Program by Office**

Program Code	Program Category	Program	Activities	FTEs FY 2020-21	+/-	FTEs FY 2021-22	Revenue Categories
1 04	002	Customer Service and Business Assistance	Prog Admin: Monitor/Dist/Audit	0.10	0.00	0.10	IX
2 04	003	Advance Clean Air Technology	MSRC Program Administration	0.35	0.00	0.35	IX
3 04	020	Operational Support	Analyze/Prepare/Impl/Track WP	2.71	1.00	3.71	IX
4 04	021	Operational Support	Contract Admin/Monitor/Process	3.20	0.00	3.20	IX
5 04	023	Operational Support	FA Rep/Reconcile/Inv/Acct	0.70	0.00	0.70	IX
6 04	030	Advance Clean Air Technology	AB134	2.00	0.00	2.00	IX
7 04	035	Operational Support	AB617- Support	0.50	0.00	0.50	IX
8 04	038	Operational Support	Fin Mgmt/Oversee Activities	2.75	0.00	2.75	IX
9 04	045	Operational Support	Office Budget/Prep/Impl/Track	0.05	0.00	0.05	IX
10 04	071	Operational Support	Cost Analysis/Payments	0.04	0.00	0.04	IX
11 04	083	Policy Support	Health Effects Air Pollution Support	0.02	0.00	0.02	IX
12 04	085	Operational Support	Building Corporation	0.02	0.00	0.02	IX
13 04	130	Advance Clean Air Technology	Clean Fuels Contract Admin/Monitor	0.15	0.00	0.15	IX
14 04	170	Customer Service and Business Assistance	Billing Services	8.00	0.00	8.00	IX,III,IV
15 04	233	Operational Support	Employee Relations	0.10	0.00	0.10	IX
16 04	260	Customer Service and Business Assistance	Fee Review	0.10	0.00	0.10	IX,III,IV,XV
17 04	265	Operational Support	Financial Mgmt/Accounting	7.27	0.00	7.27	IX
18 04	266	Operational Support	Fin/SCAQMD Stat Analysis & Audit	0.80	0.00	0.80	IX
19 04	267	Operational Support	Financial Mgmt/Treasury Mgmt	1.00	0.00	1.00	IX
20 04	268	Operational Support	Financial Systems	0.10	0.00	0.10	IX
21 04	355	Customer Service and Business Assistance	Grants Management	1.00	0.00	1.00	IX,IV,XV
22 04	447	Operational Support	Mobile Sources/Accounting	0.65	0.00	0.65	IX
23 04	457	Advance Clean Air Technology	Mobile Source/Moyer Adm	1.02	0.00	1.02	IX
24 04	493	Operational Support	Outreach/SB/MB/DVBE	0.05	0.00	0.05	IX
25 04	510	Operational Support	Payroll	4.10	0.00	4.10	IX
26 04	542	Advance Clean Air Technology	Prop 1B:Goods Movement	0.50	0.00	0.50	IX
27 04	544	Advance Clean Air Technology	Prop 1B:Low Emiss Sch Bus	0.05	0.00	0.05	IX
28 04	565	Customer Service and Business Assistance	Public Records Act	0.02	0.00	0.02	IX
29 04	570	Operational Support	Purchasing	2.50	0.00	2.50	IX
30 04	571	Operational Support	Purchasing/Receiving	1.20	0.00	1.20	IX
31 04	572	Operational Support	Purchasing-Receiving/Stockroom	1.00	0.00	1.00	IX
32 04	630	Operational Support	Cash Mgmt/Revenue Receiving	5.25	0.00	5.25	IX,III,IV,XI
33 04	631	Customer Service and Business Assistance	Cash Mgmt/Refunds	0.30	0.00	0.30	IX,III,IV,XI
34 04	791	Ensure Compliance	Toxics/AB2588	0.15	0.00	0.15	X
35 04	805	Operational Support	Training	0.20	0.00	0.20	IX
36 04	825	Operational Support	Union Negotiations	0.02	0.00	0.02	IX
37 04	826	Operational Support	Union Steward Activities	0.01	0.00	0.01	IX
38 04	827	Operational Support	VW-General Admin	1.00	0.00	1.00	XVII
39 04	855	Operational Support	Web Tasks	0.02	0.00	0.02	IX

Total Finance	49.00	1.00	50.00
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Finance Line Item Expenditure						
Major Object / Account # / Account Description	FY 2019-20 Actuals	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate *	FY 2021-22 Adopted Budget	
Salary & Employee Benefits						
51000-52000 Salaries	\$ 3,703,925	\$ 3,650,089	\$ 3,660,464	\$ 3,603,868	\$ 3,801,392	
53000-55000 Employee Benefits	2,294,651	2,423,141	2,423,140	2,380,445	2,456,638	
Sub-total Salary & Employee Benefits	\$ 5,998,576	\$ 6,073,230	\$ 6,083,604	\$ 5,984,313	\$ 6,258,030	
Services & Supplies						
67250 Insurance	\$ -	\$ -	\$ -	\$ -	\$ -	
67300 Rents & Leases Equipment	-	-	-	-	-	
67350 Rents & Leases Structure	-	-	-	-	-	
67400 Household	-	900	900	900	900	
67450 Professional & Special Services	145,988	168,178	168,178	168,178	160,606	
67460 Temporary Agency Services	50,228	63,000	163,000	163,000	67,000	
67500 Public Notice & Advertising	6,293	7,000	7,000	7,000	7,000	
67550 Demurrage	300	780	780	780	780	
67600 Maintenance of Equipment	2,549	1,860	1,860	1,860	1,860	
67650 Building Maintenance	-	-	-	-	-	
67700 Auto Mileage	2,754	4,468	4,468	4,468	4,468	
67750 Auto Service	-	-	-	-	-	
67800 Travel	881	6,000	6,000	6,000	6,000	
67850 Utilities	-	-	-	-	-	
67900 Communications	1,718	9,000	9,000	9,000	9,000	
67950 Interest Expense	-	-	-	-	-	
68000 Clothing	873	1,200	1,200	1,200	1,200	
68050 Laboratory Supplies	-	-	-	-	-	
68060 Postage	175,971	111,038	111,038	111,038	115,038	
68100 Office Expense	27,445	36,120	36,120	36,120	36,120	
68200 Office Furniture	386	-	-	-	-	
68250 Subscriptions & Books	2,562	3,470	3,470	3,470	3,470	
68300 Small Tools, Instruments, Equipment	-	-	-	-	-	
68400 Gas and Oil	-	-	-	-	-	
69500 Training/Conference/Tuition/ Board Exp.	2,837	27,250	27,250	25,022	29,250	
69550 Memberships	1,910	2,793	2,793	2,793	2,793	
69600 Taxes	-	-	-	-	-	
69650 Awards	-	-	-	-	-	
69700 Miscellaneous Expenses	3,180	5,200	5,200	5,200	5,200	
69750 Prior Year Expense	(970)	-	-	-	-	
69800 Uncollectable Accounts Receivable	-	-	-	-	-	
89100 Principal Repayment	-	-	-	-	-	
Sub-total Services & Supplies	\$ 424,905	\$ 448,257	\$ 548,257	\$ 546,029	\$ 450,685	
77000 Capital Outlays	\$ -	\$ -	\$ -	\$ -	\$ -	
79050 Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -	
Total Expenditures	\$ 6,423,481	\$ 6,521,487	\$ 6,631,861	\$ 6,530,342	\$ 6,708,715	

* Estimates based on July 2020 through February 2021 actual expenditures and February 2021 budget amendments.

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INFORMATION MANAGEMENT

RON MOSKOWITZ CHIEF INFORMATION OFFICER

At a Glance:	
FY 2020-21 Adopted Budget	\$12.2M
FY 2021-22 Adopted Budget	\$12.7M
% of FY 2021-22 Adopted Budget	7.1%
Total FTEs FY 2021-22 Adopted Budget	57

DESCRIPTION OF MAJOR SERVICES:

Information Management (IM) provides a wide range of information management systems and services in support of all South Coast AQMD 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 Project Management 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, automatic system messaging (e.g., through email), GIS, etc. The Project Management unit performs project management functions along with other projects as they arise.

ACCOMPLISHMENTS:

RECENT:

Awards

- Esri 2020 Special Achievement in GIS (SAG) Award
- 2020 EPA Clean Air Excellence Award – South Coast AQMD Mobile App

Software Development

- COVID-19
 - HR/Finance/Timecard PeopleSoft setups
 - Full set of special finance revenue reports for Jill
 - CPI increase freeze, Web and billing program changes

INFORMATION MANAGEMENT (cont.)

- VW Phases 2 and 3
- FENS phase 2
- LOS
- Mobile app enhancements (Spanish, Daily Forecast, Gridded)
- Gridded AQI infrastructure
- External facing Permit Processing Dashboard
- AB617 enhancements
- Rule 1180 enhancements
- Prop 1B GMS web portal
- Lower Emission School Bus GMS web portal
- Ingres Actian X upgrade
- Automated forecast email for BM
- ATS virtualization
- AQ-Spec Phase I
- Rule 1415 enhancements
- Homepage modifications
- RYR enhancements and stoppage
- Fiscal Year-end Support
- CLASS Password reset tool upgrade
- SBCERA Alameda Decision payroll modification
- Finance Voucher H-Invoice implementation
- IT Audit
- Political District funding summary
- Timecard sellback enhancement
- AER enhancements for reporting year 2020
- Peoplesoft Tax and 1099 updates for 2020

Network/Phone System/Help Desk/Desktop-Laptop

- Internet bandwidth upgrade to 2 Gbps
- Deployed over 500 laptops
- Deployed over 100 monitors, docking stations, and MiFi's
- Completed over 6,500 Help Desk tickets
- Expanded VPN capacity
- Upgraded web gateway security (ZScaler) on all staff computers
- Configured all staff for Jabber softphone
- Deployed Zoom for all staff
- Deployed Microsoft Teams for all staff
- Next Generation Firewall implementation
- Azure Cloud direct connection with on-premises data center
- Long Beach Office network expansion

INFORMATION MANAGEMENT (cont.)

Data Center

- RDS (Remote Desktop Service) implementation
- AQSPEC dev and stage completion
- Blade hardware and OS upgrades
- Virtualization of old physical servers and virtual hosts
- Successful testing of cloud backup
- LIMS software and database migration
- Load-balance of CLASS production database
- Graylog implementation
- PRDAS' new Linux systems implementation

Database Administration

- CLASS system database migration from Ingres 11 to Actian X
- Upgrade and maintain all deployed applications such as Ride Share, AER, VWGMS, FENS, LOS, PAATS...etc. "

Workflow/Document Management

- Designed, developed, and deployed a paperless invoice payment system
- Upgraded OnBase from 18 sp1 to EP3
- Designed, developed, and deployed a paperless contract approval system (CAMS) that is fully integrated with DocuSign
- Upgraded electronic workflow for the Carl Moyer program
- Completed the migration of all letter(email) types used Public Records group to PR OnBase workflow application from the Old PR Class Application
- Migrated the OnBase Database server from SQL Server 2008 to SQL Server 2017 and upgraded the server OS from 2008 R2 to 2016.

Cyber Security

- Made continuous improvements on user security awareness program:
 - Implemented Phish Alert Button (PAB) and supported ongoing phishing email investigation
 - Launched annual phishing campaign and set up annual cybersecurity training. Provided 4 newsletters and other cybersecurity related security announcements)
- Completed RFP draft for Cybersecurity assessment and review with Gartner
- Identified cybersecurity policy/standard/procedure gaps and published the following: (non published ones are not included)
 - App41-510 Cybersecurity Policy
 - Cybersecurity Incident Response Policy
 - Identity and Access Management
 - User Access Termination Procedure
 - Firewall standard and procedure
 - Helpdesk procedure for reviewing Azure AD Security logs

INFORMATION MANAGEMENT (cont.)

- Helpdesk procedure for handling phishing alert ticket
- Procedure to handle user MFA request
- User MFA Registration Guide
- Non-Disclosure Agreement
- Kicked off and completed various self-Cybersecurity assessments and risk tracking/remediation
 - Completed initial assessment of current security state with CIS benchmark and identified high-level security control gaps
 - Admin access review/remediation
 - AD group monitoring for high privileged/sensitive groups
 - Group membership review/remediation for high privileged/sensitive groups
 - Password assessment/remediation
 - Reviewed and investigated Risky sign-in logs
 - Azure AD and O365 security review/remediation
 - Email security review and best practice (updating content filtering, mail policies, fixing auto-remediation, setting up external threat feed, and implementing DKIM)
 - Implemented email safe unsubscribe
 - Workstation/Server updating/patching
- Evaluated password managers, made the selection/purchase and onboarded Keeper to the IM team members.

Public Records

- Completed over 4,500 Public Record Requests

ANTICIPATED:

Software Development

- Source Test Tracking System (May 2021)
- AQ-Spec Phase II (inclusion of various data platforms such as Lab, R1180, AB617, etc.)
- Online Application Filing Phase II & III (additional 20 application forms)
- VW Mitigation Phase III (Contract tracking and inspection module)
- PeopleSoft Year-end ACA
- Timecard enhancement
- Mobile enhancement (FIND, Complaints), ** this will need funding to complete
- AER enhancements for 2021

Network/Phone System/Help Desk/Desktop-Laptop

- Continue Laptop Deployment
- Phone System Upgrade
- Phone System replacement evaluation
- Network DMZ implementation and migration

INFORMATION MANAGEMENT (cont.)

- Internet connectivity full diversity implementation

Data Center

- Maintenance and Support Services for Servers and Storage Devices
- Server OS Upgrades
- Cloud backup implementation
- Azure DEVOPS
- Domain Controller 2019 upgrade
- SCVMM 2019 upgrade
- Red Hat management and automation implementation
- SIEM implementation
- Storage expansion

Database Administration

- Evaluate Cloud Database migration for CLASS

Workflow/Document Management

- CAMS training
- OnBase Software Support renewal
- OnBase EP5 upgrade
- Upgrade Lawnmower form
- Upgrade Lab QA form
- Add invoicing to Public Records workflow then begin the final migration off of CLASS application
- Migrating our OnBase disk groups to use OnBase Distributed Disk groups for security
- Implement link from the Lawnmower & EV charger workflows to Peoplesoft
- Create a paperless approval process for the Lawnmower & EV charger payment memos.

Cyber Security

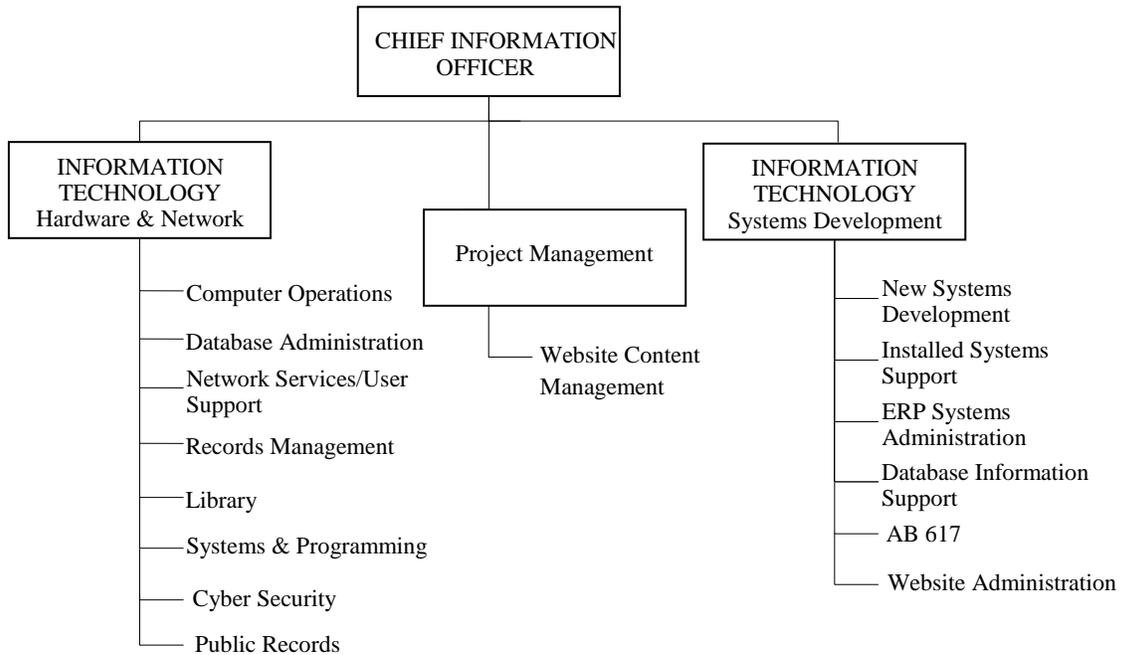
- Continuation of user security awareness program
- Cybersecurity Assessment and Remediation
- Continuation of Cybersecurity Policies and Standards
- Network traffic analysis and intrusion detection
- Vulnerability Scanning and Management solution for systems/network
- Web application security testing solution

Public Records

- Complete approximately 4,500 Public Record Requests

INFORMATION MANAGEMENT (cont.)

ORGANIZATIONAL CHART:



POSITION SUMMARY: 57 FTEs

Information Management Units	Amended FY 2020-21	Change	Budget FY 2021-22
Office Administration	2	-	2
Hardware & Network	32	-	32
Systems Development	21	-	21
Project Management	2	-	2
Total	57	-	57

INFORMATION MANAGEMENT (cont.)

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
1	Assistant Database Administrator
3	Assistant Information Technology Specialist
1	Chief Information Officer
1	Database Administrator
2	Information Technology Manager
1	Information Technology Specialist I
3	Information Technology Supervisor
4	Office Assistant
1	Public Affairs Specialist
2	Secretary
1	Senior Administrative Secretary
6	Senior Information Technology Specialist
4	Senior Office Assistant
2	Supervising Office Assistant
14	Systems Analyst
<u>11</u>	Systems and Programming Supervisor
57	Total FTEs

**Information Management
Work Program by Office**

#	Program Code	Program Category	Program	Activities	FTEs FY 2020-21	+/-	FTEs FY 2021-22	Revenue Categories
1	27 035	Operational Support	AB617-Support	AB617-Support	8.00	0.00	8.00	IX
2	27 038	Operational Support	Admin/Office Management	Overall Direction/Coord of IM	2.00	0.00	2.00	lb
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	la
5	27 173	Operational Support	CyberSecurity	CyberSecurity	1.00	0.00	1.00	la
6	27 184	Operational Support	Database Information Support	Ad Hoc Reports/Bulk Data Update	1.00	0.00	1.00	la
7	27 185	Operational Support	Database Management	Dev/Maintain Central Database	2.25	0.00	2.25	la
8	27 215	Operational Support	Annual Emission Reporting	System Enhancements for GHG	0.50	0.00	0.50	II,XVII
9	27 370	Operational Support	Information Technology Svcs	Enhance Oper Effic/Productivity	2.75	0.00	2.75	la
10	27 420	Operational Support	Library	General Library Svcs/Archives	0.25	0.00	0.25	la
11	27 470	Operational Support	Network Operations/Telecomm	Operate/Maintain/Implem SCAQMD	8.25	0.00	8.25	la
12	27 480	Operational Support	New System Development	Dev sys for special oper needs	2.00	0.00	2.00	II,IV
13	27 481	Customer Service and Business Assistance	New System Development	Dev sys in supp of Dist-wide	1.25	0.00	1.25	la,III
14	27 523	Timely Review of Permits	Permit Streamlining	Permit Streamlining	0.25	0.00	0.25	III
15	27 565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Req for Info	4.75	0.00	4.75	la
16	27 615	Operational Support	Records Information Mgmt Plan	Plan/Impl/Dir/Records Mgmt plan	1.25	0.00	1.25	la
17	27 616	Operational Support	Records Services	Records/Documents processing	3.75	0.00	3.75	la,III,IV
18	27 735	Operational Support	Systems Maintenance	Maintain Existing Software Prog	4.50	0.00	4.50	II,III,IV
19	27 736	Operational Support	Systems Implementation/PeopleS	Fin/HR PeopleSoft Systems Impl	1.50	0.00	1.50	la
20	27 770	Timely Review of Permits	Title V	Dev/Maintain Title V Program	1.50	0.00	1.50	III
21	27 791	Ensure Compliance	Toxics/AB2588	AB2588 Database Software Supp	0.50	0.00	0.50	X
22	27 827	Operational Support	VW-General Admin	VW-General Admin	1.00	0.00	1.00	XVII
23	27 855	Operational Support	Web Tasks	Create/edit/review web content	3.25	0.00	3.25	la

Total Information Management

57.00	-	57.00
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Information Management Line Item Expenditure						
Major Object / Account # / Account Description	FY 2019-20 Actuals	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate *	FY 2021-22 Adopted Budget	
Salary & Employee Benefits						
51000-52000 Salaries	\$ 6,393,667	\$ 5,827,294	\$ 5,830,454	\$ 5,830,454	\$ 5,796,846	
53000-55000 Employee Benefits	3,792,886	3,662,975	3,662,975	3,662,975	3,807,569	
Sub-total Salary & Employee Benefits	\$ 10,186,552	\$ 9,490,269	\$ 9,493,429	\$ 9,493,429	\$ 9,604,415	
Services & Supplies						
67250 Insurance	\$ -	\$ -	\$ -	\$ -	\$ -	
67300 Rents & Leases Equipment	-	1,880	1,880	1,880	1,880	
67350 Rents & Leases Structure	-	-	-	-	-	
67400 Household	-	1,250	1,250	1,250	1,250	
67450 Professional & Special Services	1,586,587	1,404,121	1,385,562	1,385,562	1,404,121	
67460 Temporary Agency Services	226,532	347,198	369,198	369,198	347,198	
67500 Public Notice & Advertising	-	-	-	-	-	
67550 Demurrage	-	650	650	650	650	
67600 Maintenance of Equipment	85,880	157,750	148,550	148,550	157,750	
67650 Building Maintenance	-	-	-	-	-	
67700 Auto Mileage	3,427	1,250	1,250	1,250	1,250	
67750 Auto Service	-	-	-	-	-	
67800 Travel	12,115	2,160	2,160	2,160	2,160	
67850 Utilities	-	-	-	-	-	
67900 Communications	44,520	36,900	36,900	36,900	36,900	
67950 Interest Expense	-	-	-	-	-	
68000 Clothing	-	-	-	-	-	
68050 Laboratory Supplies	-	-	-	-	-	
68060 Postage	634	5,500	5,500	5,500	5,500	
68100 Office Expense	1,339,505	673,912	678,338	628,338	673,912	
68200 Office Furniture	805	-	389	389	-	
68250 Subscriptions & Books	98,046	30,000	132,457	132,457	30,000	
68300 Small Tools, Instruments, Equipment	489	2,000	2,000	2,000	2,000	
68400 Gas and Oil	-	-	-	-	-	
69500 Training/Conference/Tuition/ Board Exp.	85,138	46,575	42,760	42,760	46,575	
69550 Memberships	415	1,320	1,320	1,320	1,320	
69600 Taxes	-	1,000	1,000	1,000	1,000	
69650 Awards	-	-	-	-	-	
69700 Miscellaneous Expenses	-	-	-	-	-	
69750 Prior Year Expense	(1,382)	-	-	-	-	
69800 Uncollectable Accounts Receivable	-	-	-	-	-	
89100 Principal Repayment	-	-	-	-	-	
Sub-total Services & Supplies	\$ 3,482,711	\$ 2,713,466	\$ 2,811,164	\$ 2,761,164	\$ 2,713,466	
77000 Capital Outlays	\$ 2,362,014	\$ 35,000	\$ 205,000	\$ 205,000	\$ 375,000	
79050 Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -	
Total Expenditures	\$ 16,031,277	\$ 12,238,734	\$ 12,509,593	\$ 12,459,593	\$ 12,692,881	

* Estimates based on July 2020 through February 2021 actual expenditures and February 2021 budget amendments.

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LEGAL

BAYRON T. GILCHRIST GENERAL COUNSEL

At a Glance:	
FY 2020-21 Adopted Budget	\$7.1M
FY 2021-22 Adopted Budget	\$7.2M
% of FY 2021-22 Adopted Budget	4.0%
Total FTEs FY 2021-22 Adopted Budget	35

DESCRIPTION OF MAJOR SERVICES:

The General Counsel's Office is responsible for advising the South Coast AQMD Board and staff on all legal matters and enforcing South Coast AQMD rules and state laws related to air pollution control. Attorneys review and assist in the drafting of South Coast AQMD rules and regulations to ensure they are within South Coast AQMD'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 South Coast AQMD Board and staff in court proceedings and administrative hearings related to matters arising out of staff's performance of official duties as South Coast AQMD officers and employees.

The Office is responsible for the enforcement of all South Coast AQMD rules and regulations and applicable state law. In addition, staff attorneys represent the Executive Officer in all matters before the South Coast AQMD 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:

- Staff advised and participated in the negotiation of Memoranda of Understanding (MOUs) with each of the five commercial airports in the Basin – Los Angeles International Airport (LAX), John Wayne Orange County Airport (SNA), Hollywood Burbank Airport (BUR), Ontario International Airport (ONT), and Long Beach Airport (LGB). The MOUs included schedules for the implementation of specified measures from each airport's air quality improvement plans that are eligible for State Implementation Plan credit.
- Staff advised on AB 617 implementation and reviewed and commented on all Community Emissions Reduction Plans (CERPs) for the second-year communities.

LEGAL (cont.)

- Staff advised and participated in the preparation and submittal of the Contingency Measure Plan defining the South Coast AQMD's 182(e)(5) measures.
- Staff has obtained \$3.6 million in civil penalties for air pollution violations through fiscal year 2020-2021.
- Staff has been prosecuting public nuisance matters involving the Chiquita Canyon Landfill impacting the Val Verde community in Los Angeles County and the All American Asphalt facility located in the City of Irvine. These matters have involved meeting with members of the community informally and through virtual meetings and before the hearing board, and thus far engagement with the facility representatives has resulted in the reduction of complaints alleging ongoing odor nuisance from the facilities.
- Staff submitted an amicus brief in support of United States' position that the Chemical Safety Board's demands for information from Exxon-Mobil with respect to the Torrance refinery's modified hydrofluoric acid (MHF) alkylation unit were relevant to its investigation into the 2015 explosion, even though no MHF was released. The Ninth Circuit agreed that such information was relevant.
- Staff reviewed and processed over 1,000 contracts from various departments within the District.

ANTICIPATED:

- Provide legal advice regarding the development of facility-based mobile source measures for warehouses and ports.
- Provide legal advice for the transition away from RECLAIM, including the development of (Best Available Retrofit Control Technology (BARCT) rules, and working with U.S. EPA to identify potential solutions for New Source Review (NSR) permitting and the lack of Emission Reduction Credits (ERC) in the open market.
- Provide legal advice regarding AB 617, including potential enforcement actions based on the CERPs for the first-year communities, and implementation advice for the development of CERPs in the second-year communities.
- Revise the South Coast AQMD records retention policy and provide training to staff on the requirements.
- Participate in litigation challenging the legality of U.S. EPA's revocation of the Clean Air Act waiver conferred on California's Advanced Clean Cars Program.
- Participate in litigation challenging the legality of the National Highway Transportation Administration's regulation preempting zero emission vehicle mandates.

LEGAL (cont.)

ORGANIZATIONAL CHART:



POSITION SUMMARY: 35 FTEs

Legal Units	Amended FY 2020-21	Change	Budget FY 2021-22
Office Administration	4	-	4
General Counsel	26	-	26
Investigations	5	-	5
Total	35	-	35

LEGAL (cont.)

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
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
10	Senior Deputy District Counsel
1	Senior Office Assistant
1	Senior Paralegal
1	Staff Specialist
<u>1</u>	Supervising Investigator
35	Total FTEs

Legal Work Program by Office						
Program Code	Program Category	Program	Activities	FTEs FY 2020-21	FTEs FY 2021-22	Revenue Categories
1	08 001	Advance Clean Air Technology	AB2766/Mob Src/Legal Advice	AB2766 Leg Adv: Trans/Mob Source	0.05	IX
2	08 003	Advance Clean Air Technology	AB2766/MSRC	Legal Advice: MSRC Prog Admin	0.10	IX
3	08 010	Develop Programs	AQMP	AQMP Revision/CEQA Review	0.10	II,IV,IX
4	08 019	Operational Support	AB617-Prog Develop	AB617-Program Development	0.00	IX
5	08 025	Operational Support	Admin/SCAQMD-Legal Research	Legal Research/Staff/Exec Mgmt	1.20	Ia
6	08 030	Advance Clean Air Technology	AB134	AB134	1.50	IX
7	08 035	Operational Support	AB617-General	AB617-General	2.50	IX
8	08 038	Operational Support	Admin/Office Management	Attorney Timekeeping/Perf Eval	3.50	Ib
9	08 071	Operational Support	Arch Ctgs - Admin	Rule Dev/TA/Reinterpretations	0.05	XVIII
10	08 072	Ensure Compliance	Arch Ctgs - End User	Case Dispo/Rvw, Track, Prep NOV	0.05	XVIII
11	08 073	Ensure Compliance	Arch Ctgs - Other	Case Dispo/Rvw, Track, Prep NOV	0.05	XVIII
12	08 102	Operational Support	CEQA Document Projects	CEQA Review	0.75	II,III,IX
13	08 115	Ensure Compliance	Case Disposition	Trial/Dispo-Civil Case/Injunct	4.75	II,IV,V,VII,XV
14	08 131	Advance Clean Air Technology	Clean Fuels/Legal Advice	Legal Advice: Clean Fuels	0.15	VIII
15	08 154	Ensure Compliance	Compliance/NOV Administration	Review/Track/Prep NOV/MSAs	0.75	IV
16	08 185	Ensure Compliance	Database Management	Support IM/Dev Tracking System	1.00	IV
17	08 227	Operational Support	Employee/Employment Law	Legal Advice: Employment Law	0.50	Ia
18	08 235	Ensure Compliance	Enforcement Litigation	Maj Prosecutions/Civil Actions	2.00	IV
19	08 275	Operational Support	Governing Board	Legal Advice:Attend Board/Cmte Mtgs	1.00	Ia
20	08 366	Ensure Compliance	Hearing Board/Legal	Hear/Disp-Variant/Appeal/Rev	3.00	IV,V,XV
21	08 380	Ensure Compliance	Interagency Coordination	Coordinate with Other Agencies	0.20	II,V
22	08 401	Operational Support	Legal Advice/SCAQMD Programs	General Advice: Contracts	2.00	Ia
23	08 403	Ensure Compliance	Legal Rep/Litigation	Prep/Hearing/Disposition	3.50	Ia,II
24	08 404	Policy Support	Legal Rep/Legislation	Draft Legis/SCAQMD Position/Mtgs	0.25	II,IX
25	08 416	Policy Support	Legislative Activities	Lobbying: Supp/Promote/Influence legis/Adm	0.10	Ia
26	08 457	Advance Clean Air Technology	Mob Src/C Moyer/Leg Advice	Moyer/Implement/Program Dev	0.10	IX
27	08 465	Ensure Compliance	Mutual Settlement	Mutual Settlement Program	1.50	IV
28	08 516	Timely Review of Permits	Permit Processing/Legal	Legal Advice: Permit Processing	0.10	III
29	08 565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Rec Requests	1.50	Ia
30	08 651	Develop Rules	Rules/Legal Advice	Legal Advice: Rules/Draft Regs	1.20	II
31	08 661	Develop Rules	Rulemaking/RECLAIM	RECLAIM Legal Adv/Related Iss	0.50	II
32	08 681	Customer Service and Business Assistance	Small Business/Legal Advice	Legal Advice: SB/Fee Review	0.05	II,III
33	08 717	Policy Support	Student Interns	Gov Board/Student Intern Program	0.10	Ia
34	08 770	Timely Review of Permits	Title V	Leg Advice: Title V Prog/Perm Dev	0.05	II,IV
35	08 772	Timely Review of Permits	Title V Permits	Leg Advice: New Source Title V Permit	0.05	III
36	08 791	Ensure Compliance	Toxics/AB2588	AB2588 Legal Advice: Plan & Impl	0.05	X
37	08 805	Ensure Compliance	Training	Continuing Education/Training	0.75	Ib
38	08 827	Operational Support	VW-General Admin	VW-General Admin	0.00	XVII

35.00	0.00	35.00
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Total Legal

Legal Line Item Expenditure						
Major Object / Account # / Account Description	FY 2019-20 Actuals	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate *	FY 2021-22 Adopted Budget	
Salary & Employee Benefits						
51000-52000 Salaries	\$ 4,148,432	\$ 4,192,355	\$ 4,193,985	\$ 4,121,219	\$ 4,132,656	
53000-55000 Employee Benefits	2,271,115	2,491,256	2,491,256	2,436,362	2,573,971	
Sub-total Salary & Employee Benefits	\$ 6,419,547	\$ 6,683,610	\$ 6,685,241	\$ 6,557,581	\$ 6,706,626	
Services & Supplies						
67250 Insurance	\$ -	\$ -	\$ -	\$ -	\$ -	
67300 Rents & Leases Equipment	-	-	-	-	-	
67350 Rents & Leases Structure	-	-	-	-	-	
67400 Household	-	-	-	-	-	
67450 Professional & Special Services	1,029,628	246,001	506,001	506,001	246,001	
67460 Temporary Agency Services	-	7,250	7,250	7,250	7,250	
67500 Public Notice & Advertising	-	2,500	2,500	2,500	2,500	
67550 Demurrage	-	4,000	4,000	4,000	4,000	
67600 Maintenance of Equipment	-	500	500	500	500	
67650 Building Maintenance	-	-	-	-	-	
67700 Auto Mileage	391	1,600	1,600	1,600	1,600	
67750 Auto Service	-	-	-	-	-	
67800 Travel	5,063	15,000	15,000	15,000	15,000	
67850 Utilities	-	-	-	-	-	
67900 Communications	3,050	10,300	10,300	10,300	10,300	
67950 Interest Expense	-	-	-	-	-	
68000 Clothing	-	500	500	500	500	
68050 Laboratory Supplies	-	-	-	-	-	
68060 Postage	2,210	4,750	4,750	4,750	4,750	
68100 Office Expense	8,653	16,000	16,000	16,000	16,000	
68200 Office Furniture	-	4,500	4,500	4,500	4,500	
68250 Subscriptions & Books	131,089	115,000	115,000	115,000	115,000	
68300 Small Tools, Instruments, Equipment	-	-	-	-	-	
68400 Gas and Oil	-	-	-	-	-	
69500 Training/Conference/Tuition/ Board Exp.	8,009	17,500	17,500	17,500	17,500	
69550 Memberships	1,639	750	750	750	750	
69600 Taxes	-	-	-	-	-	
69650 Awards	-	-	-	-	-	
69700 Miscellaneous Expenses	1,454	2,000	2,000	2,000	2,000	
69750 Prior Year Expense	-	-	-	-	-	
69800 Uncollectable Accounts Receivable	-	-	-	-	-	
89100 Principal Repayment	-	-	-	-	-	
Sub-total Services & Supplies	\$ 1,191,186	\$ 448,151	\$ 708,151	\$ 708,151	\$ 448,151	
77000 Capital Outlays	\$ -	\$ -	\$ -	\$ -	\$ -	
79050 Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -	
Total Expenditures	\$ 7,610,733	\$ 7,131,761	\$ 7,393,392	\$ 7,265,732	\$ 7,154,777	

* Estimates based on July 2020 through February 2021 actual expenditures and February 2021 budget amendments.

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE

**DERRICK ALATORRE
DEPUTY EXECUTIVE OFFICER**

At a Glance:	
FY 2020-21 Adopted Budget	\$10.4M
FY 2021-22 Adopted Budget	\$11.2M
% of FY 2021-22 Adopted Budget	6.2%
Total FTEs FY 2021-22 Adopted Budget	58

DESCRIPTION OF MAJOR SERVICES:

Legislative & Public Affairs/Media Office provides a broad range of services to internal and external stakeholders. These services include:

Legislative/Communications

State and Federal Relations

State and Federal Relations works with all levels of elected officials and their staff, agencies, and other stakeholders to support South Coast AQMD’s legislative priorities. Efforts are focused on policy and funding issues that support South Coast AQMD’s Air Quality Management Plan (AQMP) to meet state and federal clean air standards. This unit also works to defend against legislative activities by others detrimental to the goals and priorities of clean air.

Local Government/Community Relations

Local Government and Community Relations works in all four counties of South Coast AQMD’s 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 South Coast AQMD and stakeholders; assisting with inquiries from government offices, community members, health and environmental justice organizations, and business organizations; and, promoting and providing information on South Coast AQMD programs and initiatives.

Communications & Public Information Center

The Communications & Public Information Center serves and assists members of the public who wish to report air quality complaints, contact District staff or acquire additional information regarding South Coast AQMD programs. The Communications Center and its associated toll-free numbers, along with South Coast AQMD’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), located in the South Coast AQMD lobby, serves as a walk-up resource for all visitors to South

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

Coast AQMD. Due to COVID-19, the Public Information Center is currently closed to the public until further notice.

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.

Environmental Justice

South Coast AQMD's Environmental Justice (EJ) initiatives focus on a wide variety of programs to partner with disadvantaged communities to address air pollution related issues. Specific programs such as the Environmental Justice Community Partnership (EJCP) program and the Environmental Justice Advisory Group (EJAG) seek to build community capacity to empower residents and to reduce air pollution in areas of cumulative impact.

AB 617

The AB 617 program is a comprehensive community-based effort that focuses on improving air quality and public health in environmental justice communities. AB 617 implementation efforts span three years with 5 designated communities and one (1) pending:

- Year 1 -- Wilmington, Carson, West Long Beach; San Bernardino, Muscoy; and Boyle Heights, East Los Angeles, West Commerce
- Year 2 -- Southeast Los Angeles and Eastern Coachella Valley
- Year 3 – Pending

Media

Media Relations serves as the agency's official liaison with news media in its many forms; newspapers and radio; broadcast, cable and satellite TV; books, magazines and newsletters; online outlets; digital and social media. The Media Relations Office also supports programs and policies of South Coast AQMD and its Board with a wide range of proactive media and public relations programs. Media provides strategic counsel to the Executive Officer, Board members, staff and Executive Council members on sensitive, high-profile media relations issues as well as building public awareness of air quality issues.

Social Media

The Social Media program connects the public to South Coast AQMD by helping build and maintain clean air awareness using official agency channels on Facebook, Twitter, Instagram and LinkedIn to share news, program announcements, and informational communications for meetings and events, video live streams, advisories and other information. Our social media resources provide platforms for community members to engage with South Coast AQMD and to build a flourishing conversation to promote open dialogue.

Graphics

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

The Graphics Department is responsible for providing visual and media services for the agency, from initial concept to final design and completion of projects. Also, support community programs with multimedia development of visual collateral and videos. Graphics also ensures consistent branding of official South Coast AQMD documents and materials to build public recognition and brand awareness.

ACCOMPLISHMENTS:

RECENT:

State Legislative

- Assisted with efforts to successfully secure \$50 million statewide for air districts from the Air Pollution Control Fund to implement the AB 617 Program.
- Worked with CAPCOA and other air districts to OPPOSE four (4) backup generator bills that were attacking air district authority and were not enacted into law:
 - AB 2182 (Rubio)
 - SB 1099 (Dodd)
 - SB 802 (Glazer)
 - SB 1185 (Moorlach)
- Advocated in support of SB 895 (Archuleta) related to zero-emission fuels, fueling infrastructure and transportation technologies. This bill was enacted into law.
- Reached out to the Governor twice seeking action by Executive Order:
 - First, requested a suspension of Brown Act requirements to no longer require a physical location for a public meeting and to allow virtual government meetings to take place exclusively through electronic participation. The Governor issued this executive order in March 2020.
 - Second, requested that public notices under CEQA, that are typically filed and posted at county clerk offices, be allowed to be electronically filed with the State Clearinghouse instead. Many county offices remained fully or partially closed to the public due to COVID-19, so agencies were unable to meet CEQA filing and posting requirements. The Governor issued this executive order in September 2020.

Federal Legislative

- Organized and staffed an advocacy trip to Washington, D.C. with Governing Board and Executive Council Members to educate the Administration and Members of Congress on South Coast AQMD and air quality-related issues including the Transportation and Infrastructure bill, H.R. 2.
- As a result of COVID-19, outreach and meetings with Members of Congress and their staff shifted to ZOOM and telephone calls.
- Worked with our Congressional Delegation to increase and/or protect funding for:
 - TAG grew from \$56.3 million in Fiscal Year (FY) 2019 to \$59 million in FY 2021 and prevented the expansion of program eligibility from five (5) to ten worst nonattainment areas for ozone and particulate matter,

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

- The Diesel Emission Reductions Act (DERA) was increased to \$90 million in FY 2020 from \$87 million in FY 2019 and report language emphasized that 70-percent of awards should be made in nonattainment areas;
- Section 103/105 funding was increased to \$229.5 million in FY 2020 from \$228.3 million in FY 2019.
- \$2.5 billion included in FY 2020 Omnibus Appropriations bill for Sustainable Transportation Research and Development at the Department of Energy for research, development, demonstration and commercialization activities in the Offices of Hydrogen and Fuel Cell Technologies, Vehicle Technologies and Bioenergy Technologies.
- Worked with Members of Congress and Committee staff to include the “Clean Corridors Act of 2020” and “Climate Smart Ports Act” into H.R. 2, the “Moving Forward Framework Act” including key amendments for air quality. H.R. 2 was passed by the House of Representatives.
- Advocated for COVID-related State and local government assistance including special districts such as South Coast AQMD.
- Worked with the Administration, Members of Congress, industry, health and environmental organizations to move forward the U.S. Environmental Protection Agency Cleaner Trucks Initiative (CTI) which focuses on a proposed rule for an Ultra-Low NOx Emission Standard for Heavy Duty Trucks. CTI was delayed due to COVID-19.

Communications & Public Information Center

- Assisted the public through the handling of 32,072 incoming 1-800-CUT-SMOG calls, including 274 directed to Public Information Center and 359 Spanish Hotline calls. Due to COVID-19, the public information center is closed to the public until further notice.
- Assisted Small Business Assistance by performing nearly 884 calls to businesses with expired permits to remind them about the status of their permits, and to encourage them to bring the permits current.
- Supported public meetings, events and outreach by fulfilling collateral material requests, updating and publishing 230 web pages, and conducting five (5) public information mailings.

Small Business Assistance

- Provided assistance and training, including:
 - Permit assistance for 3,049 applications from businesses;
 - 16 on-site facility consultations;
 - Technical support on rules and regulations for 350 facilities;
 - Recordkeeping training for 11 businesses;
 - Approved and processed 768 Air Quality Permit Checklist submittals;
 - Issued 11 grants for dry cleaners; and,
 - Assisted 60 businesses file variances before the South Coast AQMD Hearing Board and assisted with 29 Fee Review cases.
- Outreached to 565 facilities as part of the Expired Permit Outreach Program.

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

- Conducted outreach to communities to meet the commitments under the AB 617 Community Emissions Reduction Plans (CERPs).

Local Government/Community Affairs

- Attended regional and community meetings throughout the four (4) counties including League of California Cities, the Councils of Governments, Chambers of Commerce and other organizations.
- Increased community engagement through,
 - Eight (8) public meetings related to community air quality issues, AB2588, rules, Hearing Board and South Coast AQMD Committees;
 - Participated in nine (9) community events such as health and environmental justice resources fairs, Council of Governments General Assemblies, and air quality related forums and conferences;
 - Organized and hosted eight (8) Visiting Dignitaries and Speakers Bureau tours;
 - Planned, organized, and produced major events, including the “Martin Luther King, Jr. Day of Service Forum” which had more than 350 attendees.

Environmental Justice

- Held four (4) EJCP Advisory Council meetings and recruited three (3) new members and held three (3) EJAG meetings.
- Organized virtual EJ Conference, “A New Era of Environmental Justice – Our Community Survival” with approximately 754 attendees including six (6) breakout sessions.
- Implemented the second year of the Los Angeles Inter-Agency Task Force to build mechanisms and strategies to facilitate intergovernmental government coordination on environmental complaints and EJ issues. Accomplishments include,
 - (3) Inter-Agency Task Force meetings and recruited three (3) members.
 - Drafted the Los Angeles County “Who to Call” Guide for Environmental Issues in English and Spanish.
 - Hosted a virtual environmental agency staff training for frontline staff working with and responding to reports from environmental justice communities with 80 attendees.
 - Partnered with the Los Angeles County Public Works to add South Coast AQMD on their online Service locator at <https://dpw.lacounty.gov/general/servicelocator/>.
- Restructured the EJCP Clean Air Ranger Education Program for elementary schools by rebranding as the Clean Air Education Program for Elementary Students (CAPES) including efforts to develop unique curriculum with videos. Activities included:
 - Three (3) of eight (8) scripts completed for videos;
 - Nine (9) of 24 curriculum units developed; and,
 - Presented CAPES at three (3) elementary schools with engagement of over 970 students, teachers and administrators.
- Launched second year of the “Why Healthy Air Matters” (WHAM) High School Education program with an updated workplan, implementation of lessons learned, expanded goals

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

for high schools, addition of middle schools, and curriculum and on-line learning components.

- WHAM outreach conducted throughout the four (4) county region with a focus on AB 617 and EJ communities resulting in confirmed participation by 97 high school classrooms and 22 middle school classrooms as of January 2021. Additional activities included:
 - Focused outreach to 62 high schools who were confirmed to participate in WHAM but were impacted by COVID-19 stay-at-home orders.
 - Converted WHAM teaching guide and student workbooks into online digital formats to accommodate distance and hybrid learning environments.
 - Created and published online WHAM videos for teacher training modules and classroom lessons for students. PowerPoints for each lesson also made available online.
 - Registration forms and teacher and student surveys made available online.
 - Drafted two (2) of four (4) units for middle school curriculum have been completed.
- Published the first Semi-Annual EJ Newsletter in English and Spanish as a flipbook and printable PDF version. It was distributed electronically and through outreach to more than 6,000 environmental and health organizations, government, industry, and other interested stakeholders.

AB 617

- For Year 1 communities, conducted on-going outreach to develop and maintain relationships, facilitate the flow of information between South Coast AQMD and Community Steering Committee (CSC) members, and engage the CSC and stakeholders in the AB 617 process. There were 12 CSC meetings from January through December.
- For Year 2 communities, conducted outreach and built interest in the AB 617 program to facilitate the formation of the CSCs resulting in nine (9) meetings and one (1) Workshop for Southeast Los Angeles and 17 meetings for Eastern Coachella Valley.
- Adapted meeting and program processes per input by each CSC to align with community priorities and needs.
- Convened other types of meetings in support of the Year 1, Year 2, and Year 3 communities such as, but not limited to, Technical Advisory Committees, workshops, Charter formation, and Community Identification.
- Worked collaboratively with other South Coast AQMD Departments and CSC Members to develop meeting formats and agendas to facilitate community-driven development (Year 1 and Year 2 communities) and implementation (Year 1) of the Community Air Monitoring Plans (CAMP) and Community Emissions Reduction Plans (CERP) as well as develop priorities for incentive funding (Year 1).
- Built relationships and partnerships with local, state and federal government organizations to facilitate implementation of AB 617 programs.
- Developed new meeting strategies to allow for CSC and community participation in virtual meetings via ZOOM, including language interpretation and web streaming.

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

Media

- Developed and issued 163 news releases to media.
- Began translating all releases into Spanish (mid Oct) resulting in 37 from 2020 through January 2021.
- **State of the Air 2020**
 - Wrote and pitched opinion piece that was picked up by Southern California News Group and ran eight of its publications. Additional coverage from KNX and OC Register.
- **COVID-19 and Air Quality**
 - Between March 16 and April 22, 2020, coordinated 44 media inquiries regarding COVID-19 and its impacts to air quality.
 - Interviews were conducted with dozens of media outlets including the Los Angeles Times, On Air With Ryan Seacrest, ABC 7 (both taped and live), Fox 11, Spectrum 1 News, Reuters, Telemundo, KCRW, NPR Los Angeles, NPR Sacramento, KNX Radio, Southern California News Group, LAist, CalMatters, and the San Francisco Gate.
 - Coverage and reprints from these media stories resulted in more than 98 news outlets covering the South Coast AQMD and air quality issues. Analytics equate this to more than \$735K in Ad Value Equivalency and reaching more than 28.4 million unique visitors.
- **4th of July 2020**
 - Pitching and outreach resulted in interviews and coverage from KNX, KPCC, LA Times, Spectrum 1, KABC Radio, City News Service, CBS, KCAL 9, KTLA, ABC, Laist, Press Enterprise, Telemundo, KCRW, and Univision LA.
- **Replace your Ride**
 - Outreach and coverage on KPCC and Laist led to largest volume of calls program has seen in a day.
- **2020 Heatwave, Wildfire and Ozone Season**
 - Outreach during wildfires to highlight air monitoring efforts resulted dozens of interviews and media coverage in print and TV including: Fox, ABC, NBC, CBS, KCAL, KPCC, KNX, LA Times, AirTalk with Larry Mantle, Univision LA, Telemundo, California Black Media, Spectrum 1, City News Service, Associated Press, In Depth with Hal Eisner and Palm Springs Television (ABC, CBS, FOX).
- **2019-2020 Check Before You Burn Season**
 - This year's CBYB was handled internally. Through pitching and social media outreach and other advertisements methods we were able to yield great results:
 - 36,000 door hangers distributed to homes in geo targeted areas.
 - Geotargeted Facebook/Instagram advertisements reached more than 41,530 people.
 - Media Campaign resulted in more than 178 stories, reaching more than 3.3 million people with a publicity value of more than \$589K.
- **Other media highlights, interviews, and coverage topics included,**
 - AB 617
 - Mobile phone application

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

- China Shipping
- Valley Generating Station
- All American Asphalt
- Compton Chemical Spill
- In addition, multiple interviews with LA Times were conducted on ongoing air quality issues including an interview with Editorial writer.

Social Media

- Original content posted to social media accounts included:
 - 867 posts on Facebook
 - 965 posts on Twitter
 - 735 posts on Instagram
- Daily AQI forecast posts established for social media platforms, featuring maps and information by area resulting in increased coverage and engagement from local reporters and meteorologists.
- September 2020 marked South Coast AQMD's historically best performing month on record with Daily AQ Forecast posts, Bobcat/El Dorado/Snow Fire coverage, and Heat Wave Ozone coverage.
 - Posting in September resulted in 500+ Twitter followers and more than 841,900 impressions (individual reach) in a one-week period (Sept. 12-18).
 - Content during this time was also shared by News Outlets/Reporters (@NBCLA, @KTLA, @KNX1070), Local Government (@LACity, @CountyofLA, @OurSantaMonica), Elected Officials (@MayorofLA), and additional influencers with large audiences.
- Sustained consistent audience reach with timely information to generate maximum public exposure for South Coast AQMD on social media platforms.
- Livestreamed Governing Board, AB 617 meetings, and other large events.
- Increased use of original content to expand South Coast AQMD's reputation and to promote resources such as the Advisor newsletter.
- Continued outreach to influencers and social media staff at other agencies, media outlets and local cities to boost our content and extend presence.

Graphics

- Completed over 250 graphic projects.
- Developed over 15 videos to support the transition to virtual platforms for conferences, events, and educational programs.
- Recorded and edited videos for Executive Officer, Executive Council, Board Members as well as other staff for both external and internal uses.
- Created lab tour video for WHAM.
- Published bi-monthly Advisor newsletter and produced the Annual Report and advertorials for local newspaper on air quality and environmental justice programs.
- Developed decals for clean bus and charging incentive programs.
- Provided visual communications support for all major events including:
 - Governing Board Meetings;

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

- Community Meetings and Town Halls;
- CAPES and WHAM programs;
- Martin Luther King, Jr. Day of Service;
- Los Angeles Faith Based Event;
- Cesar Chavez;
- Annual Environmental Justice Conference; and,
- AB 617 meetings.

ANTICIPATED:

State Legislative

- Seek at least \$100 million statewide to continue implementation of the AB 617 program.
- Work to secure at least \$350 million in statewide incentive funding to accelerate turnover to cleaner vehicles & equipment.
- Seek legislative and/or budget fix to increase CARB's Budget Act allocation authority to allow for full disbursement of Carl Moyer (Moyer) revenues generated for air districts. Over \$78.7 million was not dispersed by CARB to air districts for FY 2018-19 and FY 2019-20 combined, and new Moyer revenue going forward also would be affected.
- Work to delete or extend January 1, 2024 sunsets on AB 923 fees including the \$2 car registration fee and \$0.75 fee on new tire purchases. These fees provide sustainable, statewide funding for the Moyer program. The car registration fee results in approximately \$27 million per year for the South Coast region.
- Strengthen our state legislative outreach through increased engagement with the Governor's Office, state legislators, and Capitol staff (Members and Committees) to promote South Coast AQMD's priorities, sponsored legislation (if any), bills with Governing Board positions, and to support implementation of the South Coast AQMD's AQMP.
- Strengthen our educational outreach related to legislation to build stakeholder engagement, including, but not limited to, government entities, business, environmental organizations, and the community to support South Coast AQMD's priorities, sponsored and/or bills with Governing Board positions, and AQMP implementation efforts.
- Continue to work with South Coast AQMD Departments to improve communication and collaboration on legislative efforts.
- Improve efficiency and ease with which data can be extracted on a recurring basis for specified purposes for the benefit of public outreach and governmental relations. (e.g. CLASS and PeopleSoft)

Federal Legislative

- Secure policy objectives and funding for air quality issues through existing and new legislative opportunities such as, but not limited to, COVID Relief, Transportation and Infrastructure, Climate Change, and other efforts. Key legislative efforts include: Clean Corridors Act, Climate Smart Ports, and Point-of-Sale Incentives for medium- and heavy-duty vehicles.

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

- Work to ensure the federal government does its fair share to reduce air pollution through:
 - Funding or regulatory authority for nonattainment areas to attain National Ambient Air Quality Standards (NAAQS);
 - Funding for the TAG program, DERA, and Clean Air Act Section 103/105 programs;
 - Authorizing and funding new programs to reduce air pollution through the adoption and deployment of zero and near-zero emission technologies, fuels and charging/fueling infrastructure; and,
 - Incentivizing individuals, businesses, and all levels of government to purchase and use advanced clean technologies to reduce air pollution.
- Participate in the administrative and legislative process to educate policymakers on air quality and climate change policies as they relate to and impact the South Coast region.
- Support legislation and/or administrative efforts to protect the development of public policy based on science.
- Work with U.S. EPA, Members of Congress and stakeholders to ensure the rule-making process for the Cleaner Trucks Initiative is transparent with equitable stakeholder participation.
- Partner with stakeholders on educational outreach efforts, 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.

Local Government/Community Relations

- Continue to build and maintain relationships with stakeholders to foster two-way flow of communication in support of South Coast AQMD's mission.
- Conduct educational and informational outreach in support of regional, state and federal initiatives, such as, but not limited to U.S. EPA CTI, AB 617, and other funding & policy issues.
- Elevate awareness on South Coast AQMD and air quality issues through participation in community events through-out the region, the Visiting Dignitaries and Speaker's Bureau program and hosting signature and major events.
- Collaborate internally on issues management and communication strategies on various South Coast AQMD programs and mission-centered efforts, including interaction with stakeholders on high profile issues.
- Increase relationship building with all levels of government, community members and leaders, health and environmental organizations, business representatives and other stakeholders. A focused subset of this outreach will be on environmental justice.
- Enhance database and list management to increase successful communications.
- 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 the Public Advisor and SBA Supervisor.
- Collaborate and assist other South Coast AQMD 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 Hot Spots program,

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

AB2766 outreach to cities, incentive programs, "Check Before You Burn," Residential & Commercial Lawn and Garden Equipment rebate programs, and other projects.

Communications Center & Public Information

- Receive and process all telephone calls from the public through the main, 1-800-CUT-SMOG, after hours, Spanish Hotline, and Clean Air Connection lines. These calls also include air quality complaints, reports of equipment breakdowns, and emergency response requests.
- Assist SBA by contacting approximately 1,600 businesses with expired permits to remind them about the status of their permits and to encourage them to bring the permits current.
- Re-open the Public Information Center when appropriate COVID-19 safety measures are implemented, and governmental issued health and safety guidelines allow for in person customer service.
- Assist in publishing web pages, including updates for Community Investigations and other critical issues as they arise.
- Implement TTY software system for the hearing impaired.

Environmental Justice

- Continue implementation of the EJCP CAPES program including implementations at 20 elementary schools.
- Work with consultants to produce three (3) videos for elementary students on air quality with the accompanying curriculum.
- Host four (4) EJCP Advisory Council meetings and invite Advisory Council Members to present at each meeting to develop meaningful partnerships and share information.
- Coordinate and implement one (1) EJ Student Bus Tour or webinar on air quality for high school or college students.
- Continue implementation of the Inter-Agency Task Force, including four (4) meetings.
- Develop, organize and host the annual Environmental Justice Conference.
- Organize and host four (4) EJAG meetings.
- Publish EJ semiannual newsletter.
- Develop an EJ informational pamphlet.
- Expand efforts to inform and educate students, families, and EJ communities on air quality, public health, and South Coast AQMD.
- Oversee the consultant contract and implement WHAM for high school and middle school classrooms with corresponding curriculum and videos for in person, distance and hybrid formats.

AB 617

- Convene CSC meetings and workshops for each of the five (5) Year 1 and 2 communities which will include more than 20 meetings.
- Continue to implement the CERPs and CAMPs in Year 1 and 2 communities.
- Implement program for Year 3 community including the initial outreach process and formation of the CSC.

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

- Convene monthly CSC meetings for Year 3 AB 617 community and assist with the development process for Year 3 CERP and CAMP presentation to South Coast AQMD Board in July and work related to submitting to CARB in September.

Small Business Assistance

- Expand public awareness of South Coast AQMD's SBA program by outreaching to trade organizations, municipalities, and other agencies.
- Assist small businesses in determining applicable requirements, applying for permits, and petitioning for variances.
- Provide timely, accurate and 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 South Coast AQMD rulemaking workshops and hearings.
- 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.
- Conduct outreach communities to meet the commitments under the AB 617 Community Emissions Reduction Plans.
- Conduct outreach to facilities as part of the Expired Permit Outreach Program.

Media

- Develop a strategic communications plan for overall agency messaging and critical issues and crisis management communications.
- Provide media relations services and strategic counsel for high-profile media issues as well as ongoing South Coast AQMD programs and projects through press releases, media advisories, talking points, in-person and on-camera interviews, opinion pieces and letters to the editor.
- Review requests from partner agencies, organizations and firms for quotes from South Coast AQMD officials for articles and press releases.
- Coordinate media events for the agency and coordinate press events with other agencies and Governing Board Members.
- Continue the implementation of Google ad campaign for "The Right to Breathe."
- Implement story maps on South Coast AQMD website and continue to update and maintain hot topics webpages.
- Design and implement the FY 2020-21 Check Before You Burn program.
- Continue to strengthen relationships with members of the TV and print media.
- Develop and produce bi-monthly Advisor issues, the Annual Report, and other brochures and public content.
- Work with other departments to fine tune and make accessible the language used on meeting notices, factsheets, web pages and any other public documents.

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

- Increase participation in CAPCOA Public Affairs group.
- Continue to help focus and/or 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 South Coast AQMD sponsorships.

Social Media

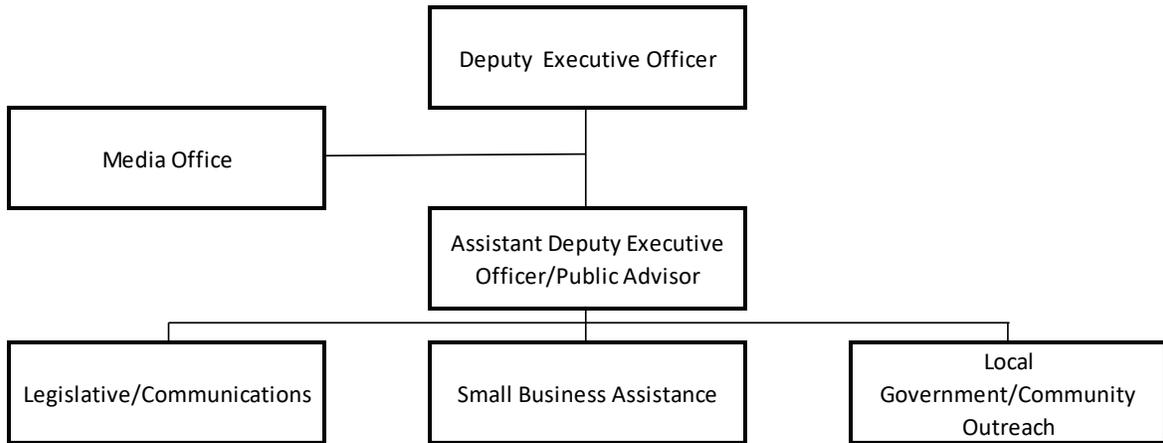
- Maintain and grow followers with a goal of a 30-percent increase from 2020.
- Continue to increase shares of content from external parties and increase impressions of posts.
- Increase use of original articles via social media from Advisor.
- Increase South Coast AQMD presence, including expanding library of new up-to-date photos and other content from all departments.
- Livestream AB 617 meetings and other large events.
- Increase relationships with social media coordinators at other agencies, media outlets and local cities.
- Develop more robust social media calendar to include social media holidays and other ways to humanize South Coast AQMD.
- Develop strategy to increase outreach, downloads and use of the Mobile apps via social media influencers.

Graphics

- Complete graphics projects and assignments, including collateral brochures and promotional items; bi-monthly Advisor; Annual Clean Car Buying Guide; signage, documents and materials for community meetings and events; educational materials; advertisements, and program announcements.
- Provide videography and editing services as needed.
- In coordination with a Director of Communications, redesign and update South Coast AQMD core collaterals and content for electronic and social media outlets to ensure themes and messaging are consistent and to create focused and clear branding of South Coast AQMD.
- Expand agency photo library and platform to house images (FLICKR, Cloud, etc).

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

CURRENT ORGANIZATIONAL CHART:



POSITION SUMMARY: 56 FTEs

Legislative & Public Affairs/Media Office Units	Amended FY 2020-21	Change	Budget FY 2021-22
Administration	8	-	8
Legislative & Public Affairs	45	-	45
Media Office	5	-	5
Total	58	-	58

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
1	Administrative Secretary
2	Air Quality Engineer
2	Air Quality Specialist
1	Assistant Deputy Executive Officer
1	Community Relations Manager
1	Deputy Executive Officer
1	Director of Communications
3	Graphic Illustrator II
1	Legislative Assistant
1	Office Assistant
3	Public Affairs Manager
1	Program Supervisor
1	Public Affairs Specialist
4	Secretary
2	Senior Administrative Secretary

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

9	Senior Office Assistant
2	Senior Public Affairs Manager
19	Senior Public Information Specialist
1	Senior Staff Specialist
1	Staff Assistant
<u>1</u>	Supervising Office Assistant
58	Total FTEs

**Legislative & Public Affairs/Media Office
Work Program by Office**

Program Code	Program Category	Program	Activities	FTEs FY 2020-21	+/-	FTEs FY 2021-22	Revenue Categories
1 35	019 Customer Service and Business Assistance	AB617-Prog Develop	AB617-Program Development	0.00	6.00	6.00	IX
2 35	037 Customer Service and Business Assistance	AB617-Outreach	AB617-Outreach	5.00	-5.00	0.00	IX
3 35	046 Customer Service and Business Assistance	Admin/Prog Mgmt	Admin Office/Units/SuppCoord Staff	5.02	1.00	6.02	lb
4 35	111 Ensure Compliance	Call Center/CUT SMOG	Smoking Vehicle Complaints	8.00	0.00	8.00	IX,XV
5 35	126 Customer Service and Business Assistance	Clean Air Connections	Coord of region-wide community group	1.00	0.00	1.00	II,IX
6 35	205 Customer Service and Business Assistance	Environmental Education	Curriculum Dev/Project Coord	0.25	0.00	0.25	II,IX,XV
7 35	240 Customer Service and Business Assistance	Environmental Justice	Impl Board's EJ Pgrms/Policies	3.00	0.00	3.00	II,IV
8 35	260 Customer Service and Business Assistance	Fee Review	Cmte Mtg/Fee-Related Complaint	0.50	0.00	0.50	II,III,IV,XV
9 35	280 Policy Support	Advisory Group/Ethnic Comm	GB Ethnic Comm Advisory Group	0.40	0.00	0.40	II,IX
10 35	281 Policy Support	Advisory Group/Small Business	SBA Advisory Group Staff Support	0.50	0.00	0.50	IV,IX
11 35	283 Policy Support	Governing Board Policy	Brd sup/Respond to GB req	0.55	0.00	0.55	la
12 35	345 Policy Support	Goods Mvmt&Financial Incentive	Goods Movement & Financial Incentives Progr	1.00	0.00	1.00	IX
13 35	350 Operational Support	Graphic Arts	Graphic Arts	2.00	0.00	2.00	la
14 35	381 Customer Service and Business Assistance	Interagency Liaison	Interact Gov Agns/Promote SCAQMD	0.15	0.00	0.15	la,XV
15 35	390 Customer Service and Business Assistance	Intergov/Geographic Deployment	Dev/Impl Local Govt Outreach	10.50	0.00	10.50	II,IX
16 35	412 Policy Support	Legislation/Federal	Lobbying/Analyses/Tracking/Out	0.25	0.00	0.25	la
17 35	413 Policy Support	Legislation/Exec Office Support	Coord Legis w/ EO, EC, Mgmt	0.25	0.00	0.25	la
18 35	414 Policy Support	Legislation-Effects	Lobbying/Analyses/Tracking/Out	0.80	0.00	0.80	la,IX
19 35	416 Policy Support	Legislative Activities	Supp/Promote/Influence Legis/Adm	0.50	0.00	0.50	la
20 35	491 Customer Service and Business Assistance	Outreach/Business	Chambers/Business Meetings	1.00	0.00	1.00	II,IV
21 35	492 Customer Service and Business Assistance	Public Education/Public Events	Pub Events/Conf/Rideshare Fair	2.00	0.00	2.00	II,V,IX,XV
22 35	494 Policy Support	Outreach/Collatera/Media	Edits,Brds,Talk shows,Commercl	5.60	0.00	5.60	la
23 35	496 Customer Service and Business Assistance	Outreach/Visiting Dignitary	Tours/Briefings-Dignitary	0.25	0.00	0.25	la
24 35	514 Customer Service and Business Assistance	Permit: Expired Permit Program	Assist w Permit Reinstatement	0.30	0.00	0.30	IV
25 35	555 Customer Service and Business Assistance	Public Information Center	Inform public of unhealthy air	1.00	0.00	1.00	II,V,IX
26 35	560 Develop Programs	Public Notification	Public notif of rules/hearings	0.50	0.00	0.50	II,IV,IX
27 35	565 Customer Service and Business Assistance	Public Records Act	Comply w/ Public Req for Info	0.10	0.00	0.10	la
28 35	679 Customer Service and Business Assistance	Small Business Assistance	Small Business/Financial Assistance	1.00	0.00	1.00	III
29 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
30 35	710 Customer Service and Business Assistance	Speakers Bureau	Coordinate/conduct speeches	0.10	0.00	0.10	la
31 35	717 Policy Support	Student Interns	Student Interns	0.10	0.00	0.10	la
32 35	791 Customer Service and Business Assistance	Toxics/AB2588	Outreach/AB 2588 Air Toxics	0.01	0.00	0.01	X
33 35	825 Operational Support	Union Negotiations	Official Labor/Mgmt Negotiate	0.01	0.00	0.01	la
34 35	826 Operational Support	Union Steward Activities	Union Steward Activities	0.01	0.00	0.01	la
35 35	855 Operational Support	Web Tasks	Create/edit/review web content	0.40	0.00	0.40	la

Total Legislative & Public Affairs/Media Office

56.00	2.00	58.00
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Legislative & Public Affairs/Media Office Line Item Expenditure						
Major Object / Account # / Account Description	FY 2019-20 Actuals	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate *	FY 2021-22 Adopted Budget	
Salary & Employee Benefits						
51000-52000	Salaries	\$ 5,168,056	\$ 5,003,376	\$ 5,003,376	\$ 4,922,525	\$ 5,252,802
53000-55000	Employee Benefits	3,193,807	3,310,018	3,310,018	3,249,025	3,589,869
Sub-total Salary & Employee Benefits		\$ 8,361,863	\$ 8,313,394	\$ 8,313,394	\$ 8,171,550	\$ 8,842,670
Services & Supplies						
67250	Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300	Rents & Leases Equipment	12	7,000	7,000	7,000	7,000
67350	Rents & Leases Structure	8,023	9,000	5,750	5,750	9,000
67400	Household	-	-	-	-	-
67450	Professional & Special Services	1,911,668	1,515,851	2,738,857	2,638,857	1,705,851
67460	Temporary Agency Services	85,560	114,000	114,000	114,000	114,000
67500	Public Notice & Advertising	62,798	26,600	26,600	26,600	26,600
67550	Demurrage	-	-	250	250	-
67600	Maintenance of Equipment	874	9,000	3,100	3,100	9,000
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	17,652	24,800	24,800	24,800	24,800
67750	Auto Service	-	-	-	-	-
67800	Travel	36,501	45,200	45,200	45,200	45,200
67850	Utilities	-	-	-	-	-
67900	Communications	42,400	47,000	40,000	40,000	47,000
67950	Interest Expense	-	-	-	-	-
68000	Clothing	1,732	-	1,500	1,500	-
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	15,595	137,800	127,300	97,300	137,800
68100	Office Expense	44,496	45,300	45,300	45,300	45,300
68200	Office Furniture	-	-	900	900	-
68250	Subscriptions & Books	28,342	18,200	28,200	28,200	18,200
68300	Small Tools, Instruments, Equipment	-	-	-	-	-
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	4,699	8,500	8,500	8,500	8,500
69550	Memberships	34,495	26,250	33,250	33,250	26,250
69600	Taxes	-	-	-	-	-
69650	Awards	23,533	49,681	49,681	49,681	49,681
69700	Miscellaneous Expenses	61,305	43,100	43,550	43,550	43,100
69750	Prior Year Expense	(235)	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		\$ 2,379,448	\$ 2,127,282	\$ 3,343,738	\$ 3,213,738	\$ 2,317,282
77000	Capital Outlays	\$ -	\$ -	\$ -	\$ -	\$ -
79050	Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures		\$ 10,741,311	\$ 10,440,676	\$ 11,657,132	\$ 11,385,288	\$ 11,159,952

* Estimates based on July 2020 through February 2021 actual expenditures and February 2021 budget amendments.

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PLANNING, RULE DEVELOPMENT & AREA SOURCES

SARAH REES DEPUTY EXECUTIVE OFFICER

At a Glance:	
FY 2020-21 Adopted Budget	\$24.4M
FY 2021-22 Adopted Budget	\$25.2M
% of FY 2021-22 Adopted Budget	14.0%
Total FTEs FY 2021-22 Adopted Budget	148

DESCRIPTION OF MAJOR SERVICES:

Planning, Rule Development and Area Sources (PRDAS) is responsible for the majority of South Coast AQMD's air quality planning and rulemaking 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. Key functions include:

- Preparing Air Quality Management Plans that include strategies to ensure that the South Coast Air Basin and Coachella Valley can achieve state and federal ambient air quality standards.
- Developing proposals for new and amended rules to implement measures in the Air Quality Management Plan, to meet state and federal requirements, and to reduce air toxic emissions.
- Socioeconomic impact and California Environmental Quality Act (CEQA) analyses for rulemaking.
- Commenting on CEQA projects throughout the South Coast Air Basin.
- Developing and implementing mobile source strategies such as:
 - Implementing fleet rules to reduce emissions from public fleets;
 - Developing facility-based measures aimed at achieving emission reductions from indirect mobile sources associated with ports, airports, railyards, and warehouses; and
 - Engaging CARB and U.S. EPA on mobile source rulemaking efforts.
- Coordinating with Legislative & Public Affairs/Media Office and the Technology Advancement Office (TAO) on state and federal legislative and regulatory issues and air quality incentives.
- Conducting air quality evaluations, modeling, forecasting, and developing emissions inventories.
- Performing compliance activities related to area sources.
- Coordinating the selection and implementation of AB 617 in priority communities, developing Community Emissions Reduction Plans, and implementing many of the action items in those plans.
- Leading the assessment, dissemination, and communication of air quality data, forecasts, advisories, and alerts, and providing guidance on health effects associated with air quality policies and other air quality-related issues that arise from a variety of situations such wildfires, individual facilities, and community concerns.
- Developing the Multiple Air Toxics Exposure Study (MATES) to assess regional air toxic emissions and risk throughout the region.
- Implementing several key ongoing programs, including the state Toxics "Hot Spots" program (AB 2588), Annual Emissions Reporting program (AER), Employee Commute Trip Reduction (Rule 2202), Rule 444, Open Burn Program and the AB 2766 Subvention fund program.
- Developing South Coast AQMD policy for climate change, energy, and other air quality related subjects.

PLANNING, RULE DEVELOPMENT & AREA SOURCES (cont.)

ACCOMPLISHMENTS:

Recent:

AB 617

- Adopted Community Emissions Reduction Plans (CERP) for the two 2019-designated communities and continued CERP implementation for the three 2018-designated communities.
- Participated in AB 617 meetings with CARB, CAPCOA and other stakeholders.
- Completed technical evaluation and community selection process for Year 3 communities, recommended one community to CARB, and began community engagement.

AB 2588

- Approved risk reduction plans for two Potentially High-Risk Level Facilities in Paramount (Anaplex and Lubeco), and for two other facilities (MM West Covina and Glendale City Water & Power). Conducted five public notifications (Pebble Beach, Lubeco, MM West Covina, Phillips 66 Refinery (Wilmington), Equilon Enterprises).
- Revised the Facility Prioritization Procedures and Supplemental Guidelines (October 2020).
- Revised the AB 2588 Public Notification Procedures (October 2020).
- Continued implementation of AB 2588, including calculating priority scores, auditing quadrennial inventories, reviewing and approving Voluntary Risk Reduction Plans, Health Risk Assessments, and Air Toxics Inventory Reports.
- Continued providing input to CARB and coordinating with CAPCOA regarding drafting updates to the AB 2588 guidelines and expanded list of covered compounds.

Air Quality Assessment

- Issued daily air quality forecasts and over 100 advisories in 2020.
- Improved software for forecasts and advisories, including high-wind forecasts for PM10 advisories.
- Reviewed 9 permit requests, answered 300+ public inquiries, and responded to media questions.
- Drafted PM2.5 wildfire and firework exceptional event demonstrations, developed tools to analyze PM2.5 and PM10 exceptional events, and contributed to the SCAB PM2.5 and Coachella Valley ozone attainment demonstrations.
- Completed deployment of the gridded real-time air quality map and public maps for AB 617.

Air Quality Modeling/Emissions Inventory

- Developed Net Emissions Analysis Tool (NEAT) which estimates emission benefits and costs associated with cleaner more efficient residential appliances.
- Developed air toxics inventories and performed modeling to estimate cancer risks for MATES V.
- Developed AB 617 community-based detailed emissions inventory for three communities.
- Hosted Technical Advisory Group meeting to assist AB 617 community source attribution analysis.
- Developed emissions inventory and attainment demonstration modeling for two SIP revisions for Coachella Valley and South Coast PM2.5 Plan for 2006 PM2.5 Standard.
- Hosted the 1st Science, Technology, Model Peer-Review (STMPR) meeting to discuss emissions inventory and attainment modeling approaches used in the two SIP revisions.
- Developing emissions for the 2022 AQMP, which includes growth projection, reductions from recently adopted regulations, emissions tracking for RECLAIM sources by industry and equipment type.

PLANNING, RULE DEVELOPMENT & AREA SOURCES (cont.)

- Updating emissions in key area source categories such as fuel combustion in residential and commercial buildings, and aircraft emissions from 41 airports.
- Developed a modeling tool to estimate biogenic VOC emissions from urbanized areas in the Basin. Collaboration with NASA and other academic agencies to use satellite data in air quality modeling.
- Conducted a comprehensive numerical modeling to simulate air quality changes during the COVID-19 shelter-in-place order.
- Continued improving air quality model predictability to be state-of-the-science and appropriate for Air Quality Management Plan (AQMP) attainment demonstrations.
- Reviewed General Conformity requirements for projects submitted to South Coast AQMD.

Annual Emissions Reporting

- Updated the Annual Emissions Reporting (AER) web tool software to implement Rule 301 amendments, improved reporting under AB 617, and on-line payments and certifications.
- Identified and notified approximately 1,600 facilities subject to South Coast AQMD's AER program.
- Reviewed data from AER reports ultimately generating \$17.8 million in annual emission fees.
- Reconciliation review of more than 250+ Emission Reports for RECLAIM facilities.
- Assisted facilities with emission reporting through three multi-hour workshops and AER hotline.
- Compiled and submitted CY2019 device level emission data to CARB.
- Provided input to CARB and coordinated with CAPCOA on updates to the Criteria Pollutant and Toxics Emissions Reporting (CTR) regulation section of AB 617 and updated list of AB 2588 compounds.
- Implemented current CTR requirements in effect for 2020 reporting year.
- Worked with stakeholders from the EQUATE Working Group on the development of a source test tracking system and potential updates to default toxic emission factors used for AER reporting.

AQMP/SIP

- Developed and adopted South Coast Air Basin Attainment Plan for 2006 24-hour PM_{2.5} Standard to address Clean Air Act requirements and submitted to U.S. EPA through CARB.
- Developed and adopted Coachella Valley Extreme Area Plan for 1997 8-hour Ozone Standard to address Clean Air Act requirements for extreme nonattainment areas and submitted to U.S. EPA through CARB.
- Prepared and submitted a RACT Demonstration and Emissions Statement Certification for the 2015 8-hour ozone standard.
- Held Advisory, Mobile Source, and Residential and Commercial Building Working Group meetings to discuss strategies for the 2022 AQMP.
- Execution and currently implementing contracts for 26 incentive projects designed to reduce criteria pollutant emissions/toxic exposure and technology demonstration and deployment.

AREA SOURCES

- Program Development
 - Continue the implementation of the Green House Gases for CARB.
 - Continue the implementation of contracts for Energy Efficiency Measures upgrades and Multifamily Affordable Housing Electrification Project.
- Program Implementation
 - Continue rule effectiveness for area sources VOC reduction rules.
 - Continue rule effectiveness for refrigerant emissions.

PLANNING, RULE DEVELOPMENT & AREA SOURCES (cont.)

- Continue rule effectiveness for vehicle scrapping and transportation programs.
- Obtained \$3.3 million in settlements from violations of area source rules.

CEQA

- Prepared CEQA documents for 20 South Coast AQMD rules and plans, oversaw the preparation of CEQA documents for three permit projects, and conducted over 30 CEQA pre-screenings.
- Reviewed over 1,000 CEQA documents prepared by other lead agencies and provided comments on over 300 CEQA documents.
- Provided technical consultation for ongoing development projects including the California High Speed Rail project and litigation support for the China Shipping Terminal project.

Facility Based Mobile Source Measures

- Continued implementation of Memorandum of Understandings (MOUs) between the South Coast AQMD and the five main commercial airports in the Basin, based on each airport's Air Quality Improvement Plan or Air Quality Improvement Measures. Continued development of indirect source rules on warehouses and railyards.
- Continued development of the MOU with the Ports of Los Angeles (LA) and Long Beach (LB) through the Ports MOU Working Group and Ports MOU Technical Working Group.
- Continued development of emission reduction strategies for new or redevelopment projects.
- Continued developing the Pacific Rim Initiative for Maritime Emission Reductions (PRIMER) through: 1) virtual meetings and electronic communications with Asian authorities and presentations at high-level policy forums; 2) outreach to major ocean carriers, marine engine manufacturers, and technical experts; 3) refining technical analyses for PRIMER incentive optimization and cost-effectiveness calculations.
- Identified potential revisions needed for the OGV emissions inventory based on recent and empirically observed changes in OGV operational profile in California waters.
- Conducted oversight of the completion of several studies, including the potential impacts of an indirect source rule on the warehousing industry, and the potential national economic impacts of accelerated deployment of ZE/NZE trucks.

Health Effects

- Continued MATES V data analysis, interactive tool development, and report writing.
- Provided health effects information in response to high-profile community concerns and completed 16 media interviews on air pollution and health-related topics.
- Managed three research contracts through the Health Effects of Air Pollution Foundation.

Fleet Rules/Mobile Sources

- Continued implementation of South Coast AQMD Fleet Rules.
- Continued technical evaluation of Rule 1610 Mobile Source Emission Reduction Credits (MSERC) applications and Rule 2202 Electric Vehicle Charging Station Projects.
- Continued tracking development of CARB's draft Mobile Source Strategy and provided comments and testimony.
- Continued tracking development of CARB's proposed regulations for OGV At-Berth, Omnibus Low-NOx for HD trucks, Advanced Clean Trucks and Fleets, TRUs, locomotives, etc. and provided comments and testimony.

PLANNING, RULE DEVELOPMENT & AREA SOURCES (cont.)

Stationary Source Rule Development

- Two Amendments Rule 445 to include contingency provisions and to address requirements for Best Available Control Measures (BACM).
- Amended Rule 1111 to provide a one-year compliance extension for specific furnaces.
- Amended Rule 1117 to establish NO_x BARCT emission limits for glass melting furnaces.
- Amended Rule 1146 to remove an ammonia limit that is required under Regulation XIII.
- Amended Rule 1178 to limit the vapor pressure in wastewater tanks to prevent a safety hazard.
- Adopted Rule 1179.1 to establish NO_x and CO limits for combustion equipment at POTWs.
- Adopted Rule 1407.1 to limit toxic air contaminants from chromium metal melting operations.
- Amended Regulations XIII, XX, and XXX to reflect reclassification of Coachella Valley.
- A number of rule development projects expected to be adopted or amended within this fiscal year such as rules for Continuous Emissions Monitoring Systems, NO_x landing rules with BARCT limits for refineries, miscellaneous combustion equipment, requirements for emergency back-up engines, rules to reduce toxic air contaminants, and indirect source rules for warehouses and railroads.
- Conducted monthly RECLAIM and New Source Review meetings and held over 50 individual facility or industry-specific meetings. Developed second version of the RECLAIM Transition Plan.
- Launched Phase II of updated web-based Flare Event Notification System (FENS) for refineries.
- New consumer incentives for the Clean Air Furnace Rebate Program.

Socioeconomic Analysis

- Completed Socioeconomic Impact Assessments for new and amended rules.
- Conducted studies for the public welfare benefits analysis in future AQMP and assessment of potential revenue that could be generated by a future sales tax.
- Developed new computer model that helps optimize spending of incentive funding.

Transportation Programs

- Assisted 162 local governments with the implementation of AB 2766 funds to reduce emissions, including 368 projects in their communities using approximately \$22M of Motor Vehicle revenues.
- Conducted 16 AB 2766 training sessions for 96 representatives of 73 local governments.
- Assisted employers with their Rule 2202 plans and processed ~ 1,200 Rule 2202 plan submittals.
- Developed a new online Employee Transportation Coordinator Training/Certification class in Zoom.
- Conducted 11 Rule 2202 ETC Training/Certification classes in which 110 new ETCs were trained.

Other

- Developed comment letters on key U.S. EPA initiatives, including the PM and Ozone proposed NAAQS, transparency in regulatory science, and transparency in cost benefit analysis for Clean Air Act actions. Coordinated with the Energy Commission and Public Utilities Commission for mobile source electrification policies.
- Completed contract management for three PM control related projects funded by AB 1318.
- Completed first phase of contract for residential energy efficiency retrofits in the Coachella Valley.
- Completed underfired charbroiler PM control testing at UCR CE-CERT.

PLANNING, RULE DEVELOPMENT & AREA SOURCES (cont.)

ANTICIPATED:

AB 617

- Continue or begin implementation of adopted CERPs for the 5 communities designated in 2018 and 2019 (Years 1 and 2), including developing plan amendments as directed by the Board.
- Develop a CERP with the one community recommended in 2020 (Year 3).
- Conduct outreach and develop recommendations for additional communities for the AB 617 program.
- Convene Technical Advisory Group meetings and participate in other AB 617 meetings with CARB, other agencies and stakeholders.

AB 2588

- Continue to work with CARB and through the CAPCOA Toxics and Risk Managers Committee (TARMAC) to update CARB AB 2588 Guidelines, including review of draft list of chemicals.
- Continue to work with CARB and through the TARMAC to develop Health Risk Assessments (HRA) guidelines for the industrywide source categories and to develop and provide training programs.
- Continue activities to implement Rule 1402 and the Hot Spots Program.

Air Quality Assessment

- Prepare PM_{2.5} attainment demonstration of the 24-hour standard in the South Coast Air Basin (2018-2020). Continue to develop tools for PM_{2.5} and PM₁₀ exceptional event demonstrations.
- Continue enhancing tools to disseminate air quality data, including interactive maps and detailed advisories and forecasts.
- Continue supporting quality forecasting, advisories, and responding to public inquiries.

Air Quality Modeling/Emissions Inventory

- Complete the development of emissions inventory to be used for the 2015 8-hour ozone attainment strategy in the 2022 AQMP.
- Conduct photochemical modeling to estimate carrying capacity for the 2015 8-hour ozone standard and develop a modeling attainment scenario.
- Continue collaboration with EPA, CARB, other regulatory agencies and academic institutions to improve air quality models to be the state-of-the-science and appropriate for AQMP attainment demonstrations.
- Host Science, Technology, Model Peer-Review (STMPR) meeting as a part of the 2022 AQMP.
- Complete the development of the Net Emissions Analysis Tool (NEAT) and maintain the tool with potential update and provide technical support to users.
- Continue technical assistance to the AB 617 program, especially to identify the sources of major air contaminants for each community.
- Continue to host AB 617 Technical Advisory Group meeting.
- Continue assisting with regional modeling projects and GIS geospatial analysis.

Annual Emissions Reporting

- Continue evaluating submissions of emissions inventories and annual emissions fees.
- Continue to improve AER on-line reporting system to facilitate data entry for users and incorporate changes to facilitate emission reporting required under AB 617.

PLANNING, RULE DEVELOPMENT & AREA SOURCES (cont.)

- Continue to work with CARB and CAPCOA on the development and implementation of the Criteria Pollutant and Toxics Emissions Reporting (CTR) regulation section of AB 617.
- Continue to work with the EQUATE Working Group to develop/improve source test tracking system and provide potential updates to default toxic emission factors.

AQMP/SIP

- Develop 2022 AQMP to address 2015 8-hour ozone standard through AQMP Advisory Group and meetings to develop specific strategies for mobile sources and residential and commercial buildings.
- Prepare Nonattainment New Source Review Demonstration and Clean Fuel for Boilers Certification as part of SIP submittal for the 2015 8-hour ozone standard.
- Prepare 2020 Milestone Report for the 2006 PM_{2.5} Standard and the 2008 Ozone Standard.
- Evaluate PM_{2.5} design values for attainment status of the 2006 24-hr PM_{2.5} standard for the Basin and ozone design values for attainment status of the 1979 1-hour ozone standard for the Basin.
- Continue developing funding to implement the incentive control measures in the 2016 AQMP.
- Execute contracts for stationary source projects that reduce emissions and toxic exposure.
- Develop tracking system for emission reductions achieved as a co-benefit to climate change programs.

AREA SOURCES

- Continue rule effectiveness for all Area Sources programs.
Continue administering contracts for residential energy efficiency upgrades in the Coachella Valley and San Fernando Valley. Continue rule effectiveness for CARB contract.

CEQA

- Update health risk guidance and South Coast AQMD's localized significance thresholds (LSTs).
- Continue commenting on CEQA Lead Agency and Responsible Agency projects and other agencies' CEQA documents.

Facility-Based Mobile Source Measures

- Proposed rules for warehouses and railyards for Governing Board consideration in 2021.
- Initiate compliance program for facilities covered by indirect source rules and MOUs.
- Track implementation of MOUs with the commercial airports to ensure progress.
- Continue developing the MOU (or other regulatory approaches) with the Ports of Los Angeles and Long Beach.
- Continue collaborations with key stakeholders at international ports, to develop incentive-based framework to accelerate deployment of cleaner vessels to trans-Pacific shipping routes; work with other coastal air districts in coordinating OGV emissions reduction strategy/programs.
- Continue to collaborate with TAO regarding marine technology manufacturers and shipping lines to identify and demonstrate promising retrofit technologies.

Health Effects

- Work with Monitoring and Analysis staff to complete MATES V, including completing data validation of monitoring data, implementation of the Advanced Monitoring component, health risk modeling, report writing and data visualization.

PLANNING, RULE DEVELOPMENT & AREA SOURCES (cont.)

Mobile Sources/Fleet Rules

- Continue working on implementation of existing fleet rules including compliance verification activities; implement mobile source 2016 AQMP measures such as fleet rule amendments.
- Secure SIP credits for mobile source incentive projects working with CARB and U.S. EPA.
- Track development of mobile source regulations by CARB and U.S. EPA.
- Continue tracking development of CARB's Mobile Source Strategy and SIP State Strategy for 2022 AQMP.

Stationary Source Rule Development

- 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, as well as New Source Review issues pertaining to the transition and adopt/amend rules to establish NOx BARCT limits for the RECLAIM transition and address comments from U.S. EPA.
- Amend Regulation XIII (New Source Review) and Regulation XX (RECLAIM) to revise New Source Review provisions for the RECLAIM transition and to address comments from U.S. EPA.
- Continue to adopt and amend rules to address contingency measures, retail mobile fueling, commitments from Community Emission Reduction Plans, and air toxics.

Socioeconomic Analysis

- Continue conducting socioeconomic analyses for rules, air quality plans, and other special projects.

Transportation Programs

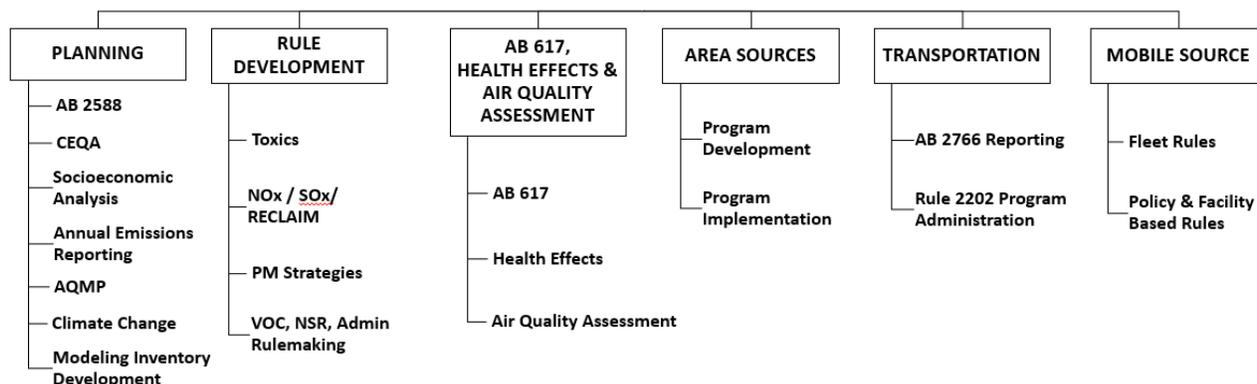
- Continue conducting Employee Transportation Coordinator certification sessions, and review and analyze Rule 2202 annual program submittals.
- Complete the development of EMovers, an on-line Rule 2202 plan submittal process.
- Initiate development of a remote submittal portal for AB 2766 Annual Reporting.

Other

- Continue implementation of rules and compliance verification activities for area sources.
- Continue development of Phase III of the web-based Flare Event Notification System (FENS).
- Continued support for on-line Rule 1415 refrigerant registration.
- Continue working with CE-CERT to characterize and quantify the mechanisms leading to hexavalent chromium emissions during heat treating.
- Continue implementing the Clean Air Furnace Rebate Program.

PLANNING, RULE DEVELOPMENT & AREA SOURCES (cont.)

ORGANIZATIONAL CHART:



POSITION SUMMARY: 148 FTEs

Planning, Rule Development and Area Sources Units	Amended FY 2020-21	Change	Budget FY 2021-22
Office Administration	9	-	9
Planning	60	-	60
Rule Development	21	-	21
Area Sources	8	-	8
Transportation Programs	11	-	11
Health Effects	3	-	3
Mobile Source	9	-	9
AB 617	27	-	27
Total	148	-	148

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
2	Administrative Secretary
10	Air Quality Engineer II
4	Air Quality Inspector II
1	Air Quality Inspector III
63	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	Director of Community Air Programs/Health Effects Officer
4	Office Assistant
8	Planning and Rules Manager
26	Program Supervisor
9	Secretary
3	Senior Administrative Secretary
4	Senior Air Quality Engineer
1	Senior Meteorologist
4	Senior Office Assistant
3	Senior Staff Specialist
148	Total FTEs

**Planning, Rule Development & Area Sources
Work Program by Office**

Program Code	Program Category	Program	Activities	FTEs FY 2020-21	+/-	FTEs FY 2021-22	Revenue Categories
1 26	002 Develop Programs	AB2766/Mobile Source	AB2766 Mobile Source Outreach	3.20	0.05	3.25	IX
2 26	010 Develop Programs	AQMP	AQMP Special Studies	2.80	0.00	2.80	IV,V,IX,XV
3 26	019 Develop Programs	AB617-Prog Develop	AB617-Program Development	0.00	29.20	29.20	IX
4 26	031 Develop Rules	AB617-BACT Clrghouse Dev	AB617-BACT Clrghouse Dev	11.95	-11.95	0.00	IX
5 26	033 Advance Clean Air Technology	AB617-Em Inventory	AB617-Em Inventory	3.00	-3.00	0.00	IX
6 26	034 Advance Clean Air Technology	AB617-Em Reduc Plns	AB617-Em Reduc Plns	10.10	-10.10	0.00	IX
7 26	035 Develop Rules	AB617-General	AB617-General	4.15	-4.15	0.00	IX
8 26	038 Develop Programs	Admin/Office Management	Coordinate Off/Admin Activities	5.30	0.00	5.30	lb
9 26	050 Develop Rules	Admin/Rule Dev/PRA	Admin: Rule Development	1.10	0.00	1.10	lb
10 26	061 Monitoring Air Quality	Air Quality Evaluation	Air Quality Evaluation	2.00	0.75	2.75	IX
11 26	068 Develop Programs	SCAQMD Projects	Prepare Environmental Assessments	4.35	0.00	4.35	II,IV,IX
12 26	071 Develop Rules	Arch Ctgs - Admin	Rdev/Aud/DB/TA/SCAQMD/Rpts/AER	0.50	0.00	0.50	XVIII
13 26	072 Ensure Compliance	Arch Ctgs - End User	Compliance/Rpts/Rule Implementation	0.75	0.00	0.75	XVIII
14 26	073 Ensure Compliance	Arch Ctgs - Other	Compliance/Rpts/Rule Implementation	1.00	0.00	1.00	XVIII
15 26	074 Develop Rules	AB 197	AB 197	0.00	0.10	0.10	XVIII
16 26	076 Ensure Compliance	Area Sources/Compliance	Area Source Compliance	4.50	0.00	4.50	III,IV,V,IX,XV
17 26	077 Develop Rules	Area Sources/Rulemaking	Dev/Eval/Impl Area Source Prog	0.25	0.00	0.25	II,IX
18 26	083 Policy Support	Hlth Effects Air Pollution Fou	Health Effects Air Poll Foundation Support	0.10	0.00	0.10	la,II,IV
19 26	102 Develop Programs	CEQA Document Projects	Review/Prepare CEQA Comments	3.75	0.00	3.75	II,IX
20 26	104 Develop Programs	CEQA Policy Development	ID/Develop/Impl CEQA Policy	0.50	0.00	0.50	IV,IX
21 26	106 Develop Programs	CEQA Resp Agy Proj	Review CEQA Docs/Perm Proj	0.00	0.50	0.50	II,III,IX
22 26	121 Develop Programs	China Cln Shipping	China Partnership Cleaner Shpg	1.00	0.00	1.00	IX
23 26	148 Policy Support	Climate/Energy/Incentives	GHG/Climate Change Policy Development	0.50	0.00	0.50	IV,XVII
24 26	165 Develop Rules	Conformity	Monitor Transp. Conformity	0.25	0.00	0.25	V,IX
25 26	215 Ensure Compliance	AER Gen/Rev/Am/Aud	AER General/Review/Amend/Audit	11.00	-2.30	8.70	II,V
26 26	216 Ensure Compliance	AER Admin/Maint	AER Administration/Maintenance	0.00	1.00	1.00	II
27 26	217 Develop Programs	Emissions Inventory Studies	AER Hotline/Support	0.75	0.00	0.75	II,V,IX,XV
28 26	218 Develop Programs	AQMP/Emissions Inventory	Dev Emiss Inv: Forecasts/RFPs	1.25	0.00	1.25	II,IX
29 26	257 Develop Rules	Fac Based Mob Src	Facility Based Mobile Src Meas	8.25	-1.00	7.25	IX
30 26	276 Policy Support	Advisory Group/Home Rule	Governing Board Advisory Group	0.50	0.00	0.50	la
31 26	277 Policy Support	Advisory Group/AQMP	Governing Board AQMP Advisory Group	0.50	0.00	0.50	II,IX
32 26	278 Policy Support	Advisory Group/Sci,Tech,Model	Scientific/Tech/Model Peer Rev	0.40	0.00	0.40	II,IX
33 26	358 Ensure Compliance	GHG Rules-Compl	Green House Gas Rules-Compliance	1.00	0.00	1.00	IV
34 26	362 Develop Rules	Health Effects	Study Health Effect/Toxicology	0.70	-0.20	0.50	II,II,IX
35 26	368 Develop Programs	Incentive RFP Emis Red Projs	Incentive Projects Admin	1.00	0.00	1.00	XVII
36 26	385 Develop Rules	Criteria Pollutants/Mob Srcs	Dev/Impl Intercredit Trading	0.20	0.00	0.20	IV,IX
37 26	397 Develop Programs	Lead Agency Projects	Prep Envrnmt Assmts/Perm Proj	2.50	-0.50	2.00	III
38 26	416 Policy Support	Legislative Activities	Supp/Promote/Influence Legis/Adm	0.50	0.00	0.50	la
39 26	443 Monitoring Air Quality	MATES V	MATES V	1.20	-1.05	0.15	XVII
40 26	444 Monitoring Air Quality	MATES V Refinery	MATES V Refinery	0.10	0.00	0.10	XVII
41 26	445 Monitoring Air Quality	Meteorology	ModelDev/Data Analysis/Forecast	2.00	0.00	2.00	II,V,IX

**Planning, Rule Development & Area Sources (Cont.)
Work Program by Office**

Program Code	Program Category	Program	Activities	FTEs FY 2020-21	+/-	FTEs FY 2021-22	Revenue Categories
42 26	449 Develop Rules	Mob Src/SCAQMD Rulemaking	Prepare SCAQMD Mob Src rulemaking proposals	1.00	0.00	1.00	IX
43 26	451 Develop Programs	Mob Src/CARB/EPA Monitoring	CARB/US EPA Mob Src Fuel Policies	0.40	0.00	0.40	IX
44 26	452 Develop Programs	Mob Src/CEC/US DOE Monitoring	CEC/US DOE Mob Src rulemaking proposals	0.20	0.00	0.20	IX,XVII
45 26	460 Develop Rules	Regional Modeling	Rule Impact/Analyses/Model Dev	5.00	0.00	5.00	II,V,IX
46 26	461 Timely Review of Permits	Permit & CEQA Modeling Review	Review Model Permit/Risk Assmt	1.00	0.00	1.00	III
47 26	503 Develop Programs	PM Strategies	PM10 Plan/Analyze/Strategy Dev	2.00	-0.80	1.20	II,V,XV
48 26	565 Customer Service and Business Assistance	Public Records Act	Comply w/ Public Rec Requests	0.79	0.00	0.79	la
49 26	620 Ensure Compliance	Refinery Pilot Project	Refinery Pilot Project	2.80	-1.70	1.10	II
50 26	645 Ensure Compliance	Rule 1610 Plan Verification	Rule 1610 Plan Verification	0.50	0.00	0.50	V,IX
51 26	646 Develop Rules	R1180 Community Mon	R1180 Comm Monitoring Refinery	0.20	0.00	0.20	XVII
52 26	654 Develop Rules	Rulemaking/NOX	Rulemaking/NOX	0.90	2.45	3.35	II,IV,XV
53 26	655 Develop Rules	NSR/Adm Rulemaking	Amend/Develop NSR & Admin Rules	0.90	2.00	2.90	II,IV,V,XV
54 26	656 Develop Rules	Rulemaking/VOC	Dev/Amend VOC Rules	0.50	0.70	1.20	II,IV,XV
55 26	659 Develop Rules	Rulemaking/Toxics	Develop/Amend Air Toxic Rules	11.40	-1.25	10.15	II,XV
56 26	661 Develop Rules	Rulemaking/RECLAIM	RECLAIM Amend Rules/Related Is	1.50	-0.80	0.70	II
57 26	685 Develop Programs	Socio-Economic	Apply econ models/Socio-econ	4.50	0.00	4.50	II,IV
58 26	717 Policy Support	Student Interns	Gov Bd/Student Intern Program	0.50	0.00	0.50	la
59 26	745 Develop Programs	Rideshare	Dist Rideshare/Telecommute Prog	0.55	0.00	0.55	IX
60 26	788 Customer Service and Business Assistance	AB2588 Mailing/Venue	AB2588 Mailing/Venue	0.00	0.50	0.50	XVII
61 26	794 Ensure Compliance	Toxics/AB2588	AB2588/Toxics	13.00	-1.20	11.80	X
62 26	796 Ensure Compliance	AB2588/Support	AB2588/Support	0.00	0.50	0.50	X
63 26	805 Operational Support	Training	Training	0.54	0.46	1.00	lb
64 26	816 Develop Programs	Transportation Regional Progs	Dev AQMP Meas/Coord w/Reg Agn	0.75	0.00	0.75	V,IX
65 26	825 Operational Support	Union Negotiations	Official Labor/Mgmt Negotiate	0.04	0.01	0.05	la
66 26	826 Operational Support	Union Steward Activities	Rep Employees in Grievance Act	0.08	0.22	0.30	la
67 26	833 Customer Service and Business Assistance	Rule 2202 ETC Training	Rule 2202 ETC Training	2.15	0.00	2.15	XI
68 26	834 Develop Programs	Rule 2202 Implement	Rule 2202 Proc/Sub Plans/Tech Eval	1.86	0.40	2.26	XI
69 26	836 Develop Programs	Rule 2202 Support	R2202 Supt/CmptrMaint/WebSubmt	1.99	0.00	1.99	V,XI
70 26	855 Operational Support	Web Tasks	Create/edit/review web content	0.05	1.16	1.21	la

Total Planning, Rule Development, and Area Sources

148.00	-	148.00
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**Planning, Rule Development & Area Sources
Line Item Expenditure**

Major Object / Account # / Account Description		FY 2019-20 Actuals	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate *	FY 2021-22 Adopted Budget
Salary & Employee Benefits						
51000-52000	Salaries	\$ 13,869,448	\$ 14,254,554	\$ 14,256,629	\$ 14,256,629	\$ 14,402,446
53000-55000	Employee Benefits	7,695,223	8,458,911	8,458,911	8,458,911	8,971,998
Sub-total Salary & Employee Benefits		\$ 21,564,671	\$ 22,713,465	\$ 22,715,540	\$ 22,715,540	\$ 23,374,444
Services & Supplies						
67250	Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300	Rents & Leases Equipment	-	-	-	-	-
67350	Rents & Leases Structure	540	2,000	2,000	2,000	1,000
67400	Household	-	-	-	-	-
67450	Professional & Special Services	521,328	894,000	864,000	714,000	1,020,700
67460	Temporary Agency Services	48,976	20,000	30,000	30,000	20,000
67500	Public Notice & Advertising	58,246	255,300	255,300	255,300	205,000
67550	Demurrage	3,458	1,000	1,000	1,000	1,000
67600	Maintenance of Equipment	3,600	5,000	5,000	5,000	2,500
67650	Building Maintenance	-	1,000	1,000	1,000	1,000
67700	Auto Mileage	3,629	8,500	8,500	8,500	4,000
67750	Auto Service	-	-	-	-	-
67800	Travel	49,223	70,000	70,000	70,000	50,000
67850	Utilities	-	-	-	-	-
67900	Communications	23,413	50,000	50,000	50,000	40,584
67950	Interest Expense	-	-	-	-	-
68000	Clothing	1,180	1,500	1,500	1,500	1,500
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	62,730	100,000	100,000	100,000	60,000
68100	Office Expense	148,871	161,484	161,484	161,484	160,000
68200	Office Furniture	-	-	-	-	-
68250	Subscriptions & Books	2,291	2,000	2,000	2,000	2,500
68300	Small Tools, Instruments, Equipment	-	-	-	-	-
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	14,725	25,000	25,000	25,000	25,000
69550	Memberships	298	4,000	4,000	4,000	4,000
69600	Taxes	-	-	-	-	-
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	27,732	125,000	115,000	115,000	125,000
69750	Prior Year Expense	(1,231)	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		\$ 969,007	\$ 1,725,784	\$ 1,695,784	\$ 1,545,784	\$ 1,723,784
77000	Capital Outlays	\$ -	\$ -	\$ -	\$ -	\$ 70,000
79050	Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures		\$ 22,533,678	\$ 24,439,249	\$ 24,411,324	\$ 24,261,324	\$ 25,168,228

* Estimates based on July 2020 through February 2021 actual expenditures and February 2021 budget amendments.

SCIENCE & TECHNOLOGY ADVANCEMENT

MATT MIYASATO

CHIEF TECHNOLOGIST/DEPUTY EXECUTIVE OFFICER

At a Glance:	
FY 2020-21 Adopted Budget	\$37.3M
FY 2021-22 Adopted Budget	\$39.8M
% of FY 2021-22 Adopted Budget	22.1%
Total FTEs FY 2021-22 Adopted Budget	235

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 Technology Advancement Office (TAO) implements the Clean Fuels Program to commercialize advanced low- and zero-emission technologies and incentive programs such as the AB 617 Community Air Protection (CAP), Carl Moyer, Lower-Emission School Bus, Volkswagen Mitigation Program (VMP), and Proposition 1B-Goods Movement programs (Prop 1B). TAO is also responsible for the administration and implementation of the Enhanced Fleet Modernization Program (EFMP), residential/commercial lawn and garden rebate and residential/school air filtration programs. Staff also provides support for the Mobile Source Air Pollution Reduction Review Committee (MSRC), and Best Available Control Technology programs (BACT). The Monitoring & Analysis Division maintains the South Coast AQMD's (District) ambient air monitoring network, maintains a Federal enhanced particulate monitoring network, operates the Rule 1180 refinery community air monitoring network, operates the analytical laboratory, conducts source tests and evaluations, conducts local community monitoring in areas of concern, 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 District's incident response program, wildfire, and special monitoring projects for the agency.

ACCOMPLISHMENTS:

RECENT:

- Continued the implementation of the Carl Moyer, Surplus Off-Road Opt-In for NOx (SOON), Lower-emission School Bus (LESB), AB 617 CAP incentives, Funding Agricultural Replacement Measures for Emission Reductions (FARMER), VMP, EFMP and the Prop 1B programs with total funding exceeding \$200 million. Implemented program efficiencies for the EFMP in 2020, resulting in a total of 1,767 vouchers funded totaling \$14.48 million in expenditures. For the VMP, worked closely with CARB and the other administering air districts to execute the grant agreement for \$165 million in funding, completed the Implementation Manual, and released the first solicitation for the Combustion Freight and Marine Projects Category, awarding \$5 million in funding to entities statewide.

SCIENCE & TECHNOLOGY ADVANCEMENT (cont.)

Implemented the Voucher Incentive Program (VIP) for replacement of on-road trucks on a first-come-first-served basis. Supported AB 617 Community Steering Committee meetings with summaries of incentives and technologies, including potential future strategies.

- Continued the Clean Fuels (CF) program, which is the research, development, demonstration and deployment program for the District. Board approved over \$68 million in projects, comprising of \$7.6 million in CF funds and \$12.1 million in awards from federal and state solicitations, and \$48.3 million in partners cost share; CF funds were leveraged with a ratio of 1:12. Projects in key technical areas include heavy-duty electric drive technologies, near-zero emission medium and heavy-duty engines, in-use emissions testing of HD trucks, local renewable natural gas production, and refueling infrastructure for alternative fuels (natural gas, electricity and hydrogen). Applied for and received \$35 million in CARB and USEPA grants for developing and demonstrating heavy duty electric and fuel cell technologies, as well as emission control systems for tanker vessels.
- Supported the development and demonstration of emission control technologies for marine and ocean-going vessels (OGV). Engaged the technology developers and vessel operators who have expertise in the area of shipping, engine technologies, emission control technologies to develop innovative technologies that will result in reducing emissions. Applied and awarded \$11.4M U.S. EPA Targeted Airshed grant (TAG) for an OGV emission reduction project.
- Updated BACT Guidelines including updates to major and minor source policy and procedures in addition to Lowest Achievable Emission Rate (LAER) BACT determinations.
- Participated and provided input in the development of CARB's AB 617 BACT/Best Available Retrofit Control Technology (BARCT) Clearinghouse web-based portal.
- Continued research, development, demonstration and deployment of in-basin renewable energy and microgrid projects, including fuel cells, solar photovoltaic, energy storage and low NOx combustion technologies.
- Continued to assess ambient air quality in the Basin, operated and maintained approximately 42 air monitoring sites resulting in 275,940 valid pollutant data points per month, collected and analyzed over 270 canisters and collected 5,760 hourly data points for ambient Volatile Organic Compounds (VOCs) and toxics and over 10,640 filters for components including mass, ions, carbon and metals. This 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. This data 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.
- Performed audits of field and laboratory test methods in support of federal monitoring programs and including "in-house" audits for air toxics; Performed 2019 data certification and review.
- Continued the District's semiannual audit program to improve quality assurance of lead (Pb), PM10 and PM2.5 measurements performed by District staff. Participated in the U.S. EPA Technical Systems Audit (TSA) for the criteria pollutant program.
- Continued special monitoring efforts to address community concerns and better characterize emissions from oil reclamation activities, metal finishing, metal forging and

SCIENCE & TECHNOLOGY ADVANCEMENT (cont.)

recycling, battery recycling facilities, oil and gas operations, and an asphalt facility. Also maintained monitoring efforts near the Salton Sea measuring hydrogen sulfide, PM10 and winds 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 880 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.
- Finalized 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. Began and continued conducting 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.
- Continued the evaluation of commercially available low-cost air quality sensors in the field and laboratory within the AQ-SPEC program. Developed a scientifically robust protocol for using sensor technology to conduct mobile measurements of air pollution based upon previous work conducted in collaboration with Google Outreach to test the performance of PM2.5, O3 and CO2 sensors on a mobile platform.
- Developed a mobile platform to conduct mobile sensor testing as part of the AQ-SPEC program.
- Installed a second testing chamber that will be used to implement a sensor library program.
- Deployed different particle and gas sensors in small networks for specific applications. A network of nine particle sensors has been operating at the fence line of Rainbow Environmental in Huntington Beach to monitor fugitive emissions of PM2.5 and PM10 from this facility in real time. An additional 90 sensors have been installed throughout the Los Angeles Air Basin for Phase II of 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 and surface PM, ultimately leading to better observations of air quality from space. As part of the U.S. EPA Science to Achieve Results (STAR) Grant project, approximately 350 sensors have been installed to monitor and measure particulate matter at the community level in 14 communities in the State of California.
- Supported AB 617 community outreach efforts and community steering group orientation by participating in multiple community meetings for the three “Year One” AB 617 communities and two “Year Two” AB 617 communities. Continued implementation of Community Air Monitoring Plans (CAMP) tailored to each “Year One” community based on the information gathered from Community Steering Committees (CSC) and considering the past and current air monitoring efforts in those communities. Air monitoring methodologies implemented include a combination of mobile monitoring, real- (or near-real-) time and time-integrated measurements at fixed monitoring stations, and development of sensor networks to provide information on the air pollution impact caused by specific emission sources. Work with the CSC and other stakeholders to develop a CAMP for each “Year Two” community.

SCIENCE & TECHNOLOGY ADVANCEMENT (cont.)

- Continued the development of state-of-the-art mobile platforms that use advanced measurement technologies to conduct highly resolved ambient concentration of criteria pollutants and air toxics. These mobile platforms are ideal for surveying large areas in a relatively short period of time, identifying pollution hotspots and sources that were previously unknown, providing valuable data for actionable consideration, and informing emission reduction efforts.
- Continued the development of a comprehensive data platform for acquiring, validating, analyzing and mapping air measurement data from the various air monitoring technologies, including real- (and near-real-) time and time-integrated measurements.
- Continued quarterly implementation of a Community Scale Project funded by the U.S.EPA and used ORS technologies for emission measurements in the Carson/Wilmington/Long Beach areas to characterize and quantify emissions from refineries and to assess their impact on surrounding communities.
- Continued efforts to maintain a network of 31 samplers for the Department of Homeland Security. Approximately 11,315 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 the District Incident and Nuisance Response efforts, including recent wildfire smoke incidents.
- Continued to update the Emissions Quantification and Testing Evaluation (EQUATE) group as per the Governing Board resolution to the recent Regulation III amendments to provide input on the source test review process assessment. Continued providing support for the development of an electronic source test submission portal and tracking dashboard.
- Worked with each major refinery in the Basin and the Western States Petroleum Association (WSPA) to finalize refinery fence-line air monitoring plans and develop quality assurance project plans, with an emphasis on fence-line coverage, data display to the public, public notifications and quality assurance/quality control (QA/QC). Continued working with the refineries on the remaining elements of their plans including communication of data and notifications. Provided formal review and feedback to Rule 1180 Refinery Fence-line monitoring plans.
- Deployed six additional Rule 1180 community air monitoring stations and began live data reporting for selected pollutants.
- Developed and implemented a web-based grant management system for incentive programs, including VMP and Prop 1B, to streamline the application process for applicants and enhance review process for staff.

ANTICIPATED:

- Incorporate and implement recommendations by the Inclusion, Diversity and Equity Advisory Panel into promotional and hiring practices.
- Seek opportunities such as student internships and educational outreach to provide opportunities that can lead to relevant experience for specialized technical careers.
- Continue to assess, revise and implement the Continuity of Operations (COOP) plan, including recent modifications in response to the COVID-19 worldwide pandemic. Develop procedures for Source Test Engineering field testing that incorporate social

SCIENCE & TECHNOLOGY ADVANCEMENT (cont.)

distancing and safe practices. Facilitate a safe, efficient and effective transition from a large scale telework environment and evaluate the long-term teleworking policy.

- Continue the development and demonstration of heavy-duty (HD) zero emission cargo transport trucks and off-road equipment and initiate the development and demonstration of zero emission goods movement corridors. Additionally, develop and demonstrate EV and hydrogen infrastructure supported by energy storage, onsite generation and microgrids to enable large deployments of zero emission HD trucks.
- Continue the development of the Solar Buydown Program for low-income communities, previously placed on hold until appropriate funding source is identified.
- 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, and infrastructure for zero- and near-zero-emission vehicles for the Carl Moyer Program, identify and obtain community support for projects to be funded by CAP incentives and initiate contracting for these projects, continue EFMP implementation and processing over 200 vouchers per month, and obligate all remaining Prop 1B Program funds awarded to the District. Also, issue grants for the replacement of school buses with lower and zero emission buses under the LESB program. Develop and implement the Zero-Emissions Class 8 Truck and Combustion categories under CARB's VMP and rerelease the Combustion Freight Category for On-Road Trucks.
- Conduct targeted outreach for incentive programs such as Commercial Lawn & Garden, Prop 1B, with a focus on small businesses.
- Continue periodic updates to the BACT Guidelines specifically major and minor source policy and procedures and LAER/BACT determinations.
- Conduct a BACT technical assessment for flares receiving biogas derived from advanced digestion and/or organic waste digestion or codigestion that considers costs, review of the current scientific literature, existing measurement methods, technology achieved in-practice, reliability issues, and if necessary, field testing. Report back to the Stationary Source Committee within 12 months of rule adoption to present findings and potential recommendations and amend the BACT Guidelines and Rule 1118.1, if necessary.
- Continue to participate in the development of CARB's AB 617 BACT/BARCT web-based portal.
- Continue research, development, demonstration and deployment of low NOx combustion technologies (0.01 g/bhp-hr), renewable energy and microgrid projects.
- Develop and implement grant management databases for tracking of demonstration and implementation projects.
- Increase deployment of cleaner construction equipment, locomotives, marine (including OGV), and on-road HD vehicles through the continued implementation of funding incentive programs to meet emission reduction goals in the AQMP.
- Continue to apply for funding opportunities from local, state, and federal programs.
- Provide monitoring, source testing, and analysis for rule development related to upcoming amendments for Rules 1407.1 and 218d.
- Continue source test protocol and report evaluations, CEMS certifications, LAP application reviews and source test observations. Increase throughput on source test evaluations anticipated due to RECLAIM (Regional Clean Air Incentives Market) sunset and permit streamlining efforts.

SCIENCE & TECHNOLOGY ADVANCEMENT (cont.)

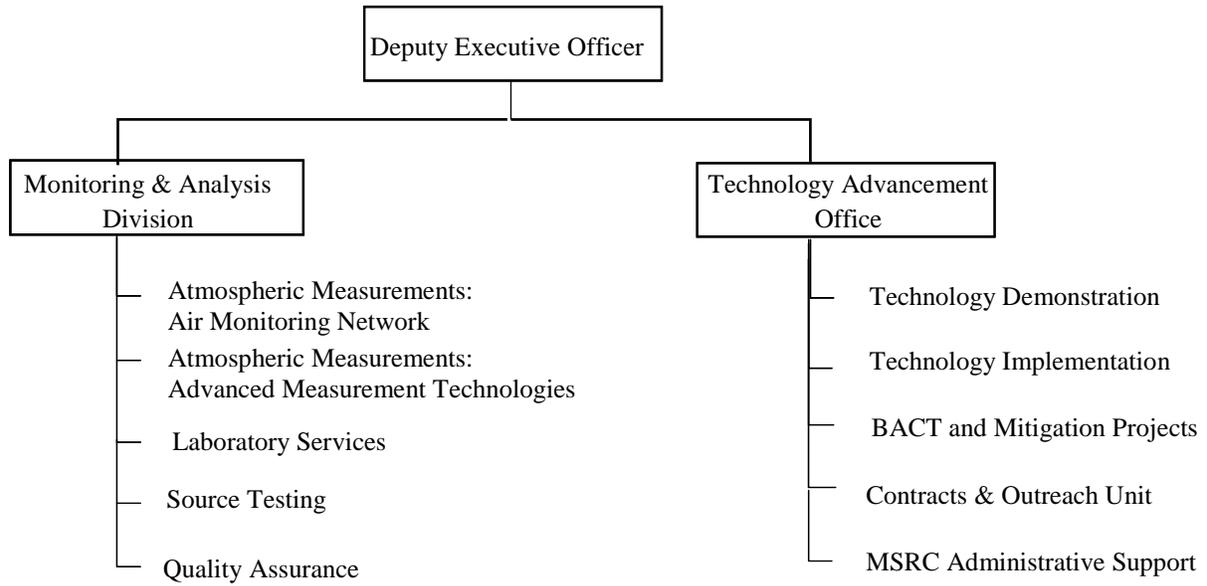
- Provide support for the completion and implementation of the source test submittal portal and tracking dashboard per the 2019 Governing Board resolution to recent Regulation III amendments.
- Evaluate source test review process and develop and implement an electronic source test submission portal and tracking dashboard.
- Facilitate an ammonia CEMS demonstration project to evaluate whether sources of ammonia can be continuously monitored for emissions. If the demonstration is successful, develop a procedure for validating the CEMS.
- Support the contract implementation for a SEP to conduct air monitoring in communities near the Aliso Canyon natural gas facility.
- Participate in outreach meetings and develop the CAMP for Year Three community (South Los Angeles). Start conducting mobile and fixed monitoring in both Year Two AB 617 communities (South East Los Angeles and East Coachella Valley), continue measurements in three Year One communities (Wilmington, Carson, West Long Beach; San Bernardino Muscoy; and East Los Angeles) as part of their respective CAMP implementation.
- Continue working with the refineries towards approval of their Rule 1180 fenceline air monitoring plans. Continue to oversee the implementation of the refinery fenceline air monitoring systems, public data website and public notification systems developed and implemented by each refinery. Work with each refinery on implementing robust QA/QC of their fenceline air monitoring systems.
- Operate and maintain refinery-related community air monitoring as required under Rule 1180.
- Support the operation of optical tent for real-time monitoring of Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) at the Phillips 66 Wilmington refinery.
- Continue operation and development of the District's air monitoring network and special monitoring efforts critical to the District operations. This includes continued compliance verification and rule development, monitoring efforts in Paramount, West Rancho Dominguez, and Irvine.
- Continued development and implementation of mobile surveying methods to assess pollutants in a large area in a short amount of time.
- Continue to refine the ozone monitoring strategy for the U.S. EPA PAMS program to provide more relevant and robust data sets for VOCs that are ozone precursors. Continue to develop concepts for additional specialized studies or ongoing measurements that would provide information to guide future pollution reduction efforts.
- 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 and data confidence improvement by investing in latest software, automated instruments and equipment and other workflow streamlining efforts.
- Continue to enhance and modernize the District's ambient monitoring network, telemetry system and data management system that receives and validates the incoming data from the air monitoring stations and special monitoring locations to additionally include AB 617 data.

SCIENCE & TECHNOLOGY ADVANCEMENT (cont.)

- Continue to assess and oversee operational integrity, efficiency and quality assurance through monthly internal audits of laboratory and field monitoring stations. Prepare for and participate in the U.S. EPA NATTS Technical System Audit.
- Continue with full-scale testing of air quality sensors in AQ-SPEC and share testing results with the public. Expand AQ-SPEC program to include sensor performance testing on a mobile platform. Finalize installation of a second sensor testing chamber to implement sensor library program. Develop concept for performance verification and/or certification of low-cost particle and gaseous sensors.
- Deploy and pilot several air quality sensor networks for the purpose of developing new low-cost monitoring capabilities for the District, regulated entities, and the public. Continue to implement the goals and objectives of the 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 in collaboration with CAPCOA agencies and environmental justice groups and communities.
- 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 District’s current measurement toolbox.
- Monitor smoke from prescribed burns that have been scheduled by the U.S Forest Service in the San Bernardino National Forest and San Jacinto Mountain Range.

SCIENCE & TECHNOLOGY ADVANCEMENT (cont.)

ORGANIZATIONAL CHART:



POSITION SUMMARY: 235 FTEs

Science & Technology Advancement Units	Amended FY 2020-21	Change	Budget FY 2021-22
Office Administration	14	-	14
Monitoring & Analysis	160	(2)	158
Technology Advancement	57	6	63
Total	231	4	235

SCIENCE & TECHNOLOGY ADVANCEMENT (cont.)

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
25	Air Quality Chemist
10	Air Quality Engineer II
4	Air Quality Inspector II
22	Air Quality Instrument Specialist I
26	Air Quality Instrument Specialist II
34	Air Quality Specialist
2	Assistant Deputy Executive Officer/Science & Technology Advancement
3	Atmospheric Measurement Manager
14	Contracts Assistant
1	Chief Technologist/Deputy Executive Officer
1	Director Monitoring & Analysis
6	Laboratory Technician
1	Meteorologist Technician
1	Monitoring Operations Manager
4	Office Assistant
2	Planning and Rules Manager
4	Principal Air Quality Chemist
2	Principal Air Quality Instrument Specialist
20	Program Supervisor
6	Secretary
3	Senior Administrative Secretary
11	Senior Air Quality Chemist
4	Senior Air Quality Engineer
11	Senior Air Quality Instrument Specialist
1	Senior Enforcement Manager
5	Senior Office Assistant
1	Senior Public Affairs Manager
1	Senior Public Information Specialist
2	Senior Staff Specialist
1	Source Testing Manager
2	Staff Assistant
3	Staff Specialist
1	Supervising Air Quality Engineer
<u>1</u>	Technology Implementation Manager
235	Total FTEs

**Science & Technology Advancement
Work Program by Office**

Program Code	Program Category	Program	Activities	FTEs FY 2020-21 +/-	FTEs FY 2021-22 +/-	Revenue Categories		
1 44	003	Advance Clean Air Technology	AB2766/MSRC	Mob Src Review Comm Prog Admin	0.50	0.50	IX	
2 44	004	Advance Clean Air Technology	Advisory Group/Small Business	AB2766 Admin Discretionary Prog	3.00	3.00	IX	
3 44	009	Develop Programs	AB 1318 Mitigation	AB 1318 Projects Admin/Impl	0.05	0.05	XVII	
4 44	012	Advance Clean Air Technology	AQMP/Control Tech Assessment	Tech Supp: Quantify Cost Effec	1.00	-0.15	0.85	VIII
5 44	015	Ensure Compliance	Acid Rain Program	Acid Rain CEMS Eval/Cert	0.20	0.00	0.20	II,IV
6 44	019	Monitoring Air Quality	AB617-Prog Develop	AB617-Program Development	0.00	39.60	39.60	IX
7 44	030	Advance Clean Air Technology	AB134	AB134	5.00	-1.00	4.00	IX
8 44	035	Monitoring Air Quality	AB617-General	AB617-General	0.50	-0.50	0.00	IX
9 44	036	Monitoring Air Quality	AB617-Monitoring	AB617-Monitoring	39.00	-39.00	0.00	IX
10 44	038	Monitoring Air Quality	Admin/Office Mgmt/Monitoring	Overall Program Mgmt/Coord	0.90	0.00	0.90	lb
11 44	039	Advance Clean Air Technology	Admin/Office Mgt/Tech Adv	Admin Support/Coordination	0.77	0.00	0.77	VIII
12 44	041	Policy Support	Admin/Office Mgmt/Policy Supp	Overall Policy Supp/Mgmt/Coord	0.49	0.00	0.49	lb
13 44	042	Ensure Compliance	Admin/Office Mgmt/Compliance	Compliance: Assign/Manage/Supp	0.37	0.00	0.37	lb
14 44	043	Develop Rules	Admin/Office Mgmt/Rules	Rules: Assign/Manage/Supp	0.15	0.00	0.15	lb
15 44	046	Monitoring Air Quality	Admin/Program Management	STA Program Administration	2.00	0.00	2.00	lb
16 44	048	Advance Clean Air Technology	Admin/Prog Mgmt/Tech Advance	Overall TA Program Mgmt/Coord	1.55	0.00	1.55	VIII
17 44	063	Monitoring Air Quality	Ambient Air Analysis	Analyze Criteria/Tox/Pollutants	8.91	-2.00	6.91	II,V,IX
18 44	064	Monitoring Air Quality	Ambient Network	Air Monitoring/Toxics Network	20.55	1.00	21.55	II,IV,V,IX
19 44	065	Monitoring Air Quality	Air Quality Data Management	AM Audit/Validation/Reporting	1.00	0.00	1.00	II,V,IX
20 44	067	Monitoring Air Quality	Ambient Lead Monitoring	Lead Monitoring/Analysis/Reporting	0.50	0.00	0.50	IV
21 44	069	Develop Programs	AQIP Evaluation	AQIP Contract Admin/Evaluation	0.10	0.00	0.10	IX
22 44	072	Ensure Compliance	Arch Ctgs - End User	Sample Analysis/Rpts	2.00	0.00	2.00	XVIII
23 44	073	Monitoring Air Quality	Arch Ctgs - Other	Sample Analysis/Rpts	2.00	0.00	2.00	XVIII
24 44	079	Monitoring Air Quality	AQ SPEC	AQ SPEC	6.19	0.00	6.19	XVII
25 44	081	Monitoring Air Quality	Air Filtration EPA	Air Filtration EPA/Admn/Impl	0.15	-0.05	0.10	V
26 44	082	Monitoring Air Quality	Air Filtration Other	Air Filtration Other/Admn/Impl	0.10	0.10	0.20	XVII
27 44	086	Advance Clean Air Technology	Airshed FC Bus	Airshed FC Bus	0.00	0.25	0.25	V
28 44	087	Advance Clean Air Technology	Airshed OGV	Airshed OGV	0.00	0.25	0.25	V
29 44	088	Advance Clean Air Technology	Aliso Canyon SEP	Aliso Cyn Air Filtration SEP	0.00	0.25	0.25	XVII
30 44	095	Advance Clean Air Technology	CA Natural Gas Veh Partnership	CA Natural Gas Veh Partnership	0.10	-0.05	0.05	VIII
31 44	096	Advance Clean Air Technology	CAPP Year 2-SB 856	CAPP Year 2-SB 856	0.00	7.75	7.75	IX
32 44	097	Advance Clean Air Technology	CAPP Year 3-AB 74	CAPP Year 3-AB 74	0.00	3.00	3.00	IX
33 44	105	Ensure Compliance	CEMS Certification	CEMS Review/Approval	5.00	0.00	5.00	II,III,VI
34 44	121	Advance Clean Air Technology	China Cln Shipping	China Partnership Cleaner Shpng	0.90	-0.50	0.40	IX
35 44	130	Advance Clean Air Technology	Clean Fuels/Contract Admin	Admin/Project Supp for TA Cont	3.90	-0.90	3.00	VIII
36 44	132	Advance Clean Air Technology	Clean Fuels/Mobile Sources	Dev/Impl Mobile Src Proj/Demo	1.00	5.00	6.00	VIII
37 44	134	Advance Clean Air Technology	Clean Fuels/Stationary Combust	Dev/Demo Clean Combustion Tech	0.30	-0.10	0.20	VIII
38 44	135	Advance Clean Air Technology	Clean Fuels/Stationary Energy	Dev/Demo Alt Clean Energy	0.55	0.00	0.55	VIII
39 44	136	Advance Clean Air Technology	Clean Fuels/Tech Transfer	Disseminate Low Emiss CF Tech	1.80	-0.80	1.00	VIII
40 44	175	Ensure Compliance	DB/Computerization	Develop Systems/Database	0.44	0.00	0.44	II,IV,VI
41 44	187	Advance Clean Air Technology	DERA Sch Bus Repl	DERA Sch Bus Repl Admin/Impl	0.10	-0.10	0.00	V
42 44	188	Advance Clean Air Technology	DERA FY 13 Veh Repl	DERA Vehicle Repl Admin/Impl	0.10	-0.10	0.00	XVII
43 44	191	Advance Clean Air Technology	DERA FY16 Locomotive	DERA FY16_LOCOM	0.00	0.05	0.05	V
44 44	194	Advance Clean Air Technology	DERA FY18 Dray Trck	DERA FY18 Dray Trck	0.00	0.10	0.10	XVII
45 44	196	Advance Clean Air Technology	DERA FY20 TRU	DERA FY20 TRU Electrification	0.00	0.45	0.45	V

**Science & Technology Advancement (Cont.)
Work Program by Office**

#	Program Code	Program Category	Program	Activities	FTEs		+/-	Revenue Categories	
					FY 2020-21	FY 2021-22		FY 2020-21	FY 2021-22
46	44	203	Advance Clean Air Technology	EFMP Program Support	5.00	0.00	0.00	5.00	XVII
47	44	248	Monitoring Air Quality	EPA Community Scale AQ-SPEC	1.00	0.00	0.00	1.00	V,XVII
48	44	258	Advance Clean Air Technology	FARMER Grant	1.50	0.00	0.00	1.50	XVII
49	44	272	Advance Clean Air Technology	FY19 TAG Volvo	0.00	0.25	0.25	0.25	V
50	44	276	Policy Support	Advisory Group/Technology Adva	0.10	-0.05	-0.05	0.05	VIII
51	44	356	Advance Clean Air Technology	GGRF ZEDT Demo	1.10	-0.70	-0.70	0.40	XVII
52	44	368	Develop Programs	Incentive RFP Emis Red Projs	3.00	-2.75	-2.75	0.25	XVII
53	44	369	Advance Clean Air Technology	In Use Em Testing	0.00	0.30	0.30	0.30	XVII
54	44	396	Develop Programs	Lawnmower Exchange	0.30	0.00	0.00	0.30	XVII
55	44	410	Policy Support	Legislation	0.50	0.00	0.00	0.50	IX
56	44	450	Ensure Compliance	Microscopic Analysis	3.00	0.00	0.00	3.00	VI
57	44	453	Advance Clean Air Technology	Mob Src: Emiss Inven Method	1.50	-1.50	-1.50	0.00	VIII,IX
58	44	456	Develop Rules	MS & AQMP Control Strategies	0.30	0.00	0.00	0.30	VIII
59	44	457	Advance Clean Air Technology	Mob Src/C Moyer Adm/Outreach	13.90	-6.00	-6.00	7.90	IX
60	44	458	Develop Programs	Mobile Source Strategies	1.00	0.00	0.00	1.00	VIII
61	44	459	Advance Clean Air Technology	Mob Src/C Moyer/Imp/Prgr Dev	4.00	0.25	0.25	4.25	IX
62	44	460	Advance Clean Air Technology	VIP Admin	0.50	0.00	0.00	0.50	IX
63	44	468	Monitoring Air Quality	NATTS(Natl Air Tox Trends Sta)	1.00	0.00	0.00	1.00	II,V,IX
64	44	489	Advance Clean Air Technology	One Stop Shop Proj	0.00	0.10	0.10	0.10	IX
65	44	500	Ensure Compliance	PM2.5 Program	10.30	0.00	0.00	10.30	II,V,IX
66	44	505	Monitoring Air Quality	PM Sampling Program (DHS)	8.41	0.00	0.00	8.41	V
67	44	507	Monitoring Air Quality	PM Sampling Spec	0.10	0.00	0.00	0.10	V
68	44	530	Monitoring Air Quality	Photochemical Assessment	3.00	0.00	0.00	3.00	V,IX
69	44	533	Advance Clean Air Technology	POLB AMECS Demo	0.10	0.00	0.00	0.10	XVII
70	44	542	Develop Programs	Prop 1B:Goods Movement	2.00	0.95	0.95	2.95	IX
71	44	545	Timely Review of Permits	Protocols/Reports/Plans	0.10	0.00	0.00	0.10	III,IV
72	44	546	Timely Review of Permits	Protocols/Reports/Plans	6.15	0.00	0.00	6.15	IV,VI
73	44	565	Customer Service and Business Assistance	Public Records Act	0.62	0.00	0.00	0.62	la
74	44	585	Monitoring Air Quality	Quality Assurance	6.00	0.00	0.00	6.00	II,V,IX
75	44	646	Monitoring Air Quality	R1180 Community Mon	14.00	-1.00	-1.00	13.00	XVII
76	44	653	Develop Rules	Rulemaking/BACT	1.50	0.00	0.00	1.50	II
77	44	657	Develop Rules	Rulemaking/Support PRA	1.20	0.00	0.00	1.20	II
78	44	663	Monitoring Air Quality	Salton Sea Monit	0.25	0.00	0.00	0.25	XVII
79	44	677	Advance Clean Air Technology	School Bus/Lower Emission Prog	2.00	0.20	0.20	2.20	IX
80	44	700	Ensure Compliance	Source Testing/Compliance	2.25	0.00	0.00	2.25	VI
81	44	701	Customer Service and Business Assistance	Source Testing/Customer Svc	0.05	0.00	0.00	0.05	VI
82	44	702	Develop Programs	ST Methods Development	0.95	0.00	0.00	0.95	II
83	44	704	Ensure Compliance	ST Sample Analysis/Compliance	4.00	0.00	0.00	4.00	VI
84	44	705	Develop Programs	ST Sample Analysis/Air Program	0.25	0.00	0.00	0.25	II
85	44	706	Develop Rules	ST Sample Analysis/Air Program	0.25	0.00	0.00	0.25	II
86	44	707	Ensure Compliance	VOC Sample Analysis/Compliance	6.50	0.00	0.00	6.50	IV,XV
87	44	708	Develop Rules	VOC Sample Analysis/Rules	0.25	0.00	0.00	0.25	II,XV

**Science & Technology Advancement (Cont.)
Work Program by Office**

#	Program Code	Program Category	Program	Activities	FTEs FY 2020-21	+/-	FTEs FY 2021-22	Revenue Categories
88	44	715	Monitoring Air Quality	Emergency Response	0.50	0.00	0.50	II
89	44	716	Ensure Compliance	Spec Monitoring/Emerg Response	2.20	0.00	2.20	III, IV, IX, XV
90	44	725	Timely Review of Permits	Special Monitoring	0.35	0.00	0.35	III
91	44	734	Advance Clean Air Technology	Permit Processing/Support E&C	0.00	0.25	0.25	V
92	44	737	Advance Clean Air Technology	Air Shed Volvo	0.00	0.40	0.40	V
93	44	738	Advance Clean Air Technology	Air Shed Daimler	0.50	0.00	0.50	V, XVII
94	44	740	Advance Clean Air Technology	Target Air Shed EPA	0.25	0.00	0.25	VIII
95	44	741	Advance Clean Air Technology	Tech Adv/Commercialization	0.60	-0.40	0.20	VIII
96	44	794	Ensure Compliance	Tech Adv/Non-Combustion	2.00	0.00	2.00	X
97	44	795	Ensure Compliance	Toxics/AB2588	1.30	0.00	1.30	VI, X
98	44	816	Advance Clean Air Technology	Toxics/Engineering	0.10	0.00	0.10	VIII
99	44	825	Operational Support	Transportation Research	0.05	0.00	0.05	la
100	44	826	Operational Support	Union Negotiations	0.05	0.00	0.05	la
101	44	827	Advance Clean Air Technology	Union Steward Activities	2.00	0.75	2.75	XVII
102	44	840	Advance Clean Air Technology	VW-General Admin	1.00	0.00	1.00	XVII
103	44	841	Advance Clean Air Technology	VW-ZE Trucks-South Coast	1.00	0.00	1.00	XVII
104	44	856	Advance Clean Air Technology	VW-Combustion-South Coast	0.00	0.40	0.40	XVII
				ZANZEFF Volvo				

Total Science & Technology Advancement

231.00	4.00	235.00
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Science & Technology Advancement Line Item Expenditure						
Major Object / Account # / Account Description		FY 2019-20 Actuals	FY 2020-21 Adopted Budget	FY 2020-21 Amended Budget	FY 2020-21 Estimate *	FY 2021-22 Adopted Budget
Salary & Employee Benefits						
51000-52000	Salaries	\$ 18,816,275	\$ 20,155,907	\$ 20,188,691	\$ 19,865,287	\$ 21,522,658
53000-55000	Employee Benefits	10,736,256	12,135,074	12,135,074	11,891,102	12,847,982
Sub-total Salary & Employee Benefits		\$ 29,552,531	\$ 32,290,980	\$ 32,323,765	\$ 31,756,389	\$ 34,370,639
Services & Supplies						
67250	Insurance	\$ -	\$ -	\$ 25,000	\$ 25,000	\$ -
67300	Rents & Leases Equipment	83,321	36,800	72,537	72,537	36,800
67350	Rents & Leases Structure	350,209	443,000	641,735	641,735	443,000
67400	Household	1,519	500	2,500	2,500	500
67450	Professional & Special Services	490,084	1,705,000	2,191,118	2,191,118	1,705,000
67460	Temporary Agency Services	451,816	141,600	368,900	368,900	141,600
67500	Public Notice & Advertising	14,779	22,000	55,193	55,193	22,000
67550	Demurrage	75,524	55,000	80,772	80,772	55,000
67600	Maintenance of Equipment	691,060	205,000	622,475	622,475	205,000
67650	Building Maintenance	180,398	170,000	232,892	232,892	170,000
67700	Auto Mileage	67,149	18,909	106,416	106,416	18,909
67750	Auto Service	8,216	-	1,500	1,500	-
67800	Travel	43,613	48,403	121,398	121,398	48,403
67850	Utilities	2,672	30,000	36,000	36,000	30,000
67900	Communications	393,163	431,000	472,565	472,565	431,000
67950	Interest Expense	-	-	-	-	-
68000	Clothing	11,577	4,000	7,220	7,220	4,000
68050	Laboratory Supplies	446,269	545,000	588,827	525,607	545,000
68060	Postage	24,891	17,318	62,368	62,368	17,318
68100	Office Expense	392,766	66,393	314,801	314,801	66,393
68200	Office Furniture	45,774	-	24,774	24,774	-
68250	Subscriptions & Books	467	1,527	2,027	2,027	1,527
68300	Small Tools, Instruments, Equipment	275,095	162,246	256,254	256,254	162,246
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	45,106	107,000	69,400	69,400	107,000
69550	Memberships	101,545	2,250	168,250	168,250	2,250
69600	Taxes	1,851	2,000	2,000	2,000	2,000
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	14,423	2,600	21,970	21,970	2,600
69750	Prior Year Expense	(4,900)	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		\$ 4,208,389	\$ 4,217,546	\$ 6,548,892	\$ 6,485,672	\$ 4,217,546
77000	Capital Outlays	\$ 7,292,849	\$ 816,000	\$ 1,422,487	\$ 1,422,487	\$ 1,203,000
79050	Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures		\$ 41,053,769	\$ 37,324,526	\$ 40,295,144	\$ 39,664,548	\$ 39,791,185

* Estimates based on July 2020 through February 2021 actual expenditures and February 2021 budget amendments.

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South Coast AQMD 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 17,150,993 (2019)
 - 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 – 14,078,942 (2019); Average Daily Miles Traveled Per Vehicle – 28 (2019)
 - 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 (2019) and more than 17 million 20-foot long container units or 20-foot equivalent units (TEUs) annually (2019)
- 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 (25,984 operating locations with 67,971 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 South Coast AQMD
 - 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 Ten Fiscal Years**

<u>Program Category</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Advance Clean Air Technology										
Contracts awarded	526	556	938	523	1,047	421	403	357	564	349
Total Funding awarded (\$M)	\$131.4	\$82.5	\$207.2	\$216.1	\$123.2	\$153.9	\$137.4	\$170.4	\$213.0	\$127.9
Ensure Compliance with Clean Air Rules										
Inspections	33,560	34,191	32,535	29,501	22,871	24,037	21,419	24,695	24,289	27,595
Notices of Violations	1,254	1,211	965	956	811	499	632	1,626	2,724	2,076
Hearing Board Orders for Abatement	47	93	51	46	411	23	27	24	29	26
Hearing Board Appeals	2	7	3	7	-	3	3	1	2	3
Customer Service										
Public Information Requests	3,410	3,543	3,460	4,505	4,012	4,958	5,282	4,676	4,830	3,416
Community/Public Meetings attended	190	274	294	264	217	239	210	156	193	144
Small Business Assistance Contacts	2,497	2,574	2,266	1,850	1,711	1,865	2,834	4,073	3,043	3,357
Develop Programs to Achieve Clean Air										
Transportation Plans processed	1,385	1,392	1,371	1,333	1,329	1,337	1,348	1,356	1,357	1,335
Emission Inventory Updates	521	530	408	460	336	356	244	343	294	269
Develop Rules to Achieve Clean Air										
Rules Developed	40	8	20	24	24	16	15	28	44	14
Monitoring Air Quality										
Samples Analyzed by the Laboratory	28,915	29,520	32,520	29,340	30,824	32,400	38,541	36,342	33,258	30,225
Source Testing Analyses/Evaluations/Reviews	1,030	952	1,035	968	996	936	952	714	632	562
Timely Review of Permits										
Applications Processed	13,044	12,225	14,153	13,217	9,495	10,116	11,780	10,913	9,463	8,345
Applications Received-Small Business	798	732	615	514	629	594	535	605	541	485
Applications Received-All Others	10,769	11,682	11,709	11,156	9,961	9,894	8,376	9,172	8,131	8,070
Policy Support										
News releases	64	57	61	62	76	89	86	120	99	126
Media Calls	252	520	1,131	774	532	1,450	1,201	-	-	-
Media Inquiries Completed	252	520	1,131	774	532	1,450	1,201	-	-	-
News Media Interactions*	-	-	-	-	-	-	-	1,235	633	672

*Tracking of News Media Interactions began in 2018

FINANCIAL POLICIES

South Coast AQMD is required to follow specific sections of the California Health & Safety Code, which guide South Coast AQMD's overall financial parameters. The Governing Board also provides financial direction to South Coast AQMD 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 South Coast AQMD 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 South Coast AQMD to fund its programs. The South Coast AQMD shall notify each person who was subject to fees imposed by the South Coast AQMD in the preceding year of the availability of information. The South Coast AQMD 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 South Coast AQMD budget.

- Fee Schedule - CA H&SC §40510

The South Coast AQMD may adopt a fee schedule for the issuance of variances and permits to cover the reasonable cost of permitting, planning, enforcement and monitoring.

- 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 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 South Coast AQMD 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 Governing Board

FINANCIAL POLICIES (cont.)

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.

South Coast AQMD Governing Board Policy

- Administrative Code

The Administrative Code of Rules and Procedures prescribes the responsibilities, conduct and specified reimbursements of employees and South Coast AQMD Board members. Sections include, but are not limited to, mileage reimbursement, travel expenses, tuition reimbursement, professional licenses and memberships, and bilingual pay.

- 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 AQMD. The purpose of this policy is to ensure that South Coast AQMD's funds are prudently invested to preserve principal and provide necessary liquidity, while earning a market average rate of return. The South Coast AQMD 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 South Coast AQMD.

The policy provides the Governing Board, the Treasurer, the Chief Financial Officer, and the Investment Oversight Committee with set duties and responsibilities to execute the policy.

- Budget Advisory Committee

Established by the South Coast AQMD Governing Board, the Budget Advisory Committee serves in an advisory capacity to the South Coast AQMD on budgeting and financial planning matters. The committee made up of members from the business and environmental communities, 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 South Coast AQMD Rule 320.

FINANCIAL POLICIES (cont.)

- Fund Balance Use

When both restricted and unrestricted resources are available for use, it is South Coast AQMD's policy to use restricted resources first and then unrestricted resources as they are needed. When using unrestricted fund balance amounts, South Coast AQMD's Governing Board approved policy is to use committed amounts first, followed by assigned and then unassigned.

- 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 South Coast AQMD 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 South Coast AQMD contracts that South Coast AQMD utilizes, when necessary, the most highly qualified outside consultants/contractors to carry out the organization's responsibilities.

- Rule 320 - Automatic Fee Adjustment

Rule 320 provides that all Regulation III fees, with specified exceptions, are automatically adjusted July 1st 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 adjustments for review by stakeholders and the Governing Board; also to hold a public hearing on the automatic fee adjustments 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.

- Treasury Operations Contingency Plan and Procedures

The Treasury Operations Contingency Plan and Procedures states the course of action that may be implemented by the South Coast AQMD to protect the safety and liquidity of the South Coast AQMD funds and to protect South Coast AQMD from disruptions to ongoing operations if: 1) the financial stability of Los Angeles County may jeopardize South Coast AQMD funds invested through the Los Angeles County Treasurer; and/or 2) the Los

FINANCIAL POLICIES (cont.)

Angeles County Treasurer, as Treasurer of South Coast AQMD, 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 Chief Financial Officer or Controller as Acting Treasurer to immediately begin implementing the defined procedures to safeguard South Coast AQMD funds.

- 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 South Coast AQMD's reliance on state subvention (\$4M), U.S. EPA Section 103/105 grants (\$5M), and one-time penalties and settlements (\$5M).

Executive Officer Administrative Policies and Procedures

- 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 South Coast AQMD Procurement Policy and Procedure document.

- 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 South Coast AQMD Procurement Policy and Procedure document.

- Travel

The Travel Policy provides guidance on allowable travel expenses, travel advances, and documentation requirements.

- Work Program- Cost Allocation Procedure

FINANCIAL POLICIES (cont.)

The Work Program allocates resources by Office, nine Work Program Categories, and Project which are tied to South Coast AQMD's Goal and Priority Objectives. Cost/Overhead Components of any given work program line can include:

- Salaries and Benefits based on regular and overtime hours charged directly to a specific work program code.
- Services and Supplies and Capital Outlays charged directly to a specific work program code.
- Division specific overhead (charges not attributable to a specific work program code such as benefits and absence time) are allocated to each direct expense work program line within that Division based on Full Time Equivalentents (FTEs).
- District General Overhead expenditures associated with the overall operation (such as utilities, insurance, security, interest, etc.) are allocated to all direct program lines based on FTEs.
- Allocatable Division Overhead allocates work program lines within each Division that are Division-specific Administrative, Office, or Management related based on the Division's FTEs.
- District-wide Overhead Allocation spreads work program lines from Divisions that support the entire District (Executive Office, Finance, Legal, etc.) or work program lines without specific revenue streams (Legislative and Public Affairs/Media Office, Public Records Act, Advisory Groups, etc.) based on FTEs.

BUDGET GLOSSARY

Account	A unique identification number and title for expenditures and revenues; used for budgeting and recording expenditures and revenues.
Administrative Fee	A fee charged to a program or project to recover the administrative costs to manage the program or project.
Adopted Budget	The annual budget for the General Fund that has been approved by South Coast AQMD's Governing Board.
Amended Budget	The adopted budget plus any modifications approved by South Coast AQMD's Governing Board during the fiscal year.
Appropriation	A specific amount of money authorized by South Coast AQMD's Governing Board which permits the South Coast AQMD to incur obligations and to make expenditures of resources.
Assigned Fund Balance	The portion of the fund balance that has been allocated by South Coast AQMD'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 South Coast AQMD's financial performance and proposed budget.
Budgetary Basis of Accounting	A form of accounting used in the budget where encumbered amounts are recognized as 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 one year 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 South Coast AQMD'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 South Coast AQMD Governing Board.
Cost Allocation	A process of accounting and recording the full costs of a program or activity by including its share of indirect or overhead costs in addition to its

BUDGET GLOSSARY (cont.)

Cost Allocation (cont)	direct costs.
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. South Coast AQMD’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 South Coast AQMD’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 South Coast AQMD is approved by South Coast AQMD’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. South Coast AQMD’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. South Coast AQMD’s fund balance is broken out into Reserves (non-spendable and committed) and Unreserved Designations. Unreserved Designations is further broken out into Assigned and Unassigned Fund

BUDGET GLOSSARY (cont.)

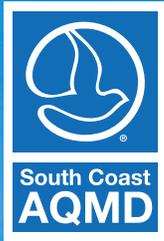
Fund Balance (cont.)	Balance. This terminology is in accordance with GASB 54.
GASB 54	A standard issued by the Government Accounting Standards Board (GASB) to guide fund balance reporting.
General Fund	The primary operating fund for South Coast AQMD where expenditures and revenues associated with the daily operations of South Coast AQMD are accounted for.
Grant	A sum of money given by an organization for a particular purpose. The grants which provide funding to South Coast AQMD's General Fund are primarily received from the U. S. Environmental Protection Agency (EPA), the Department of Homeland Security (DHS), and the California Air Resource Board (CARB).
Inventory	Value at cost of office, computer, cleaning and laboratory supplies at year-end.
Major Object	South Coast AQMD has four expenditure classifications: Salaries and Employee Benefits, Services and Supplies, Capital Outlays, and Building Remodeling. Transfers between Major Objects must be approved by the South Coast AQMD Governing Board.
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 South Coast AQMD's General Fund, inventory makes up the nonspendable balance.
Pension Obligation Bonds (POBs)	A method of financing used by South Coast AQMD to refinance its obligations to its employees' pension fund.
Proposed Budget	The annual budget that has been developed by South Coast AQMD and made available to the public for review before being presented to the South Coast AQMD 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

BUDGET GLOSSARY (cont.)

Regulations III (cont.)	most of South Coast AQMD'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 South Coast AQMD receives as income. South Coast AQMD's revenue is mainly from fees charged to control or regulate emissions.
SBCERA	San Bernardino County Employment Retirement System manages the retirement plan for South Coast AQMD 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 South Coast AQMD's budget.
Services and Supplies	Expenditures for items and services needed for the daily operations of the South Coast AQMD including professional services, utilities, office expenses, maintenance, and debt service. It is a Major Object, or classification of expenditures, within South Coast AQMD's budget.
Special Revenue Fund	A fund used to account for revenues and expenditures from specific sources earmarked for specific purposes. South Coast AQMD's main fund is its General Fund. All other funds are designated as Special Revenue Funds. The South Coast AQMD does not adopt a budget for Special Revenue Funds. 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 between different funds within South Coast AQMD's accounting system. For example, 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.

BUDGET GLOSSARY (cont.)

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 South Coast AQMD's Governing Board.
Unreserved Designations	The portion of the Fund Balance that has not been committed by South Coast AQMD's Governing Board or is nonspendable due to specific Board constraints. It is further broken down into either amounts assigned by the Governing Board for specific purposes or an unassigned amount that can only be used upon approval of the Governing Board.
Work Programs	Activities carried out by South Coast AQMD staff. Work Programs are classified into nine Work Program Categories according to the nature of the activity being performed.



South Coast Air Quality Management District

Air Quality Index Quick Guide

Good AQI: 0-50	Air quality is Good. Outdoor activity is advised for everyone.
Moderate AQI: 51-100	Air quality is acceptable; however, there could be a moderate health concern for people with severe respiratory reactions to smog.
Unhealthy for Sensitive Groups AQI: 101-150	Children and adults over the age of 65, or people with respiratory issues such as asthma may experience health effects and should minimize outdoor activities.
Unhealthy AQI: 151-200	The public may begin to experience health effects and should minimize outdoor activities. Children and adults over the age of 65, or people with respiratory issues such as asthma may experience more serious health effects and should avoid outdoor activities.
Very Unhealthy AQI: 201-300	Everyone may experience health effects. Children and adults over the age of 65, or people with respiratory issues should avoid all outdoor physical activity. Everyone else should avoid prolonged or heavy outdoor activity.
Hazardous AQI: 300+	Emergency health warning triggered. The entire population is more likely to be affected.

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@SouthCoastAQMD





**South Coast
Air Quality Management District**

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South Coast
Air Quality
Management District



Clean Fuels Program

2020 Annual Report
& 2021 Plan Update

Technology Advancement Office

Leading the way to cleaner air

Cover Photo Credits

Left to right; top to bottom

- Starcraft E-Quest XL Type C battery electric school bus at Colton USD (top left)
- Cummins-Westport 8.9L ISL G heavy-duty natural gas engine certified to 0.02 g/bhp-hr Optional Near Zero NOx Emissions standard (top middle)
- Kenworth-Toyota Class 8 fuel cell electric truck for Zero Emission Shore to Store Project (top right)
- Vehicle charging at Level 2 with SAE J1772 connector (center left)
- Volvo Class 8 battery electric VNR Electric truck at NFI for Volvo LIGHTS (center)
- EVgo 50 kW public DC fast charging station at La Kretz Innovation Campus in Los Angeles (center right)
- New Flyer Xcelsior XHE40 40' hydrogen fuel cell transit bus at Sunline Transit (lower left)
- Hydrogen storage for fuel cell bus fueling at OCTA (lower right)

South Coast Air Quality Management District

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Assembly Speaker Appointee

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Carlos Rodriguez*
Mayor Pro Tem, City of Yorba Linda
Cities of Orange County

Executive Officer

Wayne Nastri

*Technology Committee Members (as of 2/19/21)

**Technology Committee Chairman

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Table of Contents

Executive Summary

Introduction.....	EX-1
Setting the Stage	EX-2
Clean Fuels Programs	EX-3
2020 Annual Report.....	EX-4
20210 Plan Update.....	EX-5

Background and Overview

Program Background	1
Program Review.....	2
The Need for Advanced Technologies & Cleaner Fuels	3
Program Funding	5
2020 Overview.....	6
Core Technologies	7
Hydrogen/Mobile Fuel Cell Technologies and Infrastructure	9
Engine Systems/Technologies	10
Electric/Hybrid Vehicle Technologies and Infrastructure	10
Fueling Infrastructure and Deployment (Natural Gas/Renewable Fuels).....	11
Stationary Clean Fuel Technologies	11
Health Impacts, Fuel and Emissions Studies	12
Emissions Control Technologies	12
Technology Assessment and Transfer Outreach.....	13

Barriers, Scope and Impact

Overcoming Barriers.....	14
Scope and Benefits of the Clean Fuels Program.....	14
Strategy and Impact	16
Research, Development and Demonstration.....	17
Evaluate Real-World Emissions and Fuel Usage for On-Road Medium- and Heavy-Duty Vehicles	17
Development of a Pent-Roof Medium-Duty Spark-Ignited Natural Gas Engine in an Optimized Hybrid Vehicle System	20
Impact of Low Carbon Fuel Standard (LCFS) Regulation on Regional Air Quality, Emerging Vehicle Technologies, and Infrastructure	22

2020 Funding & Financial Summary

Funding Commitments by Core Technologies	26
Review of Audit Findings.....	28
Project Funding Detail by Core Technologies.....	28
Project Summaries by Core Technologies.....	33
Hydrogen/Mobile Fuel Cell Technologies and Infrastructure	33
Engine Systems/Technologies	35
Electric/Hybrid Technologies and Infrastructure.....	37
Fueling/Infrastructure and Development (Natural Gas/Renewable Fuels).....	39
Technology Assessment and Transfer/Outreach	40

Progress and Results in 2020

Key Projects Completed	44
Low NOx Diesel Development Project	44
Assessment of the Air Quality and Greenhouse Gas Impacts of a Microgrid-Based Electricity System	46

2021 Plan Update

Overall Strategy	52
Program and Funding Scope	55
Core Technologies	56
Hydrogen/Mobile Fuel Cell Technologies and Infrastructure	57
Engine Systems/Technologies	59
Electric/Hybrid Technologies and Infrastructure.....	60
Fueling Infrastructure and Deployment (Natural Gas/Renewable Fuels).....	62
Stationary Clean Fuel Technologies	63
Health Impacts, Fuel and Emissions Studies	64
Emissions Control Technologies	65
Technology Assessment and Transfer/Outreach	66
Target Allocations to Core Technology Areas	66

Program Plan Update for 2021

Funding Summary of Potential Projects	68
Technical Summaries of Potential Projects	72
Hydrogen/Mobile Fuel Cell Technologies and Infrastructure	72
Engine Systems/Technologies	77
Electric/Hybrid Technologies and Infrastructure.....	82
Fueling Infrastructure and Deployment (Natural Gas/Renewable Fuels).....	88
Stationary Clean Fuel Technologies	91
Fuel/Emissions Studies	94
Emissions Control Technologies	99
Health Impacts Studies	103
Technology Assessment/Transfer and Outreach	106

List of Figures

Figure 1: Sources of NOx 2012 Base Year.....	3
Figure 2: Total NOx Reductions Needed.....	4
Figure 3: Stages of Clean Fuels Program Projects.....	15
Figure 4: PEMS Equipment Install on School Bus.....	18
Figure 5: Chassis Dyno Setup for a Goods Movement Truck	19
Figure 6: Real-World In-Use Emissions Testing with Lab-Grade Equipment.....	19
Figure 7: Hybrid Powertrain Integration Cutaway	20
Figure 8: Effect of PHEV Battery CO2 Mass and Fuel Economy	21
Figure 9: Hybrid Powertrain Selection	22
Figure 10: Examples of CI Scores (gCO2e/MJ) for Various LCFS Fuel Pathways.....	24
Figure 11: Fuel Cost (\$/mile) Assuming User Receives 10%, 50%, and 100% of the Respective Realized LCFS Credits	25

Figure 12: Distribution of Funds for Executed Clean Fuels Projects CY 2020 (\$4.1M)27

Figure 13: Final Stage 3 Aftertreatment Configuration Down-selected from Evaluation45

Figure 14: Performance Levels Demonstrated at the end of South Coast AQMD Funded Development on Hydrothermally Aged FUL parts (435,000 mile equivalent)45

Figure 15: Retrofit configuration using MCFC s (HRSC: Heat Recovery Steam Cycle; GPU: Gas Processing Unit; MSR: Methane Stream Reforming; WGS: Water Gas Shift)46

Figure 16: Difference in summer MD8H ozone (ppb) for the 20% Best Case(left) and the 20% Worst Case(right).....47

Figure 17: Anteater Express Zero-Emission Buses47

Figure 18: Energy Consumption per Mile for Various Powertrains.....49

Figure 19: Total Cost Ownership for Various Powertrain Technology Buses49

Figure 20: NOx Reduction Comparison: No New Regulations vs Low NOx Standard in California only vs National Standard.....54

Figure 21: Technology Readiness Levels56

Figure 22: Projected Cost Distribution for Potential South Coast AQMD Projects in 2021 (\$17.9M)67

Lis of Tables

Table 1: South Coast AQMD Major Funding Partners in CY 2020.....17

Table 2: Contracts Executed or Amended (w/\$) between Jan. 1 & Dec. 31, 202029

Table 3: Supplemental Grants/Revenue Received into the Clean Fuels Fund (31) in CY 2020.....31

Table 4: Summary of Federal, State and Local Funding Awarded or Recognized in CY 2020.....31

Table 5: Projects Completed Between January 1 & December 31, 2020.....50

Table 6: Summary of Potential Projects for 202170

Appendix A

Technology Advancement Advisory Group A-1

SB 98 Clean Fuels Advisory Group..... A-2

Appendix B

Open Clean Fuels Contracts as of January 1, 2021B-1

Appendix C

Final Reports for 2020C-1

Appendix D

Technology Status..... D-1

Appendix E

Acronyms.....E-1

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EXECUTIVE SUMMARY

Introduction

The South Coast Air Quality Management District (South Coast AQMD) 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 the South Coast Air Basin (Basin) as well as 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.

In 1988, 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. That legislation also reaffirmed existence of the Technology Advancement Office (TAO) to administer the Clean Fuels Program. The TAO Clean Fuels Program is an integral part of the South Coast AQMD’s effort to achieve the significant nitrogen oxides (NOx) ppb reductions called for in the 2016 Air Quality Management Plan (AQMP) because it affords South Coast AQMD the ability to fund research, development, demonstration and accelerated deployment of clean fuels and transformative transportation technologies.

Using funding received through a \$1 motor vehicle registration fee, the Clean Fuels Program encourages, fosters and supports clean fuels and transportation technologies, such as hydrogen and fuel cells, advanced natural gas technologies, alternative fuel engines, battery electric vehicles, plug-in hybrid electric vehicles and related fueling infrastructure including renewable fuels. A key strategy of the Program, is its public-private partnerships with private industry, technology developers, academic institutions, research institutions and government agencies. Since 1988, the Clean Fuels Program leveraged nearly \$340 million into over \$1.5 billion in projects.

As technologies move towards commercialization, such as battery electric trucks, the Clean Fuels Program has been able to partner with large original equipment manufacturers (OEMs), such as Daimler, Volvo and Peterbilt in order to deploy these vehicles in larger numbers. These OEM partnerships allow the Program to leverage their research, product creation, customer relationships, and financial resources needed to move advanced technologies from the laboratories to the field and into customers’ hands. The OEMs have the resources and capabilities to design, engineer, test, manufacture, market, distribute and service quality products under brand names that are trusted. This is the type of scale needed in order to achieve the emission reductions needed to meet federal and state ambient air quality.

While South Coast AQMD aggressively seeks to leverage funds, it plays a leadership role in technology development and commercialization, along with its partners, to accelerate the reduction of criteria pollutants. As a result, the TAO Clean Fuels Program has traditionally supported a portfolio of technologies, at different technology readiness levels, to provide a continuum of emission reductions and health benefits over time. This approach provides the greatest flexibility and enhances the region’s chances toward achieving the National Ambient Air Quality Standards (NAAQS).

California Health and Safety Code (H&SC) 40448.5(e) calls for the Clean Fuels Program to consider, among other factors, the current and projected economic costs and availability of fuels, cost-effectiveness of emission reductions associated with clean fuels compared with other pollution control alternatives, use of new pollution control technologies in conjunction with traditional fuels as an alternative means of reducing emissions, potential effects on public health, ambient air quality,

visibility within the region, and other factors determined to be relevant by the South Coast AQMD. The Legislature recognized the need for flexibility, allowing focus on a broad range of technology areas, including cleaner fuels, vehicles and infrastructure, which helps the South Coast AQMD continue to make progress toward achieving its clean air goals.

H&SC 40448.5.1 requires the South Coast AQMD to prepare and submit to the Legislative Analyst each year by March 31, 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, re-calibrating the technical emphasis of the Program.

Setting the Stage

The overall strategy of TAO’s Clean Fuels Program is based, in large part, on emission reduction technology needs identified in the AQMP and the South Coast AQMD Board directives to protect the health of almost 18 million residents (nearly half the population of California) in the Basin. The AQMP, which is updated approximately every four years, is the long-term regional “blueprint” that identifies the fair-share emission reductions from all jurisdictional levels (e.g., federal, state and local). The 2016 AQMP, which was adopted by the South Coast AQMD 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 other innovative approaches, including indirect source measures and incentive programs, to reduce emissions from federally regulated sources (e.g., aircraft, locomotives and ocean-going vessels). South Coast AQMD recently initiated efforts for updating the AQMP and is coordinating the efforts with the California Air Resources Board’s (CARB) draft Mobile Source Strategy.

Ground level ozone (a key component of smog) is created by a chemical reaction between NO_x and volatile organic compound (VOC) emissions in sunlight. This is noteworthy because the primary driver for ozone formation in the Basin is NO_x emissions, and mobile sources contribute approximately 88 percent of the NO_x emissions in this region, as shown in Figure 1. Furthermore, NO_x emissions, along with VOC emissions, also lead to the formation of PM_{2.5} [particulate matter measuring 2.5 microns or less in size, expressed as micrograms per cubic meter (μg/m³)], including secondary organic aerosols.

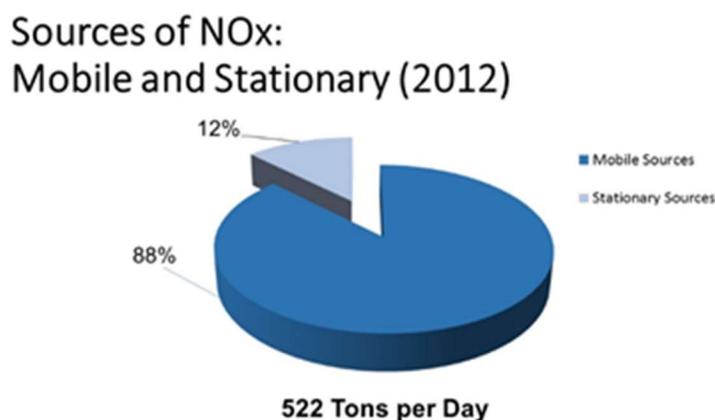
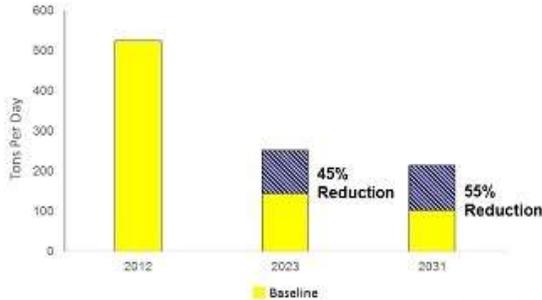


Figure 1: Sources of NO_x 2012 Base Year

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 clean fuel mobile and stationary advanced technologies to achieve health-based air quality standards. The 2016 AQMP identifies a 45 percent reduction in NO_x required by 2023 and an additional 55 percent reduction by 2031 to achieve ozone standards of 80 parts per billion (ppb) and 75 ppb, respectively. Figure 2 illustrates these needed NO_x reductions in the Basin. The majority of these NO_x reductions must come from mobile sources, both on-road and off-road. Notably, the South Coast AQMD is currently only one

of two regions in the nation designated as an extreme nonattainment area (the other region is San Joaquin Valley).

Basin Total NO_x Emissions



8-hour Ozone strategy targeting 2023 will ensure 1-hour attainment in 2022 as well as 24-hour and annual attainment in 2019 and 2025, respectively

Figure 2: Total NO_x Reductions Needed

Current state efforts in developing regulations for on- and off-road vehicles and equipment are expected to significantly reduce NO_x emissions, but are insufficient to meet South Coast AQMD needs, particularly in terms of timing.

Clean Fuels Program

The Clean Fuels Program is a very important mechanism to encourage and accelerate the advancement and commercialization of clean fuel and transportation technologies.

Figure 3 provides a conceptual design of the wide scope of the Clean Fuels Program and the relationship with incentive programs. Various stages of technology projects are funded not only to provide a portfolio of technology choices but to achieve near-term and long-term emission reduction benefits. South Coast AQMD’s Clean Fuels Program typically funds projects in the Technology Readiness Level (TRL) ranging between 3-8.



Figure 3: Stages of Clean Fuels Program Funding

Below is a summary of the 2020 Clean Fuels Annual Report and Draft 2021 Plan Update. Every Annual Report and Plan Update is reviewed by two advisory groups--the Clean Fuels Advisory Group, legislatively mandated by SB 98 (chaptered, 1999), and the Technology Advancement Advisory Group, created by the South Coast AQMD Board in 1990. These stakeholder groups review and assess the overall direction of the Program. The two groups meet approximately every six months to provide expert analysis and feedback on potential projects and areas of focus. Key technical experts working in the fields of the Program’s core technologies also typically attend and provide feedback. Preliminary

review and comment are also provided by South Coast AQMD's Board and other interested parties and stakeholders, as deemed appropriate.

2020 Annual Report

In CY 2020, the South Coast AQMD Clean Fuels Program executed 24 new contracts, projects or studies and modified 11 continuing project adding dollars toward research, development, demonstration and deployment projects as well as technology assessment and transfer of alternative fuel and clean fuel technologies. Table 1 shows our major funding partners in CY 2020. Table 2 lists the 35 projects or studies, which are further described in this report. The South Coast AQMD Clean Fuels Program contributed nearly \$4.1 million in partnership with other governmental organizations, private industry, academia and research institutes, and interested parties, with total project costs of approximately \$28.9 million. The \$4.1 million includes nearly \$500,000 recognized into the Clean Fuels Fund as pass-through funds from project partners to facilitate project administration by the Clean Fuels Program. Table 3 provides information on this outside funding received into the Clean Fuels Fund. Additionally, in CY 2020, the Clean Fuels Program continued to leverage other outside funding opportunities, securing new awards totaling \$45.8 million from federal, state and local funding opportunities. Table 4 provides a comprehensive summary of these federal, state and local revenues awarded to the South Coast AQMD during CY 2020. Like the last couple of years, the significant project scope of a few key contracts executed in 2020 resulted in higher than average leveraging of Clean Fuels dollars. Typical historical leveraging is \$4 for every \$1 in Clean Fuels funding. In 2020, South Coast AQMD continued this upward trend with nearly \$7 leveraged for every \$1 in Clean Fuels funds. Leveraging dollars and aggressively pursuing funding opportunities is critical given the magnitude of needed funding identified in the 2016 AQMP to achieve federal ozone air quality standards.

The projects or studies executed in 2020 included a diverse mix of advanced technologies. The following core areas of technology advancement for 2020 executed contracts (in order of funding percentage) include:

1. Engine Systems/Technologies (emphasizing alternative and renewable fuels for truck and rail applications);
2. Hydrogen and Mobile Fuel Cell Technologies and Infrastructure;
3. Technology Assessment and Transfer/Outreach;
4. Electric and Hybrid Vehicle Technologies and Related Infrastructure (emphasizing electric and hybrid electric trucks developed by OEMs and container transport technologies with zero emission operations); and
5. Fueling Infrastructure and Deployment (natural gas (NG)/ renewable natural gas (RNG))

The chart on page 27 shows the distribution by percentage of executed agreements in 2020 across these core technologies.

During CY 2020, the South Coast AQMD supported a variety of projects and technologies, ranging from near- term to long-term research, development, demonstration and deployment activities. This "technology portfolio" strategy provides the South Coast AQMD the ability and flexibility to leverage state and federal funding while also addressing the specific needs of the 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 near-zero and zero emissions goods movement industry; development, demonstration and deployment of large displacement natural gas and ultra-low emissions engines; and demonstration of emissions control technologies for heavy-duty engines; and natural gas and renewable natural gas deployment and support.

In addition to the 35 executed contracts and projects, 22 research, development, demonstration and deployment projects or studies and 8 technology assessment and transfer contracts were completed in 2020, as listed in Table 6. Appendix C includes two-page summaries of the technical projects completed in 2020. As of January 1, 2021, there were 106 open contracts in the Clean Fuels Program; Appendix B lists these open contracts by core technology.

In accordance with California H&SC Section 40448.5.1(d), this annual report must be submitted to the state legislature by March 31, 2021, after approval by the South Coast AQMD Board.

2021 Plan Update

Staff's re-evaluation of the Clean Fuels Program to develop the annual Plan Update is based on a reassessment of the technology progress and direction for the agency. The Program continually seeks to support the development and deployment of cost effective clean fuel technologies with increased collaboration with OEMs to achieve large scale deployment. The design and implementation of the Clean Fuels Program Plan must balance the needs in the various technology sectors with technology readiness on the path to commercialization, emission reduction potential and cofunding opportunities. For several years, the state has focused a great deal of attention on climate change and petroleum reduction goals, but the South Coast AQMD has remained committed to developing, demonstrating and commercializing technologies that reduce criteria pollutants, specifically NO_x and toxic air contaminants (TACs). Most of these technologies address the Basin's need for NO_x and TAC reductions and also garner reductions in greenhouse gases (GHG) and petroleum use. Due to these co-benefits, South Coast AQMD has been successful in partnering with the state and public/private partnerships to leverage its Clean Fuels funding extensively.

To identify technology and project opportunities where funding can make a significant difference in deploying cleaner technologies in the Basin, the South Coast AQMD engages in outreach and networking efforts. These activities range from close involvement with state and federal collaboratives, partnerships and industrial coalitions, to the issuance of Program Opportunity Notices (PONs) to solicit project ideas and concepts and Requests for Information (RFIs) to determine the current state of various technologies and their development and commercialization challenges. Additionally, unsolicited proposals from OEMs and other clean fuel technology developers are regularly received and reviewed. Potential development, demonstration and certification projects resulting from these outreach and networking efforts are included conceptually within the Draft 2021 Plan Update. Due to Assembly Bill (AB) 617¹, which requires reduced exposure to communities most impacted by air pollution, TAO conducted additional outreach to AB 617 communities regarding available zero and near-zero emission technologies and incentives to accelerate cleaner technologies. Cleaner technologies such as zero emission heavy-duty trucks are now included in the Community Emission Reduction Plans (CERPs) for these AB 617 communities. CARB adopted two critical milestone regulations for reducing emissions from heavy-duty mobile sources in 2020, the Advanced Clean Truck (ACT) regulation which mandates percent zero emission truck (ZET) sales starting in 2024 and the Omnibus Low NO_x regulation which requires lower NO_x standard heavy-duty engines starting in 2022. Despite these two major efforts, the expected NO_x reduction will still fall short of the 2023 and 2031 attainment target.

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 emission reductions 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:

¹ <https://ww2.arb.ca.gov/our-work/programs/community-air-protection-program/about>

- reducing emissions from port-related activities, such as cargo handling and container movement, and other technologies, including demonstration and deployment of zero emission drayage trucks;
- developing and demonstrating ultra-low NOx, gaseous and liquid renewable fueled, large displacement/high efficiency engines and zero emission heavy-duty vehicles;
- developing, demonstrating and deploying advanced natural gas and propane engines as well as near-zero and zero emission technologies for high horsepower applications;
- mitigating criteria pollutant emissions from renewable fuels, such as renewable natural gas, diesel and hydrogen as well as other renewable fuels and waste streams;
- producing transportation fuels and energy from renewable and waste stream sources;
- developing and demonstrating electric-drive (fuel cell, battery, plug-in hybrid and non-plug-in hybrid) technologies across light-, medium- and heavy-duty platforms;
- establishing large-scale hydrogen refueling and EV charging infrastructure to support light-, medium- and heavy-duty zero emission vehicles; and
- developing and demonstrating advanced zero emission microgrids for energy storage and demand to support transportation electrification, goods movement, and freight handling activities.

Table 6 lists potential projects across nine core technologies by funding priority:

1. Hydrogen/Mobile Fuel Cell Technologies and Infrastructure (especially large-scale refueling and production facilities) and stations that support medium and heavy-duty vehicles;
2. Engine Systems/Technologies (emphasizing alternative and renewable fuels for truck and rail applications);
2. Electric/Hybrid Vehicle Technologies and Infrastructure (emphasizing electric and hybrid electric trucks and container transport technologies with zero emission operations);
4. Fueling Infrastructure and Deployment (predominantly renewable natural gas and renewable fuels);
5. Stationary Clean Fuel Technologies (including microgrids that support electric vehicle (EV) and Hydrogen infrastructure and renewables);
6. Fuel and Emission Studies;
7. Emission Control Technologies that support low emitting diesel engines;
8. Health Impact Studies within disadvantaged communities; and
9. Technology Transfer/Assessment and Outreach.

These potential projects for 2021 total \$17.9 million, with anticipated leveraging of more than \$4 for every \$1 of Clean Fuels funding for total project costs of \$120 million. Some of the proposed projects may also be funded by revenue sources other than the Clean Fuels Program, through state and federal grants for clean fuel technologies, incentive programs such as AB 617 Community Air Protection (CAP) funding, Volkswagen Mitigation and Carl Moyer, and VOC and NOx mitigation.

CLEAN FUELS PROGRAM

Background and Overview

Program Background

The 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 the South Coast Air Basin as well as small portions of the Mojave Desert and Salton Sea Air Basins, is home to almost 18 million residents (nearly half the population of California). Due to this confluence of factors, which present unique challenges, the state legislature enabled the South Coast AQMD to implement the Clean Fuels Program to accelerate the implementation and commercialization of clean fuels and advanced mobile source technologies.

In 1988, 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. That legislation also reaffirmed existence of the Technology Advancement Office (TAO) to administer the Clean Fuels Program. The TAO Clean Fuels Program is an integral part of the South Coast AQMD’s effort to achieve the significant NO_x reductions called for in the 2016 AQMP.

California H&SC section 40448.5(e) calls for the Clean Fuels Program to consider, among other factors, the current and projected economic costs and availability of fuels, the cost-effectiveness of emission reductions associated with clean fuels compared with other pollution control alternatives, the use of new pollution control technologies in conjunction with traditional fuels as an alternative means of reducing emissions, potential effects on public health, ambient air quality, visibility within the region, and other factors determined to be relevant by the South Coast AQMD. The Legislature recognized the need for flexibility, allowing focus on a broad range of technology areas, including cleaner fuels, vehicles and infrastructure, which helps the South Coast AQMD continue to make progress toward achieving its clean air goals.

In 1999, further state legislation was passed which amended the Clean Fuels Program. Specifically, as stated in the H&SC section 40448.5.1(d), the South Coast AQMD 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 South Coast AQMD 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 South Coast AQMD’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 South Coast AQMD;
3. A description of projects funded by the South Coast AQMD, 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 South Coast AQMD 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. Concurrent with adoption and approval of the annual report and plan update every year, the Board will consider the efforts TAO has undertaken in the prior year to ensure no such duplication has occurred then make a finding through a Resolution attesting such.

The following section describes the various panels of external experts that help review the Clean Fuels Program every year.

Program Review

In 1990, the South Coast AQMD initiated an annual review of its technology advancement program by an external panel of experts. That external review process has evolved, in response to South Coast AQMD policies and legislative mandates, into two external advisory groups. The Technology Advancement Advisory Group (one of six standing Advisory Groups that make up the South Coast AQMD 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 South Coast AQMD 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 South Coast AQMD Governing Board. Also, in 1999, considering the formation of the SB 98 Clean Fuels Advisory Group, the South Coast AQMD 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 South Coast AQMD Board while changes to the Technology Advancement Advisory Group are reviewed by the South Coast AQMD Board's Technology Committee.

The charter for the Technology Advancement Advisory Group calls for approximately 12 technical experts representing industry, academia, state agencies, the scientific community and environmental interests. Traditionally, there has been exactly 12 members on this advisory group, but this year staff is recommending to the Board's Technology Committee that it add representatives from the Ports of Long Beach and Los Angeles, as both entities have been integral players and stakeholders in demonstrating near-zero and zero emissions technologies in and around the ports and surrounding environmental justice communities.

As needed, current membership changes to both advisory groups are considered by the South Coast AQMD Board and its Technology Committee, respectively, as part of consideration of each year's Annual Report and Plan Update. The current members of the SB 98 Clean Fuels Advisory Group and Technology Advancement Advisory Group (as of 2/19/21) are listed in Appendix A, with proposed changes, duly noted, subject to either South Coast AQMD Board approval or the Board's Technology Committee, per the advisory group's charters.

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 South Coast AQMD Board; 5) a public hearing of the Annual Report and Plan Update before the full South Coast AQMD Board, along with adoption of the 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 & Cleaner 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.

Ground level ozone (a key component of smog) is created by a chemical reaction between NO_x and volatile organic compound (VOC) emissions in sunlight. This is noteworthy because the primary driver for ozone formation in the Basin is NO_x emissions, and mobile sources contribute approximately 88 percent of the NO_x emissions in this region, as shown in Figure 1. Furthermore, NO_x emissions, along with VOC emissions, also lead to the formation of PM_{2.5} [particulate matter measuring 2.5 microns or less in size, expressed as micrograms per cubic meter (μg/m³)], including secondary organic aerosols.

To fulfill near -and long-term emissions 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 (70 ppb, 8-hour average) and fine particulate matter, promulgated by the U.S. Environmental Protection Agency (U.S. EPA), are projected to require additional long-term control measures for both NO_x and VOC.

The need for advanced mobile source technologies and clean fuels is best illustrated by Figure 2 which

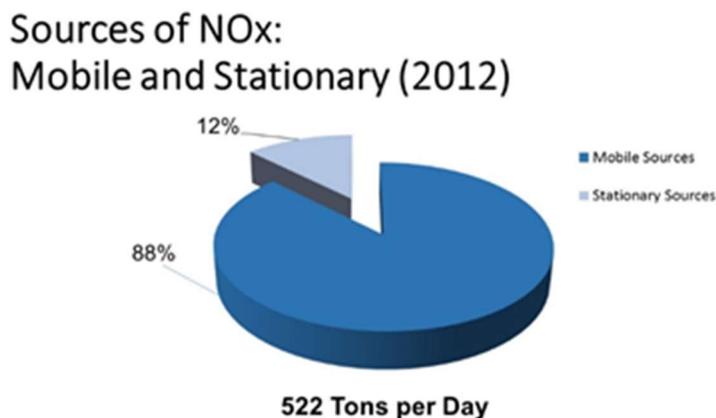
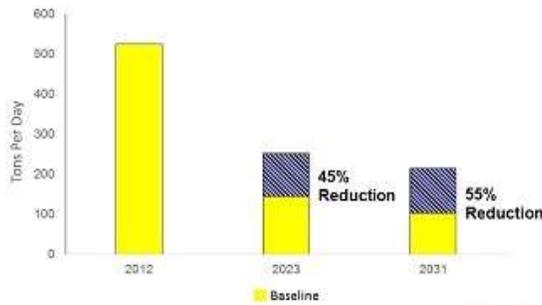


Figure 1: Sources of NO_x 2012 Base Year

Basin Total NO_x Emissions



8-hour Ozone strategy targeting 2023 will ensure 1-hour attainment in 2022 as well as 24-hour and annual attainment in 2019 and 2025, respectively

Figure 2: Total NO_x Reductions Needed

technologies (both zero and near-zero) and deploying these technologies into fleets, requiring cleaner and renewable fuels, and ensuring continued clean performance in use. Current state efforts in developing regulations for on- and off-road vehicles and equipment are expected to reduce NO_x emissions significantly, but not sufficiently to meet the South Coast AQMD needs, especially in terms of timing.

Health studies also indicate a greater need to reduce NO_x emissions and toxic air contaminant emissions. For example, the goal of South Coast AQMD’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 late 2017, South Coast AQMD 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 from major roadways and the regional carcinogenic risk from exposure of air toxics. The MATES V report is expected to be finalized by the end of 2021.

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 South Coast AQMD’s jurisdiction, reduce long-term dependence on petroleum-based fuels, and support a more sustainable energy future. Conventional strategies and traditional supply and consumption need to be retooled to achieve the federal air quality goals. To help meet this need for advanced, clean technologies, the South Coast AQMD Board continues to aggressively carry out the Clean Fuels Program and promote alternative fuels through its Technology Advancement Office (TAO).

As technologies move towards commercialization, such as battery electric and fuel cell trucks, the Clean Fuels Program has been able to partner with large original equipment manufacturers (OEMs), such as Daimler, Volvo and Kenworth, in order to eventually deploy these vehicles in increasingly large numbers. These partnerships with the OEMs allow the Program to leverage the research, product creation and financial resources that are needed to move advanced technologies from the laboratories, to the field and eventually into customers’ hands. The OEMs have the resources and abilities to design, engineer, test, manufacture, market, distribute and service quality products under brand names that are trusted. To obtain the emission reductions needed to meet federal and state ambient air quality

identifies just how far NO_x emissions must be reduced to meet federal standards by 2023 and 2031. The 2016 AQMP’s estimate of needed NO_x reductions will require the South Coast AQMD Clean Fuels Program to encourage and accelerate advancement of clean transportation technologies that are used as control strategies in the AQMP. Given this contribution, significant cuts in pollution from these sources are needed, therefore proposed AQMP mobile source strategies call for establishing requirements for cleaner

standards, large numbers of advanced technology clean-fueled vehicles must be deployed across our region and state.

Once advanced technologies and cleaner fuels are commercial-ready, there needs to be a concerted effort to get them into the marketplace and onto the roads. The South Coast AQMD's Carl Moyer Program, which was launched in 1988, helps achieve these results. The two programs produce a unique synergy, with the Carl Moyer Program (and other incentive programs, such as Proposition 1B-Goods Movement and the Community Air Protection Program²) providing incentives to push market penetration of the technologies developed and demonstrated by the Clean Fuels Program. This synergy enables the South Coast AQMD to play a leadership role in both technology development and commercialization efforts targeting reduction of criteria pollutants. Funding for both research, development, demonstration and deployment (RD³) projects as well as incentives remains a concern given the magnitude of additional funding identified in the 2016 AQMP to achieve federal ozone air quality standards.

The following sections describe program funding, provide a 2020 overview and describe core technologies of the Clean Fuels Program.

Program Funding

The Clean Fuels Program is established under 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 previous cap of two-and-half percent.

Specifically, the Clean Fuels Program is funded through a \$1 fee on motor vehicles registered in the South Coast AQMD. 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 South Coast AQMD. This revenue is typically about \$13.5 million and \$350,000, respectively, every year. For CY 2020, the funds available through each of these mechanisms were as follows:

- | | |
|---|--------------|
| • Mobile sources (DMV revenues) | \$13,258,888 |
| • Stationary sources (emission fee surcharge) | \$356,174 |

The South Coast AQMD Clean Fuels Program also receives grants and cost-sharing revenue contracts from various agencies, on a project-specific basis, that supplement the South Coast AQMD program. Historically, such cooperative project funding revenues have been received from CARB, the California Energy Commission (CEC), the U.S. EPA (including but not limited to their Diesel Emissions Reduction Act or DERA, the Clean Air Technology Initiative or CATI, and Airshed programs), 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 lists the supplemental grants and revenues totaling almost \$500,000 for contracts executed in CY 2020.

Table 4 lists the federal, state and other revenue totaling \$45.8 million awarded to the South Coast AQMD in 2020 for projects that are part of the overall Clean Fuels Program's RD³ efforts, even if for

² <http://www.aqmd.gov/home/programs/business/business-detail?title=vehicle-engine-upgrades>

financial tracking purposes the revenue is recognized into another special revenue fund other than the Clean Fuels Fund (Fund 31).

The final and perhaps most significant funding source can best be described as an indirect source, i.e., funding not directly received by the South Coast AQMD. This indirect source is the cost-sharing provided by private industry and other public and private organizations. In fact, these public-private partnerships with private industry, technology developers, academic institutions, research institutions and government agencies are a key strategy of the Clean Fuels Program. Historically, the Technology Advancement Office has been successful in leveraging its available public funds with \$4 of outside funding for each \$1 of South Coast AQMD funding. Since 1988, the Clean Fuels Program has leveraged nearly \$343 million into more than \$1.55 billion in projects. For 2020, the Clean Fuels Program leveraged each \$1 to nearly \$7 of outside funding. Similar to last year, this atypical leverage was the result of a few key significant project awards in 2020, such as the \$31.5 million project with Volvo, which includes a nearly \$20 million award to the South Coast AQMD from US EPA TAG grant. Through these public-private partnerships, the South Coast AQMD 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 South Coast AQMD aggressively seeks to leverage funds, it continues to act in a leadership role in technology development and commercialization efforts, along with its partners, 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, as previously noted, the magnitude of additional funding identified in the 2016 AQMP to achieve federal ozone air quality standards. The South Coast AQMD'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 2020 are listed in Table 1.

2020 Overview

This report summarizes the progress of the South Coast AQMD Clean Fuels Program for CY 2020. The South Coast AQMD Clean Fuels Program cost-shares projects to develop and demonstrate zero, near-zero and low emissions clean fuels and advanced technologies to push the state-of-the-technology and promote commercialization and deployment of promising or proven technologies not only for the Basin but Southern California and the nation as well. As noted, 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 South Coast AQMD Clean Fuels Program in CY 2020. During the period between January 1 and December 31, 2020, the South Coast AQMD executed 24 new contracts/agreements, projects or studies and modified 11 continuing project adding dollars during CY 2020 that support clean fuels and advanced zero, near-zero and low emission technologies (see Table 2). The South Coast AQMD Clean Fuels Program contribution for these projects was \$4.1 million, inclusive of approximately \$500,000 received into the Clean Fuels Fund as cost-share for contracts executed in this reporting period. Total project costs are \$28.9 million. The Clean Fuels contribution, total project costs and number of contracts executed in 2020 have been less than previous years largely due the effects of the COVID pandemic that impacted many of our partners business operations. Due to government lockdowns many projects have been delayed or canceled and future projects put on hold. We look forward to 2021 for a resurgence in business activity, more completed projects and newly executed projects.

The projects executed in 2020 address a wide range of issues with a diverse technology mix including near-term emissions reductions and long-term planning efforts. 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), but also funds awarded to the South Coast AQMD for projects that fall within the scope of the Clean Fuels Program’s RD³ efforts but may have been recognized (received) into another special revenue fund for financial tracking purposes (nearly \$45.8 million in 2020, see Table 4). For example, in 2020, the South Coast AQMD was awarded nearly \$37 million by USEPA as project partners with Volvo on their electric drayage truck Switch-On Project (\$20M), Sunline Transit for fuel cell electric buses (\$6M) and MAN Energy Solutions for an SCR retrofit of an ocean going vessel (\$11M) with total project costs of over \$50million. These projects will advance the commercialization of electric trucks, fuel cell buses and ocean going vessels emission reduction technology. More details on this financial summary can be found later in this report. The South Coast AQMD will continue to pursue federal, state and private funding opportunities in 2021 to amplify leverage, while acknowledging that support of a promising technology is not contingent on outside cost-sharing and affirming that South Coast AQMD will remain committed to playing a leadership role 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 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/Mobile Fuel Cell Technologies and Infrastructure support with a focus on medium and heavy duty vehicles (especially large-scale refueling facilities);
- Engine Systems/Technologies (emphasizing alternative and renewable fuels for truck and rail applications);
- Electric/Hybrid Vehicle Technologies and Related 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);
- Stationary Clean Fuels Technologies (including microgrids and renewables);
- Fuel and Emissions Studies;
- Emissions Control Technologies;
- Health Impacts Studies; and
- Technology Assessment and Transfer/Outreach.

At its January 2020 retreat, the Technology Advancement and SB-98 Clean Fuels Advisory Groups asked staff to take another look at these core technologies to determine if they still fit within the strategy of the Clean Fuels Program. That effort will be undertaken in 2020.

The South Coast AQMD continually seeks to support the deployment of lower-emitting technologies. The Clean Fuels Program is shaped by two basic factors:

1. Zero, near-zero and low 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 South Coast AQMD 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 South Coast AQMD program is significant, national and international activities affect the direction of technology trends. As a result, the South Coast AQMD program must

be flexible to leverage and accommodate these changes in state, national and international priorities. Nonetheless, while the state and federal governments have continued to turn a great deal of their attention to climate change, South Coast AQMD 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 NO_x reductions also garner greenhouse gas (GHG) reductions. Due to these “co-benefits,” the South Coast AQMD has been successful in partnering with the state and federal government. Even with the leveraged funds, the challenge for the South Coast AQMD 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 South Coast AQMD employs various outreach and networking activities as well as evaluates new ways to expand these activities. These activities range from close involvement with state and federal collaboratives, partnerships and industrial coalitions, to the issuance of Program Opportunity Notices (PONs) to solicit project ideas and concepts as well as the issuance of Requests for Information to determine the state of various technologies and the development and commercialization challenges faced by those technologies. Additionally, in the absence of PONs, unsolicited proposals from OEMs and other clean fuel technology developers are accepted and reviewed.

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 powertrains 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 NO_x technologies and clean energy alternatives such as fuel cells, solar power and other renewable and waste energy systems. The focus in recent years has been on zero and near-zero emission technologies with increased attention to heavy- and medium-duty trucks to reduce emissions from mobile sources, which contribute to more than 80 percent of the current NO_x 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 South Coast AQMD 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. In the absence of regulatory authority, the South Coast AQMD is expanding its portfolio of RD³ projects to include marine and ocean-going vessels. Utilizing mitigation funds, funding from San Pedro Bay ports and industry partners, RD³ projects to demonstrate emissions reduction technology in the marine sector where NO_x emissions are increasing are being pursued.

The 2016 AQMP included five Facility-Based Mobile Source Measures, also known as indirect source measures. Since then, staff has been developing both voluntary and regulatory measures in a process that has included extensive public input. Indirect source measures are distinct from traditional air pollution control regulations in that they focus on reducing emissions from the vehicles associated with a facility rather than emissions from a facility itself.

For example, indirect source measures for warehouses could focus on reducing emissions from trucks servicing the facility. Measures for ports will concentrate on emissions from ships, trucks, locomotives and cargo handling equipment at the ports. Measures covering new development and redevelopment projects could aim to reduce emissions from construction equipment, particularly heavy-duty diesel earth-moving vehicles.

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 South Coast AQMD programs that meet both the funding constraints and 2016 AQMP needs for achieving clean air are briefly described below.

Hydrogen/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 others have plans to commercialize their own soon. 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 limited production of a plug-in fuel cell model GLC for 2018 in Germany, with U.S. availability to follow. 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 2019, partially funded by South Coast AQMD for those in our region, there is one legacy and 39 retail operational in California, but most if not all 65 are expected to be operational by the end of 2020 with capacity for more than 10,000 fuel cell vehicles. AB 8 also requires CARB to annually assess current and future fuel cell vehicles (FCVs) and hydrogen stations in the marketplace. *The Joint Agency Staff Report on Assembly Bill 8: 2019 Annual Assessment of Time and Cost Needed to Attain 100 Hydrogen Refueling Stations in California*³ released in December 2019 covering 2019 findings states that there were 6,826 fuel cell vehicles registered in California by October 2019. However, CARB's 2017 Annual Evaluation projects 13,400 fuel cell electric vehicles (FCEVs) in California by 2020 and 37,400 by the end of 2023. Additionally, the California Fuel Cell Partnership's (CaFCP) *The California Fuel Cell Revolution, A Vision For Advancing Economic, Social, and Environmental Priorities (Vision 2030)* includes the need for up to 1,000 refueling stations statewide as well as the need to expand the market with heavy-duty technologies and their infrastructure.

Clearly, the South Coast AQMD must continue to support infrastructure required to refuel retail fuel cell vehicles and the nexus to medium- and heavy-duty trucks including reducing the cost to deploy heavy-duty hydrogen infrastructure. To that end, South Coast AQMD has cofunded a liquid hydrogen station capable of fueling up to 50 fuel cell transit buses and 10 fuel cell transit buses at OCTA. South Coast AQMD Clean Fuels funding of \$500,000 has been committed towards the CARB Zero and Near Zero-Emission Freight Facilities (ZANZEFF) Shore-to-Shore project to deploy 10 heavy-duty fuel cell trucks and install three heavy-duty hydrogen stations in Wilmington and Ontario; this contract will be executed in 2020. South Coast AQMD is also actively engaged in finding alternatives to reduce the cost of hydrogen (e.g., large-scale hydrogen refueling stations or production facilities) and potential longer-term fuel cell power plant technology. South Coast AQMD is also administering the DOE-funded Zero Emission Cargo Transport (ZECT) project (phase 2 or ZECT 2), to develop and deploy six heavy-duty fuel cell drayage trucks. Two of the fuel cell drayage trucks are manufactured by Transportation Power Inc. (TransPower), two fuel cell trucks by US Hybrid, one fuel cell truck by Kenworth, and one fuel cell truck by Hydrogenics (a Cummins Inc. company). Six of the seven vehicle designs, and integration, are completed, and four of the fuel cell drayage trucks are in demonstration. The battery and fuel cell dominant fuel cell trucks have a range of 150-200 miles.

³ <https://ww2.energy.ca.gov/2019publications/...2019.../CEC-600-2019-039.pdf>

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 PM_{2.5}, a known toxic air contaminant (TAC). Furthermore, according to CARB, trucks and buses are responsible for 37 percent of California's greenhouse gases (GHGs) and criteria emissions. 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. Even with the announced rollout of zero emission trucks beginning in 2021 by Volvo and Daimler, it is anticipated that it would take ten years for a large enough deployment of those trucks to have an impact on air quality.

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 South Coast AQMD, 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 trucks, transit and school buses, rail operations, and refuse collection and delivery vehicles to meet future federal emission standards. South Coast AQMD is supporting three contracts to convert the model year 2021 new Ford medium-duty gasoline engine to near-zero NOx level by using natural gas and propane.

In connection with the challenge to develop cleaner engine systems, on June 3, 2016, South Coast AQMD petitioned the U.S. EPA to initiate rulemaking for a lower NOx national standard for heavy-duty engines. The U.S. 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. U.S. EPA announced the Cleaner Truck Initiative on November 13, 2018, and Advance Notice of Proposed Rule on January 6, 2020, to reduce NOx emissions from on-road heavy-duty trucks starting as early as model year 2026. CARB forged ahead, announcing its own Low NOx Omnibus rule, which may be before the CARB Board as early as Spring 2020, proposing a lower NOx standard starting model year 2024. Although both announcements are welcome news, the timing is too late to help the South Coast AQMD meet its 2023 federal attainment deadline. So, despite progress, commercialization and deployment of near-zero engines are still needed.

Electric/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 light-duty passenger vehicles and more recently plug-in electric vehicles (PEVs) by almost all major automakers and increased public attention on global warming, as well as several Executive Orders issued by Former Governor Brown, such as his January 26, 2018 order, calling for 5 million ZEVs by 2030.

EV adoption continues to increase in 2017, selling more than 655,000 cumulative electric vehicles by September 2019 in California, according to Veloz (formerly the PEV Collaborative), with increasingly more announcements by international automakers (e.g., Mercedes-Benz, Volkswagen-Audi-Porsche, Hyundai/Kia, Ford, GM and several growing Chinese brands) on a variety of electrification plans, including some with extended zero emissions range. Joining the trend with longer-range battery electric light-duty passenger vehicles by Tesla, Chevy and several others, multiple manufacturers have announced light-duty electric truck development.

However, technology transfer to the medium- and heavy-duty applications is just beginning, especially in goods movement demonstrations in this region. As with hydrogen and fuel cell technologies, South

Coast AQMD is actively pursuing research, development and demonstration projects for medium- and heavy-duty battery electric vehicles and their commercialization. South Coast AQMD is administering the DOE funded ZECT project to develop and demonstrate battery electric and plug-in hybrid drayage trucks: four battery electric trucks from TransPower, two battery electric trucks from US Hybrid, two series plug-in hybrid electric trucks from TransPower, and three parallel plug-in hybrid electric trucks from US Hybrid. Battery electric trucks have an all-electric range of up to 100 miles and plug-in hybrid electric trucks have a range of up to 250 miles. This first ZECT project (ZECT 1), which was completed in 2020, gave birth to many other EV and hybrid truck projects including the Greenhouse Gas Reduction Fund (GGRF) Zero Emission Drayage Truck (ZEDT) project demonstrating more than 40 electric and hybrid drayage trucks across California. In the ZEDT project, TransPower continued their development of their electric truck platform with their OEM partner Peterbilt. In addition, Clean Fuels has cofunded the Daimler and Volvo battery electric trucks. Daimler has deployed 14 Class 8 eCascadia and three Class 6 eM2 trucks in 2019 and installed seven DC fast charging stations at fleet locations. Volvo has deployed two Class 8 rigid trucks and three Class 8 60,000-pound tractors and installed two 50 kW DC fast charging stations at its TEC Fontana dealership in December 2019.

Lastly, the same electric and hybrid technology transfer is beginning to appear on off-road and marine applications. South Coast AQMD is currently in the process of demonstrating a battery electric excavator and wheel loader with Volvo Construction Equipment as part of a FY 18 U.S. EPA Targeted Airshed Grant award. At the same time, a new electric drive, diesel hybrid tugboat is in the process of construction and demonstration by fleet operator Centerline Logistics Cooperation with cofunding from Port of Long Beach and CARB. These pilot demonstration projects are key to additional emission reductions from the off-road construction and marine sectors.

Fueling Infrastructure and Deployment (Natural Gas/Renewable Fuels)

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 percent by 2020 and 50 percent by 2030 as required by SB 350 (chaptered October 2015), the objectives of the South Coast AQMD 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 (NG) and renewable natural gas (RNG) infrastructure and deployment (electric and hydrogen fueling are included in their respective technology categories). The Clean Fuels Program will continue to examine opportunities where current incentive funding is either absent or insufficient.

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 zero and near zero-emission technologies, such as solar, energy storage, 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 as well as microgrids

and some renewables. 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.

Although stationary source NO_x emissions are small compared to mobile sources in the Basin, there are applications where cleaner fuel technologies or processes can be applied to reduce NO_x, VOC and PM emissions. Recent demonstration projects funded in part by the South Coast AQMD include a local sanitation district retrofitting an existing biogas engine with a digester gas cleanup system and catalytic exhaust emission control. The retrofit system resulted in significant reductions in NO_x, VOC and carbon monoxide (CO) emissions. This project demonstrated that cleaner, more robust renewable distributed generation technologies exist that not only improve air quality but enhance power quality and reduce electricity distribution congestion. Another ongoing demonstration project consists of retrofitting a low NO_x ceramic burner on an oil heater without the use of reagents, such as ammonia or urea, which is anticipated to achieve selective catalytic reduction (SCR) NO_x emissions or lower. SCR requires the injection of ammonia or urea that is reacted over a catalyst bed to reduce the NO_x formed during the combustion process. Challenges arise if ammonia distribution within the flue gas or operating temperature is not optimal resulting in ammonia emissions leaving the SCR in a process referred to as “ammonia slip”. The ammonia slip may also lead to the formation of particulate matter in the form of ammonium sulfates. Based on the successful deployment of this project, further emission reductions may be achieved by other combustion sources (such as boilers) by the continued development of specialized low NO_x burners without the use of reagents.

Health Impacts, Fuel and Emissions Studies

The monitoring of pollutants in the Basin is extremely important, especially when focused on (1) a 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. As we transition to new fuels and forms of transportation, 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 emissions studies, with a focus on NO_x and PM_{2.5} emissions and a detailed review of other potential toxic tailpipe emissions, for alternative fuel and diesel 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. South Coast AQMD is performing a three-year in-use emissions study of 200 next-generation technology heavy-duty vehicles in the Basin. This study, expected to be completed in 2021, is aimed at understanding the activity pattern of different vocations, understanding the real-world emissions emitted from different technologies. Other studies launched in 2020 will evaluate the emissions produced using alternative diesel blends in off-road heavy-duty engines, assess emissions impact of hydrogen-natural gas blend on near-zero emission heavy-duty natural gas engines as well as evaluating emissions produced using higher blend ethanol in light-duty gasoline vehicles.

Emissions 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 most 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 off-road mobile sources lies primarily with the U.S. EPA and CARB, both agencies are currently planning research efforts to aid the next round of rulemaking for

off-road mobile sources.

Low emission and clean fuel technologies that appear promising for on-road mobile sources should be effective at reducing emissions for a number of off-road applications. For example, immediate benefits are possible from particulate traps and SCR technologies that have been developed for on-road diesel applications although retrofits are often hampered by physical size and visibility constraints. Clean fuels such as natural gas, propane, hydrogen and hydrogen-natural gas mixtures may also provide an effective option to reduce emissions from some off-road applications, even though alternative fuel engine offerings are limited in this space, but retrofits such as dual-fuel conversions are possible and need to be demonstrated. 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. Emissions assessments are important in such projects as one technology to reduce one contaminant can increase another.

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 an essential part of the Clean Fuels Program. 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, including networking opportunities seeking outside funding. Assembly Bill (AB) 617⁴, which requires reduced exposure to communities most impacted by air pollution, required TAO to carry out additional outreach in CY 2019 to AB 617 communities regarding available zero and near-zero emission technologies as well as the incentives to accelerate those cleaner technologies into their communities. TAO staff also provide input as part of working groups, such as the Port of Long Beach EV Blueprint, Los Angeles County EV Blueprint, City of Los Angeles Zero Emissions 2028 Roadmap, Electric Power Research Institute (EPRI) study on air quality and GHG impacts of residential electrification, and Los Angeles Cleantech Incubator projects. Technology transfer efforts also include support for various clean fuel vehicle incentive programs (i.e., Carl Moyer Program, Proposition 1B-Goods Movement, etc.). Furthermore, general and, when appropriate, targeted outreach is an effective part of any program. Thus, the other spectrum of this core technology is information dissemination to educate and promote awareness of the public and end users. TAO staffed information booths to answer questions from the general public and provided speakers to participate on panels on zero and near-zero emission technologies at events, such as the 2030 California Transportation Future Summit, the Hydrogen and Fuel Cells for Freight Workshop, the ACT Virtual Event Series from August through November 2020 and the Renewable Gas 360 Symposium and Webinar Series. While South Coast AQMD's Local Government, Public Affairs & Media Office oversees and carries out such education and awareness efforts on behalf of the entire agency, TAO cosponsors and occasionally hosts various technology-related events to complement their efforts (see page 42 for a description of the technology assessment and transfer contracts executed in CY 2020 as well as a listing of the 8 conferences, workshops and events funded in CY 2020. Throughout the year, staff also participates in various programmatic outreach for the various incentive programs implemented by TAO, including the Carl Moyer Program, Proposition 1B-Goods Movement, Volkswagen Mitigation Program, Replace Your Ride, a U.S. EPA Airshed-funded Commercial Electric Lawn and Garden Incentive and Exchange Program, and residential lawn mower and EV charger rebate programs, to name a few.

⁴ <https://ww2.arb.ca.gov/our-work/programs/community-air-protection-program/about>

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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 South Coast AQMD 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 below 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. The South Coast AQMD Clean Fuels Program funds projects in the Technology Readiness Level ranging between 3-8.



Figure 3: Stages of Clean Fuels Program Projects

Due to the nature of these advanced technology research, development, demonstration and deployment (RD³) projects, the benefits are difficult to quantify since their full emissions 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.

- Near-zero NOx Engine Development for Heavy-Duty Vehicles
 - Cummins Westport: low-NOx natural gas ISN- G 8.9L and 12L engines (0.2 & 0.02 g/bhp-hr);
 - Southwest Research Institute (SwRI) project to develop a near-zero NOx Heavy-duty diesel engine; and
 - Kenworth CNG Hybrid Electric Drayage Truck project.
- Fuel Cell Development and Demonstrations
 - Kenworth Fuel Cell Range Extended Electric Drayage Truck project;
 - New Flyer Fuel Cell Transit Bus and Air Products Liquid Hydrogen Station at OCTA;
 - Retail light-duty passenger fuel cell vehicles (Toyota Mirai, Hyundai Nexa, Honda Clarity);
 - SunLine Transit Agency Advanced Fuel Cell Bus projects;
 - Commercial stationary fuel cell demonstration with UTC and SoCalGas (first of its kind);
 - 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
 - Daimler Class 6 and 8 battery electric trucks with Penske and NFI;
 - Volvo Class 8 battery electric trucks with TEC Fontana, DHE, and NFI;
 - Hybrid electric delivery trucks with National Renewable Energy Laboratory (NREL), FedEx and UPS;
 - Plug-in hybrid work truck with Odyne Systems;
 - BYD battery-electric transit bus and trucks (yard hostlers and drayage);
 - LA Metro battery electric buses;
 - Blue Bird Electric School Bus with Vehicle to Grid (V2G) capability;

- TransPower Electric school buses, including V2G capability;
 - TransPower/US Hybrid battery electric heavy-duty truck and yard hostlers; and
 - Peterbilt battery-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 NO_x and PM reduction control devices on heavy-duty on-road trucks; and
 - SwRI development of aftertreatment for heavy-duty diesel engines

South Coast AQMD 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 RD³ process.

Strategy and Impact

In addition to the feedback and input detailed in Program Review, the South Coast AQMD 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 South Coast AQMD 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 including but not limited to Bay Area AQMD, Sacramento Metropolitan AQMD, San Diego APCD and San Joaquin Valley APCD, as well as the National Association of Fleet Administrators (NAFA), major local transit districts, local gas and electric utilities, national laboratories, the San Pedro Bay Ports and several universities with research facilities, including but not limited to California State University Los Angeles, Purdue University, Universities of California Berkeley, Davis, Irvine, Los Angeles and Riverside, and University of West Virginia. The list of organizations with which the South Coast AQMD coordinates research and development activities also includes organizations specified in H&SC Section 40448.5.1(a)(2).

In addition, the South Coast AQMD holds periodic meetings with several organizations specifically to review and coordinate program and project plans. For example, the South Coast AQMD 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 CaFCP, the California Stationary Fuel Cell Collaborative, the California Natural Gas Vehicle Partnership (CNGVP), EPRI, Veloz (formerly the PEV Collaborative), the Los Angeles Cleantech Incubator's Regional Transportation Partnership, the California Hydrogen Business Council (CHBC), the SoCalEV Collaborative and the West Coast Collaborative. The coordination efforts with these various stakeholders have resulted in several cosponsored projects.

Descriptions of some of the key contracts executed in CY 2020 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 South Coast AQMD 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 South Coast AQMD program. These partners are identified in the more detailed 2020 Project

Summaries by Core Technologies contained within this report, as well as Table 4 which lists federal, state and local funding awarded to the South Coast AQMD in CY 2020 for RD³ projects (which will likely result in executed project contracts in 2021).

Table 1: South Coast AQMD Major Funding Partners in CY 2020

Research Funding Organizations	Major Manufacturers/Technology Providers
California Air Resources Board	Landi Renzo USA Corporation
California Energy Commission	Volvo Technology of America LLC
Department of Energy	US Hybrid
National Renewable Energy Laboratory	Roush Cleantech, LLC
U.S. Environmental Protection Agency	Local Entities & Utilities
Southwest Research Institute	Southern California Gas Company
	Ports of Los Angeles & Long Beach

The following two subsections broadly address the South Coast AQMD's impact and benefits by describing specific examples of accomplishments including commercial or near-commercial products supported by the Clean Fuels Program in CY 2020. 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 South Coast AQMD research and development coordination efforts in 2020 include: (a) Evaluate Real-World Emissions and Fuel Usage for On-Road Medium- and Heavy- Duty Vehicles; (b) Development of a Pent-Roof Medium-Duty Spark-Ignited Natural Gas Engine in an Optimized Hybrid Vehicle System; and (c) Impact of Low Carbon Fuel Standard (LCFS) Regulation on Regional Air Quality, Emerging Vehicle Technologies, and Infrastructure.

Evaluate Real-World Emissions and Fuel Usage for On-Road Medium- and Heavy-Duty Vehicles

On-road heavy-duty engines are now subject to the 2010 U.S. EPA emissions standards of 0.01 g/bhp-hr PM and 0.20 g/bhp-hr NO_x. However, engine manufacturers are using emissions credits which allow them to produce a mixture of engines certified at or below 0.20 g NO_x and engines certified at a level higher than 0.20 g NO_x to comply with the emissions standards on an average basis. These engines are broadly classified as natural gas stoichiometric engines with three-way catalysts and lean-burn engines with exhaust gas recirculation (EGR) and selective catalytic reduction (SCR) systems, high pressure direct injection dual-fuel engines equipped with SCR systems, diesel engines with advanced EGR and DPF technology, and diesel engines with diesel particulate filter (DPF) and urea-based SCR technology. While recent studies have shown NO_x and PM emissions are reduced from heavy-duty vehicles powered by these modern-technology engines, emissions from heavy-duty vehicles still dominate the total basin-wide NO_x and PM emissions. Therefore, additional assessment of in-use vehicle emissions remain 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. Thus, reliable and accurate emissions inventory derived from real-world studies like this one is critical input to such plans.

South Coast AQMD, CEC, CARB and Southern California Gas Company (SoCalGas) have come together to co-fund one of the largest emissions studies on heavy-duty vehicles to-date. The objective of 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 gross Vehicle Weight Rating (GVWR) greater than 14,000 lb. The project is designed to involve 200 on-road heavy-duty test vehicles used in transit, school bus, refuse, delivery and goods movement applications, and powered by engines fueled with alternative fuels (fossil fuel-based and renewable natural gas, propane, electric and hybrid), conventional and alternative diesel fuels, and a combination of diesel and natural gas (dual) fuels. The engines are categorized into six groups including:

- MY 2008 – 2015 natural gas engines certified at or below 0.20 g/bhp-hr NO_x;
- Natural gas and propane engines certified to CARB optional standard at or below 0.02 g/bhp-hr NO_x;
- MY 2010 and newer diesel engines certified at or below 0.20 g/bhp-hr NO_x;
- Diesel engines with no SCR systems;
- Dual fuel engines; and
- Alternative fuel engines including electric and fuel cell

The test vehicles are shared equally between West Virginia University (WVU) and University of California Riverside/College of Engineering-Center for Environmental Research & Technology (UCR/CE-CERT) and instrumented with portable emissions measurement systems (PEMS), portable vehicle activity measurement systems (PAMS) and other hardware to monitor daily vehicle activities, fuel usage profiles and emissions. WVU and UCR will then use the PEMS' and PAMS' results to recommend whether to develop new or improved or retain existing vocation-based heavy-duty drive cycles. Moreover, the PEMS testing results represents the current heavy-duty in-use testing program and the emissions results can be correlated to later tasks as well as the emission standard.



Figure 4: PEMS Equipment Install on School Bus

From the PAMS task of data logging 200 trucks, engine and GPS data were logged for up to 12 month to develop new chassis duty cycles specific to Basin such as school bus, goods movement, and delivery. WVU and UCR performed chassis dynamometer tests of 60 test vehicles using the developed or

improved and existing drive cycles. The chassis results is more representative of the real world emissions for the purpose of inventory planning compare to the PEMS test. The chassis cycles were based on large amount of vehicle activity data where the PEMS test is only a snap shot of one working day which could be subjected to many day to day variations. The chassis testing is also using laboratory-grade equipment vs. portable equipment shown in Figure 5.



Figure 5: Chassis Dyno Setup for a Goods Movement Truck

The study also included testing of ten test vehicles used in delivery and goods 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. Four routes were developed specifically for this study. Due to the weight of the mobile labs, only Class 7 and Class 8 vehicles were evaluated for this portion of the study. The result for this part of the study supplements the gaps between the PEMS and Chassis task.



Figure 6: Real-World In-Use Emissions Testing with Lab-Grade Equipment

As of early 2021, majority of the testing has been completed and the analysis task are set to begin. The goal of the analysis are to develop deterioration factors for engine aftertreatment technologies employed on at least four test vehicles; and based on the test results and discussion with CARB, provide

recommendations to improve CARB EMFAC model, identify technology issues and how to mitigate them, prioritize South Coast AQMD and the CEC staff and financial resources to support advanced engine and aftertreatment technology research and demonstration programs, and match vehicle technologies to vocations for which technology benefits can be maximized.

Development of a Pent-Roof Medium-Duty Spark-Ignited Natural Gas Engine in an Optimized Hybrid Vehicle System

The South Coast AQMD has been supporting rapid deployment of near-zero natural gas engines for both medium-duty and heavy-duty vehicles that have been commercialized since 2015 and supporting alternative fuel light-duty passenger vehicles since early 2000s. With nearly two decades of operational experience in the Basin, natural gas technology is well on its way towards full commercialization achieving a Technology Readiness Level 9 (see summary table on page 15). However, there are ongoing concerns, such as the 2019 Feasibility Assessment for Drayage Trucks by Gladstein, Neandross & Associates, which highlights the need for higher efficiency, more powerful natural gas engines.

To help advance natural gas vehicle technologies, the South Coast AQMD partnered with DOE, NREL and CEC to launch a research effort to identify ways to increase efficiencies from natural gas medium- and heavy-duty engines and vehicles. In September 2018, as part of this ongoing effort, NREL issued an RFP offering funding of approximately \$37 million for projects focusing on: (1) reducing the cost of natural gas vehicles; (2) increasing vehicle efficiency; and (3) advancing new innovative medium- and heavy-duty natural gas engine designs. Nine projects were selected for funding through this solicitation, four of which the South Coast AQMD helped cost-share with \$1.7 million from the Clean Fuels Fund because they aligned well with AQMP priorities to reduce NO_x and PM emissions from transportation sources.

One of those awards was to SwRI, to develop a pent-roof cylinder head version of a medium duty (MD) Isuzu diesel engine for operation on natural gas and integrate it into an Isuzu F-series truck chassis in combination with a hybrid drivetrain system as shown in Figure 7 to provide a demonstration of a highly optimized low GHG emission medium-duty truck.

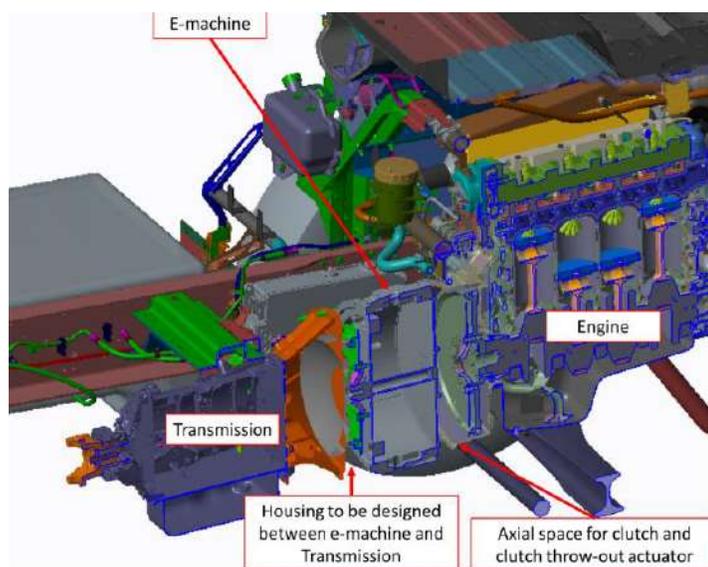


Figure 7: Hybrid Powertrain Integration Cutaway

Spark Ignition (SI) engines operating with stoichiometric combustion can use simple three-way catalysts to achieve low tailpipe emissions in comparison to more complex diesel fuel engines.

However, most SI engines are a compromised design for medium- and heavy-duty applications. They are either derived from an automotive application in which the engine is de-rated to provide for more durability or from a medium- or heavy-duty flat head diesel in which the flow field is compromised for SI combustion.

New technologies, such as cooled EGR, have recently been developed for stoichiometric SI engines which enable high efficiency and high brake mean effective pressure (BMEP) at low engine speeds. This enables torque curves comparable to diesel engines and therefore comparable operating conditions in vehicle, which enables diesel-like durability in an SI engine. SwRI seeks to improve natural gas engines and vehicle efficiency by applying a modern high-tumble combustion system to a medium-duty natural gas engine. Preliminary data from a first-generation prototype single cylinder engine (SCE) and computational fluid dynamic (CFD) studies indicate a very fast burn rate and high dilution tolerance for this combustion system, both of which are essential building blocks to developing an efficient SI multi cylinder engine (MCE). The addition of a high EGR combustion system will provide additional efficiency gains through the potential to increase the engine compression ratio and run with elevated levels of EGR dilution over the full operating map of the engine. Combining this efficient engine with an optimized hybrid system will offer even more efficiency gains, demonstrating the potential for a low NOX, low GHG medium duty truck applicable to real-world applications.

On the vehicle and hybrid system front, SwRI is recommending a mild hybrid architecture with a 100kW machine and 40kWh battery pack. Preliminary results shown in Figure 8 and Figure 9 indicate this hybrid powertrain has following benefits:

- Has a lower initial cost than the diesel powertrain
- Achieves 15% improvement on fuel economy and a 34% reduction in carbon dioxide (CO₂) on a combination of Isuzu real world cycles
- Has the potential for 25% to 80% fuel economy improvement compared to the conventional diesel engine vehicle on the standard cycles (heavy-duty urban dynamometer driving schedule (HD-UDDS), heavy heavy-duty diesel truck (HHDDT) schedule transient and city suburban cycle (CSC))

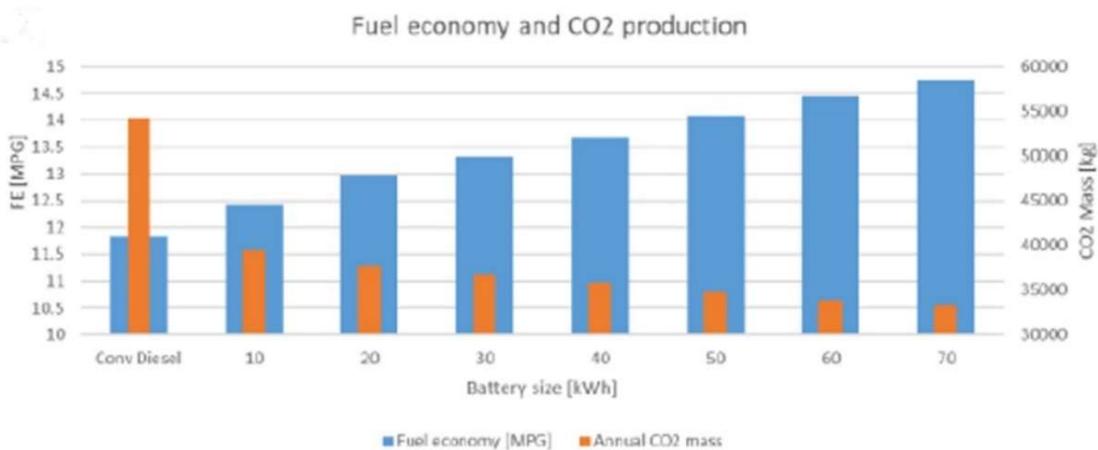


Figure 8: Effect of PHEV Battery CO₂ Mass and Fuel Economy

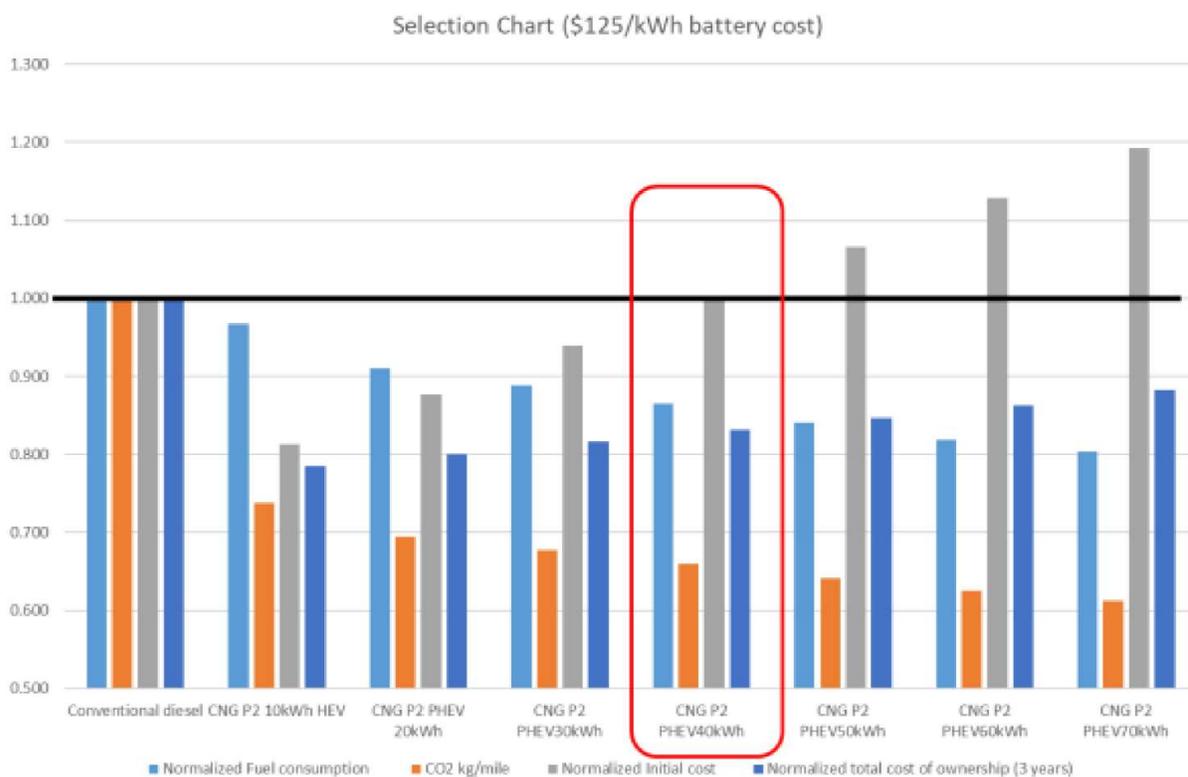


Figure 9: Hybrid Powertrain Selection

A packaging study was also completed using components representative of the hybrid powertrain selected and concluded that these components can be integrated in the base vehicle without compromising the cargo space and with minimal vehicle modifications.

On the engine development front, a new combustion system was designed and tested on a SCE, shown in Figure 9 to determine if the combustion system could achieve the requirements of the current project on an MCE platform. The test results showed that the Gen 2 combustion system met the requirements of the project and the improvements targeted with the system were achieved. These improvements included a reduction in pumping work of up to 0.1 bar pumping mean effective pressure, lower lumped efficiency losses and up to 10% higher EGR tolerance at high engine speeds. Additional analysis work was performed to support the multi-cylinder platform for the demonstration vehicle. The fired engine testing and analysis work were used to select and confirm the compression ratio of the MCE.

Impact of Low Carbon Fuel Standard (LCFS) Regulation on Regional Air Quality, Emerging Vehicle Technologies, and Infrastructure

The California Global Warming Solutions Act of 2006 (AB32) required California to reduce its overall GHG emissions to 1990 levels by 2020. With the transportation sector accounting for the largest source of emissions in California, including GHGs and criteria pollutants such as NO_x and PM, CARB moved to adopt the Low Carbon Fuel Standard (LCFS) in 2009 to encourage the production and use of cleaner, low-carbon transportation fuels in California.

The LCFS program is a state-wide effort to reduce the carbon intensity in fuels used in California transportation. The original objective of the regulation was to achieve a 10% reduction in the carbon intensity (CI) of transportation fuels used in the state by 2020, relative to 2010 levels, which was followed in 2018 with a 20% reduction by 2030 under AB32. CI benchmarks for gasoline and diesel

decline each year to meet the 20% objective by 2030.⁵ The federal equivalent of the LCFS is the Renewable Fuel Standard (RFS) program which Congress authorized under the Energy Policy Act of 2005 and expanded under the Energy Independence and Security Act of 2007 to reduce greenhouse gas emissions and expand the nation's renewable fuels sector while reducing reliance on imported oil. Both programs work collectively to reduce the State's dependency on fossil fuels and GHG emissions through regulation and incentives.⁶

A major component of these two programs is their respective credit markets and how these credits incentivize production and use of alternative fuels. For the LCFS, it is the LCFS Credit and for the RFS it is the RIN or Renewable Identification Number Credit. Both programs have obligated parties that need to meet certain standards for reducing GHGs and the credits provide a mechanism for meeting these standards. This brief, summarizes the benefits of the LCFS, and the reader is encouraged to explore the comparable benefits from the complimentary RFS and RIN credit programs as an incentive for alternative fuel transportation in California.

As previously mentioned, the LCFS program includes a LCFS credit market where low CI transportation fuels generate carbon reduction credits that can be sold to parties obligated to offset their carbon emissions. The LCFS affords three ways to generate credits: fuel pathways, projects, and capacity-based crediting. Under fuel pathway-based crediting, each transportation fuel has a CI score. The CI is calculated on a full life-cycle basis, indicating the full GHG emissions related to the fuel's production, transportation, storage, and use, and is measured in terms of grams of CO₂ equivalent per megajoule of energy (gCO₂e per MJ). The differences in energy efficiencies from one technology to a conventional technology is defined by Energy Economy Ratio (EER), i.e. EER for diesel is 1 whereas it is 5 for electricity. The EER can be a significant multiplier in LCFS credit generation. The LCFS credits cannot be generated if they are not real, quantifiable, and enforceable. As such, an LCFS fuel cannot generate credit until it is used as a transportation fuel, so both the fuel producer and the supplier/dispenser/consumer (user) are required to make the LCFS Credit real. Producer and user typically formalize this relationship through an "offtake agreement" that establishes a commitment to deliver and use the LCFS fuel. The actual fuel delivered and used is enforced through quarterly reporting to and accounting by CARB. Offtake agreements provide fuel producers with the security of a buyer and users with some certainty of lower fuel costs because offtake agreements typically delineate a percentage of the LCFS credits to the user. Hence, the LCFS program and the LCFS credit market play important roles in reducing the price of fuel to the consumer and incentivizing the adoption of alternative fuel transportation technologies. In addition, the LCFS credit system helps the alternative fuel producer offset capital and operating expenses associated with the production and transportation of these fuels to the market.⁷

Many low CI transportation fuels in the LCFS also help to reduce ground level air pollution by virtue of their production, their use in advanced zero and near-zero emission transportation technologies, and the associated displacement of conventional petroleum-based counterparts. These "clean alternative transportation fuels" result in little to no "tailpipe emissions" such as the ozone precursor NO_x, PM_{2.5}, VOC, and CO. Achieving air quality attainment standards for ozone and PM in the Basin relies significantly on reducing both NO_x and PM emissions from the transportation sector. Over the last decades, several emissions and air quality modeling studies were performed to evaluate the air quality impact of increasing renewable fuels in the transportation sector. Research included the blend level of some biofuels in conventional gasoline or diesel or renewable natural gas with conventional gas, infrastructure compatibility, manufacturer warranties, evaporative or toxic emissions, and hydrogen or

⁵ <https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard>

⁶ <https://www.epa.gov/renewable-fuel-standard-program/overview-renewable-fuel-standard>

⁷ <https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/lcfs-credit-generation-opportunities>

electric vehicle technologies and their respective infrastructure, specifically in the heavy-duty sector. The overall benefits that these low CI fuels can provide are numerous.^{8,9,10}

The Clean Fuels Program mandates the funding of programs to help reduce criteria “transportation-based” emissions such as NO_x and PM. Hence, the combined efforts of LCFS and Clean Fuels can synergistically advance both causes. Figure 10 provides examples of CI scores for some alternative fuels in the LCFS program.

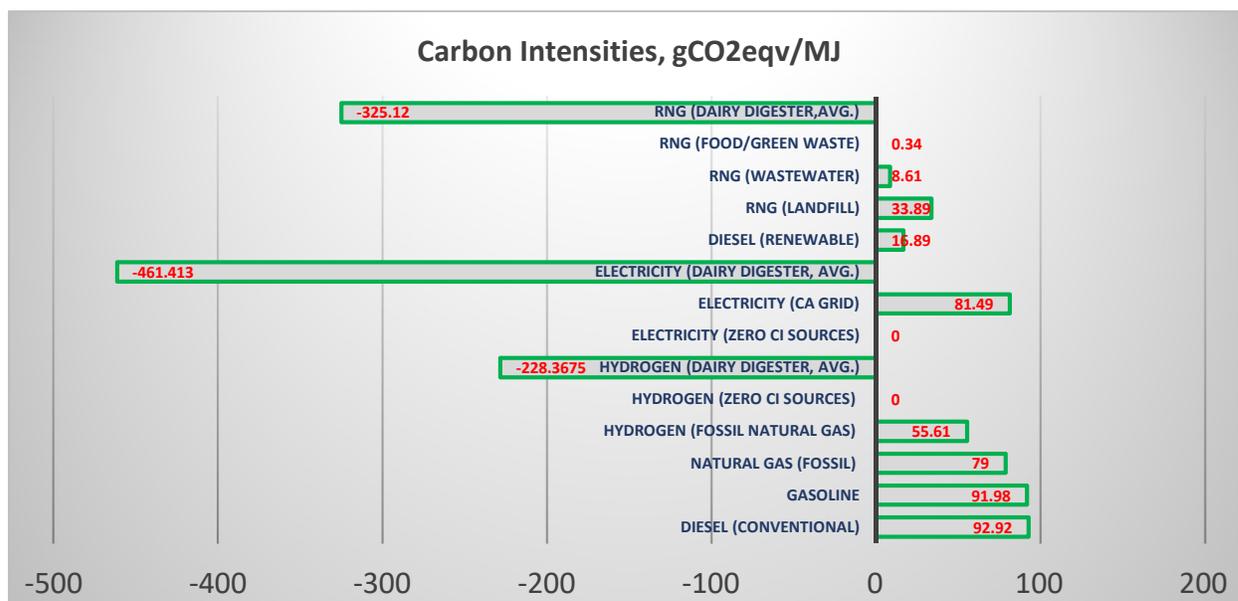


Figure 10: Examples of CI Scores (gCO₂e/MJ) for Various LCFS Fuel Pathways (not EER Adjusted). RNG, Electricity, and Hydrogen from Dairy Digester is Averaged from Multiple Pathways in the LCFS.

Some low CI transportation fuels, e.g. electricity from wind, solar and hydro are inherently air pollution free from production to use. Others, such as RNG from the capture of fugitive, high Global Warming Potential methane (e.g. dairy operations, waste biomass that generate very low to negative carbon intensities) combined with cleaner combustion technologies such as advanced near-zero natural gas engines certified to the optional standard of 0.02g-NO_x/bhp-hr or cleaner, can result in significantly reduced NO_x emissions. However, the real-world benefit of this synergy is dependent on participation from the consumer market and the adoption of the emerging low CI fuel transportation technologies. The economics of adopting new technologies is significant and currently relies on government subsidies. Renewable, low CI projects funded through the Clean Fuels Program (CFP) require demonstrated reductions in criteria pollutants. Such projects include local production of RNG and its demonstrated use in near-zero NO_x, RNG-powered heavy-duty vehicles.¹¹ Other projects that are expected to see CFP funding include renewable hydrogen partnered with fuel cell powered vehicles, or

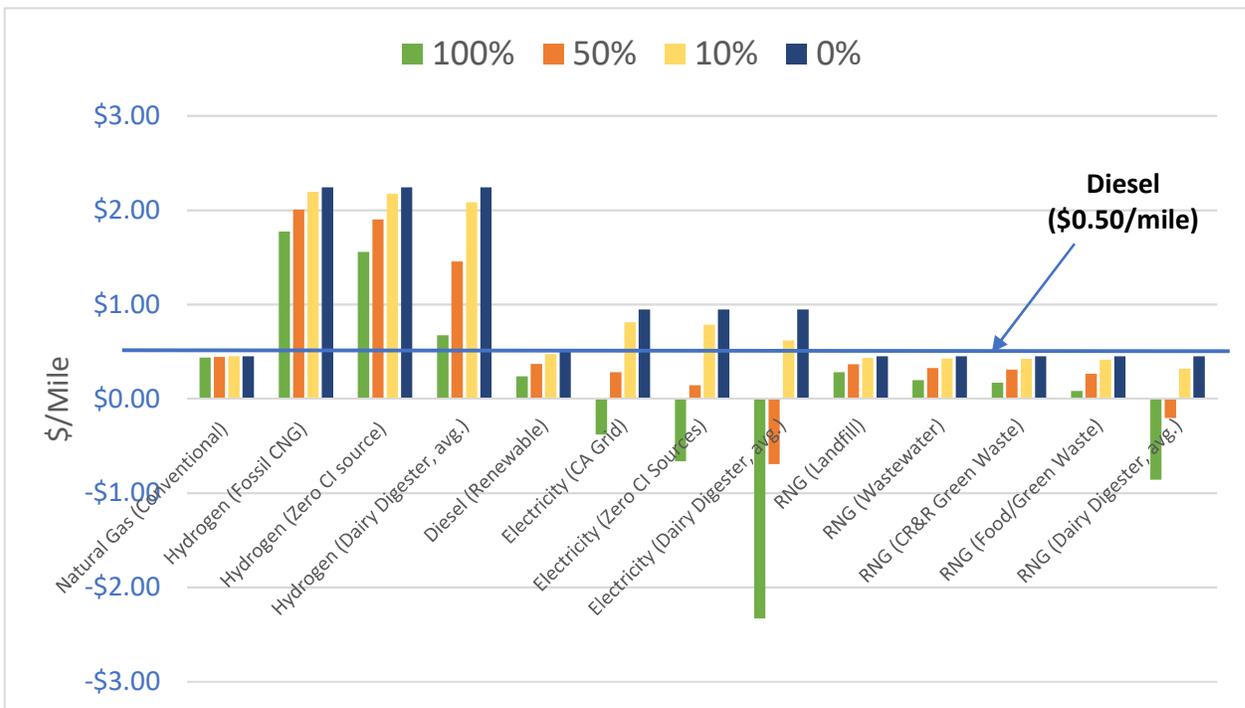
⁸ Investigation of the Effect of Mid- and High-Level Ethanol Blends on the Particulate and the Mobile Source Air Toxic Emissions from a Gasoline Direct Injection Flex Fuel Vehicle, Yang et al., Energy Fuels, 2019

⁹ Evaluation of the Impacts of Biodiesel and Second Generation Biofuels on NO_x Emissions for CARB Diesel Fuels, Hajbabaie et al., Environmental Science and Technology, 2012

¹⁰ Evaluating the regulated emissions, air toxics, ultrafine particles, and black carbon from SI-PFI and SI-DI vehicles operating on different ethanol and iso-butanol blends, Karavalakis et al., Fuel, 2014

¹¹ CR&R Anaerobic Digester, RNG, and NZE demonstration

renewable electricity used to power heavy-duty battery electric vehicles. The LCFS program and the LCFS Credit Market offer an opportunity to provide low cost, low carbon fuel and energy to these emerging alternative fuel-powered transportation technologies and support the lowering of the total cost of ownership and operation of these technologies. Economic drivers imbedded in the LCFS program could provide the necessary added incentive to accelerate the transformation of many petroleum fuel-powered fleets in the Basin. As the LCFS Credit system is reliant on both producer and user of these fuels the Clean Fuels Program is very interested in exploring outreach efforts with stakeholders in taking a broader look at how the LCFS credit market can further incentivize fleets in this region to adopt clean technologies earlier. In order to see the impact of LCFS credits on the fuel cost per mile, staff performed an analysis using the methodology that is elaborated in the LCFS regulation for calculating CI scores and EER ratios. Figure 11 summarizes the results of this effort, and shows the monetary impact associated with 10%, 50%, and 100% LCFS credits on final fuel cost per mile from various low CI transportation fuels using LCFS credit calculation methodology. As depicted in Figure 11, the greater the “share” of LCFS credit applied to the end user’s fuel cost, the lower the cost of fuel per mile. Also, transportation fuels with lower CI scores have greater fuel cost reductions per mile. However, other factors such as total cost of vehicle ownership, cost to install and maintain fueling, or charging infrastructure, as well as the amount of energy consumed will also impact the TCO of these respective technologies. Figure 11 below shows the impact of receiving 10%, 50%, and 100% LCFS credits on final fuel cost per mile of various low CI transportation fuels using LCFS credit calculation methodology.



Note: Assumptions applied: LCFS credit value \$180/MT, Diesel as reference fuel, and CI scores shown in Figure 2. Fuel pricing and fuel economies assumed for Class 8 trucks: \$3.50 per gallon and 7 mpDGE for diesel; \$2.85/DGE and 6.3 mpDGE for CNG; \$0.45/kWh and 2.1 kWh/mi for electricity; and \$15/kg and 7.5 miles/kg for hydrogen

Figure 11: Fuel Cost (\$/mile) Assuming User Receives 10%, 50%, and 100% of the Respective Realized LCFS Credits. 0% Credit is Value of Fuel Assuming Full Retail Pricing.

CLEAN FUELS PROGRAM 2020 Funding & Financial Summary

The South Coast AQMD 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 5), the South Coast AQMD 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 South Coast AQMD Board.

As projects are approved by the South Coast AQMD 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, 2020.

Funding Commitments by Core Technologies

The South Coast AQMD 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, 2020, a total of 35 contracts/agreements, projects or studies that support clean fuels were executed or amended (adding dollars), as shown in Table 2. 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 12. This wide array of technology support represents the South Coast AQMD’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 2020 reporting period are shown below with the total projected project costs:

- | | |
|--|--------------|
| • South Coast AQMD Clean Fuels Fund Contribution | \$4,137,895 |
| • Total Cost of Clean Fuels Projects | \$28,944,841 |

Traditionally, every year, the South Coast AQMD Governing Board approves funds to be transferred to the General Fund Budget for Clean Fuels administration. However, starting with FY 2017, the fund transfer from Clean Fuels to the General Fund was handled through the annual budget process. Thus, when the Board approved the South Coast AQMD’s FY 2020-21 Budget on May 1, 2020, it included \$1 million from Clean Fuels recognized in TAO’s budget for technical assistance, workshops, conferences, cosponsorships and outreach activities, as well as postage, supplies and miscellaneous costs; another \$285,000 is transferred from the Clean Fuels Fund to Capital Outlays for alternative fuel vehicle purchases for TAO’s Alternative Fuel Demonstration Program as well as supporting vehicle and energy infrastructure. Only the funds committed by December 31, 2020, are included within this report. Any portion of the Clean Fuels Funds not spent by the end of Fiscal Year 2020-21 ending June 30, 2021, will be returned to the Clean Fuels Fund.

Partially included within the South Coast AQMD contribution are supplemental sponsorship revenues from various organizations that support these technology advancement projects. This supplemental revenue for pass-through contracts executed in 2020 totaling approximately \$500,000 is listed within Table 3.

For Clean Fuels executed and amended contracts, projects and studies in 2020, the average South Coast AQMD contribution was leveraged with nearly \$7 of outside investment. The typical historical leverage amount is \$4 for every \$1 of South Coast AQMD Clean Fuels funds, but from 2016 to 2020 there were several significant contracts, significant both in funding and in the impact that they hopefully will make in strides toward developing and commercializing clean transportation technologies.

During 2020, the distribution of funds for South Coast AQMD executed contracts, purchases and contract amendments with additional funding for the Clean Fuels Program totaling approximately \$4.1 million are shown in the figure below.

Additionally, the South Coast AQMD continued to seek funding opportunities and was awarded an additional \$45.8 million in CY 2020 for RD3 projects as listed in Table 4.

As of January 1, 2021, there were 106 open Clean Fuels Fund contracts. Appendix B lists these contracts by core technology.

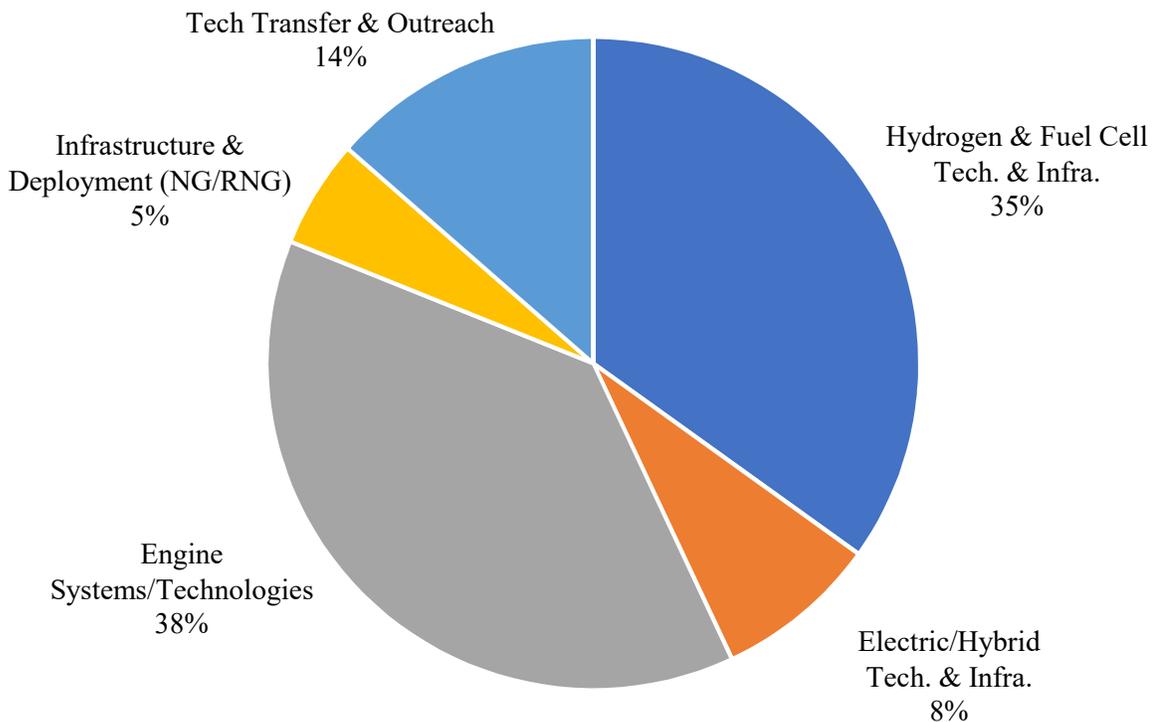


Figure 12: Distribution of Funds for Executed Clean Fuels Projects CY 2020 (\$4.1M)

Review of Audit Findings

State law requires an annual financial audit after the closing of each South Coast AQMD’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, 2020, 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 South Coast AQMD financial statements, which include the Clean Fuels Program revenue and expenditures. BCA Watson Rice, LLP, gave the South Coast AQMD an “unmodified opinion,” the highest obtainable. Notably, the South Coast AQMD has achieved this rating on all prior annual financial audits.

Project Funding Detail by Core Technologies

The 35 new and continuing contracts/agreements, projects and studies that received South Coast AQMD funding in CY 2020 are summarized in Table 2 (beginning on the next page), together with the funding authorized by the South Coast AQMD and by the collaborating project partners.

Table 2: Contracts Executed or Amended (w/\$) between January 1 & December 31, 2020

Contract	Contractor	Project Title	Start Term	End Term	SCAQMD \$	Project Total \$
Hydrogen/Mobile Fuel Cell Technologies and Infrastructure						
17317	American Honda Motor Co., Inc.	One-Year Extension of Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle	3/22/17	3/22/21	4,816	4,816
17343	American Honda Motor Co., Inc.	One-Year Extension of Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle	2/21/17	2/21/21	4,899	4,899
17385	American Honda Motor Co., Inc.	One-Year Extension of Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle	5/17/17	5/17/21	4,981	4,981
20108	University of California, Irvine	Develop Optimal Operation Model for Renewable Electrolytic Fuel Production	6/17/20	6/16/21	100,000	500,000
19313	Equilon Enterprises LLC DBA Shell Oil Products	Construct & Operate Renewable Hydrogen Refueling Station	6/30/20	4/1/22	1,200,000	12,000,000
21092	Frontier Energy, Inc.	Participate in California Fuel Cell Partnership for Calendar Year 2020 and Provide Support for Regional Coordinator	1/1/20	12/31/20	120,000	1,300,000
Engine Systems/Technologies						
20092	Southwest Research Institute	Natural Gas Engine and Vehicles Research and Development - Pent-Roof Medium Duty Natural Gas Engine	10/14/20	4/13/24	475,000	6,000,000
20122	Landi Renzo USA Corporation	Develop and Commercialize a Near-Zero Natural Gas Conversion System for On-Road Medium-Duty Vehicles	1/17/20	7/31/21	600,000	1,455,072
20316	US Hybrid	Natural Gas Engine & Vehicles Research & Development - Plug-In Hybrid CNG Drayage Truck (PHET)	6/2/20	12/1/23	500,000	2,853,006
Electric/Hybrid Technologies and Infrastructure						
14184	Green Paradigm Consulting, Inc.	DC Fast Charging Network Provider	4/4/14	6/30/23	40,000	40,000
14375	National Renewable Energy Laboratory	Data Collection & Analysis of Zero-Emission Cargo Transportation (ZECT) Demonstration Trucks	6/26/01	3/31/21	20,000	20,000
17225	Volvo Technology of America LLC	Development and Demonstration of up to 2 Class 8 Battery Electric Drayage Trucks	6/9/17	12/31/21	353,000	353,000
17244	Kenworth Truck Company	Development & Demonstration of four Class 8 CNG Hybrid Electric Drayage Trucks	9/8/17	4/14/21	(1,184,369)	(3,251,501)
18075	Selman Chevrolet Company	Extension of Lease for Two 2017 Chevrolet Bolt All-Electric Vehicles for Three Years	8/18/17	2/18/21	4,068	4,068

Table 2: Contracts Executed or Amended (w/\$) between January 1 & December 31, 2020 (cont'd)

Contract	Contractor	Project Title	Start Term	End Term	SCAQMD \$	Project Total \$
Electric/Hybrid Technologies and Infrastructure (cont'd)						
20097	Zeco Systems, Inc. DBA Greenlots	Operate, Maintain and Network the EV Chargers	2/14/20	2/13/23	155,664	155,664
20125	Roush Cleantech, LLC	Develop and Demonstrate Battery Electric Medium-Duty Truck	3/19/20	3/18/22	937,500	3,200,000
20248	Los Angeles County Economic Development Corp	Economic and Workforce Impact Analysis of Electric Revolution in Southern California	7/7/20	1/2/21	10,000	150,000
Fueling Infrastructure and Deployment (Natural Gas/Renewable Fuels)						
20178	Whittier Union High School District	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	2/21/20	11/30/34	196,500	1,052,500
Transfer	California Natural Gas Vehicle Partnership	Participation in the California Natural Gas Vehicle Partnership for Fiscal Years 2018-19 and 2019-20	7/1/20	6/30/22	25,000	170,000
Technology Assessment and Transfer/Outreach						
08210	Sawyer Associates	Technical Assistance on Mobile Source Control Measures and Future Consultation on TAO Activities	2/22/08	2/28/22	15,000	15,000
12376	University of California, Riverside	Technical Assistance with Alternative Fuels, Biofuels, Emissions Testing, and Zero-Emission Transportation Technology	6/1/14	5/31/22	150,000	150,000
19078	Green Paradigm Consulting, Inc.	Technical Assistance with Alternative Fuels, Evs, Charging & Infrastructure and Renewable Energy	9/7/18	9/30/21	211,800	540,300
20265	Eastern Research Group	Technical Assistance with Heavy-Duty Vehicle Emissions Testing, Analyses & Engine Development & Applications	6/17/20	6/16/22	50,000	50,000
Various	Various	Cosponsor 8 Conferences, Workshops & Events plus 3 Memberships	01/01/20	12/31/20	141,960	2,170,960
Direct Pay	Prizm Imaging	Procure Outreach Materials	01/01/20	12/31/20	1,848	1,848
Direct Pay	Various	Alternative Fuel Demonstration Vehicle Program Related Expenses	01/01/20	12/31/20	228	228
						\$28,944,841

Table 3: Supplemental Grants/Revenue Received into the Clean Fuels Fund (31) in CY 2020

Revenue Agreement #	Revenue Source	Project Title	Contractor	SCAQMD Contract #	Award Total \$
20132	Southern California Gas Company	Near-Zero Natural Gas Conversion System for On-Road Medium-Duty Vehicles	Landi Renzo USA Corporation	20122	300,000
19165	US EPA Airshed Grant	Near-Zero CNG School Buses	Whittier Union High School District	20178	196,500
<i>Table 3 lists revenue awarded to South Coast AQMD and received into the Clean Fuels Fund (31) only if the South Coast AQMD pass-through contract was executed during the reporting CY (2020).</i>					\$496,500

Table 4: Summary of Federal, State and Local Funding Awarded or Recognized in CY 2020

Awarding Entity or Program	Award (*) or Board Date	Purpose	Contractors	Award Total/ Fund
U.S. EPA DERA Grant	03/06/20	Fund up to 35% of Near Zero-Emission Trucks	Ecology Auto Parts	\$1,601,523 Fund 17
Southern California Gas Company	04/03/20	Emissions Impacts of Hydrogen-Natural Gas Fuel Blends in Near Zero-Emission Heavy-Duty Natural Gas Engines	University of California, Riverside	\$305,000 Fund 31
U.S. EPA DERA Grant	04/03/20	Truck Trade Down Program	Various	\$789,581 Fund 31 \$719,500 Fund 17
U.S. EPA SEPs	04/03/20	Install Air Filtration Systems at Schools	IQAir North America	\$146,250 Fund 75
California Air Resources Board	04/03/20	Install Air Filtration Systems at Schools and Residences	IQAir North America	\$1,205,300 Fund 75
Southern California Gas Company	04/03/20	Evaluation of Vehicle Maintenance Costs for On-Road Heavy-Duty Vehicles (HDVs)	West Virginia University	\$150,000 Fund 31
US EPA Airshed Grant	09/04/20	Deploy Class 8 Battery Electric Trucks and EV Infrastructure	Volvo Group North America, LLC	\$20,000,000 Fund 17
US EPA Airshed Grant	09/04/20	Deploy Fuel Cell Transit Buses	SunLine Transit Agency	\$5,906,601 Fund 17
US EPA Section 105 CATI Grant	09/04/20	Demonstrate Additional Battery Electric Trucks for the Volvo LIGHTS Project	Volvo Group North America, LLC	\$500,000 Fund 67

**Table 4: Summary of Federal, State and Local Funding Awarded or Recognized in CY 2020
(cont'd)**

Awarding Entity or Program	Award (*) or Board Date	Purpose	Contractors	Award Total/ Fund
US EPA Airshed Grant	09/04/20	Develop and Demonstrate Selective Catalytic Reduction Retrofit Technology for an Ocean-Going Vessel	MAN Energy Solutions USA Inc.	\$11,414,700 Fund 83
San Pedro Bay Ports	09/04/20	Develop and Demonstrate Selective Catalytic Reduction Retrofit Technology for an Ocean-Going Vessel	MAN Energy Solutions USA Inc.	\$300,000 Fund 83
Southern California Gas Company	10/02/20	Develop, Demonstrate and Commercialize the Ford 7.3 Liter Medium-Duty Natural Gas and Propane Conversion System	Agility Fuel Solutions	\$154,325 Fund 31
U.S. EPA Clean Diesel Program	12/04/20	Replace Diesel Transportation Refrigeration Units (TRUs) with Electrified TRUs	Albertsons Companies	\$2,240,721 Fund 31
California Air Resources Board	12/04/20	Install Air Filtration Systems at Schools and Residences	IQAir North America	\$26,850 Fund 75
<p><i>Table 4 provides a comprehensive summary of revenue awarded to South Coast AQMD during the reporting CY (2020) for TAO's RDD&D efforts which falls under the umbrella of the Clean Fuels Program, regardless of whether the revenue will be received into the Clean Fuels Program Fund (31) or the South Coast AQMD pass-through contract has been executed.</i></p>				\$45,760,351

Project Summaries by Core Technologies

The following summaries describe the contracts, projects and studies executed, or amended with additional dollars, in CY 2020. 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; South Coast AQMD cost-share, cosponsors and their respective contributions; contract term; and a description of the project.

Hydrogen/Mobile Fuel Cell Technologies and Infrastructure

17317: Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle for TAO's Fleet Demonstration Program

Contractor: American Honda Motor Company, Inc.	South Coast AQMD Cost-Share	\$ 4,816
Term: 03/22/17 – 03/22/21	Total Cost:	\$ 4,816

South Coast AQMD 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 South Coast AQMD'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 mpg. The vehicle will be placed into South Coast AQMD's alternative fuel vehicle fleet to demonstrate new fuel cell vehicles to public and private organizations to promote zero emission technologies. This lease was extended one year to continue mileage accumulation until new model is available.

17343: Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle for TAO's Fleet Demonstration Program

Contractor: American Honda Motor Company, Inc.	South Coast AQMD Cost-Share	\$ 4,899
Term: 02/21/17 – 02/21/21	Total Cost:	\$ 4,899

As noted, South Coast AQMD 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 South Coast AQMD'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 South Coast AQMD's alternative fuel vehicle fleet to demonstrate new fuel cell vehicles to public and private organizations to promote zero emission technologies. This lease was extended one year to continue mileage accumulation until new model is available.

17385: Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle for TAO's Fleet Demonstration Program

Contractor: American Honda Motor Company, Inc.	South Coast AQMD Cost-Share	\$ 4,981
Term: 05/17/17 – 05/17/21	Total Cost:	\$ 4,981

This third Honda 2017 Clarity Fuel Cell will also be placed into South Coast AQMD'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 South Coast AQMD cosponsors and attends throughout the Basin, three of these vehicles were added to the Fleet Demonstration Program in 2017. This lease was extended one year to continue mileage accumulation until new model is available.

20108: Develop Optimal Operation Model for Renewable Electrolytic Fuel Production

Contractor: University of California, Irvine	South Coast AQMD Cost-Share	\$ 100,000
	Cosponsors:	
	University of California, Irvine	350,000
	NREL	50,000
Term: 06/17/20 – 06/16/21	Total Cost:	\$ 500,000

The University of California Irvine (UCI) through its Advanced Power and Energy Program is developing a roadmap for deployment of renewable electrolytic hydrogen production facilities in California. The proposed project leverages expertise and resources through NREL and adds a comprehensive analysis of a rapidly developing electrolysis technology, which portends to serve as one of the most promising pathways for the production of renewable hydrogen. The proposed project will analyze hypothetical scenarios of model electrolysis projects, including project location, production capacity, efficiency, source of electricity, footprint, dynamic operation characteristics, capital cost, operating cost and other parameters. Based on the modeling and analyses defined above, the project will extract findings on optimal economic dispatch of the electrolysis facilities and air quality impact.

19313: Construct and Operate Renewable Hydrogen Refueling Station

Contractor: Equilon Enterprises LLC DBA Shell Oil Products	South Coast AQMD Cost-Share	\$ 1,200,000
	Cosponsors:	
	CEC ARFVTP, GFO-17-603	8,000,000
	Toyota	1,400,000
	Equilon	1,400,000
Term: 06/30/20 – 04/01/22	Total Cost:	\$ 12,000,000

On April 6, 2018, the CEC awarded \$8 million to Equilon Enterprises LLC for construction and operation of a renewable hydrogen refueling station. Equilon will own and operate the 1,000 kg/day truck refueling station on land at the Port of Long Beach, sub-leased from Toyota, which under a separate contract with Fuel Cell Energy, will generate hydrogen using a Tri-Generation system, using biogas, to produce up to 1.27 tons per day of renewable hydrogen. The station can also use delivered hydrogen. In addition to refueling Toyota vehicles at 700 bar, South Coast AQMD co-funding will be used to refuel vehicles at 350 bar, supporting various fuel cell demonstration vehicles by multiple operators in the local ports.

21092: Participate in California Fuel Cell Partnership for Calendar Year 2020 and Provide Support for Regional Coordinator

Contractor: Frontier Energy Inc	South Coast AQMD Cost-Share	\$ 120,000
	Cosponsors:	
	7 automakers, 4 public agencies, 7 industry takeholders, 35 Full & Associate Members	1,180,000
Term: 01/01/20 – 12/31/20	Total Cost:	\$ 1,300,000

In April 1999, the California Fuel Cell Partnership (CaFCP) was formed with eight members; South Coast AQMD 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. for their portion of the CaFCP’s administration. In 2020, South Coast AQMD contributed \$70,000 for Executive membership and \$50,000 to continue support for Regional Coordinator activities.

Engine Systems/Technologies

20092: Natural Gas Engine and Vehicles Research and Development – Pent-Roof Medium-Duty Natural Gas Engine

Contractor: Southwest Research Institute	South Coast AQMD Cost-Share	\$ 475,000
	Cosponsors:	
	US Dept. of Energy	2,525,000
	Southwest Research Institute, Isuzu Technical Center of America, Inc. and Southern California Gas Company	3,000,000
Term: 10/14/20 – 04/13/24	Total Cost:	\$ 6,000,000

In April 2019, the South Coast AQMD board approved 4 projects under a natural gas vehicle research consortium made up with DOE, NREL, CEC, SoCalGas and South Coast AQMD totaling over \$26 million. This project, SwRI along with Isuzu are set to develop and new cylinder head for a 4HK Isuzu gasoline engine (ongoing project at the time at SwRI) that enables the use of natural gas fuel and achieve near-zero NOx emissions as well as integrating the new engine into a medium-duty truck equipped with hybrid-electric powertrain. The technical targets of the project include casting and building new natural gas with optimized pent-roof, develop calibration and aftertreatment system to achieve 0.02 gram NOx, achieve combined fuel economy exceeding the diesel baseline as well as minimize cost by selection the best available hybrid powertrain. The project was kicked off in early 2020 and expect to go on for 37 months from project initiation.

20122: Develop and Commercialize a Near-Zero Natural Gas Conversion System for On-Road Medium-Duty Vehicles

Contractor: Landi Renzo USA Corporation	South Coast AQMD Cost-Share	\$ 300,000
	Cosponsors:	
	Southern California Gas Company (received as pass-through funds into Fund 31)	300,0000
	Landi Renzo USA Corporation	855,0720
Term: 01/17/20 – 07/31/21	Total Cost:	\$ 1,455,072

Optimization of the recently introduced Ford 7.3 liter natural gas engine for medium-duty vehicles. Develop a commercially available engine that is certified to the CARB optional low NOx standard of 0.02 g/bhp NOx. The optimization will include modification of controller software and the latest in catalyst technology to reach near-zero NOx. Once developed, the engine will be tested using both the Federal Test Procedure for emissions certification and non-certification test cycles representative of real-world use in different vocations that are prevalent in the Basin. The use of vocational-specific test cycles will provide additional insight towards the engine's real-life emission reduction potential at the desired increased efficiency.

20316: Natural Gas Engine & Vehicles Research & Development - Plug-In Hybrid CNG Drayage Truck (PHET)

Contractor: US Hybrid	South Coast AQMD Cost-Share	\$ 500,000
	Cosponsors:	
	DOE	634,137
	CEC	860,000
	US Hybrid	858,869
Term: 06/02/20 – 12/01/23	Total Cost:	\$ 2,853,006

The DOE, NREL, CEC, and South Coast AQMD partnered to launch a research effort to increase efficiency of natural gas engines for heavy-duty vehicles. Based on DOE projections, natural gas is poised to play a key role as a versatile, low-emissions and low GHG fuel. Advances in the ability to capture methane from waste streams such as landfills, wastewater treatment plants, municipal solid waste, and livestock operations for the production of Renewable Natural Gas (RNG) adds a robust renewable alternative to conventional fuels. This project will develop the next generation of a plug-in parallel hybrid heavy duty Class 8 platform based on the near-zero-emission 8.9-liter natural gas engine (L9N) from Cummins Westport (CWI). The L9N will be paired in parallel with a comparably powered battery-electric drivetrain to produce a powertrain comparable to much larger power systems. The resulting plug-in hybrid CNG truck will have improved efficiency, reduced criteria and GHG emissions, and smart geofencing and sufficient battery storage to operate zero emission miles in sensitive areas.

Electric/Hybrid Technologies and Infrastructure

14184: DC Fast Charging Network Provider

Contractor: Green Paradigm Consulting, Inc.	South Coast AQMD Cost-Share	\$ 40,000
Term: 04/04/14 – 06/30/23	Total Cost:	\$ 40,000

This contract was funded using CEC funds and Clean Fuels funds towards hardware and installation costs. Clean Fuel Connection, Inc. (CFCI) installed 10 DC fast chargers at seven sites including the Hollywood & Highland red line metro stop, Little Tokyo gold line metro stop, Westwood LADOT parking garage, La Kretz Center for Innovation, Victoria Gardens shopping mall in Rancho Cucamonga, and Mel's Diner in Santa Monica. These chargers are maintained and operated as part of the EVgo network and provide public charging to fill gaps in corridor charging in Los Angeles and San Bernardino counties.

14375: Data Collection & Analysis of Zero-Emission Cargo Transportation (ZECT) Demonstration Trucks

Contractor: National Renewable Energy Laboratory	South Coast AQMD Cost-Share	\$ 20,000
Term: 06/26/01 – 3/31/21	Total Cost:	\$ 20,000

NREL has provided data analysis to the US DOE's Zero Emission Cargo Transport (ZECT 1) program since its commencement in 2012. Under ZECT 1 two technology integrators developed three types of zero- and near-zero- emission Class 8 drayage truck technologies, consisting of two battery electric truck platforms, one CNG series-hybrid electric truck and one LNG parallel-hybrid platform. In June 2014, South Coast AQMD entered into a three-year contract with NREL to collect and analyze data on the performance of these zero- and near-zero-emission Class 8 tractors to provide consistent and objective evaluation. Delays in vehicle development required design adjustments that resulted in the DOE extending the project twice through March 2020. The protracted project required additional time and work effort by NREL that resulted in additional funding to complete this project.

17225: Develop and Demonstrate Up to Two Class 8 Battery Electric Drayage Trucks

Contractor: Volvo Technology of America, LLC	South Coast AQMD Cost-Share	\$ 0
	Cosponsors	
	California Air Resources Board <i>(received as pass-through funds into Fund 67)</i>	353,000
Term: 06/09/17 – 12/31/21	Total Cost:	\$ 353,000

Volvo is demonstrating a newer version of a PHEV diesel hybrid Class 8 truck developed under a South Coast AQMD/DOE grant to continue refinement towards commercialization, including integration of innovative and significant C-ITS efficiency measures through its Eco-Drive software, in cooperation with LA Metro and its miniburner aftertreatment technology. The PHEV diesel hybrid truck is designed to maximize operations in zero emission mode when traveling through disadvantaged communities.

17244: Develop and Demonstrate Up to Two Class 8 Battery Electric Drayage Trucks

Contractor: Kenworth Truck Company	South Coast AQMD Cost-Share	\$ (1,184,369)
	Cosponsors	
	California Air Resources Board (reduced pass-through funds in Fund 67)	(2,067,132)
Term: 09/08/17 – 04/14/21	Total Cost:	\$ (3,251,501)

Due to some technical challenges, Kenworth is only developing two instead of four Class 8 plug-in hybrid electric trucks with zero emission operation capability. These trucks have begun their demonstration in revenue drayage service at TTSI. The trucks will operate in all-electric and in conventional hybrid electric mode using a CNG engine. This will provide 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.

18075: Lease Two 2017 Chevrolet Bolt All-Electric Vehicles for Three Years for TAO's Fleet Demonstration Program

Contractor: Selman Chevrolet Company	South Coast AQMD Cost-Share	\$ 4,068
Term: 08/18/17 – 02/18/21	Total Cost:	\$ 4,068

The South Coast AQMD 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 red carpool sticker will be utilized when out in the community. These vehicle leases were extended six months to continue mileage accumulation.

20097: Operate, Maintain and Network the EV Chargers

Contractor: Zeco Systems, Inc. DBA Greenlots	South Coast AQMD Cost-Share	\$ 155,664
Term: 02/14/20 – 02/13/23	Total Cost:	\$ 155,664

Greenlots is providing three years of maintenance and operation services for 92 Level 2 EV charging ports for public and workplace charging at South Coast AQMD headquarters. This includes handling payment of EV charging sessions, monitoring of EV chargers, dispatching and handling routine maintenance, escalating charger issues, maintaining and periodically updating hardware and software updates, and providing reporting and analysis tools through its SKY networking platform.

20125: Develop and Demonstrate Battery Electric Medium-Duty Truck

Contractor: Roush Cleantech, LLC	South Coast AQMD Cost-Share	\$ 937,500
	Cosponsors:	
	Roush Cleantech, LLC	2,062,500
	Penske Truck Leasing	200,000
Term: 03/19/20 – 03/18/22	Total Cost:	\$ 3,200,000

Demand for commercially available heavy-duty battery electric trucks continues to increase, but availability is limited to a few suppliers. Roush CleanTech will develop a medium-duty battery electric Class 6-7 commercial vehicle and demonstrate the technology with local commercial fleets. These applications are local and regional goods movement, municipal fleets, utilities, a variety of transit and shuttle bus operations, and school buses. This project will develop and demonstrate three medium-duty electric trucks and these vehicles will be used to generate actual customer use-case data to help with validation cycle requirements, as well as to obtain customer feedback on usability and performance.

20248: Economic and Workforce Impact Analysis of Electric Revolution in Southern California

Contractor: Los Angeles County Economic Development Corporation	South Coast AQMD Cost-Share	\$ 10,000
	Cosponsors:	
	Los Angeles County Economic Development Corporation and project partners	140,000
Term: 07/07/20 – 01/02/21	Total Cost:	\$ 150,000

Los Angeles County Economic Development Corporation (LAEDC) conducted the Economic and Workforce Impact Analysis of Electric Mobility Revolution in Southern California. LAEDC was founded in 1981 as a nonprofit, public-benefit organization and focuses on economic impact studies, regional industry and cluster analysis and issue studies, particularly in workforce development and labor market analysis. This contract provided a comprehensive study on the electrification of mobility in Southern California, defined as the five counties of Los Angeles, Orange, Ventura, Riverside and San Bernardino. The research and resulting report from this analysis is expected to contribute to the following aims: business attraction to Southern California, workforce development in advanced mobility, and catalyze public debate and government action regarding legislation, regulation, urban planning, taxes and incentives surrounding electric mobility to demonstrate success in transportation electrification in the region.

Fueling/ Infrastructure and Deployment (Natural Gas/Renewable Fuels)**20178: Replace Diesel School Buses with Near-Zero Emissions CNG Buses**

Contractor: Whittier Union High School District	South Coast AQMD Cost-Share	\$ 0
	Cosponsors:	
	U.S. EPA <i>(received as pass-through funds into Fund 31)</i>	196,500
Term: 02/21/20 – 11/30/34	Total Cost:	\$ 1,052,500

South Coast AQMD executed a grant for Whittier Union High School District to replace a total of five old pre-1994 diesel school buses with CNG school buses certified to meet the optional low NO_x, near-zero standard of 0.02 g/bhp-hr. The award provided a total of \$1,052,500 for the purchase of five Type D CNG school bus including sales tax. These school buses are partially funded by a U.S. EPA Airshed Grant, which were recognized into the Clean Fuels Fund. The grant award \$1,052,500, comprised of \$196,500 by the U.S. EPA Airshed Grant and \$856,000 by South Coast AQMD's AB 923 funds. The Whittier Union High School District has taken possession of five 2019 CNG school buses.

Transfer: Participation in the California Natural Gas Vehicle Partnership for Fiscal Year 2020-21 and 2021-22

Contractor: California Natural Gas Vehicle Partnership	South Coast AQMD Cost-Share	\$ 25,000
	Cosponsor	
	CNGVP Participating Members	155,000
Term: 07/01/20 – 06/30/22	Total Cost:	\$ 180,000

The California Natural Gas Vehicle Partnership (CNGVP) was formed to accelerate the development of advanced natural gas vehicle technologies to provide a benchmark for lowering emissions from petroleum-based engines and to provide a pathway to hydrogen fuel cell use in the next two decades. The South Coast AQMD spearheaded the formation of this strategic alliance, which comprises state and federal air quality agencies, transportation and energy agencies, vehicle and engine manufacturers, fuel providers, and transit and refuse hauler organizations. Partnership Steering Committee members contribute monies to fund specific projects intended to achieve the goal of the Partnership. In September 2020 the South Coast AQMD approved \$25,000 in biennial dues and South Coast AQMD's participation in the Steering Committee for the next two Fiscal years. Projects or efforts funded by the Partnership include event sponsorships such as the ACT Expo and the ReThink Methane Symposiums; enhancing and maintaining the Partnership's website; co-funding research papers to assess the in-state production of renewable natural gas and its overall carbon intensity relative to transportation fuel for new near zero NO_x emission natural gas powered heavy-duty vehicles. The next two Fiscal year period is expected to result in significantly more effective and strategic messaging efforts from the Partnership.

Technology Assessment and Transfer/Outreach

08210: Technical Assistance on Mobile Source Control Measures and Future Consultation on TAO Activities

Contractor: Sawyer Associates	South Coast AQMD Cost-Share	\$ 15,000
Term: 02/28/18 – 02/28/22	Total Cost:	\$ 15,000

The Office of Science and Technology Advancement (STA) augments in-house expertise with consultants who perform through level-of-effort technical assistance contracts. Under this contract executed in 2008, Dr. Robert F. Sawyer provides technical assistance to further develop and refine the mobile source control measures. In addition, he provides assistance in air toxics control measures, review of South Coast AQMD programs such as the Clean Fuels projects, input to greenhouse gas and energy diversity policies, and state regulatory activities, such as the ZEV and ZBus regulations. Dr. Sawyer is the former Chairman of the California Air Resources Board and has over 50 years of domestic and international experience specializing in automotive emissions, alternative fuels, air pollution and

environmental issues. He has additional experience in air pollution regulatory policy advising. Dr. Sawyer is a Professor of the Graduate School and the Class of 1935 Professor of Energy Emeritus at the University of California at Berkeley and a Visiting Professor of Energy and Environment at University College London. Dr. Sawyer serves on the Clean Fuels Advisory Committee.

12376: Technical Assistance with Alternative Fuels, Biofuels, Emissions Testing & Zero-Emission Transportation Technology

Contractor: University of California, Riverside/CE-CERT	South Coast AQMD Cost-Share	\$ 150,000
Term: 06/13/14 – 05/31/22	Total Cost:	\$ 150,000

South Coast AQMD seeks to implement aggressive programs to develop and demonstrate pre-commercial technologies for low- and zero-emission vehicles and equipment, alternative fuels, and renewable energy sources. Due to constant and rapid changes in technologies and the sheer breadth of potential projects, South Coast AQMD supplements in-house technical resources with outside expertise and assistance to evaluate and implement these demonstration projects. The College of Engineering/Center for Environmental Research and Technology (CE-CERT) is a research center at University of California Riverside dedicated to research on air quality and energy efficiency with approximately 120 investigators including 30 Ph.D. level researchers. CE-CERT will provide technical expertise to evaluate a broad range of emerging technologies in alternative and/or renewable fuels and vehicles as well as to conduct air pollution formation and control studies.

19078: Technical Assistance with Alternative Fuels, EVs, Charging and Infrastructure, and Renewable Energy

Contractor: Green Paradigm Consulting, Inc.	South Coast AQMD Cost-Share	\$ 50,000
	Cosponsors:	
	California Air Resources Board <i>(received as pass-through funds into Fund 67)</i>	161,800
Term: 09/07/18 – 09/30/22	Total Cost:	\$ 211,800

The South Coast AQMD relies on expert input, consultation and support to manage various efforts conducted under the Clean Fuels Program and TAO's many incentive programs. Green Paradigm Consulting, Inc., (GPCI) is providing technical assistance with alternative fuels, renewable energy and electric vehicles as well as outreach activities to promote, assess, expedite and deploy the development and demonstration of advanced, low and zero emissions mobile and stationary technologies. This contract is for technical and administrative support for the CARB Greenhouse Gas Reduction Fund (GGRF) Zero Emission Drayage Truck Project. In CY 2020, CARB funding was allocated to GPCI to assist in putting together quarterly progress reports, processing of invoices and supporting documentation, and reimbursement requests by funding agencies and partners.

20265: Technical Assistance with Heavy-Duty Vehicle Emissions Testing, Analyses & Engine Development & Applications

Contractor: Eastern Research Group	South Coast AQMD Cost-Share	\$ 50,000
Term: 06/17/20 – 06/15/22	Total Cost:	\$ 50,000

To promote, assess, expedite and deploy the development and demonstration of advanced, zero and near-zero emissions mobile and stationary technologies, South Coast AQMD relies on expert input and consultation. Eastern Research Group has experience and capabilities in conducting both dynamometer and in-use emissions measurements. As well as being a multi-service consulting firm that focuses on transportation, energy, environmental, economic and outreach solutions, Eastern Research Group has experienced staff with extensive qualifications in clean fuel transportation technology research, development, demonstration, planning and implementation, covering current and emerging alternative fuels and advanced propulsion technologies. Eastern Research Group has been providing support over three decades to transportation programs across the country seeking to improve air quality through advanced fuel and technology introduction, mitigation strategy implementation, and end user outreach and communication.

Various: Cosponsor 8 Conferences, Workshops and Events plus 3 Memberships

Contractor: Various	South Coast AQMD Cost-Share	\$ 141,960
	Cosponsors	
	Various	2,029,000
Term: 01/01/20 – 12/31/20	Total Cost:	\$ 2,170,960

The South Coast AQMD regularly participates in and hosts or cosponsors conferences, workshops and miscellaneous events. In CY 2020, South Coast AQMD provided funding for 8 conferences, workshops and events and 3 memberships in key stakeholder organizations, as follows: Clean Fuels Advisory Group Retreat in January and September 2020; the 2030 California Transportation Future Summit in March 2020; Hydrogen and Fuel Cells for Freight Workshop in March 2020; the PEMS Conference in March 2020; the ACT Virtual Event Series from August through November 2020; the Breath of Life Awards Virtual Gala in September 2020; the High Power Charging for Commercial Vehicles Event in September 2020; and the Renewable Gas 360 Symposium and Webinar Series from June 2020 through February 2021. Additionally, for 2020, three memberships were renewed for participation in the California Hydrogen Business Council, a member-based association representing a wide array of organizations that acts as a leading advocate for the hydrogen and fuel cell industry; Calstart, a nonprofit organization working nationally and internationally with businesses and governments to develop clean, efficient transportation solutions; and Veloz, a nonprofit organization comprised of high-powered, diverse board members uniquely qualified to accelerate the shift to electric vehicles through public-private collaboration, public engagement and policy education innovation.

Direct Pay: Procure Outreach Materials

Contractor: Prizm Imaging	South Coast AQMD Cost-Share	\$ 1,848
Term: 01/01/20 – 12/31/20	Total Cost:	\$ 1,848

South Coast AQMD's Technology Advancement Office offers funding for research, development, demonstration and deployment of transformative transportation technologies, incentive funding to accelerate fleet turnover of both on- and off-road transportation, and rebates for residential electric lawn mowers and home EV charging, among other programs. Technology assessment and outreach efforts are a small but essential part of any effective program. It is important to inform potential stakeholders and educate the public about South Coast AQMD's technology advancement efforts toward reducing pollutants and ensuring public health. In 2020, high performance vinyl decals were procured to show South Coast AQMD's support and participation of the numerous truck projects being demonstrated and deployed.

Direct Pay: Alternative Fuel Demonstration Vehicle Program Expenses

Contractor: Various	South Coast AQMD Cost-Share	\$ 229
Term: 01/01/20 – 12/31/20	Total Cost:	\$ 229

The South Coast AQMD alternative fuel vehicle demonstration program showcases new clean-fuel vehicles to public and private organizations so that potential purchasers may familiarize themselves with available low-emission technologies and to push the development of even cleaner vehicle technologies. This direct pay covers cost of service for one Honda Fuel Cell Clarity.

CLEAN FUELS PROGRAM

Progress and Results in 2020

Key Projects Completed

Given the large number and diversity of emission sources contributing to the air quality problems in the Basin, there is no single technology or “silver bullet” that can solve all the region’s problems. Only a portfolio of different technologies can successfully achieve the required emission reductions needed to meet the upcoming 2023 and 2032 air quality standards as well as the state’s 2050 climate goals. Therefore, the South Coast AQMD continues to support a wide range of advanced technologies, addressing not only the diversity of emission sources, but also the time frame to commercialization of these technologies. Projects cofunded by the South Coast AQMD’s Clean Fuels Program include emission reduction demonstrations for both mobile and stationary sources, although legislative requirements limit the use of available Clean Fuels funds primarily to on-road mobile sources. The projects funded not only expedite the development, demonstration and commercialization of zero and near-zero emission technologies and fuels, but also demonstrate the technical viability to technology providers, end-users and policymakers.

In the early years, the mobile source projects funded by the Clean Fuels Program targeted low emissions technology developments in automobiles, transit buses, medium- and heavy-duty trucks and off-road applications. Over the last several years, the focus has shifted to near-zero and zero emission technologies for medium- and heavy-duty trucks, especially those in the goods movement and freight handling industry.

Table 6 provides a list of 30 projects and contracts completed in 2020. Summaries of the completed technical projects are included in Appendix C. Selected projects completed in 2020 which represent a range of key technologies from near-term to long-term are highlighted below: (a) Low NOx Diesel Development Project; and (b) Assessment of the Air Quality and Greenhouse Gas Impacts of a Microgrid-Based Electricity System.

Low NOx Diesel Development Project

CARB initiated a three phase comprehensive study to support the current Omnibus legislation involving lower emissions standards for on-road heavy-duty vehicles and the EPA Cleaner Trucks Initiative. The original Stage 1 CARB Low NOx Demonstration Program provided an initial demonstration of the feasibility of technologies for achieving a target tailpipe NOx level of 0.02 g/hp-hr on a diesel engine platform. The second stage involved developing low- load cycles for heavy-duty diesel engines.

Phase 1 incurred a significant fuel penalty due to the engine architecture using a mini- burner and waste heat recovery. As a follow-up to these earlier programs, CARB and South Coast AQMD launched a second diesel demonstration program, the Stage 3 Low NOx Demonstration Program. The Stage 3 program focused on answering two major questions:

1. Could Low NOx levels be achieved at a smaller fuel consumption penalty?
2. Could a different and more efficient system be designed to target 0.02 NOx levels?

Significant contributions to the program came from the Port of Los Angeles, South Coast AQMD, MECA, CARB, and the US EPA.

The first task in the South Coast AQMD program was the development of a modified engine calibration that would enable an advanced aftertreatment system to reach Low NOx levels. This modified calibration was incorporated into cylinder deactivation (CDA) resulting in improved fuel efficiency and maintaining a significant increase in exhaust temperatures. Engine-out NOx during the aftertreatment warm-up period

was successfully controlled. Leveraging CDA allowed this to be done with only a small impact on cold-start GHG, while hot-start GHG levels showed a benefit compared to baseline. Following an extensive evaluation of candidate aftertreatment technologies and configurations, a final configuration was chosen, which is shown in Figure 13.

This configuration employed both a close-couple light-off Selective Catalytic Reduction (LO-SCR) and a downstream system featuring dual Diesel Exhaust Fluid (DEF) dosers, including a heated upstream dosing unit. An advanced controls system was implemented on the engine including state-of-the-art model-based dosing controls, and an integrated state-based strategy controller. The final system was calibrated to minimize NO_x emissions, while at the same time maximizing efficiency and controlling GHG emissions. The final calibration was demonstrated on a system that was hydrothermally aged to represent a full useful life of 435,000 miles. The resulting performance levels are shown in Figure 14. The system was able to reach tailpipe NO_x levels below 0.02 g/hp-hr on the federal test procedure (FTP) and Ramped Modal Cycle Supplemental Emissions Test (RMC-SET), and at 0.06 g/hp-hr for the Low Load Cycle (LLC). Further testing is expected to lower these emissions further to achieve near-zero NO_x certification.

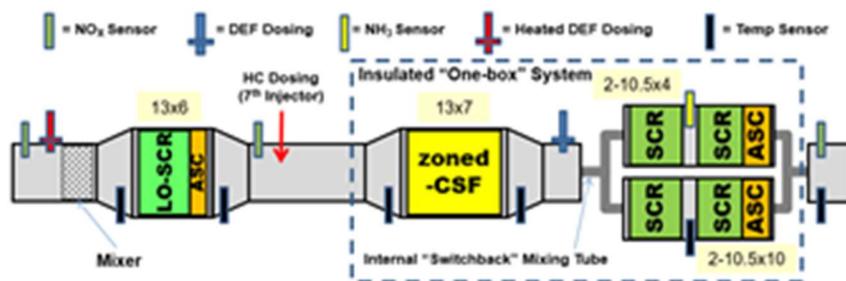


Figure 13: Final Stage 3 Aftertreatment Configuration Down-selected from Evaluation

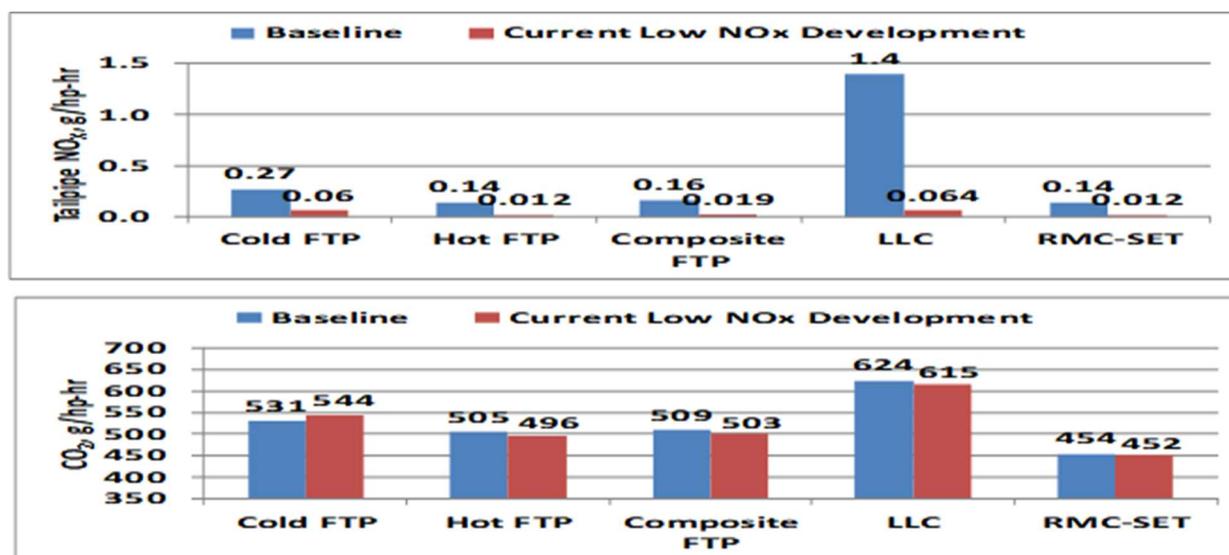


Figure 14: Performance Levels Demonstrated at the end of South Coast AQMD Funded Development on Hydrothermally Aged FUL parts (435,000 miles equivalent)

The Low NO_x configuration developed in this program has been tested over current regulatory cycles, the new LLC, and field cycles. The system has shown the potential for NO_x emission control under a wide variety of application cycles, while maintaining GHG emissions, and in some cases showing improvements. Several technology elements such as heated dosing and heated catalysts are now available for the engine and aftertreatment system and are likely to be incorporated in future on-highway engines to meet Low NO_x standards.

Assessment of the Air Quality and Greenhouse Gas Impacts of a Microgrid-Based Electricity System

The development of microgrids is gaining attention as a means of increasing the resilience and reliability of the electricity system, reducing criteria pollutant and greenhouse gas emissions of the electricity and transportation sectors, and increasing the deployment of renewable power generation resources in serving the electric load demand. The provision of electric service through microgrids has a number of potential advantages, including but not limited to:

- Reducing transmission losses and the need for transmission capacity and additional transmission lines to connect external generation
- Taking advantage of co-/poly-generation methods such as combined heat and power or district heating and cooling
- Allowing usage of otherwise stranded assets such as biogas and biomass
- Maintaining electric service in the event of an external grid outage
- Serving as a hub for grid-to-vehicle (G2V) charging and vehicle-to-grid (V2G) services for battery electric vehicles, and hydrogen fueling for fuel cell electric vehicles and V2G services for plug-in fuel cell electric vehicles.

As microgrids become prevalent, capacity for electricity generation which was previously outside the Basin will be retired and replaced with new capacity inside of the Basin. The potential of microgrids to substantially reduce the criteria pollutant emissions in southern California depend entirely on the design of the microgrids. When microgrids are used to support alternative transportation refueling (electric and hydrogen) the emission reduction benefits are increased. This project is the first to explore microgrid design features that facilitate zero emission of both criteria pollutant and greenhouse gasses with a focus on the following three tasks.

Task 1. Fuel Cell Technology for Industrial and Petroleum Refinery Microgrids

Two different types of fuel cells are considered in this work: Solid Oxide Fuel Cells (SOFC) and Molten Carbonate Fuel Cells (MCFC). Two approaches individually and in combination are considered: 1) greenfield applications where SOFC replace a productive process, e.g., power plant, steam methane reforming (SMR); and 2) retrofit applications, with MCFC assumed to be placed downstream of exhaust gas streams as a post-combustion system, which would involve every source of emissions.

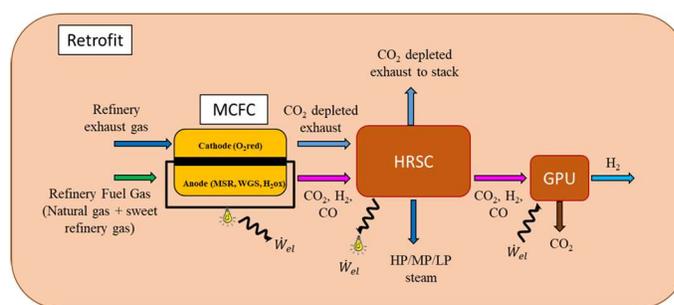


Figure 15: Retrofit configuration using MCFCs (HRSC: Heat Recovery Steam Cycle; GPU: Gas Processing Unit; MSR: Methane Stream Reforming; WGS: Water Gas Shift)

Scenarios are assessed using detailed thermodynamic models to determine the feasibility and performance within the scenario configurations including emission reductions for a given refinery deployment scenario. Emission changes are then mapped to a 2035 emissions inventory quantitatively, and spatially and temporally resolved for the location and activity of all refineries in California. The Community Multi-scale Air Quality model (CMAQ) is then used to simulate chemistry and transport within the atmosphere to resolve impacts on primary and secondary pollutant concentrations

including ozone and fine particulate matter (PM_{2.5}) from fuel cell deployment. Using CMAQ, summer and winter meteorological episodes are evaluated to analyze the effects of changing emissions during high pollutant formation conditions in California.

Fuel cell systems can feasibility be integrated into petroleum refineries in various ways to achieve emission reductions for both pollutants and GHG, although challenges related to the complexity and scale of existing refineries require further study. Emission reductions for the scenarios in this work scale with the aggressiveness of fuel cell deployment from relatively minor up to 66% of total refinery NO_x for the widespread use of MCFC. When applied to all refineries, the largest NO_x reductions occur in northern California with lesser impacts in Basin. Conversely, reductions in other pollutants including VOC are greater in Basin relative to NO_x, and more equivalent to those in northern California. The trends have AQ implications as both are precursor emissions for ozone and secondary PM_{2.5}. Emission reductions translate to a range of possible AQ impacts. For an aggressive MCFC deployment, ozone reductions peak at -2.6 ppb. Improvements in PM_{2.5} for summer are substantial, exceeding 8 µg/m³ in the Basin and occurring in other regions of the State. Similarly, improvements reach 10 µg/m³ in winter in Basin, highlighting the importance of VOC emissions in secondary PM_{2.5} formation pathways.

Task 2. Assess the Emissions and Air Quality Impacts of Renewable Fuel Blending in the Natural Gas System

Determining the change in emissions from a fuel composition shift to H₂ blends requires assessment of impacted combustion devices. UCI has developed and demonstrated a platform using in-lab testing and numerical modeling to investigate emissions and stabilities with different fuel compositions for combustion equipment. The platform was used to analyze the formation of NO_x and CO when burning mixtures of NG with H₂ in industrial applications including different configurations of turbine combustors, boiler burners, radiant tubes, and porous burners. Additionally, the same method was used to assess the combustion performance of residential and commercial appliances including cooktop, oven and broiler burners, central forced air furnaces, and water heaters. Additional devices not included in the previous work were assessed using a detailed review of the literature. Numerous aspects complicate a clear understanding of how H₂ addition may effect emissions including numerous potential pathways and quantities of H₂ production, the size and complexity of the NG system, how the diverse range of end-use sources may be affected, lack of available data, and others. Thus, assumptions are made to feasibly develop scenarios and should be considered in interpreting the results including:

- Scenarios assume 5%, 16%, and 20% by volume H₂ blending in the NG system
- Blends are perfectly mixed throughout the entire NG system in California
- End-use devices are not optimized for operation on H₂/NG blends
- Only stationary sources are impacted
- Only NO_x and CO are impacted

Emission changes are mapped to a 2035 emissions inventory quantitatively, and spatially and temporally resolved for the location and activity of end-use equipment. The Community Multi-scale Air Quality model (CMAQ) is then used to simulate chemistry and transport within the atmosphere to fully resolve impacts on primary and secondary pollutant concentrations including ozone and fine particulate matter (PM_{2.5}) from H₂ blending. Using CMAQ, summer and winter meteorological episodes are evaluated to analyze the effects of changing emissions during high pollutant formation conditions in California. In addition to the assumptions listed above, scenarios are defined by decisions regarding the mapping of NG-consuming boilers, steam generators, and equipment included in the emission inventory as “Other”. To establish a range of impacts (both positive and negative) a “Best Case” and “Worst Case” for each H₂ blend level is established. Projected impacts on state-wide NO_x range from a 6% decrease to a 4% increase demonstrating the range of effects from transitions in NG system fuel composition and the lack of current understanding of many important factors that will ultimately determine the real-world effects. AQ impacts follow suit, e.g., ozone changes vary from -2.4 to +1.6 ppb in the 20% Best and Worst Cases, respectively. Spatially, the largest impacts occur in the Basin with importance given the large populations and currently degraded AQ.

Similar impacts are noted for PM_{2.5} in winter and summer with peak changes in the Central Valley and Basin with similar importance.

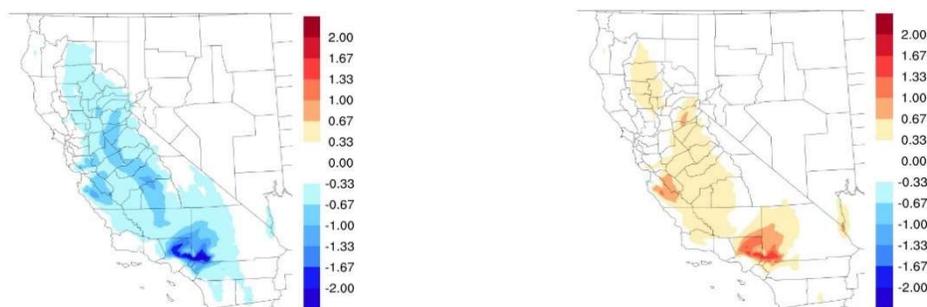


Figure 16: Difference in summer MD8H ozone (ppb) for the 20% Best Case(left) and the 20% Worst Case(right)

Task 3. Comparative Study on Environmental-Economic Impacts of Fuel Cell and Battery-Electric Buses within a Microgrid

As zero-emission vehicles increase, the development of microgrids is critical as a means of increasing the resilience and reliability of the electricity system, increasing the deployment of renewable power generation resources in serving the electric load demand, and serving as a hub for the merging of the electricity and transportation sectors, which together represent the major source of criteria pollutant emissions. The wider deployment of battery electric and fuel cell electric heavy-duty vehicles has already started, and it is expected that their penetration will increase energy demand for their operation. Therefore, it is essential to coordinate charging/fueling of these vehicles, especially integrate these zero-emission vehicles in microgrids. Microgrids can enable improving the overall energy efficiency and integrating more and more zero-emission vehicles for fleet operators.



Figure 17: Anteater Express Zero-Emission Buses

Anteater Express is the first fully zero-emission fleet in the state of California, and the first transit agency in the country to have a mix of zero-emission buses (ZEBs) in operation with 20 battery electric buses (BEBs) and one fuel cell electric buses (FCEBs). The simultaneous operation of battery electric and hydrogen buses provides a unique opportunity to develop an evaluation framework under consistent conditions. The data collected from the fleet enabled a comprehensive comparison of the two technologies and were used in statistical analysis to assess the performance of ZEBs and assess impact of various factors on overall performance of different bus technologies.

Multiple models were developed in the project to determine a driving cycle representative of Anteater Express routes which was then used in the fuel efficiency model to compare energy consumption of various bus powertrains. A detailed Life Cycle Assessment (LCA) analysis was done to assess economic and environmental impact of different ZEBs, and a strategy was developed to optimize the technology-mix of the a zero-emission in order to help transit agencies transition to a zero-emission fleet without impacting their service and routes.

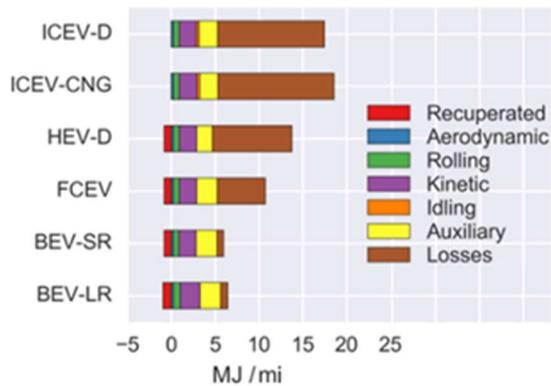


Figure 18: Energy Consumption per Mile for Various Powertrains

Results of the study include comparison of total cost of ownership, economic and environmental impacts, and overall assessment of FCEBs and BEBs. Environmental impacts included emissions criteria pollutants (NO_x, PM) and greenhouse gases. Not only the tailpipe emissions are 100% eliminated the overall life-cycle emissions are also reduced with deployment of BEBs and FCEBs. The extend to reduction depends on the fuel pathways and delivery, but for similar pathways, BEBs have lower emissions.

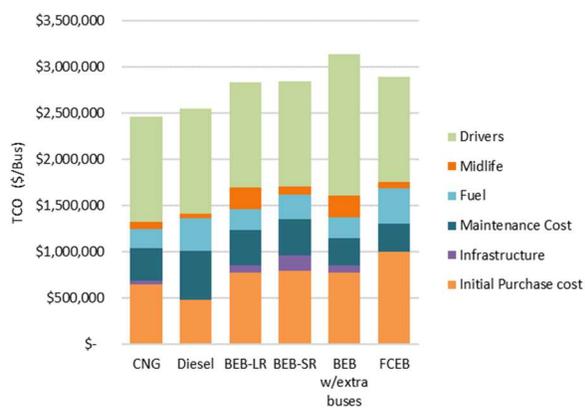


Figure 19: Total Cost Ownership for Various Powertrain Technology Buses

The use of fuel cell systems at industrial facilities can provide notable improvements in regional levels of ozone and PM_{2.5} which in turn will provide substantial benefits to human health within California. The addition of H₂ may also provide important AQ co-benefits to sensitive urban regions. Conversely, care must be taken to avoid AQ worsening in those same areas. the overall criteria pollutant and greenhouse gases are reduced with the deployment of BEBs and FCEBs and has the potential to improve air quality as well as helping mitigate and reduce impacts of climate change.

Table 5: Projects Completed between January 1 & December 31, 2020

Contract	Contractor	Project Title	Date
Hydrogen/Mobile Fuel Cell Technologies and Infrastructure			
15609	ITM Power, Inc.	Installation of Riverside Renewable Hydrogen Fueling Station	Jan 2020
15619	H2 Frontier, Inc.	Installation of Chino Renewable Hydrogen Station	Dec 2020
19191	University of California, Irvine	Development of Solid Oxide Fuel Cell and Gas Turbine (SOFC-GT) Hybrid Technology	Jun 2020
Engine Systems/Technologies			
17393	Southwest Research Institute	Development of an Ultra-Low Emission Diesel Engine for On-Road Heavy-Duty Vehicles	May 2020
18211	West Virginia University Innovation Corporation	Develop Thermal Management Strategy Using Cylinder Deactivation for Heavy-Duty Diesel Engines	Jun 2020
Electric/Hybrid Technologies and Infrastructure			
13433	US Hybrid Corporation	ZECT I : Develop and Demonstrate Two Class 8 Zero-Emission Electric Trucks	Mar 2020
14052†	Altec Capital Services, LLC	Lease of 2 PHEVs	Jan 2020
16022†	Gas Technology Institute	ZECT II - Develop & Demonstrate One Class 8 CNG Hybrid Electric Drayage Truck	Nov 2020
16046	Transportation Power, Inc.	ZECT I - Develop & Demonstrate Two Class 8 CNG Plug-In Hybrid Electric Drayage Trucks	Mar 2020
17029	University of California, Irvine	Demonstration and Evaluation of Plug-In Smart Charging at Multiple Electric Grid Scales	Dec 2020
18122	Clean Energy	Southern California Trucking Demonstration of Near-Zero ISX12N Beta Engines	Jan 2020
Fueling Infrastructure and Deployment (NG/RNG)			
12667	West Covina Unified School District	Upgrade CNG Fueling Station	Mar 2020
16075	City of Desert Hot Springs	Purchase 1 Heavy-Duty CNG Powered Truck	Mar 2020
16244†	CR & R, INC.	Renewable Natural Gas Production & Vehicle Demonstration Project	Mar 2020
Fuel/Emissions Studies			
15680	National Renewable Energy Laboratory	Develop Detailed Technology and Economics Based Assessment for Heavy-Duty Advanced Technology Development	Jun 2020
17277	University of Southern California	Conduct Market Analysis for Zero-Emission Heavy-Duty Trucks in Goods Movement	Feb 2020
18206	University of California, Irvine	Assess Air Quality and Greenhouse Gas Impacts of a Microgrid-Based Electricity System in Southern California	Jun 2020

Table 5: Projects Completed Between January 1 & December 31, 2020 (cont'd)

Contract	Contractor	Project Title	Date
Emissions Control Technologies			
17278	University of Southern California	Develop Freight Loading Strategies for Zero-Emissions Heavy-Duty Trucks in Goods Movement	Feb 2020
Technology Assessment and Transfer/Outreach			
12453†	TECH COMPASS	Technical Assistance with Alternative Fuels, Fuel Cells, Emissions Analysis, and Aftertreatment Technologies	May 2020
16200	California State University, Los Angeles	Cosponsor Regional Universities for US DOE EcoCAR 3 Competition	Apr 2020
20046†	RadTech International	Cosponsor the RadLaunch Program	Jun 2020
20098†	Coordinating Research Council, Inc.	Cosponsor the 30th Real World Emissions Workshop	Apr 2020
20104†	Gladstein, Neandross & Associates LLC	Cosponsor the 2020 Renewable Gas 360 Symposium	Feb 2020
20233†	California Hydrogen Business Council	Cosponsor the CA Hydrogen & Fuel Cell Summit	Mar 2020
20264†	CALSTART, Inc.	Cosponsor the 2030 California Transportation Future Summit	Jun 2020
21079†	Gladstein, Neandross & Associates LLC	Cosponsor 2020 ACT Virtual Event Series	Dec 2020
21093†	BREATHE California Of Los Angeles County	Cosponsor 2020 Breath of Life Awards Virtual Gala	Oct 2020

†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

2021 Plan Update

In 1988, SB 2297 (Rosenthal) was signed into law (Chapter 1546) establishing South Coast AQMD's Clean Fuels Program and reaffirming the existence of the Technology Advancement Program (TAO) to administer the Clean Fuels Program. The funding source for the Clean Fuels Program is a \$1 motor vehicle registration surcharge that 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 continues to fund a broad array of technologies spanning near- and long-term implementation. Similarly, planning will remain an ongoing activity for the Clean Fuels Program, which must remain flexible to address evolving technologies as well capitalize on the latest progress in technologies, research areas and data.

Every year, South Coast AQMD re-evaluates the Clean Fuels Program to develop a Plan Update based on reassessment of clean fuel technologies and direction of the South Coast AQMD Board. This Plan Update for CY 2021 targets several projects to achieve near-term emission reductions needed for the South Coast to meet health-based NAAQS.

Overall Strategy

The overall strategy of TAO's Clean Fuels Program is based on emission reduction technology needs identified through the AQMP process and South Coast AQMD Board directives to protect the health of the approximately 18 million residents (nearly half the population of California) in the 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 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 commercial adoption of a mix of currently available technologies as well as the expedited development and commercialization of clean fuel mobile and stationary advanced technologies in the Basin to achieve air quality standards. The 2016 AQMP identifies a 45 percent reduction in NO_x required by 2023 and an additional 55 percent reduction by 2031 to achieve ozone standards of 80 ppb and 75 ppb, respectively. The majority of these NO_x reductions must come from mobile sources, both on- and off-road. Notably, South Coast AQMD is currently only one of two regions in the nation designated as an extreme nonattainment area (the other region is San Joaquin Valley). Furthermore, in April 2019, South Coast AQMD requested a voluntary re-classification from U.S. EPA of the 1997 8-hour federal standard ozone for Coachella Valley to "extreme" status. Hotter summer months and climate change in the region have presented challenges that require additional time to reach attainment.

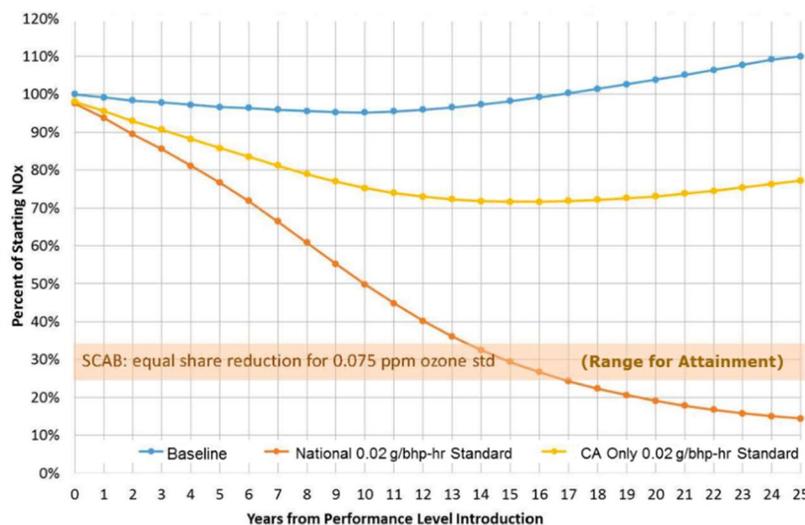
While current state efforts in developing regulations for on- and off-road vehicles and equipment are expected to reduce NO_x emissions significantly, they will be insufficient to meet South Coast AQMD needs, particularly in terms of timing. The 2016 AQMP identified a means to achieving the NAAQS through regulations and incentives for near-zero and zero emission technologies that are commercial or nearing commercialization. This strategy requires a significantly lower state and national heavy-duty truck

engine emissions standard with the earliest feasible implementation date, significant additional financial resources, and accelerated fleet turnover on a massive scale.

On June 3, 2016, in light of the need for a more stringent national heavy-duty truck engine emissions standard to achieve mobile source emission reductions, South Coast AQMD petitioned the U.S. EPA to initiate rulemaking for a lower national NOx standard for heavy-duty engines. A national NOx standard (as opposed to a California standard) for on-road heavy-duty vehicles is estimated to result in NOx emission reductions from this source category from 70 to 90 percent in 14 to 25 years, respectively. While CARB has adopted more stringent in-use fleet rules which require older trucks and buses to upgrade to newer, cleaner engines meeting the 2010 standard of 0.2 g/bhp-hr by 2023, CARB estimates that 60 percent of total heavy-duty vehicle miles traveled in the Basin are from vehicles purchased outside of California. This points to the need for a more stringent federal as well as state standard for on-road heavy-duty vehicles.

Given that the Basin must attain the 75-ppb ozone NAAQS by 2031, a new on-road heavy-duty engine NOx emission standard is critical given the time needed for OEMs to develop and produce compliant vehicles, and for national fleet turnover to occur.

Figure 20 shows the difference in NOx reductions from on-road heavy-duty trucks under three scenarios: baseline (no change in the low NOx standard) in blue, a low NOx standard adopted only in California in yellow, and lastly, a federal low NOx standard in orange.



Source: Presentation by Mr. Cory Palmer, ARB at the Symposium on California's Development of its Phase 2 Greenhouse Gas Emission Standards for On-Road Heavy-Duty Vehicles (April 22, 2015)

Figure 20: NOx Reduction Comparison: No New Regulations vs Low NOx Standard in California only vs National Standard

The U.S. 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. On November 13, 2018, U.S. EPA announced the Cleaner Truck Initiative, and on January 6, 2020, they issued an Advance Notice of Proposed Rule to reduce NOx emissions from on-road heavy-duty trucks starting as early as model year 2026. However, CARB forged ahead, announcing its own Low NOx Omnibus rule, which was adopted by CARB Board in summer 2020. The new regulation will require lower NOx standard starting in model year 2024 a goal harmonize with U.S. EPA Cleaner Truck Initiative of a national NOx stand of 0.02 g/bhp-hr in 2027, 90% below today's NOx standard. Although both are welcome news, the

timing is too late to help the South Coast AQMD meet its 2023 federal attainment deadline. So, despite the milestone progress, commercialization and deployment of cost-effective near-zero engines are still needed to meet near-term goals.

The findings from the MATES IV¹² study (May 2015), which included local scale studies near large sources such as ports and freeways, reinforced the importance of the need for transformative transportation technologies, especially near the goods movement corridor to reduce NOx emissions. In mid-2017, South Coast AQMD initiated MATES V to update the emissions inventory of toxic air contaminants, as well as modeling to characterize risks, including measurements and analysis of ultrafine particle concentrations typically emitted or subsequently formed from vehicle exhaust. The MATES V report is expected to be finalized by early 2021. In the meantime, U.S. EPA approved the use of the CARB EMFAC 2017 model for on-road vehicles for use in the State Implementation Plan and transportation conformity analyses, which assesses emissions from on-road vehicles including cars, trucks and buses. The off-road model, which assesses emissions from off-road equipment such as yard tractors, top handlers, and rubber tire gantry cranes, is being replaced by category specific methods and inventory models being developed for specific regulatory support projects.

A key strategy of the Clean Fuels Program, which allows significant leveraging of Clean Fuels funding (historically \$4 to every \$1 of Clean Fuels funds), is its public-private partnerships with private industry, technology developers, academic institutions, research institutions and government agencies. Since 1988, the Clean Fuels Program provided more than \$340 million toward projects exceeding \$1.5 billion. In 1998, South Coast AQMD's Carl Moyer Program was launched. The two programs produce a unique synergy, with the Carl Moyer Program (and other subsequent incentive programs) providing the necessary funding to push market penetration of technologies developed and demonstrated by the Clean Fuels Program. This synergy enables South Coast AQMD to act as a leader in technology development and commercialization efforts targeting reduction of criteria pollutants. Since the Carl Moyer Program began in 1998, South Coast AQMD has implemented other incentive programs (i.e., Volkswagen Mitigation, Proposition 1B-Goods Movement, Community Air Protection Program and Voucher Incentive Program), currently with cumulative funding of \$250 million annually. The 2016 AQMP also included control measures to develop indirect source regulations and strengthen the fleet rules to take advantage of incentives to further accelerate emission reductions.

Despite several current California incentive programs to deploy cleaner technologies and offset the higher procurement costs of cleaner technologies, significant additional resources are still needed for the scale necessary to achieve the NAAQS for this region. Meanwhile, South Coast AQMD is seeking to commercialize alternative low-NOx technologies that do not rely on incentives by providing customer fuel savings with low payback periods. There are several emerging key technology that will provide the NOx and GHG co-benefit which might no longer require vehicle purchase incentives.

As technologies move towards commercialization, such as heavy-duty battery electric trucks, the Clean Fuels Program has been able to partner with large OEMs, such as Daimler and Volvo to deploy these vehicles in large numbers. These OEM partnerships allow the Program to leverage their research, design, engineering, manufacturing, sales and service, and financial resources that are needed to move advanced technologies from the laboratories to the field and into customers' hands. The OEMs have the resources to develop advanced technology vehicles such as battery electric and hydrogen fuel cells, manufacture in large quantities and distribution network to support sales across the state. To obtain the emission reductions needed to meet NAAQS, large numbers of advanced technology clean-fueled vehicles must be deployed across our region and state.

¹² <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>

Figure 21 outlines a developmental progression for technology demonstration and deployment projects funded by the Clean Fuels Program and the relationship incentive programs administered by TAO play in that progression. The South Coast AQMD's Clean Fuels Program funds various stages of technology projects, typically ranging from Technology Readiness Levels 3-8, to provide a portfolio of technology choices and to achieve near-term and long-term emission reduction benefits.



Figure 21: Technology Readiness Levels

While the state continues to focus their attention on climate change (GHG reductions), South Coast AQMD remains committed to achieving NO_x reductions. Many of the technologies that address the Basin's needed NO_x reductions align with the state's GHG reduction efforts. In 2016, U.S. EPA noted that the transportation sector contributed 28 percent of overall GHG emissions. Due to these co-benefits, South Coast AQMD has been successful in partnering with the state and public/private partnerships to leverage its Clean Fuels funding extensively.

Program and Funding Scope

This 2021 Plan Update includes projects to research, develop, demonstrate and advance deployment (RD³) a variety of technologies, from near-term to long-term, that are intended to address the following challenges:

- 1) implementation of new and changing federal requirements, such as the more stringent 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 nearing commercialization and deploying commercially ready technologies; and
- 3) continued development of near-term cost-effective approaches and long-term technology development.

The overall scope of projects in the 2021 Plan Update needs to remain sufficiently flexible to address new technologies and control measures identified in the 2016 AQMP, dynamically evolving technologies, and new research and data. The latter might include findings from MATES V and revised emission inventories in EMFAC 2017.

Within the core technology areas defined later in this section, project objectives range from near term to long term. The South Coast AQMD 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 Clean Fuels Program projects are described below, from near term to long term.

- *Deployment* or technology *commercialization* efforts focus on increasing utilization of clean technologies in conventional applications, promising immediate and growing emission reduction benefits. These are expected to result in commercially available products as early as 2020, including obtaining required certifications from CARB and U.S. EPA. It is often difficult to transition users

to non-traditional technologies or fuels due to higher incremental costs or required changes to user behavior, even if these technologies or fuels offer significant benefits. In addition to government's role to reduce risk by funding technology development and testing, it is also necessary to offset incremental costs through incentives to accelerate the use of cleaner technologies. The increased use of these clean fuel technologies also depend on efforts to increase stakeholder confidence that these technologies are viable and cost-effective in the long term.

- Technologies ready to begin field *demonstration* in 2021 are expected to result in commercially available products in the 2023-2025 timeframe, and technologies being demonstrated generally are in the process of being certified by CARB and U.S. EPA. Field demonstrations provide a controlled environment for manufacturers to gain real-world experience and address end-user issues that arise prior to the commercial introduction of the technologies. Field demonstrations provide real-world evidence of performance to allay any concerns by early adopters.
- Finally, successful technology *development* projects are expected to begin during 2021 with duration of two or more years. Additionally, field demonstrations to gain long term verification of performance may also be needed prior to commercialization. Certification and commercialization would be expected to follow. Development projects identified in this plan may result in technologies ready for commercial introduction as soon as 2021-2025. Projects may involve the development of emerging technologies that are considered long-term and higher risk, but with significant emission reductions potential. Commercial introduction of such long-term technologies would not be expected until 2026 or later.

Core Technologies

The following technologies have been identified as having the greatest potential to enable the emission reductions needed to achieve NAAQS and thus form the core of the Clean Fuels Program.

The goal is to fund viable projects in all categories. However, not all project categories will be funded in 2021 due to funding limitations, and the focus will remain on control measures identified in the 2016 AQMP, with consideration for availability of suitable projects. The project categories 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 South Coast AQMD to leverage its funds with other funding partners to expedite the demonstration and deployment of clean fuel technologies in the Basin. A concerted effort is continually made to form public private partnerships to maximize leveraging of Clean Fuels funds.

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. Elements of the core hybrid electric system may overlap.

Priorities may shift during the year in keeping with the diverse and flexible “technology portfolio” approach or to leverage opportunities such as cost-sharing by the state or federal government or other entities. Priorities may also shift to address specific technology issues which affect residents within the South Coast AQMD’s jurisdiction. For example, AB 617, signed by the Governor in mid-2017, will implement actions designated in CERPs by five AB 617 communities within the South Coast region, and additional flexibility will be needed to develop new strategies and technologies for those disadvantaged communities.

The following nine core technology areas are listed by current South Coast AQMD priorities based on the goals for 2021.

Hydrogen/Mobile Fuel Cell Technologies and Infrastructure

The South Coast AQMD supports hydrogen infrastructure and fuel cell technologies as one option in the technology portfolio. It is dedicated to assisting federal and state government programs to deploy light-, medium-, and heavy-duty fuel cell vehicles (FCV) by supporting the required hydrogen fueling infrastructure.

Calendar Years 2015-2019 were a critical timeframe for the introduction of hydrogen fueling infrastructure. In 2014, Hyundai introduced the Tucson FCV for lease. In 2015, Toyota commercialized the Mirai, the first FCV available to consumers for purchase. In December 2016, Honda started delivering its 2017 Honda Clarity FCV. Other commercially available FCVs include the Audi H-Tron Quattro, Chevrolet Colorado ZH2, Hyundai Nexso, Mercedes-Benz GLC F-Cell and Nissan X-Trail. With lead times on retail level hydrogen fueling stations requiring 18-36 months for permitting, construction and commissioning, plans for future stations need to be implemented. While coordination 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 for light-duty vehicles are still needed. Changes to CARB's Low Carbon Fuel Standard (LCFS) regulation to provide credit for low carbon fuel capacity in addition to throughput should enable station operators to remain solvent during the early years until vehicle numbers ramp up. Lastly, a deliberate and coordinated effort is necessary to ensure that light-duty retail hydrogen stations are developed with design flexibility to address specific location limitations, robust hydrogen supply, and refueling reliability matching those of existing gasoline and diesel fueling stations. The current network of hydrogen fueling stations to support the current number of light-duty FCVs on the road is insufficient, and supply of hydrogen and additional hydrogen production continue to be challenges that need to be addressed.

In 2018, Former Governor Brown issued Executive Order (EO) B-48-18. Among other provisions, the order sets an additional hydrogen station network development target of 200 stations by 2025. Meeting this new ambitious target clearly requires accelerated effort on the part of the State to ensure its achievement. The EO additionally sets a target for 5 million ZEVs by 2030; FCVs are expected to comprise a significant portion of this future ZEV fleet. In September 2019, Governor Newsom issued EO N-19-19 on Climate Change, which directs CARB to push OEMs to produce even more clean vehicles, and to find ways for more Californians, including residents in disadvantaged communities, to purchase these vehicles on the new and used markets. CARB is tasked with developing new grant criteria for clean vehicle programs to encourage OEMs to produce clean, affordable cars and propose new strategies to increase demand in the primary and secondary markets for ZEVs. Finally, CARB is taking steps to strengthen existing or adopt new regulations to achieve GHG reductions within the transportation sector.

Fuel cells can play a role in medium- and heavy-duty applications where battery recharge time, although improving, is insufficient to meet fleet operational requirements. The CaFCP's 2030 Vision¹³ released in July 2018 provides a broader framework for the earlier Medium- and Heavy-Duty Fuel Cell Electric Truck Action Plan completed in October 2016, which focused on Class 4 parcel delivery trucks and Class 8 drayage trucks with infrastructure development and established metrics for measuring progress.

As part of the \$83 million Shore-to-Store project, for which the Clean Fuels Program committed \$1 million, Toyota and Kenworth will deploy 10 Class 8 fuel cell trucks and Equilon (Shell) will build two large capacity hydrogen fueling stations in Wilmington and Ontario. Kenworth will leverage the development on the fuel cell truck demonstrated in South Coast AQMD's ZECT 2 project and integrate Toyota's fuel cells into the Kenworth trucks. These fuel cell trucks will be deployed at fleets including UPS, Total Transportation Services, Southern Counties Express, and Toyota Logistics Services at the Ports of Los Angeles and Port Hueneme, as well as other fleets in Riverside County. In 2019, Toyota displayed a second

¹³CaFCP's *The California Fuel Cell Revolution, A Vision For Advancing Economic, Social, and Environmental Priorities (Vision 2030)*, September 4, 2018.

prototype Class 8 fuel cell truck at the Port of Long Beach, including plans for a new 1,000 kg/day heavy-duty hydrogen fueling station using hydrogen produced by a new tri-generation fuel cell.

Another player in the heavy-duty fuel cell truck space is Cummins who recently purchased Hydrogenics and EDI to develop fuel cell power trains. Cummins is currently working on the ZECT 2 and a CEC/South coast AQMD supported project that will develop and demonstrate fuel cell drayage trucks. Also, Volvo and Daimler this year announced a joint venture to develop fuel cell powered trucks. South Coast AQMD has created many alliances with the large OEM's and will continue to fund projects with these companies over the next year to develop heavy-duty fuel cell trucks.

The CaFCP *Fuel Cell Electric Bus Road Map* released in September 2019 supports implementation of CARB's Innovative Clean Transit and Zero Emission Airport Shuttle regulations. As part of the \$46 million Fuel Cell Electric Bus Commercialization Consortium project, for which the Clean Fuels fund contributed \$1 million, the Center for Transportation and Environment (CTE) partnered with New Flyer, Trillium, and Orange County Transportation Authority (OCTA) to deploy 10 40-foot New Flyer XHE40 fuel cell transit buses and install a liquid storage hydrogen station capable of fueling up to 50 fuel cell transit buses at OCTA. This project also deployed 10 fuel cell transit buses and a hydrogen station upgrade at Alameda-Contra Costa Transit District (AC Transit). The transit buses were delivered in December 2019 and liquid hydrogen station was completed in January 2020, and the demonstration and data collection period for the buses and station started in February 2020. SunLine Transit Agency was the recipient of a U.S. EPA Targeted Airshed grant in June 2020 to deploy five fuel cell transit buses, in addition to their existing fleet of 16 fuel cell and four battery electric transit buses and five buses that will be deployed by the end of 2020 as well as a recently upgraded 900 kg/day hydrogen station capable of supporting up to 30 fuel cell transit buses.

The 2021 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 from multiple providers, including energy stations with electricity and hydrogen co-production and higher pressure (10,000 psi) hydrogen dispensing and scalable/higher throughput;
- development of additional sources of hydrogen production and local generation of hydrogen for fueling stations far from local production sources to better meet demand of FCVs;
- 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 commercial harbor craft applications such as port cargo handling equipment, switcher locomotives and tugs;
- demonstration of fuel cell vehicles in controlled fleet applications in the Basin;
- development and implementation of strategies with government and industry to build increasing scale and renewable content 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;
- coordination with fuel cell vehicle OEMs to develop an understanding of their progress in overcoming barriers to economically competitive fuel cell vehicles and develop realistic scenarios for large scale introduction; and
- repurpose of fuel cells and hydrogen tanks for other, secondary energy production and storage uses, as well as reusing fuel cells and hydrogen tanks, and approaches to recycle catalysts and other metals.

Engine Systems/Technologies

To achieve the emissions reductions required for the Basin, internal combustion engines (ICEs) used in the heavy-duty sector will require emissions that are 90 percent lower than the 2010 standards as outlined in CARB's recently adopted Heavy-Duty On-Road "Omnibus" Low NOx regulation and EPA's Cleaner Trucks Initiative. In 2016, commercialization of the Cummins 8.9 liter (8.9L) natural gas engine achieving 90 percent 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 South Coast AQMD and other project partners, also achieved certification of the 12L natural gas engine. The 12L 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. New for 2020, Cummins certified its 6.7L natural gas engine to 0.02 g/bhp-hr NOx for the first time, further ensures viability of near-zero engine options for all market segments. For trucks that cannot utilize the Cummins near-zero emission engines, the 2021 Plan Update includes potential projects to develop, demonstrate and certify natural gas and propane engines in the 6-8L range. Although no near-zero emission diesel technology is commercially available today, South Coast AQMD has been working closely with CARB and others on defining technology pathways via several projects, including the Ultra-Low Emissions Diesel Engine Program at SwRI, opposed piston engine development with Achates Power Inc., and Thermal Management using Cycle Deactivation Project with West Virginia University. The 2021 Plan Update included on-road truck demonstrations for the SwRI as well as the Achates projects, these demonstration efforts are considered key milestones in driving up the TRL level toward full commercialization. CDA has proven to be a key engine enabling technology for controlling exhaust temperature and increasing efficiency. These demonstration projects, although not yet complete, show that near-zero emission diesel technologies are feasible via advanced engine and aftertreatment or optimized engine design and calibration. The Plan Update continues to incorporate pursuit of cleaner engines and hybrid powertrains for the heavy-duty sector. Future projects will support the development, demonstration and certification of engines and powertrains that can achieve these massive emission reductions using an optimized systems approach. In December 2018, South Coast AQMD participated in the Natural Gas Engine & Vehicle R&D Source Review Panel meeting in Sacramento to review, discuss and prioritize several natural gas engine and vehicle technology projects that increase efficiencies using advanced engines or hybrid drive trains.

The 2021 Plan includes potential projects that the South Coast AQMD might participate in with federal and state agencies towards these efforts. Specifically, these projects are expected to target the following:

- development of ultra-low emissions and improved higher efficiency natural gas engines for heavy-duty vehicles and high horsepower applications projects that move these technologies to a higher technology readiness level and eventual commercialization;
- 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 CNG hybrid vehicle technology;
- development and demonstration of diesel hybrid vehicle technology;
- 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, cylinder deactivation, improved exhaust or recirculation systems, and aftertreatment devices; and
- development of low load and cold start technologies for hybrids and diesels where high-level emissions occur.

CARB and U.S. EPA's recent initiation to create national low NOx standard for on-highway heavy-duty engines will further motivate manufacturers to develop lower-NOx emitting technologies expected to result

in greater NOx emission reductions than a California only low NOx standard for on-road heavy-duty engines.

Electric/Hybrid Technologies and Infrastructure

In an effort to meet 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 wide-scale electrification of transportation technologies. South Coast AQMD supports projects to address concerns regarding cost, battery lifetime, electric range, charging infrastructure and OEM commitment. Integrated transportation systems can encourage further emission reductions by matching EVs to typical consumer and fleet duty cycles and demands. Additionally, the challenges of installing infrastructure both in terms of costs and construction impacts needs to be better understood.

There are separate challenges associated with light-duty electric vehicles (EVs) vs. medium- and heavy-duty EVs, which are on opposite ends of the commercialization spectrum. Light-duty EVs and charging infrastructure have long been commercially available and availability of public charging and costs to deploy infrastructure are the main challenges. Medium- and heavy-duty vehicles are becoming more commercially available, with Daimler and Volvo obtaining CARB certification of their Class 6 and/or 8 battery electric trucks in 2020. Standards for charging infrastructure to support medium- and heavy-duty vehicles has generally been with the CCS1 connector in North America, with Volvo and ABB obtaining UL certification of the CCS2 connector in 2020, which is a connector standard predominantly used in Europe and other parts of the world. There is also an agreed upon SAE J3068 connector standard for single-phase and three-phase AC charging. The challenges and costs of installing medium- and heavy-duty charging infrastructure are exponentially increased compared to light-duty infrastructure. Each year there are more commercially available options for medium- and heavy-duty on-road vehicles and off-road equipment, charging infrastructure to support these vehicles and equipment, and an ability to fund larger scale deployment projects for medium- and heavy-duty vehicles, equipment, and infrastructure.

This is especially important when the number of light-duty EVs continues to increase annually. As of Q2 2020, 723,045 and 1,556,058¹⁴ new plug-in and battery electric vehicles were sold or leased in California and the U.S respectively. Greater adoption of EVs will increase significantly with the introduction of more vehicles with 200-plus mile range, such as the Tesla Model 3/S/X/Y, Jaguar i-PACE, Kia e-Niro, Hyundai Kona Electric, Mercedes Benz EQC, Audi e-tron, Nissan Leaf e Plus, Chevrolet Bolt, BMW i3, and Porsche Taycan Turbo.

The development and deployment of zero emission goods movement and freight handling technologies remains one of the top priorities for the South Coast AQMD to support a balanced and sustainable growth at the San Pedro Bay Ports as well as freight/logistics facilities throughout the Basin. The South Coast AQMD continues to work with our regional partners, including the San Pedro Bay Ports, Southern California Association of Governments (SCAG) and Los Angeles County Metropolitan Transportation Authority (Metro) to demonstrate and deploy technologies that are technically feasible, cost effective with the assistance of incentives and/or grant funding, and beneficial to all stakeholders. Specific technologies include zero emission trucks/freight handling equipment/infrastructure (battery and/or fuel cell), or plug-in hybrid powertrains, near-zero emission locomotives (e.g., 90% below Tier 4), electric locomotives using battery electric tender cars and catenary systems, 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 economical system, including a call for a zero and near-zero emission vehicle pilot project in Southern California. The City of Los Angeles Zero Emission 2028 Roadmap 2.0 in preparation for the 2028 Olympics corroborates this effort, calling for an additional 25% GHG and criteria pollutant reductions. The San Pedro Bay Ports Clean Air Action Plan

¹⁴Veloz is a non-profit advocacy organization promoting light-duty electric vehicles. <https://www.veloz.org/sales-dashboard/>

calls for zero emissions cargo handling equipment by 2030 and zero emission drayage trucks by 2035, respectively.

New zero emission battery electric technology projects include: 1) deployment of 70 Volvo Class 8 battery electric drayage/freight trucks for the Switch-On project at up to five fleets in the Inland Empire and San Fernando Valley in Los Angeles funded by a \$20 million U.S. EPA Targeted Airshed grant, 2) demonstration of two additional Class 8 battery electric drayage trucks as part of the Volvo LIGHTS project funded by a \$500,000 U.S. EPA Clean Air Technology Initiative grant, 3) retrofit of six RTG cranes with hybrid electric engines at SSA Marine Terminal in the Port of Long Beach funded by a \$2.5 million South Coast AQMD grant, and 4) Daimler Commercial Experience project to demonstrate eight Class 6 and 8 battery electric trucks and fast charging infrastructure funded by a \$1 million South Coast AQMD grant.

Continued technology advancements in light-duty infrastructure have facilitated the development of corresponding codes and standards for medium- and heavy-duty infrastructure including the UL certification of the CCS2 connector for the Volvo LIGHTS battery electric truck demonstration project. Additionally, SCE's Charge Ready Transport Program and LADWP include funding for medium- and heavy-duty vehicles and infrastructure, and there is an upcoming joint CARB-CEC heavy-duty drayage truck deployment and infrastructure solicitation for \$40 million towards a 50-truck deployment at a single drayage fleet.

Heavy-duty hybrid vehicles have historically been optimized for fuel economy, new generation hybrid powertrains that use a systems approach for co-optimizing both criteria emissions and fuel economy could provide another technology pathway to meet the air quality goals of the Basin. These hybrid systems in both plug-in and non-plug-in configurations, will focus on electrifying key engine subsystems and energy recovery to provide engine assistance during transient operations. Furthermore, the availability of additional electrical power such as 48-volt systems could allow for electric aftertreatment heaters for better transient control through thermo-management and therefore better NOx control. CARB adopted new test procedure for medium-duty and heavy-duty hybrid powertrains to certify to engine standards in CARB's proposed Heavy-Duty On-Road "Omnibus" Low NOx regulation. The new hybrid powertrain test procedures will properly credit for the fuel and emission benefits of hybrid vehicles via vehicle simulation on vehicle-based cycles and allow the entire powertrain system to certify to potentially lower emissions standards than traditional engine only tests. South Coast AQMD views these next generation hybrid powertrains can be deployed without the need for incentives by providing fuel economy benefits which could provide another potential cost-effective pathway for reducing NOx emissions in the near term.

Opportunities to develop and demonstrate technologies that could enable expedited widespread use of pre-commercial and commercial battery electric and hybrid-electric vehicles in the Basin include the following:

- demonstration of battery electric and fuel cell electric technologies for cargo handling and container transport operations, e.g., heavy-duty battery electric or plug-in electric drayage trucks with all electric range;
- demonstration of medium-duty battery electric and fuel cell electric vehicles in package delivery operations, e.g., battery electric walk-in vans with fuel cell or CNG range extender;
- development and demonstration of battery and fuel cell electric off-road equipment; e.g. battery electric off-road construction equipment or yard tractors;
- development and demonstration of CNG hybrid vehicle technology;
- development and demonstration of diesel hybrid vehicle technology;
- development of hybrid vehicles and technologies for off-road equipment;
- demonstration of niche application battery and fuel cell electric medium- and heavy-duty 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 shared electric vehicles and mass transit, and rideshare services that cater to multiple users and residents in disadvantaged communities;
- development of eco-friendly intelligent transportation system (ITS), geofencing, and Eco-Drive strategies to maximize emission reductions and energy consumption by operating in zero emission mode when driving in disadvantaged communities, demonstrations that encourage electric drive vehicle deployment in autonomous applications, optimized load-balancing strategies and improved characterization of in-duty drayage cycles and modeling/simulations for cargo freight and market analysis for zero emission heavy-duty trucks;
- demonstration and installation of infrastructure to support battery electric and fuel cell electric vehicle light-, medium- and heavy-duty fleets, and ways to reduce cost and incentivize incremental costs over conventionally fueled vehicles, meet fleet operational needs, improve reliability, and integrate with battery energy storage, renewable energy and energy management strategies (e.g., vehicle-to-grid or vehicle-to-building functionality, demand response, load management);
- development of higher density battery technologies for use in heavy-duty vehicles;
- repurpose EV batteries for other or second life energy storage uses, as well as reusing battery packs and approaches to recycle lithium, cobalt and other metals;
- development of a methodology to increase capability to accept fast-charging and resultant life cycle and demonstration of effects of fast-charging on battery life and vehicle performance; and
- deployment of infrastructure corresponding to codes and standards specific to light-, medium- and heavy-duty vehicles, including standardized connectors, fuel quality, communication protocols, and open standards and demand response protocols for EV chargers to communicate across charging networks.

Fueling Infrastructure and Deployment (Natural Gas/Renewable Fuels)

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 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 established a target to double the energy efficiency in electricity and natural gas end uses by 2030.

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.

Stationary Clean Fuel Technologies

Although stationary source NO_x emissions are small compared to mobile sources in the Basin, there are applications where cleaner fuel technologies or processes can be applied to reduce NO_x, VOC and PM emissions. For example, a recent demonstration project funded in part by the South Coast AQMD 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 NO_x, VOC and CO emissions. This project demonstrated that cleaner, more robust renewable distributed generation technologies exist that not only improve air quality but enhance power quality and reduce electricity distribution congestion.

SCR has been used as aftertreatment for combustion equipment for NO_x reduction. SCR requires the injection of ammonia or urea that is reacted over a catalyst bed to reduce the NO_x formed during the combustion process. Challenges arise if ammonia distribution within the flue gas or operating temperature is not optimal resulting in ammonia emissions leaving the SCR in a process referred to as “ammonia slip”. The ammonia slip may also lead to the formation of particulate matter in the form of ammonium sulfates. An ongoing demonstration project funded in part by the South Coast AQMD consists of retrofitting a Low NO_x ceramic burner on an oil heater without the use of reagents such as ammonia nor urea which is anticipated to achieve SCR NO_x emissions or lower. Based on the successful deployment of this project, further emission reductions may be achieved by other combustion sources such as boilers by the continued development of specialized low NO_x burners without the use of reagents.

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. UCR’s Sustainable Integrated Grid Initiative and UCI’s Advanced Energy and Power Program, funded in part by the South Coast AQMD, 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., new innovative low NO_x burners and fuel cells);
- exploration of renewables, waste gas and produced gas sources for cleaner stationary technologies;
- evaluation, development and demonstration of advanced control technologies for stationary sources;
- vehicle-to-grid, vehicle-to-building, or other stationary energy demonstration projects to develop sustainable, low emission energy storage alternatives; and
- development and demonstration of microgrids with photovoltaic/fuel cell/battery storage/EV chargers and energy management.

The development, demonstration, deployment and commercialization of advanced stationary clean fuel technologies will support control measures in the 2016 AQMP in that they reduce emissions of NO_x and VOCs from traditional combustion sources by replacement or retrofits with zero and near-zero emission technologies.

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 potential health risks). In fact, studies indicate that ultrafine particulate matter (PM) can produce irreversible damage to children's lungs. This information highlights the need for further emission and health studies to identify emissions from high polluting sectors as well as the health effects resulting from these technologies.

Over the past few years, the South Coast AQMD has funded emission studies to evaluate the impact of tailpipe emissions of biodiesel and ethanol fueled vehicles mainly focusing on criteria pollutants and 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. In 2020, South Coast approved comprehensive ethanol fuel study along with CARB and others to assess the emissions and secondary organic aerosol impacts on model year 2002 and up light duty vehicles. 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. In 2015, South Coast AQMD funded studies to further investigate the toxicological potential of emissions, such as ultrafine particles and vapor phase substances, and to determine whether 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 percent of all vehicle sales in the U.S. to an estimated 60 percent between 2009 and 2016, it is important to understand the air quality impacts from these vehicles. South Coast AQMD 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, South Coast AQMD initiated a basin wide in-use real-world emissions study, including fuel usage profile characterization and an assessment of the impacts of current technology and alternative fuels. Preliminary results suggest real-world emissions vary greatly between applications and fuel types. In 2020, CARB adopted Omnibus regulation to the next lower level NOx standard, particularly highlighting the need to address the gap between certification values and in-use emissions. The new regulation included a new low-load cycle, new in-use emissions testing metric based on 3-Bin Moving Average Windows (3B-MAW), and new concept to assess NOx across the entire vehicle population via onboard emission sensors. The new lower level emissions trigger the need to perform a new in-use study focus on assessing the variability in-use, multiple proposals from CARB, EPA and other are under discussion to fulfill that need. The current and future real-world emissions study could help stakeholders better understand the impacts of emissions in real time to a specific geographic area.

One a large scale, Senate Bill 210 was signed in the law in 2019 which directs CARB to development and implement a new comprehensive heavy-duty inspection and maintenance (HD I/M) program to support higher emitter and issues with mal-maintenance to ensure trucks maintain their emissions for their intended useful life. The HD I/M program includes a measurement emission from large population of trucks which is critical for success of this program. Remote sensing technology, which can be setup near road side and over passes has gain the spot light for enabling a new suite of technology for assess emissions in-use. South Coast AQMD staff is closing monitoring the CARB progress and see how it can help us better understand emissions inventory.

Previous studies of ambient levels of toxic air contaminants, such as the MATES studies, have found that diesel exhaust is the major contributor to health risk from air toxics. 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. In addition, staff are also performing additional advanced monitoring activities as an extension of the MATES V study.

In recent years, there has also been an increased interest at the state and federal level on the use of alternative fuels 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. More recently, the power-to-gas concept has renewed interest in hydrogen-fossil fuel blends where the emissions impact on latest ICE technologies needs to be reassessed. In 2019, South Coast AQMD, along with SoCalGas, UCR/CE-CERT launched a study to assess emissions of hydrogen-natural gas blends on near-zero emission natural gas engines. Moreover, based on higher average summer temperatures noted over the past few years, there is interest on how the higher temperatures impact ozone formation. In line with this, a project launched in 2019 to evaluate meteorological factors and trends contributing to recent poor air quality in the Basin. These types of studies may be beneficial to support the CERPs developed under AB 617, as well as other programs targeting benefits to residents in disadvantaged communities.

Some areas of focus include:

- demonstration of remote sensing technologies to target different high emission applications and sources;
- studies to identify health risks associated with ultrafine and ambient particulate matter to characterize 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 impact of new technologies, in particular EVs on local air quality as well as benefit of telematics on emission reduction strategies;
- lifecycle energy and emissions analyses to evaluate conventional and alternative fuels;
- analysis of fleet composition and its associated impacts on criteria pollutants;
- evaluation of emissions impact of hydrogen-fossil fuel blends on latest technology engines; and
- evaluation of impact of higher ambient temperatures on emissions of primary and secondary air pollutants.

Emissions Control Technologies

Although engine technology and engine systems research are required to reduce the emissions at the combustion source, dual fuel technologies and post-combustion cleanup methods are also needed to address currently installed 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 advanced SCR and DPF catalysts coupled with electrically heated diesel exhaust fluid (DEF) dosers and electrical heaters that increase the aftertreatment temperature utilizing the 48V battery system from diesel-hybrid powertrain, 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.

Recently, onboard emissions sensors have been identified by CARB and other agencies as a new method for assessing in-use emissions compliance. At the same time, researchers have proposed to use sensors, coupled with GPS, cellular connection, weather, traffic, and other online air quality models, to enable advanced concepts like Geofencing, Eco-routing, and more. 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 heated dosing technologies, close coupled catalysts, electronically heated catalysts and other advanced selective catalytic reduction systems) as well as non-thermal regen technology;
- development and demonstration of low-VOC and PM lubricants for diesel and natural gas engines;
- develop, evaluate, and demonstrate onboard sensor-based emissions monitoring methodology; and
- develop, evaluate, and demonstrate cloud-based emissions and energy management system

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 to expedite the implementation of low emission and clean fuel technologies, coordinating activities with other organizations and educating the end users of these technologies. Technology transfer efforts include supporting various incentive programs that encourage the purchase of cleaner technologies, cosponsoring technology-related conferences, workshops and other events, and disseminating information on advanced technologies to various audiences (i.e., residents in disadvantaged communities, local governments, funding agencies, technical audiences). As part of Assembly Bill (AB) 617¹⁵, which requires reduced exposure to communities most impacted by air pollution, TAO conducted additional outreach to AB 617 communities regarding available zero and near-zero emission technologies and incentives to accelerate the adoption of cleaner technologies. Cleaner technologies such as zero emission heavy-duty trucks are now included in the Community Emission Reduction Plans (CERPs) for these AB 617 communities.

Target Allocations to Core Technology Areas

The figure below presents the potential allocation of available funding, based on South Coast AQMD projected program costs of \$17.9 million for all potential projects. The actual project expenditures for 2021 will be less than the total South Coast AQMD projected program costs since not all projects will materialize. 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 South Coast AQMD funding. Specific contract awards throughout 2021 will be based on this proposed allocation, quality of proposals received and evaluation of projects against standardized criteria and ultimately South Coast AQMD Board approval.

¹⁵ <https://ww2.arb.ca.gov/our-work/programs/community-air-protection-program/about>

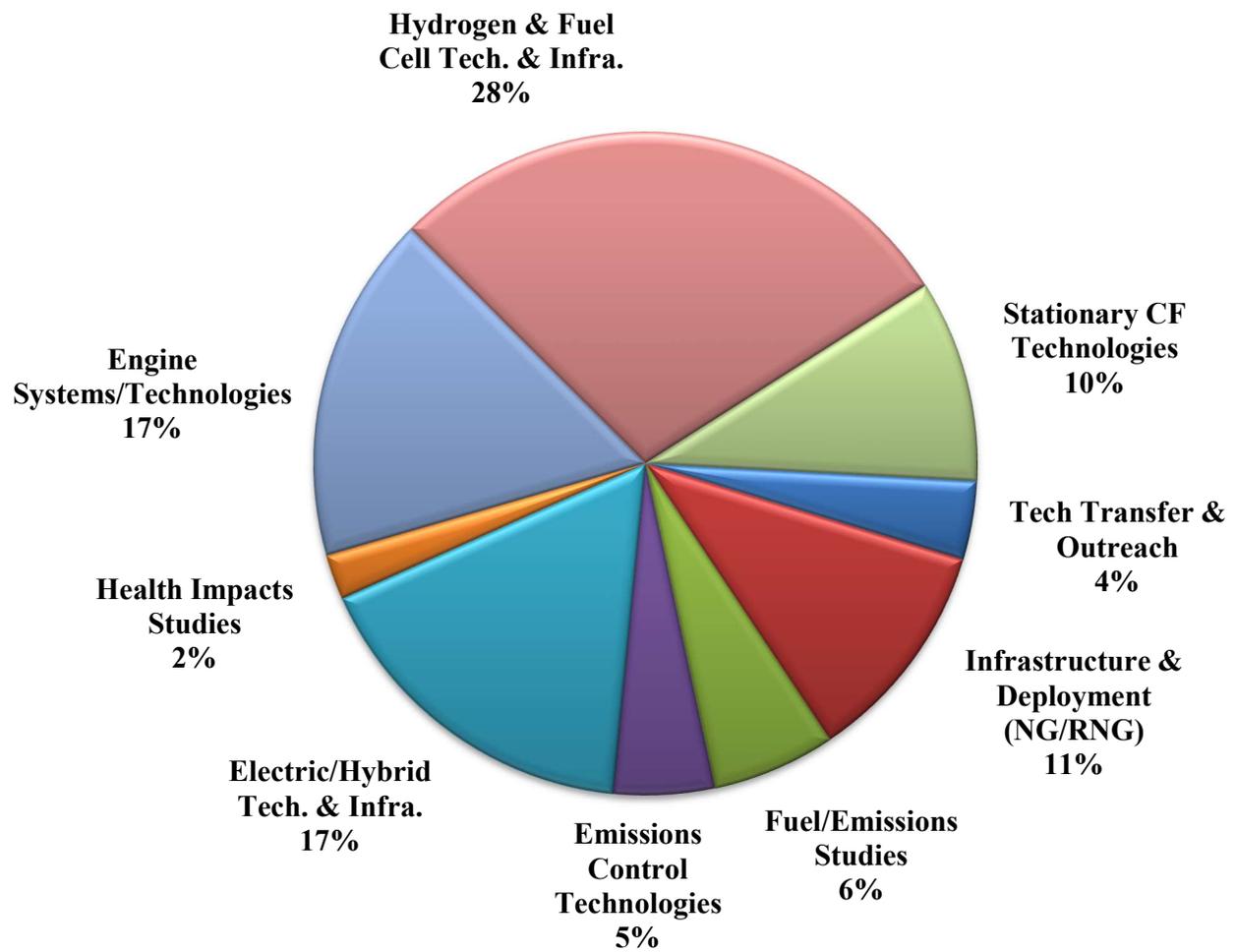


Figure 22: Projected Cost Distribution for Potential South Coast AQMD Projects in 2021 (\$17.9M)

CLEAN FUELS PROGRAM Program Plan Update for 2021

This section presents the Clean Fuels Program Plan Update for 2021. The proposed projects are organized by program areas and described in further detail, consistent with the South Coast AQMD budget, priorities and the best available information on the state-of-the-technology. Although not required, this Plan also includes proposed projects that may also be funded by revenue sources other than the Clean Fuels Program, through state and federal grants for clean fuel technologies, incentive programs such as AB 617 Community Air Protection (CAP) funding, Volkswagen Mitigation and Carl Moyer, and VOC and NOx mitigation.

Table 6 summarizes potential projects for 2021 as well as the distribution of South Coast AQMD costs in some areas as compared to 2020. The funding allocation continues the focus on development and demonstration of zero and near-zero emission technologies including infrastructure to support these vehicles and off-road equipment. For the 2021 Draft Plan, the same four funding categories remain at the top but with reduced funding for electric/hybrid technologies in light of large electric/hybrid projects recently funded and with additional funding to Stationary Clean Fuel Technologies and Emissions Control Technologies for planned projects in 2021, including:

- Heavy-duty zero emission battery electric and fuel cell trucks and infrastructure;
- Onboard sensor development for emissions monitoring and improved efficiency;
- Microgrid demonstrations to support zero emission infrastructure;
- Battery and fuel cell electric transit and school buses and fleet charging/fueling infrastructure;
- Heavy-duty diesel truck replacements with near-zero emissions natural gas trucks; and
- Fuel and emissions studies, such as conducting airborne measurements and analysis of NOx emissions and assessing emissions impacts of hydrogen-natural gas fuel blends on near-zero emissions heavy-duty natural gas engines.

As in prior years, the funding allocations again align well with the South Coast AQMD's FY 2020-21 Goals and Priority Objectives, which includes supporting development of cleaner advanced technologies. Overall, the Clean Fuels Program is designed to ensure a broad portfolio of technologies, complement 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 South Coast AQMD Governing Board for approval prior to contract initiation. This Plan Update reflects the maturity of the proposed technology and identifies contractors to implement the projects, participating host sites and fleets, and securing sufficient cost-sharing to complete the project, and other necessary factors. Recommendations to the South Coast AQMD Governing Board will include descriptions of the technologies to be demonstrated or deployed, their applications, proposed scope of work, and capabilities of the selected contractor(s) and project team, in addition to the expected costs and 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.

Proposed Project: A descriptive title and a designation for future reference.

Expected South Coast AQMD Cost: The estimated proposed South Coast AQMD cost-share as required by H&SC 40448.5.1.(a)(1).

Expected Total Cost: The estimated total project cost including the South Coast AQMD 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 South Coast AQMD 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 2021

Proposed Project	Expected SCAQMD Cost \$	Expected Total Cost \$
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Hydrogen/Mobile Fuel Cell Technologies and Infrastructure

Develop and Demonstrate Hydrogen Research to Support Innovative Technology Solutions for Fueling Fuel Cell Vehicles	90,000	1,800,000
Develop and Demonstrate Hydrogen Production and Fueling Stations	2,000,000	6,500,000
Develop and Demonstrate Medium- and Heavy-Duty Fuel Cell Vehicles	2,644,500	12,000,000
Demonstrate Light-Duty Fuel Cell Vehicles	75,000	75,000
Subtotal	\$4,809,500	\$20,375,000

Engine Systems/Technologies

Develop and Demonstrate Advanced Gaseous- and Liquid-Fueled Medium- and Heavy-Duty Engines & Vehicle Technologies to Achieve Ultra-Low Emissions	2,750,000	10,000,000
Develop and Demonstrate Alternative Fuel and Clean Conventional Fueled Light-Duty Vehicles	176,300	1,000,000
Develop and Demonstrate Low Load and Cold-Start Technologies	176,300	1,000,000
Develop and Demonstrate Low Emissions Locomotive Technologies	176,300	1,000,000
Subtotal	\$3,278,900	\$13,000,000

Electric/Hybrid Technologies and Infrastructure

Develop and Demonstrate Medium- and Heavy-Duty On-Road and Off-Road Battery Electric and Hybrid Vehicles and Equipment	2,400,000	22,800,000
Develop and Demonstrate Electric Charging Infrastructure	600,000	30,790,000
Demonstrate Alternative Energy Storage	300,000	2,000,000
Demonstrate Light-Duty Battery Electric Vehicles	200,000	200,000
Subtotal	\$3,500,000	\$55,790,000

Fueling Infrastructure and Deployment (Natural Gas/Renewable Fuels)

Demonstrate Near-Zero Emission Natural Gas Vehicles in Various Applications	500,000	2,100,000
Develop, Maintain and Expand Natural Gas Infrastructure	500,000	2,100,000
Demonstrate Renewable Transportation Fuel Manufacturing and Distribution Technologies	\$1,000,000	\$10,000,000
Subtotal	\$2,000,000	\$14,200,000

Stationary Clean Fuel Technologies

Develop and Demonstrate Microgrids with Photovoltaic/Fuel Cell/Battery Storage/EV Chargers and Energy Management	1,000,000	4,500,000
Develop and Demonstrate Zero or Near-Zero Emission Energy Generation Alternatives	264,450	1,000,000
Subtotal	\$1,264,450	\$5,500,000

Table 6: Summary of Potential Projects for 2021 (cont'd)

Proposed Project	Expected SCAQMD Cost \$	Expected Total Cost \$
Fuel/Emissions Studies		
Conduct In-Use Emissions Studies for Advanced Technology Vehicle Demonstrations	500,000	2,000,000
Conduct Emissions Studies on Biofuels, Alternative Fuels and Other Related Environmental Impacts	400,000	1,500,000
Identify and Demonstrate In-Use Fleet Emissions Reduction Technologies and Opportunities	200,000	1,000,000
Subtotal	\$1,100,000	\$4,500,000
Emissions Control Technologies		
Develop and Demonstrate Advanced Aftertreatment Technologies	250,000	1,000,000
Develop and Demonstrate Advanced Aftertreatment Catalyst Heating Technologies	250,000	1,000,000
Develop Methodology and Evaluate and Demonstrate Onboard Sensors for On-Road Heavy-Duty Vehicles	250,000	1,000,000
Demonstrate On-Road Technologies in Off-Road and Retrofit Applications	176,300	800,000
Subtotal	\$926,300	\$3,800,000
Health Impacts Studies		
Evaluate Ultrafine Particle Health Effects	88,150	1,000,000
Conduct Monitoring to Assess Environmental Impacts	132,225	500,000
Assess Sources and Health Impacts of Particulate Matter	132,225	300,000
Subtotal	\$352,600	\$1,800,000
Technology Assessment/Transfer and Outreach		
Assess and Support Advanced Technologies and Disseminate Information	350,000	800,000
Support Implementation of Various Clean Fuels Vehicle Incentive Programs	350,000	400,000
Subtotal	\$700,000	\$1,200,000
TOTALS FOR POTENTIAL PROJECTS	\$17,931,750	\$120,165,000

Technical Summaries of Potential Projects

Hydrogen/Mobile Fuel Cell Technologies and Infrastructure

Proposed Project: Develop and Demonstrate Hydrogen Research to Support Innovative Technology Solutions for Fueling Fuel Cell Vehicles

Expected South Coast AQMD Cost: \$90,000

Expected Total Cost: \$1,800,000

Description of Technology and Application:

California regulations require automakers to place increasing numbers of ZEVs into service every year. By 2050, CARB projects that 87% of light-duty vehicles on the road will be zero emission battery and FCVs.

Many stakeholders are working on hydrogen and fuel cell products, markets, requirements, mandates and policies. California has been leading the way for hydrogen infrastructure and FCV deployment. This leadership has advanced a hydrogen network that is not duplicated anywhere in the U.S. and is unique in the world for its focus on providing a retail fueling experience. In addition, the advancements have identified many lessons learned for hydrogen infrastructure development, deployment and operation. Other interested states and countries are using California's experience as a model case, making success in California paramount to enabling market acceleration and uptake in the U.S. U.S. leadership for hydrogen technologies is rooted in California, a location for implementing many DOE H2@Scale pathways, such as reducing curtailment and stranded resources, reducing petroleum use and emissions, and developing and creating jobs. The technical research capability of the national laboratories can be used to assist California in decisions and evaluations, as well as to verify solutions to problems impacting the industry. Because these challenges cannot be addressed by one agency or one laboratory, in 2018, a hydrogen research consortium was organized to combine and collaborate.

The California Hydrogen Infrastructure Research Consortium focuses on top research needs and priorities to address near-term problems in order to support California's continued leadership in innovative hydrogen technology solutions needed for fueling FCVs. These tasks also provide significant contributions to the DOE H2@Scale Initiative. For instance, advances in fueling methods and components can support the development of supply chains and deployments. Currently, funded tasks include data collection from operational stations, component failure fix verification (i.e., nozzle freeze lock), reporting about new fueling methods for medium- and heavy-duty applications and ensuring hydrogen quality is maintained. The tasks are supported by leading researchers at NREL and coordinating national labs and managed in detail (e.g., schedule, budget, roles, milestones, tasks, reporting requirements) in a hydrogen research consortium project management plan.

These efforts are complemented by projects undertaken and supported by the CaFCP and its members over the last few years such as the Vision 2030 document released in July 2018 establishing a roadmap for future FCV and hydrogen refueling stations, including barriers that need to be overcome and CARB's Advanced Clean Truck Regulation adopted in June 2020.

This project area would enable cofunding support for additional or follow on mutually agreed technical tasks with the California Hydrogen Infrastructure Research Consortium members, the CaFCP as well as other collaborative efforts that may be undertaken to advance hydrogen infrastructure technologies.

Potential Air Quality Benefits:

The 2016 AQMP identifies the use of alternative fuels and zero emission transportation technologies as necessary to lower NOx and VOC emissions, in an effort to meet federal air quality standards. One of the major advantages of FCVs 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 FCVs are available but require optimization to achieve broad market scale. The deployment of large numbers of FCVs, which is one strategy to attain air quality goals, requires a well-planned and robust hydrogen fueling infrastructure network. This South Coast AQMD project, with significant additional funding from other governmental and private entities, will work towards providing the necessary hydrogen fueling infrastructure network.

Proposed Project: Develop and Demonstrate Hydrogen Production and Fueling Stations**Expected South Coast AQMD Cost:** \$2,000,000**Expected Total Cost:** \$6,500,000**Description of Technology and Application:**

Alternative fuels, such as hydrogen and the use of advanced technologies, such as FCVs, 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 challenge to the entry and acceptance of direct-hydrogen FCVs is the limited number and scale of hydrogen refueling and production 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, dispensing pressures that support zero emission vehicle deployment and compatibility with existing CNG stations may be considered.

Energy Stations: Multiple-use energy stations that can produce hydrogen for FCVs 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 optimize strategies for hydrogen fueling infrastructure deployment and as a means to produce power and hydrogen from renewable feedstocks (e.g., biomass, digester gas) and store hydrogen in larger scales to support electric systems.

Innovative Refueling Appliances: Home or small scale refueling/recharging is an attractive advancement for alternative clean fuels for some potential applications. This project would evaluate a hydrogen innovative refueler for cost, compactness, performance, durability, emission characteristics, ease of assembly and disassembly, maintenance and operations. Other issues such as setbacks, building permits, building code compliance and UL ratings for safety would also be evaluated.

Projections for on-the-road FCVs counts are now 27,000 in 2023 and 48,900 in 2026 in California and the majority of these do not include medium- and heavy-duty vehicles that may be deployed in the Basin. To provide fuel for these vehicles, the hydrogen fueling infrastructure needs to be significantly increased and become more reliable in terms of availability. South Coast AQMD will seek additional funding from CEC and CARB to construct and operate hydrogen fueling stations and take advantage of funding opportunities that may be realized by any momentum created by the Governor's 2018 Executive Order to establish 200 stations by 2025 and adoption of CARB's Advanced Clean Truck Regulation.

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 South Coast AQMD 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. FCVs constitute some of the cleanest alternative-fuel vehicles today. Since hydrogen is a key fuel for FCVs, 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 NO_x, VOC, CO, PM and toxic compound emissions from vehicles.

Proposed Project: Develop and Demonstrate Medium- and Heavy-Duty Fuel Cell Vehicles

Expected South Coast AQMD Cost: \$2,644,500

Expected Total Cost: \$12,000,000

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 as a way of reducing costs and potentially enhancing performance of FCVs.

The California ZEV Action Plan specifies actions to help deploy an increasing number of ZEVs, including medium- and heavy-duty ZEVs. CARB recently adopted Advanced Clean Truck and Fleet Regulations in addition to Innovative Clean Transit Bus Regulation as other drivers. 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 FCVs 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 South Coast AQMD funds to demonstrate Zero Emission Container Transport (ZECT) technologies. In 2015, the DOE awarded South Coast AQMD additional funds to develop and demonstrate additional fuel cell truck platforms and vehicles under ZECT II. More recently, the Clean Fuels Program cost-shared the development of transit buses at OCTA and will cost-share the demonstration of trucks and hydrogen stations to support the Port of Los Angeles project. More projects like these are anticipated as the OEMs come on board.

This category may include projects in the following applications:

On-Road: <ul style="list-style-type: none">• Transit Buses• Shuttle Buses• Medium- & Heavy-Duty Trucks	Off-Road: <ul style="list-style-type: none">• Vehicle Auxiliary Power Units• Construction Equipment• Lawn and Garden Equipment• Cargo Handling Equipment
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Potential Air Quality Benefits:

The 2016 AQMP identifies the need to implement ZEVs. South Coast AQMD 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 FCVs. 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 FCVs 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 as well as GHG emission reductions. Currently, the range of the trucks in the ZECT II project have a targeted range of 150 miles. Future projects would include extending the range of the FCVs up to 400 miles and to demonstrate improvements to the reliability and durability of the powertrain systems and hydrogen storage system. For fuel cell transit buses, projects are being proposed that reduce the cost of the fuel cell bus to less than \$1 million through advanced technologies for the fuel cell stack and higher density and lower cost batteries.

Proposed Project: Demonstrate Light-Duty Fuel Cell Vehicles

Expected South Coast AQMD Cost: \$75,000

Expected Total Cost: \$75,000

Description of Technology and Application:

This proposed project would support the demonstration of limited production and early commercial light-duty FCVs using gaseous hydrogen with proton exchange membrane (PEM) fuel cell technology, mainly through showcasing this technology. Recent designs of light-duty FCVs 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 limited-production FCVs are planned for retail deployment in early commercial markets near hydrogen stations by several OEMs. 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 OEM technical and customer support. South Coast AQMD has included FCVs as part of its demonstration fleet since it started the Five Cities Program in 2005 with the Cities of Burbank, Ontario, Riverside, Santa Ana, and Santa Monica to deploy 30 hydrogen ICE vehicles and five hydrogen stations. As part of this effort, South Coast AQMD has provided support, education, and outreach regarding FCV technology on an ongoing 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.

Hyundai, Toyota and Honda have commercialized FCVs in California, and Toyota is redesigning the 2020 Mirai as a five-passenger sedan. The first commercial FCV leases are ending, and solo carpool lane access extends only for MY 2017 and later, encouraging new replacements. Innovative strategies and demonstration of dual fuel, ZEVs could expand the acceptance of BEVs and accelerate the introduction of fuel cells in vehicle propulsion. As hydrogen production dedicated to transportation increases from multiple providers in the next few years, and station throughput increases, dispensed hydrogen cost should start to decrease, which would encourage more model development and enable more demonstration and deployment.

Potential Air Quality Benefits:

The 2016 AQMP identifies the need to implement ZEVs. South Coast AQMD 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 FCVs. Expected immediate benefits include the deployment of zero emission vehicles in South Coast AQMD's demonstration fleet. Over the longer term, the proposed projects could help foster wide-scale implementation of ZEVs 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 South Coast AQMD Cost: \$2,750,000

Expected Total Cost: \$12,500,000

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, as well as integration and demonstration of these technologies in on-road vehicles. The NOx emissions target for this project area is 0.02 g/bhp-hr or lower and the PM emissions target is below 0.01 g/bhp-hr. Recent development of low-NOx hybrid powertrain also shown potential for achieving lower NOx as a combined system. To achieve these targets, an effective emissions control strategy must employ advanced fuel system and engine design features such as cylinder deactivation (CDA), aggressive engine calibration and improved thermal management, improved exhaust gas recirculation (EGR) 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 (HP) applications;
- development of durable and reliable retrofit technologies to partially or fully convert engines and vehicles from petroleum fuels to alternative fuels; and
- field demonstrations of advanced technologies in various fleets operating with different classes of vehicles.
- development and demonstration of CNG, propane and diesel hybrid powertrain technology

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, renewable diesel, dimethyl ether and gas-to-liquid fuels. There has been significantly more interest as well as a mandate requiring the use of renewable fuels across all sectors due to CARB's Low Carbon Fuel Standard (LCFS). Projects listed under Fuel/Emissions Studies will assess the emissions impact of renewable fuels on past and future combustion technologies. Several key diesel engine development projects that have demonstrated the ability to achieve 0.02 g/bhp-hr NOx under laboratory conditions has reach on-road truck demonstrate stage. The truck integration and packaging is another critical step towards commercialization. The prototype trucks are typically placed in revenue service to collect real-world performance data and well as end user feedback for production engines.

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 HP engines. Higher HP 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 as well as high initial cost 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 with lower NOx emissions, would increase availability to end-users and provide additional emission reductions. Moreover, a developing trend of less incentive funding is occurring as certain alternative fuel engine technologies continue to reach full commercial readiness. Thus, continued development of cost-effective technologies that do not rely on incentives are key to drive additional market penetration and emissions reduction.

The South Coast AQMD has investigated the emergence of cost-effective mild hybrid powertrain technologies to achieve targeted lower-NOx emission standard and improved fuel economy. In 2020, CARB and EPA introduced new hybrid powertrain certification test procedures aiming to help hybrid powertrain certify to engine-based emission standards. The new test procedures utilize the equivalent vehicle based test cycles and real-time vehicle simulation to account for the fuel and emission benefits of hybrid vehicles under the traditional engine based test cycles. Cost effective hybrid technologies that offers reasonable payback period could potentially offer a faster commercialization pathway for reducing both NOx and GHG in the near term by strategically utilizing the existing internal combustion engines and electric components that assists engine operation and maintain aftertreatment temperature and efficiency. Simulation results shown that these newly integrated hybrid powertrains could be achieve the CARB 2024-2026 NOx standard of 0.05 g/bhp-hr while maintain reasonable cost and feasible pathway to 0.02 g/bhp-hr. These low-NOx hybrid powertrains could be another pathway for near term emissions reduction strategy until the full commercialization of zero emission technologies. Furthermore, low-cost mild hybrid system that do not rely on incentive could drive up sales outside of California and gain additional emissions reduction from interstate commerce trucks. Due to limited time to attainment and the fast approach to the CARB 2024 NOx limit, continued development and demonstration efforts are needed in the medium- and heavy-duty sector in order to accelerate the commercialization of next generation hybrid technologies to market.

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 both in the Basin and in intrastate operation. The emissions reduction benefits 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 and 11.9L engines using natural gas achieving NOx emissions of 0.02 g/bhp-hr have been certified and commercialized, with larger displacement and advanced technology (e.g., opposed piston) engines undergoing development. Further, neat or blended alternative fuels can also reduce heavy-duty engine particulate emissions by over 90 percent compared to current diesel technology. The key to future engine system project success is cost-effectiveness and availability of future incentives. 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 South Coast AQMD fleet regulations and towards compliance of the 2016 AQMP control measures as well as future CARB and EPA low NOx regulations.

Proposed Project: Develop and Demonstrate Alternative Fuel and Clean Conventional Fueled Light-Duty Vehicles

Expected South Coast AQMD Cost: \$176,300

Expected Total Cost: \$1,000,000

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, modified biodiesel 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 South Coast AQMD 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 Low Load and Cold-Start Technologies

Expected South Coast AQMD Cost: \$176,300

Expected Total Cost: \$1,000,000

Description of Technology and Application:

Cold starts and low loads of internal combustion engines have a negative impact on the environment especially in urban areas like much of the Basin. The thermal efficiency of the internal combustion engine is significantly lower at cold-starts and lower loads. Diesel exhaust aftertreatment systems require a temperature of 250 degrees Celsius or higher to operate at the highest level of emissions reduction efficiency, furthermore diesel engines at cold start increase emissions as much as 10% compared to spark-ignited CNG engines. At low loads, an aftertreatment system often may operate at 150 degrees Celsius. It is also now known that the smaller and poorly integrated hybrid powertrain engines are experiencing similar warm-up issues due to the on-off drive cycles. In fact, the CARB and EPA low-NOx regulation all included a new low-load cycle as well as new in-use low-load operation “bins” that sets emissions limits (different than traditional limits) on low-load operations. 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 and maintain their intended operating temperature range as soon as possible after engine start. In most cases, adaptation of algorithms associated with fuel injection timing, cylinder deactivation, EGR fraction, turbo control, heated dosing, SCR pre-heaters and close coupled catalysts can be used to keep the catalyst at the correct operating temperature. This project is to investigate technology to improve catalyst temperature at start-up and low loads 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. Emphasis should be on steady temperature control at optimal degrees already proven and established through significant research. The following items are the most recently developed best practices with respect to cost and functionality. These engine-based technologies should be integrated closely with aftertreatment technologies to maximize the intended emissions benefit.

- Develop and demonstrate engine-based low-load and cold start technologies such as cylinder activation technology on heavy-duty applications; and
- develop control algorithms to ensure the engine exhaust maintains catalyst temperature throughout the duty cycle.

The project would be implemented, and fleet tested, and recorded over a minimum 12-month period. Further projects can develop from this technology and should be tested in regard to other liquid fuel burning engines.

Potential Air Quality Benefits:

The technology to reduce emissions at cold starts and low loads is beneficial to a broad spectrum of vehicles from hybrid electric, light-duty and heavy-duty engines in drayage long haul trucks. The advancement in this technology will directly contribute toward low NOx required as a result of U.S. EPA and CARB’s heavy-duty engine 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 Low Emissions Locomotive Technologies

Expected South Coast AQMD Cost: \$176,300

Expected Total Cost: \$1,000,000

Description of Technology and Application:

The objective of this project is to support the development and demonstration of gaseous and liquid fueled locomotive engines. The requirements of locomotive engines as primary generators of electricity to power the locomotive poses serious challenges. Locomotives operate at a specific duty cycle different than conventional on-road engines. The engines often run at low speed and have extended periods of idle time. The durability requirements also surpass other forms of transportation.

Large displacement gaseous fueled engines do not currently exist to power locomotives. The early stages of development of engines and systems to fill this need is currently on-going. Engines are expected to be below the current 0.2g/bhp-hr low NOx standard. The adaptation of alternative fueled locomotives in coordination with required infrastructure improvement by leading manufacturers in the industry shows great potential for further research and cost savings with less maintenance costs and better reliability.

Potential Air Quality Benefits:

This project is expected to reduce emissions around 97 tons per year of NOx for each locomotive. The reduction of PM and CO2 also shows great potential mitigation in environmental justice communities.

Electric/Hybrid Technologies and Infrastructure

Proposed Project: Develop and Demonstrate Medium- and Heavy-Duty On-Road and Off-Road Electric and Hybrid Vehicles and Equipment

Expected South Coast AQMD Cost: \$2,203,750

Expected Total Cost: \$12,500,000

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 2018, the U.S. EPA¹⁶ estimated that transportation was responsible for about 28 percent of the nation's carbon emissions, while the electricity sector emissions accounted for 27 percent.

The South Coast AQMD has long been a leader in promoting early demonstrations of next generation light-duty vehicle propulsion technologies (and fuels). However, given the commercial availability of light-duty EVs, priorities have shifted. South Coast AQMD will continue to evaluate market offerings and proposed technologies in light-duty vehicles to determine if any future support is required.

Meanwhile, medium- and heavy-duty vehicles make up 4.8¹⁷ percent of vehicles in the U.S. and drive 9.4¹⁸ percent of all vehicle miles traveled each year yet are responsible for more than 38¹⁹ percent of all the fuel burned annually. Moreover, the 2016 AQMP identified medium- and heavy-duty vehicles as the largest source of NOx emissions in the Basin. Electric and hybrid technologies have gained momentum in the light-duty sector with commercial offerings by most of the automobile manufacturers. Unfortunately, there are significant emission reductions needed for medium- and heavy-duty vehicles and off-road equipment, exacerbated by low turnover of these vehicles by fleets and high incremental costs for battery electric vehicles and equipment compared to conventional-fueled vehicles and equipment.

The South Coast AQMD has investigated the use of electric and hybrid technologies to achieve similar performance as conventional-fueled counterparts while achieving emission reductions and improved fuel economy. Multiple natural gas and diesel hybrid vehicles have been development and demonstrated under the DOE funded Zero Emissions Cargo Transport (ZECT), CARB Greenhouse Gas Reduction Fund (GGRF) and NREL's Natural Gas Vehicle Consortium. These hybrid trucks all share plug-in capability and capable of zero emission operation and some leveraging advance concepts such as Geofencing to maximize emissions reduction in certain areas. Vehicle based hybrid system continue to progress for additional emissions reduction and efficiency improvements. Engine powertrain based hybrid system began to emerge since the introduction of the optional hybrid powertrain test procedures, The hybrid powertrain based projects are further described under engine systems.

Vehicle categories to be considered for potential or future demonstration and deployment projects include drayage/freight/regional haul trucks, utility trucks, delivery vans, shuttle buses, transit buses, waste haulers, construction equipment, cranes and other off-road equipment such as yard tractors, forklifts, top handlers, and RTG cranes. Innovations that may be considered for demonstration and deployment include advancements in the auxiliary power unit, either ICE or other heat engine; and battery-dominant hybrid systems utilizing off-peak charging, with advanced battery technologies including alternative chemistries, design, and management systems. 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, renewable diesel, or even modified biodiesel may be considered if the

¹⁶ <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions>

¹⁷ <https://www.bts.gov/content/number-us-aircraft-vehicles-vessels-and-other-conveyances>

¹⁸ <https://www.bts.gov/content/us-vehicle-miles>

¹⁹ <https://www.bts.gov/content/fuel-consumption-mode-transportation-1>

emission benefits can be demonstrated as equivalent or superior to alternative fuels. Both new designs and retrofit technologies and related charging infrastructure will be considered.

Both on-road vehicles and off-road equipment are transitioning increasingly towards zero emission technologies. Off-road equipment include cargo handling and construction equipment. Several manufacturers have released battery electric and hybrid equipment, and more are becoming commercially available. Since the applications are more diverse in this sector, continued development and incentives are needed to accelerate progress in this sector.

This project category will develop and demonstrate:

- various electric vehicles and equipment;
- anticipated costs for electric vehicles and equipment;
- customer interest and preferences for these alternatives;
- integration of technologies into prototype vehicles and fleets;
- battery electric and hybrid-electric medium- and heavy-duty vehicles (e.g., drayage/freight/regional haul trucks, utility trucks, delivery vans, shuttle buses, transit buses, waste haulers);
- development and demonstration of battery electric off-road equipment, (e.g., battery electric off-road cargo handling and construction equipment);
- development and demonstration of CNG hybrid vehicle technology; and
- development and demonstration of diesel hybrid vehicle technology.

Potential Air Quality Benefits:

The 2016 AQMP identifies zero or near-zero emission vehicles as a key attainment strategy. Plug-in hybrid electric technologies have the potential to achieve near-zero emission while retaining the range capabilities of conventional-fueled vehicles, a key factor expected to enhance broad consumer acceptance. Given the variety of EV systems under development, it is critical to determine actual emission reductions and performance metrics compared to conventional-fueled vehicles. Successful demonstration of optimized prototypes would promise to enhance the deployment of zero and near-zero emission technologies.

Expected benefits include the establishment of criteria for emission 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 emission vehicles in the Basin, which is a high priority of the 2016 AQMP.

Proposed Project: Develop and Demonstrate Electric Charging Infrastructure**Expected South Coast AQMD Cost:** \$220,375**Expected Total Cost:** \$1,250,000**Description of Technology and Application:**

There is a critical need to address gaps in EV charging infrastructure availability. Almost half (47 percent) of the 1,556,058²⁰ EVs sold in the U.S. since 2010 were in California, and of those sales in California, almost half (44²¹ percent) of CVRP rebates issued as of February 2020 were for vehicles in the South Coast AQMD. In addition, the California ZEV Action Plan, which was updated in 2018, calls for 5 million ZEVs and supporting infrastructure by 2030.

There are separate challenges associated with infrastructure for light-duty EVs vs. medium- and heavy-duty EVs, which are on opposite ends of the commercialization spectrum. Light-duty EVs and charging infrastructure have long been commercially available with an agreed upon SAE J1772 connector standard for Level 1 and Level 2 charging. Availability of public fast charging and workplace charging continues to increase and is needed particularly for residents in multi-unit dwellings without easy access to home charging. Availability and costs to deploy infrastructure are the main challenges for light-duty EVs.

Medium- and heavy-duty vehicles are becoming more commercially available, with Daimler and Volvo obtaining CARB certification of their Class 6 and/or 8 battery electric trucks in 2020. Standards for charging infrastructure to support medium- and heavy-duty vehicles has generally been with the CCS1 connector in North America, with Volvo and ABB obtaining UL certification of the CCS2 connector in 2020, which is a connector standard predominantly used in Europe and other parts of the world. There is also an agreed upon SAE J3068 connector standard for single-phase and three-phase AC charging. The challenges and costs of installing medium- and heavy-duty charging infrastructure are exponentially increased compared to light-duty infrastructure. Each year there are more commercially available options for medium- and heavy-duty on-road vehicles and off-road equipment, charging infrastructure to support these vehicles and equipment, and an ability to fund larger scale deployment projects for medium- and heavy-duty vehicles, equipment, and infrastructure. As the deployment of medium- and heavy-duty vehicles and off-road equipment has increased, there is an increasing reliance on the use of standardized charging connectors and UL or Nationally Recognized Testing Laboratory (NRTL) charging infrastructure, as opposed to proprietary charging infrastructure and connectors which can only be used with vehicles and equipment manufactured by that OEM or equipment manufacturer.

The South Coast AQMD is actively pursuing development of intelligent transportation systems, such as Volvo's EcoDrive 2.0 software platform being utilized for the GGRF Zero Emission Drayage Truck (ZEDT) and Volvo LIGHTS projects, to improve traffic efficiency of battery electric and fuel cell electric drayage/freight trucks. This system provides truck drivers real-time vehicle operation feedback based on changing traffic and road conditions where trucks can dynamically change their speed to better flow through intersections. EcoDrive also uses geofencing capabilities to operate in zero emissions mode while traveling through disadvantaged communities. A truck eco-routing system can provide the eco-friendliest 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. As part of the demonstration of the Volvo diesel plug-in hybrid electric truck for the ZEDT project, this truck will be demonstrated in California for six months starting in November 2020 and data will be collected on the performance of

²⁰ Veloz is a non-profit advocacy organization promoting light-duty electric vehicles. <https://www.veloz.org/sales-dashboard/>

²¹ <https://cleanvehiclerebate.org/eng/rebate-statistics>

EcoDrive 2.0 through the connector vehicle corridor in Carson that was set up as part of the CEC funded Eco FRATIS²² freight transportation connected truck project.

This project category is one of South Coast AQMD's continued efforts to:

- deploy a network of DC fast charging infrastructure (350kW or more) and rapidly expand the existing network of public EV charging stations including energy storage systems;
- charging infrastructure and innovative systems to support medium- and heavy-duty vehicle and off-road equipment demonstration and deployment projects;
- support investigation of fast charging impact on battery life;
- develop intelligent transportation system strategies for cargo containers; and
- develop freight load-balancing strategies as well as to conduct market analysis for zero emission heavy-duty trucks in goods movement.

Potential Air Quality Benefits:

The 2016 AQMP identifies zero emission vehicles as a key attainment strategy. This proposed project category will reduce PM pollution along major roadways through the expansion of the public EV charging infrastructure network by allowing drivers to shift away from conventional-fueled vehicles to battery and fuel cell EVs. In addition, this project will assist in achieving improved fuel economy and lower tailpipe emissions, further helping the region to achieve NAAQS and protect public health. Expected benefits include the establishment of criteria for emission evaluations, performance requirements and customer acceptability of the technology. This will help both regulatory agencies and OEMs to expedite introduction of ZEVs in the Basin, which is a high priority of the 2016 AQMP.

²² <https://www.aapa-ports.org/files/PDFs/ITS%20POLA%204.24.2019.pdf>

Proposed Project: Demonstrate Alternative Energy Storage

Expected South Coast AQMD Cost: \$176,300

Expected Total Cost: \$1,500,000

Description of Technology and Application:

The South Coast AQMD 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, especially lithium-ion 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 lower 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, evaluate costs relative to current lithium-ion batteries 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-fueled vehicles. This effort will support several projects for development and demonstration of battery electric and hybrid electric 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 second life uses 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 battery electric and hybrid electric 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, off-road equipment, and other applications. Benefits will include proof of concept for new technologies, diversification of transportation fuels and lower emissions of criteria, toxic pollutants and greenhouse gases.

Proposed Project: Demonstrate Light-Duty Battery Electric and Plug-In Hybrid Vehicles

Expected South Coast AQMD 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 light-duty BEVs and PHEVs using advanced technology, mainly through showcasing this technology. Recent designs of light-duty BEVs and PHEVs provide increased electric range, improved efficiency and recharge times, and other advanced safety, energy, autonomous and performance features in new platforms and applications that can accelerate EV adoption.

South Coast AQMD has included BEVs and PHEVs as part of its demonstration fleet since the development of early conversion vehicles. South Coast AQMD also installed 92 Level 2 EV charging ports in 2017 and a DC fast charger with CHAdeMO and CCS1 connectors in 2018 to support public and workplace charging as a means of supporting education and outreach regarding BEV and PHEV technology.

Light-duty BEVs and PHEVs are available from most established OEMs and several new OEMs. Current legislation extends solo carpool lane access only for three years until September 2025.

Potential Air Quality Benefits:

The 2016 AQMP identifies the need to implement light-duty EVs. South Coast AQMD 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 BEVs. The proposed projects have the potential to accelerate commercial viability of BEVs and PHEVs. Expected immediate benefits include the deployment of ZEVs in South Coast AQMD’s demonstration fleet. Over the longer term, the proposed projects could help foster wide-scale implementation of ZEVs 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 2016 AQMP.

Fueling Infrastructure and Deployment (Natural Gas/Renewable Fuels)

Proposed Project: Demonstrate Near-Zero emission Natural Gas Vehicles in Various Applications

Expected South Coast AQMD Cost: \$440,750

Expected Total Cost: \$2,000,000

Description of Technology and Application:

Natural gas vehicles (NGVs) have been very successful in reducing emissions in the Basin due to the deployment by fleets and owners and operators of heavy-duty vehicles utilizing this clean fuel. Currently, on-road heavy-duty natural gas engines are increasingly being certified to CARB's optional low-NOx standards which are significantly lower in NOx than the current on-road heavy-duty standard. This technology category seeks to support the expansion of OEMs producing engines or systems certified to the lowest optional NOx standard or near-zero emissions and useable in a wide variety of medium- and heavy-duty applications, such as Class 6 vehicles used in school buses and in passenger and goods delivery vans, Class 7 vehicles such as transit buses, waste haulers, street sweepers, sewer-vector trucks, dump trucks, concrete mixers, commercial box trucks, and Class 8 tractors used in goods movement and drayage operations and off-road equipment such as construction vehicles and yard hostlers. This category can also include advancing engine technologies to improve engine efficiencies that will help attract heavy-duty vehicle consumers to NGVs.

Potential Air Quality Benefits:

Natural gas-powered vehicles have inherently lower engine criteria pollutant emissions relative to conventionally fueled vehicles, especially older diesel-powered vehicles. Recently, on-road heavy-duty engines have been certified to near-zero emission levels that are 90% lower in NOx than the current on-road HDV standard. California's On-Road Truck and Bus Regulation requires all on-road HDVs to meet the current standard by January 1, 2023. The deployment of near-zero emission vehicles would significantly further emission reductions relative to the state's current regulatory requirements. Incentivizing the development and demonstration of near-zero emission NGVs in private and public fleets, goods movement applications, transit buses will help reduce local emissions and emissions exposure to nearby residents. Natural gas vehicles can also have lower greenhouse gas emissions and can increase energy diversity, help address national energy security objectives, and can reduce biomass waste when produced from such feedstocks. Deployment of additional NGVs is consistent with South Coast AQMD's AQMP to reduce criteria pollutants, and when fueled by RNG supports California's objectives of reducing GHGs and the carbon intensity of the state's transportation fuel supply, as well as the federal government's objective of increasing domestically produced alternative transportation fuels.

Proposed Project: Develop, Maintain & Expand Natural Gas Infrastructure

Expected South Coast AQMD Cost: \$440,750

Expected Total Cost: \$2,000,000

Description of Technology and Application:

This project supports the development, maintenance and expansion of natural gas fueling stations in strategic locations throughout the Basin, including the Ports, and advancing technologies and station design to improve fueling and refueling efficiencies of heavy-duty NGVs. This category supports the broader deployment of near-zero emission heavy-duty vehicles and the implementation of South Coast AQMD's fleet rules. In addition, as natural gas fueling equipment begins to age or has been placed in demanding usage, components will deteriorate. This project offers 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. Heavy-duty NGVs have significantly lower emissions than their diesel counterparts 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, and improving vehicle refueling times through improved refueling systems designs and high-flow nozzles. While new or improved NGV stations have an indirect emissions reduction benefit, they help facilitate the introduction of near-zero emission NGVs in private and public fleets in the area, which have a direct emissions reduction benefit. It is expected that natural gas' lower fuel cost relative to diesel and the added financial incentives of renewable natural gas (RNG) under the state's Low Carbon Fuel Standard program and the federal Renewable Fuel Standard program will significantly reduce operating costs of high fuel volume heavy-duty NGVs and attract consumers to this technology. The increased exposure and fleet and consumer acceptance of NGVs would lead to significant and direct reductions in NO_x, VOC, CO, PM and toxic compound emissions from mobile sources. Such increased penetration of NGVs will provide direct emissions reductions of NO_x, VOC, CO, PM and air toxic compounds throughout the Basin.

Proposed Project: Demonstrate Renewable Transportation Fuel Manufacturing and Distribution Technologies

Expected South Coast AQMD Cost: \$881,500

Expected Total Cost: \$10,000,000

Description of Technology and Application:

The transportation sector represents a significant source of criteria pollution in the Basin. Clean, alternative fuel-powered transportation is a necessary component for this region to meet federal clean air standards. Alternative fuels produced from renewable sources such as waste biomass help to further efforts associated with landfill and waste diversion, greenhouse gas reduction, energy diversity and petroleum dependency. Locally produced renewable fuels further reduces concerns associated with out-of-state production and transmission of fuel as well as helps support the local economy. Renewable fuels recognized as a transportation fuel under the state's Low Carbon Fuel Standard program and the federal government's Renewable Fuel Standard program can provide financial incentives that can significantly reduce the price of fuel and hence the cost of operation of clean, alternative fuel vehicles and providing additional incentive for consumers to purchase and deploy clean, alternative renewable fueled powered vehicles.

The project category will consider the development and demonstration of technologies for the production and use of renewable transportation fuels such as renewable natural gas (RNG), renewable diesel (RD), and renewable hydrogen (RH) from various waste biomass feed stocks including municipal solid wastes, green waste, and biosolids from waste water treatment facilities, from technologies such as anaerobic digestion, gasification, and pyrolysis.

The main objectives of this project are to investigate, develop and demonstrate:

- commercially viable methods for converting renewable feed stocks into CNG, LNG, Hydrogen or diesel (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 RNG refueling facilities; and
- pipeline interconnection in the local gas grid to provide supply to users.

Potential Air Quality Benefits:

The South Coast AQMD relies on a significant increase in the penetration of zero and near-zero emission vehicles in the Basin to attain federal clean air standards by 2023 and 2032. This project would help develop a number of renewable transportation fuel production and distribution facilities to improve local production and use of renewable fuels to help reduce transportation costs and losses that can reduce total operating costs of zero and near-zero emission vehicles to be competitive with comparable diesel fueled vehicles. Such advances in production and use are expected to lead to greater infrastructure development. Additionally, this project could support the state's goal of redirecting biomass waste for local fuel production and reduce greenhouse gases associated with these waste biomass feedstocks.

Stationary Clean Fuel Technologies

Proposed Project: Develop and Demonstrate Microgrids with Photovoltaic/Fuel Cell/Battery Storage/EV Chargers and Energy Management

Expected South Coast AQMD Cost: \$1,322,250

Expected Total Cost: \$6,000,000

Description of Technology and Application:

CARB has proposed the Advanced Clean Truck Regulation which is part of a holistic approach to accelerate a large-scale transition of zero emission medium-and heavy-duty vehicles from Class 2B to Class 8. Manufacturers who certify Class 2B-8 chassis or complete vehicles with combustion engines would be required to sell zero emission trucks as an increasing percentage of their annual California sales from 2024 to 2030. By 2030, zero emission truck/chassis sales would need to be 50% of Class 4-8 straight trucks sales and 15% of all other truck sales.

The commercialization of zero emission heavy-duty trucks is currently under way with two of the largest manufacturers announcing plans for commercial products in the 2021-2022 timeframe to be introduced in Southern California. Both Daimler and Volvo, which are currently developing battery electric drayage trucks with the South Coast AQMD, are planning commercial products soon. Several fleet operators are planning large deployments of 50 to 100 trucks, some at single site locations. Also, CARB is expected to announce in spring 2020 release of a solicitation that seeks projects to deploy 50 or more heavy-duty trucks at a single location. Ever larger deployments of zero emission trucks will be needed for the technology to have an impact on air quality.

Large deployments of zero emission Class 8 battery electric trucks (BET) each carrying 300+ kW hours of battery-stored energy or fuel cell trucks (FCT) carrying 30-50 kg of hydrogen will require costly infrastructure that creates a barrier for some fleets to adopt zero emission platforms. Many fleet operators do not own but lease their facilities making the capital expenditure of EV or hydrogen infrastructure impossible to recoup in a short period of time. Like the diesel vehicles they presently operate, fleets purchase fuel for their trucks, not the fueling station. Microgrids can be instrumental in meeting the challenge of providing large amounts of energy cost effectively for EV charging or hydrogen generation to support zero emission vehicle refueling. Additionally, if the microgrid equipment is owned by a third party and the energy sold to the fleet through a power purchase agreement, the financial challenge of a large capital investment can be avoided by the fleet operator.

A microgrid is a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid. A microgrid can connect and disconnect from the grid to enable it to operate in both grid-connected and island-mode. Microgrids can work synergistically with the utility grid to provide power for zero emission vehicle refueling by managing when energy from the grid is used—during off-peak hours when it is the least expensive. Then during peak demand periods, the microgrid would use energy from battery storage or onsite generation. Most all the technologies that make up microgrids already exist including photovoltaic, fuel cells, battery storage, along with hardware and software for the energy management system (EMS). When grid service is interrupted, the microgrid can disconnect from it and continue to operate as an energy island independent from the grid. Having assurance of an uninterrupted fueling source is an important consideration for a fleet operator. Also, if the microgrid is connected to the fleet operator's logistics system, additional benefits in terms of infrastructure cost and battery life for BETs can be realized. If the EMS is fed information on the route a truck is going to travel, it can charge the vehicle with enough energy for the trip so the truck will operate within 20-80% state of charge (SOC) of the battery having the least amount of impact to battery life. Additionally, if the EMS is connected to the logistics system, it can plan the charging schedules with 150 kW or less powerful chargers which again

will have less impact to battery life than the planned higher powered 300+ kW chargers and lower the costs for the charging infrastructure.

The energy demand of electric and fuel cell heavy-duty trucks is substantial; for a 100-vehicle fleet of BETs with 300 kW hours, batteries would require 30 MW hours/day of energy and for a 100-vehicle fleet of FCTs, 2000 kgs/day of hydrogen. Microgrids can provide energy for hydrogen and EV infrastructure and can serve to enable large zero emission vehicle deployments and make refueling economical and reliable. Staff has demonstrated several microgrid projects with the University of California Irvine and has toured the microgrid at University of California San Diego. Currently, several pilot projects are being discussed with microgrid developers and fleet operators that involve various configurations of microgrid technologies and different business models. Proposed projects would include development and demonstration of microgrids utilizing various types of renewable and zero emitting onsite generation (fuel cell tri-generation, power to gas, photovoltaic, wind), energy storage, connectivity to logistics systems, vehicle-to-grid and vehicle-to-building technologies. Also, projects that demonstrate different business models will be considered, such as projects involving a separate entity owning some or all the microgrid equipment and engaging in a power purchase agreement to provide energy to fleets that are transitioning to zero emission trucks. Proposed projects would partner with truck OEMs and their major customers, such as large- and medium-sized fleets looking at microgrid solutions for their operations here in the Basin.

Potential Air Quality Benefits:

Microgrids can support large deployments of zero emission medium- and heavy-duty trucks that are necessary to meet the AQMP target of a 45 percent reduction in NO_x required by 2023 and an additional 55 percent reduction by 2031. Both renewable and zero emitting power generation technologies that make up a microgrid can provide a well-to-wheel zero emission pathway for transporting goods. Projects could potentially reduce a significant class of NO_x and CO emissions that are in excess of the assumptions in the AQMP and further enhance South Coast AQMD's ability to enforce full-time compliance.

Proposed Project: Develop and Demonstrate Renewables-Based Energy Generation Alternatives

Expected South Coast AQMD Cost: \$264,450

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.

Fuel/Emissions Studies

Proposed Project: Conduct In-Use Emissions Studies for Advanced Technology Vehicle Demonstrations

Expected South Coast AQMD Cost: \$500000

Expected Total Cost: \$850,000

Description of Technology and Application:

Hybrid electric, hybrid hydraulic, plug-in electric hybrid and pure EVs will all play 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.

In addition, South Coast AQMD has been supporting rapid deployment of near-zero emission natural gas technologies ever since the first heavy-duty engine is commercially available in 2015. As more near-zero emission natural gas (now propane) technology penetrate the different segments, in-use assessment of real-world benefit is needed.

The CARB EMFAC model that the 2016 AQMP is based on uses emissions data from in-use emissions studies for calculating emission factors for heavy-duty trucks rather than the certification data. For the upcoming EMFAC 202x, a natural gas engine module is included for the first time with emissions data gathered from the 2017 South Coast AQMD funded in-use emissions characterization effort. The upcoming CARB and EPA low-NOx regulation focused on addressing the gap of in-use and certification values by introducing a new methodology that includes emissions from all operations. While staff do expect the in-use emissions from new engines perform closer to certification values, there are still significant population of the 2010+ legacy fleet expected to remain in service well over 2031. There is always a need to better assess real world truck emissions and fuel economy benefit from both engines, hybrid powertrain and zero emission technologies for continued technology improvements.

The environmental benefit for each technology class is 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, which 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 South Coast AQMD's air quality goals.

Proposed Project: Conduct Emissions Studies on Biofuels, Alternative Fuels and Other Environmental Impacts

Expected South Coast AQMD Cost: \$400,000

Expected Total Cost: \$1,500,000

Description of Technology and Application:

The use of biofuels can be an important strategy to reduce petroleum dependency, air pollution and greenhouse gas emissions and help with California's aggressive GHG reduction goal. 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 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's 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. In 2019, the U.S. EPA approved 15% ethanol (E15) blends for year-round use and CARB, along with South Coast AQMD and other launched an emissions study of E15 to assess the emissions impact of the current fleet of California light duty vehicles.

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. Researchers has proposed to evaluate the emissions impact of renewable natural gas and other natural gas blends such as renewable hydrogen.

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.

More recently, the Power-to-Gas concept has renewed interest in hydrogen-fossil fuel blends which the emissions impact on latest ICE technologies needs to be reassessed. Hydrogen fueled ICE was studied heavily in the early 2000's and results has shown significant criteria emissions reduction possible with optimized engine calibration. Since then, ICE technologies have been fitted with advanced aftertreatment to allow the engines to be certified to today's NOx and low NOx standards. Therefore, emissions impact assessment is much needed on the latest engines.

Lastly, in an effort to evaluate the contribution of meteorological factors to high ozone and PM2.5 episodes

occurring in the Basin, mainly as a result of higher summer time temperatures and increased air stagnation following the drought years, a comprehensive study is necessary to evaluate the trends of meteorological factors that may adversely impact air quality in the Basin. The study will assist staff to better understand the potential impact of recent weather trends on criteria pollutant emissions and potentially develop more effective strategies for improving air quality in the future.

Potential Air Quality Benefits:

If renewable diesel, 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 South Coast AQMD 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. Additionally, understanding meteorological factors on criteria pollutant emissions may help identify ways to mitigate them, possibly through targeted advanced transportation deployment.

Proposed Project: Identify and Demonstrate In-Use Fleet Emissions Reduction Technologies and Opportunities

Expected South Coast AQMD Cost: \$220,375

Expected Total Cost: \$1,000,000

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, commercial harbor craft 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. In the last a few years, real-time emissions and fuel economy data reporting along with telematics has been demonstrated with large fleets to as fleet management tools to identify high emitters and increase operational efficiency.

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;
- development, deployment and demonstration of smart vehicle telematic systems; and
- low NOx sensor development

Potential Air Quality Benefits:

Many of the technologies identified can be applied to light- 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. The identification and replacement of high-emitting vehicles has been identified in CERPs from the Year 1 AB 617 communities as a high priority for residents living in these communities, particularly as heavy-duty trucks frequently travel on residential streets to bypass traffic on freeways surrounding these disadvantaged communities.

Emissions Control Technologies

Proposed Project: Develop and Demonstrate Advanced Aftertreatment Technologies

Expected South Coast AQMD Cost: \$500,000

Expected Total Cost: \$2,000,000

Description of Technology and Application:

There are a number of aftertreatment technologies which have shown substantial emissions reductions in diesel engines. These technologies include zoned catalyst soot filters, early light -off catalysts, dual SCR systems, pre-NOx absorbers, and ammonia slip catalysts. Additional heating technologies enabled by availability of 48 volt battery system can be used to keep desired catalyst temperatures such as heated dosing and heated catalysts are also part of the complete aftertreatment system design towards near-zero emission NOx. 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 emissions 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 truck demonstrations beyond the lab based testing, retrofit applications, such as heavy-duty line-haul and other large displacement diesel engines, street sweepers, waste haulers and transit buses. Applications for non-road may include construction equipment, yard hostlers, gantry cranes, locomotives, commercial harbor craft, 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 early light -off SCR and heated dosing, could also have NOx reductions of up to 90%.

Proposed Project: Develop and Demonstrate Advanced Aftertreatment Catalyst Heating Technologies

Expected South Coast AQMD Cost: \$220,375

Expected Total Cost: \$1,000,000

Description of Technology and Application:

The objective of this project is to support the demonstration and integration of aftertreatment systems incorporating technologies such as heated dosing and electrically heated catalysts used for on-road heavy duty vehicles. Current aftertreatment systems are required to maintain an operating temperature of 200 °C or higher for optimal performance. Diesel engines for heavy duty commercial vehicles have been discovered to operate at temperatures below 200 °C during specific parts of the driving cycle, such as low loads and cold starts. Emissions during the low-load and cold starts have been shown to increase up to 30% and PM up to 20%. Previous technologies, such as the mini burner, were successful mitigating the cold catalyst issue. There were draw backs in this technology due to increased CO₂ emissions. The mini burner was not favorable as a successful approach because it increased fuel consumption. New aftertreatment technologies, coupled with advanced engine and hybrid technologies, have shown potential to reduce emissions up to 99% without a fuel penalty. Technologies such as:

- Close-coupled catalysts
- Dual-heated diesel-exhaust fluid dosing
- Electronically heated catalysts

Current aftertreatment design incorporates a close-coupled catalyst, Diesel particulate filter, dual SCR, and an ammonia-slip catalyst. Included in this design is a required heat source at low loads, cold starts and motoring conditions. The use of an electric heat source has become feasible due to advancements in electrical-powered applications and integration with the vehicle. These heating technologies has been demonstrated under lab based testing but issues reside with further commercialization effort as the new CARB and EPA regulation significantly lengthening the warranty and durability requirements which could increase the cost and ultimate limit adoption of new and unproven technologies. Thus, large scale, OEM and supplier sponsored demonstration effort is needed to move these technologies forward.

Potential Air Quality Benefits:

This project is expected to contribute to the total emission reductions in heavy-duty on road engines. Emission reductions of 80-90% in heavy-duty diesel long-haul trucks has already been proven when an advanced aftertreatment system, incorporating an additional heat source, along with advanced engine technology such as cylinder deactivation is used. The fuel savings benefit is especially attractive to long-haul fleet operations. In order to meet the ultra-low NO_x air quality standards and promote a national low NO_x standard for heavy-duty diesel engines, an advanced aftertreatment system incorporating heated catalyst technology is required.

Proposed Project: Develop Methodology and Evaluate Onboard Emission Sensors for On-Road Heavy-Duty Vehicles

Expected South Coast AQMD Cost: \$250,000

Expected Total Cost: \$1,000,000

Description of Technology and Application:

New heavy-duty on-road vehicles represent one of the largest categories in the NO_x emissions inventory in the Basin. In order to meet the 2023 and 2031 ozone standards, NO_x emissions need to be reduced by 45% and an additional 55% from 2012 levels, respectively, mainly from mobile sources. Previous in-use emission studies, including studies funded by the South Coast AQMD, have shown significantly higher NO_x emissions from on-road heavy-duty vehicles than the certification limit under certain in-use operations, such as low power duty cycles. In CARB's adopted Heavy-Duty On-Road "Omnibus" Low NO_x regulation, in addition to the lower certification values, a low load test cycle and revisions to the not-to-exceed compliance tests. A NO_x sensor data reporting are also introduced where the vehicle computer are required to store a past period of emissions data to ensure real-world emission reductions are realized over various duty cycles, especially those low power duty cycles in urban areas. An alternative proposed new methodology is to continuously measure real-time emissions from trucks with onboard sensors. Both industry, government and regulators are looking to use the sensors to better monitor emissions compliance and leverage the real-time data from sensors to enable advances concepts such as geofencing.

This project category is to investigate near term and long-term benefits from onboard sensors to understand in-use emissions better and reduce emissions from the advanced management concept. The first part of the project is to identify and conduct proof-of-concept demonstrations of feasible candidate technologies, such as:

- laboratory evaluation of existing sensors;
- development and evaluation of next generation sensors;
- development of algorithms to extract sensor information into mass-based metric;
- demonstrate feasibility to monitor emissions compliance using sensors;
- identify low cost option for cost and benefit analysis;
- demonstrate sensors on natural gas and other mobile sources such as light-duty, off-highway and commercial harbor craft; and
- development, deployment and demonstration of smart energy/emissions management systems

Potential Air Quality Benefits:

The proposed research projects will assist the trucking industry to monitor emissions, using sensors as one of the design platform options. Reduction of NO_x and PM emissions from mobile sources is imperative for the Basin to achieve NAAQS and protect public health.

Proposed Project: Demonstrate On-Road Technologies in Off-Road and Retrofit Applications**Expected South Coast AQMD Cost:** \$176,300**Expected Total Cost:** \$800,000**Description of Technology and Application:**

On-road heavy-duty engines have demonstrated progress in meeting increasingly stringent federal and state requirements. New heavy-duty engines have progressed from 2 g/bhp-hr NO_x in 2004 to 0.2 g/bhp-hr NO_x 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 NO_x. 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, commercial harbor craft 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 off-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 South Coast AQMD Cost: \$88,150

Expected Total Cost: \$1,000,000

Description of Technology and Application:

Reducing diesel exhaust from vehicles has become a high priority in the Basin since CARB identified the particulate phase of diesel exhaust as a surrogate for all of the toxic air contaminants emitted from diesel exhaust. Additionally, health studies indicate that the ultrafine particulate matter (UPM) 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 UPM 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 new technologies and health effects of these emissions, an evaluation and comparison of UPM and the potential impacts on community exposure, particularly in disadvantaged communities, is needed.

In this project, measurements and chemical composition of UPM will be done, as well as studies conducted to characterize their toxicity. The composition of PM 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 UPM, 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 technologies, and new engine development 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 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 Basin relies on significant penetration of low emission vehicles to attain federal clean air standards. Reduction of PM 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 number of UPM generated by different types of fuels and advanced control technologies as well as provide information on potential health effects of UPM. 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 South Coast AQMD Cost: \$132,225

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, freight/logistics distribution centers and freeways is important to identify emissions exposure to surrounding communities and provide data to assess health impacts. This project category would identify areas of interest and conduct ambient air monitoring, emissions monitoring, analyze data and assess potential health impacts from mobile sources. These projects would need to be at least one year in duration in order to properly assess air quality impacts in surrounding communities.

Potential Air Quality Benefits:

The proposed project will assist in 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, particularly in disadvantaged communities; 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 Toxic Air Contaminants

Expected South Coast AQMD Cost: \$132,225

Expected Total Cost: \$300,000

Description of Technology and Application:

Previous studies of ambient levels of toxic air contaminants, such as the MATES studies, have found that diesel exhaust is the major contributor to health risk from air toxics. Analyses of diesel particulate matter (DPM) in ambient samples have been based on measurements of elemental carbon. While the bulk of particulate elemental carbon in the 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 Basin. Analysis of particulate bound organic compounds was utilized as tracers to estimate levels of ambient DPM as well as estimate levels of PM 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 and updated emissions inventory of toxic air contaminants. MATES IV also measured UPM concentrations and black carbon at monitoring sites as well as near sources such as airports, freeways, rail yards, busy intersections and freight/logistics 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 UPM concentrations typically emitted or converted from vehicle exhaust. In addition, staff are also performing additional advanced monitoring activities as an extension of the MATES V study.

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 health effects and potential community exposure, particularly in disadvantaged communities. 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 DPM as well as levels of PM from other significant combustion sources, including gasoline and diesel generated VOCs. This will allow a better estimation of potential exposure and health effects from toxic air contaminants from diesel exhaust in the Basin. This information in turn can be used to determine health benefits of promoting clean fuel technologies.

Technology Assessment/Transfer and Outreach

Proposed Project: Assess and Support Advanced Technologies and Disseminate Information

Expected South Coast AQMD Cost: \$352,600

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 South Coast AQMD's outreach efforts by coordinating activities with other organizations to expedite the implementation of advanced engines and clean fuels technologies.

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;
- emission studies and assessments of near-zero and zero-emission alternatives;
- preparation of reports, presentations at conferences, improving public relations and public communications of successful clean technology demonstrations;
- participation in and coordination of workshops and various meetings;
- support for training programs related to fleet operation, maintenance and refueling of alternative fuel vehicles and equipment;
- publication of technical papers as well as reports and bulletins; and
- dissemination of information, including websites development and updates.

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/equipment and associated infrastructure.

Potential Air Quality Benefits:

South Coast AQMD adopted fleet regulations requiring public and private fleets within the Basin to acquire alternatively fueled vehicles when making new purchases. The benefits of highlighting success stories in the use of advanced alternatively fueled vehicles could expedite the acceptance and commercialization of advanced technologies. Especially, by the operators seeking to comply with the provisions of the South Coast AQMD fleet rules. The emission reduction benefits will contribute to the goals of the AQMP.

Proposed Project: Support Implementation of Various Clean Fuels Vehicle Incentive Programs

Expected South Coast AQMD Cost: \$264,450

Expected Total Cost: \$400,000

Description of Project:

This project supports the implementation of incentive programs, including the state and federal grant programs, the Carl Moyer, lower emission school bus, Replace Your Ride Programs and the South Coast AQMD residential EV charger rebate program. Implementation support includes application review, funds allocation, equipment owner reports collection, documentation to the CARB, verification of vehicle operation, and other support as needed. Information dissemination is critical to successfully implementing the coordinated and comprehensive incentive programs. Outreach will be directed to vehicle dealers, individuals and fleets. To date, the South Coast AQMD residential EV charger rebate program has provided over 1,500 rebates, totaling \$416,087. The total available funds of \$1 million is consisted with \$500,000 from South Coast AQMD Clean Fuels Fund and \$500,000 from the Mobile Source Air Pollution Reduction Review Committee (MSRC).

Potential Air Quality Benefits:

As described earlier, the South Coast AQMD will provide matching funds to implement several key incentives programs to reduce diesel emissions in the Basin. Furthermore, the South Coast AQMD adopted fleet regulations requiring public and private fleets within the Basin to acquire alternatively fueled vehicles when making new purchases. The benefits of highlighting zero emission vehicle incentives could potentially expedite the acceptance and commercialization of advanced technologies by operators seeking to comply with the South Coast AQMD fleet rules provisions. The result of future emission reduction benefits will contribute to the goals of the AQMP. The lower emission school bus, AB 617 Community Air Protection, Volkswagen Environmental Mitigation Trust and Carl Moyer incentives programs could reduce large amounts of NOx and PM emissions, and toxic air contaminants in the Basin.

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Appendix A

South Coast AQMD Advisory Groups

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Technology Advancement Advisory Group¹

Dr. Matt Miyasato, Chair	South Coast AQMD
Don Anair	Union of Concerned Scientists
Chris Cannon	Port of Los Angeles
<i>Vacant</i>	California Air Resources Board
Dr. Michael Kleinman	University of California Irvine
Yuri Freedman	Southern California Gas Company
George Payba	Los Angeles Department of Water and Power
Phil Heirigs	Western States Petroleum Association
Vic La Rosa	Total Transportation Solutions Inc.
Tim Olson	California Energy Commission
David Pettit	Natural Resources Defense Council
Dr. Sunita Satyapal	Department of Energy
Heather Tomley	Port of Long Beach
*Laura Renger.....	Southern California Edison

*Newly appointed member

¹ Members as of February 19, 2021

SB 98 Clean Fuels Advisory Group²

- Dr. Matt Miyasato, Chair South Coast AQMD
- *Keith Brandis Volvo Group
- Dr. John Budroe California Environmental Protection Agency,
Office of Environmental Health Hazard Assessment
- Dr. John Wall Independent Consultant in Combustion Technology
- Dr. Mark Duvall Electric Power Research Institute
- Dr. Mridul Gautam West Virginia University, Adjunct Professor, &
University of Nevada-Reno
- Dr. Wayne Miller University of California, Riverside,
College of Engineering, Center for Environmental
Research and Technology
- Dr. Petros Ioannou University of Southern California
Director of the Center for Advanced Transportation
Technologies
- Dr. Scott Samuelson University of California, Irvine,
Combustion Laboratory/National Fuel Cell
Research Center
- Dr. Robert Sawyer Sawyer Associates
- Dr. Andreas Truckenbrodt Independent Consultant in Fuel Cell Technologies
- Kevin Walkowicz National Renewable Energy Laboratory
- *Dwight Robinson Mortimer & Wallace, Inc.

*Newly appointed member

² Members as of February 19, 2021

Appendix B

Open Clean Fuels Contracts as of January 1, 2021

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Contract	Contractor	Project Title	Start Term	End Term	South Coast AQMD \$	Project Total \$
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Hydrogen and Mobile Fuel Cell Technologies and Infrastructure

15366	Engineering, Procurement & Construction, LLC.	Operate and Maitain Publicly Accessible Hydrogen Fueling Station at SCAQMD's Diamond Bar HQs	10/10/14	04/09/21	0	0
15611	Ontario CNG Station, Inc.	Installation of Ontario Renewable Hydrogen Fueling Station	07/10/15	07/09/21	200,000	2,510,000
15618	FirstElement, Inc.	Installation of Eight Hydrogen Stations in Various Cities	02/05/16	02/04/21	1,000,000	16,442,000
16251	H2 Frontier Inc.	Develop & 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	02/28/21	589,750	1,574,250
17312	Hydrogenics USA, Inc.	ZECT II - Develop Fuel Cell Range-Extended Drayage Truck	11/20/17	05/19/21	1,109,279	2,433,553
17317	American Honda Motor Company, Inc.	Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle	03/22/17	03/22/21	22,120	22,120
17343	American Honda Motor Company, Inc.	Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle	02/21/17	02/21/21	22,188	22,188
17385	American Honda Motor Company, Inc.	Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle	05/17/17	05/17/21	22,285	22,285
18150	California Dept of Food and Agriculture, Division of Measurement Standards	Conduct Hydrogen Station Site Evaluations for Hydrogen Station Equipment Performance	06/28/18	02/27/21	100,000	805,000
18158	National Renewable Energy Laboratory	California Hydrogen Infrastructure Research Consortium H2 @ Scale Initiative	08/01/18	03/30/21	100,000	760,000
19172	Longo Toyota	Three Year Lease of Two 2018 Toyota Mirai Fuel Cell Vehicles	10/28/18	10/27/21	35,108	35,108
19248	Tustin Hyundai	Three Year Lease of 2019 Fuel Cell Hyundai Nexa	03/07/19	03/06/22	25,193	25,193
19313	Equilon Enterprises LLC DBA Shell Oil Products	Construct & Operate Renewable Hydrogen Refueling Station	06/30/20	04/01/22	1,200,000	12,000,000
20038	University of California, Irvine	Expansion of the UCI Hydrogen Refueling Station	10/18/19	02/17/27	400,000	1,800,000
20108	University of California, Irvine	Develop Optimal Operation Model for Renewable Electrolytic Fuel Production	06/17/20	06/16/21	100,000	500,000

Engine Systems and Technologies

19439	Cummins, Inc.	Natural Gas Engine and Vehicles Research and Development - Natural Gas Specific Combustion Design	08/30/19	08/29/23	250,000	10,996,626
20092	Southwest Research Institute	Natural Gas Engine and Vehicles Research and Development - Pent-Roof Medium Duty Natural Gas Engine	10/14/20	04/13/24	475,000	6,000,000

Contract	Contractor	Project Title	Start Term	End Term	South Coast AQMD \$	Project Total \$
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Engine Systems and Technologies (cont'd)

20122	Landi Renzo USA Corporation	Develop and Commercialize a Near-Zero Natural Gas Conversion System for On-Road Medium-Duty Vehicles	01/17/20	07/31/21	300,000	1,455,072
20316	US Hybrid	Natural Gas Engine & Vehicles Research & Development - Plug-In Hybrid CNG Drayage Truck	06/02/20	12/01/23	500,000	2,853,006
17353	Odyne Systems, LLC	Develop and Demo Medium-Heavy Duty (Class 5-7) Plug-In Hybrid Electric Vehicles for Work Truck Applications	06/09/17	02/28/22	900,000	6,955,281

Electric/Hybrid Technologies and Infrastructure

14184	Green Paradigm Consulting, Inc.	DC Fast Charging Network Provider	04/04/14	06/30/23	390,000	1,210,000
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	689,850
17065	Green Paradigm Consulting, Inc.	EV Infrastructure Installer	12/02/16	12/31/21	805,219	805,219
17105	BYD Motors, Inc.	Development and Demonstration of up to 25 Class 8 Battery Electric Drayage Trucks	04/14/17	10/13/23	2,294,436	8,942,400
17207	Peterbilt Motors	Development and Demonstration of up to 12 Class 8 Battery Electric Drayage Trucks	04/07/17	10/06/23	2,342,436	11,082,340
17225	Volvo Technology of America, LLC	Development and Demonstration of up to 2 Class 8 Battery Electric Drayage Trucks	06/09/17	12/31/21	2,341,184	9,811,447
17244	Kenworth Truck Company	Development & Demonstration of four Class 8 CNG Hybrid Electric Drayage Trucks	09/08/17	04/14/21	2,239,106	6,492,238
17316	Center for Transportation and the Environment	Develop and Demonstrate 10 Zero-Emission Fuel Cell Electric Buses	06/09/17	03/31/21	1,000,000	45,157,859
18075	Selman Chevrolet Company	Lease Two 2017 Chevrolet Bolt All-Electric Vehicles for Three Years	08/18/17	02/18/21	30,892	30,892
18129	Electric Power Research Institute	Versatile Plug-In Auxiliary Power System Demonstration	06/28/18	10/31/21	125,000	273,000
18151	Rail Propulsion System	Develop & Demonstrate Battery Electric Switcher Locomotive	04/05/18	12/30/21	0	925,000
18232	Hyster-Yale Group Inc	Electric Top-Pick Development, Integration & Demonstration	09/14/18	09/13/21	367,801	3,678,008
18277	Velocity Vehicle Group DBA Los Angeles Truck Centers, LLC	Southern California Advanced Sustainable Freight Demonstration	09/07/18	03/06/22	582,305	4,198,000
18280	Honda of Pasadena	Three-Year Lease of One Honda 2018 Clarity Plug-In Vehicle	02/07/18	06/26/21	18,359	18,359
18287	Evgo Services, LLC	Charging Station and Premises Agreement for Installation of One DCFC at SCAQMD Headquarters	06/27/18	06/26/28	0	0

Contract	Contractor	Project Title	Start Term	End Term	South Coast AQMD \$	Project Total \$
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Electric/Hybrid Technologies and Infrastructure (cont'd)

18397	Port of Long Beach	Demonstrate Zero Emission Cargo Handling Vehicle at POLB	01/04/19	05/31/21	350,000	8,668,410
19166	Phoenix Cars, LLC dba Phoenix Motorcars	Battery Electric Shuttle Bus Replacement Project	01/31/19	01/30/22	0	7,311,456
19182	Los Angeles County	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	01/03/19	01/03/22	0	0
19183	Southern California Public Power Authority	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	01/10/19	01/10/22	0	0
19202	City of Compton	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	04/11/19	04/10/22	0	0
19250	Baldemar Caraveo	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	03/06/19	03/06/22	0	0
19251	Gary Brotz	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	03/27/19	03/26/22	0	0
19252	Hui Min Li Chang	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	03/29/19	03/28/22	0	0
19253	Jennifer Chin	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	04/19/19	04/18/22	0	0
19254	Liping Huang	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	04/11/19	04/18/22	0	0
19255	Ramona Manning	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	04/05/19	04/04/22	0	0
19256	Tony Chu	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	04/04/19	04/03/22	0	0
19278	Volvo Group North America, LLC	Low Impact Green Heavy Transport Solutions (LIGHTS) - Develop and Demonstrate Zero Emissions Heavy-Duty Trucks, Freight Handling Equipment, EV Infrastructure and Renewable Energy	04/17/19	06/30/21	4,000,000	91,246,900
19279	Douglas Harold Boehm	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	03/29/19	03/28/22	0	0
19280	Emile I. Guirguis	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	04/19/19	04/18/22	0	0
19281	Helen Chi	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	03/27/19	03/26/22	0	0
19282	Hosneara Ahmed	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	04/05/19	04/04/22	0	0
19283	Hsuan Hu	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	03/27/19	03/26/22	0	0
19284	Jyi Sy Chiu	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	04/05/19	04/04/22	0	0
19285	Mercedes Manning	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	04/19/19	04/18/22	0	0
19286	Monica Sii	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	04/19/19	04/19/22	0	0
19287	Quei-Wen P Yen	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	03/29/19	03/28/22	0	0

Contract	Contractor	Project Title	Start Term	End Term	South Coast AQMD \$	Project Total \$
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Electric/Hybrid Technologies and Infrastructure (cont'd)

19288	Rae Marie Johnson	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	04/05/19	04/04/22	0	0
19289	Yilong Yang	Disburse Donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	04/09/19	04/08/22	0	0
19290	University of California, Riverside	Perform Data Collection, Analysis, and Reporting for CARB's ZANZEFF Project	02/15/19	06/30/21	836,258	836,258
19295	Ivan Garcia	Disburse donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	04/11/19	04/10/22	0	0
19296	Jamei Kun	Disburse donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	04/19/19	01/18/22	0	0
19297	Laizheng Wei	Disburse donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	04/19/19	04/18/22	0	0
19438	Puente Hills Hyundai LLC	Lease Two 2019 Hyudai Kona EVs for Three Years	06/06/19	06/05/22	61,156	61,156
20054	Puente Hills Hyundai LLC	Lease One 2019 Hyundai Kona EV for Three Years	08/23/19	08/22/22	29,640	29,640
20097	Zeco Systems, Inc. DBA Greenlots	Operate, Maintain and Network the EV Chargers	02/14/20	02/13/23	155,664	155,664
20124	Volvo Technology of America LLC	Develop & Demonstrate Battery-Electric Excavator & Wheel Loader	09/01/19	02/28/21	0	2,000,000
20125	Roush Cleantech, LLC	Develop and Demonstrate Battery Electric Medium-Duty Truck	03/19/20	03/18/22	937,500	3,200,000
20168	OMNITRANS	Disburse donated Mercedes-Benz USA, LLC Electric Vehicle Chargers	02/28/20	02/27/23	0	0
20248	Los Angeles County Economic Development Corp	Economic and Workforce Impact Analysis of Electric Revolution in Southern California	07/07/20	01/02/21	10,000	150,000

Fueling Infrastructure and Deployment (NG/RNG)

17092	Kore Infrastructure LLC	RNG Production & Vehicle Demonstration	10/14/16	10/13/21	2,500,000	25,500,000
18336	Abc Unified School District	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	10/05/18	11/30/34	117,900	676,500
18337	Alta Loma School District	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	10/05/18	11/30/34	78,600	423,000
18344	Bellflower Unified School District	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	09/07/18	11/30/34	39,300	225,500
18346	Chaffey Joint Union High School District	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	10/05/18	11/30/34	235,800	1,269,000
18348	Cypress School District	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	09/07/18	11/30/34	39,300	211,500
18349	Downey Unified School District	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	09/14/18	11/30/36	157,200	902,000
18350	Fountain Valley School District	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	09/07/18	11/30/34	39,300	211,500

Contract	Contractor	Project Title	Start Term	End Term	South Coast AQMD \$	Project Total \$
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Fueling Infrastructure and Deployment (NG/RNG) (cont'd)

18351	Fullerton Joint Union High School District	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	10/05/18	11/30/34	157,200	846,000
18355	Huntington Beach Union High School District	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	10/05/18	11/30/34	589,500	3,382,500
18363	Orange Unified School District	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	09/14/18	11/30/34	39,300	225,500
18364	Placentia-Yorba Linda Unified School District	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	10/05/18	11/30/34	235,800	1,353,000
18365	Pupil Transportation Cooperative	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	10/05/18	11/30/34	196,500	1,127,500
18367	Rialto Unified School District	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	10/05/18	11/30/34	510,900	2,931,500
18368	Rim Of The World Unified School District	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	10/05/18	11/30/34	513,600	676,500
18369	Rowland Unified School District	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	11/02/18	11/30/34	117,900	770,000
18374	Upland Unified School District	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	10/12/18	11/30/34	157,200	902,000
20178	Whittier Union High School District	Replace Diesel School Buses with Near-Zero Emissions CNG Buses	02/21/20	11/30/34	196,500	1,052,500

Fuel/Emissions Studies

17276	University of California, Riverside	Development of ECO-ITS Strategies for Cargo Containers	08/03/17	01/31/21	543,000	2,190,233
17352	California State University, Maritime Academy	Develop and Demonstrate Vessel Performance Management Software and Equipment	06/09/17	06/08/21	50,086	195,915
18090	University of California, Riverside	Study Secondary Organic Aerosol Formation from Heavy-Duty Diesel and Natural Gas Vehicles	12/05/17	02/28/21	85,000	85,000
19208	University of California, Riverside	Conduct Emission Study on Use of Alternative Diesel Blends in Off-Road Heavy Duty Engines	06/21/19	07/31/21	261,000	1,353,499
20058	University of California, Riverside	Evaluate Meteorological Factors and Trends Contributing to Recent Poor Air Quality in Basin	08/23/19	02/23/21	188,798	188,798

Technology Assessment and Transfer/Outreach

08210	Sawyer Associates	Technical Assistance on Mobile Source Control Measures and Future Consultation on TAO Activities	02/22/08	02/28/22	50,000	50,000
09252	JWM Consulting Service	Technical Assistance with Review and Assessment of Advanced Technologies, Heavy-Duty Engines and Conventional and Alternative Fuels	12/20/08	06/30/22	30,000	30,000

Contract	Contractor	Project Title	Start Term	End Term	South Coast AQMD \$	Project Total \$
Technology Assessment and Transfer/Outreach (cont'd)						
12376	University of California, Riverside	Technical Assistance with Alternative Fuels, Biofuels, Emissions Testing, and Zero-Emission Transportation Technology	06/01/14	05/31/22	225,000	225,000
16262	University of California, Davis-Institute of Transportation Studies	Support Sustainable Transportation Energy Pathways (STEPS) 2015-2018 Program	01/05/18	01/04/22	240,000	5,520,000
17097	Gladstein, Neandross & Associates, LLC	Technical Assistance with Alt Fuels and Fueling Infrastructure, Emissions Analysis and On-Road Sources	11/04/16	06/30/21	200,000	200,000
17358	AEE Solutions, LLC	Technical Assistance with Heavy-Duty Vehicle Emissions Testing, Analyses & Engine Development	06/09/17	05/31/21	200,000	200,000
19078	Green Paradigm Consulting, Inc.	Technical Assistance with Alternative Fuels, Evs, Charging & Infrastructure and Renewable Energy	09/07/18	09/30/22	200,000	540,300
19227	Gladstein, Neandross & Associates, LLC	Technical Assistance with Alternative Fuels & Fueling Infrastructure, Emissions Analysis & On-Road Sources	02/01/19	01/31/21	200,000	200,000
19302	Hydrogen Ventures	Technical Assistance with Hydrogen Infrastructure and Related Projects	04/24/19	04/23/21	50,000	50,000
20085	CALSTART, Inc	Technical Assistance for Development & Demonstration of Infrastructure and Mobile Source Applications	11/08/19	11/07/21	150,000	150,000
20163	Gladstein, Neandross & Associates, LLC	Technical Assistance with Implementation & Outreach Support for California VW Mitigation Trust Fund	01/21/20	01/21/22	26,000	26,000
20265	Eastern Research Group	Technical Assistance with Heavy-Duty Vehicle Emissions Testing, Analyses & Engine Development & Applications	06/17/20	06/16/22	50,000	50,000
20348	Gladstein, Neandross & Associates, LLC	Cosponsor the 2021 Renewable Gas 360 Symposium and Webinar Series	07/21/20	03/31/21	35,000	150,000
21078	Charging Interface Initiative (CharIn) e.V.	Cosponsor High Power Charging for Commercial Vehicles Event	09/16/20	01/31/21	12,500	240,000

Appendix C

Final Reports for 2020

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Installation of Riverside Renewable Hydrogen Fueling Station

Contractor

ITM Power Inc.

Cosponsors

California Energy Commission (CEC)
South Coast AQMD

Project Officers

Patricia Kwon,
Lisa Mirisola

Background

This project saw a hydrogen refueling station installed in Riverside, CA. The hydrogen is produced in part by an on-site electrolyzer using renewable electricity to produce zero carbon fuel. This station will offset up to 250 gallons per day of gasoline therefore improving air quality and reducing greenhouse gasses (GHGs) in California.

Project Objective

The project objective was to build and install a publicly accessible hydrogen fueling station in Riverside, CA. A total of 33% of the maximum capacity of the station will be generated on site via renewable electrolysis. The station will be capable of delivering up to 100kg per day with a 35kg per hour peak fueling capacity. The dispenser will be compliant with California Division of Measurement Standards (DMS) requirements to sell hydrogen on a per kg basis. The station will also provide fill data collection in the National Renewable Energy Laboratory (NREL) template as approved by the California Energy Commission (CEC).

Technology Description

The station uses an on-site electrolyser to split water using renewable electricity therefore producing zero carbon fuel for use in hydrogen fuel cell vehicles. The hydrogen is compressed and stored in high pressure tubes and dispensed

to vehicles in both 350 and 700 Bar pressures.

This station produces 33% of its capacity using electrolysis and 67% of the gas is provided by delivered tube trailer. This allows the site to be expanded easily in the future and allows up to 33kg of hydrogen per day to be generated from renewable sources.

Status

The project is currently deemed open to the public which means that the following milestones have been reached:

1. Installation of all station equipment and sign off by equipment provider
2. Installation of all security fences, bollards & signage to allow for unattended operation
3. Energize all equipment and run the system to enable the storage tanks to be filled with hydrogen
4. Carry out initial inspection by local fire and electrical officials
5. Carry out test fills from the vehicle dispenser to confirm fuel protocol compliance
6. Carry out a fuel gas sample to confirm compliance with fuel quality standards
7. Open to public and dispense fuel



Figure 1: Installed Dispenser at Site

Results

The station has been installed and commissioned and has been operational for 3+

years.

The station hydrogen has been sampled and analyzed multiple times in accordance with Society of Automotive Engineers J2719 and found to be within tolerance.

To date the station has dispensed over 34,800kg of fuel

Benefits

This station has the capacity to displace 250 gallons of gasoline per day.

This is the only hydrogen station in the Inland Empire and provides a basis for vehicle original equipment manufacturers (OEMs) to deploy hydrogen cars in the region. It also provides a refueling stop for customers wishing to travel as far as Palm Springs, Joshua Tree and beyond.

Project Costs

The CEC project costs met the original budget parameters of \$2,125,000. Below is the final cost breakdown.

Project Funding:

California Energy Commission	\$2,125,000
South Coast AQMD	\$200,000
Match Funding	\$409,184
Total	\$2,734,184

Commercialization and Applications

The technology utilized in this project relied entirely on vehicle deployment. Vehicle OEMs have begun deployment of fuel cell vehicles in the local area and ITM Power, Inc. has already contacted several early adopters for the technology. ITM Power, Inc. has also begun to reach out to local fleet operators to try to increase fuel at the site and boost the commercialization of this station.

The site would benefit from the creation of a large expansion space to accommodate a larger electrolyser. It would also benefit from the installation of rooftop PV to generate electricity on the site.



Figure 2: Fuel Site Entrance Sign

Installation of Chino Renewable Hydrogen Station

Contractor

H2 Frontier Inc
PowerTech Labs
ITM Power

Cosponsors

California Energy Commission (CEC)
South Coast AQMD
Hyundai R&D

Project Officer

Lisa Mirisola

Background

Automakers targeted a 2015 roll-out of hydrogen fuel cell vehicles (FCEV), making the availability of hydrogen fueling stations critically important. FCEVs play an important role in the transition of the mobile transportation sector which will help promote zero emission technologies. These new technologies are necessary to attain the federal criteria pollutant standards as well as the state greenhouse gas targets. As part of this transition, hydrogen refueling facilities for these vehicles must be expanded to satisfy the impending vehicle roll-out by the automakers.

Project Objective

The goal of this project was to establish a hydrogen station having both 350 Bar and 700 Bar dispensing capabilities utilizing a renewable source of fuel, with the flexibility to meet the anticipated demand of the future. To achieve this goal, it would be necessary to deploy a station in a high value area while creating a cost-effective design. The station would need to use a 100% renewable source of hydrogen fuel and provide the ability to sell hydrogen thru a Point-of-Sale terminal at the dispenser location while providing a system design that would be easily upgradable to meet future demand.

Technology Description

It was determined that the 100% renewable energy credits will be purchased over a three-year period

to provide the electricity to generate hydrogen by electrolysis. While this is not groundbreaking technology, the high discharge pressure is. The electrolyser provider, ITM Power, promised to deliver an 80 Bar discharge pressure system from the four Proton Exchange Membrane (PEM) stack. This higher pressure is well above the industry standard of 30 Bar. This improvement in pressure allows the station design to use one less compressor to reach 950 Bar storage pressure. Less compressors mean a smaller equipment footprint and less maintenance/operational costs. This helps reduce overall capital costs. These costs are currently extremely high and are a hindrance in propelling this technology to the mainstream public.

Due to the nature of electrolysis and its high demand for reverse osmosis in the form of deionized water (where two-thirds of the flow stream is rejected and not used), a 600-gallon subterranean water tank was installed, with a pump to collect and use this water for both street sweepers and irrigation at the facility.

Compression, storage and dispensing (CSD) equipment was provided by PowerTech Labs. The equipment consisted of a 26' container housing a Hydropac compressor, a control/data room and a chiller for the compressor. Hydrogen is stored in one large buffer tank between the electrolyser and compressor, consisting of six 950 Bar Fiba brand high-pressure tubes. Overall storage of less than 100 kilograms was required by the local fire department. Since the electrolyser is an on-demand generator, the smaller storage system helps reduce cost and footprint. The dispenser has both 350 and 700 Bar nozzles at -40C, dispensing to light duty and forklift fuel cell vehicles using the latest Society of Automotive Engineers (SAE) J 2601 standard. This system design can produce 100 kg/day with 35 kgs peak per hour reliably.

Status

Compression, storage and dispensing equipment has been purchased, installed and commissioned to SAE J2601 and SAE 2719 standards. The dispensing system has provided many successful fills for Hyundai's VIP dignitaries on multiple

occasions. This has been achieved using hydrogen (H2) tube trailer delivery.

The fire department’s final permit has been signed off on as has the electrical permit. The final building permit is waiting for the remainder of generation equipment.

A specification of 80 Bar discharge pressure was originally offered by ITM Power but has not been delivered. Powertech engineered their equipment (CSD) to meet the 35kg/hr requirement based on the 80 Bar discharge pressure. It allowed us to have one less compressor. Without this higher 80 Bar discharge pressure, the station design cannot meet the 35 kilograms back to back dispensing requirement. The original design pressure of 80 Bar was reduced to 50 Bar due to the inability of ITM to meet certain standards. Currently the ITM website shows only 20 Bar for their PEM stacks so this modified offer of 50 Bar is still questionable.

A revised Factory Acceptance Test with 10 hot starts (already at temp and pressure) and 10 cold starts (ambient temp and pressure) with 2 weeks continuous runtime data would be sufficient to accept a lower performance stack, but tests yielded only 2 cold starts, plenty of warm starts and only 8 continuous hours of runtime data.

There was enough money remaining in the budget to purchase a 30 Bar electrolyser and install it before contract expiration date. A letter requesting this change was sent to the CEC, but CEC immediately issued a stop work order. Any change of electrolysis vendors would require us to complete the project with private investment.

All ownership and assets of the Chino station returned to the CEC who reduced the performance criteria from 35 kgs peak to just 20 kgs peak and awarded the station to ITM. It has been almost a year since then and no visible progress has been seen onsite.

Benefits

In addition to criteria emission reductions, this project represents an investment in clean economical FCEV transportation to help meet California’s climate goals. The project was designed to reduce emissions of greenhouse gasses (GHG) by lowering the carbon content of transportation fuels in California. The hydrogen fuel cell environmental footprint is much smaller than the gasoline baseline and achieves 100%

GHG emission reduction using renewable electricity and on-site electrolysis. The on-site system removes the requirement for a diesel vehicle to deliver hydrogen, which means that this system is essentially zero carbon. In summary a 100 kg per day station that is operating at full usage could be expected to offset 200 gallons of petrol per day and therefore 24,000MJ of energy and 2,300 kg’s of CO2 per day. At 100% capacity it is estimated that the annual savings would be 839.5 metric tons of CO2.

Project Costs

This project was not completed within the proposed budget. There were many delays and cost overruns. On November 19, 2012, the CEC released a competitive Grant Solicitation PON-12-606 entitled “Hydrogen Fuel Infrastructure” under the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP).

Organization	Funding
CEC	\$3,000,000
South Coast AQMD	\$ 200,000
H2Frontier, PowerTech and ITM Power	\$1,414,384
Total	\$4,614,384

Commercialization and Applications

This project would not have been profitable, assuming Renewable Energy Credits (REC’s) at \$0.18 per KW and 65 Kw per kilogram results in \$11.70 per kg just for hydrogen generation. The cost of electricity to operate adds another \$0.25 per kg for compression cooling and dispensing. This cost estimate would be \$4.50 + \$11.70=\$16.20 cost per kg. Not including cost of water, the retail sale of hydrogen would have to be above \$18 just to break even without counting maintenance costs. A 100% renewable station perhaps was a little early in the commercialization of retail hydrogen. Without profit margins, this industry will not attract private investors and will remain dependent on funding to advance this technology.

Development of Solid Oxide Fuel Cell and Gas Turbine (SOFC-GT) Hybrid Technology

Contractor

University of California, Irvine

Cosponsors

UC Irvine Advanced Power and Energy Program
U.S. Department of Energy (DOE)

Project Officer

Seungbum Ha

Background

Improving air quality in urban areas requires the reduction of criteria pollutant emissions across several sectors. The power sector for both stationary and mobile applications is of particular interest, in part due to the local emissions in disadvantaged and rural communities and its significant contribution to criteria pollutant and greenhouse gas emission compared to other sectors. To meet state energy and environmental goals, interest is growing in fuel cell – gas turbine (FC-GT) hybrid technology as a continuous power generation technology given the unique combination of ultra-high efficiency, ultra-low criteria pollutant emissions, and ability to operate on zero-carbon renewable hydrogen (H₂).

In this project, the optimization of 10 MW class SOFC-GT hybrid power plant technology is addressed for both stationary power generation in the South Coast Air Basin for operating on natural gas (NG), biogas (BG) and renewable H₂ sourced from excess solar and wind. In addition, the optimization of two cases for a 50 MW hybrid power generation plant is addressed, one with carbon capture (CCS) and one without. Finally, both a 3.5 MW SOFC-GT hybrid long-haul locomotive and a tugboat are evaluated as candidates for land-based and marine-based mobile applications respectively, both fueled by liquefied natural gas (LNG) and utilizing the LNG as a low temperature heat sink to increase the overall system efficiency. The Total Plant Cost (TPC) and the Cost of Electricity (COE) are provided for the stationary applications.

Project Objective

The goals of the project were to develop overall system FC/GT simulations and optimize both stationary and mobile applications as a technology

candidate to replace existing sources of major NO_x and particulate emissions today in the South Coast Air Basin, and to provide techno-economic analyses for the stationary applications to assess feasibility. The project objectives were to:

- 1) Develop integration models to fully realize the potential of hybrid SOFC-GT systems for disturbed power in the 10 to 50 MW range fueled by NG, BG, and renewable H₂,
- 2) Develop integration models to fully realize the potential of hybrid SOFC-GT systems in the 3.5 MW range fueled by LNG for mobile applications including long-haul locomotives and tugboats.
- 3) Conduct a techno-economic analysis for the stationary applications.

Technology Description

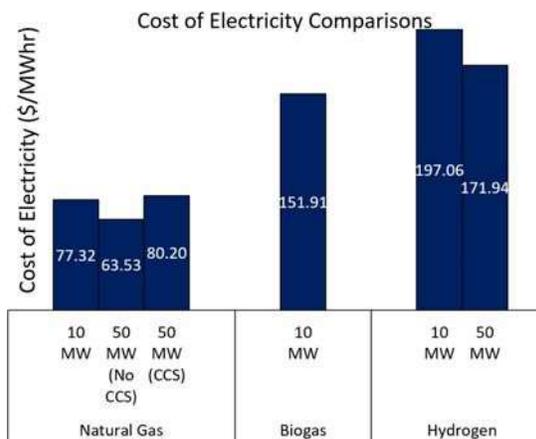
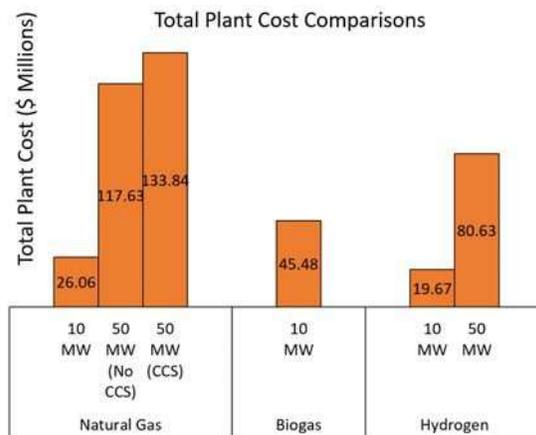
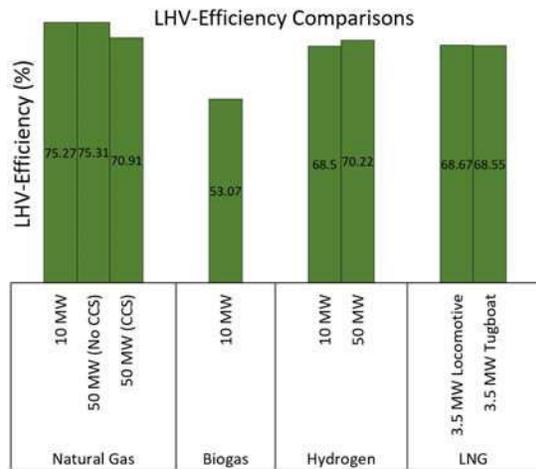
The approach was to first develop 10 MW SOFC-GT hybrid system configurations for a distributed power plant appropriate for wide scale deployment in the South Coast Air Basin that can be operated on NG and BG with the potential to operate on renewable H₂. Second, a 50 MW SOFC-GT was selected as a candidate for a large power generation resource in the Basin including service as a Transmission Integrated Grid Energy Resource (TIGER) station operating on NG and renewable H₂. Finally, for two major mobile applications, a 3.5 MW LNG-fueled was analyzed for long-haul locomotive and marine-based tugboat applications, the latter of which with a specialized GT air filter to remove the salt content from the ambient air and thereby mitigate compressor blade corrosion.

The project leveraged a five-year U.S. Department of Energy (DOE) U.S./China “Clean Energy Research Center (CERC)” water-energy nexus initiative wherein APEP conducted a study with the Chinese Academy of Sciences (CAS) on water efficient 100 MW class SOFC-GT integrated gasification fuel cell (IGFC) systems operating on pulverized coal.

Results

For the 10 MW stationary hybrids, the NG-fueled case resulted in the highest efficiency at 75.27%

(LHV) followed by the H2-fueled case at 68.50%



and the BG-fueled case at 53.07%. At the 50 MW scale, the NG-fueled case without CCS efficiency is 75.31% and with CCS is 70.91% followed by the H2-fueled at 70.22%. The TPC for the 10 MW NG-fueled hybrid is \$26,063,604 with a COE at \$77.32/MWhr, BG-fueled is \$45,483,880 with a COE at \$151.91/MWhr, and H2-fueled is \$19,671,000 with COE at \$197.06/MWhr. When

moving to the 50 MW scale, the TPC for the NG-fueled hybrid without CCS and with CCS is \$117,628,563 with COE at \$63.53/MWhr and \$133,835,172 with COE at \$80.20/MWhr, respectively. The TPC for the 50 MW H2-fueled hybrid is \$80,626,000 with COE at \$171.94. For the mobile applications, the 3.5 MW long-haul locomotive has an average LHV-efficiency at 68.67% and, for the tugboat, 68.55%.

Commercialization and Applications

The project proved the feasibility and efficacy of SOFC-GT hybrid technology for both stationary and mobile applications with the following salient conclusions:

- **The results reveal promise for economically viable implementation.** The ultra-high efficiencies and reasonable COE of stationary hybrids portend a promising future market.
- **Stationary applications are more ready for commercialization than mobile.** The stationary application for distributed power generation has a less demanding duty cycle than the application for mobile applications.
- **Operating SOFC-GT hybrids with anode recirculation.** Among anode, cathode, and no recirculation, anode recirculation yields the highest power output/electrical efficiency.
- **The utilization of LNG in mobile applications is beneficial.** LNG provides a higher stored power and energy density, and a higher efficiency given its cryogenic nature as a heat sink.
- **A reduction in renewable H₂ cost is required to enable H₂ as a fuel for distributed generation.** While the TPC for a renewable H₂-fueled SOFC/GT is the lowest at both scales, the current cost of renewable H₂ (due to the price of electricity to power electrolyzers from solar and wind) results in the most expensive COE among the three fuels.

Project Cost

The cost of the one-year project was \$900,000, comprised of \$200,000 in support from the South Coast AQMD and \$700,000 of match funding from the DOE CERC initiative that included cost share from Southern California Edison and Southern California Gas and collaboration with CAS and the Chinese Ministry of Science and Technology.

Development of an Ultra-Low Emission Diesel Engine for On-Road Heavy-Duty Vehicles

Contractor

Southwest Research Institute

Cosponsors

South Coast AQMD
U.S. Environmental Protection Agency (EPA)
California Air Resources Board (CARB)
Manufacturers of Emissions Controls (MECA)

Project Officer

Joseph Lopat

During the Stage 3 program, an additional effort was launched. Designated Stage 3b, it will continue an on-going effort examining the use of additional engine technologies to further improve fuel consumption and green house gas (GHG) emissions while maintaining Low NO_x levels. The Low Load Cycle (LLC) target would be developed based off examining the balance of NO_x and GHG emissions.

The portion of the program funded by South Coast AQMD and their funding partner, The Port of Los Angeles, involved the development of the modified engine calibrations, the screening and selection of aftertreatment hardware options, and the final development of the down-selected technology package for the engine-aftertreatment system.

Background

The original Stage 1 CARB Low NO_x Demonstration Program provided an initial demonstration of the feasibility of technologies for achieving a target tailpipe NO_x level of 0.02 g/hp-hr on both a diesel and natural gas engine platform. The diesel demonstration platform was a 2014 Volvo MD13TC EU6 engine, and that program, along with the supplemental Stage 1b durability program funded by South Coast AQMD, demonstrated the feasibility and durability of a system which reached NO_x levels near the 0.02 g/hp-hr level. However, due to the low exhaust temperatures of the MD3TC engine created by a turbo-compound for waste heat recovery, there was a significant fuel consumption penalty. CARB later expanded this original demonstration with the Stage 2 program, which focused on Low Load operations typical of urban and vocational applications.

As a follow-up to these earlier programs, CARB and South Coast AQMD launched a second diesel demonstration program, the Stage 3 Low NO_x Demonstration Program. The Stage 3 program focused on answering two major questions:

1. Could Low NO_x levels be achieved at a smaller fuel consumption penalty?
2. Could a different and more efficient system be designed to target 0.02 NO_x levels.

Status

The South Coast AQMD Stage 3 development effort was completed January 2020. Further stages involving improvements in technologies to lower NO_x, including testing renewable diesel, will be ongoing. CARB Stage 3b is currently in progress and is expected to be completed in July 2021. The final report for Stage 3b will be submitted at that time.

Results

The first task in the South Coast AQMD program was the development of a modified engine calibration that would enable an advanced aftertreatment system to reach Low NO_x levels. This modified calibration was later supplemented by the Stage 3b engine hardware work, which resulted in a modified engine calibration that incorporated cylinder deactivation (CDA) as a level to improve fuel efficiency and maintain aftertreatment system temperatures. The final engine calibration shows the impact of the modifications on the early part of the cold-start Federal Test Procedure (FTP) cycle. The engine modifications resulted in a significant increase in

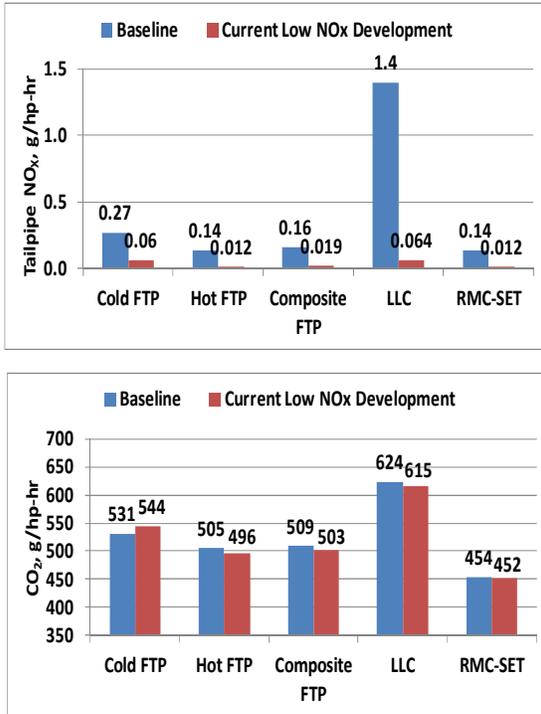


Figure 1: Performance Levels Demonstrated at the End of South Coast AQMD Funded Development on Hydrothermally Aged FUL parts (435,000 miles equivalent)

exhaust temperatures while also controlling engine-out NO_x during the aftertreatment warm-up period. Leveraging CDA allowed this to be done with only a small impact on cold-start GHG, while hot-start GHG levels showed a benefit compared to baseline. Following an extensive evaluation of candidate aftertreatment technologies and configurations, a final configuration was chosen, which is shown in Figure . This configuration employed both a close-couple light-off Selective Catalytic Reduction (LO-SCR) and a downstream system and featured dual Diesel Exhaust Fluid (DEF) dosers, including a heated upstream dosing unit. An advanced controls system was implemented on the engine including state-of-the-art model-based dosing controls, and an integrated state-based strategy controller with multiple thermal management modes. The final system was calibrated to minimize NO_x emissions, while at the same time maximizing efficiency and controlling GHG emissions. The final calibration was demonstrated on a system that was hydrothermally aged to represent a full useful life of 435,000 miles. The resulting performance levels are shown in Figure . The system was able to reach tailpipe NO_x levels below 0.02 g/hp-hr on the FTP and Ramped Modal Cycle Supplemental Emissions Test (RMC-SET), and at 0.06 g/hp-hr for the LLC.

At the same CO₂ levels of the FTP and LLC were better than the baseline engine by 1 to 1.5%, while the Low NO_x configuration was fuel consumption neutral on the RMC-SET compared to the baseline.

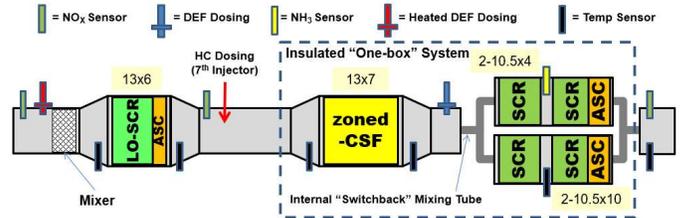


Figure 2: Final Stage 3 Aftertreatment Configuration Down-selected from Evaluation

Project Costs

The funding for Stage 3 is shown in Table 1.

CARB	\$750,000
South Coast AQMD	\$287,500
Port of Los Angeles	\$287,500
Total stage 3	\$1,325,000

Table 1: Funding for Stage 3

An additional \$1,375,000 was provided in Stage 3b by EPA, MECA, and the SwRI-run CHEDE-VII industry consortium. In total, considering both Stage 3 and the Stage 3b supplement, the overall program has been funded to nearly \$2,700,000.

Commercialization and Applications

The Stage 3 program is a critical data point supporting the development of new Low NO_x regulations for both CARB and EPA. Data from this program will support both the ARB Omnibus Low NO_x Rule and the EPA Cleaner Trucks Initiative NPRM.

The Low NO_x configuration developed in this program has been tested over current regulatory cycles, the new LowLoad Cycle, and field cycles. The system has shown the potential for NO_x emission control under a wide variety of application cycles, while maintaining GHG emissions, and in some cases showing improvements.

Several technology elements of the engine and aftertreatment system are likely to be incorporated in future on-highway engines to meet Low NO_x standards.

DEVELOP THERMAL MANAGEMENT STRATEGY USING CYLINDER DEACTIVATION FOR HEAVY-DUTY DIESEL ENGINES

Contractor

West Virginia University Innovation Corporation
(WVUIC)

Co-Sponsors

Environmental Canada, US EPA, Jacobs Vehicle
Systems (JVS), Cummins Inc.

Project Officer

Joseph Lopat

post turbine exhaust gas temperature can be realized with a 25% reduction in BSFC.

Technology Description

West Virginia University, Center for Alternative Fuels, Engine and Emissions (WVU-CAFEE), JVS and Cummins Inc. propose this collaborative effort that will integrate cost-effective cylinder deactivation hardware, developed by JVS, in a 15 L Cummins ISX HDD engine platform with suitable engine controls and calibration for improving BTE and selective catalytic reduction (SCR) thermal management at engine loads below 30%. The proposed JVS cylinder deactivation technology has been developed as a cost-effective integration into current technology HDD engines. JVS has demonstrated the ability to deactivate independently all six cylinders at any given point of time. However, a complete system integration, which addresses noise vibration and harshness (NVH) issues, seamless transition of CDA to baseline and calibration of active cylinders has not been realized.

Background

Cylinder deactivation (CDA) was shown to reduce pumping losses in spark ignited engines. The concept of CDA has recently gained interest in the heavy-duty diesel (HDD) engine segment as a pathway to a fuel-efficient thermal management strategy and, in some cases, for improvements to brake thermal efficiency (BTE). Certain vocational duty cycles that are characterized by frequent stop-and-go (urban delivery, refuse truck, port drayage) and extended idle and creep mode operations (port drayage vehicles), are plagued by higher NO_x emissions due to increased cooling of the exhaust aftertreatment system. Operations are typically below the 30% power curve of the engine and account for a major fraction of the engine operation in regions characterized by high vehicle traffic density.

Project Objective

The thermal management strategies currently employed are associated with a fuel penalty. It is imperative, therefore, to adopt a strategy that results in a minimal to no fuel penalty. Recent studies have shown that a CDA approach in a heavy-duty 6-cylinder engine can result in close to a 63°C increase in post turbine exhaust gas temperature with no change in brake-specific fuel consumption (BSFC), while a 13°C increase in

Status

In the final phase of the project, two thermal management strategies were tested: CDA while motoring (stay-hot) and early exhaust valve opening (EEVO) (get-hot). The stay hot strategy was tested on steady state motoring points as well as on a transient California Air Resources Board (CARB) low-load cycle (LLC). The EEVO was tested on idle conditions as a quick warmup strategy.

Results

Figure 1 shows motoring operation at 1,200 rpm for operation with one cylinder, two cylinders and three cylinders disabled. The results show that compared to the baseline cooldown profile of the exhaust gas at inlet of SCR, the time taken for the SCR inlet temperature to reach below SCR activation increases with the increasing number of

cylinders disabled. The increase in temperature is primarily due to lowering the air flow across the aftertreatment system during no-fueling and motoring operation. The results show that by disabling three cylinders, the SCR inlet temperature takes over a minute to reach 150°C. This is a viable option to reduce the increased NOx options after a down-hill operation.

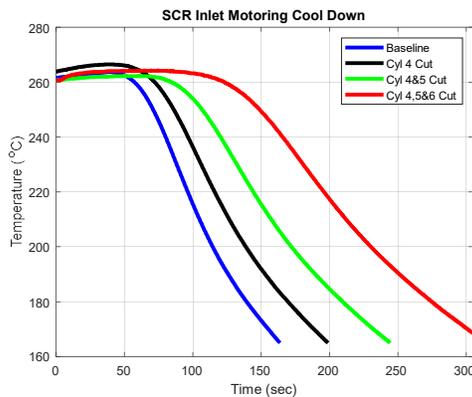


Figure 1: 1,200 rpm SCR Inlet Temperature Profile for Various Cylinder Cut-Off

Figure 2 shows the results of the temperature profiles for CDA operation during the CARB LLC cycle. Six-cylinder CDA while motoring during the LLC cycle can keep the SCR inlet temperature above the 150°C threshold.

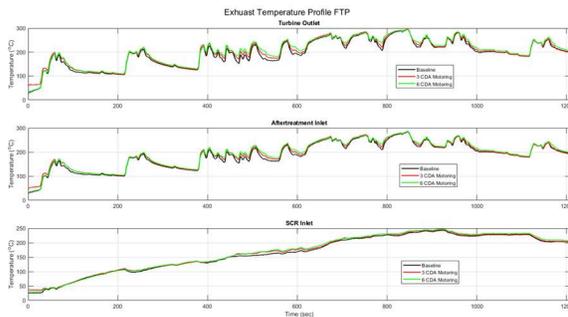


Figure 2: CDA Motoring Operation over the CARB LLC Cycle

It was decided to use EEVO for all load points below 1000 ft-lbs and to use an increased idle speed to increase the fueling and mass flow rate of air. The results show that the get-hot strategy can reach the 150°C threshold two minutes faster than the baseline warm-up strategy and sustained conducive SCR temperatures are observed during the LLC cycle.

During the warm-start the get-hot strategy is found to be far-more effective with NOx emissions temperatures at the inlet of SCR reaching over 200°C. The get-hot strategy can potentially lower cold-start NOx emissions. It may also be effective during frequent start-stop operations. The downside of the EEVO get-hot strategy is the fuel penalty that is incurred during the EEVO operation. However, with smart engine calibration this fuel penalty can be lowered from the current 10-15% compared to baseline.

Benefits

Near-zero NOx from HD diesel engines can reduce NOx nationally from the 11 million commercial diesel trucks on road. Reduction of NOx by 90% can significantly improve air quality nationally.

Project Cost

Funding for the project is listed in the following table.

Environmental Canada	\$100,000
South Coast AQMD	\$250,000
US EPA	\$250,000
Cummins and JVS (in kind)	\$100,000
Total	\$700,000

Commercialization and Applications

WVU is continuing to work on the development of smart calibrations to optimize fuel consumption. Optimization of the CDA operation can potentially yield fuel savings that can offset the increased fuel consumption from EEVO operation. WVU is also partnering with Tula Technologies to further advance the CDA control for optimal firing patterns. The continuous work on this project is expected to have a good chance for commercialization compared to the success of other CDA platforms used by General Motors and others. CDA supports the need for low NOx diesel engines soon to be required by CARB and the US EPA.

South Coast AQMD Contract #13433

March 2020

Zero Emission Cargo Transport (ZECT-I): Develop and Demonstrate Two Class 8 Zero-Emission Electric Trucks

Contractor

US Hybrid Corporation

Cosponsors

US Hybrid Corporation
U.S. Department of Energy (US DOE)
South Coast AQMD
University of California, Riverside

Project Officer

Phil Barroca

Background

On-road heavy-duty diesel trucks are a significant source of diesel particulate matter and NOx emissions with adverse health effects. The impact on public health is more pronounced in the communities adjacent to goods movement corridors near the Ports of Los Angeles (POLA) and Long Beach (POLB) and major freeways in Southern California. Recognizing the significant impact diesel trucks have on air quality and public health, the South Coast AQMD has been working with regional stakeholders, including the POLA and POLB, to promote and support the development and deployment of advanced zero emission cargo transport technologies in the South Coast Air Basin. This project was one of four zero emission drayage truck technologies South Coast AQMD that received a grant under the Department of Energy's (DOE's) Zero Emission Cargo Transport (ZECT) Demonstration program.

Project Objective

The objective of this project was to develop and build two zero emission Class 8 battery electric drayage trucks (BETs) for demonstration in real world drayage service to promote and accelerate the use of electric transportation technologies in cargo transport operations. US Hybrid's BETs were referred to as eTrucks™.

Upon completion, the eTrucks™ were planned to be demonstrated in real world drayage service for two years in partnership with a South Coast AQMD-approved fleet in Basin.

Technology Description

The demonstration eTrucks™ were built on a Navistar ProStar Model 8600 chassis with 80,000-lbs Gross Combined Weight Rating (GCWR). The eTrucks™ are powered by a 320-kW electric drive system which has been developed mainly for on-road eTrucks™ applications. The electric motor is an induction type design, free of high cost rare-earth permanent magnet materials making it commercially cost effective. The motor is powered by a proven traction motor inverter rated at 420-kVA at 600V-DC. An energy management system was employed to ensure efficiency and reliability of the lithium-ion cells. Truck one (eTruck™ 1) was fabricated and operated using EnerDel lithium-iron-phosphate (LFP) battery packs with 180 kWh of total capacity. This initial battery platform demonstrated inadequate range, power, and life cycle. US Hybrid's eTruck™ 2 used 280 kWh of A123 lithium nickel-manganese-cobalt (NMC) battery chemistry which provided sufficient power and energy density and durability (cycle life). eTruck™ 2 provided an approximate 100-mile range under normal operating conditions (80% depth-of-discharge). To support the eTruck™ acceleration requirements, the energy storage system was set up to meet the required power density at low state of charge and to accept the regenerated power at a higher state of charge. In addition, a proprietary eTruck™ control system optimizes eTruck™ efficiency, maximizing battery life, and protecting key components such as batteries and power electronics from excessive temperatures, voltage spikes, and current surges.



Figure 1: eTruck™ 2 at South Coast AQMD
January 2020

Status

The ZECT I project was completed March 31, 2020. On March 24, 2015, eTruck™ 1 was successfully demonstrated at TTSI’s facility with 80,000-lbs. GCWR. eTruck™ 2 was delivered to TTSI in June 2019 for demonstration.



Figure 2: eTruck™ 1 with 80,000 lbs GCWR Trailer

Results

Two battery electric trucks were designed, developed, and deployed for demonstration at the POLA and the POLB by US Hybrid. TTSI was the primary demonstrating fleet at the ports. The drivers really liked the smooth truck operation especially at low speed as they engage with the trailers and maneuver in the lot with virtually no operating noise. Drivers and operators still have range anxiety even when we increased the battery capacity by 55% for an effective range of 100 miles in full load real world operation.

The eTrucks™ powertrain system performance was well within the design parameters and there were no issues during the demonstration for both trucks. The auxiliary systems were updated from the first truck to the second to be 30% more efficient. The biggest lesson learned in this project was how difficult it was to deal with battery suppliers, both in technical performance (power density, energy density, life degradation), and charge profiling to extend battery life. US Hybrid was able to validate its cost model for small (100), medium (200), and large volume (500) units per year. It requires more production and supply chain experience to validate the cost models for thousands of annual units. We were able to develop a price matrix/indicator of \$/mile-range for battery electric trucks for drayage applications. Furthermore, US Hybrid was able to develop a Utilization Factor Indicator for the eTrucks™ that is a composite of loss of payload due to added weight of large battery box and the loss of utilization due to charge time based on double shift (16 hours) operation.

Overall, the electric traction system is capable of meeting drayage performance demands. The main issue with electric-powered trucks is life cycle cost, and most importantly the capital cost associated with the truck purchase, including the battery replacement (estimated in 4 years) in the 8-year typical life operation. US Hybrid calculated an operation cost (\$/mile) for the eTruck™ based on Southern California Edison rates at its facility in Torrance, CA of \$0.15/kWh (net) and \$0.39/kWh (gross), taxes and demand charges, and a diesel truck getting 6 mile/gal, and fuel cost at \$2.80/gal or \$0.46/mile, equating diesel fuel to electric energy at \$0.15/kWh and assuming 3 kWh/mile AC power. When compared to natural gas at 4 miles/GGE and \$1.60/GGE, the break-even electricity rate should be \$ 0.13/kWh. This is in contradiction with most reported sales literature. Special electrical rates of less than \$0.15/kWh is needed to have a break-even operation cost if electric trucks are to compete with diesel and natural gas fuels. The operation cost data does not include any cost for infrastructure or utilization of on-board charges (eTruck™ cost) or DC off-board charger, facility cost, etc.

Project Costs

Total project cost was \$2,116,323, with \$943,810 from South Coast AQMD/US DOE and \$1,172,513 from US Hybrid. Original cost share was projected at \$1,043,811.

Commercialization and Applications

Based on the development and operation of the two eTrucks™, the following is the best estimate of commercial viability economics of incremental cost \$/mile-range and productivity of the truck. Not accounting for container weight capacity reduction, heavy battery, and time allocated to charge a large battery pack, the eTruck™ energy efficiency is about \$2.8kWh/mile. The battery cost used for the calculations is \$498/kWh including BMS, packaging for heavy duty shock and vibration, and IP67 rating and protection.

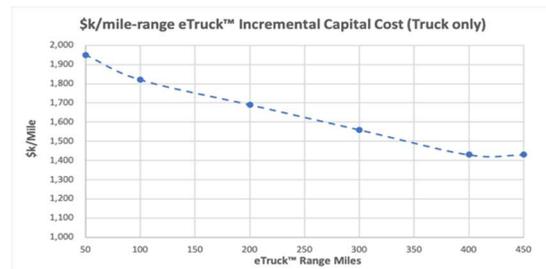


Figure 3: Incremental Capital Cost (truck only) (\$/mile range)

Zero Emission Cargo Transport (ZECT-I) Develop and Demonstrate Two Class 8 CNG Plug-In Hybrid Electric Drayage Trucks

Contractor

Transportation Power, Inc. (TransPower)

Cosponsors

California Energy Commission (CEC)
U.S. Department of Energy (DOE)

Project Officer

Phil Barroca

Background

On-road heavy-duty diesel trucks are a significant source of diesel particulate matter and NO_x emissions that can create serious health effects. The impact on public health in Southern California is more pronounced in communities along the goods movement corridors near the Ports of Los Angeles and Long Beach, and next to major freeways. Recognizing the significant impact diesel trucks have on air quality and public health, the South Coast AQMD 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 with rules, regulations, and mandates of the South Coast AQMD, California Air Resources Board (CARB), Environmental Protection Agency (EPA), and DOE, while also helping to foster economic development in the region.

Project Objective

The overarching goal of this ZECT project was to develop a hybrid-electric drive system using a natural gas engine as a range extender and to demonstrate two Class 8 drayage trucks using this system in service with Total Transportation Services, Inc. (TTSI) at the Ports of Los Angeles and Long Beach. This project was one of four zero emission drayage truck technologies funded by a grant from the DOE under the ZECT

Demonstration Program. The vehicles were intended to be demonstrated in near-dock drayage service for two years in partnership with Transportation Services, Inc. or other South Coast AQMD approved fleets in the basin. A specific project objective was to determine if a very small compressed natural gas (CNG) engine could provide sufficient power to work as a range-extender for locally-driven trucks, while also being capable of operating intermittently in a zero emissions mode, solely on battery power with the engine turned off.

Technology Description

The TransPower ElecTruck™ drive system uses a



Figure 1: TransPower CNG Series Hybrid Truck No. 2

unique combination of two 150 kW permanent magnet motors that were originally developed for the Fisker Karma hybrid passenger car. The demonstration vehicles (one of which is pictured above) were equipped with inverter-charger units (ICU) 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 lithium ion battery modules were installed on both trucks providing 30-40 miles of all-electric (battery-only) range under normal operating conditions. Lithium-iron-phosphate cells were installed on the first

truck and nickel-manganese-cobalt on the second truck. A proprietary vehicle control system controls the CNG auxiliary power unit (APU), optimizes vehicle efficiency, maximizes battery life, and protects key components such as batteries and power electronics from excessive temperatures, voltage spikes, or current surges.

Status

The ZECT project was successful in demonstrating the proof-of-concept of a CNG hybrid configuration to meet the basic load-carrying requirements of an 80,000-pound Class 8 truck. The innovative dual motor configuration selected for the trucks provided adequate performance and high reliability in a package that cost less and was more compact than competing motive drive options. The ICUs performed up to expectations and enabled the trucks to be safely recharged with minimal external infrastructure. Battery energy storage capacity exceeded contract specifications. The major unanticipated problem encountered during the project was that the Ford 3.7-liter engine selected for the APU, when limited to Stationary Trim mode, was incapable of supplying more than 60 kilowatts (kW) of power, making it impossible to carry full loads at freeway speeds for more than about 50-60 miles. Limitations of the chosen engine control strategy also resulted in higher APU emissions than desired. In addition, the experimental battery product selected for the first prototype truck had severe quality problems that limited use of this truck and forced the use of a different battery in the second truck, which delayed its deployment. Despite these challenges, operators of these trucks commented that they were the best electrically-driven trucks they had driven at the time. On-going advances in engine control and battery technology are expected to address the range limitation and emissions issues, making hybrid-electric trucks of this type a practical alternative.

Results

The two prototype CNG hybrid trucks accumulated approximately 5,000 miles of test operation, including several long-distance trips of 100 miles or more while unloaded. They were put through two years of intermittent use in commercial drayage operations carrying full loads, along with a series of dynamometer tests at the University of California, Riverside (UCR). Results of the UCR dynamometer testing, shown in the bar graph below, indicate NOx emissions of more than 7 g/bhp-hr. across the four duty cycles tested. The

higher-than-anticipated emissions were the result of TransPower’s inability to obtain a certified automotive engine configuration that was expected to be provided by Ford. This forced TransPower to use a CNG engine designed for stationary power generation, whose control could not be optimized to minimize automotive emissions within project budgetary constraints.

Benefits

Cycle n/a	Ave Speed mi/hr	Duration sec	Distance mi/cycle	Net Total Energy kWhr	Net Generator Energy kWhr	Net Battery Energy kWhr	Total Energy usage kWhr/mi	Generator energy usage kWhr/mi	Battery Energy usage kWhr/mi	SOC usage %
SGI Hill	40.79	448	5.07	22.95	4.37	18.58	4.53	0.86	3.66	11
UDDS	18.39	1061	5.42	15.02	12.34	2.67	2.77	2.28	0.49	2
UDDS	18.48	1061	5.45	14.97	12.83	2.14	2.75	2.36	0.39	1
DTP 3	23.98	4229	26.65	56.52	50.20	6.32	2.12	1.88	0.24	5
UDDS (No APU)	18.31	1061	5.40	17.15	0.00	17.15	3.18	0.00	3.18	10
SGI (No APU)	33.15	427	3.93	19.04	0.00	19.04	4.85	0.00	4.85	12
UDDS	18.46	1061	5.44	15.49	11.87	3.62	2.85	2.18	0.67	2
UDDS	18.39	1061	5.48	14.65	12.09	2.56	2.67	2.21	0.47	2

Figure 2: Summary Across All Cycles for Chassis Dyno Testing for Truck No. 2

By demonstrating the proof-of-concept of using a CNG engine to augment a battery pack in a Class 8 truck application, this project established a foundation for future work, which could yield emissions and energy efficiency benefits by utilizing larger CNG engines with more typical automotive controls. This technology could reduce air pollutants while helping to address global warming if utilized for goods movement, which is seen as one of the leading sources of criteria pollutants and carbon emissions.

Project Costs

The total cost of the TransPower hybrid project was \$2.68 million, exceeding the projected \$2.1 million. South Coast AQMD funded over \$1.15 million. TransPower’s cost share was \$1,529,065, exceeding the original \$900,000.

Commercialization and Applications

Evidence is mounting that electrification of Class 8 trucks has great commercial potential, and the size of the locally-driven U.S. electric Class 8 truck market is in the tens of thousands of trucks per year. Improvement in CNG hybrid technology could enable application to long-haul trucks, which could expand the addressable market to hundreds of thousands of trucks per year.

South Coast AQMD Contract #17029

December 2020

Demonstration and Evaluation of Plug-in Smart Charging at Multiple Electric Grid Scales

Contractor

University of California, Irvine (UCI)

Cosponsors

UCI Advanced Power and Energy Program (APEP)
 US Department of Energy
 Hyundai
 Southern California Edison

Project Officer

Seungbum Ha



Figure 1: KIA Soul EVs

Background

Improving air quality in urban areas requires the reduction of criteria pollutant emissions across several sectors. The transportation sector is of particular interest due to the local emissions in disadvantaged communities and the regional contribution to criteria pollutants and greenhouse gas emissions. To meet State energy and environmental goals, the deployment of alternative vehicles including plug-in electric vehicles (PEV) and fuel cell electric vehicles has increased in recent years and it is expected to increase further. Since these vehicles are connected to the electric grid, their interaction with the electricity sector and grid is of utmost importance. For PEVs to contribute to emissions reductions, plug-in vehicles must interface with the electric grid such that 1) their usage of renewable energy is maximized and 2) charging behavior does not cause the grid to violate its ability to adhere to reliability criteria and balance the electric load demand at all grid scales. To coordinate and control charging of PEVs, smart charging strategies should be implemented.

In this project, a previously developed smart charging strategy was implemented, deployed, and demonstrated on the UCI Microgrid Solar CarShade nanogrid using a fleet of 10 battery PEVs. This project increases understanding on how PEVs should be managed on the electric grid distribution system so that their deployment can become a valuable asset for electric grid operation and the microgrid, renewable resource utilization, and emission reduction.

Project Objective

The purpose of the project was to implement a smart charging algorithm previously developed by the UCI Advanced Power and Energy Program (APEP) on a fleet of PEVs and demonstrate the smart charging strategy on a nanogrid located on the UCI Microgrid. The project goals were to:

- 1) Further develop an existing smart charging algorithm so that it can be tuned by balancing area operators, investor-owned utilities, and third parties (e.g., microgrid operators) for their specific needs and implementation in their specific domains; and
- 2) Successfully demonstrate the effectiveness of the developed algorithm on the UCI Microgrid Solar CarShade nanogrid with specially equipped PEVs.

Approach

A smart charging algorithm previously developed was modified to enable implementation on a small scale at the distribution level on a nanogrid. The Solar CarShade nanogrid includes a building, 48 kW of photovoltaic (PV) panels, a 100kW/100 kWh battery and 20 level 2 electric vehicle (EV) chargers. The smart charging strategy is a decentralized valley-filling optimization where the charging profile of each vehicle is optimized individually and independent of the rest of the fleet and based on a cost profile, price signal, or load profile (cost load). The cost profile is then updated with the vehicle's

charging profile, and the updated cost profile is then used for upcoming vehicles. Several scenarios were developed and first simulated using different cost load profiles based on data collected from the UCI Microgrid.

A strategy was developed to implement the smart charging algorithm on the CarShade nanogrid using 10 KIA Soul EVs. This strategy included several components including a driver portal for the participating drivers to enter their travel plan, and communication with the vehicles to poll their status and enable sending charging ON/OFF commands to the vehicles. This strategy was then deployed and demonstrated in the nanogrid

Results

The smart charging algorithm was deployed on the nanogrid and demonstrated. More than 80 days of testing and demonstration were conducted with different cost profiles and various scenarios. The smart charging results were recorded, and data was collected and recorded including vehicle status, commands sent, nanogrid load, PV generation, as well as data from the chargers.

Overall, the demonstration was successful with the qualification that communication was periodically interrupted due to network connectivity issues.

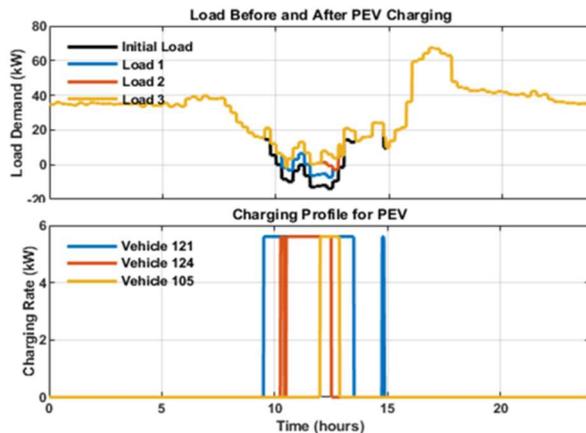


Figure 2: Load Demand and Charging Profile

Project Costs

The total cost of the project was \$750,000. South Coast AQMD provided \$250,000 of the total cost. Match funding of \$500,000 was provided by UCI, the U.S. Department of Energy, Southern California Edison, and Hyundai.

Commercialization and Applications

The demonstration proved feasibility and efficacy of the smart charging algorithm deployed on a nanogrid. Below are some observations and lessons learned from the project:

- **Demonstration results reveal promise for large-scale implementation in the future.** All components and strategies developed in the project can be scaled up for a larger fleet.
- **The strategy can be implemented and deployed on parking structures.** The strategy can be deployed on parking structures at workplaces as well as retail centers with minimum infrastructure upgrade.
- **Standards should be developed for communications with the vehicles and charging infrastructure.** To reduce upfront cost and effort for fleets with EVs of different make and model, standards should be developed.
- **Required communication rate with the fleets might be higher than expected originally.** To identify issues and to ensure customer satisfaction, communication with the vehicles is required.
- **Negative impacts of high rate of communication with the vehicles should be addressed.** The auxiliary battery is depleted with a high rate of communication. The issue can be addressed in the design of the vehicles.
- **Strategies must be developed to incentivize PEV drivers to participate in smart charging programs**
- **Load forecasting helps improve the outcome of smart charging for larger fleets.** While impact of forecasting is small for smaller fleets, it can significantly improve the smart charging results for larger fleets.

Southern California Trucking Demonstration of Near-Zero ISX12N Beta Engines

Contractors

Clean Energy
Cummins Westport Inc.

Co-Sponsors

South Coast AQMD
California Energy Commission (CEC)

Project Officer

Phil Barroca

Background

The Ports of Los Angeles and Long Beach rank drayage trucks as the second largest source of NO_x and the largest source of greenhouse gas (GHG) emissions from port-related activities.

Replacing the almost 8,000 oldest diesel port trucks with trucks powered by the Cummins Westport (CWI) ISX12N ultra low-NO_x engine and fueled with renewable natural gas (RNG) is one of the best opportunities for air quality improvement in Southern California.

One of the key barriers to adoption of the ISX12N engine among drayage fleets is the lack of experience with the engine operating in the port drayage application. Skepticism about the technology is amplified by the unsatisfactory experience of some truckers with the first-generation natural gas technologies that were deployed in port drayage over 10 years ago in response to the first Clean Truck Program.

Project Objective

Clean Energy and CWI initiated this project to demonstrate 20 trucks repowered with pre-commercial (“beta”) versions of the ISX12N engine for one-year periods. Beta engines were used to allow the project to be performed in parallel with CWI efforts to finalize ISX12N engine development and secure California Air Resources Board (CARB) certification to the lowest optional low NO_x standard of 0.02g-NO_x/bhp-hr. This parallel approach was intended to shorten the traditional time between the initial

commercial launch and the market prove-out of the new engine.

Technology Description

CWI developed the ISX12N engine with funding support from South Coast AQMD, CEC, and others to be certified to the CARB optional low NO_x standard of 0.02g-NO_x/bhp-hr. This certification is 90% cleaner than the current new truck engine manufacturing standard, and over 98% cleaner than the emissions standard of almost 8,000 of the oldest port trucks. When fueled with RNG, climate pollutants can be reduced by 50% to over 500% compared to diesel. These percentages are dependant on the carbon intensity of the RNG source under the CARB Low Carbon Fuel Standard (LCFS) program.



Figure 1: Cummins Westport ISX12N Ultralow-NO_x Engine

The ISX12N also eliminates 100% of the toxic diesel particulate matter and diesel petroleum use of a diesel truck. The ISX12N is also far quieter than diesel engines, reducing noise pollution.

Status

Seven trucking companies from port drayage and regional trucking participated in the project by running the demo trucks in their actual operations. Participating companies were TTSI, 4Gen, Pacific 9 Transportation (Pac 9), NFI, Green Fleet Systems, CR&R, and Orange Avenue Express. Demonstrations started in September of 2017 and ended on June 30, 2019. Each of the seven participating fleets ran their trucks for a 12-month period commencing at staggered starting dates. The trucks traveled a total of 567,603 miles

during the demonstration and as of mid-August had run over 750,000 miles.

Results

The engine performed exceptionally well for this project with an engine availability of 98% during the demonstration. Trucks traveled to all the routine destinations and routes in southern California for port trucks and regional trucks including near the port, along the 710 corridor, and to the Inland Empire, San Diego, and Central Valley. The ISX12N has proven to reliably perform port drayage and regional hauling services throughout southern California and even beyond.

Drivers and fleet operators found the ISX12N to be suitable for the job. Six of the operators have either acquired, or are planning to acquire, trucks with the commercial ISX12N. These near-term orders involve approximately 140 trucks with over 70 delivered in 2019.

Benefits

The 20 demonstration trucks displaced 129,674 gallons of diesel fuel and reduced 4.02 tons of NOx over the course of the project. Because the trucks were powered by 100% RNG, GHG emissions were reduced by 887 tons.



Figure 2: Greenhouse Gas Reduction Equivalencies



Figure 3: Pac 9 Class 8 with ISX12N Refueling with CNG

Project Costs

The project budget and the actual project costs are shown in the table below. Funding provided by CEC of \$2,845,000 and South Coast AQMD of \$650,000 matched the project budget. Cost share costs incurred by the project contractors and participating fleets totaled \$2,717,007, which was \$217,007 more than the project budget of \$2,500,000. The higher cost incurred by participants was due to higher used truck acquisition and repair costs (unrelated to the beta engine and associated CNG and LNG fuel systems) and high project management costs due to the overall duration of the project.

Project Budget		Actual Costs
South Coast AQMD	\$650,000	\$650,000
CEC	\$2,845,000	\$2,845,000
Cost Share	\$2,500,000	\$2,717,007
Total	\$5,995,000	\$6,212,007

Commercialization and Applications

This project helped demonstrate the capability of the ISX12N engine in routine port drayage and regional trucking applications. The ISX12N is CARB certified and commercially available and in 2020 received a Technology Readiness Level (TRL) 9 in an Addendum to the Port’s Clean Air Action Plan.

Upgrade CNG Fueling Station

Contractor

West Covina Unified School District (WCUSD)

Cosponsor

South Coast AQMD

Project Officer

Phil Barroca

Background

In 2012 West Covina Unified School District initiated participation in the South Coast AQMD’s Lower-Emission School Bus Replacement Program with a desire to replace its fleet of older diesel-powered school buses with alternative fueled vehicles. To date, the district has replaced 9 Type D diesel-powered school buses with comparable compressed natural gas (CNG)-powered school buses. Currently, the district’s school bus fleet is composed of 19 buses as follows:

Type of School Bus	No.
CNG	9
Gasoline	3
Diesel	7

Of the 7 diesel-powered school buses, 6 were manufactured prior to 2004 and are scheduled to be replaced with CNG-powered school buses as South Coast AQMD grant funding becomes available.

The first CNG-powered school buses acquired by the district were fueled by outdated temporary refueling equipment that worked poorly. As additional CNG-powered school buses were acquired, fiduciary and safety responsibility dictated that the district should install a new and permanent time-fill CNG fueling facility.

Project Objective

The objective of this project was to construct a slow-fill CNG refueling facility for the district to refuel its natural gas school buses on-site, both to

meet present and projected future needs. The station would be located at 1717 W. Merced Avenue in West Covina. This objective was completed in October 2018 with the installation of fueling posts and a slow-fill fueling station. The district hired and worked with Jaycox Construction who installed both the fueling posts and station.

Technology Description

The new station is comprised of two 7.2 standard cubic feet per minute (scfm) BRC FuelMaker model FMQ-8-36 compressors, gas conditioning equipment, controls and all ancillary equipment, two 33.5 cubic feet CNG storage spheres, and 9 time-fill fueling posts. The dual compressor unit dispenses CNG at 6.7 gasoline gallon equivalent (GGE)/hr. WCUSD buses average 30 miles of daily travel and consume about 10 GGE at an average fuel efficiency of 3 mpGGE. Concurrent refueling of all nine buses requires 13-14 hours or 1.5 hours per bus. Field trips of 150 miles requires 8 hours of refueling using both compressors. The dual compressor design is meeting the district’s demands.



Figure 1: BRC FuelMaker FMQ-8-36

Status

In 2012, the district was awarded a grant by South Coast AQMD to construct a CNG refueling station. The contract for this project was extended from December 2017 through March 2020 following a no cost time extension request from the district in 2017. While designing the new fueling station the district encountered an issue with the available electrical power required to power the

compressors. This issue was resolved in partnership with Southern California Edison and required an upgrade to the main electrical service to provide the necessary electrical power for the new CNG compressors and station. The district issued a request for quotes on the project in 2017 and awarded the job to Jaycox Construction which commenced construction in 2018.



Figure 2: Type D CNG Bus Refueling

Results

The station displaces more than 12,000 gallons of diesel fuel annually. The station was first commissioned in late summer of 2018. The chart below provides a monthly throughput amount in GGEs per month and seasonal fueling patterns for the first full calendar year of operation in 2019. From January to December 2019, a total of 15,784 CCFs (hundred cubic foot) were consumed. Using

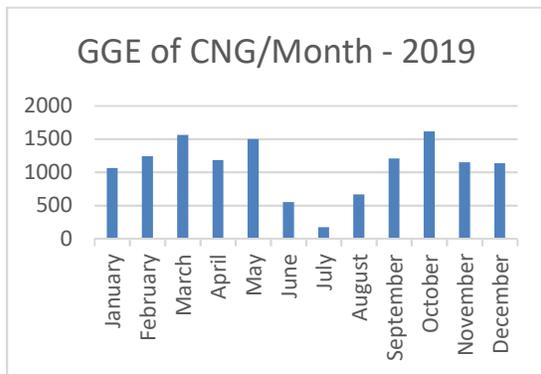


Figure 3: Throughput in GGE/month-2019

a conversion formula of 1.212 CCFs per gallon of gasoline, and 1.115 gallons of gasoline per gallon of diesel, the CNG station saved 13,023 gallons of gasoline fuel or 11,679 of diesel. In terms of NO_x and particulate matter (PM) emissions, 1.23 tons of nitrogen oxides were taken out of the air and particulate matter has been reduced as well.

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 district's transportation services to significantly cut operational costs. Fuel and labor cost savings to the district equal \$12,000 annually and is anticipated to exceed twice that once the district replaces the current fleet of pre-2004 diesel-powered school buses with CNG-powered school buses.

Project Costs

Projected bid costs were anticipated at approximately \$100,000. Actual project costs were \$84,915 as follows:

Actual Project Cost	
100% Payment and Performance Bond	\$2,500
Installation of slow-fill CNG refueling station	\$77,806
Sales Tax	\$4,609
Total Station Cost	\$84,915

Of this \$84,915, the South Coast AQMD funded \$60,000 and the district contributed \$24,915.

Commercialization and Applications

The West Covina Unified School District Time-Fill CNG fueling systems is comprised of two BRC FuelMaker FMQ-8-36 CNG compressors, producing 6.7 GGE/hr @3600 psig, with nine connector hoses to fill 9 Type D CNG school buses concurrently. The buses average 3 miles/GGE, and 30 miles/day and 1.5 hours of dedicated fuel time or nearly 14 hours for all nine. Field trips can be 150 miles and require 8 hours of dedicated fill time typically over the weekend. Jaycox Construction provides monthly servicing of the system. The system continues to meet the district's needs and the dual compressor system provides the district with redundancy to be able to conduct maintenance on one compressor and still have CNG fueling available. WCUSD recently secured a renewable natural gas (RNG) agreement and will earn dividends from the Low Carbon Fuel Standard and federal Renewable Fuel Standard programs to help lower operating expenses.

Purchase One Heavy-Duty CNG Powered Truck

Contractor

City of Desert Hot Springs

Cosponsors

South Coast AQMD
Mobil Source Review Committee (MSRC)

Project Officer

Phil Barroca

Background

In 2009, the Mobil Source Review Committee (MSRC) awarded the city of Desert Hot Springs \$25,000 in match funds to purchase a heavy-duty dedicated compressed natural gas (CNG)-powered stakebed truck estimated to cost \$50,000. Due to the financial impact of the 2008-2015 recession, the City's budget was unable to include the necessary cost share for the grant funds. By 2014, MSRC was informed that the City was not able to meet its cost share, making indefinite the purchase of the vehicle. In October of 2015, with the assistance of a coordinator for the Clean Cities Coachella Valley Region, Mr. Richard Cromwell, Desert Hot Springs was able to secure Clean Fuels Funds (CFF) from the South Coast AQMD as a cost share in addition to the already secured funds approved by MSRC. To cover the increased price of the vehicle (\$50,000 in 2009 to \$63,000 in 2015) the City was awarded an additional \$38,000 in matching CFF funds.

Project Objective

In 2015, the South Coast AQMD approved match funding with the MSRC to support the purchase one new heavy-duty CNG truck for the city of Desert Hot Springs. The purchase of this new cleaner natural gas-powered truck would be countered with the removal of a comparable truck with higher emissions. The new CNG vehicle would be placed into service with the City's Public Works Department. The CNG-powered vehicle would provide the City with a clean, alternative fuel heavy-duty vehicle to help lower criteria pollutants and greenhouse gas (GHG) emissions. The vehicle would be domiciled at the City yard. Refueling would be provided at the upgraded CNG

refueling station owned and operated by Clean Energy at the Mission Springs Water District in the city of Desert Hot Springs. Clean Energy dispenses low carbon intensity renewable natural gas (RNG) under the name Redeem™. The City, in turn, would remove a 2007 gasoline powered Ford pick-up from their fleet.

The South Coast AQMD's Air Quality Management Plan relies on accelerated implementation of advanced technologies within Southern California to achieve federal and state ambient air quality standards and further reductions in air toxic exposure. Conversion of high mileage gasoline or diesel-powered vehicles to natural gas-powered vehicles can significantly reduce criteria pollutants, GHG emissions, and the use of petroleum-based fuel.



Figure 1: F-450 CNG Stakebed Truck

Technology Description

The technology employed in this project includes the conversion of a new 2016 original equipment manufacturer (OEM) gasoline-powered heavy-duty 6.8-liter V-10 spark-ignited engine to a dedicated CNG engine using a California Air Resources Board (CARB) certified CNG conversion system that includes pressure regulators, injectors and on-board high pressure CNG storage tanks and fuel lines. The OEM truck is a 2016 Ford F-450 2x4 stakebed truck chassis with a gross vehicle weight rating (GVWR) of 16,500 lbs. The CNG conversion system is a 2016 CARB-certified Impco system with 31 gasoline gallon equivalent (GGE) @ 3600 psig of onboard CNG storage. The CNG storage system is comprised of two identical high pressure Type 3 gas cylinders positioned behind the cab. The CARB

Executive Order for the Impco system is A-328-0033 which is certified to the 0.2g-NOx/bhp-hr heavy-duty on-road NOx standard. All conversions were performed prior to vehicle delivery and under the supervision of Miramar Truck Center, San Diego, CA. The vehicle is fueled by CNG or low carbon intensity renewable natural gas (RNG) that is dispensed at the local Clean Energy station under the tradename Redeem™.

Status

Desert Hot Springs took delivery of a new 2016 heavy-duty CNG-powered Ford F-450 stakebed on April 28, 2016. This vehicle was funded through the South Coast AQMD and the MSRC. To acknowledge the efforts of those involved in this project, the City issued a press release on May 26, 2016 announcing the vehicle's delivery. In addition to acknowledging the funding partners, special recognition was made to two representatives from the Clean Cities of the Coachella Valley Region, Mr. Richard Cromwell and Mr. Jack Hogan.

Under the contracts for this project, the City concurrently and permanently removed a 2007 gasoline-powered Ford F-150 pick-up with 25,459 miles. This vehicle was dismantled by Dick's Auto Wrecking in Fontana, CA. The new CNG-powered heavy-duty truck is deployed by the City's Public Works Department and has accrued about 5,000 miles. The vehicle is fueled with low carbon intensity RNG from the Clean Energy natural gas refueling station located in the city on Park Lane and on the Mission Springs Water District property. This station was upgraded with funding through AB1318.

Results

The city of Desert Hot Springs has deployed the heavy-duty CNG truck under this project with the Department of Public Works (DPW). The City's DPW assigns a work truck to each staff person. Because of the current configuration in the flatbed, the truck is being used to haul signs to notify drivers of pending and ongoing road work and road closures. The vehicle is also utilized to place barricades when requested by the City's police department. As these work efforts are less frequent, this truck sees somewhat limited daily driving. The DPW recognizes the truck is capable of much more and expects to use it more in the field for green waste and trash removal citywide. The vehicle's 31 GGE of fueling provides approximately 300 miles of range. City staff and vehicle operators are satisfied with the vehicle's ability to perform.



Figure 2: CNG F-450 Being Deployed

Benefits

The CNG powered Ford F-450 is powered by low carbon intensity RNG supplied at the local Clean Energy station on Park Lane and the engine system is certified to federal on-road heavy-duty NOx standard of 0.2g-NOx/bhp-hr. The City estimates that the CNG vehicle is generating 30% less NOx than a comparable diesel-fueled vehicle and the use of low carbon intensity RNG is contributing to lower GHG emissions. Use of the vehicle reduces immediate air pollution exposure to the residents of and visitors to the City.

Project Costs

Purchase and registration of the CNG truck cost \$61,387.98. The vehicle was funded with \$25,000 by the MSRC, and \$36,387.98 from the South Coast AQMD. Costs to insure and operate this vehicle were paid for by the city of Desert Hot Springs.

Commercialization and Applications

The city of Desert Hot Springs acquired this vehicle in 2016 and has continued to operate this vehicle in limited but necessary public works activities. The vehicle continues to meet the City's performance standards and has not incurred any major issues that has prevented its routine usage. The vehicle has been maintained by Palm Springs Motors. Maintenance costs associated with this technology has been comparable to conventional fueled vehicles used in comparable applications. The vehicle also performs well and without incidence during the extreme high summer temperatures in the Coachella Valley.

Develop Detailed Technology and Economics Based Assessment for Heavy-Duty Advanced Technology Development

Contractor

National Renewable Energy Laboratory (NREL)
Ricardo Strategic Consulting (Ricardo)

Cosponsors

Southern California Gas Company

Project Officer

Phil Barroca

Background

In August 2015, the South Coast AQMD, with co-funding from the Southern California Gas Company (SoCalGas), executed a contract with the U.S. Department of Energy’s (DOE) National Renewable Energy Laboratory (NREL) to develop a detailed technology and economics-based assessment for the deployment of advanced heavy-duty vehicle technologies suitable in commercial fleet applications. This project, commonly referred to as ComZEV, analyzed six technologies which included a 2010 compliant diesel, a 0.02g-NO_x/bhp diesel, a 0.02g-NO_x/bhp-hr compressed natural gas (CNG) alone as well as with a hybrid electric, battery-electric, and battery-electric with fuel cell range extender. The additional technologies were six vehicle vocations including Class 5-6 medium-duty delivery vehicles, Class 8 port drayage, short haul, and long-haul trucks and Class 8 refuse and transit buses.

COMZEV Key Technology and Vocation Analysis Matrix						
Technology / Vocation	Class 5-6 Medium Duty Delivery	Class 8 Port Drayage	Class 8 Short haul	Class 8 Long Haul	Class 8 Refuse Truck	Class 8 Transit Bus
Conventional Diesel	✓	✓	✓	✓	✓	✓
Diesel .02g NO _x	✓	✓	✓	✓	✓	✓
CNG SI .02g NO _x	✓	✓	✓	✓	✓	✓
CNG SI .02g NO _x Hybrid	✓	✓	✓	✓	✓	✓
Battery Electric	✓	✓	X	X	✓	✓
H2 Fuel Cell (Gaseous Storage)	✓	✓	✓	✓	✓	✓

Figure 1 – Final Technology/Vocation Matrix

Project Objective

NREL and Ricardo developed a detailed technology and economics-based roadmap for the

adoption of advanced commercial vehicle technologies to reduce nitrogen oxides (NO_x) and greenhouse gas (GHG) emissions through 2050, with an emphasis on the years 2023 and 2032 to correspond to the Federal Clean Air Act (CAA) 8-hour ozone standards attainment deadlines. The ComZEV study was to identify barriers and opportunities to match advanced technology options to key commercial medium- and heavy-duty vehicle vocations in Southern California.

Technology Description

Ricardo developed Total Cost of Ownership (TCO) and Adoption-Rate models and applied data from NREL’s Fleet DNA vocational vehicle and duty-cycle database. The Adoption Rate model forecasts technology adoption based on both economic and non-economic factors that influence buying decisions by fleet owners. The model compares and contrasts potential adoption rates for zero- and near-zero emission truck technologies and can help assess the benefits and costs of various incentives or mandates, analyze short- and long-term total cost of ownership between technologies and identify key factors that create “tipping points” for widespread adoption. It can also assess the importance of sales volumes and scalability, barriers in early commercialization and options to address these, sensitivity to fuel prices and other external factors. Technology adoption rates enable quantifying NO_x and GHG emission reductions and goals through 2050. The Technology Adoption Scenario is enhanced through feedback from industry and governmental stakeholders and the incorporation of non-economic and non-technical market drivers and barriers.

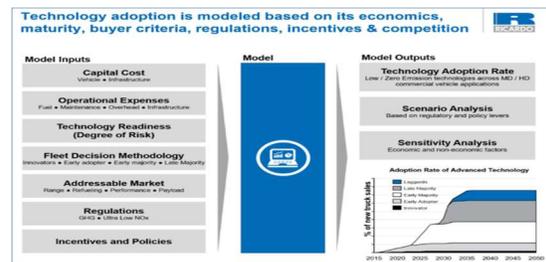


Figure 2: Modeling Framework

Status

A detailed technology and economics-based roadmap for the adoption of advanced commercial vehicle technologies was developed with the focus of quantifying key technological, market, and policy barriers to alternative vehicle adoption. Vehicle adoption modeling was completed using detailed choice-modeling methodology and the resulting impacts on NO_x and GHG emissions through 2050 were evaluated for the South Coast Air Basin in California.

Results

Results indicate that there are many drivers of vehicle adoption that involve cost. The key drivers appear to be economies of scale and fuel cost. Results also indicate that all technologies play an important role in reducing both NO_x and GHG emissions. CNG is the dominant alternative over diesel near-term for short-haul, long-haul, transit bus and refuse truck markets due to having the lowest cost. Battery-electric is the most economically attractive for low range applications with battery-electric hydrogen fuel cells offering the most attractive economics of all technologies for medium- and long-range applications. Key barriers to adoption of the advanced vehicle technologies include limited refueling infrastructure in the case of CNG. Hydrogen range limitations or payload restrictions are barriers in battery-electric trucks, and high costs are barriers for hydrogen fuel and hydrogen fuel cell technology.

NO_x and GHG reductions and the economics of deployment.

The model showed that there are three vocations that comprise most of the GHG and NO_x emission reductions through 2050 for the Southern California fleet. The three include the Class 8 Long Haul, the Class 8 Drayage, and the Class 5-6 MD Delivery. The Class 8 Long Haul emissions are primarily a function of the high travel requirement for this vocation combined with the improved diesel fuel economy and high CNG and hydrogen adoption by 2050. The Class 8 Drayage emissions are significant due to the vocation’s high emission rate (poor aftertreatment) combined with early adoption of battery electric technology. The Class 5-6 MD is included due to delivery emissions caused by a large vehicle population combined with the adoption of battery electric technology, hydrogen technology, and improved diesel fuel efficiency. All powertrain technologies contribute to different market applications and timing, providing significant reductions in NO_x (60-62%) and tailpipe CO₂ (37-39%) emissions reduction by 2050 relative to the business-as-usual scenario.

Project Costs

The total project costs are noted below with payouts shared equally by South Coast AQMD and SoCalGas.

Task	NREL	Ricardo	Total
Total	\$230,000	\$270,000	\$500,000

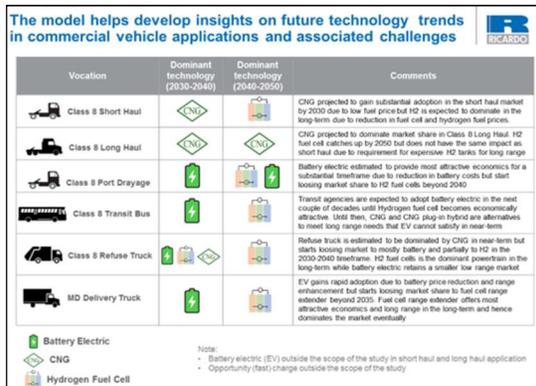


Figure 3: Vehicle Types and Alternative Technologies

Benefits

The key benefit of this study is the development of a roadmap for near-zero and zero-emission technologies calibrated to South Coast AQMD air quality attainment objectives that comprehends

Commercialization and Applications

The addressable market is expected to grow as refueling infrastructure develops to provide sufficient coverage and battery price and energy density improves to provide more range. Hydrogen fuel cell and fuel costs are expected to reduce dramatically beyond 2035 due to synergies with light-duty fuel cell vehicle manufacturing and adoption.

The roadmap provided Total Cost of Ownership and Adoption-Rate models to estimate adoption rate projections and the resulting fleet emission impacts based on best available data on economic, governmental and societal drivers at the time of the study. This tool and methodology can be updated with the latest information and be used to conduct additional sensitivity analysis as technologies mature and the economics continue to evolve providing a guide for future California funding incentives.

Conduct Market Analysis for Zero-Emission Heavy-Duty Trucks in Goods Movement

Contractor

University of Southern California

Cosponsors

US Department of Transportation

Volvo Research and Education Foundation

Majestic Realty

Project Officer

Seungbum Ha

Background

Achievement of a zero emissions (ZE) vehicle fleet is part of the long range plans for California, the South Coast AQMD, and more recently the San Pedro Bay Ports and many local jurisdictions. The use of ZE heavy duty trucks (HDTs) for freight movement remains a challenge particularly in the heavy duty sector.

Project Objective

This research examines the potential for ZE or near-ZE vehicles with respect to freight operations, economic impacts and environmental benefits. The focus is on HDTs used in short-haul drayage services, one of the most promising market segments for early adoption. Drayage service is defined as short haul pickup/delivery of goods to/from ports, warehouse and distribution centers, and intermodal facilities. To provide a comprehensive assessment of the market potential for ZE and near-ZEHDTs, several dimensions of their costs and benefits were considered.

Technology Description

ZEHDTs have different performance characteristics than conventional diesel HDTs, namely range, load capacity, and refueling time. For a given set of pickups/deliveries, the number of trucks required depends on the range of the vehicle and its load capacity. These in turn determine miles traveled (including associated labor costs) and refueling time costs. Near ZE HDTs, such as hybrid electric, have similar performance characteristics to conventional diesel.

A simulation model and actual drayage trip data were used to generate a set of simple drayage demands to be accomplished over a single eight-hour shift day. The simulation model optimized

routes so that total costs are minimized. Using an all diesel fleet as the base case, the simulation model was used to estimate the number of trucks required to meet demands. ZE trucks were incrementally introduced into the fleet with subsequent model runs. The model was run until the maximum possible number of ZE trucks was reached.

Three target years, 2020, 2025, and 2030, and three vehicle technologies: diesel, natural gas hybrid, and battery electric were considered. Performance attributes for 2020 are based on data from field tests; attributes for 2025 and 2030 are based on most recently available data on expected improvements in the various technologies.

Two case studies were conducted of short haul firms to test the potential penetration of ZEHDTs with more realistic truck activity. The case study data considers both range and charging constraints, as well as the additional effect of the gross vehicle weight restriction.

The simulation and case study research were supplemented with two rounds of interviews and a stated preference survey to gather information on trucking industry perspectives. Interviews were conducted with OEMs as well as drayage firm owners and operators. A market analysis of drayage activity concentrations was also conducted.

Status

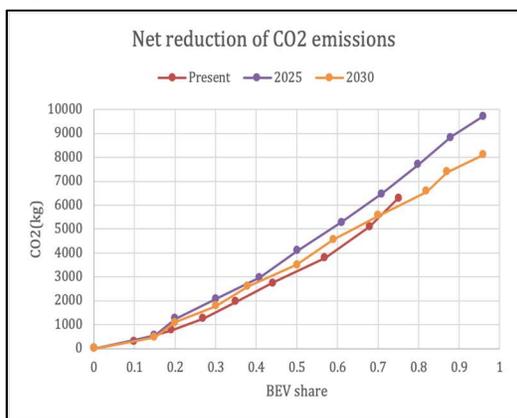
This project has been completed and the final report published in December 2020 on the METTRANS website:

<https://www.mettrans.org/research/developing-markets-for-zero-emission-vehicles-in-short-haul-goods-movement>.

Results

Results show a clear trade-off between emissions reductions and larger BEV fleet size. In 2020, the maximum possible share of BEVs is 75% and requires a near doubling of the fleet. In 2025 and 2030, the maximum possible share rises to 96%, and the vehicle fleet increases by about one third in 2025 and 20% in 2030. Increased fleet size adds to costs, leading to clear tradeoffs between emissions reductions and drayage costs. Figure 1 compares the net reduction of CO₂ for the three target years.

Figure 1: BEV Share and Net CO2 Reductions



Simulation results were used to generate four scenarios: all diesel, all NG hybrid, midpoint ZE, and maximum ZE. Diesel and hybrid trucks have similar range and refueling requirements, so differ only in emissions and costs. Annualized emissions savings relative to diesel were estimated. See Table 1. Max ZE has the greatest emissions net savings for all but NOX in 2020.

Table 1: Net Annualized Emissions Savings

Net Emissions Savings	All NG Hybrid	Midpoint ZE	Max ZE
PM 2.5 (g)			
2020	2350	3525	8075
2025	1175	3150	7525
2030	1175	3275	7525
NOX (kg)			
2020	2725	675	1550
2025	1225	600	1425
2030	1225	625	1425
CO2 (kg)			
2020	1311500	687750	1576500
2025	1160500	1019750	2429500
2030	1040500	880500	2024000

The annualized cost per unit of emissions removed relative to diesel HDTs was estimated. Capital, vehicle operations, and driver costs were included. The all hybrid alternative is the least cost alternative for all emissions and all target years. This is due to the lower operating costs of hybrids and lower emissions relative to diesel. At the same time, the hybrid alternative does not require additional vehicles, and therefore has much lower capital costs than the ZE alternatives. The max ZE alternative generates modest savings in 2030, but of much lower magnitude than the hybrid alternative. Results illustrate the contrast between possible policy objectives. If reducing emissions is the most

important objective, ZEHDTs meet that objective, but at very high cost relative to other alternatives.

Benefits

The main benefit of this project is incorporating freight operations into assessments of the market for ZEHDTs in the short-haul market. The project provides a set of findings and recommendations that can provide guidance for policy makers and regulators.

Finding 1: Current state of BEV technology-BE ZEHDTs have limited application in the short haul heavy truck market. *Recommendation:* State / local policy should take into account the full impacts of ZEHDTs on freight operations and costs

Finding 2: NG hybrid near zero vehicles are preferred in the short term. *Recommendation:* State / local policy should be more flexible and consider hybrid technologies as viable near and middle term options for GHG and other emissions reductions

Finding 3: The medium-term market is promising and depends critically on the rate of improvement of battery technology and rate of decline in vehicle price. *Recommendation:* Continue to promote and invest in battery technology improvements

Finding 4: The medium-term market depends on charging infrastructure and energy availability. *Recommendation:* Develop a comprehensive investment plan for public charging stations and identify a funding source

Finding 5: The medium-term market depends on subsidies. *Recommendation:* Develop a comprehensive subsidy and incentive program to promote ZE and near-ZE purchase and use and fund at a sufficiently high level

Project Costs

SCAQMD	\$350,000
Caltrans	\$126,000
Volvo Research and Education Foundation	\$25,000
Majestic Realty	\$23,000
Total	\$524,000

Commercialization and Application

The results of this project can be applied to current and future rulemaking on emissions reductions in the heavy duty vehicle sector. The research should be extended to consider weight limits, a broader set of operating conditions, infrastructure costs and availability and full life cycle costing.

Assess Air Quality and Greenhouse Gas Impacts of a Microgrid-Based Electricity System in Southern California

Contractor

University of California, Irvine (UCI)

Cosponsors

UCI Advanced Power and Energy Program
National Science Foundation,
Southern California Gas Company

Project Officer

Seungbum Ha

Background

The development of microgrids is gaining attention as a means of increasing the resilience and reliability of the electricity system, reducing criteria pollutant and greenhouse gas emissions of the electricity and transportation sectors, and increasing the deployment of renewable power generation resources in serving the electric load demand. As microgrids become prevalent, capacity for electricity generation, previously outside the basin, will be retired and replaced with new capacity inside of the Southern California Air Basin (Basin). The potential of microgrids to substantially reduce the criteria pollutant emissions in Southern California depend entirely on the design of the microgrids.

Project Objective

This project is the first to explore microgrid design features that facilitate zero emission of both criteria pollutant and greenhouse gasses with a focus on the following three tasks:

Task 1. Commercial, Industrial and Petroleum Refinery Microgrids: Assess fuel cell technology to mitigate pollutant and greenhouse gas emissions.

Task 2. Renewable Fuel Blending: Assess the emissions impacts of renewable fuel blending in the natural gas system.

Task 3. Public Mobility: Compare battery electric buses and hydrogen fuel cell electric buses.

Technology Description

Task 1. Two approaches individually and in combination were considered: 1) greenfield applications where SOFC replace a productive process, e.g., power plant, SMR; and 2) retrofit

applications, with MCFC assumed to be placed downstream of exhaust gas streams as a post-combustion system, which would involve every source of emissions. Scenarios were assessed using detailed thermodynamic models to determine the feasibility and performance within the scenario configurations including emission reductions for a given refinery deployment scenario

Task 2. Determining the change in emissions from a fuel composition shift to H₂ blends requires assessment of impacted combustion devices. UCI has developed and demonstrated a platform using in-lab testing and numerical modeling to investigate emissions and stabilities with different fuel compositions for combustion equipment and assessed the combustion performance of residential and commercial appliances including cooktop, oven and broiler burners, central forced air furnaces, and water heaters. Numerous aspects complicate a clear understanding of how H₂ addition may affect emissions including numerous potential pathways and quantities of H₂ production, the size and complexity of the NG system, how the diverse range of end-use sources may be affected, lack of available data, and others.

Task 3. The simultaneous operation of battery electric and hydrogen buses provides a unique opportunity to develop an evaluation framework under consistent conditions. The data collected from the fleet enabled a comprehensive comparison of the two technologies and were used in statistical analysis to assess the performance of ZEBs and assess impact of various factors on overall performance of different bus technologies. A detailed life cycle assessment analysis was done to assess economic and environmental impact of different ZEBs, and a strategy was developed to optimize the technology-mix of the a zero-emission to help transit agencies transition to a zero-emission fleet without impacting their service and routes.

Results

Task 1. Emission reductions were identified for the scenarios in this work scale with the aggressiveness of fuel cell deployment from relatively minor up to 66% of total refinery NO_x for the widespread use of MCFC. When applied to all refineries, the largest

NO_x reductions occur in northern California with lesser impacts in Basin. Emission reductions translate to a range of possible air quality impacts. For an aggressive MCFC deployment, ozone reductions peak at -2.6 ppb. Improvements in PM_{2.5} for summer are substantial, exceeding 8 µg/m³ in the Basin and occurring in other regions of the state. Similarly, improvements reach 10 µg/m³ in winter in the Basin, highlighting the importance of VOC emissions in secondary PM_{2.5} formation pathways.

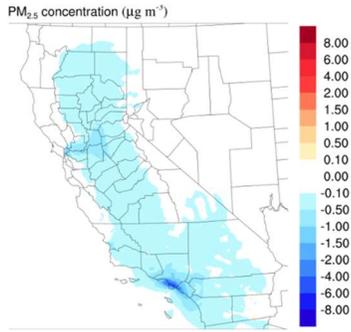


Figure 1: Summer 24-h PM_{2.5} from Reference Case for Widespread Use of MCFC in California Refineries

Task 2. Projected impacts on state-wide NO_x range from a 6% decrease to a 4% increase demonstrating the range of effects from transitions in NG system fuel composition and the lack of current understanding of many important factors that will ultimately determine the real-world effects. Air quality impacts follow suit, e.g., ozone changes vary from -2.4 to +1.6 ppb in the 20% best and worst cases, respectively. Similar impacts are noted for PM_{2.5} in winter and summer with peak changes in the Central Valley and Basin with similar importance.

Task 3. Results of the study include comparison of total cost of ownership, economic and environmental impacts, and overall assessment of fuel cell electric buses (FCEBs) and battery electric buses (BEBs).

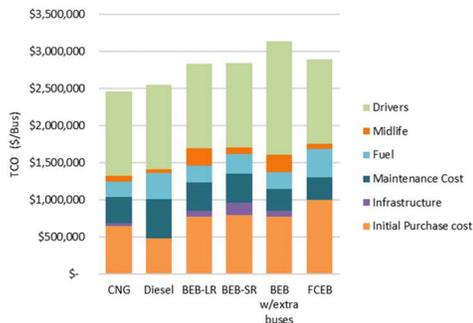


Figure 2: Total Cost of Ownership comparison

Commercialization and Applications

The following are main conclusions from this work:

- Impacts on ozone follow trends for NO_x and are most prominent downwind of refineries in northern California. Peak MD8H reductions range from -2.6 ppb to -0.55 ppb depending on the scenario.
- Impacts on PM_{2.5} are substantial in summer and winter, i.e., potentially exceeding 8 µg/m³ and 10 µg/m³ respectively. Peak improvements are in Basin, and reductions occur in the S.F. Bay Area and Central Valley.
- Impacts on total statewide NO_x include 6% decreases to 4% increases demonstrating the wide range of possible impacts depending on blend level, equipment assumptions, and others
- FCEB total cost of ownership is comparable to that of BEB-Long range
- For BEBs, the total cost of ownership is impacted by the pricing strategies and tariffs set by the utility or microgrid
- Results of MCDA indicate that FCEB and BEBs-Long Range (BEB-LR) with plug-in charging are preferred over BEBs-Short Range (BEBs-SR) with on-route charging

Benefits

The use of fuel cell systems at industrial facilities can provide notable improvements in regional levels of ozone and PM_{2.5} which in turn will provide substantial benefits to human health within California. The addition of H₂ may also provide important AQ co-benefits to sensitive urban regions. Conversely, care must be taken to avoid AQ worsening in those same areas. The overall criteria pollutant and greenhouse gases are reduced with the deployment of BEBs and FCEBs and has the potential to improve air quality as well as helping mitigate and reduce impacts of climate change.

Project Costs

The cost of the project was \$450,000. South Coast AQMD provided \$250,000 and \$200,000 of match funding was provided by a combination of UCI, the National Science Foundation, and Southern California Gas Company.

Develop Freight Loading Strategies for Zero-Emissions Heavy-Duty Trucks in Goods Movement

Contractor

University of Southern California (USC)

Cosponsors

National Science Foundation

Volvo Research and Education Foundation

Project Officer

Seungbum Ha

Background

Recent advances in sensing and navigation technologies make it easier to route vehicles from origin to destination based on traffic characteristics obtained from historical and available real time traffic data. Current applications however do not distinguish between different classes of vehicles and associated dynamics which often have a big impact on travel time and traffic flow characteristics. The lack of coordination among different shippers, along with their lack of a coordinated exchange of information makes it difficult to predict changes in travel times as it relates to upcoming freight loads. In general, the current freight transportation system is full of inefficiencies leading to imbalances in traffic with respect to space and time, and these imbalances have significant individual and environmental costs. Information technologies, software and hardware technologies as well as the emergence of battery electric trucks offer a strong potential for dramatic improvements in balancing freight loads in multimodal networks.

Project Objective

The objective of this project is to develop a methodology to reduce inefficiencies in the current freight system by using a centrally coordinated load balancing system to provide routes to users that benefit the overall system. This load balancing system should lead to system and user benefits in terms of mobility and environmental impact for mixed fleets of diesel and zero-emission freight vehicles (ZEFV) as well as

taking into consideration concepts such as empty container reuse.

Technology Description

The developed freight load balancing system is based on a co-simulation optimization approach that combines real time traffic simulators with a route optimization algorithm in a feedback configuration as shown in the figure below.

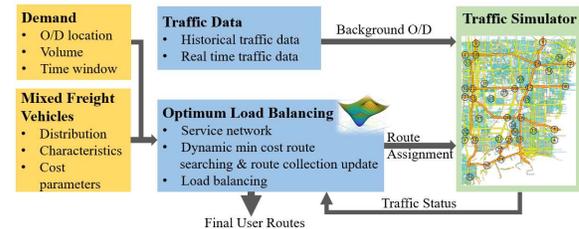


Figure 1: Co-Simulation Optimization Method

The advantage of the proposed approach is that it makes use of available software tools and fast computers to evaluate the impact on travel times of the initially generated optimized load balancing routes and then makes the necessary changes taking into consideration the nonlinear impact of loads on travel time. The impact of loads on travel times is something that current routing systems do not consider which often leads to possible unintended load imbalances. The technology assumes a “system manager” that receives all user requests for route planning and allocates loads to time, space, and mode windows to minimize an overall system cost. The load balancing system is developed for one type of truck (diesel) and was then extended to two type of trucks, diesel and battery electric. The use of mixed fleet of diesel and electric trucks introduces additional constraints and cost criteria. Electric trucks have a higher capital cost, shorter range, and longer refueling time than diesel trucks. The proposed technology is shown to be flexible to include additional freight technologies and concepts such as the empty container reuse that aims to reduce the empty container trips.

Status

The project was officially completed February 2, 2020 with the final report submitted to South Coast AQMD at the end of January 2020.

Results

The proposed centrally coordinated freight load balancing system has potential for improvements in balancing freight loads across the road and rail networks. All simulated scenarios showed consistent improvements in fuel economy and emissions. Electric trucks can be incorporated in the proposed load balancing system despite the added constraints of range and charging times.

Based on models of diesel and electric engines and tests with different speed cycles the electric engines are found to consume less energy than diesel except during congestion. The figures below are an example of how fuel consumption and emissions change as the number of electric trucks increases in a heavy traffic scenario.

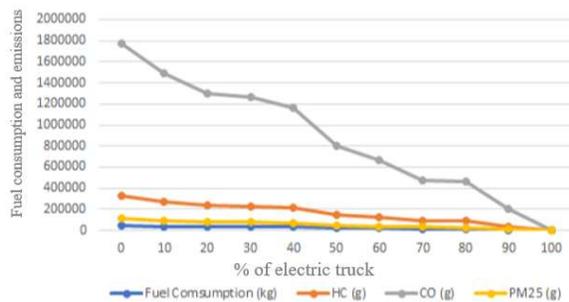


Figure 2a: Reduction of Fuel Consumption and Emissions (HC, CO, PM25) as Percent of Electric Truck

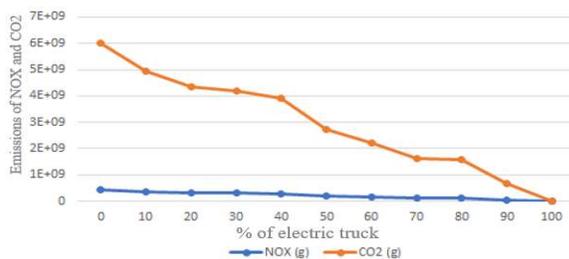


Figure 2b: Reduction of Emissions (NOx, CO2) as Percent of Electric Truck

In a mixed fleet of diesel and electric vehicles the total energy cost without including charging cost decreases as the percentage of electric vehicles increases. Charging, however, during driver working times adds to the overall costs and makes the overall cost higher as the percent of electric trucks increases. The concept of empty container reuse and other technologies and

concepts can be easily incorporated in the proposed load balancing approach.

Benefits

A centrally coordinated freight load balancing system can reduce inefficiencies of freight movements in complex surface networks by achieving a better distribution of freight loads in time and space and reducing the overall cost in terms of mobility under various traffic conditions as shown in the figure below.

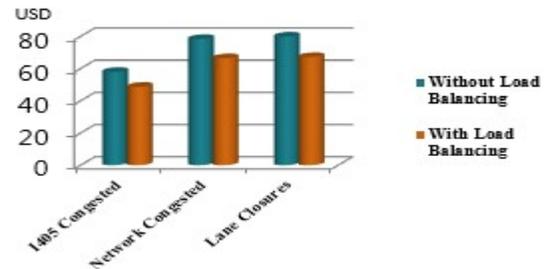


Figure 3: Cost Benefits under Different Conditions

The benefits on fuel consumption and emissions (HC, CO, NOx, CO2, PM25) in the case of diesel trucks gained by load balancing generated using the Environmental Protection Agency model MOVES are of the order of about 5% under light, 9% under medium traffic conditions and 22% under heavy traffic conditions when compared with no load balancing.

Project Costs

The total project cost was \$1,001,000. South Coast AQMD's share was \$200,000 with the remaining \$801,000 contributed by the National Science Foundation and the Volvo Research and Education Foundation.

Commercialization and Applications

Shippers are very sensitive to costs and, in general, open to new technologies if they can see the benefit. The proposed centrally coordinated freight load balancing system shows the potential benefits of central coordination for freight routing and offers a strong incentive for commercialization.

Cosponsor Regional Universities for US Department of Energy EcoCAR3 Competition

Contractor

California State University, Los Angeles

Cosponsors

US Department of Energy (DOE)
General Motors (GM)
California State University Los Angeles

Project Officer

Lisa Mirisola

Background

EcoCAR 3 is a four-year advanced plug-in hybrid passenger vehicle design-and-build competition sponsored by the United States Department of Energy (DOE) and General Motors and managed by Argonne National Laboratory. Of the 16 North American universities chosen to participate, California State University of Los Angeles (Cal State LA) is the only competitor from California. In keeping up with Los Angeles history and current needs, the team elected to design a police themed vehicle with a pursuit capability for this EcoCAR 3 competition.

Project Objective

Each team redesigned a stock gasoline Chevrolet Camaro into a hybrid vehicle that reduced the environmental impact while retaining performance, safety, and consumer appeal. The cornerstone goal of the program is the creation of the next generation of engineers by providing them with real-world research experience in the development of extremely complex advanced vehicle technologies.

Technology Description

The Cal State LA team designed a Parallel Post Transmission Plug-in Hybrid Electric Vehicle based on a 2016 V6 Chevrolet Camaro.

The engine selected was the GM 182 Hp 2.4L Ecotec engine that utilizes renewable ethanol fuel for reduced overall emissions. The 135 kWh UQM Power Phase electric motor used was also deployed for regenerative braking. The electric motor is fed

from a 12.6 kWh, battery pack. A new control system was designed to control the hybrid functionality and the new components.

Status

Year 4 of the competition was dedicated to completing the design-and-build project resulting in a vehicle in performing condition. This included updating multiple systems including installation of the air conditioning and on-board battery charger. In addition to addressing the technical development, the vehicle was appropriately dressed in the police “uniform”, as in Figure 1.



Figure 1. Fully Assembled Cal State LA Police Vehicle

Results

The engineering subteams throughout the year produced eleven technical reports and presentations recording the design and vehicle integration updates. In addition to working on all vehicle systems, the engineering vector was applied to the design of the control software and autonomous driving technology.

Two graduated students working in the vehicle controls area authored two papers: “MPC-Based Power Management Strategy to Reduce Power Loss in Energy Storage System of HEV – Improved Model” and “Neuroevolution Based Optimization of Hybrid Transmission Shift Points”. These papers were presented at the 6th Annual IEEE SusTech Conference 2018 in Long Beach, CA.

The communications team produced eleven reports and presentations, performed outreach events, created videos and blogs and updated the team website and social media. The EcoCAR team

organized two workshops for about 150 -200 middle-school students. Throughout the year the team hosted several hundred students from local schools in the EcoCAR garage. Ethnically diverse members shared their life experiences to inspire students to pursue a college education.

In addition, the EcoCAR team has participated in numerous public outreach events where members displayed the vehicle and engaged the public.



Figure 2. Cal State LA Team Conducts a Quiz on Hybrid Cars to Los Angeles Sheriff Department Officers, Diamond Bar, CA, April 2018

This included the Car Classic Auto Show hosted by the Art Center College of Design held at the Angel City Brewery, the Diamond Bar City Birthday Fair (see Figure 2), and the final competition at the Fontana Speedway.

Benefits

About forty students participated on the team in Year 4. Several students graduated, securing jobs in the automotive and high-tech sectors, including five new engineers at General Motors. Participation in EcoCAR has resulted in opening doors to team participants from disadvantaged communities such as East Los Angeles and providing them with the opportunity to obtain employment in high-pay engineering jobs at such coveted giants as GM, Boeing, and Northrop Grumman

In recognition of the team’s outreach and public education accomplishments, Cal State LA has received the 2018 Clean Air Award from South Coast AQMD (see Figure 3).



Figure 3. Cal State LA EcoCAR Team Accepts the Clean Air Award, October 2018

Project Costs

Project Partner	Funding
US DOE, Argonne National Lab, CARB	\$200,000
Chevrolet Camaro: GM	\$250,000
Sponsorship Training: MathWorks, Siemens NX, and <u>Autonomie</u> ,	
Components/Software: General Motors, MathWorks, Freescale, BOSCH, ETAS, Siemens, GKN Driveline, Woodward, EnerDel, Ricardo, New Eagle, and A123 Systems.	
CSULA	\$250,000
South Coast AQMD	\$100,000
Total (approximate)	\$800,000

Commercialization and Applications

The police-oriented vehicle fuses the unique law enforcement needs and plug-in hybrid capabilities. Hybrid functionality saves fuel and provides financial savings to police departments. It has three distinct modalities: stakeout mode – the engine is off when parked, with the air conditioning and equipment run via battery pack; patrol mode – the car is driven in full electric mode and releases no emissions, and lastly, pursuit mode – both its electric motor and its engine are operating, optimizing energy consumption, even during high-speed chases.

Appendix D

Technology Status

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Technology Status

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 this technology status evaluation 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.

Staff has developed an approach to evaluating the core technologies, especially some of the specific platforms and technologies discussed in the draft plan and annual report. The technology status evaluation below utilizes 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 measurement:

● Excellent ● Good ○ Satisfactory ● Poor ● Unacceptable

The table below summarizes staff evaluation of the potential projects anticipated in the Plan Update, 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	CPUC—California Public Utilities Commission
AC—absorption chiller	CRDS—cavity ring-down spectroscopy
ADA—American with Disabilities Act	CRT—continuously regenerating technology
AER—all-electric range	CSC—city suburban cycle
AFRC—air/fuel ratio control	CVAG—Coachella Valley Association of Governments
AFVs—alternative fuel vehicles	CWI—Cummins Westport, Inc.
APCD—Air Pollution Control District	CY—calendar year
AQMD—Air Quality Management District	DC—direct connection
AQMP—Air Quality Management Plan	DCFC—direct connection fast charger
ARB—Air Resources Board	DCM—dichloromethane
ARRA—American Recovery & Reinvestment Act	DEF—diesel exhaust fluid
AWMA—Air & Waste Management Association	DEG—diesel equivalent gallons
BACT—best available control technology	DGE—diesel gallon equivalents
BEB—battery electric bus	DF—deterioration factor
BET—battery electric truck	DME—dimethyl ether
BEV—battery electric vehicle	DMS—Division of Measurement Standards
BSNO _x —brake specific NO _x	DMV—Department of Motor Vehicles
BMEP – brake mean effective pressure	DOC—diesel oxidation catalysts
BMS—battery management system	DOE—Department of Energy
CAAP—Clean Air Action Plan	DOT—Department of Transportation
CAFR—Comprehensive Annual Financial Report	DPF—diesel particulate filters
CaFCP—California Fuel Cell Partnership	DPT3—Local Drayage Port Truck (cycle) - where 3=local (whereas 2=near-dock, etc.)
CARB—California Air Resources Board	DRC—Desert Resource Center
CATI—Clean Air Technology Initiative	DRI—Desert Research Institute
CBD—Central Business District (cycle) - a Dyno test cycle for buses	ECM—emission control monitoring
CCF—California Clean Fuels	EDD—electric drayage demonstration
CCHP—combined cooling, heat and power	EDTA—Electric Drive Transportation Association
CCV—closed crankcase ventilation	EGR—exhaust gas recirculation
CDA—cylinder deactivation	EIA—Energy Information Administration
CDFR/DMS—California Department of Food & Agriculture/Division of Measurement Standards	EIN—Energy Independence Now
CEC—California Energy Commission	EMFAC—Emission FACTors
CE-CERT—College of Engineering – Center for Environmental Research and Technology	EPRI—Electric Power Research Institute
CEMS—continuous emission monitoring system	E-rEV—extended-range electric vehicles
CEQA—The California Environmental Quality Act	ESD—emergency shut down
CFCI—Clean Fuel Connection, Inc.	ESS—energy storage system
CFD—computational fluid dynamic	EV—electric vehicle
CHBC—California Hydrogen Business Council	EVSE—electric vehicle supply equipment
CHE—cargo handling equipment	FCEB – fuel cell electric bus
CMAQ—community multi-scale air quality	FCV—fuel cell vehicle
CNG—compressed natural gas	FTA—Federal Transit Administration
CNGVP—California Natural Gas Vehicle Partnership	FTP—federal test procedures
CO ₂ —carbon dioxide	G2V—grid-to-vehicle
CO—carbon monoxide	g/bhp-hr—grams per brake horsepower per hour
ComZEV—Commercial Zero-Emission Vehicle	GC/MS—gas chromatography/mass spectrometry
CPA—Certified Public Accountant	GCW—gross combination weight
	GCVW—gross container vehicle weight
	GDI—gasoline direct injection

LIST OF ACRONYMS (cont'd)

GGE—gasoline gallon equivalents	LVP—low vapor pressure
GGRF—Greenhouse Gas Reduction Relief Fund	MATES—Multiple Air Toxics Exposure Study
GHG—greenhouse gas	MCE—multi cylinder engine
GNA—Gladstein, Neandross & Associates, LLC	MCFC—molten carbonate fuel cells
GPU—gas processing unit	MD—medium duty
GREET- Greenhouse Gasses, Regulated Emissions and Energy Use in Transportation	MECA—Manufacturers of Emission Controls Association
GTL—gas to liquid	MOA—Memorandum of Agreement
GVWR—gross vehicle weight rating	MOVES—Motor Vehicle Emission Simulator
H&SC—California Health and Safety Code	MPa—MegaPascal
HCCI—Homogeneous Charge Combustion Ignition	MPFI—Multi-Port Fuel Injection
HCNG—hydrogen-compressed natural gas (blend)	MPG—miles per gallon
HD – heavy duty	MPGde—miles per gallon diesel equivalent
HDDT—highway dynamometer driving schedule	MSRC—Mobile Source Air Pollution Reduction Review Committee
HD-FTP—Heavy-Duty Federal Test Procedure	MSW—municipal solid wastes
HD-OBD—heavy-duty on-board diagnostics	MY—model year
HHDDT—heavy heavy-duty diesel truck schedule	MTA—Metropolitan Transportation Authority (Los Angeles County “Metro”)
HPLC—high-performance liquid chromatography	NAAQS—National Ambient Air Quality Standards
HRSC – heat recovery steam cycle	NAFA—National Association of Fleet Administrators
HT—high throughput	NFPA—National Fire Protection Association
HTFCs—high-temperature fuel cells	NCP—nonconformance penalty
H2NIP—Hydrogen Network Investment Plan	NEV—neighborhood electric vehicles
HTPH—high throughput pretreatment and enzymatic hydrolysis	NextSTEPS—Next Sustainable Transportation Energy Pathways
HyPPO—Hydrogen Progress, Priorities and Opportunities report	NG/NGV—natural gas/natural gas vehicle
Hz—Hertz	NGO—non-governmental organization
ICE—internal combustion engine	NH3—ammonia
ICEV—internal combustion engine vehicle	NHTSA—Natural Highway Traffic Safety Administration
ICU—inverter-charger unit	NMHC—non-methane hydrocarbon
ICTC—Interstate Clean Transportation Corridor	NO—nitrogen monoxide
IVOC—intermediate volatility organic compound	NO ₂ —nitrogen dioxide
kg—kilogram	NO + NO ₂ —nitrous oxide
LACMTA—Los Angeles County Metropolitan Transit Authority	NOPA—Notice of Proposed Award
LADOT—City of Los Angeles Dept. of Transportation	NO _x —oxides of nitrogen
LADWP—Los Angeles Department of Water and Power	NRC—National Research Council
LCA—life cycle assessment	NREL—National Renewables Energy Laboratory
LCFS—Low Carbon Fuel Standard	NSPS—new source performance standard
Li—lithium ion	NSR—new source review
LIMS—Laboratory Information Management System	NZ—near zero
LLC—low load cycl	OBD—on-board diagnostics
LLNL—Lawrence Livermore National Laboratory	OCS—overhead catenary system
LNG—liquefied natural gas	OCTA—Orange County Transit Authority
LO-SCR—light-off selective catalytic reduction	OEHHA—Office of Environmental Health Hazard Assessment
LPG—liquefied petroleum gas or propane	OEM—original equipment manufacturer
LSM—linear synchronous motor	One-off—industry term for prototype or concept vehicle
LSV—low-speed vehicle	
LUV—local-use vehicle	

LIST OF ACRONYMS (cont'd)

PAH—polyaromatic hydrocarbons	SULEV—super ultra-low emission vehicle
PbA—lead acid	SUV—sports utility vehicle
PCM—powertrain control module	TAO—Technology Advancement Office
PEMFC—proton exchange membrane fuel cell	TAP—(Ports’) Technology Advancement Program
PEMS—portable emissions measurement system	TC—total carbon
PEV—plug-in electric vehicle	TEMS—transportable emissions measurement system
PHET—plug-in hybrid electric truck	THC—total hydrocarbons
PHEV—plug-in hybrid vehicle	TO—task order
PM—particulate matter	tpd—tons per day
PM _{2.5} —particulate matter ≤ 2.5 microns	TRB—Transportation Research Board
PM ₁₀ —particulate matter ≤ 10 microns	TRL—technology readiness level
POS—point of sale	TSI—Three Squares, Inc.
ppm—parts per million	TTSI—Total Transportation Services, Inc.
ppb—parts per billion	TWC—three-way catalyst
PSI—Power Solutions International	UCI—University of California, Irvine
PTR-MS—proton transfer reaction-mass spectrometry	UCR—University of California, Riverside
RD&D—research, development and demonstration	UCR/CE-CERT—UCR/College of Engineering/Center for Environmental Research & Technology
RDD&D (or RD3)—research, development, demonstration and deployment	UCLA—University of California, Los Angeles
RFP—Request for Proposal	UDDS—urban dynamometer driving schedule
RFS—renewable fuel standards	μg/m ³ —microgram per cubic meter
RI—reactive intermediates	ULEV—ultra low emission vehicle
RMC-SET—ramped modal cycle supplemental emissions test	UPS—United Postal Service
RNG—renewable natural gas	U.S.—United States
RTP/SCS—Regional Transportation Plan/Sustainable Communities Strategy	U.S.EPA—United States Environmental Protection Agency
SAE—Society of Automotive Engineers	V2B—vehicle-to-building
SB—Senate Bill	V2G—vehicle-to-grid
SCAB—South Coast Air Basin or “Basin”	V2G/B—vehicle-to-building functionality
SCAQMD—South Coast Air Quality Management District	VMT—vehicle miles traveled
SCFM—standard cubic feet per minute	VOC—volatile organic compounds
SCE—single cylinder engine	VPP—virtual power plant
SCE—Southern California Edison	WGS—water gas shift
SCR—selective catalytic reduction	WVU—West Virginia University
SHR—steam hydrogasification reaction	ZEB—zero-emission bus
SI—spark ignited	ZECT—Zero Emission Cargo Transport
SI-EGR—spark-ignited, stoichiometric, cooled exhaust gas recirculation	ZEV—zero emissions vehicle
SIP—State Implementation Plan	
SJVAPCD—San Joaquin Valley Air Pollution Control District	
SMR—steam methane reforming	
SOAs—secondary organic aerosols	
SoCalGas—Southern California Gas Company (A Sempra Energy Utility)	
SOFC—solid oxide fuel cells	



South Coast Air Quality Management District

21865 Copley Drive, Diamond Bar, CA 91765-4178
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BOARD MEETING DATE: March 5, 2021

AGENDA NO. 33

PROPOSAL: Approve Annual RECLAIM Audit Report for 2019 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-sixth year of this program. Recent trends in trading future year RTCs are analyzed and presented in this report. A list of facilities that did not reconcile their emissions for the 2019 Compliance Year is also included in the report. This action is to approve the Annual RECLAIM Audit Report for 2019.

COMMITTEE: Stationary Source Committee, February 19, 2021, Reviewed

RECOMMENDED ACTION:

Approve the Annual RECLAIM Audit Report for 2019 Compliance Year.

APPROVED
by the
South Coast Air Quality
Management District Board
Date: <u>March 5, 2021</u>
<u>Wayne Natri</u>
Clerk of the Board

Wayne Natri
Executive Officer

AD:DO

Background

The Board adopted the RECLAIM program on October 15, 1993 to provide a more flexible compliance program than command-and-control for specific facilities which represent South Coast AQMD'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

Cleaning the air that we breathe...

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.

Although the NO_x RECLAIM program is transitioning to a command-and-control regulatory structure, RECLAIM Rule 2015 - Backstop Provisions, requires that staff 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 2019 (which encompasses the time period for Cycle 1 from January 1, 2019 to December 31, 2019 and for Cycle 2 from July 1, 2019 to June 30, 2020). Based on audited emissions in this report and previous annual reports, staff has determined that RECLAIM met its emissions goals for Compliance Year 2019, as well as for all previous compliance years with the only exception of NO_x emissions in Compliance Year 2000. For that year, NO_x emissions exceeded programmatic allocations (by 11 percent) primarily due to emissions from electric generating facilities during the California energy crisis. For Compliance Year 2019, audited NO_x emissions were 20 percent less than programmatic NO_x allocations and audited SO_x emissions were 23 percent less than programmatic SO_x allocations.

Audit Findings

The audit of the RECLAIM Program's Compliance Year 2019 and trades of RTCs that occurred during calendar year 2020 show:

- **Overall Compliance** – Audited NO_x and SO_x emissions from RECLAIM facilities were significantly below programmatic allocations.
- **Universe** – The RECLAIM universe consisted of 253 facilities as of June 30, 2019. No new facilities were included, no facilities were excluded, and seven facilities in the RECLAIM universe shut down during Compliance Year 2019. Thus, 246 active facilities were in the RECLAIM universe on June 30, 2020, the end of Compliance Year 2019.

Of the seven facilities that shut down, three facilities cited financial reasons, one facility relocated outside the South Coast AQMD, two facilities sold to new owners and removed their equipment, and one facility underwent a corporate merger and consolidation. All seven facilities permanently ceasing operations were in NO_x RECLAIM.

- Facility Compliance** – The vast majority of RECLAIM facilities complied with their allocations during the 2019 compliance year (95 percent of NOx facilities and 97 percent of SOx facilities). Thirteen facilities (five percent of total facilities) exceeded their allocations (12 facilities exceeded their NOx allocations, and one facility exceeded its SOx allocations) during Compliance Year 2019. The 12 facilities that exceeded their NOx allocations had total NOx emissions of 339.9 tons and did not have adequate allocations to offset 213.6 of those tons. The exceedances represent 2.60 percent of total RECLAIM NOx universe allocations and 62.8 percent of total NOx emissions from the 12 facilities. The one SOx facility that exceeded its SOx allocation had total SOx emissions of 1.22 tons and did not have adequate allocations to offset 0.27 tons. This exceedance represents 0.01 percent of total RECLAIM SOx universe allocations and 22.1 percent of total SOx emissions from the 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 South Coast AQMD staff determination that the facilities exceeded their Compliance Year 2019 allocations.
- Job Impacts** – Based on a survey of RECLAIM facilities, the RECLAIM program had minimal impact on employment during the 2019 compliance year, which is consistent with previous years. RECLAIM facilities reported an overall net loss of 4,167 jobs, representing 4.0 percent of their total employment. A comparison of reported job impacts between Cycle 1 and Cycle 2 facilities suggests that the coronavirus (COVID-19) global pandemic affected Cycle 2 facility job losses. One facility cited RECLAIM as a factor contributing to the addition of one job during Compliance Year 2019. No RECLAIM facility reported job losses due to RECLAIM during Compliance Year 2019. 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 2020 was slightly lower in terms of number of trades (1.3 percent), lower with respect to total value (46.9 percent), slightly lower in volume for discrete-year RTCs (9.4 percent) and lower in volume of infinite-year block (IYB) RTCs excluding swaps (69.6 percent), when compared to calendar year 2019. A total of \$1.54 billion in RTCs has been traded since the adoption of RECLAIM, of which \$18.2 million occurred in calendar year 2020 (compared to \$34.2 million in calendar year 2019), excluding swaps.

The annual average prices of discrete-year NOx and SOx RTCs for Compliance Years 2019, 2020, and 2021 and IYB NOx and SOx RTCs traded in calendar year 2020 were below the applicable review thresholds for average RTC prices. The annual average prices of RTCs traded during calendar years 2019 and 2020 are summarized and compared to the applicable thresholds in Tables 1 and 2.

Table 1 – Average Prices for Discrete-Year RTCs Traded during Calendar Years 2019 and 2020

Year Traded	Average Price (\$/ton)				Review Thresholds (\$/ton)	
	2018 NOx RTC	2019 NOx RTC	2020 NOx RTC	2021 NOx RTC	Rule 2015 (b)(6)	Health and Safety Code §39616(f)
2019	\$2,261	\$5,410	\$12,190	\$8,678	\$15,000	\$47,585
2020		\$4,287	\$8,323	\$9,418		
Year Traded	2018 SOx RTC	2019 SOx RTC	2020 SOx RTC	2021 SOx RTC	Rule 2015 (b)(6)	Health and Safety Code §39616(f)
2019	\$1,764	\$7,985	None traded	None traded	\$15,000	\$34,261
2020		\$4,387	\$2,300	None traded		

Table 2 – Average Prices for IYB RTCs Traded during Calendar Years 2019 and 2020

RTCs	Average Price (\$/ton)		Review Threshold (\$/ton) [Health and Safety Code §39616(f)]
	Traded in 2019	Traded in 2020	
NOx	\$94,183	\$116,405	\$713,777
SOx	\$13,213	\$32,251	\$513,919

- Role of Investors** – Investors remained active in the RTC market, and their involvement in 2020 was comparable to prior years. Investors were involved in 151 of the 189 discrete NOx trades with price, and 4 of the 5 discrete SOx trades with price. With respect to IYB trades, investors’ participation was notable, and were involved in 10 of the 18 IYB NOx trades with price, and both of the IYB SOx trades with price. Compared to calendar year 2019, investor holdings of total IYB NOx RTCs remained the same at 1.3 percent and decreased from 4.7 percent to 4.2 percent for IYB SOx RTCs at the end of calendar year 2020. 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 2019 Compliance Year
2. Board Presentation

ATTACHMENT 1

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Annual RECLAIM Audit Report for 2019 Compliance Year

March 5, 2021

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SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

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Speaker of the Assembly
Appointee

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Cities of Orange County

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EXECUTIVE OFFICER

Wayne Nastri

TABLE OF CONTENTS

List of Abbreviations	i
Executive Summary	ES-1
INTRODUCTION	I-1
Chapter 1: RECLAIM Universe	1-1
Chapter 2: RTC Allocations and Trading	2-1
Chapter 3: Emission Reductions Achieved	3-1
Chapter 4: New Source Review Activity	4-1
Chapter 5: Compliance	5-1
Chapter 6: Reported Job Impacts	6-1
Chapter 7: Air Quality and Public Health Impacts	7-1
Figures	
Figure 1-1: Universe Changes in Compliance Year 2019	1-5
Figure 2-1: NOx RTC Supply	2-7
Figure 2-2: SOx RTC Supply	2-8
Figure 2-3: Annual Trading Values for NOx and SOx (Excluding Swaps)	2-10
Figure 2-4: Calendar Year 2020 Overall Trading Activity (Excluding Swaps)	2-11
Figure 2-5: Calendar Year 2020 Trading Activity for Discrete-Year RTCs (Excluding Swaps)	2-13
Figure 2-6: Calendar Year 2020 Trading Activity for IYB RTCs (Excluding Swaps)	2-15
Figure 2-7: Discrete-Year NOx RTC Trades (Excluding Swaps)	2-16
Figure 2-8: Discrete-Year SOx RTC Trades (Excluding Swaps)	2-17
Figure 2-9: IYB NOx RTC Trades (Excluding Swaps)	2-18
Figure 2-10: IYB SOx RTC Trades (Excluding Swaps)	2-19
Figure 2-11: Bi-Monthly Average Prices for NOx RTCs near Expiration	2-26
Figure 2-12: Calendar Year 2020 Investor-Involved Discrete-Year NOx and SOx Trades Based on Value Traded	2-31
Figure 2-13: Calendar Year 2020 Investor-Involved Discrete-Year NOx and SOx Trades Based on Volume Traded with Price	2-31
Figure 2-14: Calendar Year 2020 Investor-Involved IYB NOx and SOx Trades Based on Value Traded	2-32
Figure 2-15: Calendar Year 2020 Investor-Involved IYB NOx and SOx Trades Based on Volume Traded with Price	2-32
Figure 3-1: NOx Emissions and Available RTCs	3-4
Figure 3-2: SOx Emissions and Available RTCs	3-6
Figure 7-1: NOx Emission Trend for RECLAIM Sources	7-2
Figure 7-2: SOx Emission Trend for RECLAIM Sources	7-3
Figure 7-3: Calendar Year 2019 NOx Quarterly Emissions	7-5
Figure 7-4: Quarterly NOx Emissions from Calendar Years 2008 through 2019	7-6
Figure 7-5: Calendar Year 2019 SOx Quarterly Emissions	7-7
Figure 7-6: Quarterly SOx Emissions from Calendar Years 2008 through 2019	7-8

TABLE OF CONTENTS

Tables

Table 1-1:	RECLAIM Universe Changes _____	1-4
Table 2-1:	Changes in NOx and SOx RTC Supplies during Compliance Year 2019 (tons/year) _____	2-6
Table 2-2:	Trade Registrations in Calendar Years 2020 and 2019, Including Swaps _____	2-9
Table 2-3:	Value Traded in Calendar Years 2020 and 2019, Excluding Swaps (millions of dollars) _____	2-10
Table 2-4:	Volume of Discrete-Year RTCs Traded in Calendar Years 2020 and 2019, Excluding Swaps (tons) _____	2-11
Table 2-5:	Volume of IYB RTCs Traded in Calendar Years 2020 and 2019, Excluding Swaps (tons) _____	2-11
Table 2-6:	Discrete-Year Trade Registrations in Calendar Years 2020 and 2019 by Price, Excluding Swaps _____	2-12
Table 2-7:	Discrete-Year RTC Value Traded in 2020 and 2019, Excluding Swaps (millions of dollars) _____	2-12
Table 2-8:	Discrete-Year RTC Volume Traded in Calendar Years 2020 and 2019 by Price, Excluding Swaps (tons) _____	2-13
Table 2-9:	IYB Trade Registrations in Calendar Years 2020 and 2019 by Price _____	2-14
Table 2-10:	IYB RTC Value Traded in 2020 and 2019, Excluding Swaps (millions of dollars) _____	2-14
Table 2-11:	IYB RTC Volume Traded in Calendar Years 2020 and 2019 by Price, Excluding Swaps (tons) _____	2-14
Table 2-12:	NOx Trade Registrations Involving Swaps _____	2-21
Table 2-13:	SOx Trade Registrations Involving Swaps _____	2-22
Table 2-14:	Annual Average Prices for Discrete-Year NOx RTCs during Calendar Years 2015 through 2020 (price per ton) _____	2-23
Table 2-15:	Annual Average Prices for Discrete-Year SOx RTCs during Calendar Years 2015 through 2020 (price per ton) _____	2-23
Table 2-16:	Twelve-Month Rolling Average Prices of Compliance Year 2020 Discrete-Year NOx RTCs _____	2-24
Table 2-17:	Three-Month Rolling Average Prices of Compliance Year 2020 Discrete-Year NOx RTCs _____	2-25
Table 2-18:	Twelve-Month Rolling Average Prices of Compliance Year 2020 Discrete-Year SOx RTCs _____	2-25
Table 2-19:	IYB NOx Pricing (Excluding Swaps) _____	2-27
Table 2-20:	IYB SOx Pricing (Excluding Swaps) _____	2-28
Table 3-1:	Annual NOx Emissions for Compliance Years 1994 through 2019 _____	3-3
Table 3-2:	Annual SOx Emissions for Compliance Years 1994 through 2019 _____	3-5
Table 3-3:	Summary of Landing Rules _____	3-11
Table 3-4:	Breakdown Emission Comparison for Compliance Year 2019 _____	3-18
Table 3-5:	NOx Emissions Impact from the Changes in Universe (Tons) _____	3-19
Table 3-6:	SOx Emissions Impact from the Changes in Universe (Tons) _____	3-19
Table 5-1:	MDP Impact on Annual Emissions _____	5-5
Table 5-2:	Monitoring Requirements for RECLAIM Sources _____	5-7
Table 5-3:	Passing Rates Based on RATAs of Certified CEMS in 2019 _____	5-8
Table 5-4:	Passing Rates Based on RATAs of Certified CEMS in 2020 _____	5-9
Table 6-1:	Job Impacts at RECLAIM Facilities for Compliance Year 2019 _____	6-2
Table 7-1:	Summary of Ozone Data _____	7-10
Table 7-2:	Per Capita Exposure to Ozone above the State One-Hour Standard of 0.09 ppm (hours) _____	7-11

TABLE OF CONTENTS

Appendices

Appendix A: RECLAIM Universe of Sources _____	A-1
Appendix B: Facility Inclusions _____	B-1
Appendix C: RECLAIM Facilities Ceasing Operation or Excluded _____	C-1
Appendix D: Facilities that Exceeded their Annual Allocation for Compliance Year 2019 __	D-1
Appendix E: Reported Job Impacts Attributed to RECLAIM _____	E-1

LIST OF ABBREVIATIONS

AAQS	Ambient Air Quality Standards
ACEMS	Alternative Continuous Emissions Monitoring System(s)
AER	Annual Emission Report
APEP	Annual Permit Emissions Program
AQMD	Air Quality Management District
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
CEMS	Continuous Emissions Monitoring System(s)
CEQA	California Environmental Quality Act
CGA	Cylinder Gas Audit
COVID-19	Coronavirus Disease 2019
CPMS	Continuous Process Monitoring System(s)
EDR	Electronic Data Reporting
ERC	Emission Reduction Credit
GHG	Greenhouse Gas
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
RACT	Reasonably Available Control Technology
RATA	Relative Accuracy Test Audit
RECLAIM	REgional CLean Air Incentives Market
RTC	RECLAIM Trading Credit
RTU	Remote Terminal Unit
SIP	State Implementation Plan
SOx	Oxides of Sulfur
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 (South Coast AQMD) 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 2019 (January 1 through December 31, 2019 for Cycle 1 and July 1, 2019 through June 30, 2020 for Cycle 2 facilities). This annual audit report covers activities for the twenty-sixth 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, 2019, the overall changes in RECLAIM participants were 134 facilities included into the program, 73 facilities excluded from the program, and 202 facilities ceased operation. Thus, the RECLAIM universe consisted of 253 active facilities at the end of Compliance Year 2018 (December 31, 2018 for Cycle 1 facilities and June 30, 2019 for Cycle 2 facilities). During Compliance Year 2019 (January 1, 2019 through December 31, 2019 for Cycle 1 facilities and July 1, 2019 through June 30, 2020 for Cycle 2 facilities), no facilities were included into the RECLAIM universe, no facilities were excluded, and seven facilities (all in the NOx universe) shut down and are no longer in the active RECLAIM universe. These changes resulted in a net decrease of seven facilities in the universe, bringing the total number of active RECLAIM facilities to 246 as of the end of Compliance Year 2019.

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 resulted in an overall reduction of 48.4% (or 5.7 tons/day) in SOx allocations. 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 amendments 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 2019, the fourth year of implementation, the NOx allocation supply was reduced by 15.1 % (or 4.0 tons/day). The only remaining changes in RTC supply during Compliance Year 2019 were due to allocation adjustments for clean fuel production pursuant to Rule 2002(c)(12) which increased overall NOx RTC supply by 13.2 tons and SOx RTC supply by 2.6 tons.

Since the inception of the RECLAIM program in 1994, a total value of \$1.54 billion dollars has been traded in the RTC trading market, excluding swap trades. During calendar year 2020, there were 300 RTC trade registrations, including swap trades. There were 277 RTC trade registrations with a total value of \$18.2 million traded, excluding swap trades. RTC trades are reported to South Coast AQMD 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).

Excluding swap trades, in calendar year 2020 a total of 1,854 tons of discrete-year NOx RTCs, 377 tons of discrete-year SOx RTCs, 156 tons of IYB NOx RTCs and 20 tons of IYB SOx RTCs were traded. The RTC trading market activity decreased during calendar year 2020 compared to calendar year 2019, in number of trades (by 1.3%), in total value (by 46.9%), and in volume both for discrete-year RTCs (by 9.4%) and IYB RTCs (by 69.6%).

Discrete-year RTC trades with price (*i.e.*, price >\$0.00) registered during calendar year 2020 include trades for Compliance Years 2019, 2020, and 2021 NOx RTCs, and Compliance Years 2019 and 2020 SOx RTCs, excluding swap trades. The annual average prices of discrete-year NOx RTCs traded during calendar year 2020 were \$4,287, \$8,323, and \$9,418 per ton for Compliance Years 2019, 2020, and 2021 RTCs, respectively. The annual average prices for discrete-year SOx RTCs traded during the same period were \$4,387, and \$2,300 per ton for Compliance Years 2019 and 2020 RTCs, respectively.

Prices for discrete-year NOx and SOx RTCs for all compliance years are still well below the \$47,585 per ton of NOx and \$34,261 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 2020 for IYB NOx RTCs was \$116,405 per ton and the annual average price for IYB SOx RTCs was \$32,251 per ton. Therefore, annual average IYB RTC prices did not exceed the \$713,777 per ton of IYB NOx RTCs or the \$513,919 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). IYB NOx RTC trade activities were concentrated towards the first half of calendar year 2020, during which petroleum refining companies acquired from investors 74 tons of IYB NOx RTCs.

Investors were active in the RTC market during calendar year 2020. They were involved in 151 of the 189 discrete-year NOx trade registrations and 4 of the 5 discrete-year SOx trade registrations with price. Investors were also involved in

10 of the 18 IYB NO_x and both of the IYB SO_x trades with price. Investors were involved in 72% of total value and 66% of total volume for discrete-year NO_x trades, and 62% of the total value and 71% of the total volume for discrete-year SO_x trades. At the end of calendar year 2020, investors' holdings of IYB NO_x RTCs stayed consistent at 1.3% of total NO_x RECLAIM RTCs, while investors' holdings of IYB SO_x RTCs decreased slightly to 4.2% of the total SO_x RECLAIM RTCs, compared to investor's holdings of 4.7% in calendar year 2019.

Chapter 3: Emission Reductions Achieved

For Compliance Year 2019, aggregate NO_x emissions were below total allocations by 20% and aggregate SO_x emissions were below total allocations by 23%. No emissions associated with breakdowns were excluded from reconciliation with facility allocations in Compliance Year 2019. 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 2019. With respect to the Rule 2015 backstop provisions, Compliance Year 2019 aggregate NO_x and SO_x 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 2019, a total of three NO_x RECLAIM facilities had NSR NO_x emission increases, and no SO_x RECLAIM facilities had an NSR SO_x emission increase due to expansion or modification. Consistent with all prior compliance years, there were sufficient NO_x and SO_x 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 NO_x emission increases and a 1-to-1 offset ratio for SO_x emission increases on a programmatic basis. In Compliance Year 2019, RECLAIM demonstrated federal equivalency with a programmatic NO_x offset ratio of 1,504-to-1 based on the compliance year's total unused allocations and total NSR emission increases for NO_x. There were no SO_x NSR emission increases that resulted from starting operations of new or modified permitted sources during the compliance year. RECLAIM inherently complies with the federally-required 1-to-1 SO_x offset ratio for any compliance year, provided aggregate SO_x emissions under RECLAIM are lower than or equal to aggregate SO_x allocations for that compliance year. As shown in Chapter 3 (Table 3-2 and Figure 3-2), there was a surplus of SO_x RTCs during Compliance Year 2019. Therefore, RECLAIM more than complied with the federally-required SO_x offset ratio and further quantification of the SO_x offset ratio is unnecessary. Also, the NNI is satisfied by the program's 1-to-1 offset ratio. 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) for major sources. The same

BACT guidelines are used to determine BACT applicable to RECLAIM and non-RECLAIM facilities.

Chapter 5: Compliance

Based on South Coast AQMD Compliance Year 2019 audit results, 247 of the 259 (95%) NO_x RECLAIM facilities complied with their NO_x allocations, and 31 of the 32 SO_x facilities (97%) complied with their SO_x allocations based on South Coast AQMD audit results. So, thirteen facilities exceeded their allocations (12 facilities exceeded their NO_x allocations, and one facility exceeded its SO_x allocation). The 12 facilities that exceeded their NO_x allocations had aggregate NO_x emissions of 339.9 tons and did not have adequate allocations to offset 213.6 tons (or 62.8%) of their combined emissions. The facility that exceeded its SO_x allocations had total SO_x emissions of 1.22 tons and did not have adequate allocations to offset 0.27 tons (or 22.1%). The NO_x and SO_x exceedance amounts are relatively small compared to the overall NO_x and SO_x allocations for Compliance Year 2019 (2.60% of total NO_x allocations and 0.01% of total SO_x allocations). The exceedances from these facilities did not impact the overall RECLAIM emission reduction goals. The overall RECLAIM NO_x and SO_x emission reduction targets and goals were met for Compliance Year 2019 (*i.e.*, aggregate emissions for all RECLAIM facilities were well below aggregate allocations). 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 South Coast AQMD's determination that the facilities exceeded their Compliance Year 2019 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. South Coast AQMD staff is not able to independently verify the accuracy of the facility reported job impact information.

According to the Compliance Year 2019 employment survey data gathered from APEP reports, RECLAIM facilities reported a net loss of 4,167 jobs, representing 4.0% of their total employment. A comparison of reported job impacts between Cycle 1 and Cycle 2 facilities suggests that the coronavirus (COVID-19) global pandemic affected Cycle 2 facility job losses. One RECLAIM facility cited RECLAIM as a factor contributing to the addition of one job during Compliance Year 2019. No facility reported job losses due to RECLAIM, during Compliance Year 2019.

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 2019 NO_x and SO_x emissions decreased

2.1% and 20.3%, respectively, relative to Compliance Year 2018. Quarterly calendar year 2019 NOx emissions fluctuated within five percent of the mean NOx emissions for the year. Quarterly calendar year 2019 SOx emissions fluctuated within fifteen 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 2020, 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 South Coast AQMD. Those emissions reports are used to identify candidates for the Air 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, than would occur under command-and-control, because RECLAIM facilities must comply with the same toxics rules as non-RECLAIM facilities.

INTRODUCTION

The South Coast Air Quality Management District (South Coast AQMD) 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. South Coast AQMD staff has completed the initial tri-annual program audit and each individual annual program audit report through the 2019 Compliance Year Audit.

This report presents the annual program audit and progress report of RECLAIM's twenty-sixth compliance year (January 1 through December 31, 2019 for Cycle 1 and July 1, 2019 through June 30, 2020 for Cycle 2 RECLAIM facilities), also known as Compliance Year 2019. 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 summarizes changes to the universe of RECLAIM sources that occurred up until July 1, 2019 (covered under the Annual RECLAIM Audit Report for 2018 Compliance Year), then discusses changes to the RECLAIM universe of sources in detail through the end of Compliance Year 2019.
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 South Coast AQMD's compliance program, as well as the monitoring, reporting, and recordkeeping (MRR) protocols for NO_x and SO_x.
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, 2019, the overall changes in RECLAIM participants were 134 facilities included into the program, 73 facilities excluded from the program, and 202 facilities ceased operation. Thus, the RECLAIM universe consisted of 253 active facilities at the end of Compliance Year 2018 (December 31, 2018 for Cycle 1 facilities and June 30, 2019 for Cycle 2 facilities). During Compliance Year 2019 (January 1, 2019 through December 31, 2019 for Cycle 1 facilities and July 1, 2019 through June 30, 2020 for Cycle 2 facilities), no facilities were included into the RECLAIM universe, no facilities were excluded, and seven facilities (all in the NOx universe) shut down and are no longer in the active RECLAIM universe. These changes resulted in a net decrease of seven facilities in the universe, bringing the total number of active RECLAIM facilities to 246 as of the end of Compliance Year 2019.

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 were 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 were not automatically included but did 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; publicly-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 was not in a category specifically excluded from the program could voluntarily join RECLAIM regardless of its emission level. Additionally, a facility could be required to enter the RECLAIM universe if:

- It increased its NO_x and/or SO_x emissions from permitted sources above the four ton per year threshold; or
- It ceased to be categorically excluded and its reported NO_x and/or SO_x emissions were greater than or equal to four tons per year; or
- It was determined by 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 was 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).

2016 AQMP Control Measure CMB-05

Up until March 2017, staff conducted a process of identifying facilities to be included in RECLAIM pursuant to Rule 2001(b) – Criteria for Inclusion in RECLAIM. As part of the adoption Resolution of the Final 2016 AQMP in March 2017, staff was directed by the Governing Board to modify Control Measure CMB-05 – Further NO_x Reductions from RECLAIM Assessment to achieve an additional five tons per day NO_x 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 many RECLAIM facilities are also subject, and required that the implementation of BARCT be no later than December 31, 2023.

2018 Rule Amendments

On January 5, 2018, the Governing Board amended two rules, Rule 2001 – Applicability, and Rule 2002 – Allocations for Oxides of Nitrogen (NO_x) and Oxides of Sulfur (SO_x), to initiate the transition of the NO_x and SO_x RECLAIM program to a command-and-control regulatory structure as soon as practicable. The amendments also precluded new or existing facilities from entering the NO_x and SO_x RECLAIM programs. On October 5, 2018, the Governing Board further amended Rule 2001, opening a pathway for a facility to opt out of the RECLAIM program should their equipment qualify. Shortly thereafter, the United States Environmental Protection Agency (USEPA) recommended that facilities be kept in RECLAIM until all the rules associated with the transition to a command-and-control regulatory structure are adopted, so that the full transitioning of the

RECLAIM Program can be evaluated for incorporation into the State Implementation Plan (SIP) as a package with all the accompanying rules in place. In order to address USEPA's concerns, the Governing Board amended Rule 2001 on July 12, 2019 to remove the opt-out provision so that facilities cannot exit RECLAIM (see further discussion in Chapter 3).

Following approval of these Rule 2001 amendments, the only allowable changes to the RECLAIM Universe result from facilities that cease operations, as indicated by removing all equipment requiring a South Coast AQMD permit to operate, or by rendering such equipment permanently inoperable (*i.e.*, from facility shutdowns).

Universe Changes

In the early years of the RECLAIM program, some 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, some facilities that were not part of the original universe were subsequently added to the program based on the original inclusion criteria mentioned above. On the other hand, RECLAIM facilities that permanently go out of business are removed from the active emitting RECLAIM universe.

The overall changes to the RECLAIM universe from the date of adoption (October 15, 1993) through June 30, 2019 (the last day of Compliance Year 2018 for Cycle 2 facilities) were: the inclusion of 134 facilities (including 34 facilities created by partial change of operator of existing RECLAIM facilities), the exclusion of 73 facilities, and the shutdown of 202 facilities. Thus, the net change in the RECLAIM universe from October 15, 1993 through June 30, 2018 was a decrease of 141 facilities from 394 to 253 facilities. In Compliance Year 2019 (January 1, 2019 through December 31, 2019 for Cycle 1 facilities and July 1, 2019 through June 30, 2020 for Cycle 2 facilities), no facilities were included, no facilities were excluded, and seven facilities shut down. These changes brought the total number of facilities in the RECLAIM universe to 246 facilities. The Compliance Year 2019 RECLAIM universe includes 216 NO_x-only, no SO_x-only, and 30 both NO_x and SO_x RECLAIM facilities. The list of active facilities in the RECLAIM universe as of the end of Compliance Year 2019 is provided in Appendix A.

Facility Inclusions and Exclusions

No RECLAIM facilities were included in or excluded from the RECLAIM universe during Compliance Year 2019.

Facilities Permanently Ceasing Operations

Seven NO_x RECLAIM facilities permanently ceased operations in Compliance Year 2019. Three of these facilities shut down due to financial reasons. One facility relocated outside of the South Coast AQMD. Two facilities shut down when they sold to new owners and removed all equipment requiring a South Coast AQMD permit to operate. The last facility permanently ceased operations

as a result of a corporate merger and consolidation. Appendix C lists these facilities and provides brief descriptions of the reported reasons for their closures.

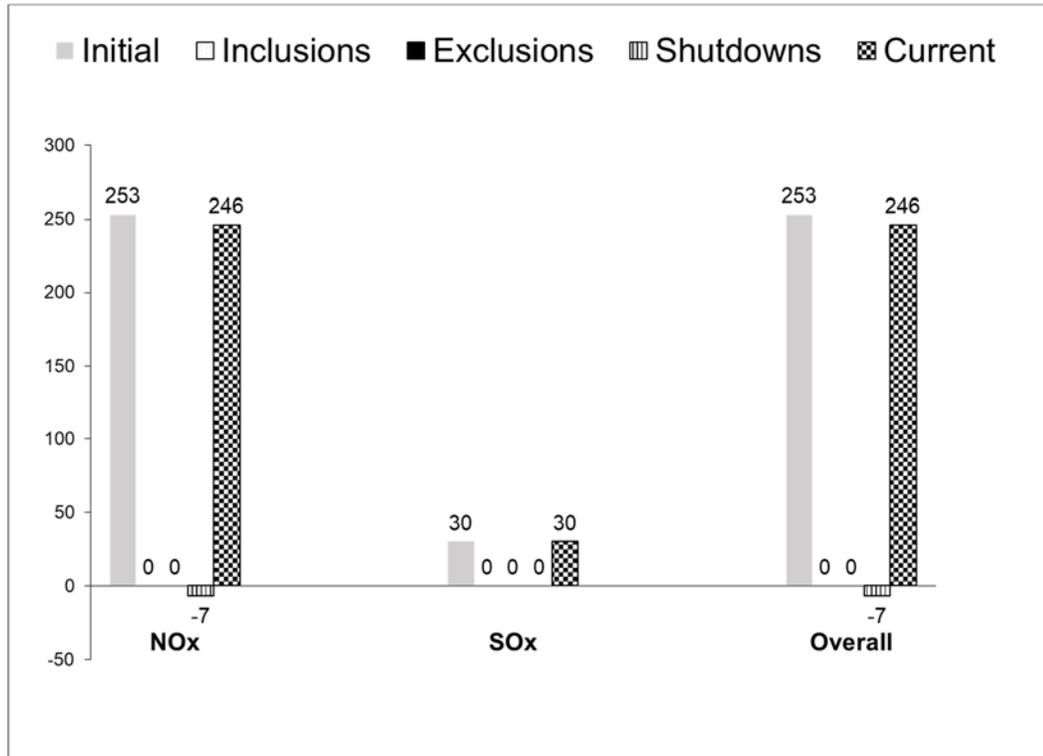
The above-mentioned changes to the RECLAIM universe resulted in a net decrease of seven facilities in the RECLAIM universe during Compliance Year 2019. Table 1-1 summarizes overall changes in the RECLAIM universe between the start of the program and end of Compliance Year 2019 (December 31, 2019 for Cycle 1 facilities and June 30, 2020 for Cycle 2 facilities). Changes to the RECLAIM universe that occurred in Compliance Year 2019 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 2018	134	13	134
Exclusions – October 15, 1993 through Compliance Year 2018	-72	-4	-73
Shutdowns – October 15, 1993 through Compliance Year 2018	-201	-20	-202
Universe – June 30, 2019	253	30	253
Inclusions – Compliance Year 2019	0	0	0
Exclusions – Compliance Year 2019	0	0	0
Shutdowns – Compliance Year 2019	-7	0	-7
Universe – End of Compliance Year 2019	246	30	246

* "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 2019



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 resulted in an overall reduction of 48.4% (or 5.7 tons/day) in SOx allocations. 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 amendments 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 2019, the fourth year of implementation, the NOx allocation supply was reduced by 15.1 % (or 4.0 tons/day). The only remaining changes in RTC supply during Compliance Year 2019 were due to allocation adjustments for clean fuel production pursuant to Rule 2002(c)(12) which increased overall NOx RTC supply by 13.2 tons and SOx RTC supply by 2.6 tons.

Since the inception of the RECLAIM program in 1994, a total value of \$1.54 billion dollars has been traded in the RTC trading market, excluding swap trades. During calendar year 2020, there were 300 RTC trade registrations, including swap trades. There were 277 RTC trade registrations with a total value of \$18.2 million traded, excluding swap trades. RTC trades are reported to South Coast AQMD 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).

Excluding swap trades, in calendar year 2020 a total of 1,854 tons of discrete-year NOx RTCs, 377 tons of discrete-year SOx RTCs, 156 tons of IYB NOx RTCs and 20 tons of IYB SOx RTCs were traded. The RTC trading market activity decreased during calendar year 2020 compared to calendar year 2019, in number of trades (by 1.3%), in total value (by 46.9%), and in volume both for discrete-year RTCs (by 9.4%) and IYB RTCs (by 69.6%).

Discrete-year RTC trades with price (i.e., price >\$0.00) registered during calendar year 2020 include trades for Compliance Years 2019, 2020, and 2021 NOx RTCs, and Compliance Years 2019 and 2020 SOx RTCs, excluding swap trades. The annual average prices of discrete-year NOx RTCs traded during calendar year 2020 were \$4,287, \$8,323, and \$9,418 per ton for Compliance Years 2019, 2020, and 2021 RTCs, respectively. The annual average prices for discrete-year SOx RTCs traded during the same period were \$4,387, and \$2,300 per ton for Compliance Years 2019 and 2020 RTCs, respectively.

Prices for discrete-year NOx and SOx RTCs for all compliance years are still well below the \$47,585 per ton of NOx and \$34,261 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 2020 for IYB NOx RTCs was \$116,405 per ton and the annual average price for IYB SOx RTCs was \$32,251 per ton. Therefore, annual average IYB RTC prices did not exceed the \$713,777 per ton of IYB NOx RTCs or the \$513,919 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). IYB NOx RTC trade activities were concentrated towards the first half of calendar year 2020, during which petroleum refining companies acquired from investors 74 tons of IYB NOx RTCs.

Investors were active in the RTC market during calendar year 2020. They were involved in 151 of the 189 discrete-year NOx trade registrations and 4 of the 5 discrete-year SOx trade registrations with price. Investors were also involved in 10 of the 18 IYB NOx and both of the IYB SOx trades with price. Investors were involved in 72% of total value and 66% of total volume for discrete-year NOx trades, and 62% of the total value and 71% of the total volume for discrete-year SOx trades. At the end of calendar year 2020, investors' holdings of IYB NOx RTCs stayed consistent at 1.3% of total NOx RECLAIM RTCs, while investors' holdings of IYB SOx RTCs decreased slightly to 4.2% of the total SOx RECLAIM RTCs, compared to investor's holdings of 4.7% in calendar year 2019.

Background

South Coast AQMD issues each RECLAIM facility at the time of inclusion into RECLAIM 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 South Coast AQMD 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 qualified¹ external offsets previously provided by the facility, and any unused 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

¹ Only external offsets provided at a one-to-one offset ratio after the base year were used as the basis for allocation quantification purposes.

needed RTCs through trade registrations (or a combination of the two), based on their operational needs.

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 2019 data, RTC trading and price data discussed in this chapter are for calendar year 2020.

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 RTCs allocated by South Coast AQMD, 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 facilities², 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. The South Coast AQMD Governing Board may adopt additional rules that affect RTC supply. Changes in the RTC supply during Compliance Year 2019 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 NO_x or SO_x in a year, any RTCs it was issued upon entering RECLAIM are removed from the market upon its exclusion.

² Per Rule 2002(c)(4), the window of opportunity for non-RECLAIM facilities to convert ERCs to RTCs other than during the process of a non-RECLAIM facility entering the program closed June 30, 1994.

As discussed in Chapter 1, the South Coast AQMD Governing Board amended Rule 2001 on October 5, 2018 to allow qualifying facilities to opt-out of the RECLAIM program. Based on continuing conversations with USEPA, the Governing Board subsequently amended Rule 2001 on July 12, 2019 to remove the opt-out provision so that facilities can no longer exit RECLAIM. Facilities that were excluded by means of this opt-out provision, as opposed to the normal exclusion criteria described in the preceding paragraph, retained their initially-allocated RTCs³. No facilities were excluded during Compliance Year 2019. Therefore, there were no changes to the NOx or SOx supplies in Compliance Year 2019 due to facility exclusions from RECLAIM.

On January 5, 2018, the South Coast AQMD Governing Board amended Rule 2001 – Applicability to discontinue facility inclusions into RECLAIM. The Executive Officer could only include a facility into RECLAIM up until January 5, 2018, and no facility can elect to enter RECLAIM after January 5, 2018. No facilities were included in the RECLAIM program in Compliance Year 2019. Therefore, there are no changes to the NOx or SOx RTC supplies in Compliance Year 2019 due to facility inclusions into RECLAIM.

Allocations Adjustments Due to Facility Shutdowns

Prior to an October 7, 2016 amendment of Rule 2002, shutdown facilities 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 shut down on or after October 7, 2016, the Rule 2002 amendment established a BARCT-based RTC discounting methodology that is more closely aligned to the 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.

Seven RECLAIM facilities shut down during Compliance Year 2019, none of which were listed in Tables 7 and 8 of Rule 2002. Therefore, there were no changes to the NOx RTC supplies in Compliance Year 2019 due to facility shutdowns. Most of these shutdown facilities sold their RTC credits.

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

³ Except for shutdown facilities that are subject to Rule 2002(i); see discussion in the next section.

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 NO_x allocations, the NO_x 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 2019, 13.2 tons of NO_x RTCs (0.16% of total NO_x allocation for Compliance Year 2019) and 2.6 tons of SO_x RTCs (0.12% of total SO_x allocation for Compliance Year 2019) were added to refineries' Compliance Year 2019 RTC holdings at the end of the compliance year.

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 accordingly⁴. There were no changes in RTC allocations due to activity corrections in Compliance Year 2019.

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 2019.

Net Changes in RTC Supplies

The changes to RTC supplies described in the above sections resulted in a net increase of 13.2 tons of NO_x RTCs (0.16% of the total) and an increase of 2.6 tons of SO_x RTCs (0.12% of the total) for Compliance Year 2019. Table 2-1

⁴ 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.

summarizes the changes in NOx and SOx RTC supplies that occurred in Compliance Year 2019 pursuant to Rule 2002.

**Table 2-1
Changes in NOx and SOx RTC Supplies during Compliance Year 2019 (tons/year)**

Source	NOx	SOx
Universe changes	0	0
Clean Fuel/Reformulated Gasoline	13.2	2.6
Activity corrections	0	0
MSERCs	0	0
Net change	13.2	2.6

Note: The data in this table represents the changes that occurred over the course of Compliance Year 2019 to the Compliance Year 2019 aggregate NOx and SOx RTC supplies originally issued pursuant to Rule 2002, not the difference between 2019 aggregate RTC supply and that for any other compliance year.

Allocation Reduction Resulting from BARCT Review

Pursuant to California Health and Safety Code §40440, South Coast AQMD 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 CMB-10 – Additional NOx Reductions for RECLAIM (NOx) calling for additional NOx reductions from RECLAIM sources. South Coast AQMD 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, CARB, and 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.

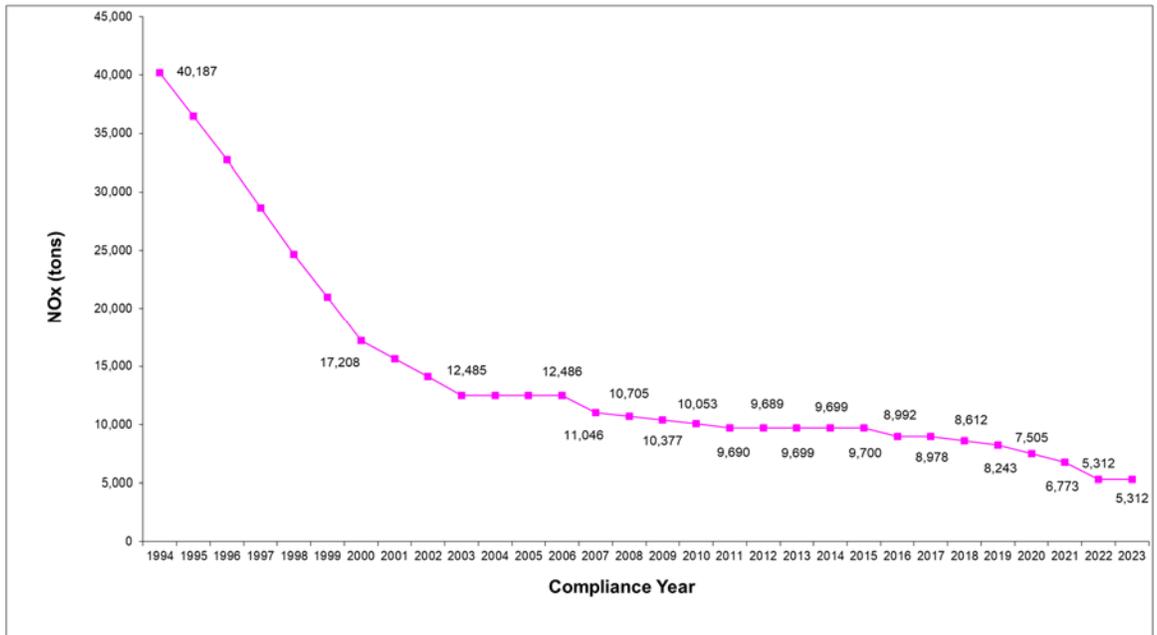
On November 5, 2010, the Governing Board adopted changes to the RECLAIM program implementing the 2007 AQMP Control Measure CMB-02 – Further SOx Reductions for RECLAIM (SOx). These amendments resulted in a BARCT-based overall reduction of 5.7 tons SOx per day when fully implemented in Compliance Year 2019 (the reductions were 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

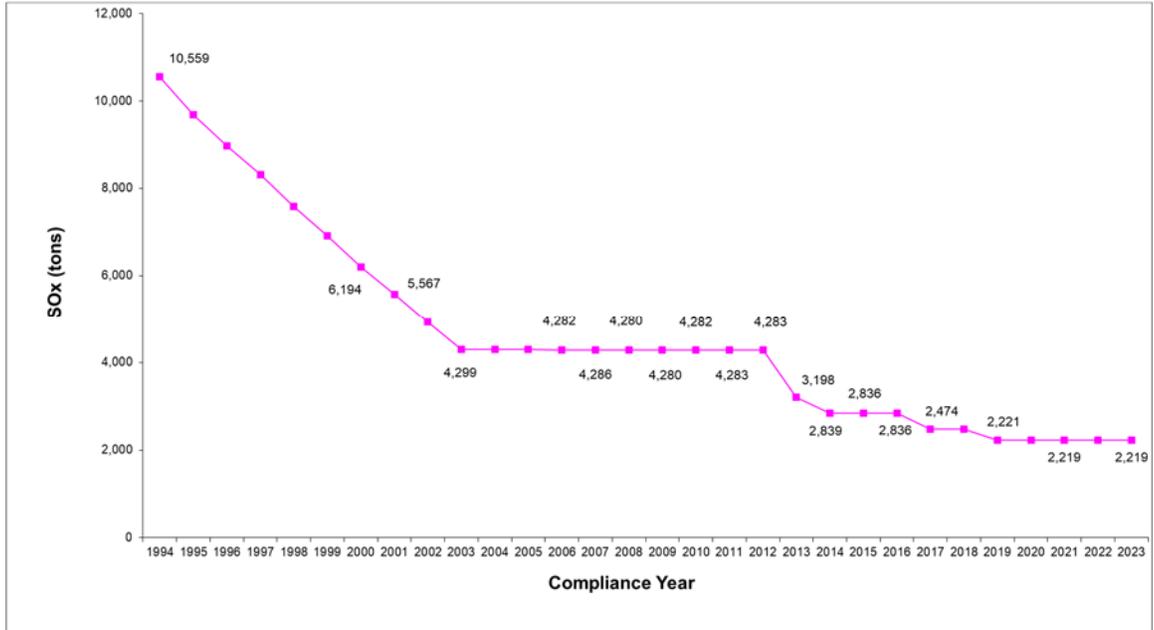
additional reduction of 12 tons of NOx per day (45% reduction) when fully implemented in Compliance Year 2022. The reductions are being phased-in with 2 tons per day in Compliance Year 2016 and 2017, 3 tons per day in Compliance Year 2018, 4 tons per day in Compliance Year 2019, 6 tons per day in Compliance Year 2020, 8 tons per day in Compliance Year 2021 and 12 tons per day in Compliance Year 2022 and thereafter.

Figures 2-1 and 2-2 illustrate the total NOx and SOx RTC supplies, respectively, through the end of Compliance Year 2023, incorporating all the changes discussed above.

Figure 2-1
NOx RTC Supply



**Figure 2-2
SOx RTC Supply**



RTC Trades

RTC Price Reporting Methodology

RTC trades are reported to South Coast AQMD 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 may be 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 prices 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)(R), 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' Non-tradable/Non-usable 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 2020, the overall program review thresholds⁵ in 2020 dollars, pursuant to Health and Safety Code §39616(f), are \$47,585 per ton of discrete-year NOx RTCs, \$34,261 per ton of discrete-year SOx RTCs, \$713,777 per ton of IYB NOx RTCs, and \$513,919 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 trades with zero price, and discrete-year and IYB RTC swap trades. The RTC market activity in calendar year 2020 was comparable to the market activity in calendar year 2019 in terms of the number of trades. Table 2-2 compares NOx and SOx trade registrations for calendar years 2020 and 2019.

**Table 2-2
Trade Registrations in Calendar Years 2020 and 2019, Including Swaps**

RTC	2020	2019
NOx	279	273
SOx	21	31
Total	300	304

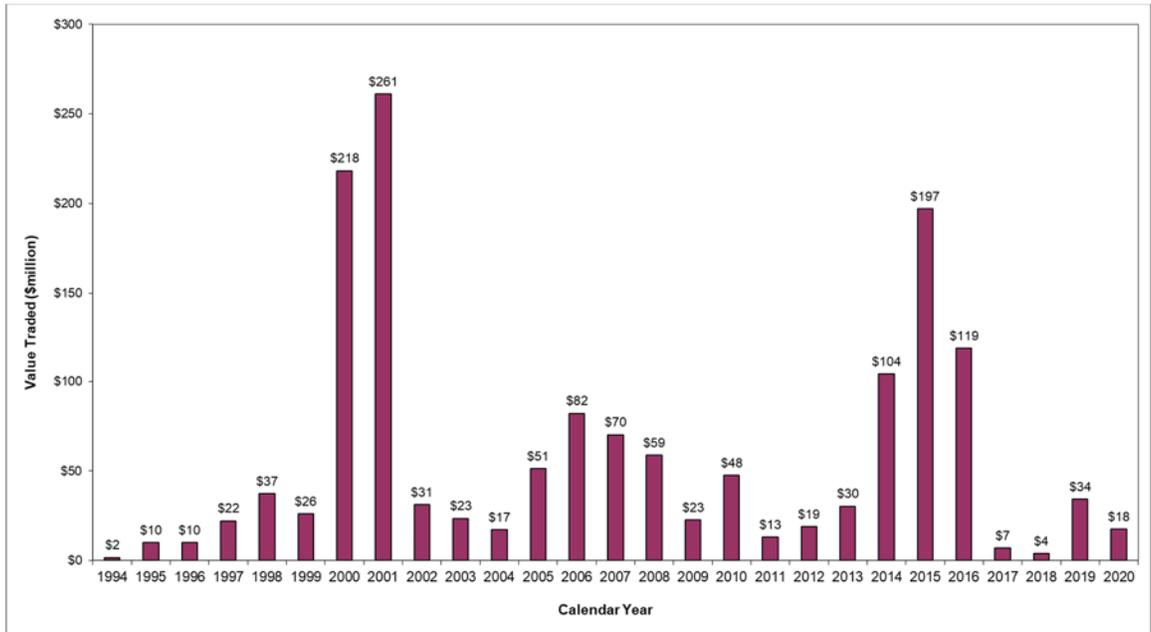
The \$18.19 million traded in calendar year 2020 was significantly less compared to calendar year 2019, excluding swap trades. Table 2-3 compares the value of NOx and SOx RTCs traded in calendar years 2020 and 2019. Figure 2-3 illustrates the annual value of RTCs traded in RECLAIM since the inception of the program.

⁵ These program review thresholds were adjusted using the October 2020 Consumer Price Index (CPI), due to the unavailability of the December 2020 CPI by the end of January 2021 when this report was compiled.

Table 2-3
Value Traded in Calendar Years 2020 and 2019, Excluding Swaps (millions of dollars)

RTC	2020	2019
NOx	\$17.52	\$32.33
SOx	\$0.67	\$1.91
Total	\$18.19	\$34.24

Figure 2-3
Annual Trading Values for NOx and SOx (Excluding Swaps)



With respect to total volume traded (excluding swap trades), trades of discrete-year RTCs were slightly higher for NOx but significantly lower for SOx in calendar year 2020 than in calendar year 2019, while trades of IYB RTCs in calendar year 2020 were significantly lower than the trading volume in 2019. Tables 2-4 and 2-5 compare 2020 and 2019 for NOx and SOx trade volume for discrete-year and IYB trades, respectively. Figure 2-4 summarizes overall trading activity (excluding swaps) in calendar year 2020 by pollutant. Additional information on the discrete-year and IYB trading activities, value, and volume are discussed later in this chapter.

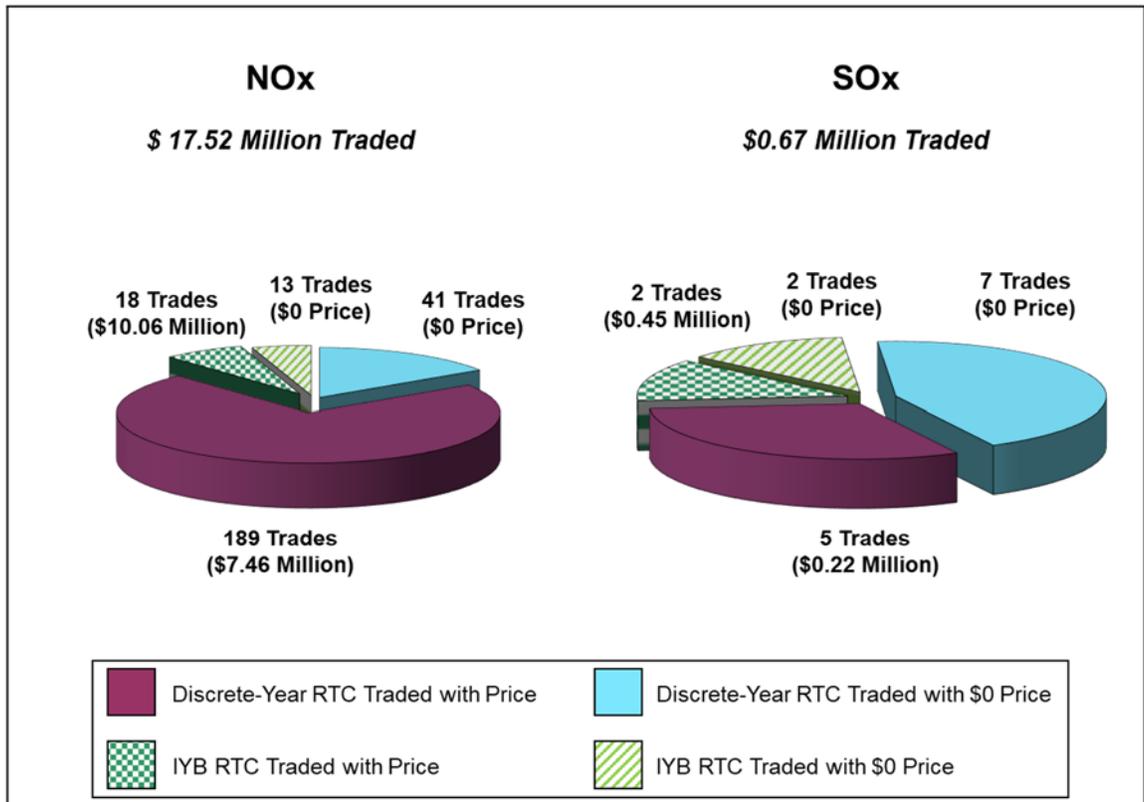
Table 2-4
Volume of Discrete-Year RTCs Traded in Calendar Years 2020 and 2019, Excluding Swaps (tons)

RTC	2020	2019
NOx	1,854	1,796
SOx	377	666
Total	2,231	2,462

Table 2-5
Volume of IYB RTCs Traded in Calendar Years 2020 and 2019, Excluding Swaps (tons)

RTC	2020	2019
NOx	156	526
SOx	20	55
Total	176	581

Figure 2-4
Calendar Year 2020 Overall Trading Activity (Excluding Swaps)



There were 63 trades with zero price in calendar year 2020. 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 2020, 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 2020, there were a total of 230 discrete-year NOx RTC trades and 12 discrete-year SOx RTC trades, excluding swap trades. The trading of discrete-year NOx RTCs included RTCs for Compliance Years 2019 through 2021 (see Table 2-14). The trading of discrete-year SOx RTCs included RTCs for Compliance Years 2019 and 2020 (see Table 2-15). Table 2-6 compares the number of trade registrations in 2020 and 2019, both with price and with zero price.

Table 2-6
Discrete-Year Trade Registrations in Calendar Years 2020 and 2019 by Price, Excluding Swaps

Year	RTC	With Price	With \$0 Price	Total
2020	NOx	189	41	230
	SOx	5	7	12
	Total	194	48	242
2019	NOx	178	46	224
	SOx	17	7	24
	Total	195	53	248

Total discrete-year RTC trading values significantly increased for NOx and significantly decreased for SOx on a relative basis in calendar year 2020 when compared to calendar year 2019. Table 2-7 compares the total value of the discrete-year RTC trades in 2020 and 2019.

Table 2-7
Discrete-Year RTC Value Traded in 2020 and 2019, Excluding Swaps (millions of dollars)

RTC	2020	2019
NOx	\$7.46	\$4.23
SOx	\$0.22	\$1.19
Total	\$7.68	\$5.41

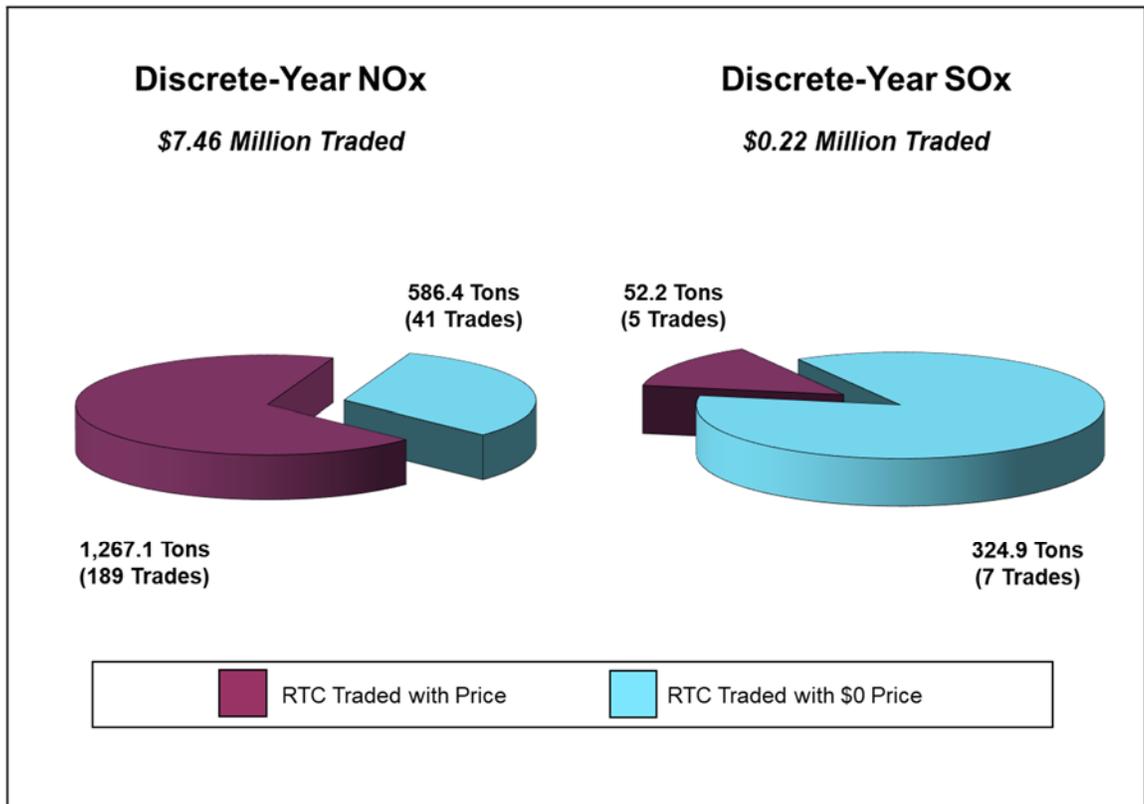
In calendar year 2020, the overall quantities of discrete-year NOx RTCs traded slightly increased compared to calendar year 2019, while the quantities of discrete-year SOx RTCs traded significantly decreased. Table 2-8 compares the volume of NOx and SOx RTCs traded in calendar years 2020 and 2019,

excluding swap trades. Figure 2-5 illustrates the trading activity of discrete-year RTCs (excluding swaps) for calendar year 2020.

Table 2-8
Discrete-Year RTC Volume Traded in Calendar Years 2020 and 2019 by Price, Excluding Swaps (tons)

Year	RTC	With Price	With \$0 Price	Total
2020	NOx	1,267	586	1,854
	SOx	52	325	377
	Total	1,319	911	2,231
2019	NOx	1,124	672	1,796
	SOx	230	436	666
	Total	1,354	1,108	2,462

Figure 2-5
Calendar Year 2020 Trading Activity for Discrete-Year RTCs (Excluding Swaps)



IYB RTC Trading Activity

In calendar year 2020, there were 31 IYB NOx trades and four (4) IYB SOx trades, excluding swaps. The IYB NOx trades included RTCs with Compliance Years 2019 through 2022 as start years, while the IYB SOx trades included

RTCs with Compliance Years 2020 and 2021 as start years. Table 2-9 compares the number of RTC trade registrations from 2020 and 2019.

Table 2-9
IYB Trade Registrations in Calendar Years 2020 and 2019 by Price

Year	RTC	With Price	With \$0 Price	Total
2020	NOx	18	13	31
	SOx	2	2	4
	Total	20	15	35
2019	NOx	33	9	42
	SOx	6	0	6
	Total	39	9	48

Total IYB RTC trade values significantly decreased in calendar year 2020 compared to calendar year 2019. Table 2-10 compares the NOx and SOx IYB RTC trade values in calendar years 2020 and 2019.

Table 2-10
IYB RTC Value Traded in 2020 and 2019, Excluding Swaps (millions of dollars)

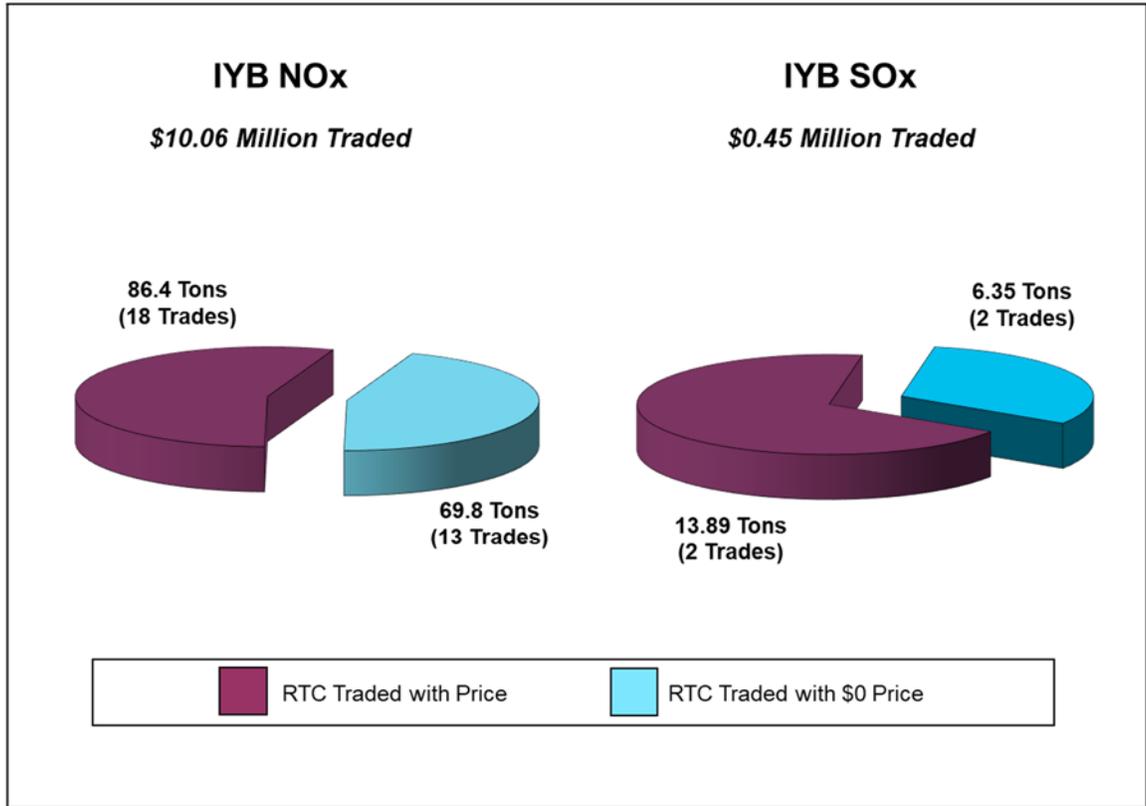
RTC	2020	2019
NOx	\$10.06	\$28.10
SOx	\$0.45	\$0.73
Total	\$10.51	\$28.83

In calendar year 2020, the total volume of IYB RTCs traded (excluding swap trades) decreased significantly compared to calendar year 2019. Despite the large decrease, the amount of IYB RTCs traded is well within the range of historic values. Table 2-11 compares the NOx and SOx IYB RTCs trade volumes in calendar years 2020 and 2019. As described earlier, the majority of trades with zero price were between facilities under common ownership and facilities that had a change of operator. Figure 2-6 illustrates the calendar year 2020 IYB RTC trading activity excluding swap trades.

Table 2-11
IYB RTC Volume Traded in Calendar Years 2020 and 2019 by Price, Excluding Swaps (tons)

Year	RTC	With Price	With \$0 Price	Total
2020	NOx	86	70	156
	SOx	14	6	20
	Total	100	76	176
2019	NOx	298	227	526
	SOx	55	0	55
	Total	353	227	581

Figure 2-6
Calendar Year 2020 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 chapter.

**Figure 2-7
Discrete-Year NOx RTC Trades (Excluding Swaps)**

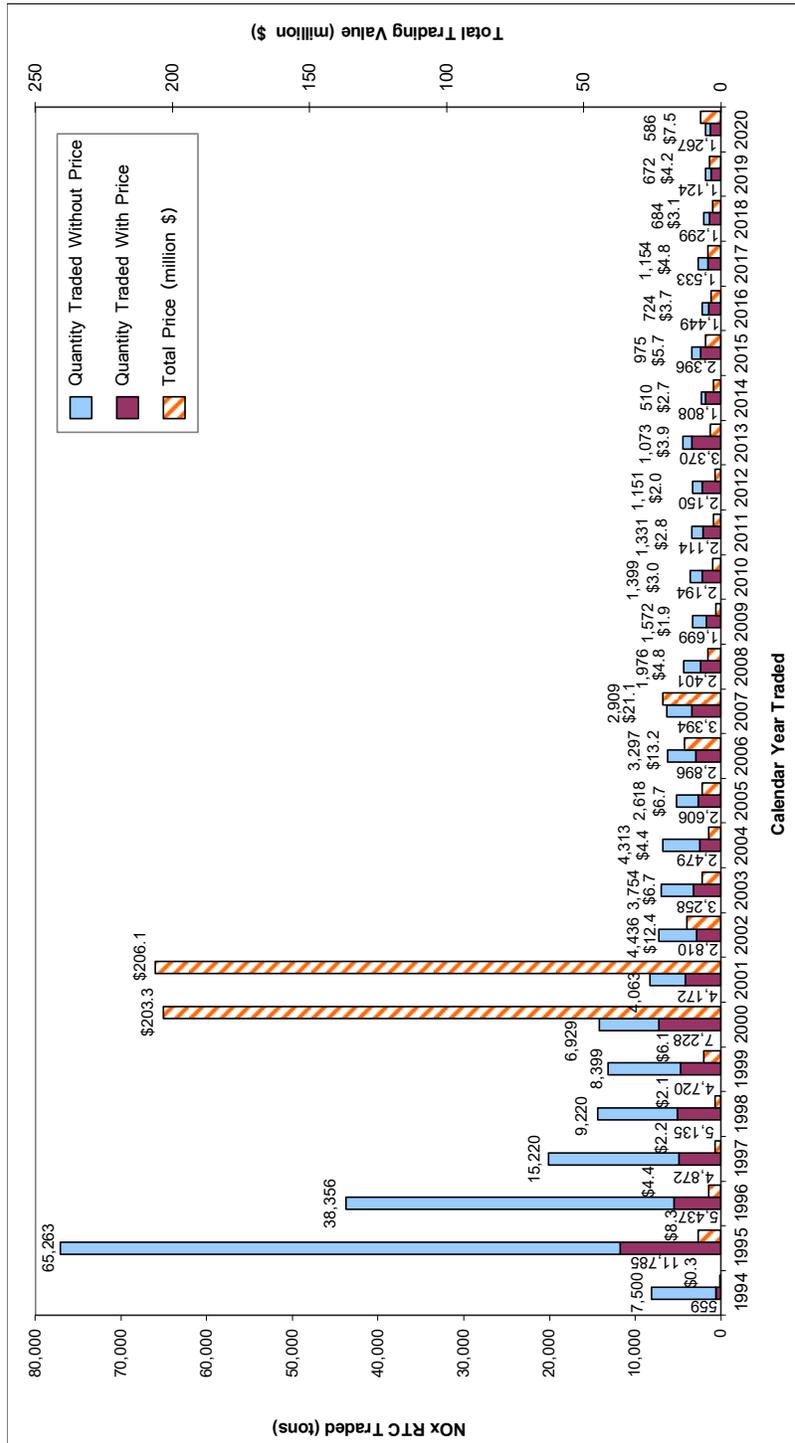


Figure 2-8
Discrete-Year SOx RTC Trades (Excluding Swaps)

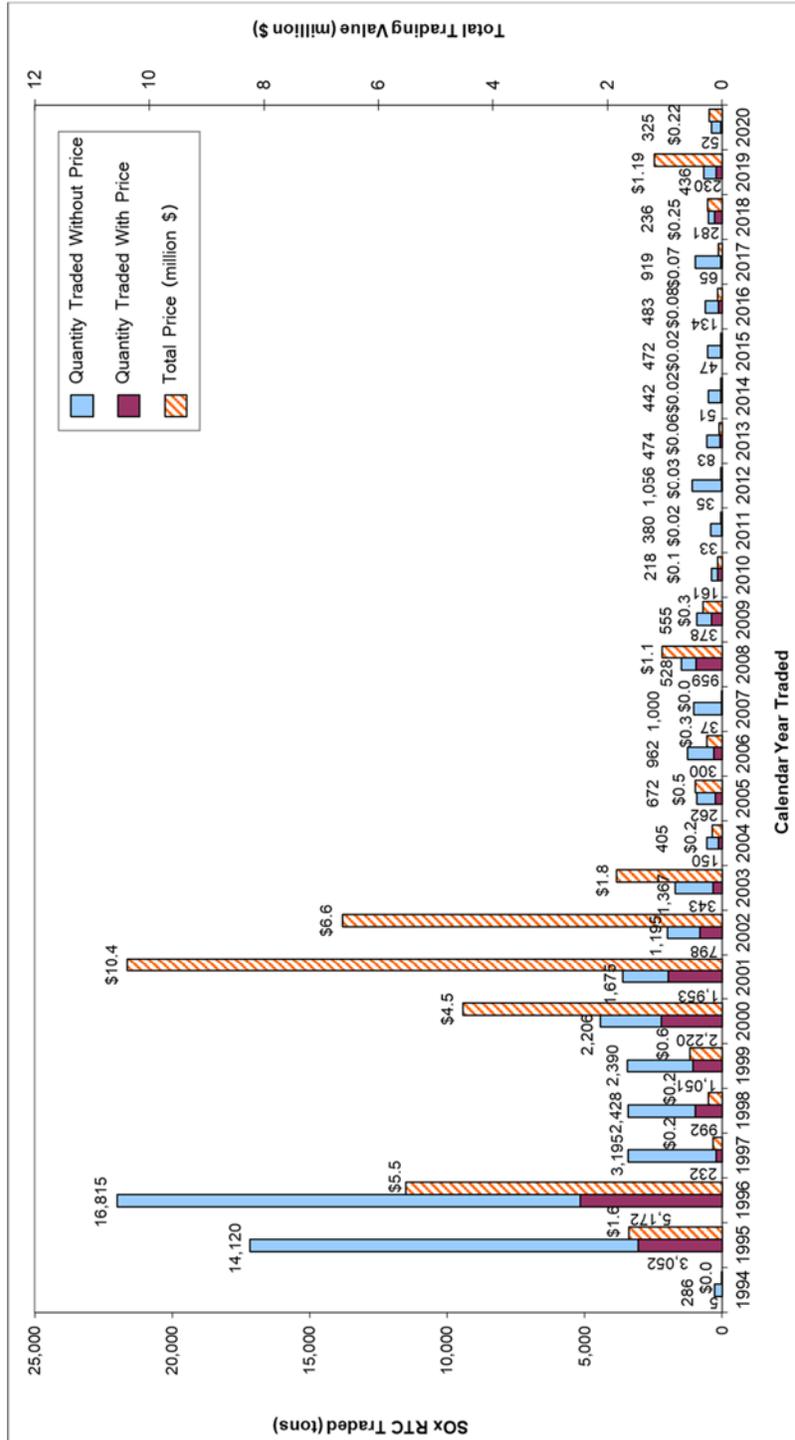


Figure 2-9
 IYB NOx RTC Trades (Excluding Swaps)

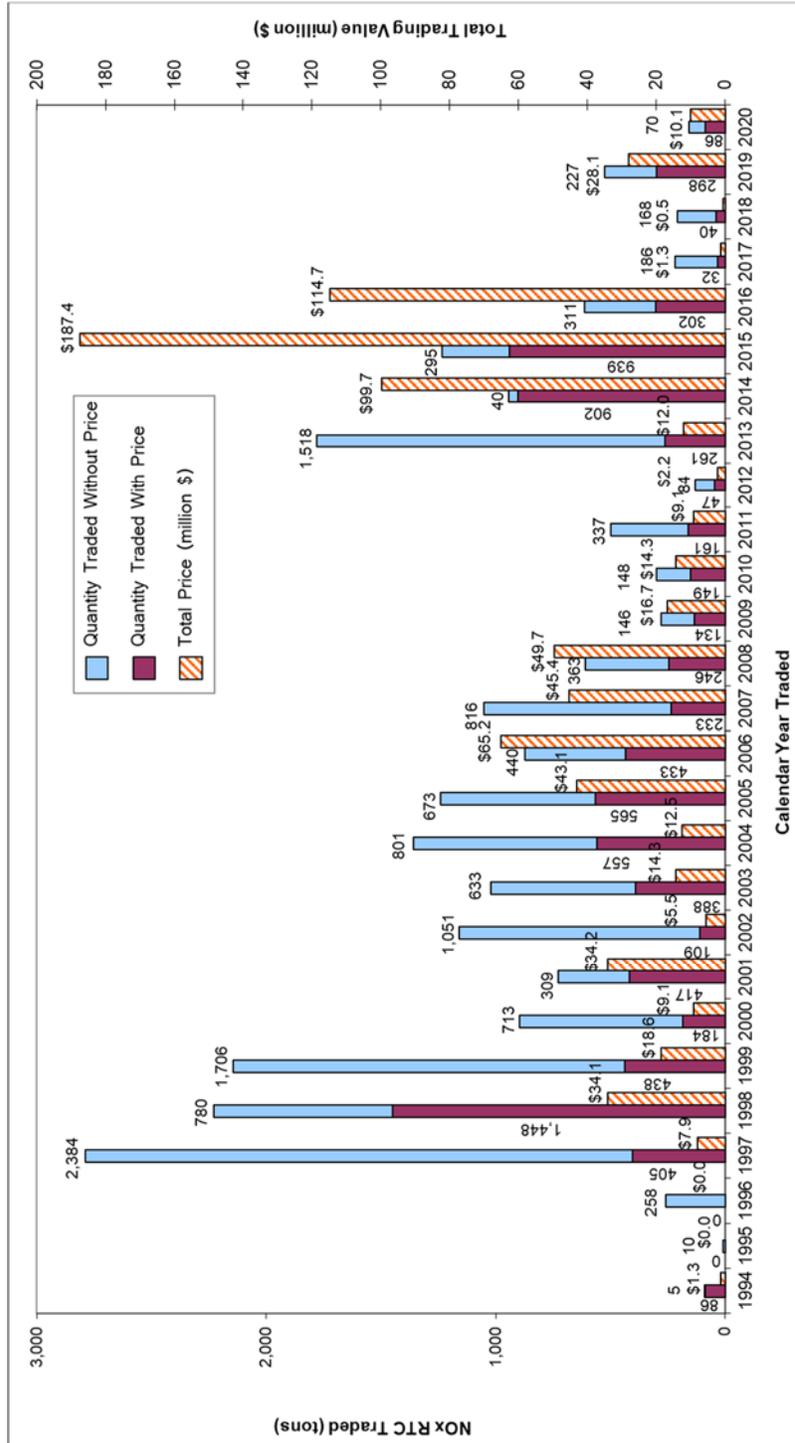
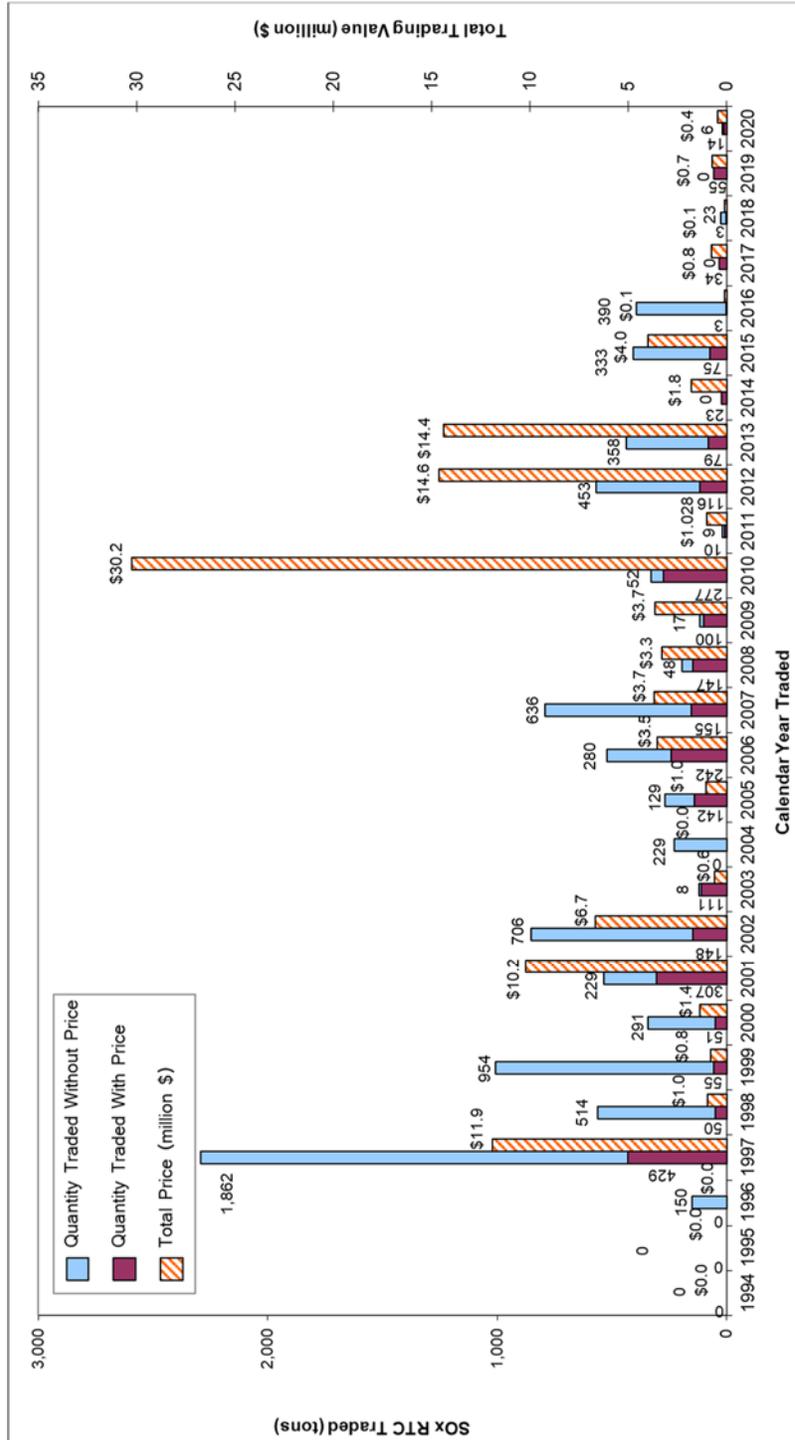


Figure 2-10
IYB SOx RTC Trades (Excluding Swaps)



Swap Trades

In addition to traditional trades of RTCs for a price, RTC swaps also occur between trading partners. Most 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 are 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.

During calendar year 2020, twenty-three trade registrations included RTC swaps with a total value of about \$2.3 million. Fourteen swap trades involved swapping a larger quantity of discrete-year RTCs for a smaller quantity of discrete-year RTCs with a later expiration date. These trades were collectively valued at \$2.1 million. Four trades involved swapping coastal credits for a larger quantity of inland credits. The total value of these trades was \$0.1 million. Two swap trades involved a forward contract, in which one party agreed to purchase RTCs during 2020 and sell the same volume and vintage of RTCs back to the other party in 2022 at zero price. Total value of these trades is \$0.1 million. The three remaining trades were between facilities or RTC holders under common ownership. The total value of the remaining three trades is \$18,426. Upon further investigation, staff concluded that these three transactions were not at arm's-length, and that the prices reported for the transfer of RTCs for these three trades should not be regarded as market prices but "swap trades." 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 these 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 or a true market-based price. Tables 2-12 and 2-13 present the calendar years' 2001 through 2020 RTC swaps for NOx and SOx, respectively.

Table 2-12
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
2018	\$0.51	0	178.5	4	4
2019	\$0.37	0	128.8	7	7
2020	\$1.79	0	324.6	18	18

* 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 2-13
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
2018	\$0	0	0	0	0
2019	\$0.02	0	1.4	1	1
2020	\$0.51	0	80.2	5	5

* 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 2-14 and 2-15 list the annual average prices for discrete-year NOx and SOx RTCs traded from calendar years 2015 through 2020. The table shows that all annual average prices for discrete-year NOx and SOx RTCs were well below the \$47,585 per ton of NOx and \$34,261 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 the \$15,000 threshold specified under Rule 2015(b)(6) for reviews of the compliance aspects of the program.

**Table 2-14
Annual Average Prices for Discrete-Year NOx RTCs during Calendar Years 2015 through 2020 (price per ton)**

RTC Compliance Year	Calendar Year during which RTCs Traded					
	2015	2016	2017	2018	2019	2020
2011						
2012						
2013						
2014	1,038.82					
2015	1,642.05	1,625.75				
2016	2,833.39	2,926.90	2,202.90			
2017	4,019.76	6,606.21	4,181.75	1,871.76		
2018	6,006.11		10,639.19	3,788.31	2,261.39	
2019	8,066.67			5,645.67	5,409.79	4,286.74
2020				5,673.91	12,189.81	8,322.89
2021					8,677.54	9,417.56

**Table 2-15
Annual Average Prices for Discrete-Year SOx RTCs during Calendar Years 2015 through 2020 (price per ton)**

RTC Compliance Year	Calendar Year during which RTCs Traded					
	2015	2016	2017	2018	2019	2020
2011						
2012						
2013						
2014	483.40					
2015	380.00	540.29				
2016		1,254.55	635.83			
2017			1,385.71	785.56		
2018				954.61	1,764.20	
2019			4,800.00		7,984.79	4,386.87
2020			4,800.00			2,300.00
2021						

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 would have become effective in 2019. The price floor in 2002(f)(1)(I) was subsequently removed by the Governing Board on October 5, 2018. 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 October 5, 2018 amendment to Rule 2002 eliminated the requirement to calculate IYB NOx RTC prices. The October 2018 report to the South Coast

AQMD Stationary Source Committee was the last time the twelve-month rolling average prices of IYB NOx RTCs report was generated.

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.”

Starting January 2017, the Executive Officer calculates and reports the twelve-month rolling average prices for current compliance year SOx RTCs as required by the November 5, 2010 amendment to Rule 2002, which 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 2-16 through 2-18 list the various rolling average prices described above. The average NOx and SOx discrete-year RTC prices have all remained well below the applicable reporting thresholds,

**Table 2-16
Twelve-Month Rolling Average Prices of Compliance Year 2020 Discrete-Year NOx RTCs**

Reporting Month	12-Month Period	Average Price (\$/ton)
January 2020	January 2019 through December 2019	\$12,190
February 2020	February 2019 through January 2020	\$10,770
March 2020	March 2019 through February 2020	\$8,220
April 2020	April 2019 through March 2020	\$8,186
May 2020	May 2019 through April 2020	\$7,921
June 2020	June 2019 through May 2020	\$7,975
July 2020	July 2019 through June 2020	\$9,620
August 2020	August 2019 through July 2020	\$9,781
September 2020	September 2019 through August 2020	\$9,758
October 2020	October 2019 through September 2020	\$9,755
November 2020	November 2019 through October 2020	\$9,447
December 2020	December 2019 through November 2020	\$9,607
January 2021	January 2020 through December 2020	\$8,323

Table 2-17
Three-Month Rolling Average Prices of Compliance Year 2020 Discrete-Year NOx RTCs

Reporting Month	3-Month Period	Average Price (\$/ton)
January 2020	October 2019 through December 2019	\$12,190
February 2020	November 2019 through January 2020	\$10,890
March 2020	December 2019 through February 2020	\$8,438
April 2020	January 2020 through March 2020	\$6,024
May 2020	February 2020 through April 2020	\$5,054
June 2020	March 2020 through May 2020	\$6,179
July 2020	April 2020 through June 2020	\$12,232
August 2020	May 2020 through July 2020	\$13,720
September 2020	June 2020 through August 2020	\$13,261
October 2020	July 2020 through September 2020	\$11,128
November 2020	August 2020 through October 2020	\$8,286
December 2020	September 2020 through November 2020	\$8,057
January 2021	October 2020 through December 2020	\$6,659

Table 2-18
Twelve-Month Rolling Average Prices of Compliance Year 2020 Discrete-Year SOx RTCs

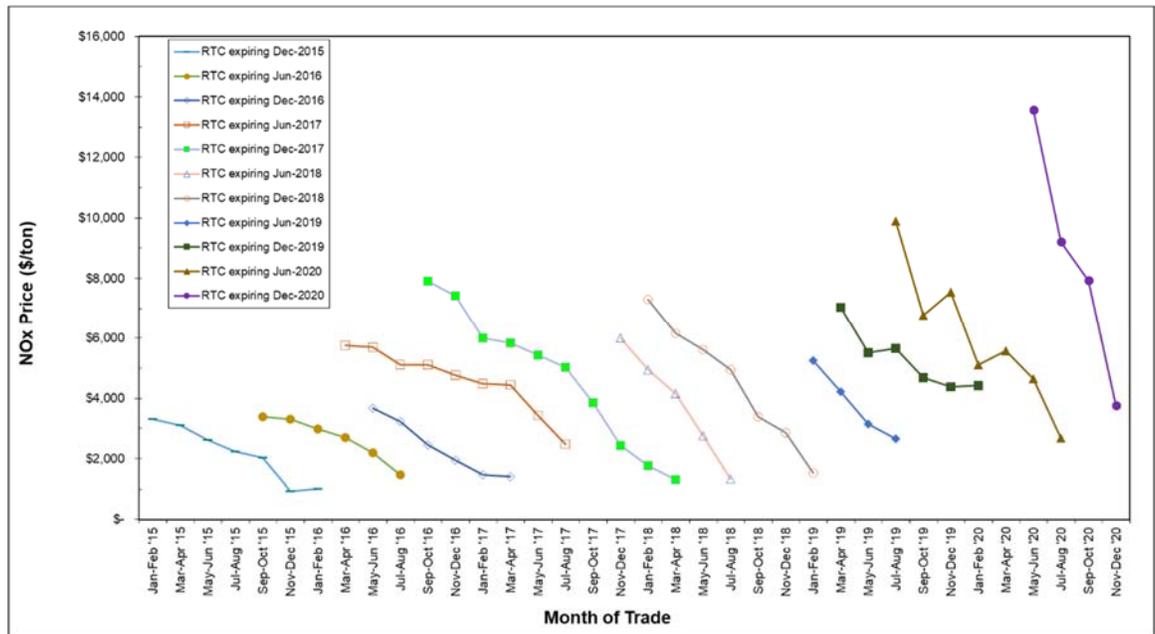
Reporting Month	12-Month Period	Average Price (\$/ton)
January 2020	January 2019 through December 2019	-
February 2020	February 2019 through January 2020	-
March 2020	March 2019 through February 2020	-
April 2020	April 2019 through March 2020	-
May 2020	May 2019 through April 2020	-
June 2020	June 2019 through May 2020	-
July 2020	July 2019 through June 2020	-
August 2020	August 2019 through July 2020	-
September 2020	September 2019 through August 2020	-
October 2020	October 2019 through September 2020	-
November 2020	November 2019 through October 2020	-
December 2020	December 2019 through November 2020	-
January 2021	January 2020 through December 2020	\$2,300

Average Price for NOx RTCs Nearing Expiration

Generally, RTC prices decrease as their expiration dates approach, and 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 2020 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 prices for these near-expiration NOx RTCs are 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 each compliance year. 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 2020, there were only five discrete-year SOx trades with price for Compliance Years' 2019 and 2020 RTCs. These prices ranged from \$800 per ton to \$5,600 per ton throughout the year.

**Figure 2-11
Bi-Monthly Average Prices 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 2020 was \$116,405 per ton, which is higher than the annual average price of \$94,183 per ton traded in calendar year 2019. The annual average price for IYB SOx RTCs

traded in calendar year 2020 was \$32,251 per ton, which is much higher than the \$13,213 per ton traded in calendar year 2019 but more consistent with IYB SOx RTC prices prior to calendar year 2019. 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 2-19 and 2-20, respectively. In calendar year 2019, the annual average IYB RTC prices did not exceed the \$713,777 per ton of NOx RTCs or the \$513,919 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 2-19
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
2018	\$0.52	39.6	5	\$13,223
2019	\$28.1	298.4	33	\$94,183
2020	\$10.1	86.4	18	\$116,405

* No information regarding swap trades was reported until May 9, 2001.

Table 2-20
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
2018	\$0.09	3.16	2	\$30,000
2019	\$0.73	54.9	6	\$13,213
2020	\$0.45	13.89	2	\$32,251

* No information regarding swap trades was reported until May 9, 2001.

Recent Program Amendments' Effect on IYB NOx RTC Trading Trend

With the planned transition to a command-and-control regulatory structure, the longevity and utility of IYB NOx RTCs would be expected to diminish. Therefore, it is reasonable for the values of volume traded and of IYB NOx RTCs to decrease as they did in calendar years 2017 and 2018. However, the volumes traded and values of IYB NOx RTCs increased significantly in calendar years 2019 and 2020 versus 2017 and 2018.

In subsequent working group meetings and discussion with USEPA, several issues were found in transitioning the New Source Review component of the program. Recent developments (see discussion on Program Amendments in Chapter 3) on RECLAIM transition have led to postponing the final transition of facilities out of RECLAIM until all necessary rules have been adopted and

approved into the SIP. This delay has apparently created volatility in the trends of IYB NOx RTC trades.

In calendar year 2020, the values of IYB NOx RTCs continued to increase as it did in calendar year 2019. The surge in IYB trading activity in the latter half of 2019 continued into calendar year 2020. While the volume traded and the total value traded of IYB NOx RTCs decreased as compared to calendar year 2019, the price per ton increased. From calendar year 2019 to 2020, the price per ton increased by 24%, which is not as substantial as the increase of 612% from calendar year 2018 to 2019. Calendar year 2020 IYB NOx price per ton is more comparable to the annual average prices in years prior to calendar year 2017.

This year, petroleum refining companies purchased 85.9% of the IYB NOx RTCs sold with price, down from the 98.6% of the IYB NOx RTCs bought by these facilities in calendar year 2019. In total, 74 tons of IYB NOx RTCs were bought by these refineries. In general, refineries tend not to sell RTCs, and instead tend to use the credits solely to reconcile their annual emissions. These recent purchases effectively removed 74 tons of IYB NOx RTCs from the market and reduced liquidity.

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 has 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 South Coast AQMD within five business days of reaching an agreement. These reports are posted on South Coast AQMD's website. There were two reports submitted in calendar year 2020 identifying an agreed upon contingent right to buy or sell RTCs. Neither of these reported rights were exercised in calendar year 2020.

In addition to reconciling emissions at RECLAIM facilities, RTCs are also used by RTC holders to satisfy variance conditions and offset other projects. During calendar year 2020, two such instances occurred. In the first case, a non-RECLAIM facility retired 7.5 tons of NOx RTCs to comply with a Supplemental Environmental Impact Report mandated Mitigation Monitoring Program. In the second case, a RECLAIM facility retired 0.2 tons of SOx RTCs to satisfy a variance condition.

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 2020, investors were actively involved in 151 of the 189 discrete-year NOx RTC trades with price and 4 of the 5 discrete-year SOx RTC trades with price. Investors were involved in 10 of the 18 IYB NOx trades with price, and both IYB SOx trades with price.

Investors’ involvement in discrete-year NOx and SOx trades registered with price in calendar year 2020 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 72% and 62%, 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 66% and 71% 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. Investors were involved in 61% and 100% of IYB NOx and SOx trades by value, and in 63% and 100% of IYB NOx and SOx trades by volume, respectively.

Figure 2-12
Calendar Year 2020 Investor-Involved Discrete-Year NOx and SOx Trades Based on Value Traded

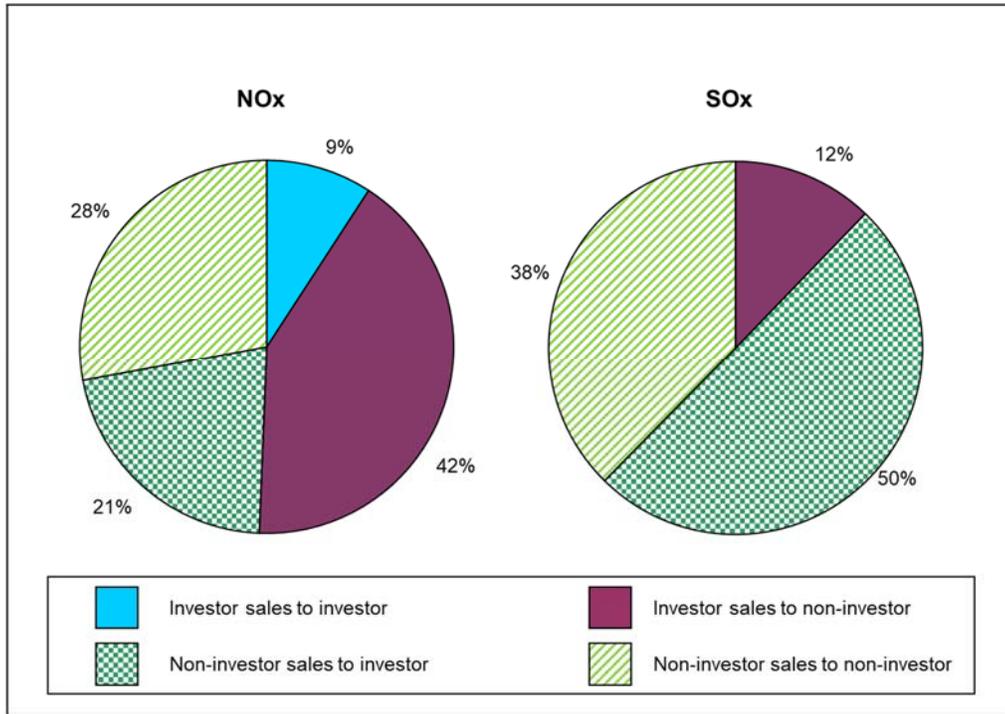


Figure 2-13
Calendar Year 2020 Investor-Involved Discrete-Year NOx and SOx Trades Based on Volume Traded with Price

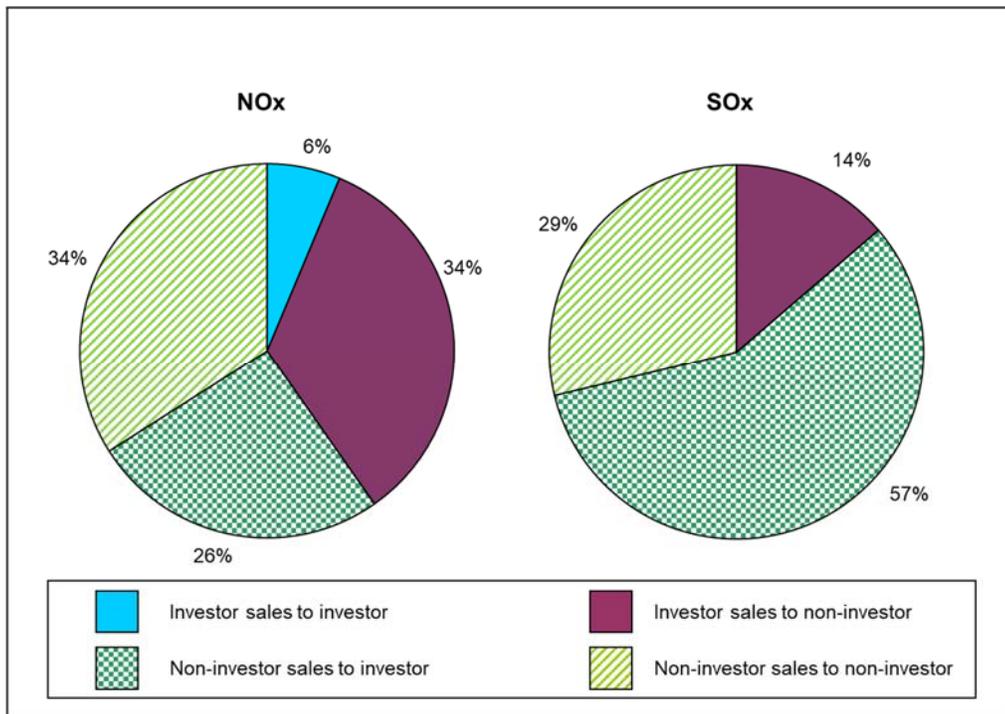


Figure 2-14
Calendar Year 2020 Investor-Involved IYB NOx and SOx Trades Based on Value Traded

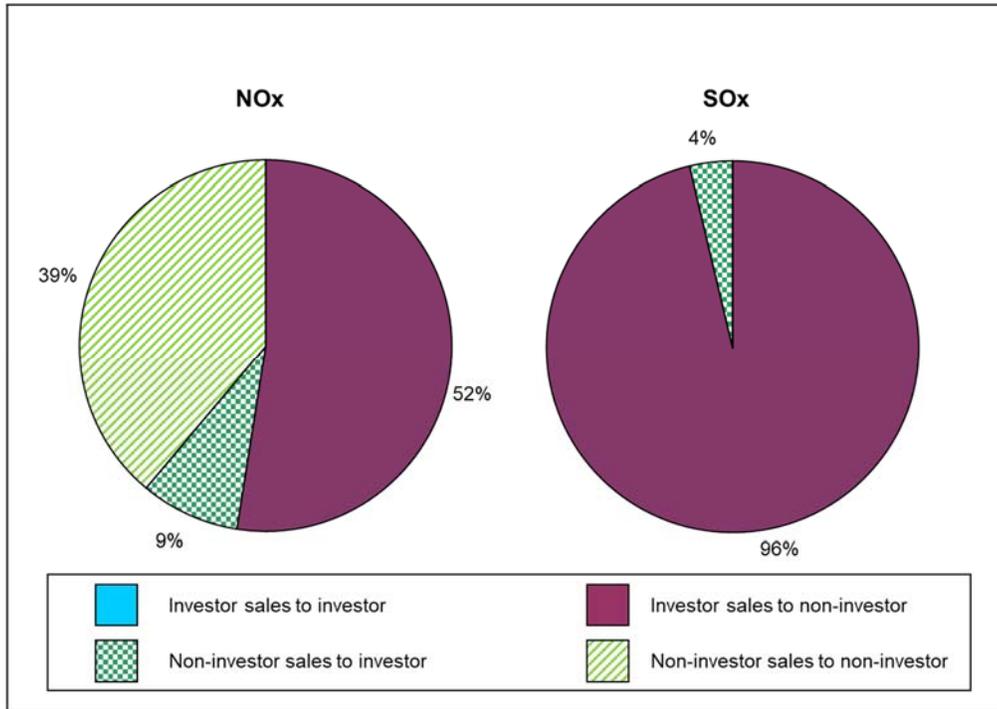
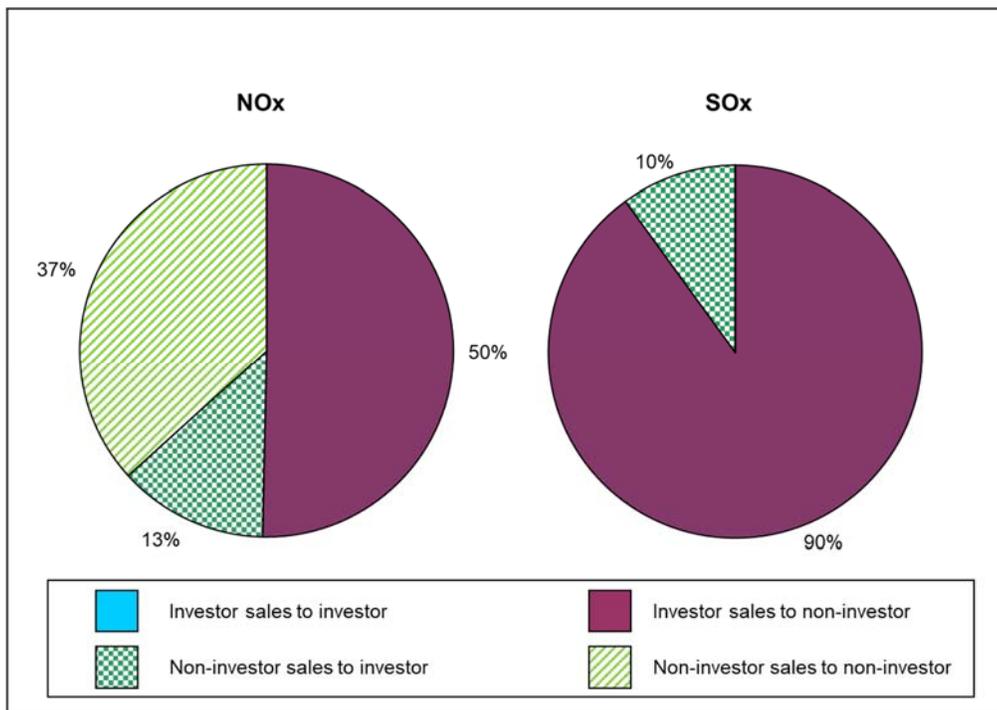


Figure 2-15
Calendar Year 2020 Investor-Involved IYB NOx and SOx Trades Based on Volume Traded with Price



As of the end of calendar year 2020, investors' holding of IYB NOx RTCs had stayed consistent at 1.3% when compared to the end of calendar year 2019. Mutual fund investors are no longer holders of IYB NOx RTCs, down from highs 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 went slightly down to 4.2% when compared to the end of calendar year 2019 at 4.7%. 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. Seven NOx RECLAIM facilities shut down during Compliance Year 2019. One of these facilities bought RTCs year to year. Another facility had no emissions or RTCs for more than 10 years prior to shut down. The other five facilities held a total of 45.5 tons of IYB NOx RTCs prior to their shutdown. Three of the five facilities sold a total of 30.9 tons of IYB NOx RTCs to investors. The two remaining facilities transferred 9.3 tons IYB NOx RTCs to facilities under common ownership, leaving 5.3 tons in their allocation accounts.

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, they do not have the option to switch to another source of credits when RTCs become expensive because there is no alternative source of credits available to RECLAIM facilities. 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 RTCs 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 South Coast AQMD 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 2019, the total RECLAIM NOx emissions were 6,597 tons, while the total NOx RTC allocation was 8,243 tons. This NOx RTC surplus of 1,646 tons (20% of allocation, and 25% of emissions) 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 2021.

As shown in Table 3-1, there was an excess of 1,646 tons of NOx RTCs at the end of Compliance Year 2019. During calendar year 2020, 74 tons of IYB NOx RTCs were purchased by three petroleum refining companies. Based on the industry's historical practice of holding and not selling RTCs, this could result in less RTC availability even though there may be a surplus. If the refineries'

purchases are considered removed from the market, the surplus would effectively be 1,572 tons, representing an even more substantial decrease in unused RTCs.

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. Despite the small percentage of RTCs held by investors (1.3% at the end of calendar year 2020), their impact on RTC availability and prices can be significant because of their participation in most of the trades, which may allow them to be in a strong position to influence prices. As evidenced in the trade of Compliance Year 2021 NOx RTCs, the price of RTCs purchased by facilities at the end of calendar year 2020 to comply with NSR requirements moderated relative to RTC prices paid at the end of calendar year 2019 for Compliance Year 2020 NOx RTCs

CHAPTER 3 EMISSION REDUCTIONS ACHIEVED

Summary

For Compliance Year 2019, aggregate NOx emissions were below total allocations by 20% and aggregate SOx emissions were below total allocations by 23%. No emissions associated with breakdowns were excluded from reconciliation with facility allocations in Compliance Year 2019. 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 2019. With respect to the Rule 2015 backstop provisions, Compliance Year 2019 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 with 4 tons/day of the NOx Allocation reduction occurring through Compliance Year 2019.

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 48.4% (2,081 tons/year, or 5.7 tons/day) overall reduction, with the reductions phased-in from Compliance Year 2013 through Compliance Year 2019. The final 255.5 tons/year (0.7 tons/day) allocation reduction occurred in Compliance Year 2019.

Emissions Audit Process

Since the inception of the RECLAIM program, South Coast AQMD 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.

South Coast AQMD staff adjusts the APEP-reported emissions based on audit results, as necessary. Whenever South Coast AQMD 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 South Coast AQMD'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 pollutant are met each year.

Table 3-1 and Figure 3-1 show aggregate audited NOx emissions and the aggregate annual NOx RTC supply for Compliance Years 1994 through 2019. No facility audits for Compliance Years 1994 through 2017 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. Aggregate NOx allocations for Compliance Year 2019 were reduced by 1,470 tons from Compliance Year 2015 levels due to the 2015 BARCT-related amendment of Rule 2002.

Annual NOx emissions remained within a narrow range (7,246 tons to 7,691 tons annually) between Compliance Years 2011 and 2017. A trend of reduced NOx emissions is seen for the past two compliance years. Compliance Year 2019 NOx emissions were more than 600 tons below this range at 6,597 tons. Compliance Year 2019 NOx emissions were below total allocations by 20%.

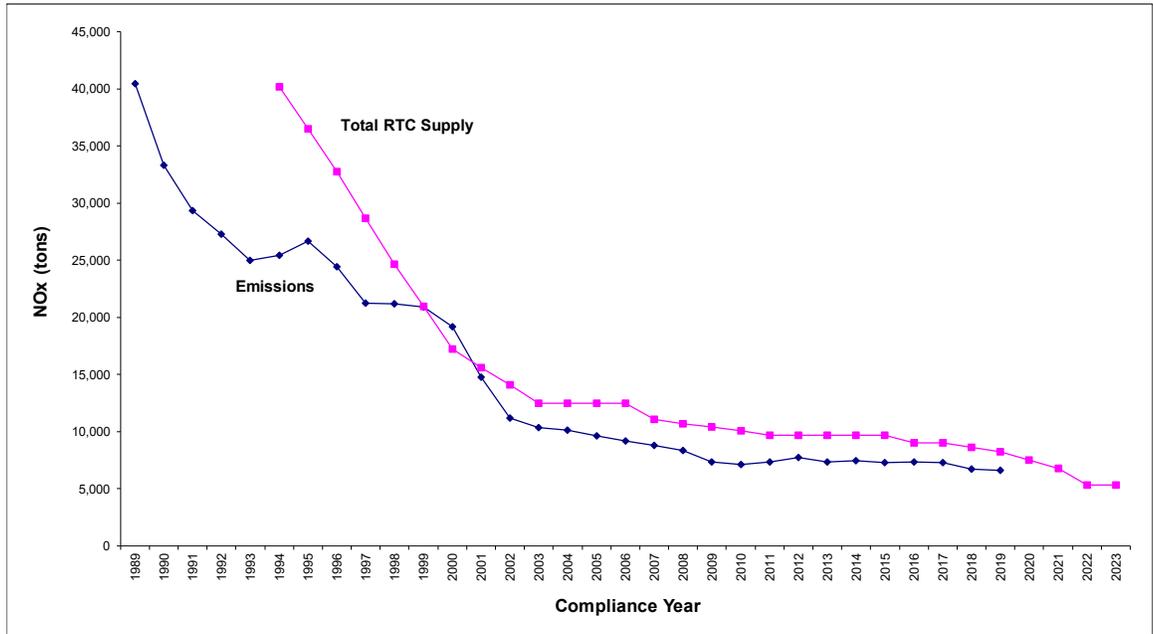
Table 3-1
Annual NOx Emissions for Compliance Years 1994 through 2019

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%
2017	7,246	-71%	8,978	1,732	19%
2018	6,740	-73%	8,612	1,872	22%
2019	6,597	-74%	8,243	1,646	20%

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. Aggregate SOx allocations from Compliance Year 2003 through Compliance Year 2012, prior to the 2010 BARCT-related amendment to Rule 2002, were relatively constant. At that time, the amount of unused RTCs peaked at 40%. Since then, Compliance Year 2019 SOx allocations were reduced by about 2,081 tons. On the other hand, annual SOx emissions steadily declined between Compliance Years 2007 and 2013, and remained within a narrow range between Compliance Year 2013 and 2018 (between 2,024 tons and 2,176 tons). For Compliance Year 2019, SOx emissions decreased by 433 tons compared to those in Compliance Year 2018 (from 2,134 tons to 1,701 tons). SOx emissions in Compliance Year 2019 were below total allocations by 23%, compared to 14% for Compliance Year 2018. 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.

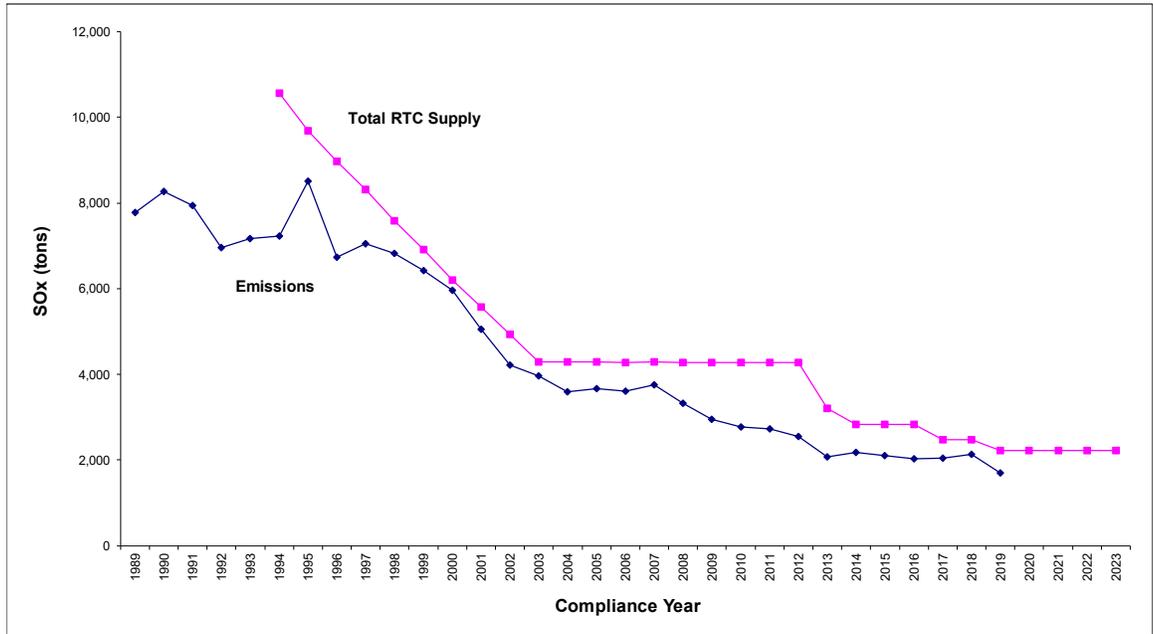
Table 3-2
Annual SOx Emissions for Compliance Years 1994 through 2019

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%
2017	2,043	-72%	2,474	431	17%
2018	2,134	-70%	2,474	340	14%
2019	1,701	-76%	2,221	520	23%

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 rules¹ and sought to achieve reductions equivalent to these subsumed rules that continue to apply to non-RECLAIM facilities. RECLAIM facilities were 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. However, as part of the effort to transition² the RECLAIM program from a market incentive-based program to a command-and-control regulatory structure requiring BARCT level controls as soon as practicable, the Governing Board, on October 5, 2018, amended Rule 2001 specifying that RECLAIM facilities are required to comply with the rules contained in Table 1 of Rule 2001 that are adopted or amended on or after October 5, 2018. As subsumed NOx rules in Table 1 of Rule 2001 are amended after this date the requirements of these, and prospective amended or adopted rules, apply equally to both RECLAIM and non-RECLAIM facilities (see “Landing Rules” paragraph under “Program Amendments”). There were no new subsumed SOx rules in Table 2 of Rule 2001 adopted or amended in Compliance Year 2019³.

¹ See Tables 1 and 2 of Rule 2001.

² Pursuant to both the March 3, 2017 Governing Board adopted resolution during the adoption of the 2016 AQMP, and California State Assembly Bill (AB) 617 approved in July 2017.

³ As discussed in the “Annual RECLAIM Audit Report for 2018 Compliance Year” (March 6, 2020), the applicable requirements of amended rules 1310 and 1325 to SOx sources were administrative, and

As discussed in last year's "Annual RECLAIM Audit Report for 2018 Compliance Year", on July 12, 2019, two rules not subsumed by RECLAIM, Regulation IX – Standards of Performance for New Stationary Sources (NSPS) and Regulation X National Emission Standards for Hazardous Air Pollutants (NESHAPS), were amended by the Governing Board to incorporate new or amended federal standards that had been enacted by USEPA for stationary sources. Historically, the Governing Board adopted NSPS (40 CFR 60) and NESHAP (40 CFR 61) actions 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. Regulations IX and X were previously last amended October 7, 2016, and April 3, 2015, respectively. The amendments to Regulation IX and X incorporate new or revised NSPS and NESHAP actions that had since occurred. In 2016, USEPA promulgated one new NSPS for municipal solid waste landfills that commence construction, reconstruction, or modification after July 17, 2014. In addition, USEPA also amended existing provisions of six NSPS standards, two NSPS appendices, one NESHAP standard, and one NESHAP appendix. The amendments to Regulation IX and X incorporated these USEPA NSPS and NESHAP actions into SCAQMD's regulations.

Additionally, one other rule not subsumed by RECLAIM, Rule 1111 – Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces, was amended by the Governing Board on December 6, 2019, to reduce NOx emissions from residential and commercial gas-fired fan-type space heating furnaces with a rated heat input capacity of less than 175,000 BTU per hour and applies to manufacturers, distributors, sellers, and installers of such furnaces. Rule 1111 was amended in 2009 to lower the NOx emission limit from 40 to 14 ng/Joule (ng/J), and again amended in 2014 to include a mitigation fee option where manufacturers can pay a per-unit fee in lieu of meeting the Ultra Low-NOx emission limit of 14 ng/J. The mitigation fee option for condensing and non-condensing furnaces ended on September 30, 2019. The December 6, 2019 latest amendment to Rule 1111 also included a limited exemption from the Ultra Low NOx emission limit as it applies to furnaces installed at elevations greater than or equal to 4,200 feet above sea level until October 1, 2020. During this interim exemption, furnaces would be required to meet the Low-NOx (40 ng/J) emission limit, while providing manufacturers time to conduct high altitude testing, develop kits, and guidance for the installation of furnaces in higher elevations.

Since Regulation IX, Regulation X, and Rule 1111 were not subsumed under RECLAIM and contained no exemptions from their applicability to RECLAIM NOx or SOx sources, the requirements of these amended rules apply equally to both RECLAIM and non-RECLAIM facilities. As such, 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, during Compliance Year 2019, both rules subsumed by RECLAIM, and rules not subsumed by RECLAIM that were recently amended or

intended to facilitate SIP approval and did not result in any limitations on SOx sources at non-RECLAIM facilities. Hence, amendments to rules 1310 and 1325 applied equally to RECLAIM and non-RECLAIM sources and did not result in disproportionate impacts.

adopted, did not result in any disparate impacts between NO_x and SO_x sources at RECLAIM and NO_x and SO_x sources at non-RECLAIM facilities.

Program Amendments

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 NO_x Reductions from RECLAIM Assessment to achieve an additional five tons per day NO_x 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 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 that are covered by the Greenhouse Gas (GHG) cap-and-trade program no later than December 31, 2023.

Transition Process

To further this effort, staff organized and held monthly working group meetings (with the first meeting held on June 8, 2017) to discuss the transition of facilities in the RECLAIM program to a command-and-control regulatory structure and to discuss key policy issues. The objective is to provide an open forum for all stakeholders to discuss and guide the transition process. The goal is to develop “Landing Rules” establishing the BARCT emission levels for equipment transitioning out of the NO_x RECLAIM program. Rule 2001 – Applicability specifically exempts RECLAIM facilities from a number of existing command-and-control NO_x rules (see Table 1 of Rule 2001). As part of the transition process, these command-and-control rules have to be amended and additional new NO_x BARCT command-and-control rules have to be adopted (collectively referred to as “Landing Rules”) to ensure that when a facility transitions out of RECLAIM, its NO_x equipment has explicit BARCT emission limits and an appropriate time frame to achieve compliance.

To initiate the transition of NO_x sources out of RECLAIM, Rule 2001 – Applicability, and Rule 2002 – Allocations for Oxides of Nitrogen (NO_x) and Oxides of Sulfur (SO_x), were amended by the Governing Board on January 5, 2018. Amended Rule 2001 precluded new or existing facilities from entering the NO_x and SO_x 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 holdings for 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 NO_x-emitting equipment. This initial determination notification serves as a preliminary notice to a facility for which all NO_x sources are covered by Landing Rules, and will be issued when South Coast AQMD staff determines every permitted NO_x source is covered by Landing Rules. When an initial determination notification is issued to a facility, the RECLAIM facility then has 45 days from the date of the notification to identify all NO_x-emitting equipment. Failure to provide this information to South Coast 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 valid for the then current compliance year can be used or sold.

Staff originally identified an initial group of 38 facilities that could potentially exit the NOx RECLAIM program because they had no facility NOx emissions, or had 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 could not reasonably comply with), various locations permits, or unpermitted equipment and/or RECLAIM equipment that met current command-and-control BARCT rules. However, these facilities have not been issued final determinations to exit RECLAIM pending resolution with USEPA of New Source Review provisions for facilities that are expected to be transitioned out of RECLAIM.

Rules 2001 and 2002 were again amended by the Governing Board on October 5, 2018. Amended Rule 2001 added a provision to allow facilities to opt out of RECLAIM if certain criteria were met. Additionally, Tables 1 and 2 had previously contained only rules that were not applicable to RECLAIM facilities pertaining to NOx or SOx emissions, respectively. However, in order to facilitate the transition process, the amendments to Rule 2001 specify that RECLAIM facilities are required to comply with the rules contained in Table 1 that are adopted or amended on or after October 5, 2018. Amended Rule 2002 provided an option for facilities that received an initial determination notification to stay in RECLAIM for a limited time, while complying with applicable command-and-control requirements. Additionally, amended Rule 2002 established a requirement that facilities which are issued a final determination to be transitioned out of the NOx RECLAIM program to provide emission reduction credits to offset any NOx emissions increases, calculated pursuant to Rule 1306 – Emission Calculations, notwithstanding the exemptions contained in Rule 1304 – Exemptions and the requirements contained in Rule 1309.1 – Priority Reserve, until New Source Review provisions governing NOx emission calculations and offsets are amended to address former RECLAIM sources. Finally, Rule 2002 removed the requirement to report IYB NOx RTC prices to the Board when the price falls below the minimum threshold.

Rule 2001 was again amended by the Governing Board on July 12, 2019, to remove the opt-out provision provided for in the October 5, 2018 amendments to the rule. This amendment was in response to USEPA's recommendation that facilities remain in RECLAIM until all rules associated with the transition to a command-and-control regulatory structure have been adopted and approved into the SIP.

Landing Rules

As explained earlier, Landing Rules are needed to establish BARCT emission limits, the timing for the implementation of BARCT, and monitoring, reporting, and recordkeeping (MRR) requirements. These Landing Rules also serve to facilitate the transition process for RECLAIM facilities from the requirements of

RECLAIM to a command-and-control regulatory structure. Determination of BARCT limits are made through an analytical process that is comprised of assessing South Coast AQMD and other agency regulatory requirements and emission limits, researching control options and effectiveness of the controls, and analyzing the cost-effectiveness of the control options. Emission levels are established based on their achievability, source test results, and vendor guarantees.

Throughout the BARCT determination process, rule-specific working group meetings are held to present staff's findings regarding the feasibility and cost-effectiveness of implementing BARCT. Working group meetings are open to the public and provide an opportunity for stakeholders to participate in the rule development process. During the public process, cost assumptions are discussed through the Working Group to solicit comments. Cost-effectiveness and incremental cost-effectiveness, if applicable, are discussed and presented during the rule working group meetings, presented at the Public Workshop, included in the Draft Staff Report, and included in the Board Letter for the adoption hearing. The socioeconomic analysis uses the cost data to estimate regional and industry-specific socioeconomic impacts from the proposed rule and its proposed controls, while the California Environmental Quality Act (CEQA) analysis provides the environmental impacts that result from implementing a rule.

Staff have identified a number of rules that need amendments and new rules that need to be adopted to support the transitioning of NO_x sources out of RECLAIM. The following eleven Landing Rules were amended or adopted by the Governing Board to facilitate the transition:

- Rule 1100 – Implementation Schedule for NO_x Facilities,
- Rule 1110.2 – Emissions from Gaseous - and Liquid-Fueled Engines,
- Rule 1117 – Emissions from Container Glass Melting and Sodium Silicate Furnaces
- Rule 1118.1 -- Control of Emissions from Non-Refinery Flares,
- Rule 1134 – Emissions of Oxides of Nitrogen from Stationary Gas Turbines,
- Rule 1135 – Emissions of Oxides of Nitrogen from Electricity Generating Facilities,
- Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional and Commercial Boilers, Steam Generators, and Process Heaters,
- Rule 1146.1 – Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters,
- Rule 1146.2 – Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters,
- Rule 2001 – Applicability, and
- Rule 2002 – Allocations for Oxides of Nitrogen (NO_x) and Oxides of Sulfur (SO_x).

A summary of the Landing Rules are provided in Table 3-3. The status of the remaining Landing Rules to be amended or adopted are listed in Table 3-3 as either "In Progress" or "To Be Determined". Further information regarding the specifics of each rule can be found at <http://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules>. Details on past amended or

adopted rules can be found by entering the amendment or adoption date of a given rule at <http://www.aqmd.gov/home/news-events/meeting-agendas-minutes> and down-loading the relevant rule board agenda item.

**Table 3-3
Summary of Landing Rules**

Rule(s)	Focus Area	Description
218, 218.2 and 218.3	Continuous Emission Monitoring / Continuous Emission Monitoring Performance Specifications <i>Applicability:</i> equipment that require CEMS at non-RECLAIM facilities.	Revises provisions for continuous emission monitoring systems for facilities exiting RECLAIM. <i>(In Progress – 1st Qtr. 2021)</i>
1100	Implementation Schedule for NOx Facilities <i>Applicability:</i> equipment specified in Rules 1146, 1146.1, and 1110.2.	Establishes implementation schedule for RECLAIM and prior RECLAIM sources to meet applicable provisions of Landing Rules: <ul style="list-style-type: none"> • Implementation schedule for equipment meeting applicability under Rules 1146 and 1146.1 <i>(Adopted December 7, 2018)</i> • Implementation schedule for equipment meeting applicability under Rule 1110.2 <i>(Amended November 1, 2019)</i> • Revises definition of “industry-specific category” to reflect the intent to exempt equipment at refineries from the NOx emission limits or permit submission deadlines specified in Rules 1100, 1110.2, 1146, and 1146, that will be regulated in an industry-specific rule for refineries and related industries under Proposed Rule 1109.1 <i>(Amended January 10, 2020)</i> This rule will be amended as necessary as a companion rule to a Landing Rule as it is amended or adopted.
1109 <i>(to be rescinded)</i> and 1109.1	Refinery and Related Industries Equipment <i>Applicability:</i> equipment emitting NOx at refineries and related industries.	Establishes NOx emission limits to reflect BARCT for equipment located at a refinery. <i>(In Progress – 2nd Qtr. 2021)</i>

Rule(s)	Focus Area	Description
1110.2	<p>Emissions from Gaseous - and Liquid-Fueled Engines</p> <p><i>Applicability:</i> all stationary and portable engines over 50 rated brake horsepower.</p>	<ol style="list-style-type: none"> 1. Maintains existing BARCT levels for NO_x, VOC, and CO emission limits, and allows: <ul style="list-style-type: none"> • Interim alternate emission limits for compressor gas lean-burn engines, • Concentration based limits for linear generator technology, and • Interim VOC based emission limits for certain electricity generating engines. 2. Specifies emission averaging time. 3. Includes additional monitoring requirements for engines at former RECLAIM facilities. 4. Revises exemptions for: <ul style="list-style-type: none"> • Diesel engines operated at remote radio transmission sites, • Tuning of an engine and/or associated emission control equipment, • Replacement of catalytic equipment as a major repair, and • Diesel engines powering cranes located on offshore platforms, provided specific criteria are met. <p style="text-align: right;"><i>(Amended November 1, 2019)</i></p> <p><i>[Estimated emission reductions, 0.29 tons of NO_x per day.]</i></p>
1117	<p>Emissions from Container Glass Melting and Sodium Silicate Furnaces</p> <p><i>Applicability:</i> container glass melting and sodium silicate furnaces.</p>	<ol style="list-style-type: none"> 1. Updates NO_x and SO_x emission limits to reflect current BARCT for container glass melting and sodium silicate furnaces: <ul style="list-style-type: none"> • 0.75 lb. of NO_x per ton of glass pulled on a rolling 30-day average for container glass melting furnaces, • 0.50 lb. of NO_x per ton of product pulled on a rolling 30-day average for sodium silicate furnaces, as well as • 1.1 lbs. of SO_x per ton of material pulled on a rolling 30-day average for both container glass melting and sodium silicate furnaces 2. Revises monitoring, reporting, and recordkeeping requirements. 3. Includes provisions to reduce emissions for idling, startup, and shutdown of furnaces. 4. Includes NO_x emission limits for auxiliary combustion equipment associated with container glass melting operations: <ul style="list-style-type: none"> • 30 ppmvd NO_x at 3% O₂ or 0.036 lb. per MMBTU of heat input. <p style="text-align: right;"><i>(Amended June 5, 2020)</i></p> <p><i>[Estimated emission reductions, 0.57 tons of NO_x per day, and 0 tons of SO_x per day (since the rule does not impose a more stringent SO_x limit than is already required to be achieved.)]</i></p>

Rule(s)	Focus Area	Description
1118.1	<p>Control of Emissions from Non-Refinery Flares</p> <p><i>Applicability:</i> flares located at landfills, wastewater treatment plants, oil and gas production facilities, organic liquid loading stations, tank farms, and other locations that are not a refinery.</p>	<ol style="list-style-type: none"> 1. Establishes NOx, VOC, and CO emission limits to reflect current BARCT for new, replaced, or relocated flares. 2. Establishes industry-specific capacity thresholds for existing flares. Flares that exceed the applicable capacity threshold in two consecutive calendar years shall either be modified to comply with the established limit or implement plan to reduce the amount of gas flaring. 3. Establishes requirements for source testing, monitoring, reporting, and recordkeeping. 4. Provides exemptions for low-use and low-emitting flares. <p style="text-align: right;"><i>(Adopted January 4, 2019)</i></p> <p><i>[Estimated emission reductions: 0.18 tons of NOx per day, and 0.014 tons of VOC per day.]</i></p>
1134	<p>Emissions of Oxides of Nitrogen from Stationary Gas Turbines</p> <p><i>Applicability:</i> stationary gas turbines, 0.3 MW and larger, except turbines located at electricity generating facilities, refineries or public owned treatment works, or fueled by landfill gas.</p>	<ol style="list-style-type: none"> 1. Updates NOx and ammonia emission limits to reflect current BARCT, effective beginning January 1, 2024. 2. Provides implementation timeframes to facilitate transition. <ul style="list-style-type: none"> • Alternative compliance date for compressor gas turbines, provided the facility demonstrates 25% or more NOx emission reductions beginning December 31, 2023. • Extension of up to 36 months to comply with ammonia emission limits, provided an ammonia continuous emissions monitoring system is installed and the turbine operates less than one thousand hours per year. 3. Revises monitoring, reporting, and recordkeeping requirements 4. Provides exemptions for units that are shown to be not cost effective for retrofit or replacement: <ul style="list-style-type: none"> • Low-use turbines, and • Turbines achieving emissions close to the established limit. <p style="text-align: right;"><i>(Amended April 5, 2019)</i></p> <p><i>[Estimated emission reductions: 2.8 tons of NOx per day.]</i></p>

Rule(s)	Focus Area	Description
1135	<p>Emissions of Oxides of Nitrogen from Electricity Generating Facilities</p> <p><i>Applicability:</i> electric generating units at electricity generating facilities.</p>	<ol style="list-style-type: none"> 1. Updates emission limits to reflect current BARCT: <ul style="list-style-type: none"> • NOx and ammonia emission limits for boilers and gas turbines, and • NOx, ammonia, carbon monoxide, volatile organic compounds, and particulate matter for internal combustion engines. 2. Revises monitoring, reporting, and recordkeeping requirements. 3. Provides exemptions for units that are shown to be not cost effective for retrofit: <ul style="list-style-type: none"> • Low-use units, • Units achieving emissions close to the established limits, and • Units required to be shut down in the near term. <p style="text-align: right;"><i>(Amended November 2, 2018)</i></p> <p><i>[Estimated emission reductions: 1.7 tons of NOx per day.]</i></p>

Rule(s)	Focus Area	Description
<p>1146, 1146.1, and 1146.2</p>	<p>Emissions of Oxides of Nitrogen from:</p> <p>Rule 1146 - Industrial, Institutional and Commercial Boilers, Steam Generators, and Process Heaters</p> <p><i>Applicability:</i> boilers, process heaters, and steam generators that are greater than or equal to 5 MMBtu/hr.</p> <p>Rule 1146.1 - Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters</p> <p><i>Applicability:</i> boilers, process heaters, and steam generators that are greater than 2 MMBtu/hr or and less than 5 MMBtu/hr.</p> <p>Rule 1146.2 - Large Water Heaters and Small Boilers and Process Heaters</p> <p><i>Applicability:</i> boilers, process heaters, and steam generators that are greater than 400,000 and less than or equal to 2 MMBtu/hr.</p>	<p>1. For Rule 1146 and 1146.1 facilities:</p> <ul style="list-style-type: none"> • Updates emission limits to reflect current BARCT. <ul style="list-style-type: none"> ➤ NOx and ammonia emission limits for boilers, steam generators, and heaters • Specifies compliance schedule in Rule 1100. <p>2. For Rule 1146.2 units:</p> <ul style="list-style-type: none"> • Comply with the 30 ppm limit by December 31, 2023, if a technology assessment (to be completed by January 1, 2022) determines that the NOx emission limits specified in Rule 1146.2 still represent BARCT. <p style="text-align: right;"><i>(Amended December 7, 2018)</i></p> <p><i>[Estimated emission reductions: 0.31 tons of NOx per day.]</i></p> <p>1. For Rule 1146 facilities:</p> <ul style="list-style-type: none"> • Removes ammonia slip limit which is currently addressed under Regulation XIII. <p style="text-align: right;"><i>(Amended December 4, 2020)</i></p> <p><i>[Estimated emission reductions: 0 tons of NOx per day.]</i></p>
<p>1147</p>	<p>NOx Reductions from Miscellaneous Sources</p> <p><i>Applicability:</i> miscellaneous equipment that require a District permit but not regulated by other Regulation XI rules.</p>	<p>1. Removes equipment that will be regulated under Proposed Rules 1147.1 and 1147.2.</p> <p>2. Evaluates existing NOx emission limits.</p> <p style="text-align: right;"><i>(In Progress – 2nd Qtr. 2021)</i></p>

ANNUAL RECLAIM AUDIT

Rule(s)	Focus Area	Description
1147.1 <i>(to be incorporated into 1147)</i>	NOx Reductions for Equipment at Aggregate Facilities <i>Applicability:</i> equipment at aggregate facilities.	Establishes NOx emission limits to reflect current BARCT. <i>(In Progress – 2nd Qtr. 2021)</i>
1147.2 <i>(to be renamed as 1147.1)</i>	NOx Reductions from Metal Melting and Heating Furnaces <i>Applicability:</i> metal melting and heating- furnaces.	Establishes NOx emission limits to reflect current BARCT. <i>(In Progress – 3rd Qtr. 2021)</i>
1153.1	Emissions of Oxides of Nitrogen from Commercial Food Ovens <i>Applicability:</i> commercial food ovens.	Updates NOx emission limits to reflect current BARCT. <i>(To Be Determined)</i>
1159.1	Control of NOx Emissions from Nitric Acid Processing Tanks <i>Applicability:</i> nitric acid processing tanks	Updates NOx emission limits to reflect current BARCT. <i>(In Progress – 4th Qtr. 2021)</i>
2001	Applicability <i>Applicability:</i> facilities operating under the RECLAIM program	<ol style="list-style-type: none"> 1. Prevents new NOx RECLAIM facility inclusions as of January 5, 2018. <i>(Amended January 5, 2018)</i> 2. Allows facilities to opt-out of RECLAIM, if certain conditions are met. <i>(Amended October 5, 2018)</i> 3. Removes the opt-out provision for RECLAIM facilities until all rules associated with the transition to a command-and-control regulatory structure have been adopted and approved into the SIP. <i>(Amended July 12, 2019)</i>

Rule(s)	Focus Area	Description
2002	<p>Allocations for Oxides of Nitrogen (NOx) and Oxides of Sulfur (SOx)</p> <p><i>Applicability:</i> facilities operating under the RECLAIM program.</p>	<ol style="list-style-type: none"> 1. Establishes NOx RECLAIM facility exit notification requirements. 2. Requires exited facilities to provide emission reduction credits to offset any NOx emissions increases, until New Source Review provisions governing NOx emission calculations and offsets are amended. 3. Prohibits exited facilities from selling or transferring future compliance year RECLAIM Trading Credits. <p style="text-align: right;"><i>(Amended January 5, 2018)</i></p> <ol style="list-style-type: none"> 1. Provides option for facilities that received an initial determination notification to stay in RECLAIM for a limited time. 2. Establishes requirement for facilities issued a final determination to be transitioned out of the NOx RECLAIM program to provide emission reduction credits to offset any NOx emissions increases, calculated pursuant to Rule 1306, notwithstanding the exemptions contained in Rule 1304 and requirements in Rule 1309.1 until New Source Review provisions governing NOx emission calculations and offsets are amended to address former RECLAIM sources. <p style="text-align: right;"><i>(Amended October 5, 2018)</i></p>
2005	<p>New Source Review for RECLAIM</p> <p><i>Applicability:</i> facilities operating under the RECLAIM program</p>	<ol style="list-style-type: none"> 1. Allows for New Source Review provisions to address facilities that are transitioning from RECLAIM to command-and-control. 2. Amendments to Regulation XIII may be needed to address New Source Review provisions for facilities that transition out of RECLAIM. <p style="text-align: right;"><i>(To Be Determined)</i></p>

Monthly working group meetings continue to be held, as necessary, 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. Since the RECLAIM universe includes many different industries, separate working groups have been formed to address and develop these different BARCT Landing Rules. Completion of the development efforts for the remaining Landing Rules is now targeted for the fourth quarter in 2021. The current plan is to transition NOx RECLAIM sources after the New Source Review provisions are addressed by a rule amendment and all NOx Landing Rules have been adopted and approved by EPA into the SIP.

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 in writing by South Coast AQMD. 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 South Coast AQMD 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 3-4, a review of APEP reports for Compliance Year 2019 found that no facilities requested to exclude breakdown emissions from being counted against their allocations. Thus, for Compliance Year 2019, no additional RTCs are required to offset breakdown emissions pursuant to Rule 2015(d)(3).

**Table 3-4
Breakdown Emission Comparison for Compliance Year 2019**

Pollutant	Compliance Year 2019 Unused RTCs (tons)	Unmitigated Breakdown Emissions¹ (tons)	Remaining Compliance Year 2019 RTCs (tons)
NOx	1,646	0	1,646
SOx	520	0	520

¹ Data for unmitigated breakdown emissions (not counted against Allocation) as reported under APEP reports.

Impact of Changing Universe

In general, 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. Facilities exiting the RECLAIM program result in their emissions not being accounted and therefore diminish the

demand of RTCs while the facility operator may retain their RTCs⁴. On the other hand, facilities entering the program add to the accounting of emissions and increase the demand of RTCs while they may or may not be issued Allocations to account for their historical activities⁵. However, the Governing Board amended Rule 2001 on January 5, 2018 to preclude any facility from entering the RECLAIM program and amended Rule 2001 on July 12, 2019 to remove the opt-out provision so that facilities cannot exit RECLAIM.

As discussed in Chapter 1, during Compliance Year 2019, no facilities were included or excluded from the NOx or SOx universes, and seven facilities (seven NOx-only facilities and no NOx and SOx facilities) shut down. Compliance Year 2019 NOx and SOx audited emissions and initial Compliance Year 2019 allocations for facilities that were shut down during Compliance Year 2019 are summarized in Tables 3-5 and 3-6.

**Table 3-5
NOx Emissions Impact from the Changes in Universe (Tons)**

Category	Compliance Year 2019 NOx Emissions (tons)	Initial Compliance Year 2019 NOx Allocations (tons)
Shutdown Facilities	5.62	16.3
Excluded Facilities	Not applicable	Not applicable
RECLAIM Universe	6,597	8,243

**Table 3-6
SOx Emissions Impact from the Changes in Universe (Tons)**

Category	Compliance Year 2019 SOx Emissions (tons)	Initial Compliance Year 2019 SOx Allocations (tons)
Shutdown Facilities	Not applicable	Not applicable
Excluded Facilities	Not applicable	Not applicable
RECLAIM Universe	1,701	2,221

Backstop Provisions

Rule 2015 requires that South Coast AQMD 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 2019 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 2019.

⁴ Rule 2002(i) as amended in October 2016, requires the reduction of the RTC holdings of a shutdown facility that is listed in Tables 7 or 8 of Rule 2002 by an amount equivalent to the emissions above the most stringent BARCT level (see discussion in Chapter 2).

⁵ When an existing facility enters the program, it is issued RTC allocations based on its operational history pursuant to the methodology prescribed in Rule 2002.

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 2019, a total of three NO_x RECLAIM facilities had NSR NO_x emission increases, and no SO_x RECLAIM facilities had an NSR SO_x emission increase due to expansion or modification. Consistent with all prior compliance years, there were sufficient NO_x and SO_x 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 NO_x emission increases and a 1-to-1 offset ratio for SO_x emission increases on a programmatic basis. In Compliance Year 2019, RECLAIM demonstrated federal equivalency with a programmatic NO_x offset ratio of 1,504-to-1 based on the compliance year's total unused allocations and total NSR emission increases for NO_x. There were no SO_x NSR emission increases that resulted from starting operations of new or modified permitted sources during the compliance year. RECLAIM inherently complies with the federally-required 1-to-1 SO_x offset ratio for any compliance year, provided aggregate SO_x emissions under RECLAIM are lower than or equal to aggregate SO_x allocations for that compliance year. As shown in Chapter 3 (Table 3-2 and Figure 3-2), there was a surplus of SO_x RTCs during Compliance Year 2019. Therefore, RECLAIM more than complied with the federally-required SO_x offset ratio and further quantification of the SO_x offset ratio is unnecessary. Also, the NNI is satisfied by the program's 1-to-1 offset ratio. 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) for major sources. The same BACT guidelines are used to determine BACT applicable 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 operations¹.

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. South Coast AQMD 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 SO₂ 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 SO₂ standards, SOx is a precursor to PM_{2.5}. The Basin is in Serious Non-attainment with 2006 Federal 24-hours standard and 2012 Federal annual standard for PM_{2.5}. The applicable offset ratio for PM_{2.5} 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 nonattainment 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. South Coast AQMD uses the same BACT guidelines in applying BACT to both 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 70 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 facilities² 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 as explained earlier. This annual program audit report assesses NSR permitting activities for Compliance Year 2019 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 2019 shows that RECLAIM facilities were able to expand and modify their operations while complying with NSR requirements. During Compliance Year 2019, a total of three NOx RECLAIM facilities (two in Cycle 1 and one in Cycle 2) were issued permits to operate, which resulted in a total of 1.095 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: 1,646 tons, SOx: 520 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 programmaticly 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

² New facilities are facilities that received all South Coast AQMD Permits to Construct on or after October 15, 1993.

a surrogate for RACT as the basis for calculating programmatic NOx and SOx 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 potential 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 three RECLAIM facilities resulted in 1.095 tons of NOx emission increase pursuant to Rule 2005(d). Additionally, as identified in Table 3-1 (Annual NOx Emissions for Compliance Years 1994 through 2019), 1,646 tons of Compliance Year 2019 NOx RTCs remained unused. Therefore, the Compliance Year 2019 NOx programmatic offset ratio calculated from this methodology is 1,504-to-1 as shown below:

$$\begin{aligned} \text{NOx Offset Ratio} &= \left(1 + \frac{1,646 \text{ tons}}{1.095 \text{ tons}} \right)\text{-to-1} \\ &= 1,504\text{-to-1} \end{aligned}$$

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. Since RECLAIM does not dedicate all unused RTCs to NSR uses in any given year, it does not actually provide a 1,504-to-1 offset ratio; but this analysis does demonstrate that RECLAIM provides more than enough unused RTCs to account for the 1.2-to-1 required offset ratio. 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 520 tons of excess (unused) SOx RTCs for Compliance Year 2019. Since there were no SOx emission increases that resulted from starting operations of new or modified permitted sources 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 2019 shows that RECLAIM is in compliance with both state NNI and federal NSR requirements. South Coast AQMD 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 2019, two RECLAIM facilities were subject to the 40-ton modeling requirement; two facilities for NOx emissions, and no facilities for SOx emissions.

This modeling is performed with an USEPA approved air dispersion model to assess the impact of a facility's 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 South Coast AQMD'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 facility's 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).

One NOx facility had initial NOx allocations in 1994 and exceeded their initial allocations by more than 40 tons in Compliance Year 2019. The other NOx

facility had no initial allocation in 1994 and had NO_x emissions greater than 40 tons in Compliance Year 2019. Both facilities submitted modeling that demonstrated that NO_x emissions from their major sources during 2019 will not cause an exceedance of any state or federal NO₂ AAQS.

CHAPTER 5 COMPLIANCE

Summary

Based on South Coast AQMD Compliance Year 2019 audit results, 247 of the 259 (95%) NO_x RECLAIM facilities complied with their NO_x allocations, and 31 of the 32 SO_x facilities (97%) complied with their SO_x allocations based on South Coast AQMD audit results. So, thirteen facilities exceeded their allocations (12 facilities exceeded their NO_x allocations, and one facility exceeded its SO_x allocation). The 12 facilities that exceeded their NO_x allocations had aggregate NO_x emissions of 339.9 tons and did not have adequate allocations to offset 213.6 tons (or 62.8%) of their combined emissions. The facility that exceeded its SO_x allocations had total SO_x emissions of 1.22 tons and did not have adequate allocations to offset 0.27 tons (or 22.1%). The NO_x and SO_x exceedance amounts are relatively small compared to the overall NO_x and SO_x allocations for Compliance Year 2019 (2.60% of total NO_x allocations and 0.01% of total SO_x allocations). The exceedances from these facilities did not impact the overall RECLAIM emission reduction goals. The overall RECLAIM NO_x and SO_x emission reduction targets and goals were met for Compliance Year 2019 (i.e., aggregate emissions for all RECLAIM facilities were well below aggregate allocations). 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 South Coast AQMD's determination that the facilities exceeded their Compliance Year 2019 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 are 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 subsequently included in the RECLAIM program, each RECLAIM facility is issued an annual allocation for each compliance year pursuant to the methodology prescribed in Rule 2002. A facility in existence prior to October 1993 is issued allocations by South Coast AQMD 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 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 Annual Permit Emissions Program (APEP) report, respectively.

Compliance Audit

Since the beginning of the program, South Coast AQMD staff has conducted annual audits of each RECLAIM facility’s emission reports to ensure their integrity and reliability. All facilities that submitted emission reports during a compliance year are subject to compliance audits, even for those that are shutdown or have a change of operator. This results in additional facility audits over the number of active facilities in the universe at the end of a compliance year. For Compliance Year 2019, a total of 259 facility audits were completed. The audit process also 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 South Coast AQMD or submitted in QCERs and APEP reports. For Compliance

Year 2019, these inspections revealed that some facilities did not obtain or record valid monitoring data, 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 failed to properly apply MDP. Appropriate compliance actions are 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 its SOx allocations). Seven of these 12 facilities (six NOx-only facilities and one NOx-and-SOx facility) failed to acquire adequate RTCs to offset their reported emissions. The remaining six NOx-only facilities exceeded allocations based on their audited emissions. The list of facilities that failed to reconcile their emissions during Compliance Year 2019 is provided in Appendix D.

Based on audit findings, eight NOx-only facilities and zero NOx-and-SOx facilities were found to have under-reported their emissions and didn't hold sufficient RTCs to reconcile their audited emissions. Among the eight facilities found to have under-reported their emissions, the reasons for the under-reporting include one or more of the following causes:

- mathematical error,
- misread fuel meter,
- failed to report emissions for all NOx sources, and
- failure to properly apply missing data procedures.

Overall, the Compliance Year 2019 allocation compliance rates for facilities are 95% (247 out of 259 facilities) for NOx RECLAIM and 97% (31 out of 32 facilities) for SOx RECLAIM¹. For purposes of comparison, the allocation compliance rates for Compliance Year 2018 were 94% and 97% for NOx and SOx RECLAIM facilities, respectively. In Compliance Year 2019, the 12 facilities that had NOx emissions in excess of their individual NOx allocations had 339.9 tons of NOx emissions and didn't have adequate RTCs to cover 213.6 of those tons (or 62.8% of their total emissions). The SOx facility that exceeded its SOx allocation had total SOx emissions of 1.22 tons and didn't have adequate allocations to offset 0.27 tons (or 22.1% of their total emissions). The NOx and SOx exceedance amounts are relatively small compared to the overall allocations for Compliance Year 2019 (2.60% of aggregate NOx allocations and 0.01% of aggregate SOx allocations). Pursuant to Rule 2010(b)(1)(A), all 12 facilities had their respective NOx or SOx Allocation exceedances deducted from their annual

¹ Compliance rates for both NOx and SOx are based on 259 NOx and 32 SOx completed audits, respectively.

emissions allocations for the compliance year subsequent to South Coast AQMD's determination that the facilities exceeded their Compliance Year 2019 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"² 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 emissions³.

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, 93 NO_x facilities and 16 SO_x facilities used MDP in reporting portions of their annual emissions during Compliance Year 2019. In terms of mass emissions, 5.4% of the total reported NO_x emissions and 9.5% of the total reported SO_x emissions in the APEP reports were calculated using MDP for Compliance Year 2019. 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).

² Based on uncontrolled emission factor at maximum rated capacity of the source and 24 hours per day operation.

³ 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)
2017	3.8% (92 ; 273)	6.3% (15 ; 126)
2018	3.7% (90 ; 252)	7.0% (16 ; 150)
2019	5.4% (93 ; 343)	9.5% (16 ; 161)

* Numbers in parentheses that are separated by a semicolon 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, 93 facilities reported NOx emissions using MDP in Compliance Year 2019. Even though the number of facilities is higher than in 1995, the percentage of emissions reported using MDP during Compliance Year 2019 is much lower than it was in 1995 (5% compared to 23%). Additionally, in terms of quantity, NOx emissions determined by the use of MDP in Compliance Year 2019 were about 6% of those in Compliance Year 1995 (343 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 5% of reported NO_x annual emissions were calculated using MDP in Compliance Year 2019. 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 5% 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 2019, a significant portion of NO_x MDP emissions data (75%) and of SO_x MDP emissions data (44%) 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 NO_x sources into major sources, large sources, process units, and equipment exempt from obtaining a written permit pursuant to Rule 219. All SO_x 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 South Coast AQMD to be equivalent to CEMS in relative accuracy, reliability, reproducibility, and timeliness.

For Compliance Year 2019, even though the number of major sources monitored by either CEMS or ACEMS represent 19% and 63% of all permitted RECLAIM NOx and SOx sources, respectively, reported emissions revealed that 77% of all RECLAIM NOx emissions and 96% 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 South Coast

AQMD’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 against 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 $\pm 20\%$ for pollutant concentration, $\pm 15\%$ for stack flow rate, and $\pm 20\%$ for pollutant mass emission rate. In addition, the RATAs reveal 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: 1) the CEMS bias (how much it differs from the reference method on the average), and 2) the CEMS confidence coefficient (how variable that bias or average difference is).

Tables 5-3 and 5-4 summarize the 2019 and 2020 calendar years’ passing rates, respectively, for submitted RATAs of certified CEMS for NO_x and SO_x concentration, total sulfur in fuel gas concentrations, stack flow rate (in-stack monitors and F-factor based calculations), and NO_x and SO_x mass emissions. However, the tables do not include SO_x 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 2019 and 2020 passing rates are calculated from RATA data submitted before January 10, 2020 and January 10, 2021, 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 2019¹**

Concentration						Stack Flow Rate				Mass Emissions			
NO _x		SO ₂		Total ² Sulfur		In-Stack Monitor		F-Factor Based Calc.		NO _x		SO _x ³	
No.	% Pass	No.	% Pass	No.	% Pass	No.	% Pass	No.	% Pass	No.	% Pass	No.	% Pass
338	100	91	100	21	100	54	100	306	100	320	100	90	100

¹ The calculation of passing rates includes all RATAs submitted by January 10, 2020.

² Includes Cylinder Gas Audit (CGA) tests.

³ Does not include SO_x emissions calculated from total sulfur analyzers.

**Table 5-4
Passing Rates Based on RATAs of Certified CEMS in 2020¹**

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
399	100	104	100	20	100	73	100	383	99.7	374	100	90	100

¹ The calculation of passing includes all RATAs submitted by January 10, 2021.

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/SO₂ 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 South Coast AQMD. An electronic reporting system, known as Electronic Data Reporting (EDR), allows 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 South Coast AQMD and also expedites reviews. In calendar year 2020, 98% of RATA results 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 South Coast AQMD, and to help automate compliance tracking. Under RECLAIM, facilities report their emissions electronically on a per device basis to South Coast AQMD's Central Station computer as follows:

- Major sources must use a Remote Terminal Unit (RTU) to telecommunicate emission data to South Coast AQMD'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 South Coast AQMD'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 South Coast AQMD'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 South Coast AQMD.

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 South Coast AQMD 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. South Coast AQMD staff is not able to independently verify the accuracy of the facility reported job impact information.

According to the Compliance Year 2019 employment survey data gathered from APEP reports, RECLAIM facilities reported a net loss of 4,167 jobs, representing 4.0% of their total employment. A comparison of reported job impacts between Cycle 1 and Cycle 2 facilities suggests that the coronavirus (COVID-19) global pandemic affected Cycle 2 facility job losses. One RECLAIM facility cited RECLAIM as a factor contributing to the addition of one job during Compliance Year 2019. No facility reported job losses due to RECLAIM, during Compliance Year 2019.

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 2019 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 2019 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 2019.

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 South Coast AQMD for Compliance Year 2019 and clarifying information collected by South Coast AQMD staff. South Coast AQMD 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 2019 APEP reports and follow-up contacts with facilities. A total of 122 facilities reported 7,430 job gains, while 130 facilities reported a total of 11,597 job losses. Net job losses were reported in all of the three categories: sales of products (137), non-manufacturing (2,481), and manufacturing (1,549). Table 6-1 shows a total net loss of 4,167 jobs, which represents a net decrease of 4.0% at RECLAIM facilities during Compliance Year 2019. A comparison of reported job impacts between Cycle 1 and Cycle 2 facilities during Compliance Year 2019 shows that Cycle 1 facilities (January 1, 2019 – December 31, 2019) reported an overall job gain of 0.35% while Cycle 2 facilities (July 1, 2019 – June 30, 2020) reported an overall job loss of 7%, coinciding with the outbreak of the novel coronavirus (COVID-19) global pandemic and supporting the widely reported effects on employment as the reason for Cycle 2 job losses. This trend in employment numbers is also suggested in the 2020 employment data for the State of California.¹

Table 6-1
Job Impacts at RECLAIM Facilities for Compliance Year 2019

Description	Manufacture	Sales of Products	Non-Manufacture	Total*
Initial Jobs	50,354	655	53,098	104,107
Overall Job Gain	2,508	75	4,847	7,430
Overall Job Loss	4,057	212	7,328	11,597
Final Jobs	48,805	518	50,617	99,940
Net Job Change	-1,549	-137	-2,481	-4,167
Percent (%) Job Change	-3.08%	-20.92%	-4.67%	-4.00%
Facilities Reporting Job Gains	83	21	75	122
Facilities Reporting Job Losses	93	28	78	130

* 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 for two of the seven RECLAIM facilities that ceased operations in Compliance Year 2019, as listed in Appendix C, are included in Table 6-1. The other five facilities did not specify a change in the number of jobs for Compliance Year 2019. Of the seven facilities that ceased operations, three facilities cited that they were no longer financially able to competitively operate, one relocated outside of the South Coast AQMD, two facilities were sold and all equipment was removed, and one facility underwent a corporate merger and consolidation. According to their APEP reports, the shutdown of these seven facilities led to a total loss of 141 jobs (117 manufacturing jobs, 0 sales jobs, and 24 non-manufacturing jobs).

¹ The 2020 California employment data was obtained from the State of California Employment Development Department website at: <https://www.labormarketinfo.edd.ca.gov/geography/lmi-by-geography.html>.

One RECLAIM facility attributed job gains to RECLAIM for Compliance Year 2019. The facility stated that the reason for increased jobs at their facility was because they had to hire an employee to help them with RECLAIM reporting (refer to Appendix E).

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 2019 NO_x and SO_x emissions decreased 2.1% and 20.3%, respectively, relative to Compliance Year 2018. Quarterly calendar year 2019 NO_x emissions fluctuated within five percent of the mean NO_x emissions for the year. Quarterly calendar year 2019 SO_x emissions fluctuated within fifteen percent of the year's mean SO_x 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 2020, 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 NO_x or SO_x emission increases are required to be equipped with BACT, which minimizes to the extent feasible the increase of NO_x and SO_x emissions. RECLAIM and non-RECLAIM facilities that emit toxic air contaminants are required to report those emissions to South Coast AQMD. Those emissions reports are used to identify candidates for the Air 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, than would occur under command-and-control, because RECLAIM facilities must comply with the same toxics rules as non-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, South Coast AQMD staff evaluates per capita exposure to air pollution, toxic risk reductions, emission trends, and seasonal fluctuations in emissions. South Coast AQMD staff also generates quarterly emissions maps depicting the geographic distribution of RECLAIM emissions. These maps are generated and posted quarterly on South

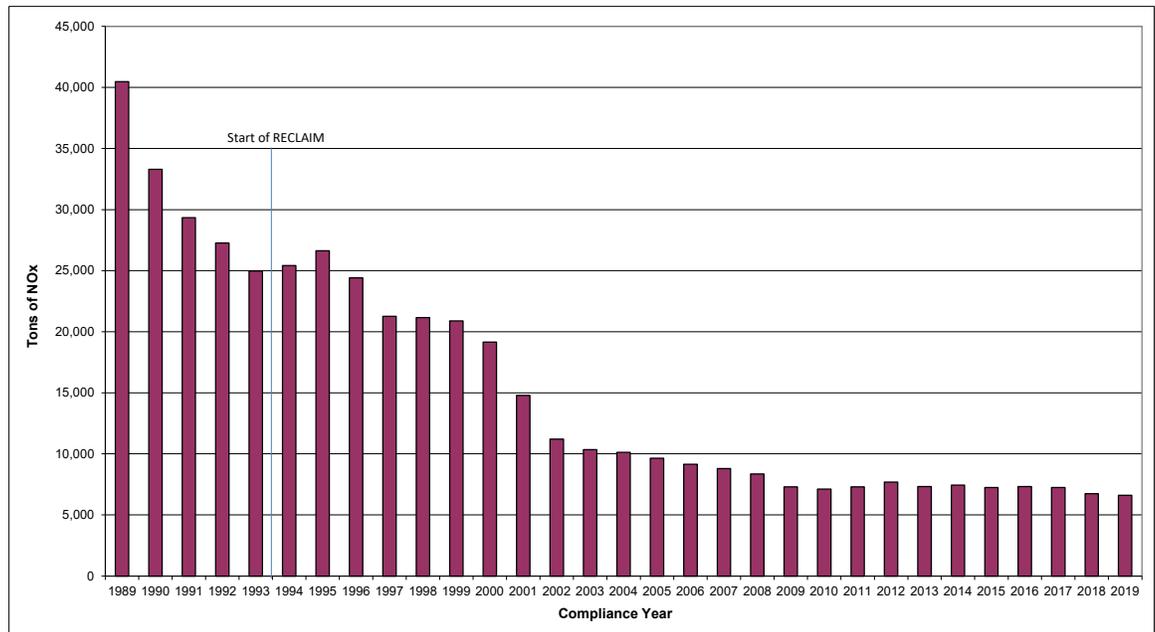
Coast AQMD's website¹, and include all the quarterly emissions maps presented in previous annual program audit reports. This chapter addresses:

- 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.

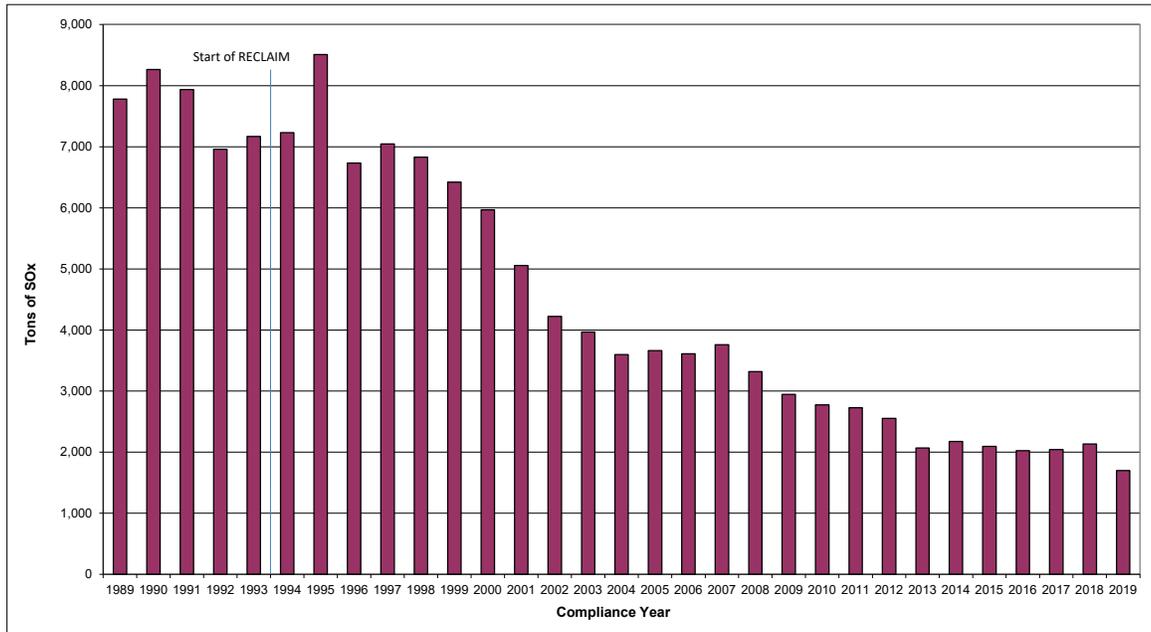
Figure 7-1
NOx Emission Trend for RECLAIM Sources



Note: 1989-1993 emissions presented in this figure are the emissions from the facilities in the 1994 NOx universe.

¹ Quarterly emission maps from 1994 to present can be found at:
<http://www.aqmd.gov/home/programs/business/about-reclaim/quarterly-emission-maps>.

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 2010. The emissions for Compliance Year 2010 to Compliance Year 2017 fluctuated within a narrow range; all are within 5% of their average of 7,338 tons/year. The NOx emissions for Compliance Year 2018 were at a low of 6,740 tons/year, representing a 7% decrease from Compliance Year 2017. NOx emissions for Compliance Year 2019 fell even further to a record low of 6,597 tons/year, a further 2% reduction from Compliance Year 2018. Since Compliance Year 1995, annual SOx emissions have also followed a general downward trend. There were a few slight increases for a few Compliance Years when compared to each respective previous compliance year, but Compliance Year 2019 saw a large drop to a record low 1,701 tons/year, a 20% reduction compared to 2,134 tons/year in Compliance Year 2018. From 2013 to 2018, SOx emissions had been fluctuating within a narrow range (2,024 – 2,176 tons/year or $\pm 3\%$ of the range's mean). 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, South Coast AQMD 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 2019 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 2019 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.

Historically, 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.

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.

Figure 7-3 shows the 2019 mean quarterly NOx emission level, which is the average of the aggregate audited emissions for each of the four quarters, and the 2019 audited quarterly emissions. Figure 7-4 compares the 2019 quarterly NOx emissions with the quarterly emissions from 2008 through 2018. During calendar year 2019, quarterly NOx emissions varied from four percent below the mean in the second quarter (April through June) to about four percent above the mean in the third quarter (July through September). Figure 7-4 shows that the calendar year 2019 quarterly emissions profile is consistent with previous years under RECLAIM, albeit with reduced NOx emissions. Figures 7-3 and 7-4, along with the qualitative analysis performed above show that in calendar year 2019 there has not been a significant shift in NOx emissions from the winter months to the summer months.

Figure 7-3
Calendar Year 2019 NOx Quarterly Emissions

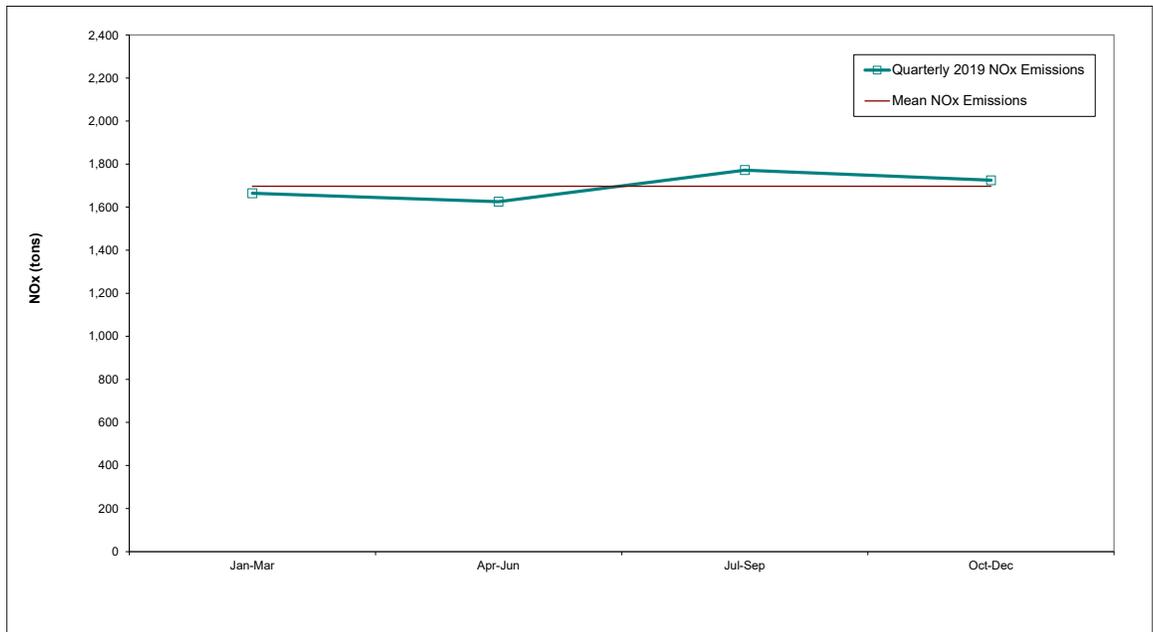
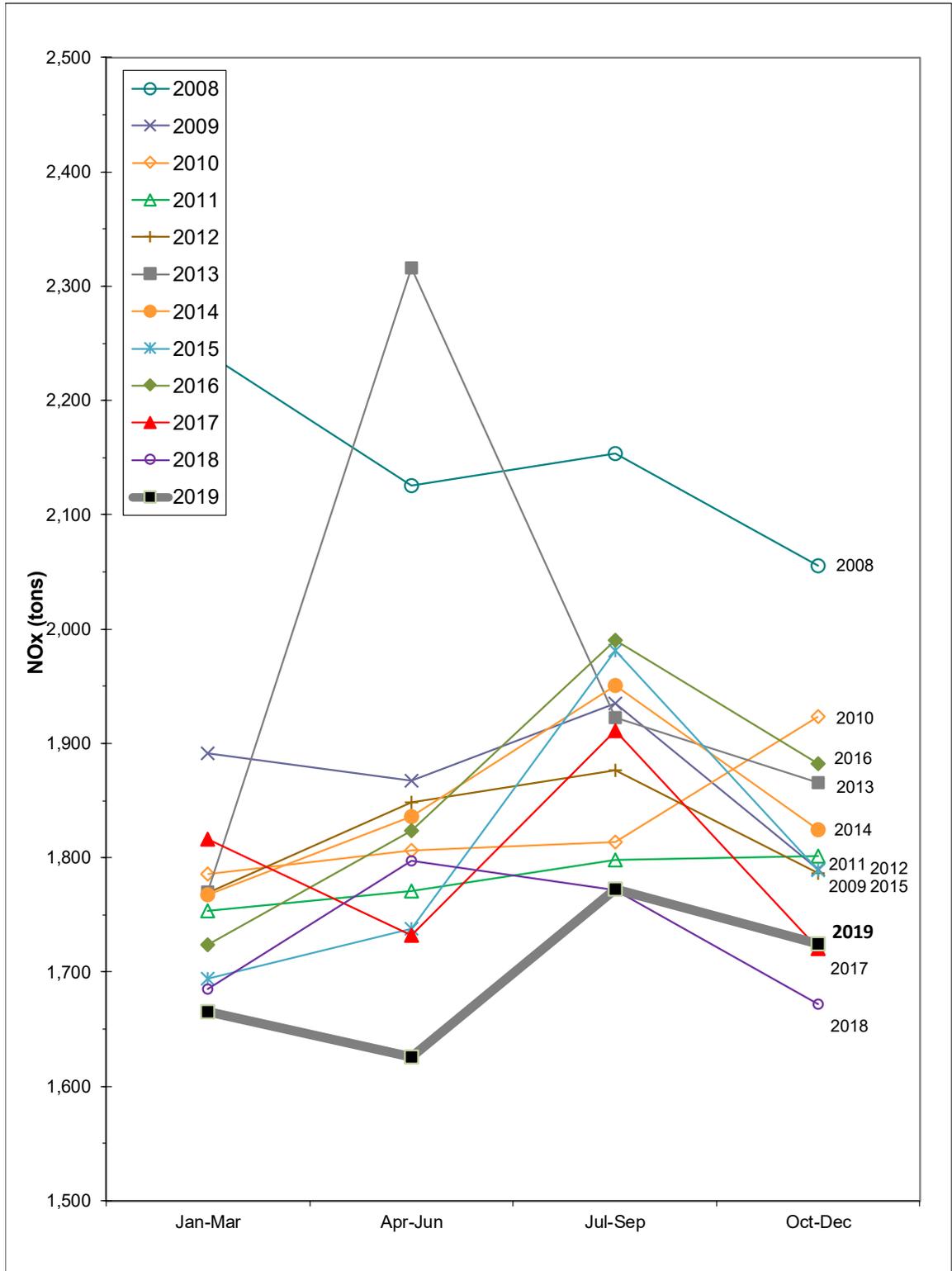


Figure 7-4
Quarterly NOx Emissions from Calendar Years 2008 through 2019



Similar to Figure 7-3 and 7-4 for NOx quarterly emissions, Figure 7-5 presents the 2019 mean quarterly SOx emissions and the 2019 audited quarterly emissions, while Figure 7-6 compares the 2019 quarterly SOx emissions with the quarterly emissions from 2008 through 2018. Figure 7-5 shows that quarterly SOx emissions during calendar year 2019 varied from eight percent below the mean in the fourth quarter (October through December) to about fourteen percent above the mean in the first quarter (January through March). Figure 7-6 shows that the calendar year 2019 quarterly emissions profile is roughly consistent with previous years under RECLAIM, with the exception of the third quarter (July through September). Even though the typical summer third quarter rise in SOx emissions did not occur, the Compliance Year 2019 emissions profile shows that this did not result in a shift of those emissions to the fourth quarter (October through December). In addition, Compliance Year 2019 SOx emissions dropped 20% with respect to Compliance Year 2018. Both Figures 7-5 and 7-6, along with the qualitative analysis performed above, show that in calendar year 2019 there was not a significant shift in SOx emissions from the winter months to the summer months.

Figure 7-5
Calendar Year 2019 SOx Quarterly Emissions

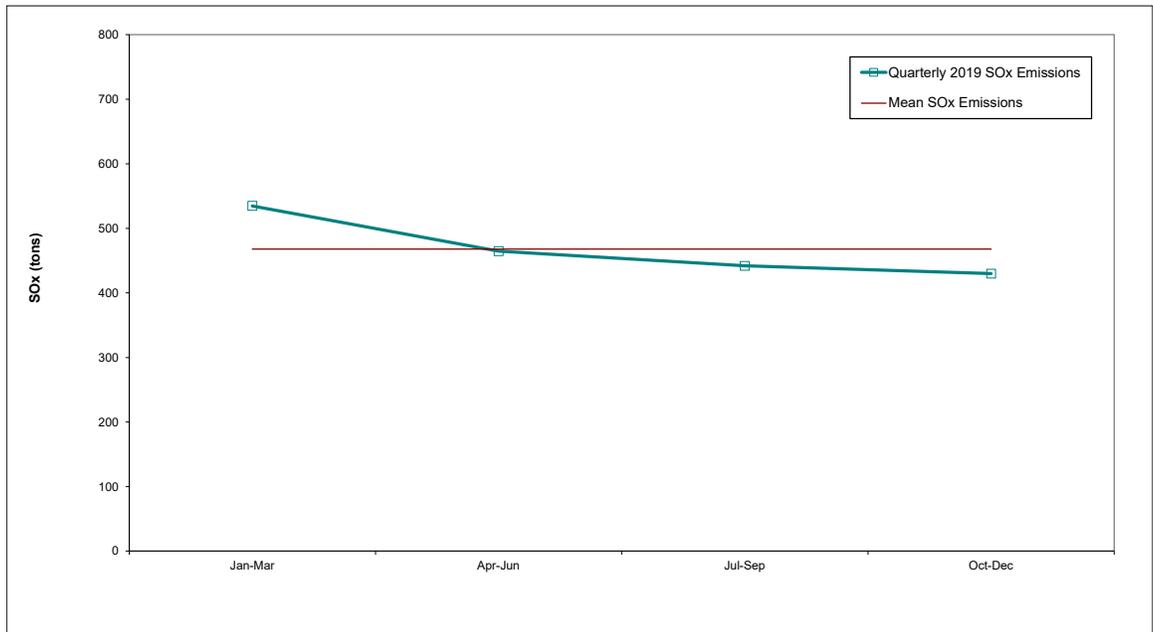
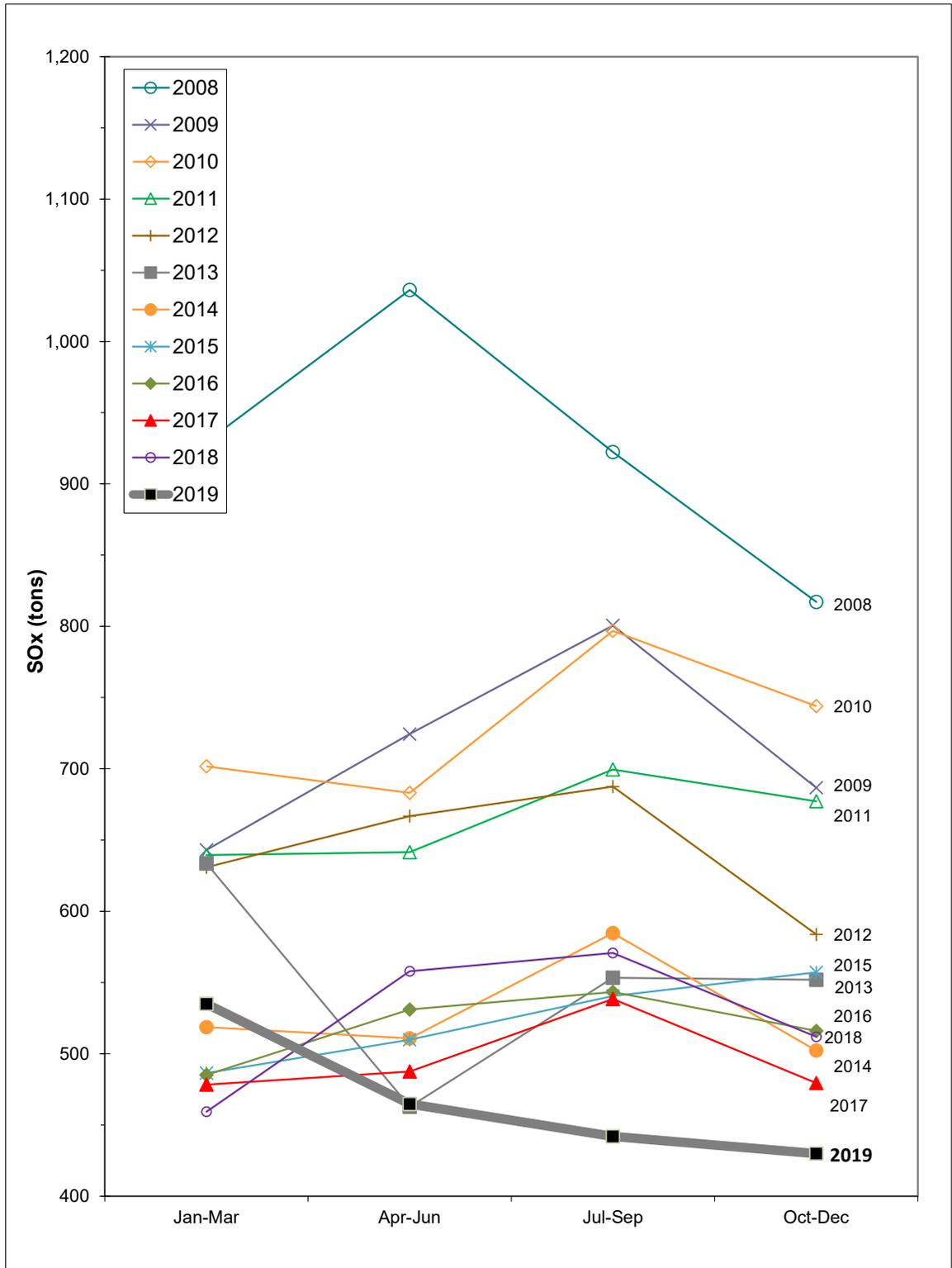


Figure 7-6
Quarterly SOx Emissions from Calendar Years 2008 through 2019



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 Office of Environmental Health Hazard Assessment (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 160 days in 2020. A difference in the number of days per year the basin exceeds each standard periodically occurs 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 2020 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 each standard in 2020 increased significantly when compared to 2019. Table 7-1 also shows that both the Basin Maximum 8-hour ozone concentration and 1-hour ozone concentration also increased relative to last year. The Basin Maximum 1-hour ozone concentration in 2020 is the highest it has been since 2003. There were several individual factors that contributed to this dramatic rise in ozone

concentration throughout 2020. This past year there were record high temperatures, abnormally stagnant meteorology, and an increase in NO_x and VOC emissions from a historic wildfire season. Further analysis is needed to unravel the relative impacts of each contribution.

**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
2018	86	141	109	141	0.125	0.142
2019	82	128	105	128	0.118	0.137
2020	132	160	145	160	0.185	0.140

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

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

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 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. Relative to calendar year 2019, the 2020 per capita exposures were significantly higher for all regions. For calendar year 2020, the actual per capita exposure for the Basin was 9.07 hours, which represents an 88.7% 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
2018 actual	1.97	0.90	0.14	2.37	7.79
2019 actual	2.07	0.94	0.22	1.88	8.57
2020 actual	9.07	7.92	3.10	5.07	23.20
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.

calculations are used to determine the Basin-wide per capita exposure by summing and dividing over the whole Basin.

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.*, South Coast AQMD 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 toxic's 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 NO_x or SO_x emission increases are also required to be equipped with BACT, which minimizes to the extent feasible NO_x and SO_x 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 South Coast AQMD 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, NO_x, SO_x, 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 South Coast AQMD. Beginning with the FY 2000-01 reporting cycle, toxics emission reporting for the AB2588 Program was incorporated into South Coast AQMD'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 procedures⁴ into one of three categories: low, intermediate, or high priority. Facilities ranked with low priority are exempt from future reporting. Facilities ranked with intermediate priority are classified as South Coast AQMD 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 South Coast AQMD's 2019 Annual Report on the AB2588 Air Toxics "Hot Spots" program⁵, staff has reviewed and approved 349 HRAs as of the end calendar of year 2019. About 95% of the facilities have cancer risks below 10 in a million and 95% 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 South Coast AQMD discusses the health risks from the facility. South Coast AQMD has conducted such public notification meetings for 61 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, 28 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 South Coast AQMD 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, 2015⁶. 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 NO_x and SO_x 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.

⁴ The toxics prioritization procedures can be found at: <http://www.aqmd.gov/home/regulations/compliance/toxic-hot-spots-ab-2588>.

⁵ The 2019 AB2588 Annual Report can be found at: http://www.aqmd.gov/docs/default-source/planning/risk-assessment/ab2588_annual_report_2019.pdf.

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>.

South Coast AQMD has initiated a MATES V study and staff began air toxics measurements at 10 fixed stations in early 2018. The advanced monitoring components also began in 2018, and included flight measurements, mobile monitoring and optical remote sensing technologies. The advanced monitoring components focus mainly on refinery emissions and potential community impacts, but also include other air pollution sources that are located close to communities. Staff has developed the emissions inventory and has been developing the modeling platform for the air toxics health risk modeling. Staff will continue to monitor and assess toxic impacts as part of future annual program audits.

APPENDIX A

RECLAIM UNIVERSE OF SOURCES

The RECLAIM universe of active sources as of the end of Compliance Year 2019 is provided below.

Facility ID	Cycle	Facility Name	Program
800088	2	3M COMPANY	NOx
185145	2	9W HALO WESTERN OPCP LP DBA ANGELICA	NOx
185146	2	9W HALO WESTERN OPCP L.P. D/B/A ANGELICA	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
187165	1	ALTAIR PARAMOUNT, LLC	NOx/SOx
800196	2	AMERICAN AIRLINES, INC,	NOx
16642	1	ANHEUSER-BUSCH LLC., (LA BREWERY)	NOx/SOx
117140	2	AOC, LLC	NOx
174406	1	ARLON GRAPHICS LLC	NOx
12155	1	ARMSTRONG FLOORING INC	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
185801	1	BERRY PETROLEUM COMPANY, LLC	NOx
166073	1	BETA OFFSHORE	NOx
155474	2	BICENT (CALIFORNIA) MALBURG LLC	NOx
132068	1	BIMBO BAKERIES USA INC	NOx
1073	1	BORAL ROOFING LLC	NOx

ANNUAL RECLAIM AUDIT

Facility ID	Cycle	Facility Name	Program
150201	2	BREITBURN OPERATING LP	NOx
174544	2	BREITBURN OPERATING LP	NOx
185574	1	BRIDGE ENERGY, LLC	NOx
185575	2	BRIDGE ENERGY, LLC	NOx
185600	2	BRIDGE ENERGY, LLC	NOx
185601	2	BRIDGE ENERGY, LLC	NOx
190051	2	BRIDGE POINT LONG BEACH LLC	NOx/SOx
184958	1	BRONCS INC. DBA WEST COAST TEXTILES	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
141555	2	CASTAIC CLAY PRODUCTS, LLC	NOx
14944	1	CENTRAL WIRE, INC.	NOx/SOx
148925	1	CHERRY AEROSPACE	NOx
800030	2	CHEVRON PRODUCTS CO.	NOx/SOx
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
182561	1	COLTON POWER, LP	NOx
182563	1	COLTON POWER, LP	NOx
38440	2	COOPER & BRAIN - BREA	NOx

ANNUAL RECLAIM AUDIT

Facility ID	Cycle	Facility Name	Program
126536	1	CPP - POMONA	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
180908	1	ECO SERVICES OPERATIONS CORP.	NOx/SOx
115663	1	EL SEGUNDO ENERGY CENTER LLC	NOx
186899	1	ENERY HOLDINGS, LLC	NOx
9053	1	ENWAVE LOS ANGELES INC.	NOx
11034	2	ENWAVE LOS ANGELES INC.	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
346	1	FRITO-LAY, INC.	NOx
2418	2	FRUIT GROWERS SUPPLY CO	NOx
142267	2	FS PRECISION TECH LLC	NOx
192551	2	GLC FULLERTON LLC	NOx/SOx
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
800003	2	HONEYWELL INTERNATIONAL INC	NOx
187348	2	HYDRO EXTRUDER, LLC	NOx

ANNUAL RECLAIM AUDIT

Facility ID	Cycle	Facility Name	Program
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
187823	2	KIRKHILL INC	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
192519	1	LEGACY BY-PRODUCTS LLC	NOx
141295	2	LEKOS DYE AND FINISHING, INC	NOx
144455	2	LIFOAM INDUSTRIES, LLC	NOx
83102	2	LIGHT METALS 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
14049	2	MARUCHAN INC	NOx
3029	2	MATCHMASTER DYEING & FINISHING INC	NOx
182970	1	MATRIX OIL CORP	NOx
2825	1	MCP FOODS INC	NOx
176952	2	MERCEDES-BENZ WEST COAST CAMPUS	NOx
94872	2	METAL CONTAINER CORP	NOx
800207	1	METRO ST HOSP (EIS USE)	NOx
155877	1	MILLERCOORS USA LLC	NOx
12372	1	MISSION CLAY PRODUCTS	NOx
11887	2	NASA JET PROPULSION LAB	NOx
115563	1	NCI GROUP INC., DBA, METAL COATERS OF CA	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

ANNUAL RECLAIM AUDIT

Facility ID	Cycle	Facility Name	Program
800408	1	NORTHROP GRUMMAN SYSTEMS	NOx
800409	2	NORTHROP GRUMMAN SYSTEMS CORPORATION	NOx
130211	2	NOVIPAX, INC	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
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
11435	2	PQ CORPORATION	NOx/SOx
7416	1	PRAXAIR INC	NOx
42630	1	PRAXAIR INC	NOx
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
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
189040	1	RED COLLAR PET FOODS, INC	NOx
180410	2	REICHHOLD LLC 2	NOx

ANNUAL RECLAIM AUDIT

Facility ID	Cycle	Facility Name	Program
800113	2	ROHR, INC.	NOx
4242	2	SAN DIEGO GAS & ELECTRIC	NOx
15504	2	SCHLOSSER FORGE COMPANY	NOx
14926	1	SEMPRA ENERGY (THE GAS CO)	NOx
152707	1	SENTINEL ENERGY CENTER LLC	NOx
184288	2	SENTINEL PEAK RESOURCES CALIFORNIA, LLC	NOx
184301	1	SENTINEL PEAK RESOURCES CALIFORNIA, LLC	NOx
188635	1	SFII FLYTE, LLC	NOx
800129	1	SFPP, L.P.	NOx
37603	1	SGL TECHNIC LLC	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
191415	2	SIERRA ALUMINUM, DIV OF SAMUEL, SON & CO	NOx
191420	2	SIERRA ALUMINUM, DIV OF SAMUEL, SON & CO	NOx
101977	1	SIGNAL HILL PETROLEUM INC	NOx
187885	2	SMITHFIELD PACKAGED MEATS CORP	NOx
119596	2	SNAK KING CORPORATION	NOx
185352	2	SNOW SUMMIT, LLC.	NOx
4477	1	SO CAL EDISON CO	NOx
5973	1	SOCAL GAS CO	NOx
8582	1	SO CAL GAS CO/PLAYA DEL REY STORAGE FAC	NOx
800127	1	SO CAL GAS CO	NOx
800128	1	SO CAL GAS CO	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

ANNUAL RECLAIM AUDIT

Facility ID	Cycle	Facility Name	Program
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
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
191386	2	THE NEWARK GROUP, INC. DBA GREIF, INC	NOx
97081	1	THE TERMO COMPANY	NOx
129497	1	THUMS LONG BEACH CO	NOx
800330	1	THUMS LONG BEACH	NOx
68118	2	TIDELANDS OIL PRODUCTION COMPANY ETAL	NOx
800325	2	TIDELANDS OIL PRODUCTION CO	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
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
183108	2	URBAN COMMONS LLC EVOLUTION HOSPITALITY	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
14502	2	VERNON PUBLIC UTILITIES	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
127299	2	WILDFLOWER ENERGY LP/INDIGO GEN., LLC	NOx

APPENDIX B
FACILITY INCLUSIONS

As discussed in Chapter 1, no facilities were added to the RECLAIM universe in Compliance Year 2019. As of January 5, 2018, inclusion of new facilities is not allowed pursuant to amendments to Rule 2001.

APPENDIX C

RECLAIM FACILITIES CEASING OPERATION OR EXCLUDED

South Coast AQMD 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 2019. The reasons for shutdowns and exclusions cited below are based on the information provided by the facilities and other information available to South Coast AQMD staff.

Facility ID	42676
Facility Name	CES PLACERITA INC
City and County	Newhall, Santa Clarita, Los Angeles County
SIC	1112
Pollutant(s)	NOx
1994 Allocation	151,510 lbs.
Reason for Shutdown	The facility cited financial reasons for shutdown. Their turbine was outdated and inefficient. The cost to bring it into compliance, and to become competitive in the energy market, was too high.

Facility ID	52517
Facility Name	REXAM BEVERAGE CAN COMPANY
City and County	Chatsworth, Los Angeles County
SIC	3411
Pollutant(s)	NOx
1994 Allocation	52,003 lbs.
Reason for Shutdown	The facility stated that their operations relocated to Arizona.

Facility ID	56940
Facility Name	CITY OF ANAHEIM/COMB TURBINE GEN STATION
City and County	Anaheim, Orange County
SIC	4911
Pollutant(s)	NOx
1994 Allocation	2,098 lbs.
Reason for Shutdown	The facility stated that their operation permanently ceased because repair of the inoperable turbine was impractical and cost prohibitive.

Facility ID	168088
Facility Name	POLYNT COMPOSITES USA INC
City and County	Lynwood, Los Angeles County
SIC	2821
Pollutant(s)	NOx
1994 Allocation	6,300 lbs.
Reason for Shutdown	The facility shutdown following a corporate merger in late 2017. All operations were transferred/consolidated to an existing RECLAIM facility within South Coast AQMD.

ANNUAL RECLAIM AUDIT

Facility ID 173290
Facility Name MEDICLEAN
City and County Commerce, Los Angeles County
SIC 7219
Pollutant(s) NOx
1994 Allocation 15,420 lbs.
Reason for Shutdown The facility sold to a new owner and the equipment was removed.

Facility ID 176708
Facility Name ALTAGAS POMONA ENERGY INC.
City and County Pomona, Los Angeles County
SIC 4911
Pollutant(s) NOx
1994 Allocation 590,920 lbs.
Reason for Shutdown The facility cited a lack of demand from their peaker unit in a changing energy market as their reason for shutdown. The facility had not run in over 2 years and was approved for retirement and dismantled..

Facility ID 185101
Facility Name LSC COMMUNICATIONS, LA MFG DIV
City and County Torrance, Los Angeles County
SIC 2752
Pollutant(s) NOx
1994 Allocation 23,018 lbs.
Reason for Shutdown The facility sold to a new owner. The equipment was removed, the building demolished, and the property was redeveloped.

APPENDIX D
FACILITIES THAT EXCEEDED THEIR ANNUAL ALLOCATION
FOR COMPLIANCE YEAR 2019

The following is a list of facilities that did not have enough RTCs to cover their NOx and/or SOx emissions in Compliance Year 2019 based on the results of audits conducted by South Coast AQMD staff.

Facility ID	Facility Name	Compliance Year	Pollutant
136	Press Forge Co.	2019	NOx
3721	Dart Container Corp of California	2019	NOx
7411	Davis Wire Corp.	2019	NOx
20203	Reconserve of California-Los Angeles Inc.	2019	NOx
59618	Pacific Continental Textiles, Inc.	2019	NOx
126536	CPP Pomona	2019	NOx
156741	Harbor Cogeneration Co, LLC	2019	NOx
183415	Ontario International Airport Authority	2019	NOx
183832	AST Textile Group, Inc.	2019	NOx
184958	Broncs Inc. DBA West Coast Textiles	2019	NOx
186899	Energy Holdings LLC	2019	NOx
800170	LA City, DWP Harbor Generating Station	2019	NOx
800181	California Portland Cement Co.	2019	SOx

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:	95212
Facility Name:	FABRICA
City and County:	Santa Ana, Orange County
SIC:	2273
Pollutant(s):	NOx
Cycle:	1
Job Gain:	1
Job Loss:	0
Comments:	The facility explained that they hired one process engineer to help with RECLAIM reporting.

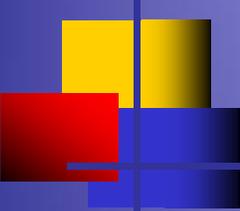


Annual RECLAIM Audit Report for 2019 Compliance Year

South Coast Air Quality Management District

Board Meeting

March 5, 2021

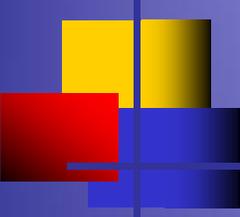


RECLAIM

REgional Clean Air Incentives Market (RECLAIM) program:

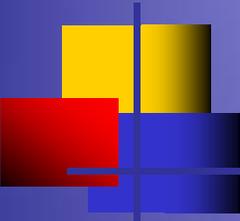
- A cap and trade program adopted in October 1993
- Objective is to meet emission reduction requirements and enhance emission monitoring while providing additional flexibility to lower compliance costs
- Includes largest NO_x and SO_x sources
- Specifies facility declining annual emissions caps
- Allows options to reduce emissions or buy RECLAIM Trading Credits (RTCs)

Compliance Year (CompYr) 2019 is the 26th 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 2019
 - Cycle 1: Jan 1, 2019 – Dec 31, 2019
 - Cycle 2: Jul 1, 2019 – Jun 30, 2020
- RECLAIM had 246 facilities at the end of CompYr 2019 (253 at end of CompYr 2018)



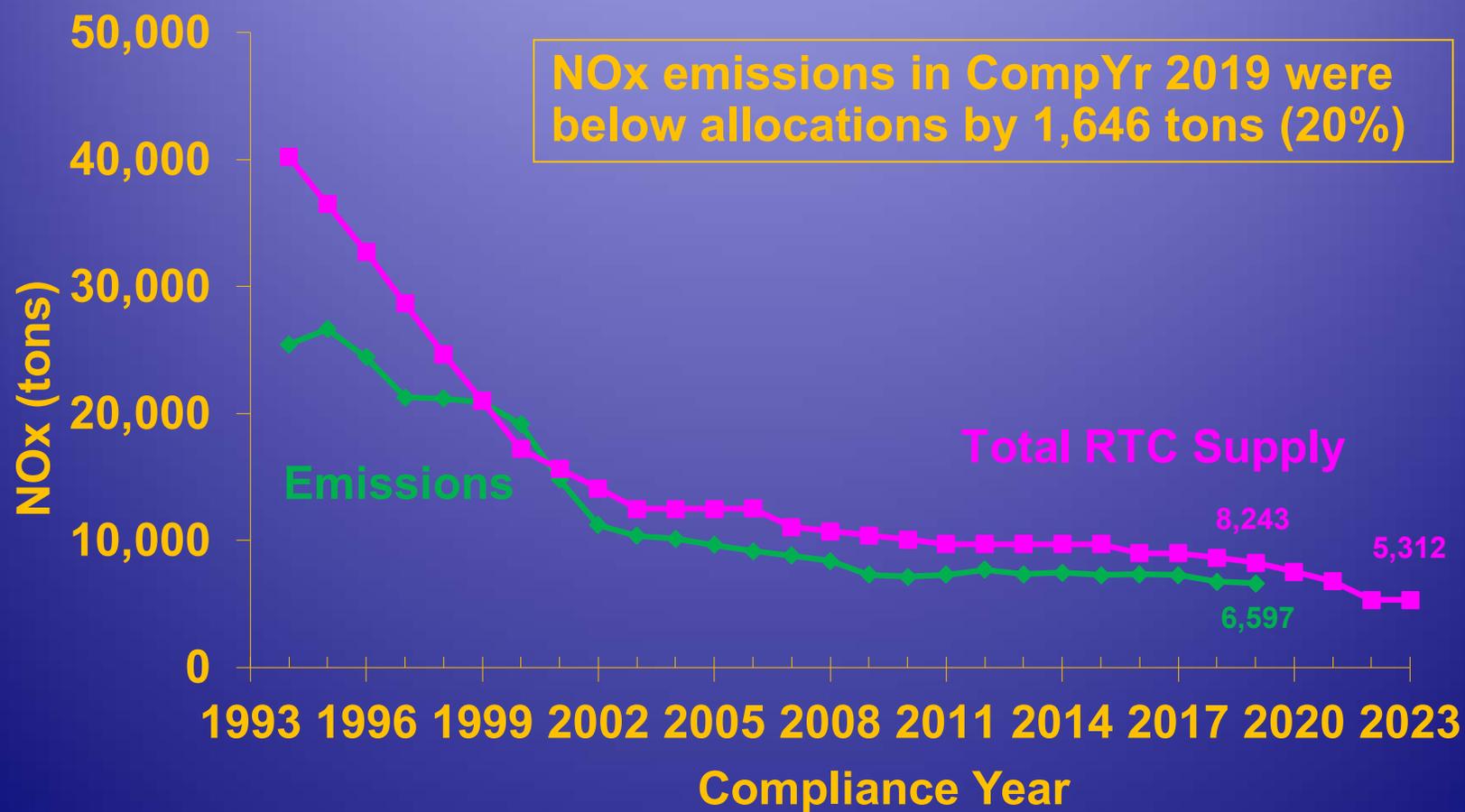
2019 Annual RECLAIM Audit Findings Compliance

- RECLAIM met overall NO_x and SO_x emissions goals:
 - NO_x emissions **20%** below allocations
 - SO_x emissions **23%** below allocations

- Allocation Shave
 - NO_x Shave of 22.5% adopted January 2005 and implemented in 2007 - 2011
 - SO_x Shave of 48.4% adopted November 2010 and implemented in 2013 – 2019
 - Additional NO_x Shave of 45.2% adopted in December 2015 and implemented in 2016 – 2022
 - Reduction of 4 tons/day (15.1%) NO_x and 5.7 tons/day (48.4%) SO_x allocations in Compliance Year 2019

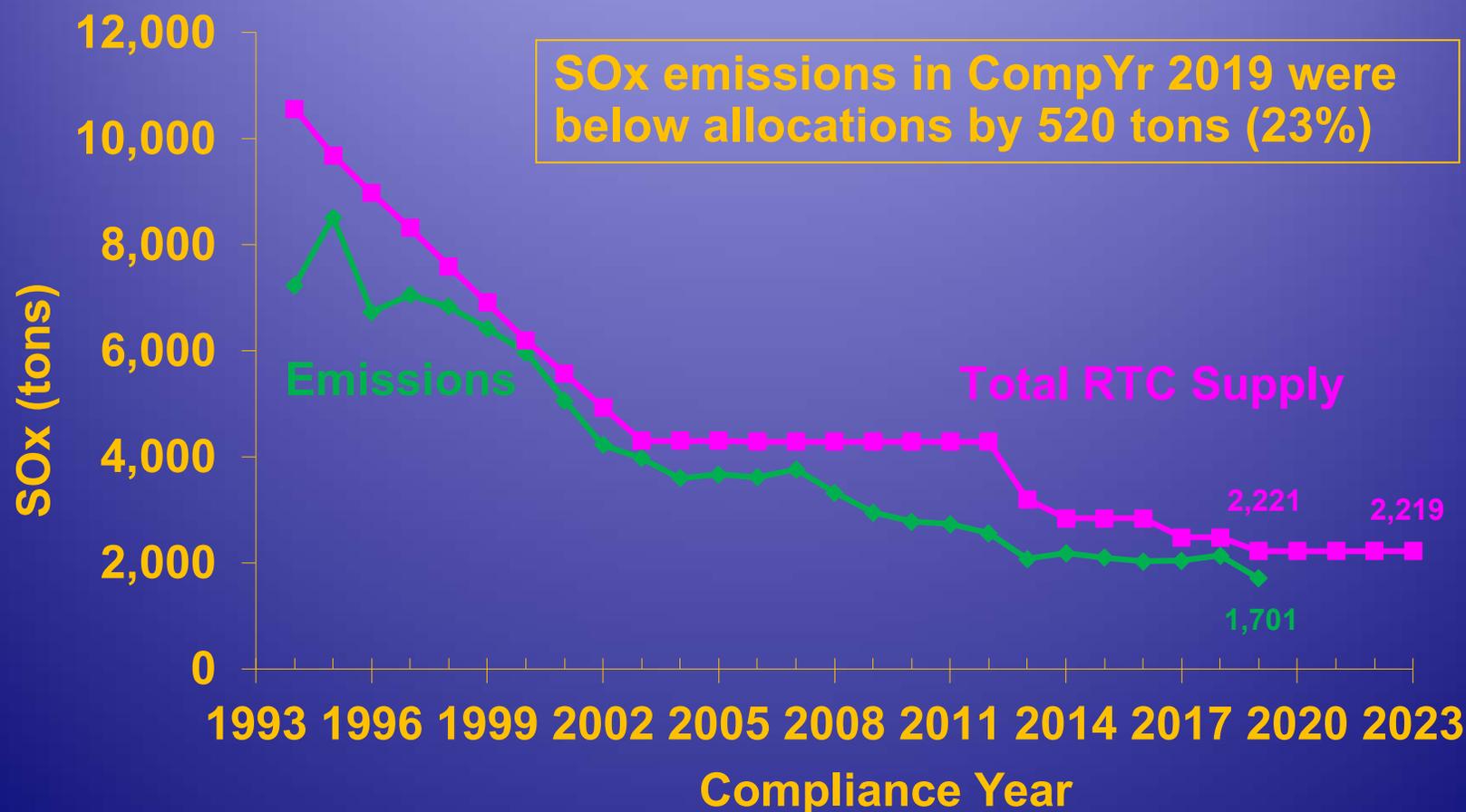
RECLAIM

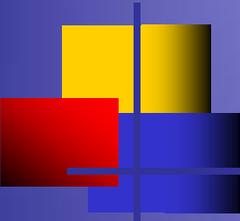
NOx Emissions vs. Allocations Trends



RECLAIM

SOx Emissions vs. Allocations Trends





2019 Annual RECLAIM Audit Findings Compliance

- RECLAIM had a high rate of facility compliance:
 - NO_x Facilities – 95%
 - SO_x Facilities – 97%

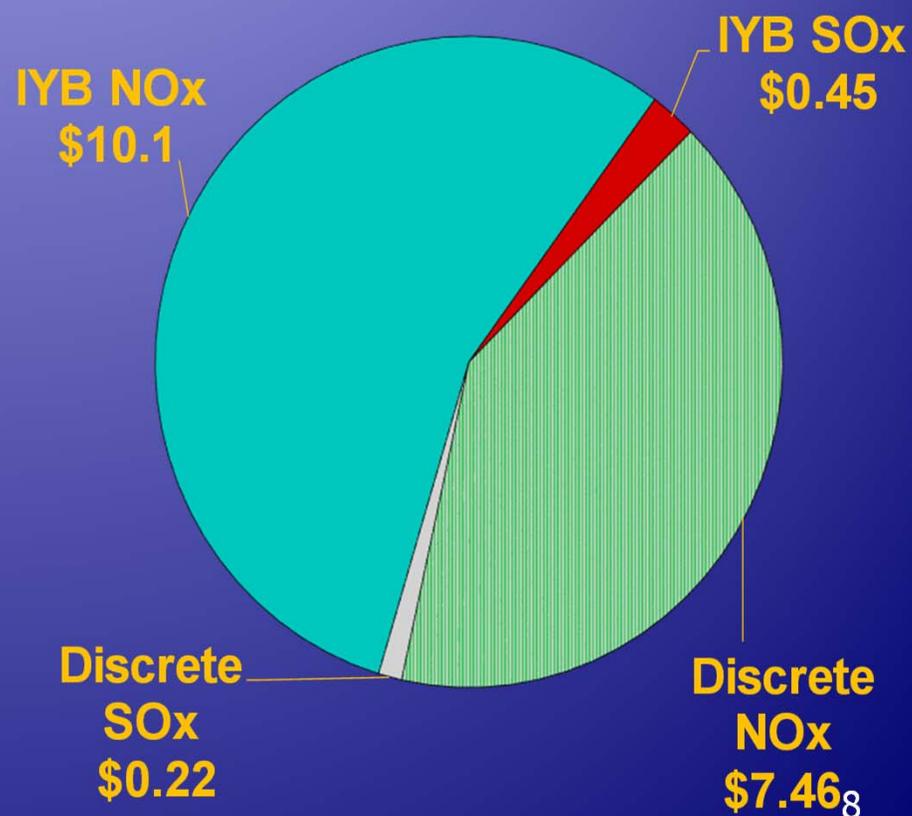
- Facilities exceeding their allocations
 - NO_x – 12 facilities exceeded by 339.9 tons (2.60% of total allocations)
 - SO_x – one facility exceeded by 1.22 tons (0.01% of total allocations)

2019 Annual RECLAIM Audit Findings

Credit Trading and Prices

- \$1.54 billion of RTCs traded since program inception
- RTCs are traded as either Discrete Year or Infinite-Year Block (IYB)
- \$18.19 million of RTCs traded in Calendar Year (CaYr) 2020 (\$ 34.24 million in CaYr 2019)

Value Traded in CaYr 2020
(Million \$)



2019 Annual RECLAIM Audit Findings

Average Discrete Year NOx RTC Prices



- Average prices in CalYr 2020 below program review thresholds:
 - \$15,000/ton [Rule 2015]
 - \$47,585/ton* [Health and Safety Code]

* - Adjusted by October 2020 CPI 9

2019 Annual RECLAIM Audit Findings

Average Discrete Year SOx RTC Prices



- Average prices in CaYr 2020 below program review thresholds:
 - \$15,000/ton [Rule 2015]
 - \$34,261*/ton [Health and Safety Code]

* - Adjusted by October 2020 CPI 10

2019 Annual RECLAIM Audit Findings

Average IYB RTC Prices



- 2020 IYB RTC average prices remain below program review thresholds [Health and Safety Code]

- NOx = \$713,777/ton*

- SOx = \$513,919/ton*

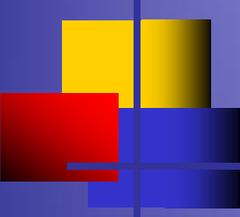
* - Adjusted by October 2020 CPI 11

2019 Annual RECLAIM Audit Findings Investor Participation during CalYr 2020

- Investors are RTC holders who are not RECLAIM facility operators
- Investor participation remains active in CalYr 2020 trades.

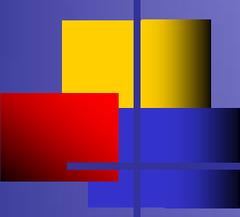
RTC Type	Value		Volume	
	NOx	SOx	NOx	SOx
Discrete	72%	62%	66%	71%
IYB	61%	100%	63%	100%

- Investors' holdings at the end of CalYr 2020
 - 1.3% of IYB NOx RTCs (remained the same as 1.3% in CalYr 2019)
 - 4.2% of IYB SOx RTCs (down from 4.7 % in CalYr 2019)



2019 Annual RECLAIM Audit Findings RECLAIM Transition

- On January 5, 2018, the Board directed staff to initiate the transition of the RECLAIM program to a command-and-control regulatory structure:
 - Monthly working group meetings
 - Rule-specific working groups
 - As of January 2021, the Board amended and/or adopted 11 “Landing Rules” to implement BARCT



2019 Annual RECLAIM Audit Findings

- RECLAIM facilities overall employment loss of 4.0% (net loss of 4,167 jobs)
- Met federal NSR offset ratios
- No significant shift in seasonal emissions
- No evidence of increased health risk due to RECLAIM

2019 Annual RECLAIM Audit Findings Summary/Recommendations

Summary:

- Programmatic compliance achieved (NO_x and SO_x emissions were 20% and 23% below allocations, respectively)
- Individual facility compliance rate remained high (95% & 97% for NO_x and SO_x, respectively, based on 100% of RECLAIM facilities audited in Compliance Year 2019)
- RTC prices stayed below program review thresholds
- RECLAIM met all other requirements

Recommendation:

- Approve the Annual RECLAIM Audit Report for 2019 Compliance Year