



South Coast Air Quality Management District

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BOARD MEETING DATE: October 7, 2022

AGENDA NO. 21

REPORT: Report to Legislature and CARB on South Coast AQMD
Regulatory Activities for Calendar Year 2021


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 ACTIONS:

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




Wayne Nastri
Executive Officer

DA:LTO:RAR:HC

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.

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 2021.

**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)**

August 2022

Cleaning the Air that We Breathe...

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
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Wayne Natri
Executive Officer

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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 2021 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 2021. 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, CEQA Guidelines Section 15251(l) and implemented pursuant to South Coast AQMD Rule 110. The adoption, amendment, or rescission of rules and regulations are subject to South Coast AQMD's certified CEQA program. Since the adoption, amendment or rescission of plans, such as the AQMP, are not covered under the certified CEQA program, they are still subject to CEQA. Having a certified regulatory program means that the 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 certain 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 2021, the South Coast AQMD Governing Board adopted, amended, or rescinded the following rules for which public workshops were conducted:

- Adopted Rules: 118.1, 218.2, 218.3, 316, 429.1, 1109.1, 1147.1, 1150.3, 1407.1, and 2305;
- Amended Rules: 218, 1111, 1304, 1426, 1466, 1469, 1469.1, 1470, and 2005; and
- Rescinded Rule: 1109.

Refer to Chapter I 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 has 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 Air Quality Management Plans (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, regional employment and competitiveness.

In 2021, the South Coast AQMD identified and analyzed potential socioeconomic impacts of six new rules (Rules 1407.1, 1150.3, 2305, 1147.1, 118.1, and 1109.1), five amended rules (Rule 218 Series, 1426 (combined rule development with 1469), 1466, 1469.1, and 1111), and Regulation III – Fees. Significant socioeconomic impacts were identified for Rule 1407.1, the Rule 218 Series, Rule 2305, and Rule 1109.1 and these are described in more detail in Chapter 1. Chapter 1 also 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.

Engineering and Permitting

Background

Section 40452 of the California Health and Safety Code requires that the 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 emissions 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 2020 Compliance Year to the Legislature.

The following paragraphs provide a summary for each report.

Permitting Data – Calendar Year 2021

During CY 2021, South Coast AQMD dispositioned a total of 5,485 applications. CY 2021 was the first full year of the COVID-19 pandemic, which affected incoming permit applications

numbers. Most of these applications were for Permits to Operate (2,376), Area Sources & Certified/ Registrations (885), and Changes of Operators (815). Also, 1,097 permits were not renewed. This data is summarized in Table 1 on page 30.

Table 2, beginning on page 31, 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 three NAICS codes were 447110/447190 – Gasoline Service Stations, 324110 – Petroleum Refineries, and 811121 - Automotive Body, Paint, and Interior Repair and Maintenance.

Emission Offset Transactions Data – Fiscal Year 2020/2021

During fiscal year 2020-2021, a total of 27 emission offset transactions were completed, which included 21 transactions for reactive organic gases (ROG), 3 transactions for oxides of nitrogen (NOx), and 3 transactions for particulate matter with an aerodynamic diameter less than 10 microns (PM10). There were no transactions for carbon monoxide (CO) or for oxides of sulfur (SOx). The amounts of emissions offsets transferred, by pollutant, include 393 pounds per day of ROG, 5 pounds per day of NOx, and 11 pounds of PM10 (see Table 3 on page 60). 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 for a permit for a new source because of a failure to provide the required emission offsets. (See page 61 for details).

RECLAIM Audit Report

The REgional CLean Air Incentives Market (RECLAIM) program was adopted in 1993 to provide facilities with flexibility in achieving the same emissions reduction goals as would have been achieved under the traditional command and control approach, while lowering the cost of compliance. To ensure RECLAIM is achieving its goal, 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. The results of the annual audit show that RECLAIM continues to meet its aggregate emission goals and all other specified objectives.

As discussed in more detail in the audit report (see Chapter V), a total of 240 facilities were in the RECLAIM program at the end of Compliance Year 2020. Total NOx emissions from RECLAIM facilities were 27% less than the aggregate NOx allocations, and SOx emissions were 35% less than the aggregate SOx allocations for the program. The vast majority of RECLAIM facilities complied with their allocations during the 2020 compliance year (93% of NOx facilities and 100% of SOx facilities).

A total of over \$1.56 billion in RTCs has been traded since the adoption of RECLAIM, of which \$20.0 million occurred in CY 2021 (compared to \$18.2 million in CY 2020), excluding swaps. The annual average prices of discrete-year NOx and SOx RTCs and infinite-year block (IYB –

trades that involve blocks of RTCs with a specified start year and continuing in perpetuity) NOx and SOx RTCs traded in January 2022 and April 2022 show that the average 12-month and 3-month rolling average price for Compliance Year 2022 NOx RTCs exceeded the applicable Rule 2002 price thresholds and annual price per ton threshold for Compliance Years 2021, 2022, and 2023 exceeded Rule 2015 thresholds (annual price per ton of \$18,846, \$33,085 and \$37,808 for Compliance Years 2021, 2022 and 2023, respectively, each exceeding the Rule 2015 threshold of \$15,000 per ton). As such, the provisions of Rule 2002 (f)(1)(H) and Rule 2015 (b)(6) triggered assessments of the RECLAIM program including recommendations to the Board. These efforts are in progress.

In Compliance Year 2020, RECLAIM facilities reported a net loss of 3,687 jobs, representing 4.0% 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 2020 Compliance Year.”

Budget and Work Program

Refer to Chapter II for the Fiscal Year 2022-2023 Budget Report.

Clean Fuels Programs

2021 Annual Report

In CY 2021, the South Coast AQMD Clean Fuels Program executed 19 new contracts, projects or studies and modified five continuing projects increasing investment in toward research, development, demonstration and deployment projects, as well as technology assessment and transfer of alternative fuel and clean fuel technologies. South Coast AQMD’s Clean Fuels Program contributed over \$10.6 million in partnership with other governmental organizations, private industry, academia and research institutes, and interested parties, with total project costs of approximately \$253 million. The \$10.6 million includes over \$4.3 million recognized into the Clean Fuels Fund as pass-through funds from project partners to facilitate project administration. Additionally, in CY 2021, the Clean Fuels Program continued to leverage other outside funding opportunities, securing new awards totaling \$48.7 million from federal, state and local funding opportunities. The significant project scope of a few key contracts executed in 2021 resulted in higher than average leveraging of Clean Fuels dollars. Typical leveraging is \$4 for every \$1 in Clean Fuels funding. In 2021, South Coast AQMD exceeded this upward trend with nearly \$39 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 2021 included a diverse mix of advanced technologies. The following core areas of technology advancement for 2021 executed contracts (in order of funding percentage) include:

1. Electric and Hybrid Vehicle Technologies and Related Infrastructure (emphasizing electric and hybrid electric trucks developed by Original Equipment Manufacturers (OEMs) and container transport technologies with zero emission operations);
2. Hydrogen and Mobile Fuel Cell Technologies and Infrastructure;
3. Engine Systems/Technologies (emphasizing alternative and renewable fuels for truck and rail applications);
4. Technology Assessment and Transfer/Outreach;
5. Fuel/Emission Studies; and
6. Stationary Clean Fuels Technology

A “technology portfolio” strategy enables South Coast AQMD to leverage state and federal funding while also addressing the specific needs of the Basin. Projects included:

- Battery electric and hybrid electric technologies and infrastructure to develop and demonstrate medium- and heavy-duty vehicles in support of transitioning to near-zero and zero emissions goods movement;
- 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 2021, the following were completed: 24 executed contracts and projects; 24 research, development, demonstration and deployment projects or studies; and, seven technology assessment and transfer contracts. As of January 1, 2022, there were 109 open contracts in the Clean Fuels Program.

In accordance with California Health & Safety Code Section 40448.5.1(d), this annual report regarding the clean-burning fuels program was submitted to the state legislature by March 31, 2022, after approval by the South Coast AQMD Governing Board.

2022 Plan Update

The Clean Fuels Program is evaluated annually to develop the annual Plan Update based on a reassessment of the technology progress and direction for the agency. The Program continually seeks to support the development and deployment of 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 co-funding opportunities. For several years, the state has focused 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 NOx and Toxic Air Contaminants (TACs). Most of these technologies address the Basin’s need for NOx and TAC reductions and reduce 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.

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 2022 Plan Update. Relatedly, Assembly Bill (AB) 617 requires reduced exposure to communities most impacted by air pollution. The Technology Advancement Office (TAO) conducted outreach to AB 617 communities regarding available zero and near-zero emission technologies and incentives to accelerate the deployment of cleaner technologies. Cleaner technologies such as near-zero and zero emission heavy-duty trucks are now included in the Community Emission Reduction Plans (CERPs) for these AB 617 communities, and an RFP for zero emission heavy-duty truck program will be released in 2022.

CARB adopted two critical milestone regulations for reducing emissions from on-road heavy-duty mobile sources in 2020, the Advanced Clean Truck (ACT) regulation, which mandates an increasingly higher percentage of zero emission truck sales starting in 2024, and the Omnibus Low NOx regulation, which requires lower exhaust NOx standards on heavy-duty engines starting in 2024. CARB is also working on the Heavy-Duty Vehicle Inspection and Maintenance Program as well as the Advanced Clean Fleets regulation for Board consideration in 2022.

Despite these major efforts, NOx emission reductions in the South Coast AQMD are still expected to fall short of the levels necessary to meet ozone attainment deadlines.

The Plan Update includes near- to long-term projects to develop, demonstrate and commercialize a variety of technologies that are intended to provide emission reductions over the next five to ten years. Areas of focus include:

- Technologies to reduce emissions from goods movement and port-related activities, including near-zero and zero emission drayage trucks and infrastructure;
- Ultra-low NOx, gaseous and liquid renewable fueled, large displacement/high efficiency engines and heavy-duty zero emission engine technologies;
- Advanced, low-NOx natural gas and propane engines as well as near-zero and zero emission technologies for high horsepower applications;
- Renewable fuels, such as renewable natural gas, diesel and hydrogen as well as other renewable fuels and waste streams to mitigate criteria pollutant emissions;
- 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;
- Large-scale hydrogen refueling and electric vehicle (EV) charging infrastructure to support light-, medium- and heavy-duty zero emission vehicles;
- Ultra-fast charging for heavy duty battery electric vehicles; and

- Zero emission microgrids that utilize electric energy storage systems and onsite clean power generation to support transportation electrification demands associated with 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 2022 total \$21.8 million of Clean Fuels funding, with the anticipation of total project costs of \$167.5 million, leveraging more than \$4 for every \$1 of Clean Fuel funds spent. Some proposed projects may also be funded by other sources, such as state and federal grants for clean fuel technologies, incentive programs such as AB 617 Community Air Protection, Volkswagen Mitigation and Carl Moyer VOC and NOx mitigation funds.

CHAPTER I
RULE DEVELOPMENT, CEQA, and SOCIOECONOMIC IMPACT ANALYSES

RULE DEVELOPMENT PROJECTS APPROVED IN 2021 AND CEQA ALTERNATIVES

This section summarizes each rule adoption, amendment, and rescission projects approved by the South Coast AQMD Governing Board in the preceding CY (e.g., 2021). Each summary provides information about the estimated emission reductions, cost-effectiveness, alternatives considered, if applicable, 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. Rules and regulations promulgated by South Coast AQMD must first be reviewed to determine if they are 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. Still, 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 rules and regulations are subject to South Coast AQMD’s certified CEQA program. The adoption, amendment or rescission of plans such as the AQMP are not included in the South Coast AQMD’s certified CEQA program, but are still subject to CEQA. South Coast AQMD’s certified regulatory program enables the agency to 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. 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 2021, 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.

JANUARY 8, 2021

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

- 1. Rule 1407.1 – Control of Toxic Air Contaminant Emissions from Chromium Alloy Melting Operations:** Rule 1407.1 was adopted to reduce metal toxic air contaminant emissions from melting operations of metals containing greater than 0.5 percent chromium, including, but not limited to, alloy steel, chromium non-ferrous alloys, stainless steel, superalloys, and chromium alloys. Rule 1407.1 contains collection efficiency requirements and hexavalent chromium mass emission limits to control point source emissions; housekeeping requirements and building enclosure provisions to limit fugitive emissions; and source testing, material testing, parameter monitoring, and recordkeeping requirements. A Final EA was prepared for the project and the analysis concluded that there would be no significant adverse environmental impacts; thus, no alternatives analysis was required.

Estimated Emission Reductions: Not quantified reductions of point source and fugitive emissions of metal toxic air contaminants (e.g., hexavalent chromium, arsenic, cadmium, and nickel). *Cost-Effectiveness:* Not applicable. *CEQA Alternatives:* Not required. *Socioeconomic Impact:* Yes, see Socioeconomic Impact Assessments section. *Source(s) of Funding:* Permit Fees, Emission Fees, Annual Operating Fees, and AB617.

FEBRUARY 5, 2021

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

- 1. Rule 1150.3 – Emissions of Oxides of Nitrogen from Combustion Equipment at Landfills:** Rule 1150.3 was adopted to establish: 1) NO_x and CO emission limits for boilers, process heaters, and turbines located at Municipal Solid Waste landfills and

landfill gas to energy facilities; and 2) emissions monitoring, reporting and recordkeeping requirements. The South Coast AQMD Governing Board determined that the project was exempt from CEQA, therefore, no alternatives analysis was required.

Estimated Emission Reductions: 0.15 ton of NO_x per day. *Cost-Effectiveness:* \$27,200 per ton of NO_x reduced. *CEQA Alternatives:* Not required. *Socioeconomic Impact:* Yes, see Socioeconomic Impact Assessments section. *Source(s) of Funding:* Permit Fees, Emission Fees, Annual Operating Fees, and AB617.

MARCH 5, 2021

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

- 1. Rule 218 Series comprised of Amended Rule 218 – Continuous Emission Monitoring, Rule 218.2 – Continuous Emission Monitoring System: General Provisions, and Rule 218.3 – Continuous Emission Monitoring System: Performance Specifications:** Rule 218 was amended to incorporate a phase-out provision requiring an owner or operator of any Continuous Emission Monitoring System (CEMS) subject to Rules 218 and 218.1 to transition to comply with Rules 218.2 and 218.3 in accordance with the implementation schedule as specified in subdivision (d) of either Rule 218.2 or Rule 218.3, as applicable. Rules 218.2 and 218.3 were adopted to establish requirements and specifications for installation and operation for CEMS at non-RECLAIM and former RECLAIM facilities. Specifically, Rule 218.2 focuses on CEMS administrative requirements and was developed to: 1) incorporate provisions retained from Rule 218 but with updates to the certification process for CEMS modifications and reporting requirements; and 2) incorporate a new provision that would require the continuous operation of CEMS, except during qualifying CEMS maintenance and repair or when an emission source is offline for at least one week. Rule 218.3 focuses on CEMS performance specifications and was developed to: 1) incorporate provisions retained from Rule 218.1 but with modifications to span range, data acquisition and handling system, relative accuracy test audit, and calibration gas requirements; and 2) incorporate a new provision which provides specifications on data handling methods for data measured below 10 percent or above 95 percent of the upper span value, emission data averaging method, CEMS data availability requirements, and CEMS out-of-control period and alternative data acquisition. 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:* Yes, see Socioeconomic Impact Assessments section. *Source(s) of Funding:* Permit Fees, Emission Fees, and Annual Operating Fees.

APRIL 2, 2021

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

1. **Amended Rule 1426 – Emissions from Metal Finishing Operations, and Amended Rule 1469 – Hexavalent Chromium Emissions from Chromium Electroplating and Chromic Acid Anodizing Operations:** Rule 1426 was amended to: 1) reduce fugitive emissions of hexavalent chromium, nickel, cadmium, and lead from metal finishing facilities that have tanks containing one or more of these metals by establishing building enclosure requirements to prevent emissions due to cross drafts; and 2) establish housekeeping requirements and best management practices to minimize or prevent the accumulation of metal toxic air contaminants from tank solutions on. To prevent duplicative requirements and streamline implementation, Rule 1469 was amended to incorporate provisions from Rule 1426 which are applicable to facilities with hexavalent chromium tanks subject to Rule 1469 and other minor administrative amendments. The South Coast AQMD Governing Board determined that the project was exempt from CEQA, therefore, no alternatives analysis was required.

Estimated Emission Reductions: Not quantified, reductions in the ambient air concentrations of hexavalent chromium, nickel, cadmium, and lead. *Cost-Effectiveness:* Not applicable. *CEQA Alternatives:* Not required. *Socioeconomic Impact:* Yes for Rule 1426, see Socioeconomic Impacts Assessment section. *Source(s) of Funding:* Permit Fees, Emission Fees, Annual Operating Fees, and AB617.

MAY 7, 2021

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

1. **Rule 2305 – Warehouse Indirect Source Rule – Warehouse Actions and Investments To Reduce Emissions (WAIRE) Program, and Rule 316 – Fees for Rule 2305:** Rule 2305 was adopted to: 1) either directly reduce emissions of NOx and PM, including diesel PM, or to facilitate local and regional emission reductions of these pollutants from existing and new warehouses with an indoor floor space equal to or greater than 100,000 square feet within a single building and the mobile sources attracted to these warehouses; and 2) subject operators of applicable existing and new warehouses to an annual Warehouse Actions and Investments to Reduce Emissions (WAIRE) Points Compliance Obligation (WPCO) intended to reduce regional and local emissions from warehouse indirect sources and require warehouse operators and/or owners to annually earn a specified number of WAIRE points by completing actions from a menu of emissions reduction measures which included: a) acquiring and/or using near-zero emissions (NZE) and zero-emission (ZE) trucks; b) acquiring and/or using ZE yard trucks; c) installing and/or using ZE charging/fueling infrastructure (e.g., electric charger, hydrogen fuel station) for cars, trucks, and/or

transport refrigeration units; d) installing and/or using onsite energy systems (e.g., solar panels); and e) implementing community benefits (e.g., Minimum Efficiency Reporting Value (MERV 16) or greater filters or filter systems). WAIRE Points may be earned only for “surplus” actions that go beyond existing state and federal regulations. In addition, warehouse operators may apply to earn WAIRE Points through a Custom WAIRE Plan specific to their operations that satisfy prescribed performance metrics, or they can pay an optional mitigation fee to South Coast AQMD that will be used in a mitigation program to achieve the emissions reductions by implementing measures such as subsidizing the purchase of NZE and ZE trucks and/or the installation of charging and fueling infrastructure for ZE trucks. The mitigation program is designed to prioritize use of the mitigation fees in areas near the warehouses using this compliance option.

Rule 316 was adopted to establish fees to be paid by warehouse operators subject to Rule 2305 to fund South Coast AQMD administrative costs associated with: 1) the submittal and review of various notifications and reports; 2) evaluating Custom WAIRE Plans; 3) implementing a program using mitigation fees from warehouse operators that choose to pay a mitigation fee; and 4) implementing compliance activities such as conducting desktop audits, onsite inspections, and reviewing records.

The Final EA concluded that the project had the potential to generate significant and unavoidable adverse environmental impacts for the topics of: 1) aesthetics; 2) agriculture and forestry resources; 3) air quality and greenhouse gas (GHG) emissions; 4) biological resources; 5) cultural resources; 6) energy; 7) geology and soils; 8) hazardous materials; 9) solid and hazardous waste; 10) hydrology and water quality; 10) mineral resources; 11) noise; 12) transportation; and 13) utilities and service systems. The following five alternatives were analyzed:

Alternative A – No Project: Alternative A, the no project alternative, consists of what would occur if the project was not approved. Under Alternative A, the WAIRE Program would not be implemented and therefore, the existing and new warehouses located in the South Coast AQMD’s jurisdiction that meet the applicability requirements in Rule 2305 would not be required to meet their WPCO. Moreover, the WPCO compliance strategies in the form of WAIRE Menu actions, a Custom WAIRE Plan, and/or the payment of the optional mitigation fee would not be implemented.

Alternative B – Decreased Emission Reductions: Alternative B was crafted to result in fewer emission reductions of NO_x and PM_{2.5} through three different approaches: 1) reducing the number of affected warehouses by increasing the warehouse size requirement from “greater than or equal to 100,000 square feet” to “greater than or equal to 200,000 square feet”; 2) postponing the beginning of the initial compliance and reporting dates by one year, such that the regulated warehouses would have a longer time period to plan for and phase in any actions

that they would need to undertake to meet their WPCO; and 3) relaxing the rule stringency, such that the rule stringency factor is less than 0.0025 WAIRE Points per weighted annual truck trips (WATT) and could be as low as 0.0001 WAIRE Points per WATT.

Alternative C – Increased Emission Reductions: Alternative C was crafted to result in greater emission reductions of NO_x and PM_{2.5} in two different ways: 1) increasing the number of affected warehouses under WAIRE Program by removing the warehouse size requirement of “greater than or equal to 100,000 square feet” and including all warehouses; and 2) increasing the rule stringency, such that the rule stringency factor is greater than 0.0025 WAIRE Points per WATT and could be as high as 0.0050 WAIRE Points per WATT.

Alternative D – All Natural Gas Options Only: Alternative D was crafted to limit the number of actions on the WAIRE Menu that warehouse operators could select and implement to earn WAIRE Points, while maintaining the rule stringency factor of 0.0025 WAIRE Points per WATT. Specifically, the only actions allowed to earn WAIRE Points under Alternative D are related to the use of all-natural gas equipment such as the acquisition and/or use of natural gas trucks, renewable natural gas (RNG) and/or LNG and equipment, and installation and/or use of natural gas infrastructure. Alternative D would limit the range of compliance actions on the WAIRE Menu as constraints. Under Alternative D, the number and types of actions on the Custom WAIRE Plans that warehouse operators could select and implement to earn WAIRE Points would also be limited to the use of all-natural gas equipment, and/or installation and/or use of natural gas infrastructure and would not include non-natural gas options.

Alternative E – All Electric Options Only: Alternative E was crafted to limit the number of actions on the WAIRE Menu that warehouse operators could select and implement to earn WAIRE Points, while maintaining the rule stringency factor of 0.0025 WAIRE Points per WATT. Specifically, the only actions allowed to earn WAIRE Points under Alternative E are related to the use of all-electric equipment such as the acquisition and/or use of all-electric trucks and installation and/or use of ZE fueling or charging infrastructure. Alternative E would limit the range of compliance actions on the WAIRE Menu as constraints. Under Alternative E, the number and types of actions on the Custom WAIRE Plans that warehouse operators could select and implement to earn WAIRE Points would also be limited to the use of all electric equipment and would not include non-electric options.

The South Coast AQMD Governing Board certified the Final EA and approved the project as proposed.

Estimated Emission Reductions: Approximately 1.5 to 2.5 tons per day of NO_x, with emission reductions beginning as early as 2022 but no later than the 2023-2024 period. Over the compliance period from 2022 to 2031, Rule 2305 will result in a total of 3,200 to 8,600 tons of NO_x reductions and 48 to 64 tons of PM reductions. No emission reductions

are expected from implementing Rule 316. *Cost-Effectiveness*: -\$11,000 - \$101,000 per tons of NOx reduced per day. *CEQA Alternatives*: Five alternatives were analyzed, see alternatives described above. *Socioeconomic Impact*: Yes, see Socioeconomic Impacts Assessment section. *Source(s) of Funding*: Permit Fees, Emission Fees, Annual Operating Fees, mobile sources, and AB617.

JUNE 4, 2021

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

- 1. Amended Rule 1466 – Control of Particulate Emissions from Soils with Toxic Air Contaminants:** Rule 1466 was designed to minimize the off-site fugitive dust emissions containing toxic air contaminants via dust control measures that can be implemented during earth-moving activities at applicable sites. Specifically, Rule 1466 was amended to further minimize fugitive dust emissions containing toxic air contaminants by: 1) expanding the types of earth-moving activities to include dredging, earth-cutting and filling, and mechanized land clearing; 2) enhancing dust control measures for vehicles, stockpiling, periods of inactivity, and sites adjacent to schools, joint use agreement properties, and athletic areas; 3) removing alternative provisions for dust control measures, ambient dust concentration limits, and other requirements; 4) clarifying and revising monitoring, PM10 calculation methodologies, and dust control measures; 5) adding additional requirements for notifications and recordkeeping; and 6) streamlining provisions for existing fencing and signage. The South Coast AQMD Governing Board determined that the project was exempt from CEQA and, therefore, no alternatives analysis was required.

Estimated Emission Reductions: Not quantified. *Cost-Effectiveness*: Not applicable. *CEQA Alternatives*: Not required. *Socioeconomic Impact*: Yes, see Socioeconomic Impacts Assessment section. *Source(s) of Funding*: Permit Fees, Emission Fees, and Annual Operating Fees.

- 2. Amended Rule 1469.1 – Spraying Operations Using Coatings Containing Chromium:** Rule 1469.1 was amended to reduce hexavalent chromium emissions from the spraying of chromate coatings and related activities by: 1) updating point source monitoring ; 2) updating housekeeping, best management practices, and building enclosure requirements ; 3) adding requirements for visual inspections and duct cleaning; 4) revising recordkeeping requirements; 5) adding prohibitions for certain spray booths ; 6) updating definitions ; and 7) revising exemptions. The South Coast AQMD Governing Board determined that the project was exempt from CEQA and, therefore, no alternatives analysis was required.

Estimated Emission Reductions: Not quantified. *Cost-Effectiveness*: Not applicable. *CEQA Alternatives*: Not required. *Socioeconomic Impact*: Yes, see Socioeconomic Impacts

Assessment section. *Source(s) of Funding:* Permit Fees, Emission Fees, Annual Operating Fees and AB617.

AUGUST 6, 2021

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

- 1. Rule 1147.1 – NO_x Reductions from Aggregate Dryers:** Rule 1147.1 was adopted to reduce NO_x emission limits, while limiting CO emissions, from gaseous fuel-fired aggregate dryers previously regulated by South Coast AQMD Rule 1147 – NO_x Reductions from Miscellaneous Sources, in the “asphalt manufacturing” category. Rule 1147.1 establishes: 1) emission limits of 30 parts per million (ppm) NO_x and 1,000 ppm CO, which represent Best Available Retrofit Control Technology (BARCT); 2) compliance deadlines with an implementation schedule that takes into consideration equipment age, the existing permitted NO_x limit, the number of units per facility, and whether facilities have multiple pieces of equipment subject to multiple source-specific command-and-control rules; and 3) monitoring, reporting, and recordkeeping requirements. The South Coast AQMD Governing Board determined that the project was exempt from CEQA and, therefore, no alternatives analysis was required.

Estimated Emission Reductions: 0.01 ton of NO_x per day by July 1, 2025 and 0.04 ton per day by July 1, 2056. *Cost-Effectiveness:* \$46,000 per ton of NO_x reduced. *CEQA Alternatives:* Not required. *Socioeconomic Impact:* Yes, see Socioeconomic Impact Assessments section. *Source(s) of Funding:* Permit Fees, Emission Fees, Annual Operating Fees, and AB617.

OCTOBER 1, 2021

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

- 1. Amended Rule 1111 – Reduction of NO_x Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces:** Rule 1111 was amended to: 1) extend the mitigation fee alternative compliance option end date from September 30, 2021 to September 30, 2023 for mobile home furnaces; 2) extend the exemption for condensing and non-condensing furnaces certified at 40 nanograms per Joule (ng/J) for installations in high-altitude areas (e.g., elevations greater than or equal to 4,200 feet) from September 30, 2021 to March 31, 2022; 3) permanently exempt downflow and large-sized (e.g., rated at or greater than 100,000 British thermal units (BTU) per hour) condensing and non-condensing furnaces that are installed in high altitude areas (e.g., elevations greater than or equal to 4,200 feet); and 4) add requirements for recordkeeping and labeling. The South Coast AQMD

Governing Board determined that the project was exempt from CEQA and, therefore, no alternatives analysis was required.

Estimated Emission Reductions: A delay in achieving approximately 0.016 ton per day (equivalent to 32 pounds per day) of NOx emission reductions as a result of the delayed compliance date for mobile home furnaces and a negligible amount of NOx emission reductions forgone (e.g., less than one pound per day) as a result of the exemptions for furnaces installed in high-altitude areas. *Cost-Effectiveness:* Not required. *CEQA Alternatives:* Not required. *Socioeconomic Impact:* None. *Source(s) of Funding:* Emission Fees and Annual Operating Fees.

2. **Rule 118.1 – Public Safety Provisions for Stationary Emergency Standby Engines, and Amended Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines:** Rule 118.1 was adopted to: 1) provide critical service facilities that operate emergency standby engines to exclude operating hours during a Public Safety Power Shutoff event (PSPS) as well as during activities associated with a PSPS event the option to exclude these engine operating hours from counting towards an annual operating limit of up to 200 hours; and 2) require notification and summary reports for facilities electing to exclude emergency standby engine operating hours due to a PSPS event. Rule 1470 was amended to: 1) establish alternative testing schedule and maintenance requirements for in-use stationary emergency standby diesel-fueled compression ignition engines rated at greater than 50 brake horsepower at applicable water and sewage facilities located in very high fire hazard severity zones provided they are not located in SB 535 Disadvantaged Communities; 2) allow applicable water and sewage facilities to conduct maintenance and testing according to an alternative schedule provided that the operating permit incorporates the alternative schedule limiting the maintenance and testing to no more than 20 hours averaged over a consecutive three-year rolling period, with no individual calendar year exceeding 30 hours; and 3) include revised definitions of terms for the sake of clarity and consistency throughout the rule. The South Coast AQMD Governing Board determined that the project was exempt from CEQA and, therefore, no alternatives analysis was required.

Estimated Emission Reductions: None. *Cost-Effectiveness:* Not required. *CEQA Alternatives:* Not required. *Socioeconomic Impact:* None. *Source(s) of Funding:* Permit Fees, Emission Fees, Annual Operating Fees, and AB617.

NOVEMBER 5, 2021

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

1. **Rule 1109.1 – Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations, Rule 429.1 – Startup and Shutdown Provisions at Petroleum**

Refineries and Related Operations, Amended Rule 1304 – Exemptions, Amended Rule 2005 – New Source Review for RECLAIM, and Rescinded Rule 1109 – Emissions of Oxides of Nitrogen from Boilers and Process Heaters in Petroleum Refineries: This project is comprised of adopted Rules 1109.1 and 429.1, amended Rules 1304 and 2005, and rescinded Rule 1109. Rule 1109.1 was adopted to implement BARCT requirements to reduce NO_x emissions while not increasing CO emissions from petroleum refineries and facilities with operations related to petroleum refineries. Boilers, gas turbines, ground level flares, fluidized catalytic cracking units, petroleum coke calciners, process heaters, sulfur recovery units/tail gas treating units, steam methane reformer (SMR) heaters, SMR heaters with gas turbine, sulfuric acid furnaces, and vapor incinerators are categories of combustion equipment subject to Rule 1109.1.

Rule 429.1 was adopted to establish: 1) new requirements for startup, shutdown, commissioning, and certain maintenance events, including an exemption from the NO_x and CO concentration limits in Rule 1109.1 during these events; and 2) notification and recordkeeping requirements for units subject to Rule 1109.1).

Rules 1304 and 2005 were amended to include a narrow best available control technology (BACT) exemption to address potential emission increases associated with the installation of new or the modification of existing post-combustion air pollution control equipment, including but not limited to selective catalytic reduction (SCR) and ultralow NO_x burner (ULNB) technology, or other equipment modifications to comply with the NO_x emission limits in Rule 1109.1. Lastly, Rule 1109 was rescinded because the requirements in Rule 1109.1 supersede the outdated requirements in Rule 1109.

This project amended the previous BARCT assessments conducted for: 1) facilities in the refinery sector as previously analyzed in the December 2015 Final Program EA (PEA) for Amended Regulation XX – Regional Clean Air Incentives Market (December 2015 Final PEA for NO_x RECLAIM); and 2) Control Measure CMB-05 and the entire RECLAIM Transition project in the 2016 Air Quality Management Plan (AQMP) as previously analyzed in the March 2017 Final Program Environmental Impact Report (EIR) for the 2016 AQMP. A Final Subsequent EA (SEA) was prepared for this project and the analysis concluded that there would be more severe potential significant and unavoidable adverse environmental impacts compared to the NO_x RECLAIM project analyzed in the December 2015 Final PEA for NO_x RECLAIM in terms of construction-related air quality, hazards and hazardous materials associated with ammonia, and hydrology. The Final SEA also concluded that the project is expected to have less severe, but significant impacts for greenhouse gas emissions that were previously examined in the December 2015 Final PEA for NO_x RECLAIM. The following four alternatives were analyzed in the Final SEA:

Alternative A – No Project: Alternative A, the no project alternative, means that petroleum refineries and facilities related to petroleum refineries would remain

subject to the NOx RECLAIM program and not be subject to a command-and-control rule. Under Alternative A, facilities remaining subject to the RECLAIM program would still be subject to the 12 tons per day NOx RECLAIM Trading Credit (RTC) shave by the end of 2022 and the state law adopted pursuant to AB 617 which requires air districts “in nonattainment for one or more air pollutants to adopt an expedited schedule for the implementation of best available retrofit control technology, as specified.” AB 617 applies to each industrial source that, as of January 1, 2017, was subject to a specified market-based compliance mechanism (e.g., CARB’s AB 32 Cap-and-Trade program for GHGs) and gives highest priority to those permitted units that have not modified emissions-related permit conditions for the greatest period of time. Thus, facilities would still need to be evaluated under a BARCT analysis and, depending on the outcome of that analysis, would need to take action to comply.

Alternative B – More Stringent Proposed Project: Alternative B contemplated more requirements, more stringent emission limits to be achieved, and less flexibility or relief to those subject to the project. Alternative B proposed applying earlier deadlines so that the small heaters would need to achieve nine ppm NOx within five years, and small boilers would need to achieve five ppm NOx within six months of having 25 percent or more of the burners replaced.

Alternative C – Less Stringent Proposed Project: Alternative C contemplated fewer requirements, higher (less stringent) emission limits to be achieved, and more flexibility or relief to comply with the project requirements. Under Alternative C, the time frames for operators to submit an I-Plan in order to achieve NOx and CO limits were adjusted to include a two- or three-phase timeline, with reduced percentage reduction targets for each phase.

Alternative D – Limited Start-up, Shutdown, Malfunction: Alternative D would allow emissions that occur during start-ups, shutdowns, and malfunctions (SSM), pursuant to the definitions in the Rule 429.1, to not be considered when determining compliance with the NOx emission limits in Rule 1109.1 by limiting the duration and severity (e.g., peak NOx concentration in terms of ppm) of each SSM event.

The South Coast AQMD Governing Board certified the Final SEA and approved the project as proposed.

Estimated Emission Reductions: 7 to 8 tons per day of NOx while not increasing CO emissions, with a corresponding regionwide net decrease in annual PM2.5 concentration of 0.11 micrograms per cubic meter. *Cost-Effectiveness:* \$32,698 per ton of NOx reduced. *CEQA Alternatives:* Four alternatives were analyzed, see alternatives described above. *Socioeconomic Impact:* Yes, see Socioeconomic Assessments section. *Source(s) of Funding:* Permit Fees, Emission Fees, Annual Operating Fees, and AB617.

SOCIOECONOMIC IMPACT ASSESSMENTS

California 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 the requirements of 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 2021, the South Coast AQMD identified and analyzed potential socioeconomic impacts of six new rules (Rule 118.1 (with Rule 1470 amendments), 1109.1, 1147.1, 1150.3, 1407.1, and 2305), five amended rules (Rule 218 Series, 1111, 1426 (combined rule development with 1469), 1466, and 1469.1), and Regulation III – Fees. Significant socioeconomic impacts were identified for the Rule 218 Series, Rule 1109.1, Rule 1407.1, and Rule 2305 and these are described in more detail in this section. 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.

RULE DEVELOPMENT PROJECTS WITH SIGNIFICANT SOCIOECONOMIC IMPACTS

Rule 1407.1 – Control of Toxic Air Contaminant Emissions from Chromium Alloy Melting Operations (Adopted January 8, 2021)

Rule 1407.1 was adopted on January 8, 2021, to address toxic air contaminant (TAC) emissions from melting operations of metals that contain greater than 0.5 percent chromium content, including, but not limited to alloy steel, chromium non-ferrous alloys, stainless steel, and superalloys. Rule 1407.1 establishes point source emission limits, housekeeping requirements and building enclosure provisions to address fugitive emissions, source testing requirements, material testing, and monitoring, reporting, and recordkeeping requirements. Staff identified 11 facilities in the manufacturing sector (NAICS 31-33) that are potentially affected by the requirements of Rule 1407.1.

Staff analyzed cost impacts for the following requirements in Rule 1407.1: 1) Baghouses with High Efficiency Particle Arrestors/Ultra Low Particulate Air Systems; 2) Bag Leak Detection Systems (BLDS); 3) Building modifications; 4) Source testing requirements; 5) Smoke Tests; 6) Housekeeping and roof cleaning; 7) Butterfly Cap Installation; and 8) Standards and Calibration Materials. The overall cost of Rule 1407.1 ranges between \$39.7 million to \$53.8 million, or \$2.75 million to \$2.79 million annually (between 2021 and 2041), depending on the real-interest rate scenario (1% and 4%, respectively). Job impacts resulting from implementation of Rule 1407.1 were estimated between 98 and 100 jobs foregone on average annually between 2021 and 2041, and the impacts were largest in the manufacturing industry with an average of 27 jobs foregone annually.

Rule 218 Series (Adopted March 5, 2021) comprised of:

- **Amended Rule 218 - Continuous Emission Monitoring**
- **Amended Rule 218.1 - Continuous Emission Monitoring Performance Specifications**
- **Rule 218.2 - Continuous Emission Monitoring System**
- **Rule 218.3 - Continuous Emission Monitoring System: Performance Specification**

The Rule 218 Series does not impact air quality or emission limitations, and as such a socioeconomic assessment was not statutorily required. Nevertheless, staff prepared a brief potential cost and regional economic impacts assessment for Rule 218 Series. The Rule 218 Series requires affected facilities to purchase data acquisition and handling systems (DAHS) software that controls the CEMS equipment. The universe of affected facilities comprised of a wide range of industries with a large variability in the number of devices per facility. Staff identified 47 different North American Industry Classification System (NAICS) codes in universe of the affected facilities, with the largest number of devices in the Petroleum and Coal Products Manufacturing (NAICS 324) industry. An estimated 765 CEMS devices at 205 facilities were identified as potentially affected by the requirements of the Rule 218 Series.

Staff expects that most of the compliance costs from the Rule 218 Series are one-time costs for software upgrades for each device. The estimated cost per upgrade at refineries is about \$21,000 per device, and the largest cost per refinery is \$1 million (due to the large number of devices using continuous emission monitoring systems). For non-refinery facilities, staff assumed an upgrade cost of \$65,000 per device. The total one-time cost of the Rule 218 series is estimated at \$38.1 million. The annualized cost of the proposed rules and amendments in the 218 Series are expected to be from \$1.5 to \$2.2 million annually between 2024 and 2049, respectively. The 218 Series is expected to result in 44 to 68 jobs foregone annually on average over 25 years of expected useful life of the software upgrades. About 63 percent of the affected facilities are classified as small businesses under the Small Business Association definition.

Rule 2305 – Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions (WAIRE) Program, and Proposed Rule 316 – Fees for Rule 2305 (Adopted May 7, 2021)

Rule 2305 applies to any existing or new warehouse located in South Coast AQMD’s jurisdiction with an indoor warehouse floor space equal to or greater than 100,000 square feet within a single building that may be used for warehousing activities by one or more warehouse operators. Rule 2305 requires warehouses subject to the rule to annually take actions which either reduce emissions regionally and/or locally or that facilitate emission reductions.

Staff’s analysis expects Rule 2305 to potentially affect 3,995 warehouse operators at 2,902 warehouses classified under a variety of industry codes, mainly in the goods-movement industries of construction (NAICS 23), manufacturing (NAICS 31-33), wholesale trade (NAICS 42), retail trade (NAICS 44-45), and transportation and warehousing (NAICS 48-49). Of the 3,995 warehouse operators potentially affected by Rule 2305, 1,964 are estimated to be in Los Angeles County, 468 estimated to be in Orange County, 470 estimated to be in Riverside County, and 1,093 estimated to be in San Bernardino County.

Staff analyzed the following potential costs for Rule 2305:

- Zero-emission (ZE) and near zero-emission (NZE) Truck Acquisitions (Capital Cost) and Usage (Operating & Maintenance [O&M] Cost)
- ZE and NZE Truck Visits from a Fleet Not Owned by a Warehouse Operator (O&M)
- Electric Vehicle Charger Acquisition (Capital) and Usage (O&M)
- Hydrogen Filling Station Acquisition (Capital) and Usage (O&M)
- ZE Yard Truck Acquisition (Capital) and Usage (O&M)
- Solar Panel Acquisition (Capital) and Usage (O&M)
- High-Efficiency Filter Systems Acquisition (Capital) and Replacement Filters (O&M)
- Transport Refrigeration Units (TRU) Plug Acquisition (Capital) and Usage (O&M)

- Pay Mitigation Fee (O&M)
- Administrative Costs

Staff analyzed 19 different scenarios to show a range of potential outcomes. The cost outcomes are shown in the following table:

Scenario No.	Equipment	Discounted Total Cost – Net Present Value 4% (in millions)	Average Annual Cost (in millions)	Average Cost per Square Foot per Year
Sc1	NZE Class 8	\$1,103	\$127	\$0.16
Sc2	NZE Class 8	\$1,220	\$139	\$0.17
Sc3	NZE Class 8	\$374	\$45	\$0.06
Sc4	NZE Class 8	\$750	\$94	\$0.12
Sc5	ZE Class 8	\$942	\$112	\$0.14
Sc6	ZE Class 6 & 8	\$1,604	\$187	\$0.23
Sc7	Mitigation Fee	\$5,264	\$670	\$0.83
Sc7a	Mitigation Fee	\$985	\$114	\$0.14
Sc8	NZE Class 6	\$1,627	\$184	\$0.23
Sc9	NZE Class 6	\$468	\$59	\$0.07
Sc10	ZE Class 6	-\$87	-\$13	-\$0.02
Sc11	Solar	\$9,712	\$979	\$1.21
Sc12	ZE Class 8	\$7,445	\$837	\$1.04
Sc13	ZE Class 2b-3	\$753	\$82	\$0.10
Sc14	ZE Class 2b-3	\$978	\$119	\$0.15
Sc15	Filter System	\$5,057	\$635	\$0.79
Sc16	Filter	\$4,953	\$622	\$0.77
Sc17	TRU	\$46	\$6	\$0.70
Sc18	Yard Trucks	\$1,029	\$120	\$0.15

Average annual costs of Rule 2305 range from -\$12.6 million/year (or -\$0.02/square foot/year) for the lowest cost scenario (Scenario 10: ZE Class 6 Visits from a Non-owned Fleet) up to \$979.0 million/year (or \$1.21/square foot/year) for the highest cost scenario (Scenario 11: Solar Panel Installations).

Based on the different scenarios, the compliance cost of Rule 2305, and the application of the Regional Economic Models, Inc. (REMI) model, the projected job impact ranges from up to 240 jobs created to up to 11,100 jobs forgone on average annually from 2022 to 2031 in total across all South Coast AQMD industries for the low-cost (Scenario 10) and high-cost (Scenario 7) scenarios, respectively. Scenario 10 assumed all potentially affected warehouse operators comply with Rule 2305 through third party visits from Class 6 zero-emission vehicles, while Scenario 7 assumed all potentially affected warehouse operators comply with Rule 2305 by paying a mitigation fee and not receiving any funds from the mitigation fee for future compliance with Rule 2305.

Rule 1109.1 – Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations (Adopted November 5, 2021)

Rule 1109.1 was adopted on November 5, 2021, to address NOx emissions from combustion equipment at facilities, including asphalt plants, biofuel plants, hydrogen production plants, petroleum refineries, facilities that operate petroleum coke calciners, sulfuric acid plants, and sulfur recovery plants. Rule 1109.1 is one of the “landing rule” projects that facilitates the transition of the NOx RECLAIM program to a command-and-control regulatory structure. The rule established NOx and CO emission limits to reflect the Best Available Retrofit Control Technologies (BARCT) for most combustion equipment categories at these facilities. Additionally, Rule 1109.1 established provisions for monitoring, recordkeeping, and reporting and provides alternative implementation and compliance approaches including an Implementation Plan (I-Plan), BARCT Equivalent Compliance Plan (B-Plan), and BARCT Equivalent Mass Cap Plan (B-Cap), which provides flexibility and opportunities for facilities to reduce cost impacts. Rule 1109.1 is expected to realize 7 to 8 tons per day in NOx emission reductions.

The majority of the cost impacts affect seven refineries and estimated costs for Selective Catalytic Reduction (SCR) retrofits and upgrade projects on heaters and boilers (using Ultra Low-NOx Burner technology). The total discounted costs range from \$2.336 billion to \$2.920 billion based on 4% and 1% discount rates, respectively, and the average annual total costs of Rule 1109.1 range from \$98.10 million to \$132.45 million per year based on the 1% and 4% real interest rate, respectively. Despite incurring most of the total compliance cost, the petroleum and coal products manufacturing industry (NAICS 324) is projected to experience only minor impacts in terms of jobs forgone (14 annually, on average). This is due to the fact that the industry is capital-intensive. As such, less labor would be required to produce the same number of products or services.

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 2021 annual assessment of Rule 320 resulted in an across-the-board 1.7-percent increase in fee rates (equivalent to the change in the California CPI from December 2019 to December 2020) which went into effect on July 1, 2021. 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.

Nearly all the facilities regulated by the 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 \$4.57 million to the 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 \$1.80 million for about 3,500 facilities), followed by the services sector (approximately \$0.72 million for about 10,000 facilities) and the retail trade sector (approximately \$0.65 million for about 4,200 facilities). Within the manufacturing sector, the petroleum and coal products manufacturing industry, mostly comprised of refineries, was estimated to experience an increase of approximately \$0.67 million.

CHAPTER II
ENGINEERING AND PERMITTING ACTIVITIES

Engineering and Permitting

Description of Services

Engineering & Permitting (E&P) is responsible for processing applications for Permits to Construct and Operate, and for special services. The permit processing activities involve approximately 340 major facilities that have been issued Title V Federal Operating permits, about 240 facilities in the RECLAIM program, and over 25,000 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.

Recent Accomplishments

- 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 2,100 Permits to Construct and 5,700 applications for Permits, Plans, and ERC during FY 2020-21;
 - 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 create a cushion to help address additional incoming permit applications anticipated from RECLAIM program phase-out over the next one to three years.
- Met the 3,000 pending applications (less RECLAIM transition applications) target for FY 2020-21 by maintaining pending application inventory (excluding Permits to Construct issued).
- Achieved and maintained the timely completion rate for new permit applications by processing over 71 percent of new permit applications within 180 days of being deemed complete.
- Issued over 144 Title V renewal and modification permits in calendar year 2021.
- Continued development of Online Permit Processing tools and other automation efforts, including additional Rule 222 Registration equipment, as well as Forms E-xx. Continued to support online permitting for dry cleaning equipment, gasoline dispensing facilities and automotive refinishing spray booths, as well as three Rule 222 Registration categories. Over 400 permits and registrations were issued online during the 12-month period.
- 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).

- Coordinated with Compliance and Enforcement Division to provide support for incident response and investigate community reports including but not limited to the October 2021 Dominguez Channel Odor Event.
- Provided Pre- and Post-application conferences to help permit applicants.
- Participated, reviewed, and provided permit remedies to permit holders throughout Calendar Year 2021 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 2021.
- Provided support to 151 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.
- Maintained division-wide efficiency while equipping staff with the necessary tools to effectively work from home.
- Onboarded and trained a new class of 14 permit processing engineers in October 2021.

Anticipated Accomplishments

- 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

Permitting Data

During calendar year 2021, South Coast AQMD dispositioned a total of 5,485 applications. Calendar Year 2021 was the first full year of the COVID-19 pandemic which affected incoming permit applications numbers. Most of these applications were for Permits to Operate (2,376 Area Sources & Certified/ Registrations (885), and Changes of Operators (815). Also, 1,097 permits were not renewed. This data, broken down into nine different categories, is summarized in Table 1 on the following page.

Table - 1
Permit Applications Completed Between 01/01/2021 and 01/01/2022

Type	Count
Permits to Construct	259
Permits to Operate (PO)	2,376
Changes of Operator (C/O)	815
Denials	13
Cancellations	433
Emission Reduction Credits (ERCs)	49
Plans	504
Title V (TV)/RECLAIM	151
Area Sources & Certified/Registrations	885
Total	5,485
<i>Permits Not Renewed</i>	1,097

*This includes 1,606 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 three NAICS codes were 447110/447190 – Gasoline Service Stations, 324110 – Petroleum Refineries, and 811121 - Automotive Body, Paint, and Interior Repair and Maintenance.

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

NAIC (Revised)	NAIC Desc (Revised)	Area Source / Registration	C/O	Cancelled	Denial	ERC	PC	Plans	PO	RECLAIM / TV	Grand Total
111110	Soybean Farming			1			0	0			1
111219	Other Vegetable (except Potato) and Melon Farming						0	1			1
111320	Citrus (except Orange) Groves	1					0	0			1
111332	Grape Vineyards						0	4			4
111920	Cotton Farming						0	1			1
111998	All Other Miscellaneous Crop Farming	1	12				0	8	3	2	26
112990	All Other Animal Production						0	3			3
115114	Postharvest Crop Activities (except Cotton Ginning)			1			1	0	1		3
211111	Crude Petroleum and Natural Gas Extraction – crude petroleum extraction	10		2			0	10	13	3	38
211112	Natural Gas Liquid Extraction						0	0	2		2
211120	Crude Petroleum Extraction	39	32	1			0	1			73
212319	Other Crushed and Broken Stone Mining and Quarrying						0	0	2	1	3
212321	Construction Sand and Gravel Mining						0	0	12		12
213112	Support Activities for Oil and Gas Operations		1				0	1	12		14
221111	Hydroelectric Power Generation	1	1				0	0			2

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

237990	Other Heavy and Civil Engineering Construction					1					0	0	1		2
238110	Poured Concrete Foundation and Structure Contractors				1						0	0	3		4
238120	Structural Steel and Precast Concrete Contractors										0	0	1		1
238130	Framing Contractors				1						0	0	1		2
238160	Roofing Contractors				6						0	0			6
238210	Electrical Contractors and Other Wiring Installation Contractors				10			1			0	2	1		15
238320	Painting and Wall Covering Contractors										0	0	3		3
238350	Finish Carpentry Contractors										0	0	1		1
238390	Other Building Finishing Contractors						2				0	0	1		3
238910	Site Preparation Contractors				19						0	5			24
238990	All Other Specialty Trade Contractors				37						0	1	7		45
311119	Other Animal Food Manufacturing							1			0	0			1
311211	Flour Milling										0	0	2		2
311352	Confectionery Manufacturing from Purchased Chocolate							2			0	0	1		3
311411	Frozen Fruit, Juice, and Vegetable Manufacturing										0	0	2		2
311412	Frozen Specialty Food Manufacturing										0	0	2		2
311422	Specialty Canning										0	0	1		1
311511	Fluid Milk Manufacturing									2	0	0	2		4

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

311611	Animal (except Poultry) Slaughtering				1													1		25
311612	Meat Processed from Carcasses		9		1															14
311613	Rendering and Meat Byproduct Processing																			6
311812	Commercial Bakeries		7		3															24
311824	Dry Pasta, Dough, and Flour Mixes Manufacturing from Purchased Flour																			3
311919	Other Snack Food Manufacturing				1															9
311920	Coffee and Tea Manufacturing		5																	5
311930	Flavoring Syrup and Concentrate Manufacturing				8															13
311942	Spice and Extract Manufacturing		8						2											11
311991	Perishable Prepared Food Manufacturing																			9
311999	All Other Miscellaneous Food Manufacturing		2																	5
312120	Breweries																			15
312140	Distilleries				15															15
312230	Tobacco Manufacturing																			4
313210	Broadwoven Fabric Mills																			4
313310	Textile and Fabric Finishing Mills																			26
313320	Fabric Coating Mills																			5
314999	All Other Miscellaneous Textile Product Mills																			2

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

315220	Men's and Boys' Cut and Sew Apparel Manufacturing								0	0	1	1	1
315240	Women's, Girls', and Infants' Cut and Sew Apparel Manufacturing								0	0	2	2	2
316998	All Other Leather Good and Allied Product Manufacturing								0	0	1	1	1
321114	Wood Preservation			13					0	0			13
321920	Wood Container and Pallet Manufacturing			3	1				0	0			4
321991	Manufactured Home (Mobile Home) Manufacturing				8				0	0			8
322130	Paperboard Mills								0	0	4		4
322211	Corrugated and Solid Fiber Box Manufacturing			3					1	0	9		13
322212	Folding Paperboard Box Manufacturing								1	2	2		5
322220	Paper Bag and Coated and Treated Paper Manufacturing							1	11	0	2	1	15
322299	All Other Converted Paper Product Manufacturing	1							0	0			1
323111	Commercial Printing (except Screen and Books)			3	11				2	0	19	1	36
323113	Commercial Screen Printing								0	0	1		1
324110	Petroleum Refineries							6	40	12	42	31	162
324121	Asphalt Paving Mixture and Block Manufacturing			3	3			2	3	0	17	3	28
324122	Asphalt Shingle and Coating Materials Manufacturing								3	1	8	4	17

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

324191	Petroleum Lubricating Oil and Grease Manufacturing									0	0	2				2
325110	Petrochemical Manufacturing		1							0	2	6				9
325120	Industrial Gas Manufacturing									2	2	3	6			13
325180	Other Basic Inorganic Chemical Manufacturing									0	0	4				4
325211	Plastics Material and Resin Manufacturing		13			3				0	0	5	1			22
325212	Synthetic Rubber Manufacturing					9				0	4					13
325311	Nitrogenous Fertilizer Manufacturing									0	0	2				2
325320	Pesticide and Other Agricultural Chemical Manufacturing			2						0	1	4				7
325411	Medicinal and Botanical Manufacturing			1						0	3					4
325412	Pharmaceutical Preparation Manufacturing			2			6			0	1	11	1			21
325414	Biological Product (except Diagnostic) Manufacturing									0	1	1	1			3
325510	Paint and Coating Manufacturing					3				2	0	8				13
325520	Adhesive Manufacturing						2			0	2	8				12
325611	Soap and Other Detergent Manufacturing			1				42		0	0					43
325612	Polish and Other Sanitation Good Manufacturing									0	0	2				2

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

325613	Surface Active Agent Manufacturing								0	0	1		1
325620	Toilet Preparation Manufacturing							0	2	26			28
325910	Printing Ink Manufacturing							0	0	1			1
325998	All Other Miscellaneous Chemical Product and Preparation Manufacturing							0	0	4			4
326111	Plastics Bag and Pouch Manufacturing							0	1	6	1		8
326112	Plastics Packaging Film and Sheet (including Laminated) Manufacturing							2	1				3
326113	Unlaminated Plastics Film and Sheet (except Packaging) Manufacturing					16		0	0		1		17
326121	Unlaminated Plastics Profile Shape Manufacturing					10		0	0	1	1		12
326122	Plastics Pipe and Pipe Fitting Manufacturing							0	0	1			1
326140	Polystyrene Foam Product Manufacturing						2	0	0		1		3
326150	Urethane and Other Foam Product (except Polystyrene) Manufacturing							0	0	1			2
326199	All Other Plastics Product Manufacturing							1	1	32	2		38
326212	Tire Retreading					6		0	0				6
326299	All Other Rubber Product Manufacturing							0	0	4			4

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

331513	Steel Foundries (except Investment)									1									1
331524	Aluminum Foundries (except Die-Casting)		8							1									10
332111	Iron and Steel Forging									0	2								19
332112	Nonferrous Forging					2				1	11								17
332117	Powder Metallurgy Part Manufacturing		4							0									4
332216	Saw Blade and Handtool Manufacturing					1				1	8								10
332311	Prefabricated Metal Building and Component Manufacturing	1								0									1
332312	Fabricated Structural Metal Manufacturing									0	1								1
332313	Plate Work Manufacturing									0	1								6
332321	Metal Window and Door Manufacturing									2	2								5
332322	Sheet Metal Work Manufacturing									1	3								5
332410	Power Boiler and Heat Exchanger Manufacturing		1							0									1
332431	Metal Can Manufacturing									0									1
332510	Hardware Manufacturing									0	2								2
332613	Spring Manufacturing									0	1								1
332710	Machine Shops									0	7								17
332722	Bolt, Nut, Screw, Rivet, and Washer Manufacturing					3				0	5								11
332811	Metal Heat Treating									0	4								5

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

332812	Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers				1					1	0	13		15
332813	Electroplating, Plating, Polishing, Anodizing, and Coloring		2		17					18	4	40	1	82
332911	Industrial Valve Manufacturing									0	0	2		2
332912	Fluid Power Valve and Hose Fitting Manufacturing		2							0	0	4		6
332913	Plumbing Fixture Fitting and Trim Manufacturing	1								0	0	10		11
332919	Other Metal Valve and Pipe Fitting Manufacturing									0	0	1		1
332994	Small Arms, Ordnance, and Ordnance Accessories Manufacturing				4					0	0			4
332996	Fabricated Pipe and Pipe Fitting Manufacturing		7							0	0	1	1	9
332999	All Other Miscellaneous Fabricated Metal Product Manufacturing							1		0	0	8		9
333111	Farm Machinery and Equipment Manufacturing									0	0	3		3
333132	Oil and Gas Field Machinery and Equipment Manufacturing				1					0	0	2		3

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

333249	Other Industrial Machinery Manufacturing					1				0	0				1
333314	Optical Instrument and Lens Manufacturing								1	0	2				3
333316	Photographic and Photocopying Equipment Manufacturing								0	2					2
333318	Other Commercial and Service Industry Machinery Manufacturing								0	0	1				1
333414	Heating Equipment (except Warm Air Furnaces) Manufacturing		3						0	0					3
333514	Special Die and Tool, Die Set, Jig, and Fixture Manufacturing								0	0	2				2
333911	Pump and Pumping Equipment Manufacturing								0	0	1				1
333924	Industrial Truck, Tractor, Trailer, and Stacker Machinery Manufacturing								2	0	2				4
333994	Industrial Process Furnace and Oven Manufacturing								0	0	5				5
333999	All Other Miscellaneous General Purpose Machinery Manufacturing								0	0	2				2
334118	Computer Terminal and Other Computer Peripheral Equipment Manufacturing								0	0	1				1

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

334220	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing								0	0	2	2	4
334412	Bare Printed Circuit Board Manufacturing	16							0	0	1		17
334413	Semiconductor and Related Device Manufacturing								2	3	12		17
334418	Printed Circuit Assembly (Electronic Assembly) Manufacturing		1						0	0	2		3
334419	Other Electronic Component Manufacturing		2						2	0	2		6
334510	Electromedical and Electrotherapeutic Apparatus Manufacturing		2					1	1	3	11		18
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing								0	0	2		2
334515	Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals	2	23						0	0			25
334516	Analytical Laboratory Instrument Manufacturing		2						0	0	13		15
334519	Other Measuring and Controlling Device Manufacturing	3							0	0	4		7

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

334614	Software and Other Prerecorded Compact Disc, Tape, and Record Reproducing										0	0	10		11
335121	Residential Electric Lighting Fixture Manufacturing										0	0	1		1
335122	Commercial, Industrial, and Institutional Electric Lighting Fixture Manufacturing					1					0	0			1
335129	Other Lighting Equipment Manufacturing						2				0	0			2
335220	Major Household Appliance Manufacturing										0	0	4		4
335312	Motor and Generator Manufacturing						1				0	1			2
335314	Relay and Industrial Control Manufacturing			2							0	1			3
335911	Storage Battery Manufacturing							3			4	3	10		20
335931	Current-Carrying Wiring Device Manufacturing										0	0	2		2
335932	Noncurrent-Carrying Wiring Device Manufacturing										0	0	1		1
335991	Carbon and Graphite Product Manufacturing							1			0	0			1
335999	All Other Miscellaneous Electrical Equipment and Component Manufacturing										0	0	1		1
336111	Automobile Manufacturing										0	0	1		1

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

336211	Motor Vehicle Body Manufacturing		2					0	0	0	3		5
336390	Other Motor Vehicle Parts Manufacturing			4				0	0	1			5
336411	Aircraft Manufacturing	1		4				10	2	21	6		44
336412	Aircraft Engine and Engine Parts Manufacturing							4	6	9	1		20
336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing	1		3				6	0	10			20
336414	Guided Missile and Space Vehicle Manufacturing			1				0	0	22			23
336419	Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment Manufacturing							1	0	2	4		7
336991	Motorcycle, Bicycle, and Parts Manufacturing	1						0	0	1			2
337110	Wood Kitchen Cabinet and Countertop Manufacturing		1					0	1	1	1		4
337122	Nonupholstered Wood Household Furniture Manufacturing							1	0	6	1		8
337125	Household Furniture (except Wood and Metal) Manufacturing				1			0	0				1
337212	Custom Architectural Woodwork and Millwork Manufacturing		2					0	0				2
337215	Showcase, Partition, Shelving, and Locker Manufacturing			1				1	0	2			4

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

337910	Mattress Manufacturing								0	0	10	10
339112	Surgical and Medical Instrument Manufacturing							0	1	9	10	
339113	Surgical Appliance and Supplies Manufacturing	3	2					0	0		5	
339114	Dental Equipment and Supplies Manufacturing							0	0	1	1	
339115	Ophthalmic Goods Manufacturing							0	0	1	1	
339920	Sporting and Athletic Goods Manufacturing							0	0	1	1	
339950	Sign Manufacturing							2	0	15	17	
339992	Musical Instrument Manufacturing							1	0	2	3	
339999	All Other Miscellaneous Manufacturing	42						0	0	5	47	
423110	Automobile and Other Motor Vehicle Merchant Wholesalers							0	0	1	1	
423120	Motor Vehicle Supplies and New Parts Merchant Wholesalers							0	0	1	1	
423130	Tire and Tube Merchant Wholesalers							0	0	1	1	
423220	Home Furnishing Merchant Wholesalers							0	0	1	1	
423310	Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers							0	0	4	4	
423320	Brick, Stone, and Related Construction Material Merchant Wholesalers	1						0	0	24	25	

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

423420	Office Equipment Merchant Wholesalers									0	1						1
423440	Other Commercial Equipment Merchant Wholesalers	20								0	0						20
423450	Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers									4	0	1					5
423510	Metal Service Centers and Other Metal Merchant Wholesalers				12					0	4	2	2				20
423610	Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers	1			1					0	0						2
423690	Other Electronic Parts and Equipment Merchant Wholesalers									0	1						1
423720	Plumbing and Heating Equipment and Supplies (Hydronics) Merchant Wholesalers	7						3		0	0						10
423740	Refrigeration Equipment and Supplies Merchant Wholesalers							1		0	0						1
423810	Construction and Mining (except Oil Well) Machinery and Equipment Merchant Wholesalers	3								0	0	1					4
423830	Industrial Machinery and Equipment Merchant Wholesalers				1			1		0	0	1					3
423840	Industrial Supplies Merchant Wholesalers									0	1	1					2

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

423860	Transportation Equipment and Supplies (except Motor Vehicle) Merchant Wholesalers							4	0										4
423920	Toy and Hobby Goods and Supplies Merchant Wholesalers			1				0	0										1
423930	Recyclable Material Merchant Wholesalers							0	0										7
423990	Other Miscellaneous Durable Goods Merchant Wholesalers							0	0										3
424110	Printing and Writing Paper Merchant Wholesalers				1			0	0										1
424130	Industrial and Personal Service Paper Merchant Wholesalers							0	0										4
424210	Drugs and Druggists' Sundries Merchant Wholesalers							0	4										6
424310	Piece Goods, Notions, and Other Dry Goods Merchant Wholesalers					3		0	0										4
424410	General Line Grocery Merchant Wholesalers						1	0	1										9
424420	Packaged Frozen Food Merchant Wholesalers							0	0										1
424430	Dairy Product (except Dried or Canned) Merchant Wholesalers							0	0										1
424480	Fresh Fruit and Vegetable Merchant Wholesalers							0	0										1
424490	Other Grocery and Related Products Merchant Wholesalers							0	0										1

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

424590	Other Farm Product Raw Material Merchant Wholesalers				1					0	0	3		4
424690	Other Chemical and Allied Products Merchant Wholesalers	1	2							0	0	5		8
424710	Petroleum Bulk Stations and Terminals		1		2			2		3	3	7	3	21
424720	Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals)									0	2	6		8
424810	Beer and Ale Merchant Wholesalers									0	0	7		7
424910	Farm Supplies Merchant Wholesalers									0	0	4		4
424990	Other Miscellaneous Nondurable Goods Merchant Wholesalers	1			1					1	0	1	1	4
441110	New Car Dealers									0	1	6		11
441120	Used Car Dealers						2			0	0	3		5
441228	Motorcycle, ATV, and All Other Motor Vehicle Dealers									0	0	1		1
441320	Tire Dealers									0	0	8		9
442110	Furniture Stores									0	0	2		2
442210	Floor Covering Stores				2					0	0			2
443142	Electronics Stores									0	3	1		4
444110	Home Centers	1								0	0	2		3
444130	Hardware Stores	1			1					0	1	4		7
445110	Supermarkets and Other Grocery (except Convenience) Stores	3	2		1					0	12	9		27
445120	Convenience Stores		1		2					1	0	18		22
445291	Baked Goods Stores				1					0	0			1
445299	All Other Specialty Food Stores				1					0	0			1

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

517919	All Other Telecommunications	2							0	1					3
518210	Data Processing, Hosting, and Related Services		8						0	2					10
519120	Libraries and Archives								0	6					6
522110	Commercial Banking								0	2					2
522130	Credit Unions								0	0	1				1
522292	Real Estate Credit								0	1					1
522298	All Other Nondepository Credit Intermediation								0	0	1				1
522310	Mortgage and Nonmortgage Loan Brokers								0	0	2				2
523910	Miscellaneous Intermediation								0	4	6				10
523930	Investment Advice								0	1					1
523991	Trust, Fiduciary, and Custody Activities	2							0	1					3
524113	Direct Life Insurance Carriers	1							0	0	1				2
524114	Direct Health and Medical Insurance Carriers	1							0	2	1				4
524126	Direct Property and Casualty Insurance Carriers								0	1					1
524210	Insurance Agencies and Brokerages	1							0	0	1				2
525110	Pension Funds	1							0	0					1
525920	Trusts, Estates, and Agency Accounts								0	1	2				3
525990	Other Financial Vehicles								0	1	4				5
531110	Lessors of Residential Buildings and Dwellings	2	12	1					0	3	10				28

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

531120	Lessors of Nonresidential Buildings (except Miniwarehouses)		6	1				0	2	10		19
531130	Lessors of Miniwarehouses and Self-Storage Units	1						0	0			1
531190	Lessors of Other Real Estate Property							0	1	2		3
531210	Offices of Real Estate Agents and Brokers	3						0	3	9		15
531312	Nonresidential Property Managers							2	1	5		8
532111	Passenger Car Rental							0	1	5		6
532120	Truck, Utility Trailer, and RV (Recreational Vehicle) Rental and Leasing							0	0	3		3
532220	Formal Wear and Costume Rental			1				0	0			1
532412	Construction, Mining, and Forestry Machinery and Equipment Rental and Leasing	1						0	0	2		3
532490	Other Commercial and Industrial Machinery and Equipment Rental and Leasing	9		1				0	0	13		23
541110	Offices of Lawyers			1				0	1			2
541213	Tax Preparation Services	2						0	0			2
541310	Architectural Services							0	0	1		1
541320	Landscape Architectural Services	1						0	0			1
541330	Engineering Services	1		6				4	3	5		19
541380	Testing Laboratories	8		2	2			0	1	1		14

Table 2-Calendar Year 2021--Disposition Type by NAICS Code

541712	Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology) – nanotechnology research and experimental development laboratories							0	1	8		9
541713	Research and Development in Nanotechnology	1						0	0			1
541714	Research and Development in Biotechnology (except Nanobiotechnology)		1					0	0			1
541715	Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology)	2						0	1			3
541810	Advertising Agencies			2				0	1			3
541940	Veterinary Services	1						1	0	2		4
541990	All Other Professional, Scientific, and Technical Services	63	3	1				0	3		1	71
551112	Offices of Other Holding Companies	2	1					0	0	4		7
561110	Office Administrative Services	1						0	2	12		15
561210	Facilities Support Services	18						0	0			18
561311	Employment Placement Agencies	1		5				0	0	2		8
561312	Executive Search Services							0	1			1

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

621112	Offices of Physicians, Mental Health Specialists									0	0	1		1
621330	Offices of Mental Health Practitioners (except Physicians)									0	1			1
621340	Offices of Physical, Occupational and Speech Therapists, and Audiologists									0	0	1		1
621410	Family Planning Centers									0	0	1		1
621420	Outpatient Mental Health and Substance Abuse Centers									0	2			2
621491	HMO Medical Centers									0	0	1		1
621498	All Other Outpatient Care Centers									0	0	1		1
621511	Medical Laboratories	2								0	2	3		7
621610	Home Health Care Services									0	0	1		1
621910	Ambulance Services									0	1			1
621991	Blood and Organ Banks	2								0	0	2		4
621999	All Other Miscellaneous Ambulatory Health Care Services	1								0	0	1		2
622110	General Medical and Surgical Hospitals	7	11	4						0	19	25	2	68
622210	Psychiatric and Substance Abuse Hospitals									2	0	2	2	6
622310	Specialty (except Psychiatric and Substance Abuse) Hospitals									0	1			1

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

623110	Nursing Care Facilities (Skilled Nursing Facilities)				2									0	0	2		4
623210	Residential Intellectual and Developmental Disability Facilities													0	0	1		1
623311	Continuing Care Retirement Communities													0	1	1		2
623312	Assisted Living Facilities for the Elderly			1		1								0	1			3
623990	Other Residential Care Facilities													0	0	1		1
624110	Child and Youth Services			1										0	0			1
624120	Services for the Elderly and Persons with Disabilities													0	1	1		2
624190	Other Individual and Family Services													0	1	3		4
624310	Vocational Rehabilitation Services													1	1			2
624410	Child Day Care Services			1										0	0	1		2
711110	Theater Companies and Dinner Theaters			1		1								0	0			2
711190	Other Performing Arts Companies													0	0	1		1
711211	Sports Teams and Clubs			1										0	1			2
711410	Agents and Managers for Artists, Athletes, Entertainers, and Other Public Figures			1										0	0			1
712130	Zoos and Botanical Gardens													0	0	1		1
713110	Amusement and Theme Parks					1		1						5	0	6	1	14

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

713910	Golf Courses and Country Clubs		3							0	0	1		4
713940	Fitness and Recreational Sports Centers									0	3	6		9
721110	Hotels (except Casino Hotels) and Motels	3	2							0	5	10		20
722320	Caterers	1								0	0	3		4
722410	Drinking Places (Alcoholic Beverages)									0	1			1
722511	Full-Service Restaurants	4		1						0	1	7		13
722513	Limited-Service Restaurants	6			1					0	1	5		13
811111	General Automotive Repair		7							0	0	23		30
811112	Automotive Exhaust System Repair		2							0	0	1		3
811118	Other Automotive Mechanical and Electrical Repair and Maintenance		1							1	0	2		4
811121	Automotive Body, Paint, and Interior Repair and Maintenance		54	6						2	1	69	1	133
811192	Car Washes				2					0	0	6		8
811198	All Other Automotive Repair and Maintenance				1					0	0	1		2
811211	Consumer Electronics Repair and Maintenance									0	0	2		2
811219	Other Electronic and Precision Equipment Repair and Maintenance									0	0	2		2

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

811310	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance									0	0	5		5
811412	Appliance Repair and Maintenance	2								0	0	1		3
811420	Reupholstery and Furniture Repair									0	0	1		1
812210	Funeral Homes and Funeral Services									1	0	3		4
812220	Cemeteries and Crematories		3							1	0	7		11
812320	Drycleaning and Laundry Services (except Coin-Operated)		15							0	0	60		75
812921	Photofinishing Laboratories (except One-Hour)									0	7			7
812990	All Other Personal Services		1							0	0			1
813110	Religious Organizations	1								0	3	2		6
813410	Civic and Social Organizations	1								0	0	1		2
813910	Business Associations					1				0	0			1
813920	Professional Organizations									0	0	1		1
813990	Other Similar Organizations (except Business, Professional, Labor, and Political Organizations)	2								0	1	2		5
921110	Executive Offices									0	6	12		27
921120	Legislative Bodies	6								0	1			1

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

NAICS Code	Other General Government Support	12	3				0	3	13	1	32
921190	Other General Government Support										
922110	Courts	1					0	1	2		4
922120	Police Protection	5					0	2	26	1	34
922130	Legal Counsel and Prosecution						0	1			1
922140	Correctional Institutions						0	6	7		13
922150	Parole Offices and Probation Offices						0	1			1
922160	Fire Protection	3					0	2	1		6
922190	Other Justice, Public Order, and Safety Activities	1					0	0			1
923120	Administration of Public Health Programs						0	1			1
923130	Administration of Human Resource Programs (except Education, Public Health, and Veterans' Affairs Programs)						0	1	1		2
924110	Administration of Air and Water Resource and Solid Waste Management Programs						0	0	4		6
924120	Administration of Conservation Programs	1					0	0	1		2
925110	Administration of Housing Programs	1					0	0			1
926110	Administration of General Economic Programs						0	1			1
926120	Regulation and Administration of	3					1	1			6

Table 2-Calendar Year 2021-Disposition Type by NAICS Code

	Transportation Programs																
926130	Regulation and Administration of Communications, Electric, Gas, and Other Utilities			2			2	1	0	4	2					11	
928110	National Security							0	1	6					7		
#N/A	#N/A	206	102	52		4	7	30	217	1					619		
Grand Total		885	815	433	13	49	259	504	2376	151					5485		

Annualized Publication of Emission Reduction Credit (ERC) And Short Term Emission Reduction Credit (STERC) Transactions for Fiscal Year 2020-21¹ (California Health and Safety Code Section 40452)

Pursuant to paragraph (c) of section 40452 of the California Health and Safety Code, this report summarizes data on emission offset transactions and applications, by pollutant, during the previous fiscal year. Note that during Fiscal Year 2020-21, no applications were denied for a permit for a new source for the reason of failure to provide the required emission offsets.

Table 3 summarizes privately held Emission Reduction Credit (ERC) and Short-Term Emission Reduction Credit (STERC) transactions for Fiscal Year 2020-21, including totals, by pollutant, of the number of emission offset transactions and the quantity of emission offsets transferred in units of pounds per day and tons per year. Table 4 summarizes ERC banking applications processed during Fiscal Year 2020-21, including the number of newly generated STERCs by pollutant in units of pounds per day and tons per year.

Tables 4 and 5 provide details on the amount of each emission offset transaction and processed ERC banking application, respectively.

Table 3: Emission Offset Transactions – Fiscal Year 2020-21

Criteria Pollutant	Number of Emission Offset Transfer Transactions ²				Quantity of Emission Offsets Transferred ³ (lb/day)				Annualized Quantity of Emission Offsets Transferred ³ (ton/year ⁴)			
	ERC	STERC ⁵	STERC ⁶	TOTAL	ERC	STERC ⁵	STERC ⁶	TOTAL	ERC	STERC ⁵	STERC ⁶	TOTAL
ROG	15	6	0	21	349	44	0	393	63.7	8	0	71.7
NOX	3	0	0	3	5	0	0	5	1	0	0	1
SOX	0	0	0	0	0	0	0	0	0	0	0	0
CO	0	0	0	0	0	0	0	0	0	0	0	0
PM10	3	0	0	3	11	0	0	11	2	0	0	2

¹ This report does not include RECLAIM Trading Credit (RTC) transactions.

² Includes all emission offset certificates that transferred ownership.

³ Includes the total amount of emission offsets transferred.

⁴ Sum of individual transactions in Table 3.

⁵ STERC transfer transactions including the long term emission offset, those that have an ending year of 9999.

⁶ STERC transfer transactions not including the long term emission offset in which the emission offset with the greatest year is treated like a long term emission offset.

Table 4: Emission Offset Applications – Fiscal Year 2020-21

Criteria Pollutant	Number of Banking Applications Resulting in the Issuance of New STERCs ⁷	Quantity of Emission Reductions Achieved (STERCs) ⁸ (lb/day)	Annualized Quantity of Emission Reductions Achieved ⁹ (ton/year ⁹)
ROG	0	0	0
NOX	0	0	0
SOX	0	0	0
CO	0	0	0
PM10	0	0	0

**Table 4: Emission Offset Transaction Summary – Fiscal Year 2020-21
Sorted by Pollutant and Amount**

SCAQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
SC2021-001	ROG	2	0.4	ERC	N/A	N/A
SC2021-002	ROG	13	2.4	ERC	N/A	N/A
SC2021-003	ROG	4	0.7	ERC	N/A	N/A
SC2021-004	ROG	6	1.1	ERC	N/A	N/A
SC2021-005	ROG	4	0	STERC	2020	2020
SC2021-006	ROG	4	0.7	STERC	2021	9999
SC2021-007	ROG	17	3.1	STERC	2021	9999
SC2021-008	ROG	1	0.2	ERC	N/A	N/A
SC2021-009	ROG	150	27.4	ERC	N/A	N/A
SC2021-010	ROG	2	0.4	STERC	2011	9999
SC2021-011	ROG	11	2	STERC	2021	9999
SC2021-012	ROG	1	0.2	ERC	N/A	N/A
SC2021-013	ROG	1	0.2	ERC	N/A	N/A
SC2021-014	ROG	5	0.9	STERC	2021	9999

⁷ Includes all emission offset applications resulting in the generation of new certificates.

⁸ Includes the total amount of emission offsets generated.

⁹ Sum of individual transactions in Table 4.

SCAQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
SC2021-015	ROG	5	0.9	STERC	2021	9999
SC2021-016	ROG	1	0.2	ERC	N/A	N/A
SC2021-017	ROG	1	0.2	ERC	N/A	N/A
SC2021-018	ROG	66	12	ERC	N/A	N/A
SC2021-019	ROG	33	6	ERC	N/A	N/A
SC2021-020	ROG	1	0.2	ERC	N/A	N/A
SC2021-021	ROG	3	0.5	ERC	N/A	N/A
SC2021-022	ROG	66	12	ERC	N/A	N/A
Total		397	71.7		N/A	

Table 4, Continued

SCAQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
SC1920-023	NOX	1	0.2	ERC	N/A	N/A
SC1920-024	NOX	2	0.4	ERC	N/A	N/A
SC1920-025	NOX	2	0.4	ERC	N/A	N/A
Total		5	1		N/A	

Table 4, Continued

SCAQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
N/A	SOX	No Records				
Total		181	33		N/A	

Table 4, Continued

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

Table 4, Continued

SCAQMD NO.	POLLUTANT	AMOUNT (LB/DAY)	AMOUNT (TON/YR)	TYPE	START YEAR	END YEAR
SC2021-026	PM10	1	0.2	ERC	N/A	N/A
SC2021-027	PM10	7	1.3	ERC	N/A	N/A
SC2021-028	PM10	3	0.5	ERC	N/A	N/A
Total		11	2	N/A		

**Table 5: Emission Offset Application Summary – Fiscal Year 2020-21
Sorted by Pollutant and Amount**

SCAQMD NO.	POLLUTANT	AMOUNT ¹⁰ (LB/DAY)	AMOUNT ¹⁰ (TON/YR)	TYPE	START YEAR	END YEAR
N/A	No Records					
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 2022-2023 BUDGET

Due to the bulk of these material, Chapter III is available online at [Budget Cover Design 2022 \(003\).pdf \(aqmd.gov\)](#). 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.

**CHAPTER IV
CLEAN FUELS PROGRAM 2021 ANNUAL REPORT AND 2022 PLAN UPDATE**

Due to the bulk of these material, Chapter IV is available online at [Reports \(aqmd.gov\)](https://reports.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.

CHAPTER V
ANNUAL RECLAIM AUDIT REPORT FOR 2020 COMPLIANCE YEAR

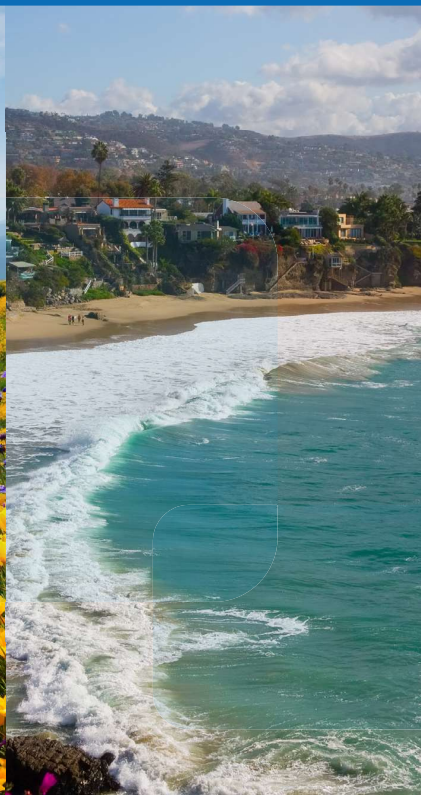
Due to the bulk of these material, Chapter V is available online at [RECLAIM Annual Reports for each Compliance Year](#). Anyone who would like to obtain a hard copy may do so by contacting South Coast AQMD's Public Information Center at (909)396-2001.



South Coast
AQMD

Budget

Fiscal Year
2022-2023



South Coast Air Quality Management District



SOUTH COAST

AIR QUALITY MANAGEMENT DISTRICT

BUDGET
FISCAL YEAR 2022-2023

Prepared by Finance
Sujata Jain, Chief Financial Officer



SOUTH COAST
AIR QUALITY MANAGEMENT DISTRICT

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SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

GOVERNING BOARD

BEN BENOIT
Chairman
Cities of Riverside County Representative

VANESSA DELGADO
Vice Chairman
Senate Rules Committee Appointee

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

ANDREW DO
County of Orange Representative

GIDEON KRACOV
Governor's Appointee

SHEILA KUEHL
County of Los Angeles Representative

LARRY McCALLON
Cities of San Bernardino County Representative

VERONICA PADILLA-CAMPOS
Speaker of the Assembly Appointee

V. MANUEL PEREZ
County of Riverside Representative

NITHYA RAMAN
City of Los Angeles 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 6, 2022

South Coast Air Quality Management District Board and Stakeholders

Transmittal of the Executive Officer's Fiscal Year 2022-23 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 2022-23. 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 2022-23 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 2022-23 is a balanced budget with expenditures and revenues of \$189.2 million and 970 positions.

The proposed FY 2022-23 level of expenditures, up five percent from the FY 2021-22 adopted budget, is mainly due to increased costs for salaries due to lowering the vacancy rate from 13% to 11%, the new labor agreements approved in FY 2021-22 and an increase in budgeted positions. The increase in budgeted positions includes the previously approved FY 2021-22 mid-year actions adding a net of two positions and this budget proposal that is requesting a net increase of 11 positions.

The FY 2022-23 proposed revenue budget of \$189.2 million, up five percent from the FY 2021-22 adopted budget, includes steady progress on South Coast AQMD's implementation of the Volkswagen Mitigation Action, AB 617 programs, and AB 134 programs. At \$107.4 million or 57 percent of the projected revenue budget, stationary

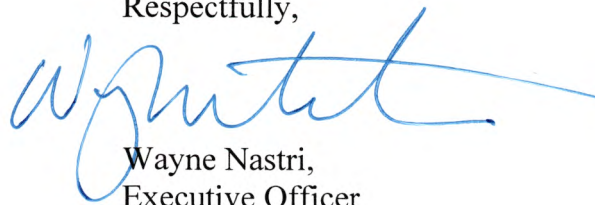
source revenues account for the largest source of revenue, and in light of the continued COVID-19 impact, could be precarious. Over the past two decades, total permit fees (including permit processing, annual operating permit, and annual emissions-based fees) collected from stationary sources has increased by about 45.2 percent from \$66.8 million in FY 1991-92 to \$101.7 million (estimated) in FY 2021-22. When adjusted for inflation however, stationary source revenues have decreased by 14 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 ongoing effects of 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 41 percent of FY 2022-23 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 2022-23 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 2022-23 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



GOVERNMENT FINANCE OFFICERS ASSOCIATION

*Distinguished
Budget Presentation
Award*

PRESENTED TO

**South Coast Air Quality Management District
California**

For the Fiscal Year Beginning

July 01, 2021

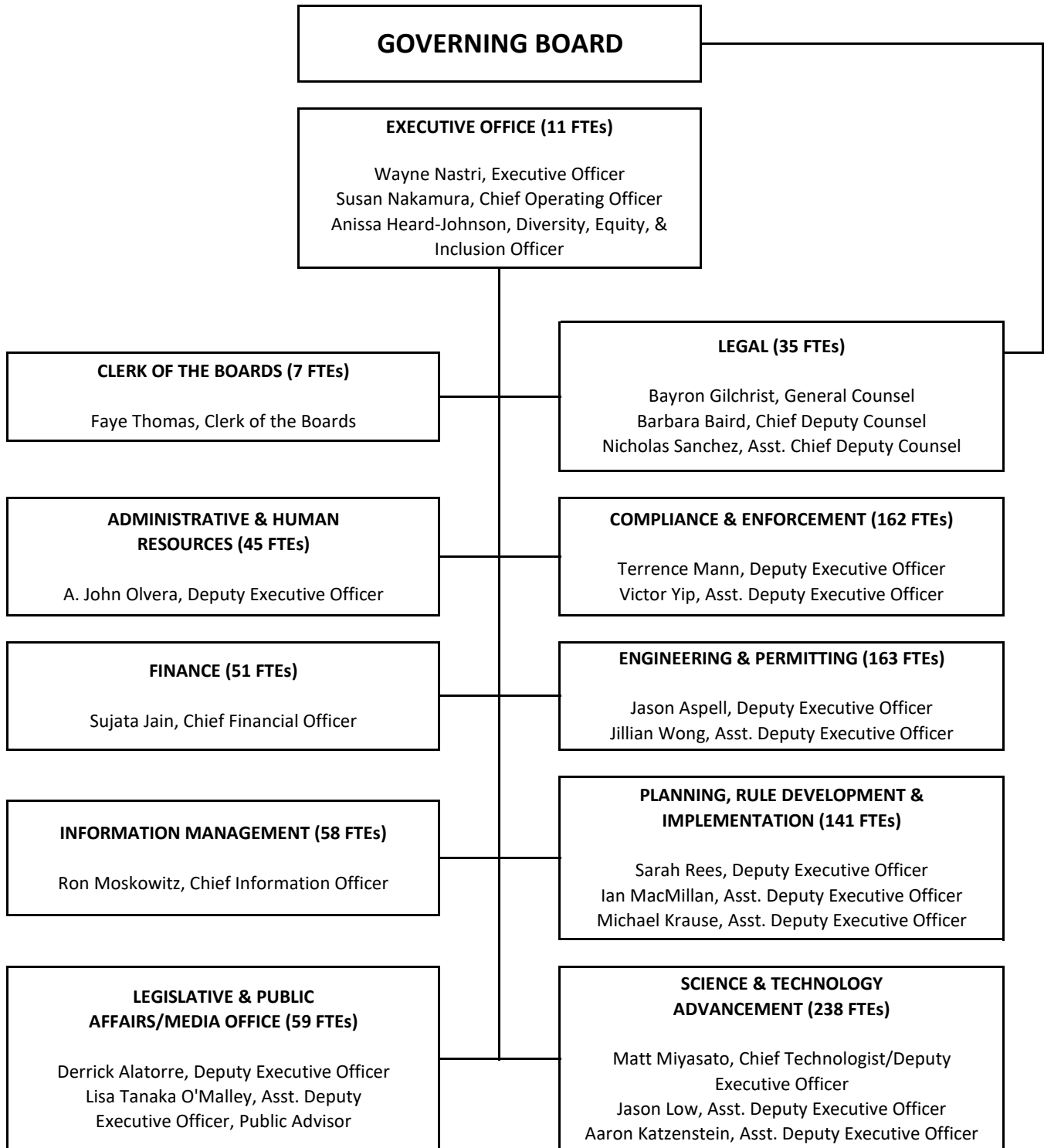
Christopher P. Morill

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 01, 2021. In order to receive this award, a governmental 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
(970 FTEs)**



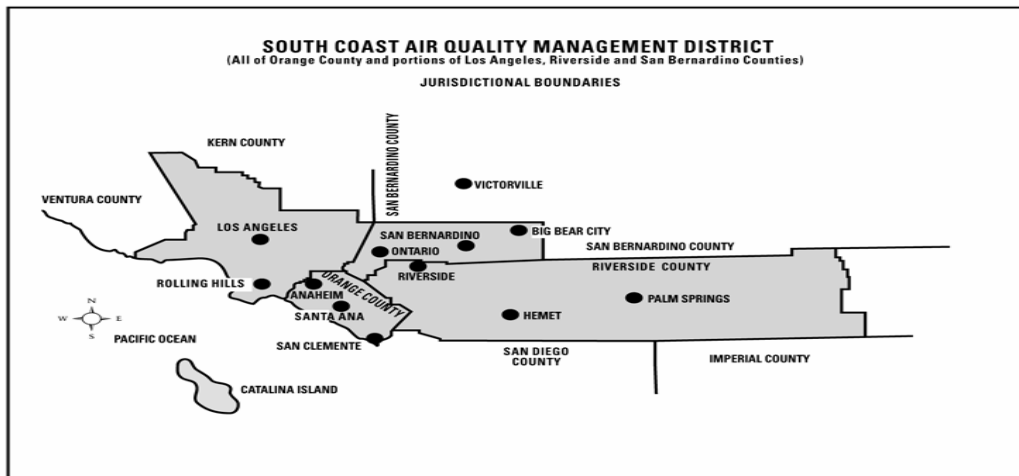
SUMMARY

Preface

This document represents the adopted FY 2022-23 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 5, 2022. In addition, a workshop for the Governing Board was held on April 8, 2022. 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 6, 2022.

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.



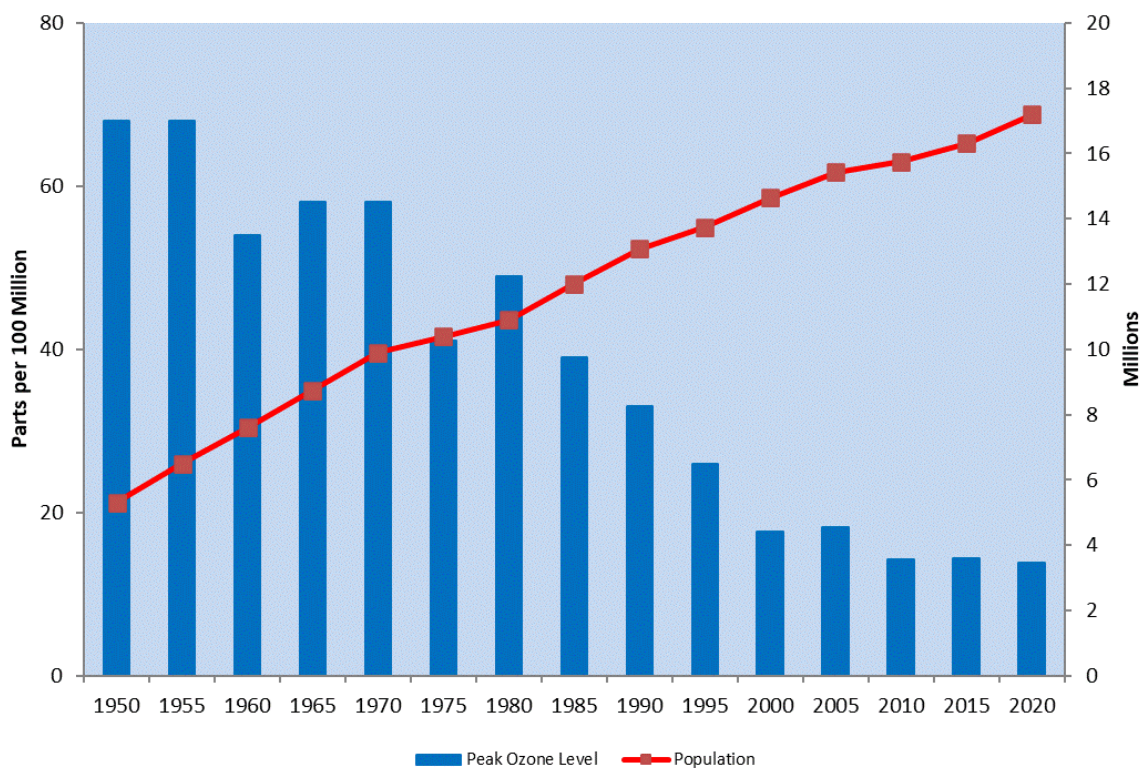
Air Quality History

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 2022-23:

- 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 United States 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 has improved significantly over the past several decades, the Basin continues to have the worst air pollution in the country. Ozone levels have fallen by more than three-quarters since peaks in the mid-1950s, but the basin fails to meet current federal ozone standards. In 2021, the 2015 8-hour ozone NAAQS was exceeded in the Basin on 130 days and the former 1997 8-hour ozone NAAQS was exceeded on 67 days. The 2015 ozone NAAQS was exceeded in the Basin on 157 days in 2020 and 126 days in 2019. Note that all the air quality values for 2021 in this report are preliminary values that are subject to change during the validation process. Though the ozone air quality has improved substantially over the long term, ozone levels have remained relatively stable over the past decade. However, continued reductions in ozone precursor emissions are expected to improve ozone air quality. 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 can affect year-to-year differences in 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 2021 data was 120 ppb, compared to 139 ppb in 2020 and 117 ppb in 2019.

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 2020, the 24-hour PM_{2.5} NAAQS was exceeded on 34 days in the South Coast Air Basin. In 2021, there were 24 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 firework emissions and wildfire smoke, which can be transported across wide distances. PM_{2.5} levels during Independence Day on July 4th and 5th are typically among the highest days of the year in the Basin. In 2021, most of the exceedances of the 24-hour standard were recorded during a period of unfavorable meteorology in November and early-December. The historically large ship backlog at the ports of Los Angeles and Long Beach, along with the increased goods movement throughout the Basin, may also have contributed to these high PM_{2.5} concentrations. While these exceedances would not be considered exceptional events by U.S. EPA guidance, several wildfires and Independence Day firework events occurring during the 2019-2021 period meet the criteria for an exceptional event. When removing the influence of events that are likely to be considered exceptional by U.S. EPA and with preliminary 2021 data, the 2019-2021 24-hour design value is 37 µg/m³, measured at the Mira Loma station. The Basin's annual 2019-2021 design value in 2021 was 13.9 µg/m³ (preliminary data) at the Ontario-60 near road site after removing likely exceptional events.

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 2021 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, all lead stations in the Basin have met the lead standard through 2019. 2021 concentrations are not available at the time of publication. Unfortunately, due to a temporary pause in lead monitoring caused by the initial stages of the COVID-19 pandemic, 2020 lead data fails the completeness requirements. A redesignation request to the U.S. EPA will be made when three years of complete data is collected.

Nitrogen dioxide, sulfur dioxide, and carbon monoxide levels meet all federal national ambient air quality standards. 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 100 ppb and the SO₂ 1-hour standard to 75 ppb. In 2021, the Basin attained these standards 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 aircrafts, ocean going vessels, trains, trucks with international and out-of-state registration, and selected off-road equipment is primarily overseen by U.S. EPA. 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 matters (PM10 and PM2.5), 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 and Coachella Valley 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. The 2022 AQMP is currently under development to address the attainment of 2015 8-hour ozone NAAQS.

Sanctions, Federal Implementation Plans, and Conformity Findings: The CAA mandates that sanctions be imposed on an area if a suitable SIP is not submitted to or 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 39 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 monitoring stations that measure levels of 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 the 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 photochemical, meteorological and emissions models, South Coast AQMD planners simulate future air quality to demonstrate attainment of the applicable 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. These include, but not limited to, satellite-based air quality data, sensor-based traffic volume, ocean going vessel data collected through Automatic Identification System (AIS) transponders, and aircraft data collected using Aircraft Communications, Addressing and Reporting System (ACARS).

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), even though South Coast AQMD adopted facility based mobile source measures and indirect source rules targeting major facilities such as airports and warehouses.

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 (2023 for the 2006 24-hour PM_{2.5} NAAQS, 2025 for the 2012 annual PM_{2.5} NAAQS, 2023 for the 1979 1-hour ozone NAAQS, 2024 for the 1997 8-hour ozone NAAQS, 2032 for the 2008 8-hour ozone NAAQS, and 2037 for the 2015 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. The 2012 AQMP addressed the 24-hour PM_{2.5} NAAQS. The 2016 AQMP addresses the 2008 8-hour ozone NAAQS and the 2012 annual PM_{2.5} NAAQS and demonstrates compliance with the requirements for being a “serious” non-attainment area for the 24-hour PM_{2.5} NAAQS requirements. The 2022 AQMP, which is currently under development, will address the 2015 8-hour ozone NAAQS, with an anticipated adoption in 2022. Six 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 Committees.

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 committee 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 2022-2023 budget is from July 1, 2022 to June 30, 2023. 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.

The 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. Special Revenue Fund appropriations are approved by the Governing Board on an as-needed basis 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. South Coast AQMD reports Special Revenue Funds on a modified accrual basis in the Annual Comprehensive Financial Report.

Budget Process

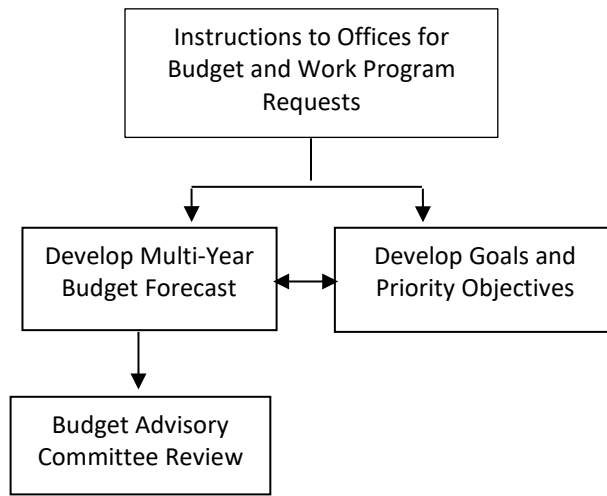
The South Coast AQMD budget process begins with the Chief Financial Officer issuing instructions and guidelines to the Offices. Under the guidance of the Executive Officer, the Chief Operating Officer, and the Chief Financial Officer, the Offices also begin establishing Goals and Priority Objectives 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

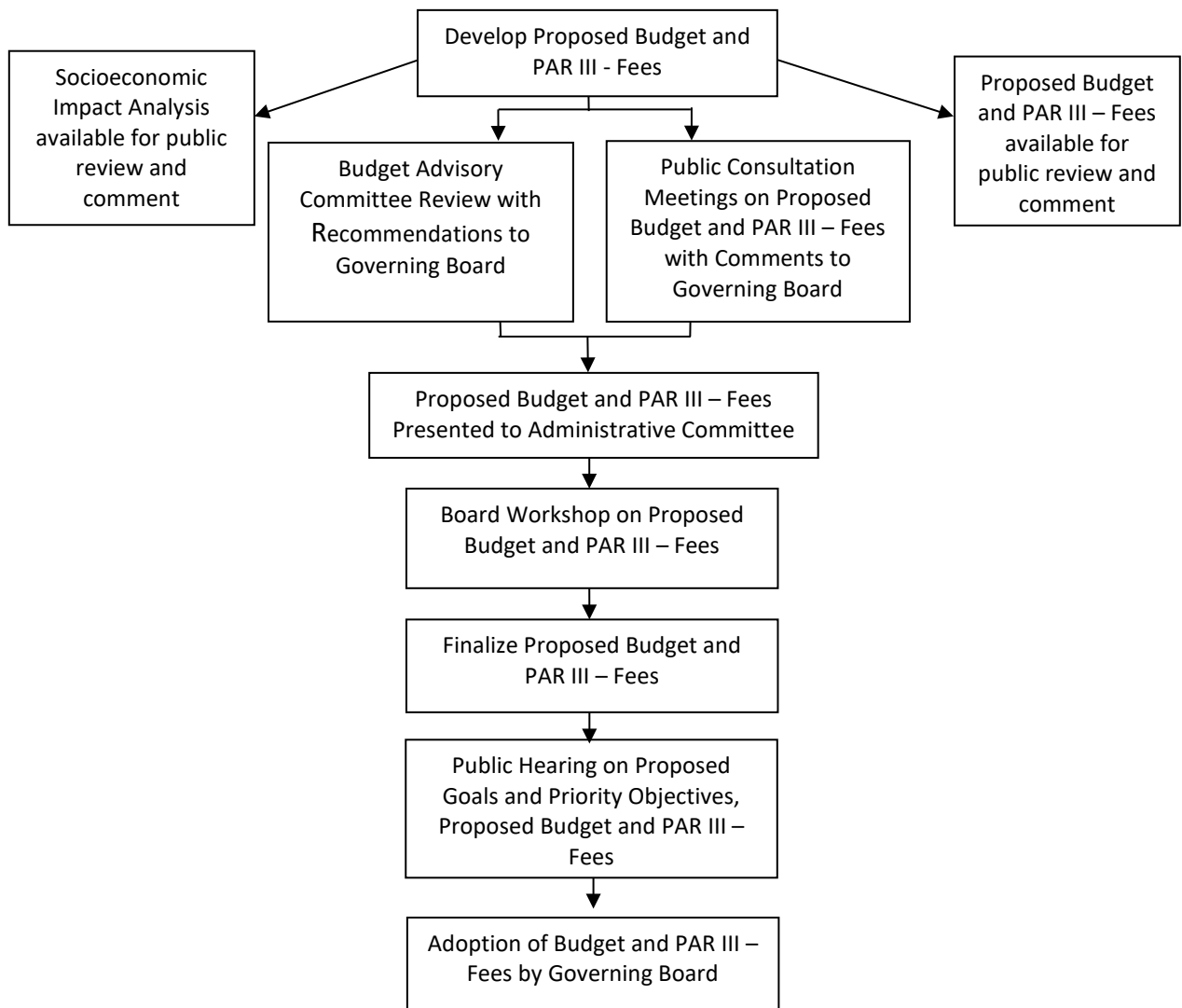
The proposed budget is presented to South Coast AQMD's Governing Board at a budget workshop and to South Coast AQMD's Administrative Committee. Any public comments and Budget Advisory Committee recommendations are submitted to the Governing Board by April 15th of each year. The proposed budget is adopted by the Governing Board and is in place on July 1st 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 2022-23 Budget Timeline	
Budget submissions received from Offices	Jan 7, 2022
Budget Advisory Committee meeting	Jan 14, 2022
Proposed budget available for public review	April 1, 2022
Budget Advisory Committee meeting on proposed budget	April 1, 2022
Public Workshop on proposed budget	April 5, 2022
Proposed budget presented to Administrative Committee	April 8, 2022
Governing Board Special Meeting	April 8, 2022
Public comments and Budget Advisory Committee recommendations submitted to Governing Board	April 15, 2022
Public Hearing & Governing Board adoption of budget	May 6, 2022

Adopted Budget & Work Program

Budget Overview

The adopted budget for FY 2022-23 is a balanced budget with revenues/transfers in and expenditures/transfers out of \$189.2 million. To compare against prior years, the following table shows South Coast AQMD's amended budget and actual expenditures for FY 2020-21, adopted and amended budgets for FY 2021-22 and adopted budget for FY 2022-23.

Description	FY 2020-21 Amended	FY 2020-21 Actual	FY 2021-22 Adopted	FY 2021-22 Amended¹	FY 2022-23 Adopted
Staffing	949	-	957	959	970
Revenue/Transfers In	\$179.3	\$177.9	\$179.9	\$184.6	\$189.2
Expenditures/Transfers Out	\$181.8	\$171.9	\$179.9	\$186.2	\$189.2

¹ Includes Board approved changes through February 2022

The FY 2022-23 adopted budget reflects an increase of \$3.0 million in expenditures/transfers out from the FY 2021-22 amended budget and an increase of \$9.3 million in expenditures/transfers out from the FY 2021-22 adopted budget. The increase in expenditures/transfers out from the FY 2021-22 adopted budget is mainly due to increased costs for salaries due to lowering the vacancy rate from 13% to 11%, the new labor agreements approved in FY 2021-22, and an increase in budgeted positions. The FY 2022-23 adopted budget of 970 positions has a net increase of 11 positions over the FY 2021-22 amended budget.

Expenditures

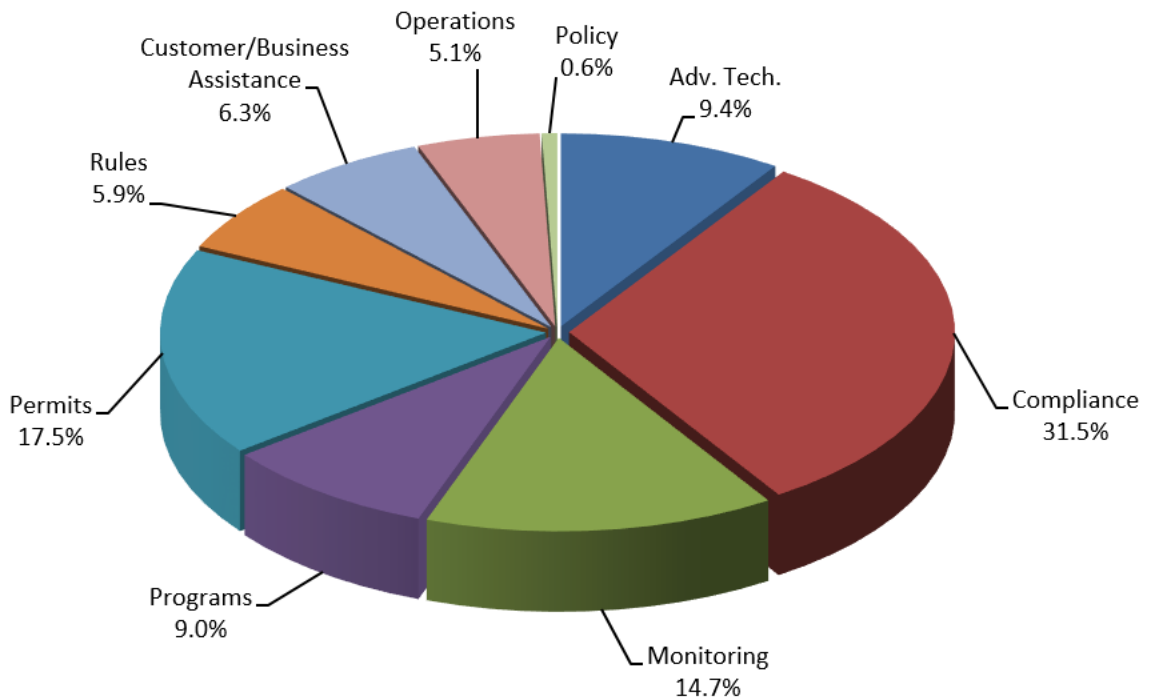
Work Program

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 fully burdened budgeted expenditures by Program Category for FY 2022-23.

Work Program Category Expenditures



The following table compares South Coast AQMD Work Program expenditures by category for the FY 2021-22 adopted budget and FY 2022-23 adopted budget.

Work Program Categories	FY 2021-22 Adopted Budget	FY 2022-23 Adopted Budget
Advance Clean Air Technology	\$16,662,843	\$17,757,050
Customer Service and Business Assistance	10,903,032	11,924,677
Develop Programs to Achieve Clean Air	16,722,332	17,021,917
Develop Rules to Achieve Clean Air	9,713,071	11,141,681
Ensure Compliance with Clean Air Rules	57,377,234	59,559,503
Monitoring Air Quality	26,336,839	27,776,671
Operational Support	9,569,399	9,726,544
Policy Support	1,259,631	1,218,271
Timely Review of Permits	31,339,022	33,036,496
Total	\$179,883,403	\$189,162,810

Note: Fully burdened expenditures based on the Cost Allocation Schedule

Account Categories

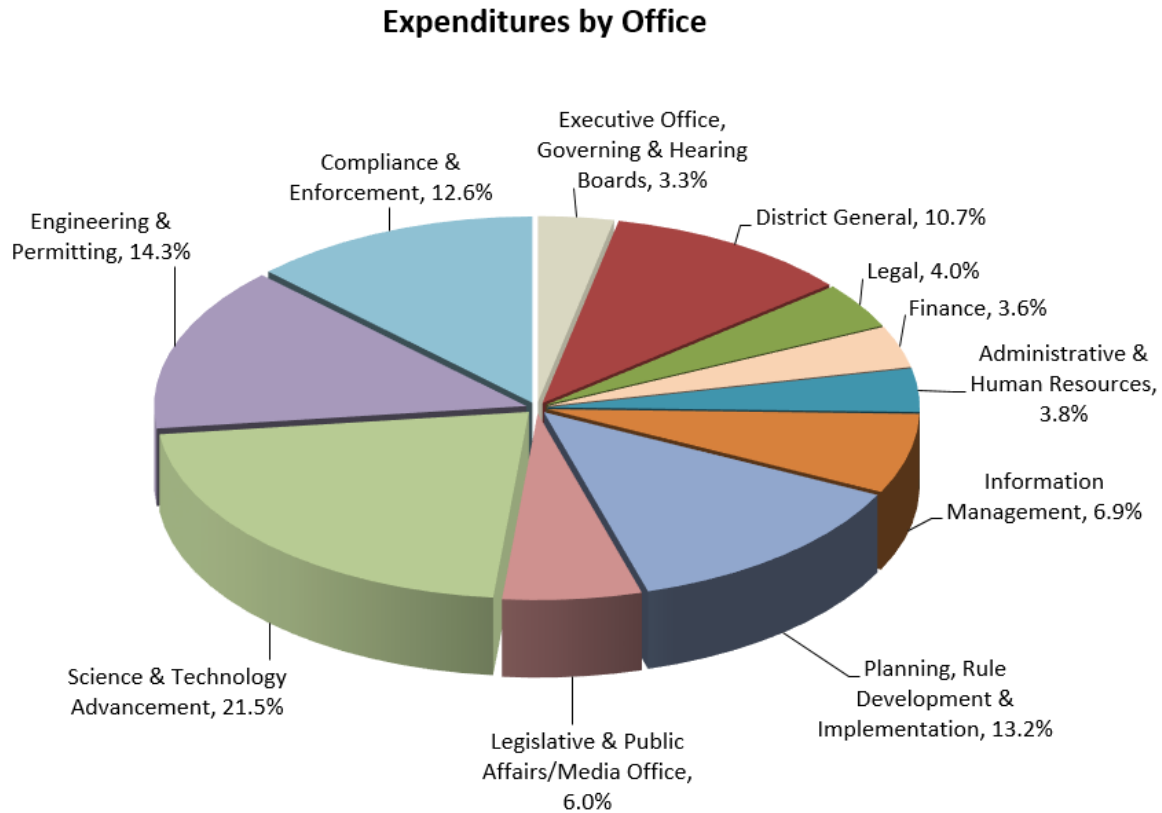
The following table compares the FY 2021-22 adopted budget and the FY 2021-22 amended budget to the adopted budget for FY 2022-23 by account category. The FY 2021-22 amended budget includes the Board-approved mid-year adjustments through February 2022.

Account Description	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget¹	FY 2022-23 Adopted Budget
Salaries/Benefits	\$146,228,481	\$146,746,052	\$154,702,506
Insurance	1,449,140	1,449,140	1,811,425
Rents	804,123	865,125	793,123
Supplies	3,302,458	3,861,800	3,274,018
Contracts and Services	11,145,047	13,852,677	12,287,396
Maintenance	1,837,949	2,314,263	1,840,943
Travel/Auto Expense	916,823	1,033,163	936,823
Utilities	1,967,620	1,967,620	1,965,620
Communications	898,884	848,950	1,098,884
Capital Outlays	1,850,000	3,639,554	2,051,000
Other	1,448,283	1,567,402	1,430,983
Debt Service	7,193,242	7,193,242	4,128,736
Transfers Out	841,353	841,353	2,841,353
Total	\$179,883,403	\$186,180,341	\$189,162,810

¹ Includes Board approved changes through February 2022

As mentioned previously, the adopted budget for FY 2022-23 represents an approximately \$3.0 million increase in expenditures from the FY 2021-22 amended budget. The FY 2021-22 amended budget includes mid-year increases associated with the following: monitoring equipment, 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 2022-23.

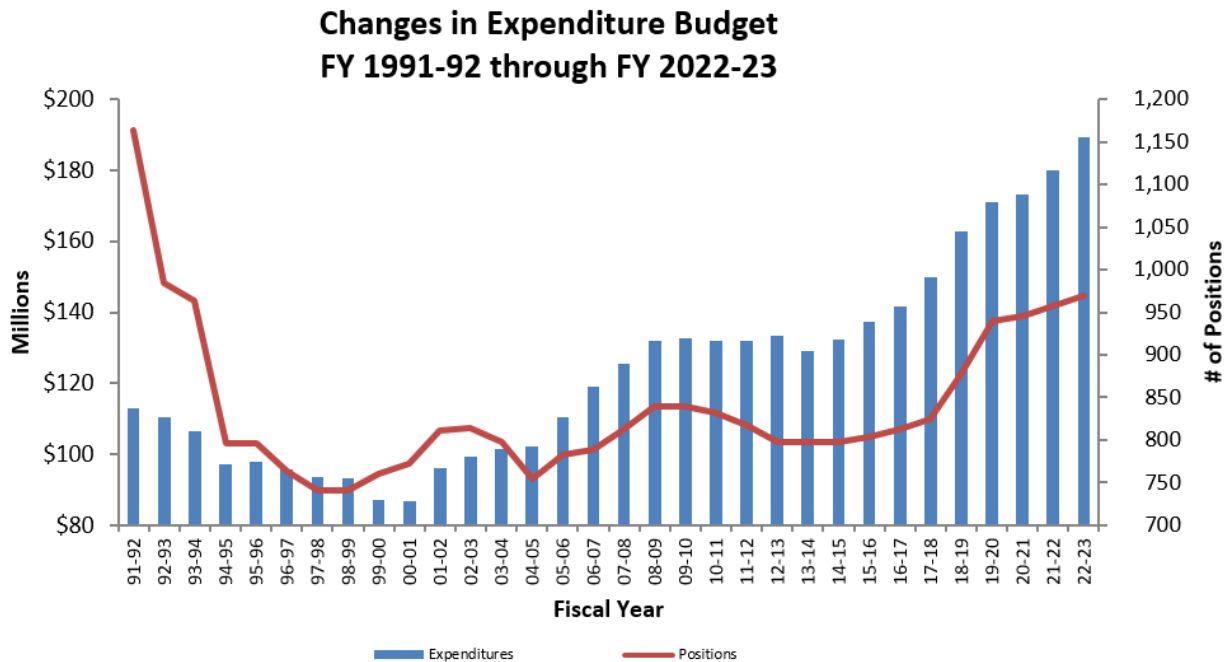


Budget Strategy

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

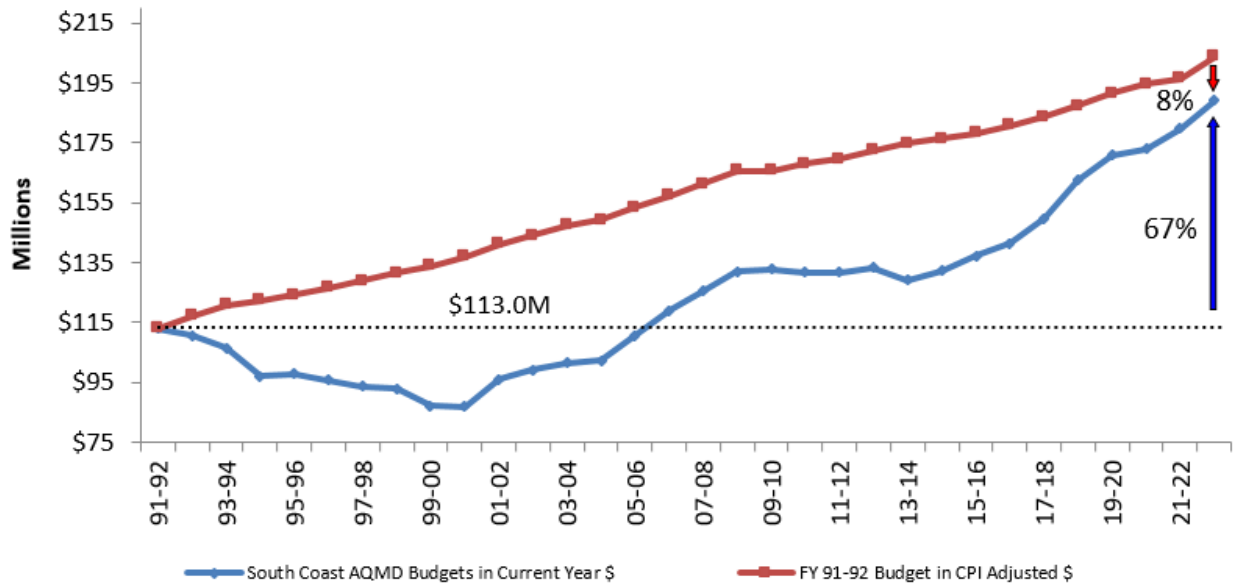
in additional funding sources, has increased South Coast AQMD’s workload substantially. Nonetheless, South Coast AQMD continues to focus on the efficient use of its resources. South Coast AQMD performs an on-going review of revenues, expenditures, and staffing levels and regularly presents results to the Board. The adopted vacancy rate for FY 2022-23 is 11%, which is 2% lower than the rate for the FY 2021-22 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 2022-23 reflects a staffing level of 970 FTEs. This staffing level is 17% (193 FTEs) below the FY 1991-92 level.



The FY 2022-23 adopted budget is 67% 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 2022-23 proposal is 8% lower.

Inflation Impact on South Coast AQMD Budgets FY 1991-92 through FY 2022-23



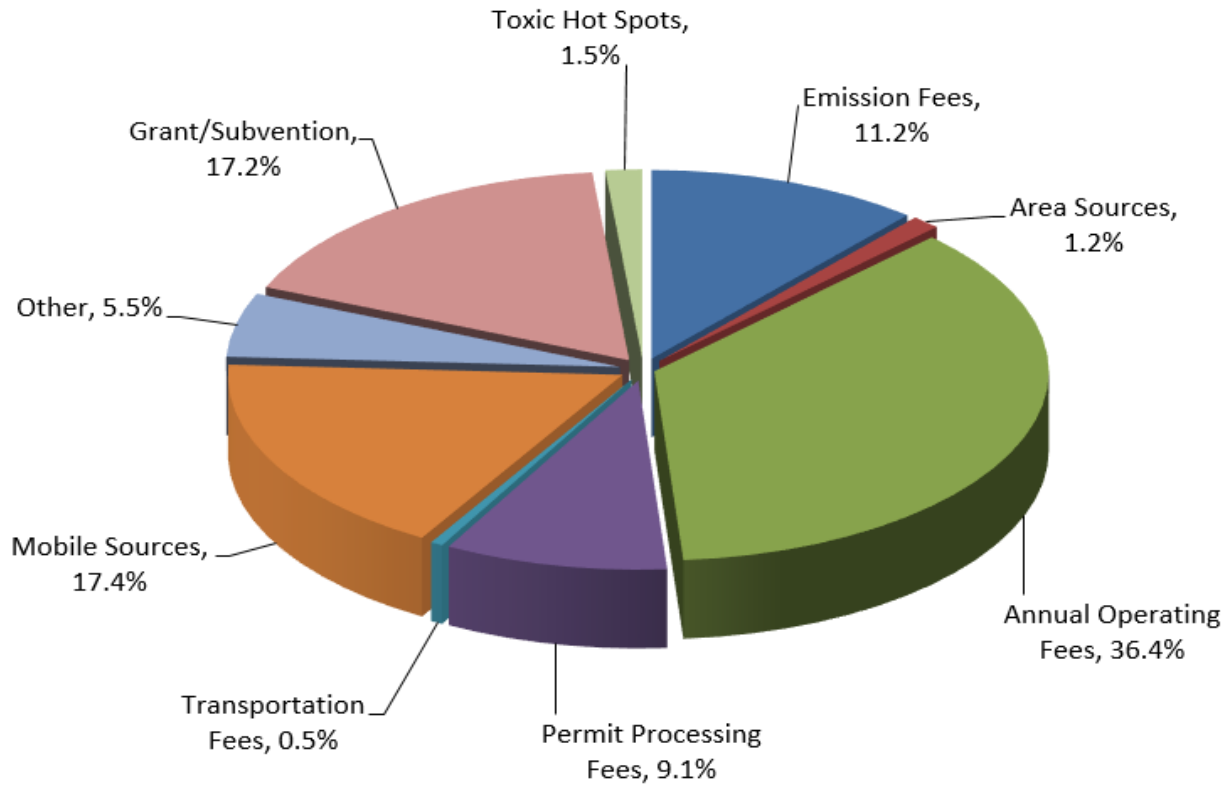
Note: CPI adjustment based on California Consumer Price Index for the preceding Calendar Year

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 2022-23, these fees are projected to generate approximately \$113.9 million or 60% of South Coast AQMD revenues; of this \$113.9 million, \$107.4 million or 57% 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 5% of total revenues in FY 2022-23. 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 2022-23 budget.

Revenues by Major Category



The following table compares the FY 2021-22 adopted revenue budget and the FY 2021-22 amended revenue budget to the adopted revenue budget for FY 2022-23. The FY 2021-22 amended revenue budget includes Board-approved mid-year changes through February 2022.

Revenue Description	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget ¹	FY 2022-23 Adopted Budget
Annual Operating Emission Fees	\$19,955,890	\$19,955,890	\$21,275,050
Annual Operating Permit Renewal Fees	64,041,550	64,041,550	68,854,670
Permit Processing Fees	16,141,800	16,141,800	17,281,830
Portable Equipment Registration Program	1,000,000	1,000,000	1,000,000
Area Sources	2,056,000	2,056,000	2,236,500
Grants/Subvention	29,534,960	31,757,108	32,472,710
Mobile Sources	32,470,096	32,470,096	32,890,660
Transportation Programs	934,900	934,900	954,720
Toxic Hot Spots	2,750,170	2,750,170	2,834,000
Other ²	6,790,637	6,790,637	7,034,680
Transfers In	4,207,400	6,729,225	2,327,990
Total	\$179,883,403	\$184,627,376	\$189,162,810

¹ Includes Board approved changes through February 2022

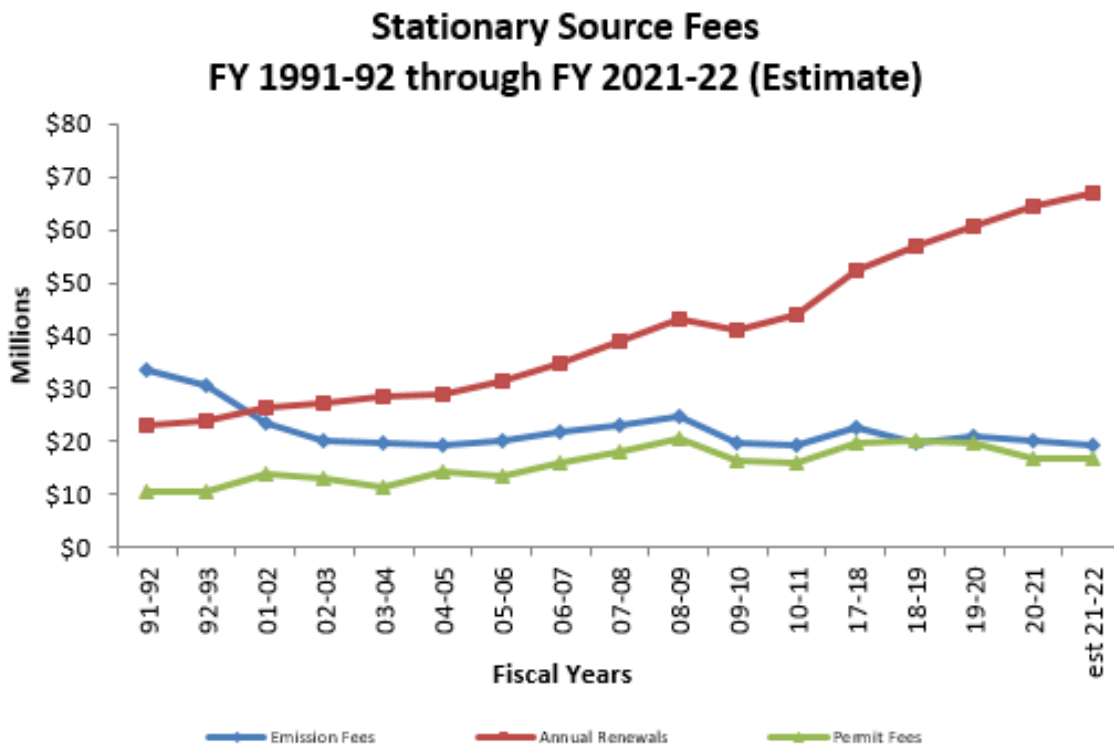
² Includes revenues from Interest, Lease Income, Source Testing, Hearing Board, Penalties/Settlements, Subscriptions, and Other

Over the past two decades, total permit fees (including permit processing, annual operating permit, and annual emissions-based fees) collected from stationary sources has increased by about 52% from \$66.9 million in FY 1991-92 to \$101.7 million (estimated) in FY 2021-22. When adjusted for inflation however, stationary source revenues have decreased by 14% 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 2021-22 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 2022-23 from FY 2021-22 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 2022-23. Finally, the AB 617 Community Air Protection Program implementation funding from CARB is budgeted at a higher level than the FY 2021-22 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 2021-22.



Debt Structure

Pension Obligation Bonds

In June 2004 the South Coast AQMD 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 remaining annual payment requirements under these bonds are as follows:

Year Ending June 30	Principal	Interest	Total
2023	3,780,000	348,736	4,128,736
2024	4,010,000	118,897	4,128,897
Total	\$7,790,000	\$467,633	\$8,257,633

Fund Balance

South Coast AQMD is projecting an Unreserved (Unassigned) Fund Balance for June 30, 2023 of \$70,765,079 in addition to the following Reserved and Unreserved Designated Fund Balances for FY 2022-23.

Classification	Reserves/Unreserved Designations	Amount
Committed	Reserve for Encumbrances	\$ 16,000,000
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		\$ 22,229,673

Reserves are portions of the fund balance set aside for future use and are therefore not available for appropriation. These funds consist 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 2024-25, South Coast AQMD will realize a \$4.1M savings in Pension Obligation Bond payments.

Fiscal 2021-22 Estimate and Five Year Projection						
(\$ in Millions)						
	FY 21-22 Estimate	FY 22-23 Adopted	FY 23-24 Projected	FY 24-25 Projected	FY 25-26 Projected	FY 26-27 Projected
STAFFING	959	970	970	970	970	970
REVENUES/TRANSFERS IN*	\$180.9	\$189.2	\$193.9	\$195.4	\$197.3	\$200.1
EXPENDITURES/TRANSFERS OUT	\$182.6	\$189.2	\$196.8	\$201.7	\$204.7	\$207.7
Change in Fund Balance	(\$1.7)	-	(\$2.9)	(\$6.3)	(\$7.4)	(\$7.6)
UNRESERVED FUND BALANCE (at year-end)	\$76.9	\$76.9	\$74.0	\$67.7	\$60.3	\$52.7
% of REVENUE	43%	41%	38%	35%	31%	26%
* CPI fee increases are projected as follows: FY 2022-23 – 6.5%, FY 2023-24 – 3.8%, FY 2024-25 – 3.0%, FY 2025-26 – 3.1% and FY 2026-27 – 3.3%.						

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 2022-23 through 2026-27
West Guard Station Installation
Child Care Building Roof Replacement
Patio Crack and Joint Sealing
Concrete Repair in East Courtyard & Pedestrian Areas
Cafeteria Exhaust Equipment Replacement
Fire Life Safety System Upgrade
Air Handler Mechanical Systems Upgrade/Fan Wall Installation
Fleet Vehicle Replacements
Irrigation System Renovation
Parking Lot Repair and Reseal
Landscape Renovation
Saw Tooth Lab Roof Refurbishment
Leibert AC Units Replacement/Data Center Enhancements
Pneumatic HVAC Controls to Electronic Control Update
Roofing Surface Recoat
Atrium and Building Expansion Joint Waterproofing
Restroom and Copy/Coffee Sink and Counter Tops Replacement
Automatic Transfer Switch Upgrade
Building Lighting Controls Upgrade
Fluorescent Down Lighting (LED) Retrofit
Child Care Playground Renovation
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)
Building Window and Structural Joint Sealing
Emergency Generator Upgrade

SUMMARY OF FISCAL YEAR 2022-23 ADOPTED BUDGET

	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget ¹	FY 2021-22 Estimate ²	FY 2022-23 Adopted
Funding Sources				
Revenue	\$ 175,676,003	\$ 177,898,151	\$ 175,045,778	\$ 186,834,820
Transfers-In	4,207,400	6,729,225	5,901,528	2,327,990
Total Funding Sources	\$ 179,883,403	\$ 184,627,376	\$ 180,947,306	\$ 189,162,810
Funding Uses				
Salaries & Employee Benefits	\$ 146,228,481	\$ 146,746,052	\$ 145,254,285	\$ 154,702,506
Services & Supplies	30,963,569	34,953,382	32,956,164	29,567,951
Capital Outlays	1,850,000	3,639,554	3,639,554	2,051,000
Transfers-Out	841,353	841,353	841,353	2,841,353
Total Funding Uses	\$ 179,883,403	\$ 186,180,341	\$ 182,691,356	\$ 189,162,810

Fund Balances - Reserves & Unreserved Designations	Classification	Projected June 30, 2022	Projected June 30, 2023
Reserve for Encumbrances	Committed	\$ 14,600,000	\$ 16,000,000
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		\$ 20,829,673	\$ 22,229,673
Unassigned Fund Balance	Unassigned	\$ 70,765,079	\$ 70,765,079
Total Fund Balances		\$ 91,594,752	\$ 92,994,752

¹ The FY 21-22 Amended Budget includes mid-year changes through February 2022.

² Includes estimated encumbrances of \$10,600,000 which will be applicable to the fiscal year ending June 30, 2022.

ANALYSIS OF PROJECTED JUNE 30, 2022 FUND BALANCE

Fund Balances as of June 30, 2021		
Reserves	\$ 11,138,539	
Designated	6,149,673	
Unassigned	72,450,590	
Total Fund Balances, June 30, 2021	\$	89,738,802
Add Excess Fiscal Year 2021-22 Revenues over Expenditures		
Revenues	\$ 180,947,306	
Expenditures ¹	172,091,356	
Sub-Total	\$	8,855,950
Deduct Decrease in Encumbrances Open on June 30, 2022		(7,000,000)
Total Projected Fund Balances, June 30, 2022	\$	91,594,752
Fund Balances (Projected) at June 30, 2022		
Reserve for Encumbrances	\$	14,600,000
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		70,765,079
Total Projected Fund Balances, June 30, 2022	\$	91,594,752
Note: This analysis summarizes the estimated amount of funds that will be carried into FY 2022-23.		
¹ Expenditures do not include estimated \$10,600,000 encumbrances for the Fiscal Year ended June 30, 2022.		

**SCHEDULE OF AVAILABLE FINANCING AND PROJECTED FISCAL YEAR
2022-23 RESERVES AND DESIGNATIONS**

Fund Balances	\$ 91,594,752	
Emission Fees	21,275,050	
Annual Renewal Fees	68,854,670	
Permit Processing Fees	17,281,830	
Portable Equipment Registration Program	1,000,000	
State Subvention	3,917,180	
State Grant	21,880,000	
Federal Grant	6,675,530	
Interest Revenue	962,220	
Lease Revenue	151,390	
Source Test/Analysis Fees	450,070	
Hearing Board Fees	284,140	
Penalties and Settlements	4,600,000	
Area Sources	2,236,500	
Transportation Programs	954,720	
Mobile Sources/Clean Fuels	32,890,660	
Air Toxics "Hot Spots"	2,834,000	
Other Revenues/Transfers In	2,914,850	
Total Funds		\$ 280,757,562
Less Projected Fiscal Year 2022-23 Reserves and Designations		
Reserve for Encumbrances	\$ 16,000,000	
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		\$ 22,229,673
Available Financing		\$ 258,527,889

ANALYSIS OF PROJECTED JUNE 30, 2023 FUND BALANCE

Fund Balances as of June 30, 2022		
Reserves	\$	14,680,000
Designated		6,149,673
Unassigned		70,765,079
Total Fund Balances, June 30, 2022	\$	91,594,752
Add Excess Fiscal Year 2022-23 Revenues over Expenditures		
Revenues	\$	189,162,810
Expenditures ¹		178,562,810
Sub-Total	\$	10,600,000
Deduct Decrease in Encumbrances Open on July 1, 2022		(9,200,000)
Total Projected Fund Balances, June 30, 2023	\$	92,994,752
Fund Balances (Projected) Fiscal Year 2022-23		
Reserve for Encumbrances	\$	16,000,000
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		70,765,079
Total Projected Fund Balances, June 30, 2023	\$	92,994,752
¹ Expenditures do not include estimated \$10,600,000 encumbrances for the Fiscal Year ended June 30, 2023.		

Revenue Comparison				
Revenue Account	FY 2020-21 Actual	FY 2021-22 Adopted Budget	FY 2021-22 Estimated	FY 2022-23 Adopted
Emission Fees	\$ 20,215,773	\$ 19,955,890	\$ 19,228,500	\$ 21,275,050
Annual renewal Fees	63,041,978	64,041,550	65,536,328	68,854,670
Permit Processing Fees	16,675,965	16,141,800	16,901,273	17,281,830
Portable Equipment Registration Program	1,528,360	1,000,000	1,288,132	1,000,000
State Subvention	3,944,728	3,944,730	3,917,184	3,917,180
State Grant	20,071,867	19,324,580	18,687,356	21,880,000
Federal Grant	7,742,659	6,265,650	7,714,921	6,675,530
Interest Revenue	596,953	509,290	317,214	962,220
Lease Revenue	124,285	168,800	142,321	151,390
Source Test/Analysis Fees	265,860	591,100	175,023	450,070
Hearing Board Fees	274,352	213,000	293,600	284,140
Penalties and Settlements	4,714,521	4,600,000	5,004,680	4,600,000
Area Sources	2,369,926	2,056,000	2,000,000	2,236,500
Transportation Programs	704,936	934,900	896,450	954,720
Mobile Sources/Clean Fuels	26,200,886	32,470,096	28,697,244	32,890,660
Air Toxics "Hot Spots"	2,545,038	2,750,170	2,883,526	2,834,000
Other Revenues/Transfers In	6,911,388	4,915,847	7,263,554	2,914,850
Total Revenue	\$ 177,929,474	\$ 179,883,403	\$ 180,947,306	\$ 189,162,810

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 2022-23 Adopted Budget: The non-RECLAIM emissions are based on Annual Emission Report (AER) data for Calendar Year 2020. The RECLAIM NO_x and SO_x emission projection is based on holdings according to the RECLAIM Trading Credit (RTC) listing. The flat emission fees are projected based on the number of active facilities with at least one permit. The adopted budget includes a 6.5% CPI fee increase.

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. This category includes Refinery Related Community Air Monitoring System Annual Operating and Maintenance Fees (Rule 301(aa)).

EXPLANATION OF REVENUE SOURCES

FY 2022-23 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 6.5% CPI fee increase.

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 the budget is a 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 2022-23 Adopted Budget: The projection is based on the anticipated number and type of applications that will be processed. The adopted budget includes a 6.5% CPI fee increase.

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 2022-23 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 development, and architectural coatings revenue collection.

FY 2022-23 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. The adopted budget includes a 6.5% CPI fee increase.

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 2022-23 Adopted Budget: The current amount of \$3.9 million is included in the FY 2022-23 Adopted budget.

EXPLANATION OF REVENUE SOURCES

State Grant

Under AB 617, 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.

FY 2022-23 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 2022-23 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 2022-23 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 2022-23 Adopted Budget: The projection is based on the existing lease agreements.

EXPLANATION OF REVENUE SOURCES

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 2022-23 Adopted Budget: The revenue projection is based on the anticipated number of tests and analyses. The adopted budget includes a 6.5% CPI fee increase.

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 2022-23 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 6.5% CPI fee increase.

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 2022-23 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

EXPLANATION OF REVENUE SOURCES

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 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 2022-23 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.

EXPLANATION OF REVENUE SOURCES

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 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 2022-23 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 2022-23 Adopted Budget: The projection is based on the anticipated number of registrations. The adopted budget includes a 6.5% CPI fee increase.

EXPLANATION OF REVENUE SOURCES

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.

FY 2022-23 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

Other revenue includes revenue attributable to professional services South Coast AQMD renders to other agencies, reimbursements from special revenue funds (non-mobile source), and Public Records Act requests.

FY 2022-23 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 2020-21 Actuals	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate *	FY 2022-23 Adopted Budget
Salary & Employee Benefits						
51000-52000	Salaries	\$ 86,272,888	\$ 90,535,521	\$ 91,011,475	\$ 90,087,471	\$ 99,008,006
53000-55000	Employee Benefits	48,924,955	55,692,960	55,734,577	55,166,814	55,694,500
Sub-total Salary & Employee Benefits		\$ 135,197,844	\$ 146,228,481	\$ 146,746,052	\$ 145,254,285	\$ 154,702,506
Services & Supplies						
67250	Insurance	\$ 1,203,093	\$ 1,449,140	\$ 1,449,140	\$ 1,449,140	\$ 1,811,425
67300	Rents & Leases Equipment	242,750	212,280	253,291	253,291	200,280
67350	Rents & Leases Structure	605,023	591,843	611,834	611,834	592,843
67400	Household	814,682	907,195	909,895	909,895	897,195
67450	Professional & Special Services	11,415,623	8,796,501	11,484,830	10,517,091	9,944,850
67460	Temporary Agency Services	618,188	772,048	750,694	750,694	771,048
67500	Public Notice & Advertising	398,763	507,623	523,123	452,123	512,623
67550	Demurrage	68,250	161,680	184,135	184,135	161,680
67600	Maintenance of Equipment	1,040,241	815,470	1,271,384	1,242,743	818,464
67650	Building Maintenance	870,185	1,022,479	1,042,879	1,002,479	1,022,479
67700	Auto Mileage	37,485	106,127	204,127	144,127	105,927
67750	Auto Service	418,327	470,000	470,000	450,000	470,000
67800	Travel	3,703	340,696	359,036	280,403	360,896
67850	Utilities	1,542,239	1,967,620	1,967,620	1,797,620	1,965,620
67900	Communications	1,064,270	898,884	848,950	848,950	1,098,884
67950	Interest Expense	3,353,106	3,186,361	3,186,361	3,186,361	348,736
68000	Clothing	30,988	78,508	99,508	99,508	89,965
68050	Laboratory Supplies	404,089	557,000	622,175	512,000	562,000
68060	Postage	302,207	432,158	446,989	374,656	421,158
68100	Office Expense	1,389,449	1,538,421	1,709,712	1,495,626	1,531,011
68200	Office Furniture	170,913	48,000	75,982	75,982	46,000
68250	Subscriptions & Books	385,326	179,074	248,451	248,451	178,617
68300	Small Tools, Instruments, Equipment	242,035	177,276	366,962	366,962	179,246
68400	Gas and Oil	156,710	292,021	292,021	250,000	266,021
69500	Training/Conference/Tuition/ Board Exp.	746,416	992,807	981,857	906,417	987,607
69550	Memberships	96,836	76,428	259,772	247,522	75,328
69600	Taxes	13,096	64,500	64,500	37,000	65,500
69650	Awards	109,148	69,023	69,023	69,023	70,023
69700	Miscellaneous Expenses	60,556	245,525	192,250	185,250	232,525
69750	Prior Year Expense	(51,753)	-	-	-	-
69800	Uncollectable Accounts Receivable	691,419	-	-	-	-
89100	Principal Repayment	3,840,443	4,006,881	4,006,881	4,006,881	3,780,000
Sub-total Services & Supplies		\$ 32,283,807	\$ 30,963,569	\$ 34,953,382	\$ 32,956,164	\$ 29,567,951
77000	Capital Outlays	\$ 2,382,488	\$ 1,850,000	\$ 3,639,554	\$ 3,639,554	\$ 2,051,000
79050	Building Remodeling	-	\$ -	\$ -	\$ -	\$ -
99950	Transfers Out	\$ 2,081,989	\$ 841,353	\$ 841,353	\$ 841,353	\$ 2,841,353
Total Expenditures		\$ 171,946,128	\$ 179,883,403	\$ 186,180,341	\$ 182,691,356	\$ 189,162,810

* Estimates based on July 2021 through February 2022 actual expenditures and February 2022 budget amendments.

SALARIES & EMPLOYEE BENEFITS

Acct. #	Account Description	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate	FY 2022-23 Adopted Budget	Increase/ (Decrease)^(a)
51000- 52000	SALARIES	\$90,535,521	\$91,011,475	\$90,087,471	\$99,008,006	\$8,472,485
<p>These accounts include salaries and special pays such as: Call-Back, Hazard, Night Shift, Rideshare, Skill-Based, Stand-By and Overtime. The FY 2022-23 Adopted Budget reflects a 11% vacancy rate (actual vacant positions are currently at 15%). The FY 2022-23 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 2022-23 Adopted Budget is the shift of the vacancy rate from 13% to 11% and the adopted personnel actions.</p>						
53000	EMPLOYEE BENEFITS	\$3,936,136	\$3,936,136	\$3,896,039	\$4,504,110	\$567,974
<p>This account includes the costs associated with State Disability Insurance, employer share of unemployment insurance, and Medicare. In addition, this account includes individual memberships and/or management physicals.</p>						
54000	RETIREMENT	\$39,352,693	\$39,352,693	\$38,951,811	\$39,202,008	(\$150,685)
<p>This account includes the employer's share of the employee retirement system contributions. The decrease from the FY 2021-22 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	\$12,404,131	\$12,445,748	\$12,318,964	\$11,988,383	(\$415,748)
<p>This account includes employer's share of health, life, dental, vision care and accident insurance.</p>						

^(a) FY 2022-23 Adopted Budget vs. FY 2021-22 Adopted Budget.

SALARIES & EMPLOYEE BENEFITS

South Coast AQMD Personnel Summary – Authorized/Funded Positions						
Positions as of	Mid-Year Adjustments		Positions as of	FY 2022-23 Request		Positions as of
July 1, 2021	Add	Delete	June 30, 2022	Add	Delete	July 1, 2022
957	17	(15)	959	22	(11)	970

Fiscal Year 2021-22 Mid-Year Changes in Authorized/Funded Positions				
Office	Position	Add	Delete	Total
Administrative and Human Resources	Administrative Assistant I	1	-	1
Administrative and Human Resources	Senior Office Assistant		(1)	(1)
Compliance & Enforcement	AQ Inspector II	4	-	4
Compliance & Enforcement	AQ Inspector III	1	-	1
Compliance & Enforcement	Office Assistant	1	-	1
Compliance & Enforcement	Administrative Assistant I	1	-	1
Compliance & Enforcement	Senior Enforcement Manager	1	-	1
Compliance & Enforcement	Program Supervisor	1	-	1
Executive Office	Director of Community Air Programs	1	-	1
Engineering & Permitting	Program Supervisor	1	-	1
Engineering & Permitting	Senior Air Quality Engineering Manager	1	-	1
Legislative & Public Affairs/Media Office	Senior Public Affairs Specialist	1	-	1
Planning, Rule Development & Implementation	Administrative Assistant I	-	(1)	(1)
Planning, Rule Development & Implementation	Office Assistant	-	(1)	(1)
Planning, Rule Development & Implementation	Program Supervisor	-	(1)	(1)
Planning, Rule Development & Implementation	Air Quality Inspector II	-	(4)	(4)
Planning, Rule Development & Implementation	Air Quality Inspector III	-	(1)	(1)
Planning, Rule Development & Implementation	Director of Strategic Initiatives/Community Air Programs	-	(1)	(1)
Science & Technology Advancement	Administrative Assistant II	1	-	1
Science & Technology Advancement	Air Quality Chemist	1	-	1
Science & Technology Advancement	Air Quality Instrument Specialist II	-	(1)	(1)
Science & Technology Advancement	Planning and Rules Manager	1	-	1
Science & Technology Advancement	Program Supervisor	-	(1)	(1)
Science & Technology Advancement	Senior Air Quality Engineer	-	(1)	(1)
Science & Technology Advancement	Senior Office Assistant	-	(1)	(1)
Science & Technology Advancement	Senior Public Affairs Manager	-	(1)	(1)
Total Mid-Year Changes		17	(15)	2

SALARIES & EMPLOYEE BENEFITS

Fiscal Year 2022-23 Adopted Personnel Actions				
Office	Position	Add	Delete	Total
Administrative and Human Resources	Human Resources Analyst	1	-	1
Clerk of the Boards	Senior Office Assistant	1	-	1
Compliance and Enforcement	Program Supervisor	3	-	3
Compliance and Enforcement	Staff Specialist	1	-	1
Compliance and Enforcement	Air Quality Inspector II	-	(5)	(5)
Executive Office	Administrative Assistant II	1	-	1
Engineering & Permitting	Air Quality Engineer II	-	(2)	(2)
Engineering & Permitting	Supervising Air Quality Engineer	2	-	2
Finance	Senior Fiscal Assistant	1	-	1
Information Management	Assistant Information Technology Specialist	-	(2)	(2)
Information Management	Information Technology Specialist I	-	(1)	1
Information Management	Information Technology Specialist II	3	-	1
Information Management	Information Technology Manager – Cybersecurity	1	-	1
Legal	Assistant Chief Deputy Counsel	1	-	1
Legal	Senior Deputy District Counsel	-	(1)	(1)
Planning, Rule Development & Implementation	Air Quality Specialist	2	-	2
Science & Technology Advancement	Administrative Assistant I	1	-	1
Science & Technology Advancement	Air Quality Inspector II	1	-	1
Science & Technology Advancement	Air Quality Specialist	3	-	3
Total Fiscal Year 2022-23 Adopted Personnel Actions		22	(11)	11

SERVICES & SUPPLIES

Acct. #	Account Description	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate	FY 2022-23 Adopted Budget	Increase/ (Decrease) ^(a)
67250	INSURANCE	\$1,449,140	\$1,449,140	\$1,449,140	\$1,811,425	\$362,285
<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	\$253,291	\$253,291	\$200,280	(\$12,000)
<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	\$591,843	\$611,834	\$611,834	\$592,843	\$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 - \$20,300 Free and low-cost public facilities are used whenever possible for public workshops and informational meetings. The FY 2022-23 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	\$907,195	\$909,895	\$909,895	\$897,195	(\$10,000)
<p>This account is used for trash disposal, landscape maintenance, parking lot maintenance, janitorial supplies, and janitorial contracts. The decrease from the FY 2021-22 Adopted Budget reflects the anticipated level of expenditures for FY 2022-23.</p>						
67450	PROFESSIONAL & SPECIAL SERVICES	\$8,796,501	\$11,484,830	\$10,517,091	\$9,944,850	\$1,148,349
<p>This account is for services rendered to South Coast AQMD by outside contractors. The FY 2022-23 Professional & Special Services supporting detail is located at the end of this section. The increase from the FY 2021-22 Adopted Budget is a result of expenditures related to emergency operations center and an increase in the health insurance brokerage contract. The FY 2022-23 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 2022-23 Adopted Budget vs. FY 2021-22 Adopted Budget.

SERVICES & SUPPLIES

Acct. #	Account Description	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate	FY 2022-23 Adopted Budget	Increase/ (Decrease)^(a)
67460	TEMPORARY AGENCY SERVICES	\$772,048	\$750,694	\$750,694	\$771,048	(\$1,000)
<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 FY 2022-23 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	\$507,623	\$523,123	\$452,123	\$512,623	\$5,000
<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	\$184,135	\$184,135	\$161,680	\$0
<p>This account is for various freight and cylinder charges as well as workspace reconfigurations and personnel moves. The FY 2022-23 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	\$815,470	\$1,271,384	\$1,242,743	\$818,464	\$2,994
<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 FY 2022-23 Adopted Budget 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	\$1,022,479	\$1,042,879	\$1,002,479	\$1,022,479	\$0
<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 2022-23 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 2022-23 Adopted Budget vs. FY 2021-22 Adopted Budget.

SERVICES & SUPPLIES

Acct. #	Account Description	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate	FY 2022-23 Adopted Budget	Increase/ (Decrease)^(a)
67700	AUTO MILEAGE	\$106,127	\$204,127	\$144,127	105,927	(\$200)
<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 FY 2022-23 Adopted Budget 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	\$470,000	\$450,000	\$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	\$340,696	\$359,036	\$280,403	\$360,896	\$20,200
<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 FY 2022-23 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	\$1,967,620	\$1,967,620	\$1,797,620	\$1,965,620	(\$2,000)
<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 2021-22 Adopted Budget reflects the anticipated level of expenditures for FY 2022-23.</p>						
67900	COMMUNICATIONS	\$898,884	\$848,950	\$848,950	\$1,098,884	\$200,000
<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 increase from the FY 2021-22 Adopted Budget reflects the anticipated level of expenditures for FY 2022-23. The FY 2022-23 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	\$3,186,361	\$3,186,361	\$3,186,361	\$348,736	(\$2,837,625)
<p>This account is for the interest due on the 1995 and 2004 Pension Obligation Bonds. The decrease from the FY 2021-22 Adopted Budget is due to the maturity of the 1995 Pension Obligation Bond.</p>						

^(a)FY 2022-23 Adopted Budget vs. FY 2021-22 Adopted Budget.

SERVICES & SUPPLIES

Acct. #	Account Description	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate	FY 2022-23 Adopted Budget	Increase/ (Decrease)^(a)
68000	CLOTHING	\$78,508	\$99,508	\$99,508	\$89,965	\$11,457
<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 2021-22 Adopted Budget reflects the anticipated level of expenditures for FY 2022-23.</p>						
68050	LABORATORY SUPPLIES	\$557,000	\$622,175	\$512,000	\$562,000	\$5,000
<p>This account is used to purchase various supplies such as chemicals, calibration gases and glassware for laboratory services. The FY 2022-23 Adopted Budget reflects no change in anticipated needs. The FY 2022-23 Adopted Budget does not include amounts for federally funded grant programs. An expenditure appropriation will occur mid-year when the grants are awarded.</p>						
68060	POSTAGE	\$432,158	\$446,989	\$374,656	\$421,158	(\$11,000)
<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 2021-22 Adopted Budget reflects the anticipated level of expenditures for FY 2022-23.</p>						
68100	OFFICE EXPENSE	\$1,538,421	\$1,709,712	\$1,495,626	\$1,531,011	(\$7,410)
<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 FY 2022-23 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	\$48,000	\$75,982	\$75,982	\$46,000	(\$2,000)
<p>This account is for office furniture under \$5,000. The decrease from the FY 2021-22 Adopted Budget reflects the anticipated level of expenditures for FY 2022-23.</p>						
68250	SUBSCRIPTIONS & BOOKS	\$179,074	\$248,451	\$248,451	\$178,617	(\$457)
<p>This account is used to purchase reference materials, magazine subscriptions, books, and on-line database legal research services.</p>						

^(a)FY 2022-23 Adopted Budget vs. FY 2021-22 Adopted Budget.

SERVICES & SUPPLIES

Acct. #	Account Description	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate	FY 2022-23 Adopted Budget	Increase/ (Decrease) ^(a)
68300	SMALL TOOLS, INSTRUMENTS, EQUIPMENT	\$177,276	\$366,962	\$366,962	\$179,246	\$1,970
<p>This account covers the purchase of small tools and equipment for air monitoring stations, laboratory, and headquarters building maintenance. The FY 2022-23 Adopted Budget does not include amounts for federally funded grant programs. Expenditure appropriations will occur mid-year for these programs.</p>						
68400	GAS & OIL	\$292,021	\$292,021	\$250,000	\$266,021	(\$26,000)
<p>This account is for the purchase of gasoline, oil, and alternative fuels for the South Coast AQMD fleet. The FY 2022-23 Adopted Budget reflects a decrease in anticipated needs.</p>						
69500	TRAINING/CONF/ TUITION/BOARD EXP	\$992,807	\$981,857	\$906,417	\$987,607	(\$5,200)
<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 decrease from the FY 2021-22 Adopted Budget reflects the anticipated level of expenditures for FY 2022-23.</p>						
69550	MEMBERSHIPS	\$76,428	\$259,772	\$247,522	\$75,328	(\$1,100)
<p>This account provides for South Coast AQMD membership in in scientific, clean fuels, advanced technology, and related environmental business/policy organizations. The decrease from the FY 2021-22 Adopted Budget reflects the anticipated level of expenditures for FY 2022-23.</p>						
69600	TAXES	\$64,500	\$64,500	\$37,000	\$65,500	\$1,000
<p>This account is for unsecured property and use taxes, fuel taxes, and sales taxes. The FY 2022-23 Adopted Budget reflects the increase in expenditures for necessary licenses and permits fees.</p>						
69650	AWARDS	\$69,023	\$69,023	\$69,023	\$70,023	\$1,000
<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 2022-23 Adopted Budget reflects an increase in the anticipated level of expenditures.</p>						
69700	MISCELLANEOUS EXPENSES	\$245,525	\$192,250	\$185,250	\$232,525	(\$13,000)
<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 2021-22 Adopted Budget reflects the anticipated level of expenditures for FY 2022-23.</p>						

^(a)FY 2022-23 Adopted Budget vs. FY 2021-22 Adopted Budget.

SERVICES & SUPPLIES

Acct. #	Account Description	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate	FY 2022-23 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	\$4,006,881	\$4,006,881	\$4,006,881	\$3,780,000	(\$226,881)
This account reflects the principal due on the 2004 pension obligation bonds. The decrease from the FY 2021-22 Adopted Budget is due to the maturity of the 1995 Pension Obligation Bond.						

^(a)FY 2022-23 Adopted Budget vs. FY 2021-22 Adopted Budget.

SERVICES & SUPPLIES

Fiscal Year 2022-23 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	Alliant Health Insurance Brokerage	95,000
	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	Emergency Operations Center	1,000,000
	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	65,000
	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	584,114
	Dist. General Overhead	Wellness Program	35,312
		Sub-total District General	
Governing Board	Operational Support	Board Member Assistant/Consultants	\$807,784
	Sub-total Governing Board		\$807,784
Executive Office	Develop Programs	Diversity, Equity, & Inclusion Programs	\$100,000
	Develop Programs	Professional & Special Services	75,000
	Sub-total Executive Office		\$175,000
Finance	Customer Service and Business Assistance	AB 2766 Audit of DMV Fee Recipients	\$10,000
	Operational Support	Bank Service Charges/Los Angeles County Treasurer Office	60,000
	Ensure Compliance	Bank Services Fund 15, Hot Spots Lockbox	15,000
	Operational Support	E-Check Fee	3,000
	Operational Support	Financial Audit	59,305
	Operational Support	Financial Consultant for Treasury Management	23,000
	Operational Support	LA County Treasurer Office - PGP Maintenance	1,650
	Sub-total Finance		\$171,955
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	

SERVICES & SUPPLIES

Fiscal Year 2022-23 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	73,107
	Operational Support	Occupational Health Services	75,000
	Operational Support	Test Development	15,000
	Operational Support	Third-Party Claims Administrator for Workers Compensation	21,792
	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 and 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	

SERVICES & SUPPLIES

Fiscal Year 2022-23 Professional & Special Services Detail by Office (cont.)			
Office	Program	Contract Description	Amount
Information Management (cont.)	Operational Support	Ingres/OpenIngres Advanced Success Pack	\$140,000
	Operational Support	InstallShield Software Support	3,800
	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			\$1,404,121

SERVICES & SUPPLIES

Fiscal Year 2022-23 Professional & Special Services Detail by Office (cont.)			
Office	Program	Contract Description	Amount
Planning, Rule Development & Implementation	Ensure Compliance	AB 2588 Printing and Mailing	\$7,000
	Ensure Compliance	AB 2588 Public Notification Meeting Interpretive Services	3,500
	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
	Ensure Compliance	Language Interpretation/Translation Services	5,000
	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 Rules	Shipping Data Licenses and Subscriptions	14,200
	Develop Programs	Shipping Special Studies	50,000
	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
Sub-total Planning, Rule Development & Implementation			\$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 2022-23 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
	Operational Support	Workspace Reconfiguration	3,500
	Sub-total Compliance & Enforcement		\$7,500
Total Professional & Special Services			\$9,944,850

CAPITAL OUTLAYS, BUILDING REMODELING & TRANSFERS OUT

Acct. #	Account Description	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate	FY 2022-23 Adopted Budget	Increase/ (Decrease)^(a)
77000	CAPITAL OUTLAYS	\$1,850,000	\$3,639,554	\$3,639,554	\$2,051,000	\$201,000

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 2022-23 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 2022-23 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 2022-23 is provided at the end of this section.

^(a)FY 2022-23 Adopted Budget vs. FY 2021-22 Adopted Budget.

Acct. #	Account Description	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate	FY 2022-23 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 2022-23.

^(a)FY 2022-23 Adopted Budget vs. FY 2021-22 Adopted Budget.

Acct. #	Account Description	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate	FY 2022-23 Adopted Budget	Increase/ (Decrease)^(a)
99950	TRANSFERS OUT	\$841,353	\$841,353	\$841,353	\$2,841,353	\$2,000,000

The FY 2022-23 Adopted Budget includes transfers to the Debt Service Fund and Health Effects Research Fund.

^(a)FY 2022-23 Adopted Budget vs. FY 2021-22 Adopted Budget.

CAPITAL OUTLAYS, BUILDING REMODELING & TRANSFERS OUT

Fiscal Year 2022-23 Capital Outlays Detail				
Office	Program	Category	Description	Amount
Administrative & Human Resources	Operational Support	Replacement	Cafeteria freezer replacement	\$12,000
	Operational Support	New	Golf cart for rover security guard	11,000
Sub-total Administrative & Human Resources				\$23,000
District General	Operational Support	N/A	Unbudgeted Capital Outlay - This amount is set aside for unanticipated needs or emergency situations to avoid interruption of operations.	\$350,000
	Operational Support	Upgrade	Cafeteria exhaust equipment upgrade/replacement	445,000
	Operational Support	Replacement	Fleet vehicle replacement	545,000
Sub-total District General				\$1,340,000
Information Management	Operational Support	Upgrade	Misc. telecommunication upgrade/enhancement	\$85,000
	Operational Support	Upgrade	Mobile app enhancements	90,000
	Sub-total Information Management			
Science & Technology Advancement	Monitoring Air Quality	New	Air monitoring trailer replacement for Glendora and Perris AMS	\$210,000
	Monitoring Air Quality	Replacement	Replacement instruments for gaseous and particulate measurements	173,000
	Monitoring Air Quality	New	Cryogenic preconcentrator with autosampler	90,000
	Monitoring Air Quality	New	Met One EBM Plus units	40,000
Sub-total Science & Technology Advancement				\$513,000
Total Capital Outlays				\$2,051,000

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**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
ADOPTED GOALS AND PRIORITY OBJECTIVES
FOR FY 2022-2023**

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 2022-23.

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 final 2022 AQMP by the end of 2022.
2	Secure Incentive Funding for Emissions Reduction	Increase funding for pollution reduction projects.	Secure increased funding of \$250 million.
3	Implementation of AB 617 in Designated Communities	Implement plans for each of the six communities designated in 2018, 2019, and 2020.	Implementation of air monitoring and emissions reduction plans for the six communities designated in 2018, 2019, and 2020.
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 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 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 Resource Groups	Support Employee Resource Groups.	Attend 100% Employee Resource Group meetings and assist the Employee Resource Groups to develop goals and objectives that are in alignment with agency mission.
7	Training and Development	Develop job related equity professional development and 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 proposed changes (+/-), and the proposed budget for the next fiscal year. An FTE position represents one person-year.

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

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

Advance Clean Air Technology
Work Program by Category

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2021-22 +/-	FTEs FY 2022-23 +/-	Expenditures FY 2021-22 \$	Expenditures FY 2022-23 +/- \$	Revenue Categories
1	08 001	I	LEG	AB2766/Mob Src/Legal Advice	AB2766 Leg Adv: Trans/Mob Source	0.05	0.00	10,815	443	IX
2	04 003	III	FIN	AB2766/MSRC	MSRC Program Administration	0.35	0.00	51,769	1,082	IX
3	08 003	I	LEG	AB2766/MSRC	Legal Advice: MSRC Prog Admin	0.10	0.00	21,630	886	IX
4	44 003	I	STA	AB2766/MSRC	Mob Src Review Comm Prog Admin	0.50	0.00	87,027	4,121	IX
5	44 004	I	STA	Advisory Group/Small Business	AB2766 Admin Discretionary Prog	3.00	0.00	522,160	24,728	IX
6	44 012	I	STA	AQMP/Control Tech Assessment	Tech Supp: Quantify Cost Effec	0.85	-0.20	147,945	(29,453)	VIII
7	04 030	I	FIN	AB134	AB134	2.00	0.00	295,823	6,181	IX
8	08 030	I	LEG	AB134	AB134	1.25	0.00	270,370	11,073	IX
9	44 030	I	STA	AB134	AB134	4.00	-4.00	696,213	(696,213)	IX
10	60 030	I	CE	AB134	AB134	0.25	0.05	39,524	10,803	IX
11	44 039	I	STA	Admin/Office Mgt/Tech Adv	Admin Support/Coordination	0.77	0.00	134,021	6,347	VIII
12	44 048	I	STA	Admin/Prog Mgmt/Tech Advance	Overall TA Program Mgmt/Coord	1.55	0.00	269,782	12,776	VIII
13	44 086	I	STA	Airshed FC Bus	Airshed FC Bus	0.25	0.00	43,513	2,061	V
14	44 087	I	STA	Airshed OGV	Airshed OGV	0.25	0.00	43,513	2,061	V
15	44 088	I	STA	ALISO CANYON SEP	ALISO CYN AIR FILTRATION SEP	0.25	0.00	43,513	2,061	XVII
16	44 094	I	STA	Capture and Control	Capture and Control Program	0.00	0.20	-	36,459	XV,XVII
17	44 095	I	STA	CA Natural Gas Veh Partnership	CA Natural Gas Veh Partnership	0.05	0.00	8,703	412	VIII
18	44 096	I	STA	CAPP Year 2-SB 856	CAPP Year 2-SB 856	7.75	1.00	1,343,066	252,024	IX
19	44 097	I	STA	CAPP Year 3-AB 74	CAPP Year 3-AB 74	3.00	3.00	522,160	571,616	IX
20	44 121	I	STA	China Clin Shipping	China Partnership Cleaner Shpng	0.40	0.00	69,621	3,297	IX
21	04 130	III	FIN	Clean Fuels/Contract Admin	Clean Fuels Contract Admin/Monitor	0.15	0.00	22,187	464	VIII
22	44 130	I	STA	Clean Fuels/Contract Admin	Admin/Project Supp for TA Cont	3.00	0.00	522,160	24,728	VIII
23	08 131	I	LEG	Clean Fuels/Legal Advice	Legal Advice: Clean Fuels	0.15	0.00	32,444	1,329	VIII
24	44 132	I	STA	Clean Fuels/Mobile Sources	Dev/Impl Mobile Src Proj/Demo	6.00	0.00	2,394,374	(300,598)	VIII
25	44 134	I	STA	Clean Fuels/Stationary Combust	Dev/Demo Clean Combustion Tech	0.20	-0.10	34,811	(16,581)	VIII
26	44 135	I	STA	Clean Fuels/Stationary Energy	Dev/Demo Alt Clean Energy	0.55	-0.54	95,729	(93,906)	VIII
27	44 136	I	STA	Clean Fuels/Tech Transfer	Disseminate Low Emiss CF Tech	1.00	-0.31	174,053	(48,269)	VIII
28	44 191	I	STA	DERA FY16 Locomotive	DERA FY16 LOCOM	0.05	0.00	8,703	412	V
29	44 194	I	STA	DERA FY18 Dray Trck	DERA FY18 Dray Trck	0.10	0.00	17,405	824	XVII
30	44 196	I	STA	DERA FY20 TRU	DERA FY20 TRU Electrification	0.45	0.00	78,324	3,709	V
31	44 203	I	STA	EFMP Program Support	EFMP Program Support	5.00	0.00	870,266	41,214	XVII
32	44 258	I	STA	FARMER Grant	Fund Ag Replacement Measures	1.50	-1.50	261,080	(261,080)	XVII
33	44 259	I	STA	FARMER YEAR 2	Fund Ag Replacement Year 2	0.00	0.50	-	91,148	XVII
34	44 261	I	STA	FARMER YEAR 3	Fund Ag Replacement Year 3	0.00	1.00	-	182,296	XVII
35	44 272	I	STA	FY19 TAG Volvo	FY 19 TAG Volvo Switch-On	0.25	0.00	43,513	2,061	XVII
36	44 356	I	STA	GGRF ZEDT Demo	GGRF ZEDT Demo Admin	0.40	-0.40	69,621	(69,621)	XVII
37	44 369	I	STA	In Use Em Testing	In Use Em Testing	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	0.00	0.00	-	-	XVII
39	04 457	III	FIN	Mobile Source/Moyer Adm	Carl Moyer: Contract/Fin Admin	1.02	0.00	150,870	3,153	IX
40	08 457	I	LEG	Mob Src/C Moyer/Leg Advice	Moyer/Implem/Program Dev	0.10	0.00	21,630	886	IX
41	16 457	I	AHR	MS/Carl Moyer Admin	C Moyer/Contractor Compliance	0.03	0.02	4,913	3,762	IX
42	44 457	I	STA	Mob Src/C Moyer Adm/Outreach	Carl Moyer: Impl/Program Grant	7.90	5.00	1,675,020	976,598	XVII
43	44 459	I	STA	Mob Src/C Moyer/Impl/Prgr Dev	Moyer/Implem/Program Dev	4.25	0.00	759,522	15,236	XVII
44	44 460	I	STA	VIP Admin	VIP Admin/Outreach/Impl	0.50	0.00	87,027	4,121	XVII
45	44 489	I	STA	One Stop Shop Proj	One Stop Shop Pilot Proj	0.10	0.00	17,405	824	XV
46	44 533	I	STA	POLB AMECS Demo	POLB AMECS Demo-Admin/Impl	0.10	0.00	17,405	824	XVII

Advance Clean Air Technology (Cont.)

Work Program by Category

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2021-22 +/-	FTEs FY 2022-23	Expenditures FY 2021-22	Expenditures FY 2022-23 +/-	Revenue Categories
47	04 542	1	FIN	Prop 1B:Goods Movement	Contracts/Finance Admin	0.50	0.50	\$ 73,956	\$ 1,545	IX
48	16 542	1	AHR	Prop 1B:Goods Movement	Prop 1B: Goods Movement	0.03	0.03	4,913	292	IX
49	04 544	1	FIN	Prop 1B:Low Emiss Sch Bus	Grants/Finance Admin	0.05	0.05	7,396	155	IX
50	44 677	1	STA	School Bus/Lower Emission Prog	School Bus Program Oversight	2.20	2.20	382,917	18,134	IX
51	44 734	1	STA	Air Shed Volvo	Targeted Air Shed Volvo Admin	0.25	0.25	43,513	2,061	XVII
52	44 737	1	STA	Air Shed Daimler	Targeted Air Shed Daimler Admin	0.40	0.25	69,621	(24,047)	XVII
53	44 738	1	STA	Target Air Shed EPA	Targeted Air Shed Admin/impl	0.50	0.50	87,027	4,121	V,XVII
54	44 740	1	STA	Tech Adv/Commercialization	Assess CFs/Adv Tech Potential	0.25	0.25	43,513	2,061	VIII
55	44 741	1	STA	Tech Adv/Non-Combustion	Dev/Demo Non-Combustion Tech	0.20	0.20	34,811	1,649	VIII
56	44 816	1	STA	Transportation Research	Transport Research/Adv Systems	0.10	0.10	17,405	824	VIII
57	44 827	1	STA	VW-General Admin	VW-General Admin	2.75	2.75	469,344	31,970	XVII
58	44 840	1	STA	VW-ZE Trucks-South Coast	VW-ZE Trucks-South Coast	1.00	1.00	174,053	8,243	XVII
59	44 841	1	STA	VW-Combustion-South Coast	VW-Combustion-South Coast	1.00	1.00	174,053	8,243	XVII
60	44 856	1	STA	ZANZEFF Volvo	ZANZEFF Volvo	0.40	0.40	69,621	3,297	XVII
Total Advance Clean Air Technology						69.35	72.62	\$ 13,683,988	\$ 792,630	\$ 14,476,619

**Customer Service and Business Assistance
Work Program by Category**

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2021-22 +/-	FTEs FY 2022-23 +/-	Expenditures FY 2021-22 \$	Expenditures FY 2022-23 \$	Revenue Categories
1	04 002	III	FIN	AB2766/Mobile Source	Prog Admin: Monitor/Dist/Audit	0.10	0.00	14,791	10,309	IX
2	35 019	I	LPA	AB617- Prog Develop	AB617-Program Development	6.00	1.00	929,485	356,628	IX
3	50 038	I	EP	Admin/Office Management	Dev/Coord Goals/Policies/Overs	3.00	0.00	528,743	31,850	IX
4	60 038	III	CE	Admin/Office Budget	Dev/Coord Goals/Policies/Overs	5.00	0.00	907,318	838,784	IX
5	35 046	III	LPA	Admin/Prog Mgmt	Admin Office/Units/SuppCoord Staff	6.02	-1.00	933,203	922,326	IX
6	50 047	I	EP	Admin/Operations Support	Budget/Contracts/Reports/Projects	3.00	0.00	531,243	31,850	IX
7	60 047	I	CE	Admin/Operations Support	Budget/Contracts/Reports/Projects	3.00	0.00	477,788	28,983	IX
8	35 126	II	LPA	Clean Air Connections	Coord of region-wide community group	1.00	0.00	185,897	183,730	IX,IX
9	04 170	I	FIN	Billing Services	Answer/Resp/Resolv Prob & Inq	8.00	0.00	1,202,791	1,226,517	IX,III,IV
10	50 200	I	EP	Economic Dev/Bus Retention	Perm Proc/Public Participation	0.10	0.00	17,625	1,062	III
11	35 205	II	LPA	Environmental Education	Curriculum Dev/Project Coord	0.25	0.00	46,474	45,933	IX,IX,XX
12	35 240	I	LPA	Environmental Justice	Impl Board's EJ Pgrms/Policies	3.00	1.00	557,691	734,922	IX,IV
13	04 260	III	FIN	Fee Review	Cmte Mtg/Fee-Related Complaint	0.10	0.00	14,791	309	IX,III,IV,XX
14	35 260	III	LPA	Fee Review	Cmte Mtg/Fee-Related Complaint	0.50	0.00	92,948	91,865	IX,III,IV,XX
15	50 260	III	EP	Fee Review	Fee Review Committee	0.45	0.00	79,312	4,777	IX,III,IV
16	04 355	III	FIN	Grants Management	Grant Anlyz/Eval/Negot/Acc/Rpt	1.00	0.00	147,911	3,091	IX,XX,XXV
17	35 381	III	LPA	Interagency Liaison	Interact Gov Agns/Promote SCAQMD	0.15	0.00	27,885	325	IX,XX
18	35 390	I	LPA	Intergov/Geographic Deployment	Dev/Impl Local Govt Outreach	10.50	0.00	1,989,918	22,749	IX,IX
19	50 425	I	EP	Lobby Permit Services	Supp Perm Proc/Customer Svc	1.00	0.00	176,248	186,864	III
20	27 481	III	IM	New System Development	Dev sys in supp of Dist-wide	1.25	0.00	277,214	6,790	IX,III
21	03 490	II	EO	Outreach	Publ Awareness Clean Air Prog	0.97	0.00	328,209	59,322	IX
22	35 491	II	LPA	Outreach/Business	Chambers/Business Meetings	1.00	0.00	185,897	2,167	IX,III,IV
23	35 492	II	LPA	Public Education/Public Events	Pub Events/Conf/Rideshare Fair	2.00	0.00	738,799	4,333	IX,III,IV,XX
24	60 492	II	CE	Outreach/Business	Pub Events/Conf/Rideshare Fair	0.10	0.00	15,810	966	IX
25	35 496	II	LPA	Outreach/Visiting Dignitary	Tours/Briefings-Dignitary	0.25	0.00	46,474	542	IX
26	35 514	I	LPA	Permit: Expired Permit Program	Assist w Permit Reinstatement	0.30	0.00	55,769	650	IV
27	50 520	I	EP	Perm Proc/Pre-Appl Mtg Outreach	Pre-App Mtgs/Genl Prescreening	1.00	0.00	176,248	10,617	III
28	16 540	III	AHR	Print Shop	Printing/Collating/Binding	5.00	-0.60	818,759	55,417	IX
29	35 555	II	LPA	Public Information Center	Inform public of unhealthy air	1.00	0.00	275,897	2,167	IX,IX
30	03 565	III	EO	Public Records Act	Comply w/ Public Req for Info	0.01	0.00	3,384	612	IX
31	04 565	I	FIN	Public Records Act	Comply w/ Public Rec Requests	0.02	0.00	2,958	62	IX
32	08 565	III	LEG	Public Records Act	Comply w/ Public Rec Requests	1.50	0.00	324,444	13,288	IX
33	16 565	III	AHR	Public Records Act	Comply w/ Public Rec Requests	0.03	0.00	4,913	292	IX
34	17 565	III	CB	Public Records Act	Comply w/ Public Rec Requests	0.02	0.00	4,729	66	IX
35	26 565	III	PRA	Public Records Act	Comply w/ Public Rec Requests	0.79	0.06	143,511	18,206	IX
36	27 565	III	IM	Public Records Act	Comply w/ Public Req for Info	4.75	0.00	971,315	25,802	IX
37	35 565	III	LPA	Public Records Act	Comply w/ Public Req for Info	0.10	0.00	18,590	217	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.

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

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2021-22 +/-	FTEs FY 2022-23	Expenditures FY 2021-22	+/-	Expenditures FY 2022-23	Revenue Categories
38	44	565	III	STA	Public Records Act	0.62	0.62	\$ 107,913	\$ 5,111	\$ 113,024	la
39	50	565	III	EP	Public Records Act	0.25	0.00	44,062	2,654	46,716	la
40	60	565	III	CE	Public Records Act	0.30	0.00	47,429	2,898	50,327	la
41	04	631	III	FIN	Cash Mgmt/Refunds	0.30	0.30	44,373	927	45,301	III,IV,XI
42	35	679	III	LPA	Small Business Assistance	1.00	0.00	185,897	(2,167)	183,730	III
43	08	681	III	LEG	Small Business/Legal Advice	0.05	0.00	10,815	443	11,258	II,III
44	50	690	I	EP	Source Education	2.80	0.00	493,494	29,726	523,220	III,IV,V,XV
45	60	690	I	CE	Source Education	0.20	0.80	31,619	136,138	167,757	III,IV,V,XV
46	44	701	I	STA	Source Testing/Customer Svc	0.05	0.00	8,703	412	9,115	VI
47	35	710	I	LPA	Speakers Bureau	0.10	0.00	18,590	(217)	18,373	la
48	16	720	I	AHR	Subscription Services	0.70	0.09	114,626	22,428	137,055	IV,XVII
49	26	788	I	PRA	AB2588 Mailing/Venue	0.50	0.00	101,330	3,798	105,128	XVII
50	35	791	I	LPA	Toxics/AB2588	0.01	0.00	1,859	(22)	1,837	X
51	26	833	II	PRA	Rule 2202 ETC Training	2.15	0.00	390,569	18,480	409,049	XI

Total Customer Service & Business Assistance 81.29 1.35 82.64 \$ 14,856,261 \$ 745,296 \$ 15,601,557

**Develop Programs
Work Program by Category**

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2021-22 +/-	FTEs FY 2022-23 +/-	Expenditures FY 2021-22 \$	Expenditures FY 2022-23 \$	Revenue Categories
1	26 002	I	PRA	AB2766/Mobile Source	AB2766 Mobile Source Outreach	3.25	0.00	660,395	(42,065)	IX
2	44 009	I	STA	AB 1318 Mitigation	AB 1318 Projects Admin/Impl	0.05	0.00	8,703	412	XVII
3	03 010	I	EO	AQMP	Develop/Implement AQMP	0.05	0.00	16,918	(3,058)	II,IX
4	08 010	I	LEG	AQMP	AQMP Revision/CEQA Review	0.30	0.00	64,889	2,658	II,IV,IX
5	26 010	I	PRA	AQMP	AQMP Special Studies	2.80	0.00	524,648	24,067	IV,V,IX,XV
6	26 013	I	PRA	AAA-Irvine Activities	All American Asphalt Activities	0.00	0.20	-	38,051	XVII
7	26 019	I	PRA	AB617-Prog Develop	AB617-Program Development	29.20	-2.35	5,304,473	(196,113)	IX
8	03 019	I	EO	AB617-Prog Develop	AB617-Program Development	0.00	1.00	-	277,203	IX
9	50 019	I	EP	AB617-Prog Develop	AB617-Program Development	1.00	0.20	176,248	47,989	IX
10	03 028	I	EO	Admin/SCAQMD Policy	Dev/Coord Goals/Policies/Overs	0.44	0.00	223,878	(26,909)	IX
11	26 038	I	PRA	Admin/Office Management	Coordinate Off/Admin Activities	5.30	0.90	982,798	216,786	IX
12	26 068	II	PRA	SCAQMD Projects	Prepare Environmental Assessments	4.35	0.00	965,221	12,390	II,IV,IX
13	44 069	I	STA	AQIP Evaluation	AQIP Contract Admin/Evaluation	0.10	0.00	17,405	824	IX
14	26 102	II	PRA	CEQA Document Projects	Review/Prepare CEQA Comments	3.75	-0.50	681,225	(62,895)	II,IX
15	26 104	I	PRA	CEQA Policy Development	ID/Develop/Impl CEQA Policy	0.50	0.00	115,830	4,298	IV,IX
16	26 106	II	PRA	CEQA Resp Agcy Proj	Review CEQA Docs/Perm Proj	0.50	0.00	90,830	4,298	II
17	44 107	I	STA	CARB PilotPrj JETSI	CARB Pilot Project (JETSI)	0.00	1.05	-	191,411	XVII
18	44 108	I	STA	CARB PilotPrj JETSI	CEC Pilot Project (JETSI)	0.00	0.55	-	100,263	XVII
19	26 121	I	PRA	China Clin Shipping	China Partnership Cleaner Shpg	1.00	0.00	285,860	10,395	IX
20	26 217	I	PRA	Emissions Inventory Studies	AER Hotline/Support	0.75	0.00	136,245	6,447	II,IV,IX,XV
21	26 218	I	PRA	AQMP/Emissions Inventory	Dev Emiss Inv: Forecasts/RFPs	1.25	0.00	227,075	10,744	IX
22	26 368	I	PRA	Incentive RFP Emiss Red Projs	Incentive Projects Admin	1.00	0.00	181,660	8,595	XVII
23	44 368	I	STA	Incentive RFP Emiss Red Projs	Incentive Projects Admin	0.25	-0.10	43,513	(16,169)	XVII
24	60 368	I	CE	Incentive RFP Emiss Red Projs	Incentive Projects Admin	0.00	0.10	-	16,776	XVII
25	44 396	I	STA	Lawnmower Exchange	Lawn Mower Admin/Impl/Outreach	0.30	0.00	52,216	2,473	XVII
26	26 397	II	PRA	Lead Agency Projects	Prep Envrnt Assmts/Perm Proj	2.00	-0.85	363,320	(144,526)	III
27	26 451	I	PRA	Mob Src/CARB/EPA Monitoring	CARB/US EPA Mob Src Fuel Policies	0.40	-0.30	72,664	(53,638)	IX
28	26 452	I	PRA	Mob Src/CEC/US DOE Monitoring	CEC/US DOE Mob Src rulemaking proposals	0.20	-0.10	36,332	(17,306)	IX,XVII
29	44 458	I	STA	Mobile Source Strategies	Implement Fleet Rules	1.00	0.00	174,053	8,243	XVII
30	26 503	I	PRA	PM Strategies	PM10 Plan/Analyze/Strategy Dev	1.20	-1.10	217,992	(198,966)	II,V,XV
31	60 503	I	CE	PM Strategies	PM10 Plan/Analyze/Strategy Dev	0.00	0.10	-	16,776	XV
32	44 542	I	STA	Prop 1B-Goods Movement	Prop 1B-Goods Movement	2.95	0.00	608,254	4,519	IX
33	35 560	I	LPA	Public Notification	Public notif of rules/hearings	0.50	0.00	112,948	(1,083)	II,IV,IX
34	26 685	I	PRA	Socio-Economic	Apply econ models/Socio-econ	4.50	0.00	967,470	13,680	II,IV
35	44 702	I	STA	ST Methods Development	Eval ST Methods/Validate	0.95	0.00	165,351	7,831	II
36	44 705	I	STA	ST Sample Analysis/Air Program	Analyze ST Samples/Air Prgrms	0.25	0.00	43,513	2,061	II
37	26 745	I	PRA	Rideshare	Dist Rideshare/Telecommute Prog	0.55	0.00	99,913	4,728	IX
38	26 816	I	PRA	Transportation Regional Progs	Dev AQMP Meas/Coord w/Reg Agn	0.75	0.00	136,245	6,447	V,IX
39	26 834	I	PRA	Rule 2202 Implement	Rule 2202 Proc/Sub Plans/Tech Eval	2.26	-0.01	410,552	17,523	XI
40	60 834	I	CE	Rule 2202 Implement	R2202 Proc/Sub Plans/Tech Eval	0.00	0.10	-	16,776	XI
41	26 836	I	PRA	Rule 2202 Support	R2202 Supt/CmptrMaint/WebSubmt	1.99	0.01	391,503	34,008	V,XI

Total Develop Programs	75.64	(1.10)	74.54	\$ 14,560,142	\$ 345,940	\$ 14,906,082
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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 2021-22 +/-	FTEs FY 2022-23 +/-	Expenditures FY 2021-22 \$	Expenditures FY 2022-23 \$	Revenue Categories
1	44 043	I	STA	Admin/Office Mgmt/ Rules	Rules: Assign/Manage/Supp	0.15	0.00	26,108	1,236	lb
2	26 050	I	PRA	Admin/Rule Dev/PRA	Admin: Rule Development	1.10	-1.00	199,826	(180,800)	lb
3	26 071	I	PRA	Arch Ctgs - Admin	Rdev/Aud/DB/TA/SCAQMD/Rpts/AER	0.50	-0.40	90,830	(71,804)	XVIII
4	26 074	I	PRA	AB 197	AB 197	0.10	0.00	18,166	860	XVIII
5	26 077	I	PRA	Area Sources/Rulemaking	Dev/Eval/Impl Area Source Prog	0.25	-0.15	45,415	(26,389)	II,IX
6	60 077	I	CE	Area Sources/Rulemaking	Dev/Amend/Area S Rules/Credits	0.00	0.10	-	16,776	XVIII
7	26 165	I	PRA	Conformity	Monitor Transp. Conformity	0.25	0.00	45,415	2,149	V,IX
8	26 257	I	PRA	Fac Based Mob Src	Facility Based Mobile Src Meas	7.25	0.00	1,442,035	56,017	IX
9	26 362	II	PRA	Health Effects	Study Health Effect/Toxicology	0.50	1.00	90,830	194,553	II,III,IX
10	26 385	I	PRA	Criteria Pollutants/Mob SrCs	Dev/Impl Intercrredit Trading	0.20	0.00	36,332	1,719	IV,IX
11	26 449	I	PRA	Mob Src/SCAQMD Rulemaking	Prepare SCAQMD Mob Src rulemaking proposals	1.00	1.10	181,660	217,877	IX
12	44 456	I	STA	MS & AQMP Control Strategies	AQMP Control Strategies	0.30	0.00	52,216	2,473	XVII
13	26 460	I	PRA	Regional Modeling	Rule Impact/Analyses/Model Dev	5.00	1.00	1,073,300	233,233	II,V,IX
14	26 646	I	PRA	R1180 Community Mon	R1180 Comm Monitoring Refinery	0.20	0.00	36,332	1,719	XVII
15	50 650	I	EP	Rulemaking	Dev/Amend/Impl Rules	0.25	0.00	44,062	2,654	II,XV
16	08 651	I	LEG	Rules/Legal Advice	Legal Advice: Rules/Draft Regs	1.20	0.00	259,555	10,630	II
17	44 653	I	STA	Rulemaking/BACT	Dev/Amend BACT Guidelines	1.50	-1.50	261,080	(261,080)	II
18	50 653	I	EP	Rulemaking/BACT	Dev/Amend BACT Guidelines	0.00	1.80	-	336,356	II
19	26 654	I	PRA	Rulemaking/NOX	Rulemaking/NOX	3.35	-0.60	608,561	(85,358)	II,IV,XV
20	26 655	I	PRA	NSR/Adm Rulemaking	Amend/Develop NSR & Admin Rules	2.90	-1.10	526,814	(184,354)	II,IV,V,XV
21	26 656	I	PRA	Rulemaking/VOC	Dev/Amend VOC Rules	1.20	2.90	217,992	582,056	II,IV,XV
22	44 657	I	STA	Rulemaking/Support PRA	Assist PRA w/ Rulemaking	1.20	-0.10	208,864	(8,338)	II
23	50 657	I	EP	Rulemaking/Support PRA	Provide Rule Development Supp	0.25	0.00	44,062	2,654	II,XV
24	60 657	I	CE	Rulemaking/Support PRA	Provide Rule Development Supp	1.10	-0.30	173,906	(39,700)	IV,XV
25	26 659	I	PRA	Rulemaking/Toxics	Develop/Amend Air Toxic Rules	10.15	-0.25	1,843,849	39,680	II,XV
26	08 661	I	LEG	Rulemaking/RECLAIM	RECLAIM Legal Adv/Related Iss	0.50	0.00	108,148	4,429	II
27	26 661	I	PRA	Rulemaking/RECLAIM	RECLAIM Amend Rules/Related Is	0.70	0.30	127,162	63,093	II
28	44 706	I	STA	ST Sample Analysis/Air Program	Analyze ST Samples/Rules	0.25	0.00	43,513	2,061	II
29	44 708	I	STA	VOC Sample Analysis/Rules	VOC Analysis & Rptg/Rules	0.25	0.00	43,513	2,061	II,XV
30	50 752	I	EP	Title III Rulemaking	Title III Dev/Implement Rules	0.25	0.00	44,062	2,654	II,V,XV
31	50 773	I	EP	Title V & NSR Rulemaking-Supp	Title V Rules Dev/Amend/Impl	0.25	0.00	44,062	2,654	II
Total Develop Rules						42.10	2.80	7,937,671	921,769	8,859,439

**Ensure Compliance
Work Program by Category**

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2021-22 +/-	FTEs FY 2022-23 +/-	Expenditures FY 2021-22 \$	+/- \$	Expenditures FY 2022-23 \$	Revenue Categories
1	60 013	I	CE	AAA-Irvine Activities	All American Asphalt Activities	0.00	0.20	\$ -	\$ 33,551	\$ 33,551	XVII
2	44 015	I	STA	Acid Rain Program	Acid Rain CEMS Eval/Cert	0.20	0.00	34,811	1,649	36,459	II,IV
3	60 019	I	CE	AB617-Prog Develop	AB617-Program Development	5.10	0.10	806,289	66,047	872,337	IX
4	44 042	I	STA	Admin/Office Mgmt/Compliance	Compliance: Assign/Manage/Supp	0.37	0.00	64,400	3,050	67,450	Ib
5	60 070	I	CE	CARB PERP Program	CARB Audits/Statewide Equip Reg	6.00	0.00	948,576	57,966	1,006,541	XIX
6	60 071	I	CE	Arch Ctgs - Admin	Report Review	0.00	0.10	-	16,776	16,776	XVIII
7	08 072	I	LEG	Arch Ctgs - End User	Case Dispo/Rvw, Track, Prep NOV's	0.05	0.00	10,815	443	11,258	XVIII
8	26 072	I	PRA	Arch Ctgs - End User	Compliance/Rpts/Rule Implementation	0.75	-0.75	136,245	(136,245)	-	XVIII
9	44 072	I	STA	Arch Ctgs - End User	Sample Analysis/Rpts	2.00	0.00	348,106	16,486	364,592	XVIII
10	60 072	I	CE	Arch Ctgs - End User	Compliance/Rpts/Rule Implementa	0.00	0.70	-	117,430	117,430	XVIII
11	08 073	I	LEG	Arch Ctgs - Other	Case Dispo/Rvw, Track, Prep NOV's	0.05	0.00	10,815	443	11,258	XVIII
12	26 073	I	PRA	Arch Ctgs - Other	Compliance/Rpts/Rule Implementation	1.00	-1.00	181,660	(181,660)	-	XVIII
13	60 073	I	CE	Arch Ctgs - Other	Compliance/Rpts/Rule Implementation	0.00	1.00	-	167,757	167,757	XVIII
14	26 076	I	PRA	Area Sources/Compliance	Area Source Compliance	4.50	-4.50	837,470	(837,470)	-	III,IV,V,IX,XV
15	60 076	I	CE	Area Sources/Compliance	Area Source Compliance	0.00	5.25	-	880,724	880,724	XVIII
16	16 080	III	AHR	Auto Services	Vehicle/Radio Repair & Maint	4.00	-0.55	655,007	(56,478)	598,530	Ia
17	60 093	I	CE	CARB Oil & Gas Reg.	GHG EM Stds Oil/NG Facilities	4.00	1.00	632,384	206,401	838,784	XVII
18	44 105	I	STA	CEMS Certification	CEMS Review/Approval	5.00	0.00	870,266	41,214	911,480	II,III,VI
19	35 111	II	LPA	Call Center/CUT SMOG	Smoking Vehicle Complaints	8.00	0.00	1,487,176	(17,333)	1,469,843	IX,XV
20	08 115	I	LEG	Case Disposition	Trial/Dispo-Civil Case/Injunct	4.75	0.00	1,027,405	42,079	1,069,484	II,IV,V,VII,XV
21	60 152	III	CE	Compliance/IM Related Activiti	Assist IM: Design/Review/Test	0.20	0.10	31,619	18,708	50,327	IV
22	08 154	I	LEG	Compliance/NOV Administration	Review/Track/Prep NOV's/MSAs	0.75	0.00	162,222	6,644	168,866	IV
23	60 155	I	CE	Compliance Guidelines	Procedures/Memos/Manuals	0.25	-0.05	39,524	(5,973)	33,551	IV
24	50 156	I	EP	Perm Proc/Info to Compliance	Prog Permit Info to Compliance	3.00	0.00	528,743	31,850	560,593	III,IV,XV
25	60 157	I	CE	Compliance/Special Projects	Prog Audits/Data Req/Brd Supp	4.00	1.00	632,384	206,401	838,784	II
26	60 158	I	CE	Compliance Testing	R461/Combustion Equip Testing	0.50	0.50	111,048	56,709	167,757	IV
27	44 175	I	STA	DB/Computerization	Develop Systems/Database	0.44	0.00	76,583	3,627	80,210	II,IV,VI
28	08 185	I	LEG	Database Management	Support IM/Dev Tracking System	1.00	0.00	256,296	8,859	265,154	IV
29	26 215	I	PRA	AER Gen/Rev/Amy/Aud	AER General/Review/Amend/Audit	8.70	-1.50	1,580,442	(200,603)	1,379,840	II,V
30	26 216	I	PRA	AER Admin/Maint	AER Administration/Maintenance	1.00	1.50	181,660	293,979	475,639	II
31	08 235	I	LEG	Enforcement Litigation	Mal Prosecutions/Civil Actions	2.00	0.00	432,591	17,171	450,309	IV
32	50 240	I	EP	Environmental Justice	R461/Combustion Equip Testing	0.50	0.00	88,124	5,308	93,432	II,IV,XV
33	26 358	I	PRA	GHG Rules-Compl	Green House Gas Rules-Compliance	1.00	-1.00	181,660	(181,660)	-	IV
34	60 358	I	CE	GHG Rules-Compl	Greenhouse Gas Rule Compliance	0.00	1.30	-	218,084	218,084	XVII
35	17 364	I	CB	Hearing Board/Abatement Orders	Attnd/Recrd/Monitr Mtgs	0.10	0.00	23,643	(331)	23,312	IV
36	17 365	I	CB	Hearing Board/Variations/Appeal	Attnd/Recrd/Monitr HB Mtgs	3.20	0.00	841,775	(10,580)	831,196	IV,V,VII
37	50 365	I	EP	Hearing Bd/Variations	Variations/Orders of Abatement	0.75	0.00	132,186	7,962	140,148	VII
38	60 365	I	CE	Hearing Bd/Variations	Variations/Orders of Abatement	0.25	-0.05	39,524	(5,973)	33,551	VII
39	08 366	I	LEG	Hearing Board/Legal	Hear/Dispo-Variant/Appeal/Rev	3.00	0.00	648,887	26,576	675,463	IV,V,XV
40	26 371	I	PRA	Indir Src Rule Cmpl	Indir Source Rule Compliance	0.00	2.50	-	475,639	475,639	XVII
41	60 375	I	CE	Inspections	Compliance/Inspection/Follow-up	85.00	-10.00	13,442,155	(856,389)	12,585,766	II,V,XV
42	50 377	I	EP	Inspections/RECLAIM Audits	Audit/Compliance Assurance	6.00	0.00	1,057,487	63,699	1,121,186	II,IV
43	60 377	I	CE	Inspections/RECLAIM Audits	Audit/Compliance Assurance	16.00	0.00	2,529,535	154,575	2,684,110	II,IV
44	08 380	I	LEG	Interagency Coordination	Coordinate with Other Agencies	0.20	0.00	43,259	1,772	45,031	II,IV
45	08 403	III	LEG	Legal Rep/Litigation	Prep/Hearing/Disposition	3.50	0.00	913,036	31,005	944,041	Ia,II

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 2021-22 +/-	FTEs FY 2022-23 +/-	Expenditures FY 2021-22 \$	Expenditures FY 2022-23 \$	Revenue Categories
46	44	450	I	STA	Microscopic Analysis	3.00	0.00	522,160	24,728	XVII
47	08	465	I	LEG	Mutual Settlement	1.50	0.00	324,444	13,288	IV
48	50	492	I	EP	Customer Service	0.50	0.00	88,124	5,308	II,V,IX,XV
49	44	500	I	STA	PM2.5 Program	10.30	0.00	1,792,748	84,901	II,V,IX
50	60	539	I	CE	Procedure 5 Review	3.00	2.00	474,288	364,497	XVII
51	60	550	II	CE	Public Complaints/Breakdowns	10.00	0.00	1,580,959	96,609	II,IV,V,XV
52	50	605	I	EP	RECLAIM/Admin Support	6.50	0.00	1,145,611	69,008	II,III,IV,XV
53	60	605	I	CE	RECLAIM/Admin Support	0.25	0.25	39,524	83,878	II,III,IV,XV
54	26	620	I	PRA	Refinery Pilot Project	1.10	-1.00	229,826	(130,800)	II
55	26	645	I	PRA	Rule 1610 Plan Verification	0.50	-0.50	90,830	(90,830)	V,IX
56	60	645	I	CE	Rule 1610 Plan Verification	0.00	0.25	-	41,939	IX
57	50	678	I	EP	School Siting	0.25	0.00	44,062	2,654	II
58	60	678	I	CE	School Siting	0.10	0.00	15,810	966	IV
59	50	680	I	EP	Small Business Assistance	0.50	0.00	88,124	5,308	III,IV
60	44	700	I	STA	Source Testing/Compliance	2.25	0.00	421,620	18,546	VI
61	44	704	I	STA	ST/Sample Analysis/Compliance	4.00	0.00	696,213	32,971	VI
62	44	707	I	STA	VOC Sample Analysis/Compliance	6.50	0.00	1,603,346	(381,422)	IV,XV
63	44	716	I	STA	Special Monitoring	2.20	-1.00	417,917	(164,162)	III,IV,IX,XV
64	60	721	I	CE	Sunshine Cyn Lndfl	0.00	0.10	-	16,776	XVII
65	60	771	I	CE	Title V	4.50	3.50	711,432	630,623	II,IV
66	04	791	III	FIN	Toxics/AB2588	0.15	0.00	37,187	464	X
67	08	791	I	LEG	Toxics/AB2588	0.05	0.00	10,815	443	X
68	27	791	III	IM	Toxics/AB2588	0.50	0.00	141,246	2,716	X
69	50	791	I	EP	Toxics/AB2588	0.25	0.25	44,062	2,654	X
70	26	794	I	PRA	Toxics/AB2588	11.80	0.00	2,143,588	101,427	X
71	44	794	I	STA	Toxics/AB2588	2.00	0.00	348,106	16,486	X
72	44	795	I	STA	Toxics/Engineering	1.30	0.00	226,269	10,716	VI,X
73	26	796	I	PRA	AB2588/Support	0.50	0.00	90,830	4,298	X
74	08	805	III	LEG	Training	0.75	0.00	162,222	6,644	lb

261.36	(0.55)	260.81	\$ 45,517,170	\$1,621,541	\$ 47,138,712
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Total Ensure Compliance

**Monitoring Air Quality
Work Program by Category**

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2021-22 +/-	FTEs FY 2022-23 +/-	Expenditures FY 2021-22 \$	Expenditures FY 2022-23 \$ +/-	Revenue Categories
1	44 013	I	STA	AAA-Irvine Activities	All American Asphalt Activities	0.00	0.40	\$ -	\$ 72,918	XVII
2	44 019	I	STA	AB617- Prog Develop	AB617-Program Development	39.60	-2.20	6,892,506	(74,636)	IX
3	44 038	I	STA	Admin/Office Mgmt/Monitoring	Overall Program Mgmt/Coord	0.00	0.00	156,648	7,418	lb
4	44 046	I	STA	Admin/Program Management	STA Program Administration	2.00	0.00	360,106	16,486	lb
5	26 061	I	PRA	Air Quality Evaluation	Air Quality Evaluation	2.75	-0.05	499,565	14,125	IX
6	44 063	I	STA	Ambient Air Analysis	Analyze Criteria/Tox/Pollutants	6.91	0.00	1,217,512	132,153	II,V,IX
7	44 064	I	STA	Ambient Network	Air Monitoring/Toxics Network	21.55	0.00	4,316,433	102,646	II,IV,V,IX
8	44 065	I	STA	Air Quality Data Management	AM Audit/Validation/Reporting	1.00	0.00	174,053	8,243	II,V,IX
9	44 067	II	STA	Ambient Lead Monitoring	Lead Monitoring/Analysis/Reporting	0.50	0.00	87,027	4,121	IV
10	44 073	I	STA	Arch Ctg - Other	Sample Analysis/Rpts	2.00	0.00	418,106	(53,514)	XVIII
11	44 079	II	STA	AQ SPEC	AQ SPEC	6.19	1.00	1,077,389	233,319	XVII
12	44 081	I	STA	Air Filtration EPA	Air Filtration EPA/Admn/Impl	0.10	0.00	17,405	824	V
13	44 082	I	STA	Air Filtration Other	Air Filtration Other/Admn/Impl	0.20	0.00	34,811	1,649	XVII
14	44 091	I	STA	Aliso Cyn SEP MAD	Aliso Cyn SEP MAD	0.00	0.20	-	36,459	XVII
15	44 113	I	STA	Carson H2S Event 21	Carson-Dominguez Chnml H2S 21	0.00	1.50	-	273,444	XVII
16	44 151	I	STA	EPA-Com-Mobile Monitoring	EPA Com Scale Mobile Monitoring	0.00	1.00	-	182,296	XVII
17	60 210	II	CE	Emergency Response	Emerg Tech Asst to Public Saf	0.10	0.00	15,810	966	IV,XV
18	44 248	I	STA	EPA Community Scale AQ-SPEC	EPA Community Scale AQ-SPEC	1.00	0.00	174,053	8,243	V,XVII
19	26 443	I	PRA	MATES V	MATES V	0.15	-0.05	47,249	(28,223)	XVII
20	26 444	I	PRA	MATES V Refinery	MATES V Refinery	0.10	0.00	18,166	860	XVII
21	26 445	I	PRA	Meteorology	ModelDev/Data Analysis/Forecast	2.00	0.70	488,320	150,370	II,V,IX
22	44 468	I	STA	NATTS(Natl Air Tox Trends Sta)	NATTS (Natl Air Tox Trends)	1.00	0.00	174,053	8,243	XVII
23	44 485	I	STA	OC Oil Spill 2021	Orange County Oil Spill 2021	0.00	0.10	-	18,230	XVII
24	44 505	I	STA	PM Sampling Program (DHS)	PM Sampling Program - Addition	8.41	0.00	1,463,788	69,322	V
25	44 507	I	STA	PM Sampling Spec	PM Sampling Special Events	0.10	0.00	17,405	824	V
26	44 530	I	STA	Photochemical Assessment	Photochemical Assess & Monitor	3.00	0.00	522,160	24,728	V,IX
27	44 585	I	STA	Quality Assurance	Quality Assurance Branch	6.00	0.00	1,044,319	49,457	II,V,IX
28	44 646	I	STA	R1180 Community Mon	R1180 Comm Monitoring Refinery	13.00	-1.10	2,512,692	(93,370)	XVII
29	44 663	I	STA	Salton Sea Monit	Mon/Analyze Hydrogen Sulfide	0.25	0.00	43,513	2,061	XVII
30	44 715	II	STA	Spec Monitoring/Emerg Response	Emergency Response	0.50	0.00	172,027	(40,879)	II
Total Monitoring Air Quality						119.31	1.50	\$ 21,945,117	\$1,128,781	\$ 23,073,898

**Operational Support
Work Program by Category**

Program Code	Goal	Office	Program	Activities	FTEs FY 2021-22 +/-	FTEs FY 2022-23 +/-	Expenditures FY 2021-22 \$	Expenditures FY 2022-23 \$	Revenue Categories
1 08 019	I	LEG	AB617-Prog Develop	AB617-Program Development	2.50	0.00	540,739	9,294	IX
2 04 020	III	FIN	Admin/SCAQMD Budget	Analyze/Prepare/Impl/Track WP	3.71	0.00	570,635	(10,417)	la
3 04 021	III	FIN	Admin/SCAQMD Contracts	Contract Admin/Monitor/Process	3.20	0.00	473,317	9,890	la
4 04 023	III	FIN	Admin/SCAQMD Capital Assets	FA Rep/Reconcile/Inv/Acct	0.70	0.00	103,538	2,163	la
5 17 024	III	CB	Admin/SCAQMD/GB/HB Mgmt	Admin Governing/Hearing Brds	1.25	1.00	345,537	170,464	la,VII,XV
6 08 025	III	LEG	Admin/SCAQMD-Legal Research	Legal Research/Staff/Exec Mgmt	1.20	0.00	259,555	10,630	la
7 16 026	III	AHR	SCAQMD Mail	Posting/Mailing/Delivery	2.30	0.20	376,629	57,088	la
8 04 035	I	FIN	AB617-Support	AB617-Support	0.50	0.00	73,956	(195)	IX
9 16 035	I	AHR	AB617-Support	AB617-Support	4.00	-0.15	655,007	(2,969)	IX
10 27 035	I	IM	AB617-Support	AB617-Support	8.00	0.00	1,635,899	7,750	IX
11 03 038	III	EO	Admin/Office Management	Budget/Program Management	1.00	1.00	340,276	214,130	lb
12 04 038	III	FIN	Admin/Office Management	Fin Mgmt/Oversee Activities	2.75	0.00	406,756	8,499	lb
13 08 038	III	LEG	Admin/Office Management	Attorney Timekeeping/Perf Eval	3.50	0.00	764,285	31,005	lb
14 16 038	III	AHR	Admin/Office Management	Reports/Proj/Budget/Contracts	6.00	-0.55	1,080,617	(120,114)	lb
15 27 038	III	IM	Admin/Office Management	Overall Direction/Coord of IM	2.00	0.00	408,975	10,864	lb
16 04 045	III	FIN	Admin/Office Budget	Office Budget/Prep/Impl/Track	0.05	0.00	7,396	155	lb
17 16 060	III	AHR	Equal Employment Opportunity	Program Dev/Monitor/Reporting	0.05	0.45	8,188	78,556	la
18 04 071	I	FIN	Arch Ctgs - Admin	Cost Analysis/Payments	0.04	0.00	5,916	(16)	XVIII
19 08 071	I	LEG	Arch Ctgs - Admin	Cost Dev/TA/Reinterpretations	0.05	0.00	10,815	186	XVIII
20 27 071	I	IM	Arch Ctgs - Admin	Database Dev/Maintenance	0.25	0.00	51,122	242	XVIII
21 04 085	III	FIN	Building Corporation	Building Corp Acct/Fin Reports	0.02	0.00	2,958	62	la
22 16 090	III	AHR	Building Maintenance	Repairs & Preventative Maint	8.00	0.00	1,310,014	89,880	la
23 16 092	III	AHR	Business Services	Building Services Admin/Contracts	2.69	-0.14	440,492	1,899	la
24 08 102	II	LEG	CEQA Document Projects	CEQA Review	0.75	0.00	162,222	2,788	II,III,IX
25 27 160	III	IM	Computer Operations	Oper/Manage Host Computer Sys	5.25	0.00	1,437,559	517,746	la
26 27 173	III	IM	CyberSecurity	CyberSecurity	1.00	1.00	204,487	215,351	la
27 27 184	III	IM	Database Information Support	Ad Hoc Reports/Bulk Data Update	1.00	0.00	218,516	5,432	la
28 27 185	III	IM	Database Management	Dev/Maintain Central Database	2.25	0.00	460,097	12,222	la
29 27 215	I	IM	Annual Emission Reporting	System Enhancements for GHG	0.50	0.00	102,244	484	II,XVII
30 16 225	III	AHR	Employee Benefits	Benefits Analysis/Orient/Records	2.50	-0.15	409,379	(1,685)	la
31 16 226	III	AHR	Classification & Pay	Class & Salary Studies	0.32	-0.02	52,401	(355)	la
32 08 227	III	LEG	Employee/Employment Law	Legal Advice: Employment Law	0.50	0.00	108,148	4,429	la
33 16 228	III	AHR	Recruitment & Selection	Recruit Candidates for SCAQMD	3.30	-0.85	608,278	(91,128)	la
34 16 232	III	AHR	Position Control	Track Positions/Workforce Analyz	0.20	0.55	32,750	97,365	la
35 04 233	III	FIN	Employee Relations	Assist HR/Interpret Salary Res	0.10	0.00	14,791	309	la
36 16 233	III	AHR	Employee Relations	Meet/Confer/Labor-Mgmt/Grievance	1.50	0.00	245,628	14,603	la
37 16 255	III	AHR	Facilities Services	Phones/Space/Keys/Audio-Visual	1.00	0.15	163,752	35,758	la
38 04 265	III	FIN	Financial Mgmt/Accounting	Record Accts Rec & Pay/Rpts	7.27	0.00	1,136,272	23,818	la
39 04 266	III	FIN	Financial Mgmt/Fin Analysis	Fin/SCAQMD Stat Analysis & Audit	0.80	0.00	118,329	2,473	la
40 04 267	III	FIN	Financial Mgmt/Treasury Mgmt	Treas Mgt Analyz/Trk/Proj/Invst	1.00	0.00	232,561	3,091	la
41 04 268	III	FIN	Financial Systems	CLASS/Rev/Act/PR/Sys Analyze	0.10	0.00	14,791	309	la
42 02 275	II	GB	Governing Board	Rep of Dist Meet/Conf/Testimony	0.00	0.00	1,660,230	-	la
43 08 275	III	LEG	Governing Board	Legal Advice:Attend Board/Cmte Mtgs	1.00	0.00	216,296	8,859	la
44 17 275	III	CB	Governing Board	Attend/Record/Monitor Meetings	1.40	0.00	331,002	(4,629)	la
45 35 350	III	LPA	Graphic Arts	Graphic Arts	2.00	0.00	371,794	(4,333)	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 2021-22 +/-	FTEs FY 2022-23 +/-	Expenditures FY 2021-22	Expenditures FY 2022-23	Revenue Categories
46	27 370	III	IM	Information Technology Svcs	Enhance Oper Effic/Productivity	2.75	0.00	\$ 585,090	\$ 14,938	la
47	08 401	III	LEG	Legal Advice/SCAQMD Programs	General Advice: Contracts	2.00	0.00	482,591	17,717	la
48	27 420	III	IM	Library	General Library Svcs/Archives	0.25	0.00	59,472	60,850	la
49	16 446	III	AHR	Mentorship Program	Mentorship Program	0.15	0.05	16,375	26,023	la
50	26 446	III	PRA	Mentorship Program	Mentor/Mentee Activities	0.00	0.10	-	19,026	IX
51	04 447	I	FIN	Mobile Sources/Accounting	Record Act Rec & Pay/Special Funds	0.65	0.00	96,142	(254)	IX
52	27 470	III	IM	Network Operations/Telecomm	Operate/Maintain/Implem SCAQMD	8.25	0.00	2,035,869	94,814	la
53	27 480	III	IM	New System Development	Dev sys for special oper needs	2.00	0.00	800,647	(250,510)	II,IV
54	04 493	II	FIN	Outreach/SB/MB/DVBE	Outreach/incr SB/DVBE Partic	0.05	0.00	7,396	155	la
55	04 510	III	FIN	Payroll	Ded/Ret Rpts/PR/St & Fed Rpts	4.10	0.00	653,937	12,672	la
56	04 570	III	FIN	Purchasing	Purch/Track Svcs & Supplies	2.50	0.00	369,779	7,727	la
57	04 571	III	FIN	Purchasing/Receiving	Receive/Record SCAQMD Purchases	1.20	0.00	177,494	3,709	la
58	04 572	III	FIN	Purchasing-Receiving/Stockroom	Track/Monitor SCAQMD Supplies	1.00	0.00	147,911	3,091	la
59	27 615	III	IM	Records Information Mgmt Plan	Plan/Imp/Dir/Records Mgmt plan	1.25	0.00	299,250	6,790	la
60	27 616	III	IM	Records Services	Records/Documents processing	3.75	0.00	911,828	3,052	914,880 la,III,IV
61	04 630	III	FIN	Cash Mgmt/Revenue Receiving	Receive/Post Pymts/Reconcile	5.25	1.00	776,535	145,471	922,006 II,III,IV,XI
62	16 640	III	AHR	Risk Management	Liab/Property/Wk Comp/Selfins	2.25	1.00	474,484	221,391	695,874 la
63	27 735	III	IM	Systems Maintenance	Maintain Existing Software Prog	4.50	0.00	1,390,397	(28,332)	1,362,065 I,III,IV
64	27 736	III	IM	Systems Implementation/Peoples	Fin/HR PeoplesSoft Systems Impl	1.50	0.00	306,731	8,148	314,879 la
65	04 805	III	FIN	Training	Continuing Education/Training	0.20	0.00	29,582	618	30,200 lb
66	26 805	III	PRA	Training	Training	1.00	0.00	181,660	8,595	190,256 lb
67	50 805	III	EP	Training	Dist/Org Unit Training	3.10	0.00	546,368	32,911	579,280 lb
68	60 805	III	CE	Training	Dist/Org Unit Training	4.00	0.00	632,384	38,644	671,028 lb
69	04 825	III	FIN	Union Negotiations	Official Labor/Mgmt Negotiate	0.02	0.00	2,958	62	3,020 la
70	16 825	III	AHR	Union Negotiations	Inclusion/Diversity/Equity	1.50	1.50	-	260,230	260,230 1a
71	26 825	III	PRA	Union Negotiations	Official Labor/Mgmt Negotiate	0.05	0.05	9,083	9,943	19,026 la
72	35 825	III	LPA	Union Negotiations	Official Labor/Mgmt Negotiate	0.01	0.00	1,859	(22)	1,837 la
73	44 825	III	STA	Union Negotiations	Labor/Mgmt Negotiations	0.05	0.00	8,703	412	9,115 la
74	50 825	III	EP	Union Negotiations	Official Labor/Mgmt Negotiate	0.05	0.00	8,812	531	9,343 la
75	60 825	III	CE	Union Negotiations	Official Labor/Mgmt Negotiate	0.10	0.00	15,810	966	16,776 la
76	04 826	III	FIN	Union Steward Activities	Rep Employees in Grievance Act	0.01	0.00	1,479	31	1,510 la
77	26 826	III	PRA	Union Steward Activities	Rep Employees in Grievance Act	0.30	0.00	54,498	2,579	57,077 la
78	35 826	III	LPA	Union Steward Activities	Union Steward Activities	0.01	0.00	1,859	(22)	1,837 la
79	44 826	III	STA	Union Steward Activities	Rep Employees in Grievance Act	0.05	0.00	8,703	412	9,115 la
80	50 826	III	EP	Union Steward Activities	Rep Employees in Grievance Act	0.05	0.00	8,812	531	9,343 la
81	60 826	III	CE	Union Steward Activities	Rep Employees in Grievance Act	0.10	0.00	15,810	966	16,776 la
82	04 827	I	FIN	VW-General Admin	VW-General Admin	1.00	0.00	147,911	(390)	147,521 XVII
83	27 827	I	IM	VW-General Admin	VW-General Admin	1.00	0.00	204,487	969	205,456 XVII
84	08 827	I	LEG	VW-General Admin	VW-General Admin	0.05	0.00	10,815	186	11,001 XVII
85	03 855	II	EO	Web Tasks	Create/edit/review web content	0.03	0.00	10,151	(1,835)	8,316 la
86	04 855	II	FIN	Web Tasks	Create/edit/review web content	0.02	0.00	4,319	(1,299)	3,020 la
87	17 855	II	CB	Web Tasks	Create/edit/review web content	0.03	0.00	7,093	(99)	6,994 la
88	26 855	II	PRA	Web Tasks	Create/edit/review web content	1.21	0.19	219,809	46,549	266,358 la

**Operational Support (Cont.)
Work Program by Category**

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2021-22 +/-	FTEs FY 2022-23 +/-	Expenditures FY 2021-22 \$	Expenditures FY 2022-23 \$	Revenue Categories
89	27	855	II	IM	Web Tasks	3.25	0.00	946,802	17,654	la
90	35	855	II	LPA	Web Tasks	0.40	0.00	74,359	(867)	la
91	50	855	II	EP	Web Tasks	0.25	0.00	44,062	2,654	la
92	60	855	II	CE	Web Tasks	0.40	-0.40	63,238	(63,238)	la
93	03	880	III	EO	Inclusion/Equity	4.00	0.00	792,052	416,759	1a
94	26	880	III	PRA	Inclusion/Equity	0.00	0.70	-	133,179	1a
95	44	880	III	STA	Inclusion/Equity	0.00	0.05	-	9,115	1a
96	60	880	I	CE	Inclusion/Equity	0.00	0.30	-	50,327	1a

Total Operational Support	151.59	7.03	158.62	\$ 31,819,557	\$ 2,669,616	\$ 34,489,173
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**Policy Support
Work Program by Category**

Program Code	Goal	Office	Program	Activities	FTEs FY 2020-21 +/-	FTEs FY 2022-23 +/-	Expenditures FY 2021-22	Expenditures FY 2022-23	Revenue Categories
1 44 041	I	STA	Admin/Office Mgmt/Policy Supp	Overall Policy Supp/Mgmt/Coord	0.49	-0.05	\$ 85,286	\$ (5,076)	80,210 lb
2 03 083	II	EO	Hlth Effects Air Pollution Fou	Health Effects Air Poll Foundation Support	0.01	0.00	3,384	(612)	2,772 la
3 04 083	II	FIN	Hlth Effects Air Pollution Fou	Health Effects Air Poll Foundation Support	0.02	0.00	2,958	62	3,020 la
4 26 083	II	PRA	Hlth Effects Air Pollution Fou	Health Effects Air Poll Foundation Support	0.10	0.00	18,166	860	19,026 la,II,IV
5 26 148	I	PRA	Climate/Energy/Incentives	GHG/Climate Change Policy Development	0.50	0.00	90,830	4,298	95,128 IV,XVII
6 50 148	I	EP	Climate/Energy/Incentives	GHG/Climate Change Support	0.50	0.00	88,124	5,308	93,432 II,IX
7 03 275	I	EO	Governing Board	Board/Committee Support	1.72	0.00	581,979	(105,190)	476,789 la
8 26 276	I	PRA	Advisory Group/Home Rule	Governing Board Advisory Group	0.50	-0.40	90,830	(71,804)	19,026 la
9 44 276	I	STA	Advisory Group/Technology Adva	Tech Adv Advisory Group Supp	0.05	0.00	8,703	412	9,115 XVII
10 50 276	I	EP	Board Committees	Admin/Statioary Source Committees	0.25	0.00	44,062	2,654	46,716 la
11 60 276	I	CE	Board Committees	Admin/Statioary Source Committee	0.10	0.00	15,810	966	16,776 la
12 26 277	I	PRA	Advisory Group/AQMP	Governing Board AQMP Advisory Group	0.50	0.00	90,830	4,298	95,128 II,IX
13 26 278	I	PRA	Advisory Group/Sci,Tech,Model	Scientific/Tech/Model Peer Rev	0.40	0.00	72,664	3,438	76,102 II,IX
14 35 280	I	LPA	Advisory Group/Ethnic Comm	GB Ethnic Comm Advisory Group	0.40	0.00	74,359	(867)	73,492 II,IX
15 35 281	I	LPA	Advisory Group/Small Business	SBA Advisory Group Staff Support	0.50	0.00	92,948	(1,083)	91,865 IV,IX
16 35 283	I	LPA	Governing Board Policy	Brd sup/Respond to GB req	0.55	0.00	102,243	(1,192)	101,052 la
17 35 345	II	LPA	Goods Mvmt&Financial Incentive	Goods Movement & Financial Incentives Progr	1.00	0.00	185,897	(2,167)	183,730 IX
18 03 381	I	EO	Interagency Liaison	Local/State/Fed Coord/Interact	0.71	0.00	240,235	(43,422)	196,814 la,IX
19 08 404	I	LEG	Legal Rep/Legislation	Draft Legis/SCAQMD Position/Mtgs	0.25	0.00	54,074	2,215	56,289 II,IX
20 03 410	I	EO	Legislation	Testimony/Mtgs/New/Current Leg	0.03	0.00	10,151	(1,835)	8,316 la,IX
21 44 410	I	STA	Legislation	Support Pollution Reduction thru Legislatio	0.50	0.00	87,027	4,121	91,148 XVII
22 35 412	I	LPA	Legislation/Federal	Lobbying/Analyses/Tracking/Out	0.25	0.00	711,604	(542)	711,063 la
23 35 413	I	LPA	Legislation/Exec Office Suppor	Coord Legis w/ EO, EC, Mgmt	0.25	0.00	46,474	(542)	45,933 la
24 35 414	I	LPA	Legislation-Effects	Lobbying/Analyses/Tracking/Out	0.80	0.00	258,718	(101,733)	156,984 la,IX
25 03 416	I	EO	Legislative Activities	Supp/Promote/Influence Legis/Adm	0.03	0.00	10,151	(1,835)	8,316 la
26 08 416	I	LEG	Legislative Activities	Lobbying: Supp/Promote/Influence legis/Adm	0.10	0.00	21,630	886	22,515 la
27 26 416	I	PRA	Legislative Activities	Supp/Promote/Influence Legis/Adm	0.50	0.00	90,830	4,298	95,128 la
28 35 416	I	LPA	Legislative Activities	Supp/Promote/Influence Legis/Adm	0.50	0.00	457,948	98,917	556,865 la
29 50 416	I	EP	Legislative Activities	Legislative Activities	0.25	0.00	44,062	2,654	46,716 la
30 35 494	I	LPA	Outreach/Collateral/Media	Edits,Brds,Talk shows,Commercl	5.60	0.00	1,205,739	(12,133)	1,193,606 la
31 08 717	II	LEG	Student Interns	Gov Board/Student Intern Program	0.10	0.00	21,630	886	22,515 la
32 26 717	II	PRA	Student Interns	Gov Bd/Student Intern Program	0.50	-0.40	90,830	(71,804)	19,026 la
33 35 717	II	LPA	Student Interns	Student Interns	0.10	0.00	18,590	(217)	18,373 la
34 60 717	II	CE	Student Interns	Gov Board/Student Intern Program	0.10	-0.10	15,810	(15,810)	- la

Total Policy Support	18.16	(0.95)	17.21	\$ 5,034,574	\$ (301,590)	\$ 4,732,985
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**Timely Review of Permits
Work Program by Category**

#	Program Code	Goal	Office	Program	Activities	FTEs FY 2021-22 +/-	FTEs FY 2022-23 +/-	Expenditures FY 2021-22 \$	Expenditures FY 2022-23 \$	Revenue Categories
1	50 120	I	EP	Certification/Registration Pro	Certification/Registration Prog	1.00	0.00	176,248	10,617	186,864
2	50 253	I	EP	ERC Appl Processing	Process ERC Applications	3.50	0.00	616,867	37,158	654,025
3	50 367	I	EP	Hearing Board/Appeals	Appeals: Permits & Denials	0.25	0.00	44,062	2,654	46,716
4	26 461	I	PRA	Permit & CEQA Modeling Review	Review Model Permit/Risk Assmt	1.00	-0.35	206,660	(57,994)	148,666
5	50 475	I	EP	NSR Implementation	Implement NSR/Allocate ERCs	2.50	0.00	440,620	26,541	467,161
6	50 476	I	EP	NSR Data Clean Up	Edit/Update NSR Data	0.50	0.00	88,124	5,308	93,432
7	50 515	I	EP	Perm Proc/Non TV/Non RECLAIM	PP: Non TitIV/TitIII/RECLAIM	50.25	0.00	8,916,453	565,896	9,482,350
8	08 516	I	LEG	Permit Processing/Legal	Legal Advice: Permit Processing	0.10	0.00	21,630	886	22,515
9	50 517	I	EP	Permit Services	Facility Data-Crete/Edit	12.50	0.00	2,203,098	132,707	2,335,805
10	50 518	I	EP	RECLAIM Non-Title V	Process RECLAIM Only Permits	4.00	0.00	704,991	42,466	747,457
11	50 519	I	EP	Perm Proc/Title III (Non TV)	Process Title III Permits	1.00	0.00	176,248	10,617	186,864
12	50 521	I	EP	Perm Proc/Expedited Permit	Proc Expedited Permits (301OT)	4.00	0.00	704,991	42,466	747,457
13	27 523	III	IM	Permit Streamlining	Permit Streamlining	0.25	0.00	51,122	1,358	52,480
14	50 523	I	EP	Permit Streamlining	Permit Streamlining	4.75	0.00	837,177	50,429	887,606
15	44 545	I	STA	Protocols/Reports/Plans	Eval Test Protocols/Cust Svc	0.10	0.00	17,405	824	18,230
16	44 546	I	STA	Protocols/Reports/Plans	Eval Test Protocols/Compliance	6.15	0.00	1,070,427	50,693	1,121,120
17	50 607	I	EP	RECLAIM & Title V	Process RECLAIM & TV Permits	18.40	0.00	3,242,960	195,344	3,438,304
18	50 643	I	EP	Rule 222 Filing Program	Rule 222 Filing Program	0.50	0.00	88,124	5,308	93,432
19	35 680	I	LPA	Small Business/Permit Streamlin	Asst sm bus to comply/SCAQMD req	3.95	0.00	734,293	(8,558)	725,735
20	44 725	I	STA	Permit Processing/Support E&C	Assist EAC w/ Permit Process	0.35	0.00	60,919	2,885	63,804
21	50 728	I	EP	Perm Proc/IM Programming	Assist IM: Design/Review/Test	2.55	0.00	449,432	27,072	476,504
22	08 770	I	LEG	Title V	Leg Advice: Title V Prog/Perm Dev	0.05	0.00	10,815	443	11,258
23	27 770	I	IM	Title V	Dev/Maintain Title V Program	1.50	0.00	306,731	8,148	314,879
24	08 772	I	LEG	Title V Permits	Leg Advice: New Source Title V Permit	0.05	0.00	10,815	443	11,258
25	50 774	I	EP	TV/Non-RECLAIM	Process Title V Only Permits	18.00	0.00	3,172,461	191,096	3,363,558
26	50 775	I	EP	Title V - Admin	Title V Administration	1.00	0.00	176,248	10,617	186,864

Total Timely Review of Permits 138.20 (0.35) 137.85 \$ 24,528,921 \$1,355,424 \$ 25,884,345

Total South Coast AQMD 957.00 13.00 970.00 \$ 179,883,401 \$ 9,279,408 \$ 189,162,810

WORK PROGRAM GLOSSARY

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

AAA-Irvine Activities (All American Asphalt Activities) – South Coast AQMD investigation of AAA-Irvine Activities to address odor complaints from the facility lodged by local residents.

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.

WORK PROGRAM GLOSSARY

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

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

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 the South Coast AQMD to submit an Annual Quantity and Emissions Report. To recover the cost of the program, a fee is assessed to these manufacturers. The fee is based on the quantity of coatings sold as well as the cumulative emissions from the quantity of coatings distributed or sold for use in the South Coast AQMD.

WORK PROGRAM GLOSSARY

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

Auto Services - maintaining 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.

Capture and Control – South Coast AQMD is partnering with others to develop a capture and control system to demonstrate that the commercially available capture and control technologies currently used by container vessels can be adapted for oil tanker vessels at berth.

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/CEC Pilot Project (JETSII) - South Coast AQMD announced the Joint Electric Truck Scaling Initiative (JETSII), a clean technology demonstration project that will deploy 100 battery-electric regional haul and drayage trucks throughout California.

WORK PROGRAM GLOSSARY

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

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

Carson H2S Event 21 (Carson-Dominguez Channel H2S 21) – South Coast AQMD investigation into odors from the Dominguez Channel seeks to address numerous complaints lodged by L.A. County residents.

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.

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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.

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.

WORK PROGRAM GLOSSARY

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.

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.

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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, 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.

EPA-Com-Mobile Monitoring (EPA Community Scale Mobile Monitoring) – EPA grant funding for the design and development of a platform for highly time-resolved mobile measurements of air toxics.

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.

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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.

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 NOx, VOC, and PM in accordance with the approved control strategy in the 2016 AQMP. Project funding comes from

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existing special revenue funds related to mitigation fees, settlements, or grants from other agencies.

Inclusion/Equity (Inclusion/Diversity/Equity) – South Coast AQMD established the Diversity, Equity and Inclusion Office to focus on the advancement of racial justice and equity both internally and externally, as part the overall goal to support communities of color and other historically underrepresented groups.

Indirect Source Rule Compliance (ISR) – Rule 2305 otherwise known as the Warehouse Indirect Source Rule (ISR). The rule requires warehouses greater than 100,000 square feet to directly reduce nitrogen oxide (NOx) and diesel particulate matter (PM) emissions, or to otherwise facilitate emission and exposure reductions of these pollutants in nearby communities.

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

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

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

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

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

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

Lead Agency Projects – 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.

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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.

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

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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.

OC Oil Spill 2021 (Orange County Oil Spill 2021) – to track monitoring and outreach costs associated with October 2021 Orange County Oil Spill.

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.

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

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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.

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.

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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.

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.

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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 fence-line 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.

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.

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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.

Sunshine Cyn Lndfill (Sunshine Canyon Landfill) – South Coast AQMD investigation of Sunshine Canyon Landfill seeks to address numerous odor complaints by local residents.

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.

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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.

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
PRDI	Planning, Rule Development & Implementation
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
WAIRE	Warehouse Actions & Investments to Reduce Emissions

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

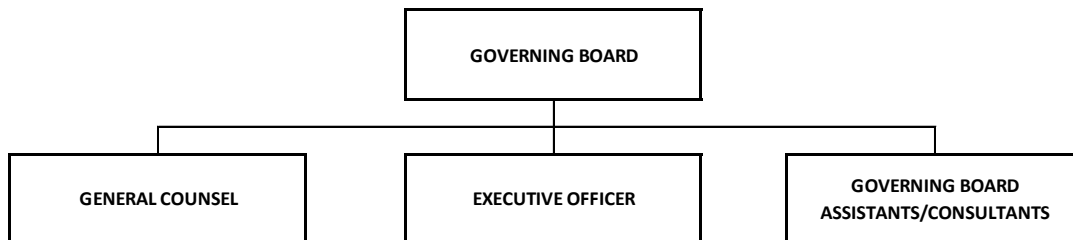
At a Glance:	
FY 2021-22 Adopted Budget	\$1.7M
FY 2022-23 Adopted Budget	\$1.7M
% of FY 2022-23 Adopted Budget	0.9%
Total FTEs FY 2022-23 Adopted Budget	N/A

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 2020-21 Actuals	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate *	FY 2022-23 Adopted Budget
Salary & Employee Benefits						
51000-52000	Salaries	\$ 195,409	\$ 359,073	\$ 359,072	\$ 359,072	\$ 359,073
53000-55000	Employee Benefits	17,328	237,073	237,074	237,074	237,073
Sub-total Salary & Employee Benefits		\$ 212,737	\$ 596,146	\$ 596,146	\$ 596,146	\$ 596,146
Services & Supplies						
67250	Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300	Rents & Leases Equipment	-	-	-	-	-
67350	Rents & Leases Structure	-	-	-	-	-
67400	Household	-	-	-	-	-
67450	Professional & Special Services	665,052	807,784	787,784	700,000	807,784
67460	Temporary Agency Services	-	-	-	-	-
67500	Public Notice & Advertising	-	-	-	-	-
67550	Demurrage	-	-	-	-	-
67600	Maintenance of Equipment	-	-	-	-	-
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	816	10,000	10,000	10,000	10,000
67750	Auto Service	-	-	-	-	-
67800	Travel	-	64,800	84,800	84,800	90,000
67850	Utilities	-	-	-	-	-
67900	Communications	12,885	20,000	10,000	10,000	20,000
67950	Interest Expense	-	-	-	-	-
68000	Clothing	-	-	-	-	-
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	2,079	10,000	10,000	10,000	3,000
68100	Office Expense	7,174	4,000	4,000	4,000	3,000
68200	Office Furniture	-	-	-	-	-
68250	Subscriptions & Books	-	-	-	-	-
68300	Small Tools, Instruments, Equipment	-	-	-	-	-
68020	Film	-	-	-	-	-
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	113,564	132,500	132,500	132,500	125,300
69550	Memberships	-	-	-	-	-
69600	Taxes	-	-	-	-	-
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	80	15,000	15,000	15,000	5,000
69750	Prior Year Expense	-	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		\$ 801,650	\$ 1,064,084	\$ 1,054,084	\$ 966,300	\$ 1,064,084
77000	Capital Outlays	\$ -	\$ -	\$ -	\$ -	\$ -
79050	Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures		\$ 1,014,387	\$ 1,660,230	\$ 1,650,230	\$ 1,562,446	\$ 1,660,230

* Estimates based on July 2021 through February 2022 actual expenditures and February 2022 budget amendments.

EXECUTIVE OFFICE

**WAYNE NASTRI
EXECUTIVE OFFICER**

At a Glance:	
FY 2021-22 Adopted Budget	\$2.4M
FY 2022-23 Adopted Budget	\$3.0M
% of FY 2022-23 Adopted Budget	1.6%
Total FTEs FY 2022-23 Adopted Budget	11

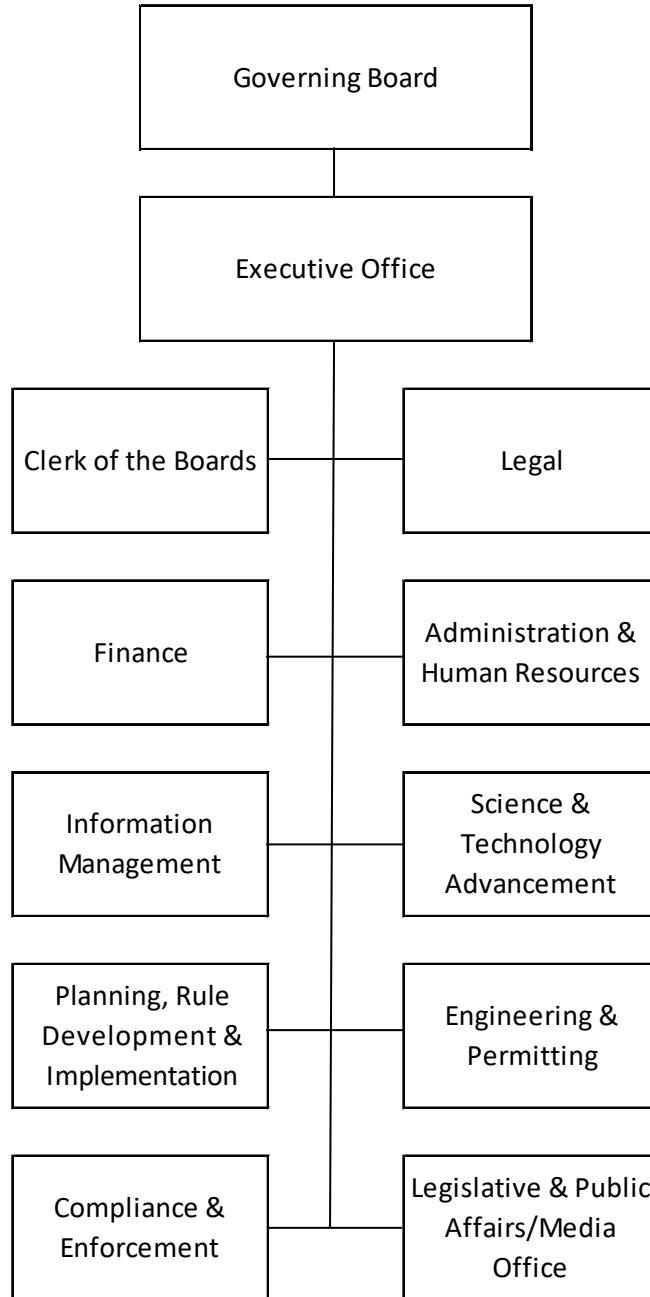
DESCRIPTION OF MAJOR SERVICES:

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, Director of Community Air Programs, and seven 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: 11 FTEs

Executive Office Unit	Amended FY 2021-22	Change	Budget FY 2022-23
Administration	10	1	11

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
1	Administrative Assistant II
1	Chief Operating Officer
1	Diversity, Equity & Inclusion Officer
1	Director of Community Air Programs
1	Executive Officer
3	Executive Assistant
1	Senior Administrative Assistant
<u>2</u>	Senior Public Affairs Specialist
11	Total FTEs

Executive Office Work Program by Office									
#	Program Code	Program Category	Program	Activities	FTEs FY 2021-22	+/-	FTEs FY 2022-23	Revenue Categories	
1	03 010	Develop Programs	AQMP	Develop/Implement AQMP	0.05	0.00	0.05	II,IX	
2	03 019	Develop Programs	AB617-Prog Develop	AB617-Program Development	0.00	1.00	1.00	IX	
3	03 028	Develop Programs	Admin/SCAQMD Policy	Dev/Coord Goals/Policies/Overs	0.44	0.00	0.44	la	
4	03 038	Operational Support	Admin/Office Management	Budget/Program Management	1.00	1.00	2.00	lb	
5	03 083	Policy Support	Hlth Effects Air Pollution Fou	Health Effects Air Poll Foundation Support	0.01	0.00	0.01	la	
6	03 275	Policy Support	Governing Board	Board/Committee Support	1.72	0.00	1.72	la	
7	03 381	Policy Support	Interagency Liaison	Local/State/Fed Coord/Interact	0.71	0.00	0.71	la,IX	
8	03 410	Policy Support	Legislation	Testimony/Mtgs:New/Current Leg	0.03	0.00	0.03	la,IX	
9	03 416	Policy Support	Legislative Activities	Supp/Promote/Influence Legis/Adm	0.03	0.00	0.03	la	
10	03 490	Customer Service and Business Assistance	Outreach	Publ Awareness Clean Air Prog	0.97	0.00	0.97	la	
11	03 565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Req for Info	0.01	0.00	0.01	la	
12	03 855	Operational Support	Web Tasks	Create/edit/review web content	0.03	0.00	0.03	la	
13	03 880	Operational Support	Inclusion/Equity	Inclusion/Diversity/Equity	4.00	0.00	4.00	1a	
Total Executive Office					9.00	2.00	11.00		

Executive Office Line Item Expenditure						
Major Object / Account # / Account Description		FY 2020-21 Actuals	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate *	FY 2022-23 Adopted Budget
Salary & Employee Benefits						
51000-52000	Salaries	\$ 1,048,560	\$ 1,459,799	\$ 1,418,182	\$ 1,418,182	\$ 1,684,423
53000-55000	Employee Benefits	593,510	647,190	688,806	688,806	968,849
Sub-total Salary & Employee Benefits		\$ 1,642,070	\$ 2,106,988	\$ 2,106,988	\$ 2,106,988	\$ 2,653,272
Services & Supplies						
67250	Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300	Rents & Leases Equipment	-	-	-	-	-
67350	Rents & Leases Structure	-	-	-	-	-
67400	Household	-	-	-	-	-
67450	Professional & Special Services	-	175,000	173,096	100,000	175,000
67460	Temporary Agency Services	-	-	-	-	-
67500	Public Notice & Advertising	-	7,500	7,500	7,500	7,500
67550	Demurrage	-	-	-	-	-
67600	Maintenance of Equipment	-	400	400	400	400
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	-	800	800	800	800
67750	Auto Service	-	-	-	-	-
67800	Travel	678	77,000	77,000	50,000	77,000
67850	Utilities	-	-	-	-	-
67900	Communications	4,950	6,500	6,500	6,500	6,500
67950	Interest Expense	-	-	-	-	-
68000	Clothing	-	-	-	-	-
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	28	7,000	7,000	7,000	7,000
68100	Office Expense	2,204	6,300	6,300	6,300	6,300
68200	Office Furniture	-	3,000	3,000	3,000	3,000
68250	Subscriptions & Books	-	5,000	6,904	6,904	5,000
68300	Small Tools, Instruments, Equipment	-	-	-	-	-
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	225	1,000	3,500	3,500	1,000
69550	Memberships	25,000	26,000	26,000	26,000	26,000
69600	Taxes	-	-	-	-	-
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	197	25,000	22,500	22,500	25,000
69750	Prior Year Expense	-	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		\$ 33,283	\$ 340,500	\$ 340,500	\$ 240,404	\$ 340,500
77000	Capital Outlays	\$ -	\$ -	\$ -	\$ -	\$ -
79050	Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures		\$ 1,675,353	\$ 2,447,488	\$ 2,447,488	\$ 2,347,392	\$ 2,993,772

* Estimates based on July 2021 through February 2022 actual expenditures and February 2022 budget amendments.

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DISTRICT GENERAL

At a Glance:	
FY 2021-22 Adopted Budget	\$18.1M
FY 2022-23 Adopted Budget	\$20.3M
% of FY 2022-23 Adopted Budget	10.7%
Total FTEs FY 2022-23 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 2020-21 Actuals	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate *	FY 2022-23 Adopted Budget	
Salary & Employee Benefits						
51000-52000	Salaries	\$ -	\$ 1,785,964	\$ 1,679,731	\$ 1,679,731	\$ 2,225,588
53000-55000	Employee Benefits	261,238	480,000	480,000	480,000	480,000
Sub-total Salary & Employee Benefits		\$ 261,238	\$ 2,265,964	\$ 2,159,731	\$ 2,159,731	\$ 2,705,588
Services & Supplies						
67250	Insurance	\$ 1,203,093	\$ 1,449,140	\$ 1,449,140	\$ 1,449,140	\$ 1,811,425
67300	Rents & Leases Equipment	147,412	117,000	117,000	117,000	105,000
67350	Rents & Leases Structure	29,797	19,300	19,300	19,300	20,300
67400	Household	791,438	869,261	869,261	869,261	859,261
67450	Professional & Special Services	1,372,386	1,273,089	1,287,323	1,287,323	2,400,089
67460	Temporary Agency Services	-	-	-	-	-
67500	Public Notice & Advertising	22,390	25,000	25,000	25,000	25,000
67550	Demurrage	-	100,000	100,000	100,000	100,000
67600	Maintenance of Equipment	323,453	410,760	410,760	410,760	407,654
67650	Building Maintenance	737,080	851,479	851,479	851,479	851,479
67700	Auto Mileage	-	-	-	-	-
67750	Auto Service	-	-	-	-	-
67800	Travel	-	-	-	-	-
67850	Utilities	1,537,423	1,937,620	1,937,620	1,787,620	1,935,620
67900	Communications	374,793	151,400	204,500	204,500	351,400
67950	Interest Expense	3,353,106	3,186,361	3,186,361	3,186,361	348,736
68000	Clothing	-	-	-	-	-
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	5,536	17,083	17,083	17,083	17,083
68100	Office Expense	158,934	313,200	298,966	160,000	313,200
68200	Office Furniture	111,202	14,000	14,000	14,000	14,000
68250	Subscriptions & Books	-	-	-	-	-
68300	Small Tools, Instruments, Equipment	-	-	-	-	-
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	-	-	-	-	-
69550	Memberships	-	-	-	-	-
69600	Taxes	9,006	57,500	57,500	30,000	57,500
69650	Awards	18,805	17,342	17,342	17,342	18,342
69700	Miscellaneous Expenses	838	10,625	10,625	10,625	9,625
69750	Prior Year Expense	(22,487)	-	-	-	-
69800	Uncollectable Accounts Receivable	691,419	-	-	-	-
89100	Principal Repayment	3,840,443	4,006,881	4,006,881	4,006,881	3,780,000
Sub-total Services & Supplies		\$ 14,706,069	\$ 14,827,041	\$ 14,880,141	\$ 14,563,675	\$ 13,425,714
77000	Capital Outlays	\$ -	\$ 175,000	\$ 125,043	\$ 125,043	\$ 1,340,000
79050	Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
99950	Transfers Out	\$ 841,353	\$ 841,353	\$ 841,353	\$ 841,353	\$ 2,841,353
Total Expenditures		\$ 15,808,660	\$ 18,109,358	\$ 18,006,268	\$ 17,689,802	\$ 20,312,655

* Estimates based on July 2021 through February 2022 actual expenditures and February 2022 budget amendments.

ADMINISTRATIVE & HUMAN RESOURCES

A. JOHN OLVERA DEPUTY EXECUTIVE OFFICER

At a Glance:	
FY 2021-22 Adopted Budget	\$6.6M
FY 2022-23 Adopted Budget	\$7.1M
% of FY 2022-23 Adopted Budget	3.8%
Total FTEs FY 2022-23 Adopted Budget	45

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 healthy 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 Human Resources Manager (Risk Management) and a Human Resources Manager (Classification & Pay/Recruitment & Selection)
- 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
- Drafted and implemented the agency's COVID-19 Prevention Program, including evaluation of potential employee exposure and providing training and equipment for safety equipment such as face coverings
- Conducted ergonomic workspace evaluations and other safety training programs
- 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 terms for non-represented groups, and implemented Terms & Conditions of Employment for Professional Unit
- Implemented the Continuity of Operations Plan (COOP) and Emergency Operations Plan (EOP) and conducted training
- Completed workspace design and reconfiguration on several floors
- Completed installation of hand-sanitizing devices/stations, protective screens, and signage throughout headquarters and LBO field office.

ANTICIPATED:

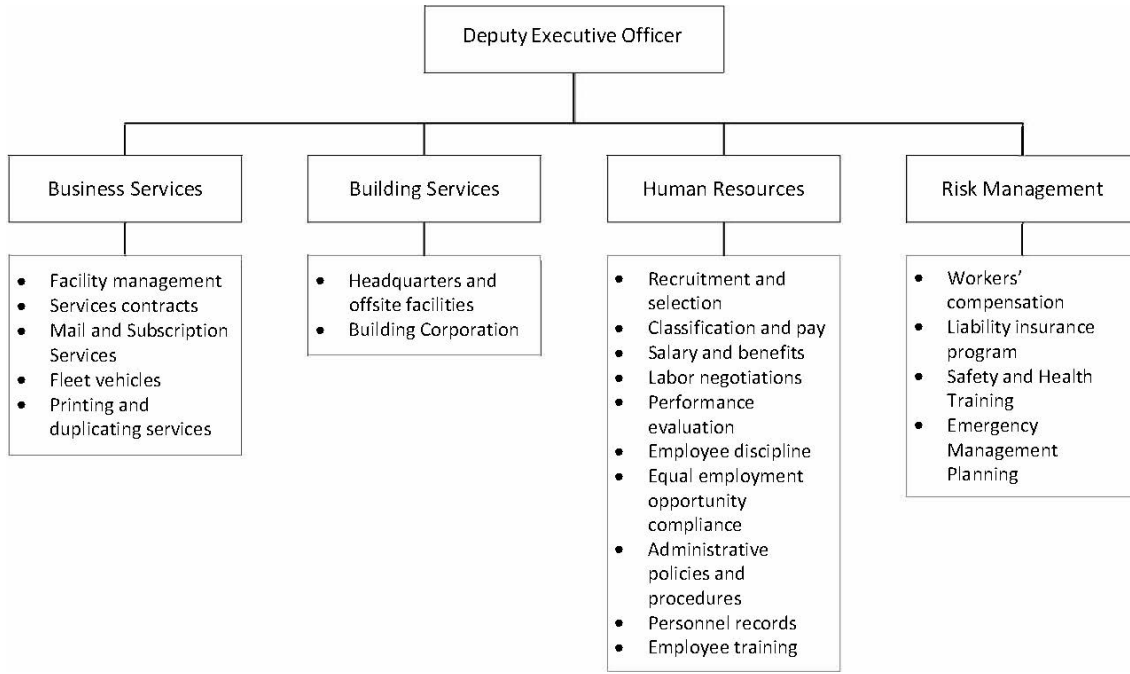
- Negotiate successor MOUs for represented groups and terms for non-represented employees
- Continue to provide virtual financial, health, and mental wellness education for all employees
- Continue to provide support and direction to management and staff with respect to adherence to relevant state and federal laws and South Coast AQMD policies, procedures and Memoranda of Understanding, including COVID-19-related legislation, regulations, policies and directives
- Continue 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
- Continue to implement the mentorship program
- Implement the Governing Board Summer Internship 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

ADMINISTRATIVE & HUMAN RESOURCES (cont.)

- 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
- Design completion for optimized data center air conditioning
- Replenish water softener system resin tank beds
- Replace and repair child care center building, including the roof
- Upgrade / Replacement of cafeteria exhaust equipment
- Complete the relocation of AHR offices and staff to recaptured space (previously occupied by the City of Diamond Bar)

ADMINISTRATIVE & HUMAN RESOURCES (cont.)

ORGANIZATIONAL CHART:



POSITION SUMMARY: 45 FTEs

Administrative & Human Resources Units	Amended FY 2021-22	Change	Budget FY 2022-23
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	7	-	7
Risk Management	2	1	3
Total	44	1	45

ADMINISTRATIVE & HUMAN RESOURCES (cont.)

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
3	Administrative Assistant I
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
6	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
1	Senior Administrative Assistant
<u>1</u>	Senior Office Assistant
45	Total FTEs

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

#	Program Code	Program Category	Program	Activities	FTEs FY 2021-22	+/-	FTEs FY 2022-23	Revenue Categories
1	16 026	Operational Support	SCAQMD Mail	Posting/Mailing/Delivery	2.30	0.20	2.50	1a
2	16 035	Operational Support	AB617-Support	AB617-Support	4.00	-0.15	3.85	IX
3	16 038	Operational Support	Admin/Office Management	Reports/Proj/Budget/Contracts	6.00	-0.55	5.45	1b
4	16 060	Operational Support	Equal Employment Opportunity	Program Dev/Monitor/Reporting	0.05	0.45	0.50	1a
5	16 080	Ensure Compliance	Auto Services	Vehicle/Radio Repair & Maint	4.00	-0.55	3.45	1a
6	16 090	Operational Support	Building Maintenance	Repairs & Preventative Maint	8.00	0.00	8.00	1a
7	16 092	Operational Support	Business Services	Building Services Admin/Contracts	2.69	-0.14	2.55	1a
8	16 225	Operational Support	Employee Benefits	Benefits Analysis/Orient/Records	2.50	-0.15	2.35	1a
9	16 226	Operational Support	Classification & Pay	Class & Salary Studies	0.32	-0.02	0.30	1a
10	16 228	Operational Support	Recruitment & Selection	Recruit Candidates for SCAQMD	3.30	-0.85	2.45	1a
11	16 232	Operational Support	Position Control	Track Positions/Workforce Anlys	0.20	0.55	0.75	1a
12	16 233	Operational Support	Employee Relations	Meet/Confer/Labor-Mgmt/Grievance	1.50	0.00	1.50	1a
13	16 255	Operational Support	Facilities Services	Phones/Space/Keys/Audio-Visual	1.00	0.15	1.15	1a
14	16 446	Operational Support	Mentorship Program	Mentorship Program	0.10	0.05	0.15	1a
15	16 457	Advance Clean Air Technology	MS/Carl Moyer Admin	C Moyer/Contractor Compliance	0.03	0.02	0.05	IX
16	16 540	Customer Service and Business Assistance	Print Shop	Printing/Collating/Binding	5.00	-0.60	4.40	1a
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	1a
19	16 640	Operational Support	Risk Management	Liabl/Property/Wk Comp/Selfins	2.25	1.00	3.25	1a
20	16 720	Customer Service and Business Assistance	Subscription Services	Rule & Gov Board Materials	0.70	0.09	0.79	IV,XVII
21	16 825	Operational Support	Union Negotiations	Inclusion/Diversity/Equity	0.00	1.50	1.50	1a

44.00	1.00	45.00
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Total Administrative & Human Resources

Administrative & Human Resources Line Item Expenditure						
Major Object / Account # / Account Description		FY 2020-21 Actuals	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate *	FY 2022-23 Adopted Budget
Salary & Employee Benefits						
51000-52000	Salaries	\$ 3,128,439	\$ 3,219,185	\$ 3,248,631	\$ 3,248,631	\$ 3,606,378
53000-55000	Employee Benefits	1,876,669	2,122,518	2,122,517	2,122,517	2,184,909
Sub-total Salary & Employee Benefits		\$ 5,005,108	\$ 5,341,703	\$ 5,371,148	\$ 5,371,148	\$ 5,791,286
Services & Supplies						
67250	Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300	Rents & Leases Equipment	89,205	41,600	41,600	41,600	41,600
67350	Rents & Leases Structure	-	-	-	-	-
67400	Household	21,550	35,284	35,284	35,284	35,284
67450	Professional & Special Services	247,289	198,149	198,149	198,149	213,149
67460	Temporary Agency Services	31,836	15,000	18,300	18,300	15,000
67500	Public Notice & Advertising	9,621	6,023	11,023	11,023	11,023
67550	Demurrage	-	-	-	-	-
67600	Maintenance of Equipment	1,868	5,500	10,500	10,500	10,500
67650	Building Maintenance	26,184	-	-	-	-
67700	Auto Mileage	2,396	4,200	4,200	4,200	4,000
67750	Auto Service	416,084	470,000	470,000	450,000	470,000
67800	Travel	-	2,500	2,500	2,500	2,500
67850	Utilities	-	-	-	-	-
67900	Communications	17,018	21,900	16,900	16,900	21,900
67950	Interest Expense	-	-	-	-	-
68000	Clothing	18,800	35,808	35,808	35,808	35,808
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	3,481	5,469	5,469	5,469	5,469
68100	Office Expense	38,204	111,300	93,000	93,000	104,890
68200	Office Furniture	27,564	21,000	21,000	21,000	21,000
68250	Subscriptions & Books	1,676	2,520	2,520	2,520	2,520
68300	Small Tools, Instruments, Equipment	3,269	5,030	10,030	10,030	7,000
68400	Gas and Oil	156,710	292,021	292,021	250,000	266,021
69500	Training/Conference/Tuition/ Board Exp.	11,197	10,062	10,062	10,062	12,062
69550	Memberships	6,778	11,265	11,265	11,265	10,265
69600	Taxes	3,678	4,000	4,000	4,000	5,000
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	634	8,000	8,000	8,000	6,000
69750	Prior Year Expense	(2,538)	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		\$ 1,132,501	\$ 1,306,631	\$ 1,301,631	\$ 1,239,610	\$ 1,300,991
77000	Capital Outlays	\$ 35,706	\$ -	\$ -	\$ -	\$ 23,000
79050	Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures		\$ 6,173,315	\$ 6,648,334	\$ 6,672,779	\$ 6,610,758	\$ 7,115,277

* Estimates based on July 2021 through February 2022 actual expenditures and February 2022 budget amendments.

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CLERK OF THE BOARDS

**FAYE THOMAS
CLERK OF THE BOARDS**

At a Glance:	
FY 2021-22 Adopted Budget	\$1.4M
FY 2022-23 Adopted Budget	\$1.6M
% of FY 2022-23 Adopted Budget	0.8%
Total FTEs FY 2022-23 Adopted Budget	7

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 43 subpoenas, public/administrative records requests, and claims against the South Coast AQMD.
- Provided support for 10 Governing Board meetings, including: preparing an agenda and minutes for each meeting; preparation, distribution, and publication of 23 meeting and public hearing notices; preparation of 24 Board Resolutions.
- Provided support for 66 hearings, pre-hearing conferences, and general meetings held by the Hearing Board, including: processing 35 petitions; preparation, distribution, and publication of 34 meeting and public hearing notices; preparation of 67 Minute Orders, Findings & Decisions, Pre-hearing Memoranda, and General Meeting Reports of Actions; and preparation and distribution of 108 daily agendas and monthly case calendars.

ANTICIPATED:

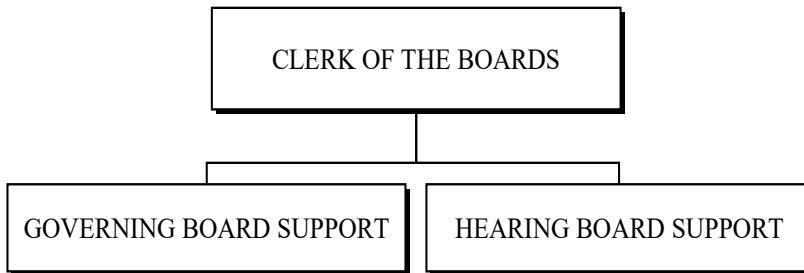
- Provide support for approximately 80 hearings, pre-hearing conferences, and general meetings held by the Hearing Board, including: processing approximately 90 petitions; preparation, distribution, and publication of approximately 100 meeting and public

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 150 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: 7 FTEs

Clerk of the Boards Unit	Amended FY 2021-22	Change	Budget FY 2022-23
Governing/Hearing Board Support	6	1	7

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
1	Clerk of the Board
3	Deputy Clerk/Transcriber
1	Office Assistant
1	Senior Deputy Clerk
<u>1</u>	Senior Office Assistant
<u>7</u>	Total FTEs

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

#	Program Code	Program Category	Program	Activities	FTEs FY 2021-22	+/-	FTEs FY 2022-23	Revenue Categories
1	17 024	Operational Support	Admin/SCAQMD/GB/HB Mgmt	Admin Governing/Hearing Brds	1.25	1.00	2.25	1a,VII,XV
2	17 275	Operational Support	Governing Board	Attnd/Recrd/Monitr Meetings	1.40	0.00	1.40	1a
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/Monitr 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	1a
6	17 855	Operational Support	Web Tasks	Create/edit/review web content	0.03	0.00	0.03	1a

Total Clerk of the Boards		6.00	1.00	7.00
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**Clerk of the Boards
Line Item Expenditure**

Major Object / Account # / Account Description		FY 2020-21 Actuals	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate *	FY 2022-23 Adopted Budget
Salary & Employee Benefits						
51000-52000	Salaries	\$ 367,966	\$ 387,899	\$ 387,899	\$ 387,899	\$ 489,660
53000-55000	Employee Benefits	243,760	281,502	281,501	281,501	311,031
Sub-total Salary & Employee Benefits		\$ 611,726	\$ 669,401	\$ 669,400	\$ 669,400	\$ 800,691
Services & Supplies						
67250	Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300	Rents & Leases Equipment	-	-	-	-	-
67350	Rents & Leases Structure	-	-	-	-	-
67400	Household	-	-	-	-	-
67450	Professional & Special Services	37,289	85,200	75,200	40,000	85,200
67460	Temporary Agency Services	6,504	-	18,000	18,000	-
67500	Public Notice & Advertising	140,633	90,000	90,000	90,000	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	-	200	300	300	200
67850	Utilities	-	-	-	-	-
67900	Communications	546	500	500	500	500
67950	Interest Expense	-	-	-	-	-
68000	Clothing	-	-	-	-	-
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	1,258	1,200	1,200	1,200	1,200
68100	Office Expense	760	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.	541,565	584,920	576,820	550,000	584,920
69550	Memberships	270	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		\$ 728,825	\$ 769,720	\$ 769,720	\$ 707,700	\$ 769,720
77000	Capital Outlays	\$ -	\$ -	\$ -	\$ -	\$ -
79050	Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures		\$ 1,340,551	\$ 1,439,121	\$ 1,439,120	\$ 1,377,100	\$ 1,570,411

* Estimates based on July 2021 through February 2022 actual expenditures and February 2022 budget amendments.

COMPLIANCE & ENFORCEMENT

TERRENCE MANN DEPUTY EXECUTIVE OFFICER

At a Glance:	
FY 2021-22 Adopted Budget	\$21.5M
FY 2022-23 Adopted Budget	\$23.8M
% of FY 2022-23 Adopted Budget	12.6%
Total FTEs FY 2022-23 Adopted Budget	162

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 25,000 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 185 inspections of chrome plating facilities (quarterly inspections of 94 facilities).
- Completed 78 Title V facility inspections.
- Completed 157 RECLAIM facility audits.
- Completed inspections of 1,612 other permitted stationary source facilities.
- Completed inspections of 2,271 PERP-registered engines/equipment.
- Responded to 12,521 complaints (94% of those received).
- Responded to 267 breakdown notifications (81% of those received).
- Issued 666 Notices to Comply and 381 Notices of Violation (NOVs).
- Conducted 25 training classes for members of the public and the regulated community.

COMPLIANCE & ENFORCEMENT (cont.)

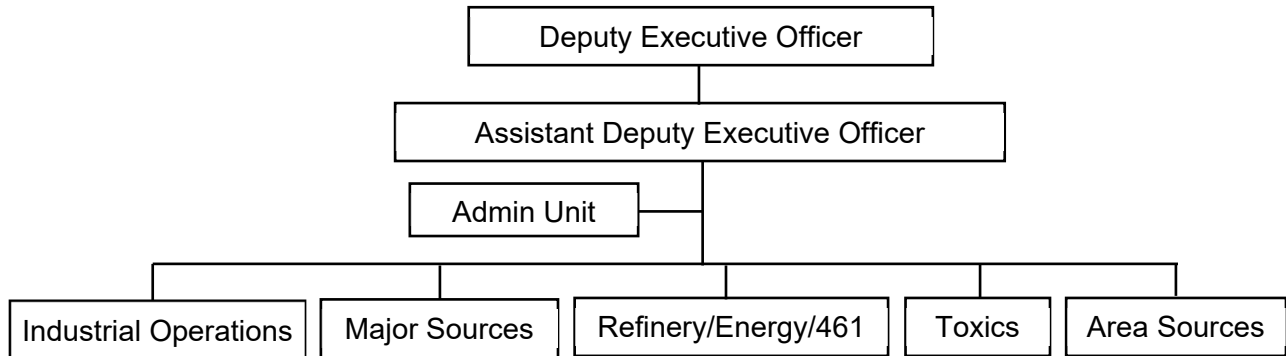
ANTICIPATED:

- 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: 162 FTEs

Office of Compliance and Enforcement Units	Amended FY 2021-22	Change	Budget FY 2022-23
Major Sources	22	-	22
Industrial Operations	52	(1)	51
Refinery/Energy/461	34	(1)	33
Toxics	38	(1)	37
Area Sources	9	-	9
Administrative Unit	4	2	6
Senior Staff	4	-	4
Total	163	(1)	162

COMPLIANCE & ENFORCEMENT (cont.)

POSITION DETAIL:

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

**Compliance & Enforcement
Work Program by Office**

#	Program Code	Program Category	Program	Activities	FTEs FY 2021-22	+/-	FTEs FY 2022-23	Revenue Categories
1	60 013	Ensure Compliance	AAA-Irvine Activities	All American Asphalt Activities	0.00	0.20	0.20	XVII
2	60 019	Ensure Compliance	AB617-Prrog Develop	AB617-Program Development	5.10	0.10	5.20	IX
3	60 030	Advance Clean Air Technology	AB134	AB134	0.25	0.05	0.30	IX
4	60 038	Customer Service and Business Assistance	Admin/Office Budget	Dev/Coord Goals/Policies/Overs	5.00	0.00	5.00	Ib
5	60 047	Customer Service and Business Assistance	Admin/Operations Support	Budget/Contracts/Reports/Projects	3.00	0.00	3.00	Ib
6	60 070	Ensure Compliance	CARB PERP Program	CARB Audits/Statewide Equip Reg	6.00	0.00	6.00	XIX
7	60 071	Ensure Compliance	Arch Ctgs - Admin	Report Review	0.00	0.10	0.10	XVIII
8	60 072	Ensure Compliance	Arch Ctgs - End User	Compliance/Rpts/RuleImpmenta	0.00	0.70	0.70	XVIII
9	60 073	Ensure Compliance	Arch Ctgs - Other	Compliance/Rpts/Rule Implementation	0.00	1.00	1.00	XVIII
10	60 076	Ensure Compliance	Area Sources/Compliance	Area Source Compliance	0.00	5.25	5.25	XVIII
11	60 077	Develop Rules	Area Sources/Rulemaking	Dev/Amend/Area S Rules/Credits	0.00	0.10	0.10	XVIII
12	60 093	Ensure Compliance	CARB Oil & Gas Reg.	GHG EM Stds Oil/NG Facilities	4.00	1.00	5.00	XVII
13	60 152	Ensure Compliance	Compliance/IM Related Activiti	Assist IM: Design/Review/Test	0.20	0.10	0.30	IV
14	60 155	Ensure Compliance	Compliance Guidelines	Procedures/Memos/Manuals	0.25	-0.05	0.20	IV
15	60 157	Ensure Compliance	Compliance/Special Projects	Prog Audits/Data Req/Brd Supp	4.00	1.00	5.00	II
16	60 158	Ensure Compliance	Compliance Testing	R461/Combustion Equip Testing	0.50	0.50	1.00	IV
17	60 210	Monitoring Air Quality	Emergency Response	Emerg Tech Asst to Public Saf	0.10	0.00	0.10	IV,XV
18	60 276	Policy Support	Board Committees	Admin/Stationary Source Committee	0.10	0.00	0.10	Ia
19	60 358	Ensure Compliance	GHG Rules-Compl	Greenhouse Gas Rule Compliance	0.00	1.30	1.30	XVII
20	60 365	Ensure Compliance	Hearing Bd/Variations	Variations/Orders of Abatement	0.25	-0.05	0.20	VII
21	60 368	Develop Programs	Incentive RFP Emis Red Projs	Incentive Projects Admin	0.00	0.10	0.10	XVII
22	60 375	Ensure Compliance	Inspections	Compliance/Inspection/Follow-up	85.00	-10.00	75.00	II,V,XV
23	60 377	Ensure Compliance	Inspections/RECLAIM Audits	Audit/Compliance Assurance	16.00	0.00	16.00	II,IV
24	60 492	Customer Service and Business Assistance	Outreach/Business	Pub Events/Contf/Rideshare Fair	0.10	0.00	0.10	IX
25	60 503	Develop Programs	PM Strategies	PM10 Plan/Analyz/Strategy Dev	0.00	0.10	0.10	XV
26	60 539	Ensure Compliance	Procedure 5 Review	Evaluate Proc 5 Asbestos Plans	3.00	2.00	5.00	XVII
27	60 550	Ensure Compliance	Public Complaints/Breakdowns	Complrtresp/Invflwup/Resolutn	10.00	0.00	10.00	II,IV,V,XV
28	60 565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Req for Info	0.30	0.00	0.30	Ia
29	60 605	Ensure Compliance	RECLAIM/Admin Support	Admin/Policy/Guidelines	0.25	0.25	0.50	II,III,IV,XV
30	60 645	Ensure Compliance	Rule 1610 Plan Verification	Old vehicle scrapping	0.00	0.25	0.25	IX
31	60 657	Develop Rules	Rulemaking/Support PRA	Provide Rule Development Supp	1.10	-0.30	0.80	IV,XV
32	60 678	Ensure Compliance	School Siting	Identify Haz. Emission Sources near Schools	0.10	0.00	0.10	IV
33	60 690	Customer Service and Business Assistance	Source Education	Prov Tech Asst To Industries	0.20	0.80	1.00	III,IV,V,XV
34	60 717	Policy Support	Student Interns	Gov Board/Student Intern Program	0.00	-0.10	0.00	Ia
35	60 721	Ensure Compliance	Sunshine Cyn Lndfll	Sunshine Canyon Landfill	0.00	0.10	0.10	XVII
36	60 771	Ensure Compliance	Title V	Title V Comp/Inspect/Follow Up	4.50	3.50	8.00	II,IV
37	60 805	Operational Support	Training	Dist/Org Unit Training	4.00	0.00	4.00	Ib
38	60 825	Operational Support	Union Negotiations	Official Labor/Mgmt Negotiate	0.10	0.00	0.10	Ia
39	60 826	Operational Support	Union Steward Activities	Rep Employees in Grievance Act	0.10	0.00	0.10	Ia
40	60 834	Develop Programs	Rule 2202 Implement	R2202 Proc/Sub Plans/Tech Eval	0.00	0.10	0.10	XI
41	60 855	Operational Support	Web Tasks	Creation/Update of Web Conten	0.40	-0.40	0.00	Ia
42	60 880	Operational Support	Inclusion/Equity	Inclusion/Diversity/Equity	0.00	0.30	0.30	1a

Total Compliance & Enforcement	154.00	8.00	162.00
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Compliance & Enforcement Line Item Expenditure						
Major Object / Account # / Account Description		FY 2020-21 Actuals	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate *	FY 2022-23 Adopted Budget
Salary & Employee Benefits						
51000-52000	Salaries	\$ 12,247,937	\$ 12,901,656	\$ 14,137,369	\$ 13,961,579	\$ 14,903,918
53000-55000	Employee Benefits	6,907,119	8,197,222	8,197,222	8,095,294	8,470,843
Sub-total Salary & Employee Benefits		\$ 19,155,056	\$ 21,098,877	\$ 22,334,591	\$ 22,056,873	\$ 23,374,761
Services & Supplies						
67250	Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300	Rents & Leases Equipment	-	-	17,000	17,000	-
67350	Rents & Leases Structure	106,143	111,543	111,543	111,543	111,543
67400	Household	-	-	-	-	-
67450	Professional & Special Services	3,492	12,500	12,500	10,000	7,500
67460	Temporary Agency Services	-	-	10,000	10,000	-
67500	Public Notice & Advertising	-	-	-	-	-
67550	Demurrage	-	-	-	-	-
67600	Maintenance of Equipment	1,734	22,000	22,000	22,000	22,000
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	73	1,000	1,000	1,000	1,000
67750	Auto Service	-	-	-	-	-
67800	Travel	-	15,000	8,000	3,000	10,000
67850	Utilities	-	-	-	-	-
67900	Communications	136,089	117,350	111,350	111,350	117,350
67950	Interest Expense	-	-	-	-	-
68000	Clothing	6,357	31,000	27,000	27,000	42,457
68050	Laboratory Supplies	877	12,000	12,000	12,000	17,000
68060	Postage	9,081	14,000	8,000	8,000	10,000
68100	Office Expense	11,487	40,000	30,000	30,000	40,000
68200	Office Furniture	-	2,000	2,000	2,000	-
68250	Subscriptions & Books	-	457	457	457	-
68300	Small Tools, Instruments, Equipment	3,955	8,000	8,000	8,000	8,000
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	7,370	25,000	25,000	25,000	25,000
69550	Memberships	-	-	-	-	-
69600	Taxes	-	-	-	-	-
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	932	3,500	3,500	3,500	3,500
69750	Prior Year Expense	(38)	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		\$ 287,551	\$ 415,350	\$ 409,350	\$ 401,850	\$ 415,350
77000	Capital Outlays	\$ -	\$ 27,000	\$ 140,000	\$ 140,000	\$ -
79050	Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures		\$ 19,442,607	\$ 21,541,227	\$ 22,883,941	\$ 22,598,723	\$ 23,790,111

* Estimates based on July 2021 through February 2022 actual expenditures and February 2022 budget amendments.

**ENGINEERING & PERMITTING
PROGRAM STATEMENT FOR FY 2022-23 BUDGET**

**JASON ASPELL
DEPUTY EXECUTIVE OFFICER**

At a Glance:	
FY 2021-22 Adopted Budget	\$25.4M
FY 2022-23 Adopted Budget	\$27.1M
% of FY 2022-23 Adopted Budget	14.3%
Total FTEs FY 2022-23 Adopted Budget	163

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 340 major facilities that have been issued Title V Federal Operating permits, about 240 facilities in the RECLAIM program, and over 25,000 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 52%, from around 7,300 to roughly 3,500 pending applications.
- Continued permit streamlining efforts by:
 - Processing almost 2,100 Permits to Construct and over 5,600 applications for Permits, Plans, and ERC during Fiscal Year (FY) 2020-21;
 - 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.
- Sustained the 3,000 - 3,500 (less RECLAIM transition applications, less Permits to Construct issued) target from FY 2020-21 by maintaining pending application inventory at less than 2,800.

ENGINEERING & PERMITTING (cont.)

- Achieved and maintained the timely completion rate for new permit applications by processing over 70 percent of new permit applications within 180 days of being deemed complete.
- Issued 175 Title V renewal and modification permits in Calendar Year (CY) 2021.
- Maintained in-office levels of production and processing of applications and permits with up to 80% of E&P Staff continuing to work at home due to continuing COVID-19 restrictions.
- Continued development of Online Permit Processing tools and other automation efforts. Continued support for online applicants for dry cleaning equipment, gasoline dispensing facilities, automotive refinishing spray booths, negative air machines, charbroilers, and small heaters and boilers. Almost 500 applications were filed online during CY 2021.
- Maintained and achieved Division's Permit Streamlining goal of application delivery to Permitting Teams within an average of 4 business days.
- Continued implementation of EPA Title V Program Audit Findings Action Plan.
- Continued efforts to post 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. XIII, Reg. XIV, and other amendments called for under AB 617, including Reg. XX, and incorporating updated Best Available Retrofit Control Technology (BARCT). This also included a significant effort in support of Rule 1109.1, which includes significant permit application and plan requirements.
- Participated in AB617 Community Meetings and in the Community Emissions Reduction Plan (CERP) implementation with respect to permitting crosschecks.
- Provided Pre- and Post-application conferences to help permit applicants.
- Participated, reviewed, and provided permit remedies to permit holders throughout CY 2021 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 CY 2021.
- Continued to maintain the Certified Permitting Professional (CPP) program. Reached out to existing CPP holders to provide support and to update and confirm contact information. Exploring new testing strategies due to ongoing COVID-19 pandemic.
- Prepared Federal New Source Review (NSR) Equivalency Determination Reports pursuant to Rule 1315.
- Prepared annual report on the NO_x and SO_x RECLAIM Program in accordance with Rule 2015.

ENGINEERING & PERMITTING (cont.)

ANTICIPATED:

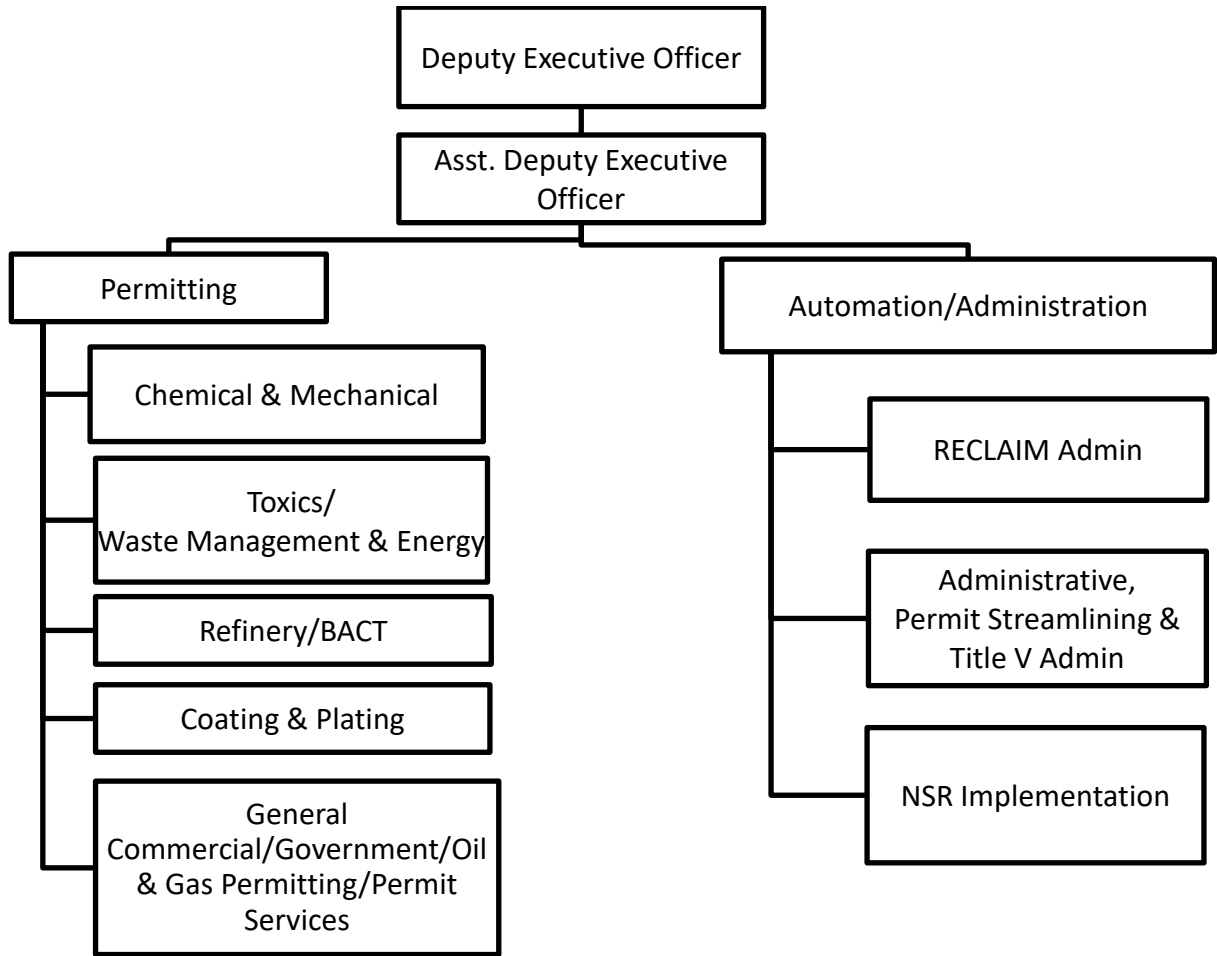
- Maintain the pending permit applications inventory excluding Permits to Construct issued and RECLAIM transition applications at or near 3,000, and total pending applications inventory to below 3,500.
- Continue to maintain the timely completion rate for new permit applications by processing 75 to 80 percent of new permit applications within 180 days of being deemed complete.
- Monitor and reduce average permit application residence times.
- 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) Improve technical training.
 - g) Revisiting policies and rules.
- Expand the outreach of the online permitting and permit automation tools for dry cleaning, gasoline dispensing facilities, automotive spray booths, negative air machines, small heaters and boilers, charbroilers, and future modules.
- Continue the development and deployment of Phase II Online Permitting efforts:
 - a) Maintain existing internal and external-facing Permit Application Status Dashboard, and implement enhancements based on user feedback,
 - b) Remaining Rule 222 Filing & Registration Forms,
 - c) Registration/Certification for Emergency Generators,
 - d) 400-E-xx Permit Application Forms, and
 - e) Future 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.

ENGINEERING & PERMITTING (cont.)

- Resume 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.
- Continue soliciting stakeholder input on permit application backlog reduction and permit streamlining efforts through Permit Streamlining Task Force subcommittee meetings.
- Resume certification testing 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.
- Continue to 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 NOx and SOx RECLAIM Program in accordance with Rule 2015.
- Continue to provide critical guidance to PRDAS in developing a streamlined NSR process for facilities exiting the RECLAIM program.
- Continue to provide training for new engineers and newly promoted supervisors
- Begin implementation of Rule 1109.1 application processing and reporting (refinery rule associated with RECLAIM sunset)

ENGINEERING & PERMITTING (cont.)

ORGANIZATIONAL CHART:



ENGINEERING & PERMITTING (cont.)

POSITION SUMMARY: 163 FTEs

Engineering & Permitting	Amended FY 2021-22	Change	Budget FY 2022-23
Administration	4	-	4
Engineering	132	-	132
Operations	27	-	27
Total	163	-	163

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
90	Air Quality Engineer II
1	Air Quality Specialist
1	Assistant Deputy Executive Officer
2	Data Technician
1	Deputy Executive Officer
1	Office Assistant
5	Administrative Assistant I
2	Senior Administrative Assistant
20	Senior Air Quality Engineer
7	Senior Air Quality Engineering Manager
17	Senior Office Assistant
2	Staff Specialist
10	Supervising Air Quality Engineer
2	Program Supervisor
<u>2</u>	<u>Supervising Office Assistant</u>
163	Total FTEs

**Engineering & Permitting
Work Program by Office**

Program Code	Program Category	Program	Activities	FTEs FY 2021-22	+/-	FTEs FY 2022-23	Revenue Categories
1	50 019 Develop Programs	AB617-Prog Develop	AB617-Program Development	1.00	0.20	1.20	IX
2	50 038 Customer Service and Business Assistance	Admin/Office Management	Dev/Coord Goals/Policies/Overs	3.00	0.00	3.00	Ib
3	50 047 Customer Service and Business Assistance	Admin/Operations Support	Budget/Contracts/Reports/Projects	3.00	0.00	3.00	Ib
4	50 120 Timely Review of Permits	Certification/Registration Pro	Certification/Registration Prog	1.00	0.00	1.00	III
5	50 148 Policy Support	Climate/Energy/Incentives	GHG/Climate Change Support	0.50	0.00	0.50	II,IX
6	50 156 Ensure Compliance	Perm Proc/Info to Compliance	Prov Permit Info to Compliance	3.00	0.00	3.00	III,IV,XV
7	50 200 Customer Service and Business Assistance	Economic Dev/Bus Retention	Perm Proc/Public Participation	0.10	0.00	0.10	III
8	50 240 Ensure Compliance	Environmental Justice	R461/Combustion Equip Testing	0.50	0.00	0.50	II,IV,XV
9	50 253 Timely Review of Permits	ERC Appl Processing	Process ERC Applications	3.50	0.00	3.50	III
10	50 260 Customer Service and Business Assistance	Fee Review	Fee Review Committee	0.45	0.00	0.45	II,III,IV
11	50 276 Policy Support	Board Committees	Admin/Stakeholder Source Committees	0.25	0.00	0.25	Ia
12	50 365 Ensure Compliance	Hearing Bd/Variations	Variations/Orders of Abatement	0.75	0.00	0.75	VII
13	50 367 Timely Review of Permits	Hearing Board/Appeals	Appeals: Permits & Denials	0.25	0.00	0.25	III
14	50 377 Ensure Compliance	Inspections/RECLAIM Audits	Audit/Compliance Assurance	6.00	0.00	6.00	II,IV
15	50 416 Policy Support	Legislative Activities	Legislative Activities	0.25	0.00	0.25	Ia
16	50 425 Customer Service and Business Assistance	Lobby Permit Services	Supp Perm Proc/Customer Svc	1.00	0.00	1.00	III
17	50 475 Timely Review of Permits	NSR Implementation	Implement NSR/Allocate ERCs	2.50	0.00	2.50	II,III,V,XV
18	50 476 Timely Review of Permits	NSR Data Clean Up	Edit/Update NSR Data	0.50	0.00	0.50	II
19	50 492 Ensure Compliance	Customer Service	Compliance/Inspection/Follow-up	0.50	0.00	0.50	II,V,IX,XV
20	50 515 Timely Review of Permits	Perm Proc/Non TV/Non RECLAIM	PP: Non TitlV/TitlIII/RECLAIM	50.25	0.00	50.25	III,XV
21	50 517 Timely Review of Permits	Permit Services	Facility Data-Crete/Edit	12.50	0.00	12.50	III,XV
22	50 518 Timely Review of Permits	RECLAIM Non-Title V	Process RECLAIM Only Permits	4.00	0.00	4.00	III,IV,XV
23	50 519 Timely Review of Permits	Perm Proc/Title III (Non TV)	Process Title III Permits	1.00	0.00	1.00	III
24	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
25	50 521 Timely Review of Permits	Perm Proc/Expedited Permit	Proc Expedited Permits (30LOT)	4.00	0.00	4.00	III
26	50 523 Timely Review of Permits	Permit Streamlining	Permit Streamlining	4.75	0.00	4.75	III
27	50 565 Customer Service and Business Assistance	Public Records Act	Comply w/ Public Req for Info	0.25	0.00	0.25	Ia
28	50 605 Ensure Compliance	RECLAIM/Admin Support	Admin/Policy/Guidelines	6.50	0.00	6.50	II,III,IV,XV
29	50 607 Timely Review of Permits	RECLAIM & Title V	Process RECLAIM & TV Permits	18.40	0.00	18.40	III
30	50 643 Timely Review of Permits	Rule 222 Filing Program	Rule 222 Filing Program	0.50	0.00	0.50	IV
31	50 650 Develop Rules	Rulemaking	Dev/Amend/Impl Rules	0.25	0.00	0.25	II,XV
32	50 653 Develop Rules	Rulemaking/BACT	Dev/Amend BACT Guidelines	0.00	1.80	1.80	II
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 FY 2021-22	+/-	FTEs FY 2022-23	Revenue Categories
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	Ib
44	50 825	Operational Support	Union Negotiations	Official Labor/Mgmt Negotiate	0.05	0.00	0.05	Ia
45	50 826	Operational Support	Union Steward Activities	Rep Employees in Grievance Act	0.05	0.00	0.05	Ia
46	50 855	Operational Support	Web Tasks	Creation/Update of Web Content	0.25	0.00	0.25	Ia
Total Engineering & Permitting					161.00	2.00	163.00	

Engineering & Permitting Line Item Expenditure						
Major Object / Account # / Account Description		FY 2020-21 Actuals	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate *	FY 2022-23 Adopted Budget
Salary & Employee Benefits						
51000-52000	Salaries	\$ 15,510,843	\$ 15,513,148	\$ 15,944,055	\$ 15,745,800	\$ 17,227,792
53000-55000	Employee Benefits	8,363,101	9,479,429	9,479,428	9,361,557	9,541,732
Sub-total Salary & Employee Benefits		\$ 23,873,944	\$ 24,992,577	\$ 25,423,483	\$ 25,107,356	\$ 26,769,524
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	1,790	2,500	2,500	2,500	2,500
67460	Temporary Agency Services	19,954	60,000	60,000	60,000	60,000
67500	Public Notice & Advertising	59,534	116,000	116,000	100,000	116,000
67550	Demurrage	-	250	250	250	250
67600	Maintenance of Equipment	-	-	-	-	-
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	8	35,000	35,000	15,000	35,000
67750	Auto Service	-	-	-	-	-
67800	Travel	-	14,433	14,433	10,000	14,433
67850	Utilities	-	-	-	-	-
67900	Communications	17,831	6,450	16,450	16,450	6,450
67950	Interest Expense	-	-	-	-	-
68000	Clothing	59	4,500	4,500	4,500	4,500
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	12,694	37,000	37,000	20,000	37,000
68100	Office Expense	28,530	59,296	59,296	40,296	59,296
68200	Office Furniture	1,528	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.	5,341	5,500	5,500	5,500	5,500
69550	Memberships	98	1,500	1,500	1,500	1,500
69600	Taxes	-	-	-	-	-
69650	Awards	-	2,000	2,000	2,000	2,000
69700	Miscellaneous Expenses	895	5,000	5,000	5,000	5,000
69750	Prior Year Expense	-	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		\$ 148,263	\$ 369,329	\$ 379,329	\$ 302,896	\$ 369,329
77000	Capital mutlays	\$ 18,102	\$ -	\$ -	\$ -	\$ -
79050	Building Remmdeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures		\$ 24,040,309	\$ 25,361,906	\$ 25,802,812	\$ 25,410,252	\$ 27,138,853

* Estimates based on July 2021 through February 2022 actual expenditures and February 2022 budget amendments.

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FINANCE

SUJATA JAIN CHIEF FINANCIAL OFFICER

At a Glance:	
FY 2021-22 Adopted Budget	\$6.7M
FY 2022-23 Adopted Budget	\$6.9M
% of FY 2022-23 Adopted Budget	3.6%
Total FTEs FY 2021-22 Adopted Budget	51

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 661 contracts and modifications, issued 28 Request for Proposals/Quotes, and processed 128 proposals/quotations. Processed 1,599 purchase orders and 235 Cal-Card orders.
- Received the Government Finance Officer's Association's (GFOA) awards for the Annual Budget, Annual Comprehensive 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 2021-22 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 2021-22 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

FINANCE (cont.)

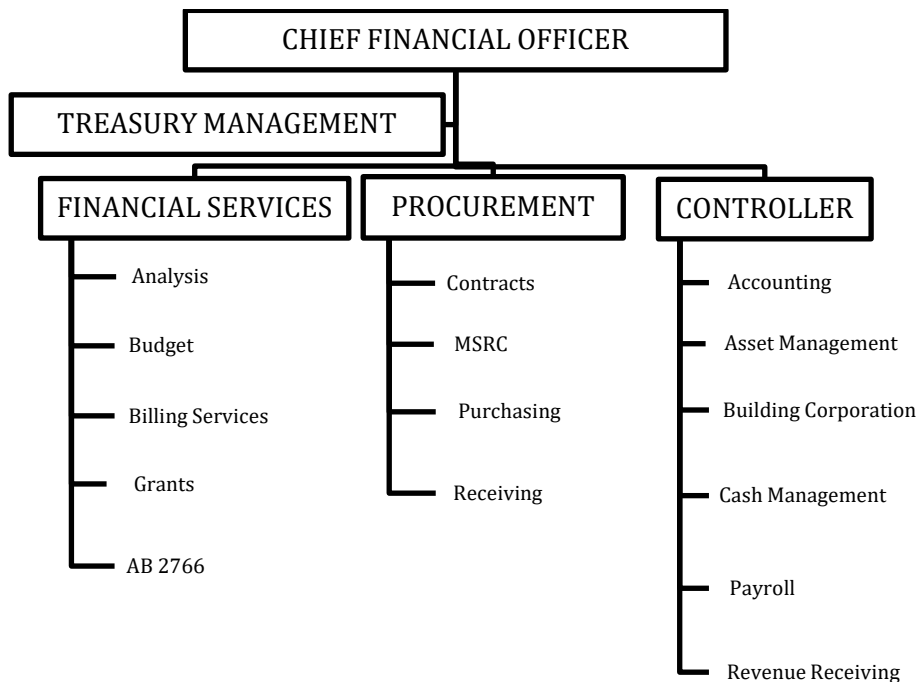
(assets) and obligations (liabilities) at the close of the fiscal year. The financial statements are prepared on the accrual basis in accordance with U.S. Generally Accepted Accounting Principles.

- 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.

ANTICIPATED:

- Continue to receive GFOA Awards for the Annual Budget, Annual Comprehensive 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.
- Continue to identify and implement additional opportunities for electronic payments.

ORGANIZATIONAL CHART:



FINANCE (cont.)

POSITION SUMMARY: 51 FTEs

Finance Units	Amended FY 2021-22	Change	Budget FY 2022-23
Office Administration	3	-	3
Controller	20	1	21
Financial Services	17	-	17
Procurement	10	-	10
Total	50	1	51

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
2	Accounting Technician
2	Administrative Assistant I
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
3	Senior Accountant
1	Senior Administrative Assistant
3	Senior Fiscal Assistant
9	Senior Office Assistant
1	Staff Assistant
1	Staff Specialist
1	Stock Clerk
<u>1</u>	Supervising Office Assistant
51	Total FTEs

Finance Work Program by Office									
#	Program Code	Program Category	Program	Activities	FTEs FY 2021-22	+/-	FTEs FY 2022-23	Revenue Categories	
1	04 002	Customer Service and Business Assistance	AB2766/Mobile Source	Prog Admin: Monitor/Dist/Audit	0.10	0.00	0.10	IX	
2	04 003	Advance Clean Air Technology	AB2766/MSRC	MSRC Program Administration	0.35	0.00	0.35	IX	
3	04 020	Operational Support	Admin/SCAQMD Budget	Analyze/Prepare/Impl/Track WP	3.71	0.00	3.71	IX	
4	04 021	Operational Support	Admin/SCAQMD Contracts	Contract Admin/Monitor/Process	3.20	0.00	3.20	IX	
5	04 023	Operational Support	Admin/SCAQMD Capital Assets	FA Rep/Reconcile/Inv/Acct	0.70	0.00	0.70	IX	
6	04 030	Advance Clean Air Technology	AB134	AB134	2.00	0.00	2.00	IX	
7	04 035	Operational Support	AB617-Support	AB617-Support	0.50	0.00	0.50	IX	
8	04 038	Operational Support	Admin/Office Management	Fin Mgmt/Oversee Activities	2.75	0.00	2.75	IX	
9	04 045	Operational Support	Admin/Office Budget	Office Budget/Prep/Impl/Track	0.05	0.00	0.05	IX	
10	04 071	Operational Support	Arch Ctgs - Admin	Cost Analysis/Payments	0.04	0.00	0.04	IX	
11	04 083	Policy Support	Hlth Effects Air Pollution Fou	Health Effects Air Poll Foundation Support	0.02	0.00	0.02	IX	
12	04 085	Operational Support	Building Corporation	Building Corp Acct/Fin Reports	0.02	0.00	0.02	IX	
13	04 130	Advance Clean Air Technology	Clean Fuels/Contract Admin	Clean Fuels Contract Admin/Monitor	0.15	0.00	0.15	IX	
14	04 170	Customer Service and Business Assistance	Billing Services	Answer/Resp/Resolv Prob & Inq	8.00	0.00	8.00	IX,II,III,IV	
15	04 233	Operational Support	Employee Relations	Assist HR/Interpret Salary Res	0.10	0.00	0.10	IX	
16	04 260	Customer Service and Business Assistance	Fee Review	Crnte Mgt/Fee-Related Complaint	0.10	0.00	0.10	IX,III,IV,XV	
17	04 265	Operational Support	Financial Mgmt/Accounting	Record Accts Rec & Pay/Rpts	7.27	0.00	7.27	IX	
18	04 266	Operational Support	Financial Mgmt/Fin Analysis	Fin/SCAQMD Stat Analysis & Audit	0.80	0.00	0.80	IX	
19	04 267	Operational Support	Financial Mgmt/Treasury Mgmt	Treas Mgt Anlyz/Trk/Proj/Invst	1.00	0.00	1.00	IX	
20	04 268	Operational Support	Financial Systems	CLASS/Rev/Acct/PR/Sys Analyze	0.10	0.00	0.10	IX	
21	04 355	Customer Service and Business Assistance	Grants Management	Grant Anlyz/Eval/Negot/Acc/Rpt	1.00	0.00	1.00	IX,IV,XV	
22	04 447	Operational Support	Mobile Sources/Accounting	Record Acct Rec & Pay/Special Funds	0.65	0.00	0.65	IX	
23	04 457	Advance Clean Air Technology	Mobile Source/Moyer Adm	Carl Moyer: Contract/Fin Admin	1.02	0.00	1.02	IX	
24	04 493	Operational Support	Outreach/SB/MB/DVBE	Outreach/Incr SB/DVBE Partic	0.05	0.00	0.05	IX	
25	04 510	Operational Support	Payroll	Ded/Ret Rpts/PR/St & Fed Rpts	4.10	0.00	4.10	IX	
26	04 542	Advance Clean Air Technology	Prop 1B:Goods Movement	Contracts/Finance Admin	0.50	0.00	0.50	IX	
27	04 544	Advance Clean Air Technology	Prop 1B:Low Emiss Sch Bus	Grants/Finance Admin	0.05	0.00	0.05	IX	
28	04 565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Rec Requests	0.02	0.00	0.02	IX	
29	04 570	Operational Support	Purchasing	Purch/Track Svcs & Supplies	2.50	0.00	2.50	IX	
30	04 571	Operational Support	Purchasing/Receiving	Receive/Record SCAQMD Purchases	1.20	0.00	1.20	IX	
31	04 572	Operational Support	Purchasing-Receiving/Stockroom	Track/Monitor SCAQMD Supplies	1.00	0.00	1.00	IX	
32	04 630	Operational Support	Cash Mgmt/Revenue Receiving	Receive/Post Pymts/Reconcile	5.25	1.00	6.25	IX,III,IV,XI	
33	04 631	Customer Service and Business Assistance	Cash Mgmt/Refunds	Research/Doc/Prep/Proc Refunds	0.30	0.00	0.30	IX,IV,XI	
34	04 791	Ensure Compliance	Toxics/AB2588	AB2588 Toxics HS Fee Collection	0.15	0.00	0.15	X	
35	04 805	Operational Support	Training	Continuing Education/Training	0.20	0.00	0.20	IX	
36	04 825	Operational Support	Union Negotiations	Official Labor/Mgmt Negotiate	0.02	0.00	0.02	IX	
37	04 826	Operational Support	Union Steward Activities	Rep Employees in Grievance Act	0.01	0.00	0.01	IX	
38	04 827	Operational Support	VW-General Admin	VW-General Admin	1.00	0.00	1.00	XVII	
39	04 855	Operational Support	Web Tasks	Create/edit/review web content	0.02	0.00	0.02	IX	

50.00	1.00	51.00
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Total Finance

Finance					
Line Item Expenditure					
Major Object / Account # / Account Description	FY 2020-21 Actuals	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate *	FY 2022-23 Adopted Budget
Salary & Employee Benefits					
51000-52000 Salaries	\$ 3,686,148	\$ 3,801,392	\$ 3,807,892	\$ 3,807,892	\$ 3,976,071
53000-55000 Employee Benefits	2,225,126	2,456,638	2,456,638	2,456,638	2,432,477
Sub-total Salary & Employee Benefits	\$ 5,911,274	\$ 6,258,030	\$ 6,264,530	\$ 6,264,530	\$ 6,408,548
Services & Supplies					
67250 Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300 Rents & Leases Equipment	-	-	-	-	-
67350 Rents & Leases Structure	-	-	-	-	-
67400 Household	-	900	900	900	900
67450 Professional & Special Services	129,211	160,606	160,606	150,606	171,955
67460 Temporary Agency Services	165,004	67,000	67,000	67,000	66,000
67500 Public Notice & Advertising	5,679	7,000	7,000	7,000	7,000
67550 Demurrage	-	780	780	780	780
67600 Maintenance of Equipment	1,069	1,860	1,860	1,860	2,960
67650 Building Maintenance	-	-	-	-	-
67700 Auto Mileage	778	4,468	4,468	4,468	4,468
67750 Auto Service	-	-	-	-	-
67800 Travel	-	6,000	6,000	4,000	6,000
67850 Utilities	-	-	-	-	-
67900 Communications	3,398	9,000	9,000	9,000	9,000
67950 Interest Expense	-	-	-	-	-
68000 Clothing	1,100	1,200	1,200	1,200	1,200
68050 Laboratory Supplies	-	-	-	-	-
68060 Postage	193,312	115,038	115,038	115,038	115,038
68100 Office Expense	23,223	36,120	36,120	30,000	36,120
68200 Office Furniture	-	-	-	-	-
68250 Subscriptions & Books	2,810	3,470	3,470	3,470	3,470
68300 Small Tools, Instruments, Equipment	-	-	-	-	-
68400 Gas and Oil	-	-	-	-	-
69500 Training/Conference/Tuition/ Board Exp.	3,686	29,250	29,250	29,250	29,250
69550 Memberships	2,105	2,793	2,793	2,793	2,693
69600 Taxes	-	-	-	-	-
69650 Awards	-	-	-	-	-
69700 Miscellaneous Expenses	2,435	5,200	5,200	5,200	5,200
69750 Prior Year Expense	(99)	-	-	-	-
69800 Uncollectable Accounts Receivable	-	-	-	-	-
89100 Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies	\$ 533,710	\$ 450,685	\$ 450,685	\$ 432,565	\$ 462,034
77000 Capital Outlays	\$ -	\$ -	\$ -	\$ -	\$ -
79050 Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures	\$ 6,444,984	\$ 6,708,715	\$ 6,715,215	\$ 6,697,095	\$ 6,870,582

* Estimates based on July 2021 through February 2022 actual expenditures and February 2022 budget amendments.

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INFORMATION MANAGEMENT

RON MOSKOWITZ
CHIEF INFORMATION OFFICER

At a Glance:	
FY 2021-22 Adopted Budget	\$12.7M
FY 2022-23 Adopted Budget	\$13.1M
% of FY 2022-23 Adopted Budget	6.9%
Total FTEs FY 2022-23 Adopted Budget	58

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, a Project Management unit, and a Cybersecurity 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

- 2020 EPA Clean Air Excellence Award
- 2021 CIO Hall of Fame Award
- 2021 Gartner Technology Innovation Americas Finalist

INFORMATION MANAGEMENT (cont.)

Software Development

- PeopleSoft 1099
- AER enhancement for 2021
- PeopleSoft W-2 electronic review
- Online payment reinstatement
- FIND - AER integration
- AB617 new communities
- PeopleSoft ACA
- Prop 1B & School Bus GMS Internal Dashboard
- Rule 1180 new station and threshold
- Google Analytics for major apps
- R1403 enhancements
- SocioEcon special data
- CPI liability fee reports
- Online payment - allow payment of registration (non-facid)
- RYR, OnBase, PeopleSoft integration
- New DEO signature FP, RTC, ERC
- GMS Prop 1B and School Bus internal evaluation
- GMS VW internal evaluation
- R1113 Delinquency issue fix
- SB95 COVID-19 special leave
- FIND update - R222 equipment search
- Prop 1B Survey tool
- PAATS release TV track fix
- Telework Stipend setup for Payroll
- ACA for FTB
- VW new solicitation for Combustion Freight On Road
- FIND map search
- School Bus GMS Phase II Ranking and Calculation
- AQ Details enhancement
- Mates download tool
- Fiscal Year-End Support
- ISR phase 1.1
- VW contract module enhancement
- CAA award nomination for 2021 and ticket
- PAATS, PPS enhancement for R461
- Rideshare Survey 2021
- Rule 1180 Notification System
- Online Payment Security Enhancements
- Finance Billing Portal Enhancement - Follow-up Module
- Monitoring for Dominguez Channel Odor event

INFORMATION MANAGEMENT (cont.)

- Configurable Monitoring Station location for AQI Map
- Automate FTE refresh for AER universe
- ISR Phase 1.2
- AQ-SPEC/AB617 Data Management System
- Payroll Enhancement for out of state worker
- BCC Open Enrollment integration to Payroll

Network/Phone System/Help Desk/Desktop-Laptop

- Over 100 Laptops/Monitors/Docking Stations Deployed
- Managed Cell Phones/MiFis/iPads
- Setup and managed 394 Zoom Webinars and 47 Zoom Meetings
- Configured and managed 16 onsite and offsite Hybrid Zoom Webinars
- Office 365 Enterprise Agreement RFQ
- Telecommunications Services RFP
- Phone System Upgrade RFQ
- Computer, Network and Server Vendors List RFQ
- VPN Server Upgrade
- Office reconfigurations

Data Center

- Memory Upgrade on Blade Servers - Required system maintenance needed to support general applications for IM and other departments
- 3Par SAN Disk Installation and Provisioning - Expanding storage capacities to accommodate additional resource requirements. This task included firmware, OS, and coordination with HP support for proper provisioning and verification.
- Planning Lab Servers: Additional Server Provisioning - Additional server update and provisioning to address needs of additional performance by Planning group.
- Planning Lab Servers: Memory Upgrade - Additional memory update and provisioning to address needs of additional performance by Planning group.
- WHAM Public Registration System Development and Deployment for LPAM - LPAM required a new registration system to allow the public to access WHAM contents. An internal project was done to address the unique requirements of this system.
- Azure Administration
- Server and Storage Maintenance Renewal

INFORMATION MANAGEMENT (cont.)

Database Administration

- Implementing Database changes for all software projects
- Monitoring and Maintaining 24/7 Availability

Workflow/Document Management

- Deployed CAMS agency wide and implemented enhancements
- Deployed Lawn & garden equipment battery rebate forms with IPF & Peoplesoft integration
- Integrated Lawnmower rebate system with IPF & Peoplesoft
- Integrated EV Charger rebate system with IPF & Peoplesoft
- Integrated RYR system with IPF & Peoplesoft
- Deploy AB 836 Grant application forms
- Enhanced Public Records system
- Created a number of Document types and associated objects to support other development efforts.

Cyber Security

- Cybersecurity Assessment completed
- Deployment of patch management solution for 1400 workstations and 274 servers
- Deployment of Windows 10 upgrade (version 21H1 to 1174 workstations)
- Email Security
 - Total emails processed: 7.5 Million
 - Total threat emails: 3.8 Million
 - Virus emails blocked: 1,305
 - Spam emails blocked: ~205,000
 - Outgoing emails: 3.3 million
- Web Filtering
 - Total Throughput: ~100TB
 - Total threats blocked: ~45,000
- Antivirus
 - Detections and Incidents: 33

Public Records

- Processing and tracking thousands of PRRs
- Received over 5,094 requests
- Closed over 4,994 requests

INFORMATION MANAGEMENT (cont.)

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
- 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

INFORMATION MANAGEMENT (cont.)

- 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.

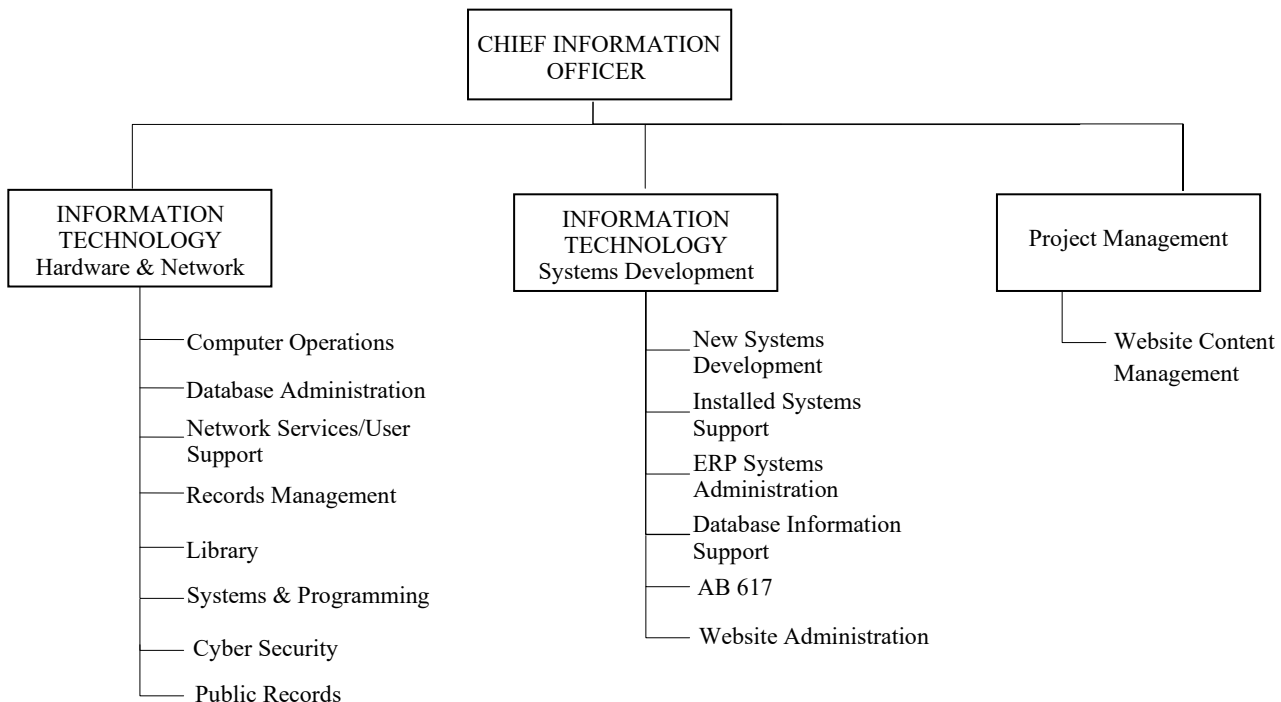
Cyber Security

- 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

ORGANIZATIONAL CHART:



INFORMATION MANAGEMENT (cont.)

POSITION SUMMARY: 58 FTEs

Information Management Units	Amended FY 2021-22	Change	Budget FY 2022-23
Office Administration	2	-	2
Hardware & Network	32	1	33
Systems Development	21	-	21
Project Management	2	-	2
Total	57	1	58

POSITION DETAIL:

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

**Information Management
Work Program by Office**

#	Program Code	Program Category	Program	Activities	FTEs FY 2021-22	+/-	FTEs FY 2022-23	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	Ib
3	27 071	Operational Support	Arch Ctgs - Admin	Database Dev/Maintenance	0.25	0.00	0.25	XVIII
4	27 160	Operational Support	Computer Operations	Oper/Manage Host Computer Sys	5.25	0.00	5.25	Ia
5	27 173	Operational Support	CyberSecurity	CyberSecurity	1.00	1.00	2.00	Ia
6	27 184	Operational Support	Database Information Support	Ad Hoc Reports/Bulk Data Update	1.00	0.00	1.00	Ia
7	27 185	Operational Support	Database Management	Dev/Maintain Central Database	2.25	0.00	2.25	Ia
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	Ia
10	27 420	Operational Support	Library	General Library Svcs/Archives	0.25	0.00	0.25	Ia
11	27 470	Operational Support	Network Operations/Telecomm	Operate/Maintain/implem SCAQMD	8.25	0.00	8.25	Ia
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	Ia,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	Ia
16	27 615	Operational Support	Records Information Mgmt Plan	Plan/Impl/Dir/Records Mgmt plan	1.25	0.00	1.25	Ia
17	27 616	Operational Support	Records Services	Records/Documents processing	3.75	0.00	3.75	Ia,III,IV
18	27 735	Operational Support	Systems Maintenance	Maintain Existing Software Prog	4.50	0.00	4.50	I,III,IV
19	27 736	Operational Support	Systems Implementation/PeopleS	Fin/HR PeopleSoft Systems Impl	1.50	0.00	1.50	Ia
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	Ia

Total Information Management	57.00	1.00	58.00
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Information Management Line Item Expenditure					
Major Object / Account # / Account Description	FY 2020-21 Actuals	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate *	FY 2022-23 Adopted Budget
Salary & Employee Benefits					
51000-52000 Salaries	\$ 6,531,306	\$ 5,796,846	\$ 5,800,041	\$ 5,800,041	\$ 6,393,318
53000-55000 Employee Benefits	3,801,857	3,807,569	3,807,570	3,807,570	3,816,270
Sub-total Salary & Employee Benefits	\$ 10,333,163	\$ 9,604,415	\$ 9,607,611	\$ 9,607,611	\$ 10,209,589
Services & Supplies					
67250 Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300 Rents & Leases Equipment	-	1,880	1,266	1,266	1,880
67350 Rents & Leases Structure	-	-	-	-	-
67400 Household	-	1,250	750	750	1,250
67450 Professional & Special Services	1,706,914	1,404,121	1,736,661	1,736,661	1,404,121
67460 Temporary Agency Services	33,544	347,198	57,458	57,458	347,198
67500 Public Notice & Advertising	-	-	-	-	-
67550 Demurrage	-	650	650	650	650
67600 Maintenance of Equipment	91,413	157,750	148,641	120,000	157,750
67650 Building Maintenance	-	-	-	-	-
67700 Auto Mileage	1,565	1,250	1,250	1,250	1,250
67750 Auto Service	-	-	-	-	-
67800 Travel	-	2,160	2,160	2,160	2,160
67850 Utilities	-	-	-	-	-
67900 Communications	35,630	36,900	31,900	31,900	36,900
67950 Interest Expense	-	-	-	-	-
68000 Clothing	-	-	-	-	-
68050 Laboratory Supplies	-	-	-	-	-
68060 Postage	188	5,500	5,500	5,500	5,500
68100 Office Expense	655,746	673,912	670,492	670,492	673,912
68200 Office Furniture	388	-	-	-	-
68250 Subscriptions & Books	215,052	30,000	74,817	74,817	30,000
68300 Small Tools, Instruments, Equipment	-	2,000	-	-	2,000
68400 Gas and Oil	-	-	-	-	-
69500 Training/Conference/Tuition/ Board Exp.	29,059	46,575	52,921	52,921	46,575
69550 Memberships	205	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	(11,272)	-	-	-	-
69800 Uncollectable Accounts Receivable	-	-	-	-	-
89100 Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies	\$ 2,758,431	\$ 2,713,466	\$ 2,786,786	\$ 2,758,145	\$ 2,713,466
77000 Capital Outlays	\$ 685,483	\$ 375,000	\$ 885,459	\$ 885,459	\$ 175,000
79050 Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures	\$ 13,777,077	\$ 12,692,881	\$ 13,279,856	\$ 13,251,215	\$ 13,098,055

* Estimates based on July 2021 through February 2022 actual expenditures and February 2022 budget amendments.

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LEGAL

**BAYRON T. GILCHRIST
GENERAL COUNSEL**

At a Glance:	
FY 2021-22 Adopted Budget	\$7.2M
FY 2022-23 Adopted Budget	\$7.5M
% of FY 2022-23 Adopted Budget	4.0%
Total FTEs FY 2022-23 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 on legal issues relating to the indirect source rule for warehouses, including issues of state authority, federal preemption, and allegations that the rule’s mitigation fee constituted a tax, as well as reviewing all documents for legal adequacy including the CEQA document and socioeconomic report.
- Staff advised on legal issues relating to the Rule 1109.1 requirements for refineries to install best available retrofit control technology, including issues concerning the interpretation of AB 617’s Best Available Retrofit Control Technology (BARCT)

LEGAL (cont.)

requirements, whether BARCT can require equipment replacement, and interpretation of other sections of the Health & Safety Code, as well as reviewing all documents including the CEQA document and socioeconomic report.

- 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.
- 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 \$5 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, grants, and agreements from various departments within the District.

ANTICIPATED:

- Provide legal advice regarding the reduction of emissions at the ports and the implementation of the facility-based mobile source rule for warehouses.
- Provide legal advice for the transition away from RECLAIM, including the development of (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.

LEGAL (cont.)

- Provide legal advice regarding AB 617, including potential enforcement actions based on the CERPs for the first-year communities, and advice for the implementation of CERPs in the second-year communities.
- Revise the South Coast AQMD records retention policy and provide training to staff on the requirements.
- Provide legal advice on the Quemetco capacity upgrade project and process for the Draft Environmental Impact Report pursuant to the California Environmental Quality Act.
- Prosecute the public nuisance matters involving the Dominguez Channel odor event impacting Carson, as well as Gardena, Long Beach, Redondo Beach, Torrance and Wilmington and other parts of L.A. County, as well as the Hyperion Water Reclamation Plant sewage discharge that impacted residents in El Segundo and other surrounding communities with odors.
- Prosecute the violations from the multiyear methane leak at the Los Angeles Department of Water and the Sun Valley Power Plant.

ORGANIZATIONAL CHART:



LEGAL (cont.)

POSITION SUMMARY: 35 FTEs

Legal Units	Amended FY 2021-22	Change	Budget FY 2022-23
Office Administration	4	-	4
General Counsel	26	-	26
Investigations	5	-	5
Total	35	-	35

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
4	Administrative Secretary/Legal
1	Assistant Chief Deputy
1	Assistant Chief Deputy – Major Prosecutions
1	Chief Deputy Counsel
1	General Counsel
4	Investigator
3	Legal Secretary
1	Office Assistant
2	Paralegal
4	Principal Deputy District Counsel
9	Senior Deputy District Counsel
1	Senior Office Assistant
1	Senior Paralegal
1	Staff Specialist
<u>1</u>	Supervising Investigator
35	Total FTEs

Legal Work Program by Office								
#	Program Code	Program Category	Program	Activities	FTEs FY 2021-22	+/-	FTEs FY 2022-23	Revenue Categories
1	08 001	Advance Clean Air Technology	AB2766/Mob Src/Legal Advice	AB2766 Leg Adv: Trans/Mob Source	0.05	0.00	0.05	IX
2	08 003	Advance Clean Air Technology	AB2766/MSRC	Legal Advice: MSRC Prog Admin	0.10	0.00	0.10	IX
3	08 010	Develop Programs	AQMP	AQMP Revision/CEQA Review	0.30	0.00	0.30	II,IV,IX
4	08 019	Operational Support	AB617-Prod Develop	AB617-Program Development	2.50	0.00	2.50	IX
5	08 025	Operational Support	Admin/SCAQMD-Legal Research	Legal Research/Staff/Exec Mgmt	1.20	0.00	1.20	la
6	08 030	Advance Clean Air Technology	AB134	AB134	1.25	0.00	1.25	IX
7	08 038	Operational Support	Admin/Office Management	Attorney Timekeeping/Perf Eval	3.50	0.00	3.50	Ib
8	08 071	Operational Support	Arch Cigs - Admin	Rule Dev/TA/Reinterpretations	0.05	0.00	0.05	XVIII
9	08 072	Ensure Compliance	Arch Cigs - End User	Case Dispo/Rvw, Track, Prep NOV's	0.05	0.00	0.05	XVIII
10	08 073	Ensure Compliance	Arch Cigs - Other	Case Dispo/Rvw, Track, Prep NOV's	0.05	0.00	0.05	XVIII
11	08 102	Operational Support	CEQA Document Projects	CEQA Review	0.75	0.00	0.75	II,III,IX
12	08 115	Ensure Compliance	Case Disposition	Trial/Dispo-Civil Case/Injunct	4.75	0.00	4.75	II,IV,V,VI,XV
13	08 131	Advance Clean Air Technology	Clean Fuels/Legal Advice	Legal Advice: Clean Fuels	0.15	0.00	0.15	VIII
14	08 154	Ensure Compliance	Compliance/NOV Administration	Review/Track/Prep NOV's/MSAs	0.75	0.00	0.75	IV
15	08 185	Ensure Compliance	Database Management	Support IM/Dev Tracking System	1.00	0.00	1.00	IV
16	08 227	Operational Support	Employee/Employment Law	Legal Advice: Employment Law	0.50	0.00	0.50	la
17	08 235	Ensure Compliance	Enforcement Litigation	Maj Prosecutions/Civil Actions	2.00	0.00	2.00	IV
18	08 275	Operational Support	Governing Board	Legal Advice: Attend Board/Cmte Mtgs	1.00	0.00	1.00	la
19	08 366	Ensure Compliance	Hearing Board/Legal	Hear/Disp-Varian/Appeal/Rev	3.00	0.00	3.00	IV,V,XV
20	08 380	Ensure Compliance	Interagency Coordination	Coordinate with Other Agencies	0.20	0.00	0.20	II,V
21	08 401	Operational Support	Legal Advice/SCAQMD Programs	General Advice: Contracts	2.00	0.00	2.00	la
22	08 403	Ensure Compliance	Legal Rep/Litigation	Prep/Hearing/Disposition	3.50	0.00	3.50	la,II
23	08 404	Policy Support	Legal Rep/Legislation	Draft Legis/SCAQMD Position/Mtgs	0.25	0.00	0.25	II,IX
24	08 416	Policy Support	Legislative Activities	Lobbying: Supp/Promote/Influence legis/Adm	0.10	0.00	0.10	la
25	08 457	Advance Clean Air Technology	Mob Src/C Moyer/Leg Advice	Moyer/Implem/Program Dev	0.10	0.00	0.10	IX
26	08 465	Ensure Compliance	Mutual Settlement	Mutual Settlement Program	1.50	0.00	1.50	IV
27	08 516	Timely Review of Permits	Permit Processing/Legal	Legal Advice: Permit Processing	0.10	0.00	0.10	III
28	08 565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Rec Requests	1.50	0.00	1.50	la
29	08 651	Develop Rules	Rules/Legal Advice	Legal Advice: Rules/Draft Regs	1.20	0.00	1.20	II
30	08 661	Develop Rules	Rulemaking/RECLAIM	RECLAIM Legal Adv/Related Iss	0.50	0.00	0.50	II
31	08 681	Customer Service and Business Assistance	Small Business/Legal Advice	Legal Advice: SB/Fee Review	0.05	0.00	0.05	II,III
32	08 717	Policy Support	Student Interns	Gov Board/Student Intern Program	0.10	0.00	0.10	la
33	08 770	Timely Review of Permits	Title V	Leg Advice: Title V Prog/Perm Dev	0.05	0.00	0.05	II,IV
34	08 772	Timely Review of Permits	Title V Permits	Leg Advice: New Source Title V Permit	0.05	0.00	0.05	III
35	08 791	Ensure Compliance	Toxics/AB2588	AB2588 Legal Advice: Plan & Impl	0.05	0.00	0.05	X
36	08 805	Ensure Compliance	Training	Continuing Education/Training	0.75	0.00	0.75	Ib
37	08 827	Operational Support	VW-General Admin	VW-General Admin	0.05	0.00	0.05	XVII

35.00	-	35.00
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Total Legal

Legal Line Item Expenditure					
Major Object / Account # / Account Description	FY 2020-21 Actuals	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate *	FY 2022-23 Adopted Budget
Salary & Employee Benefits					
51000-52000 Salaries	\$ 3,816,076	\$ 4,132,656	\$ 4,135,988	\$ 4,084,559	\$ 4,574,371
53000-55000 Employee Benefits	2,125,698	2,573,971	2,573,971	2,541,965	2,494,006
Sub-total Salary & Employee Benefits	\$ 5,941,774	\$ 6,706,626	\$ 6,709,959	\$ 6,626,524	\$ 7,068,377
Services & Supplies					
67250 Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300 Rents & Leases Equipment	-	-	-	-	-
67350 Rents & Leases Structure	-	-	-	-	-
67400 Household	-	-	-	-	-
67450 Professional & Special Services	1,231,178	246,001	776,001	776,001	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	(15)	1,600	1,600	1,600	1,600
67750 Auto Service	-	-	-	-	-
67800 Travel	-	15,000	15,000	15,000	15,000
67850 Utilities	-	-	-	-	-
67900 Communications	5,075	10,300	8,200	8,200	10,300
67950 Interest Expense	-	-	-	-	-
68000 Clothing	-	500	500	500	500
68050 Laboratory Supplies	-	-	-	-	-
68060 Postage	1,226	4,750	4,750	4,750	4,750
68100 Office Expense	7,191	16,000	7,500	7,500	16,000
68200 Office Furniture	-	4,500	4,500	4,500	4,500
68250 Subscriptions & Books	133,634	115,000	123,500	123,500	115,000
68300 Small Tools, Instruments, Equipment	-	-	-	-	-
68400 Gas and Oil	-	-	-	-	-
69500 Training/Conference/Tuition/ Board Exp.	8,708	17,500	17,500	12,000	17,500
69550 Memberships	1,025	750	750	750	750
69600 Taxes	-	-	-	-	-
69650 Awards	-	-	-	-	-
69700 Miscellaneous Expenses	403	2,000	2,000	2,000	2,000
69750 Prior Year Expense	-	-	-	-	-
69800 Uncollectable Accounts Receivable	-	-	-	-	-
89100 Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies	\$ 1,388,425	\$ 448,151	\$ 976,051	\$ 970,551	\$ 448,151
77000 Capital Outlays	\$ -	\$ -	\$ -	\$ -	\$ -
79050 Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures	\$ 7,330,199	\$ 7,154,777	\$ 7,686,010	\$ 7,597,075	\$ 7,516,528

* Estimates based on July 2021 through February 2022 actual expenditures and February 2022 budget amendments.

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE

**DERRICK ALATORRE
DEPUTY EXECUTIVE OFFICER**

At a Glance:	
FY 2021-22 Adopted Budget	\$11.2M
FY 2022-23 Adopted Budget	\$11.4M
% of FY 2022-23 Adopted Budget	6.0%
Total FTEs FY 2022-23 Adopted Budget	59

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 stakeholders to support South Coast AQMD’s legislative priorities. Efforts are focused on policy and funding issues that support the Air Quality Management Plan (AQMP) to meet state and federal clean air standards. This unit also works to defend against legislative activities 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; facilitating a two-way flow of communication with 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 (PIC) serves and assists members of the public who wish to report air quality complaints, contact staff or acquire information regarding South Coast AQMD programs. The Communications Center provides easy access to the public for reporting a variety of air quality concerns. The PIC, located in the South Coast AQMD lobby, serves as a walk-up resource for all visitors to South Coast AQMD. Due to COVID-19, the PIC is currently closed to the public until further notice.

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

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

Environmental Justice (EJ) initiatives focus on a variety of programs to partner with disadvantaged communities to address air pollution issues. Specific programs including 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 focused on improving air quality and public health in environmental justice communities. AB 617 implementation efforts span four years with six designated communities:

- 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 – South Los Angeles

Media

Media Relations serves as the official liaison with news media including 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 range of proactive media and public relations programs. Media provides 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 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

The Graphics Department is responsible for providing visual and media services, 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.

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

ACCOMPLISHMENTS:

RECENT:

State Legislative

- Assisted in securing funding:
 - \$50 million statewide for air districts to implement AB 617.
 - \$260 million in statewide AB 617 incentives program related to criteria pollutant and toxic air contaminant emissions consistent with AB 617 CERPS.
 - \$45 million in Carl Moyer funding to replace diesel trucks with low NOx medium- and heavy-duty trucks.
 - \$153 million in statewide Carl Moyer funding which was previously undispersed due to a state budget authority issue.

Federal Legislative

- Advocated with our Congressional Delegation to increase and/or protect funding for:
 - TAG grew from \$59 million in FY 2021 to nearly \$62 million in FY 2022.
 - The Diesel Emission Reductions Act (DERA) was increased to \$92 million in FY 2021 from \$90 million in FY 2021.
 - Section 103/105 funding was increased to \$231.5 million in FY 2021 from \$229.5 million in the prior year plus almost \$100 million in the American Rescue Plan Act.
- Worked with Members of Congress and Committee staff on “Clean Corridors Act of 2020” which was included in the Bipartisan Infrastructure Law to provide \$7.5 in formula allocations to states and competitive grants.
- Engaged with the Administration, Members of Congress, industry, health and environmental organizations to update U.S. Environmental Protection Agency’s NOx Emission Standard for Heavy Duty Trucks.

Communications & Public Information Center

- Assisted the public through the handling of 32,339 incoming calls, including 254 directed to PIC and 662 Spanish Hotline calls. Due to COVID- 19, the public information center is closed to the public.
- Performed nearly 1,000 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, updated, and published 233 web pages, and conducted two public information mailings.

Small Business Assistance

- Assisted small businesses with:
 - Permits for 2,375 applications from small businesses.
 - Technical assistance on rules and regulations for 377 facilities.
 - Recordkeeping training to 15 businesses.
 - Processed and approved 857 Air Quality Permit Checklist.
 - Issued 11 Dry Cleaning grants.
 - Five (5) businesses file variances before the South Coast AQMD Hearing Board.

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

- 16 Fee Review cases.
- 1,094 facilities as part of the Expired Permit Outreach Program including assistance in recovering revenue.

Local Government/Community Affairs

- Attended regional and community meetings including government, industry, environmental justice, health, and education.
- Increased community engagement through:
 - Organizing, outreach and staffing public meetings, community events and conference.
 - 11 Visiting Dignitaries and Speakers Bureau tours; and
 - Planned, organized, and produced major events, including Dr. Martin Luther King, Jr., Cesar Chavez, and 32nd Annual Clean Air Awards.

Environmental Justice

- Held four (4) EJCP Advisory Council meetings and recruited one (1) new member and four (4) EJAG meetings and recruited five (5) new members.
- Hosted hybrid 7th Annual EJ Conference with approximately 805 attendees.
- Through Inter-Agency Task Force built mechanisms and strategies to facilitate intergovernmental coordination on environmental complaints and EJ issues.
- Launched and implemented the Clean Air Education Program for Elementary Students (CAPES) in 22 schools with 29 teachers including developing unique curriculum with educational videos.
- Conducted WHAM outreach focusing on AB 617 and EJ communities resulting in participation by 300 high school classrooms and 100 middle school classrooms.
- Developed and published four units of WHAM curriculum including materials, videos and hands-on kits were completed for middle and high schools.

AB 617

- Five (5) completed CERPs.
- For Year 1, 2 and 3 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.
- Held 42 CSC meetings, four (4) budget workshops, two (2) truck incentives workshops and two program update meetings.
- Adapted meeting and program processes per input from CSCs to align with community priorities and needs.
- Convened other types of meetings in support of the Year 1, Year 2, and Year 3 communities, including Technical Advisory Committees, workshops, Charter formation, and Community Identification.

Media

- Developed and issued 110 news releases to media.
- Developed and pitched Opinion Piece that was published in the LA Daily News and 8 of its sister publications that resulted in three live interviews.

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

- Outreach during wildfires to highlight air monitoring efforts resulted dozens of interviews and media coverage in print and TV within the South Coast Air Basin.

Social Media

- Immediate and consistent of coverage from the wildfires in October, resulted in 500+ Twitter followers and over 108,714 impressions (individual reach) in one day (Oct. 12th).
 - Content was also shared by Senator Dianne Feinstein, LA Mayor Garcetti, LA County, California Governor's Office of Emergency Services and news outlets.
- Original content posted to social media accounts included 831 posts on Facebook, 936 posts on Twitter, and 455 posts on Instagram

Graphics

- Completed 409 graphics jobs for the agency.
- Re-designed layout and design for the Advisor and produced the Annual Report and LA Sentinel Wrap
- Provided photos and AV support for all major public agency events.

ANTICIPATED:

State Legislative

- Seek funding for air quality related programs to meet clean air standards:
 - AB 617, \$100 million statewide for implementation funds and \$500 million in statewide for incentive funding;
 - Secure \$600 million in Carl Moyer funding;
 - Obtain cleanup language for \$45 million in Carl Moyer funding (from 2021); and
 - Reauthorize existing Carl Moyer incentive funding sources.
- South Coast AQMD Sponsored Legislation:
 - Independent Special District Status for Air Districts
 - AB 617 Policy Changes (Including AB 617 CSC Administrative Costs Budget Request);
 - Increased Strict Liability Civil Penalties for Air Quality Violations
 - Renewable Portfolio Standard (RPS) Style Standard for Air Quality
 - Goods Movement-Related Port Cargo Fee

Federal Legislative

- Secure policy objectives and funding for air quality issues through existing and new legislative opportunities such as, but not limited to, Clean Air Act, Appropriations and COVID Relief, Transportation and Infrastructure, Climate, Supply Chain, and other efforts.
- Work to ensure the federal government does its share to reduce air pollution through:
 - Funding for the TAG program, DERA, and Clean Air Act Section 103/105 programs and other programs and grants; and
 - Regulatory and other actions.

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

- Work with U.S. EPA, Members of Congress and stakeholders to ensure the rule-making process for the Cleaner Trucks Plan is transparent with equitable stakeholder participation.

Local Government/Community Relations

- Continue to build relationships with government, industry, community, and other stakeholders in support of South Coast AQMD's mission and conduct educational and informational outreach.
- Collaborate internally on high profile issues and assist with crisis communications.
- Enhance informational databases to ensure current information is available.
- Collaborate, assist, and support other departments on major initiatives and projects.

Communications Center & Public Information

- Receive and process all communications for internal and external stakeholders.
- Assist SBA with expired permit program
- Re-open the Public Information Center when appropriate.
- Assist in processing web page updates for publishing
- Implement TTY software system for the hearing impaired.

Environmental Justice

- Implement EJCP CAPES program to reach 20 elementary schools.
- Work with consultants to produce three videos for elementary students on air quality with the accompanying curriculum for grades 1 through 6.
- Host four (4) EJCP Advisory Council meetings and invite Advisory Council Members.
- Coordinate and implement one EJ Student Bus Tour or webinar.
- Continue implementation of the Inter-Agency Task Force.
- Develop, organize, and host the annual EJ Conference.
- Organize and host four (4) EJAG meetings.
- Implement WHAM in 300 high school classrooms and 100 middle school classrooms and expand outreach to youth organizations.

AB 617

- Convene CSC meetings and workshops for each of the six communities which will include more than 25 meetings.
- Implement the CERPs and CAMPs in Year 1, 2, and 3 communities.
- Continue the outreach process among current CSCs and support capacity building for future year communities.
- 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 June 2022 and work related to submitting to CARB.

Small Business Assistance

- Expand awareness of the SBA program by outreaching to trade organizations, municipalities, and other agencies.

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

- Continue to aid small businesses regarding, rules and regulations, permit requirements, and compliance.
- Reinstate facility visits as appropriate to provide on-site assistance to small businesses
- 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, 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.
- Implement story maps on South Coast AQMD website and update and maintain hot topics webpages.
- 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.
- Increase participation in CAPCOA Public Affairs group.
- Continue to help focus and/or narrow Public Records Requests (PRR) from news media.

Social Media

- Maintain and grow followers with a goal of a 30-percent increase from 2021.
- Continue to increase shares of content 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.

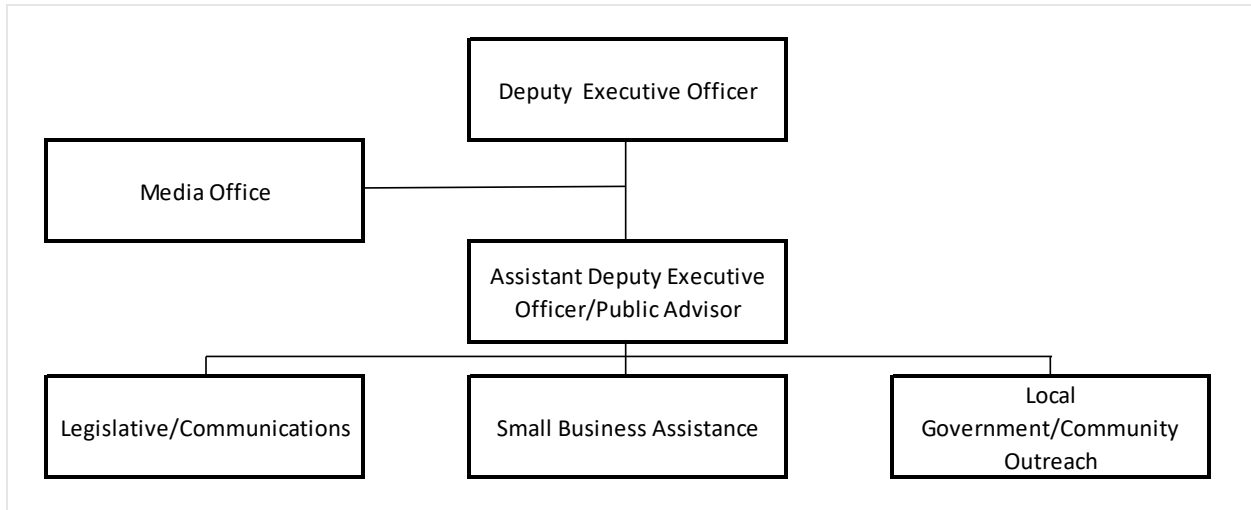
Graphics

- Complete graphics projects and assignments, including collateral brochures and promotional items.

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

- 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).

CURRENT ORGANIZATIONAL CHART:



POSITION SUMMARY: 59 FTEs

Legislative & Public Affairs/Media Office Units	Amended FY 2021-22	Change	Budget FY 2022-23
Administration	8	-	8
Legislative & Public Affairs	46	-	46
Media Office	5	-	5
Total	59	-	59

LEGISLATIVE & PUBLIC AFFAIRS/MEDIA OFFICE (cont.)

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
4	Administrative Assistant I
1	Administrative Assistant II
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
2	Senior Administrative Assistant
9	Senior Office Assistant
2	Senior Public Affairs Manager
20	Senior Public Affairs Specialist
1	Senior Staff Specialist
1	Staff Assistant
<u>1</u>	Supervising Office Assistant
59	Total FTEs

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

#	Program Code	Program Category	Program	Activities	FTEs FY 2021-22	+/-	FTEs FY 2022-23	Revenue Categories
1	35 019	Customer Service and Business Assistance	AB617-Prrog Develop	AB617-Program Development	6.00	1.00	7.00	IX
2	35 046	Customer Service and Business Assistance	Admin/Prog Mgmt	Admin Office/Units/SuppCoord Staff	6.02	-1.00	5.02	IX
3	35 111	Ensure Compliance	Call Center/CUT SMOG	Smoking Vehicle Complaints	8.00	0.00	8.00	IX,XV
4	35 126	Customer Service and Business Assistance	Clean Air Connections	Coord of region-wide community group	1.00	0.00	1.00	II,IX
5	35 205	Customer Service and Business Assistance	Environmental Education	Curriculum Dev/Project Coord	0.25	0.00	0.25	II,IX,XV
6	35 240	Customer Service and Business Assistance	Environmental Justice	Impl Board's EJ Pgrms/Policies	3.00	1.00	4.00	II,IV
7	35 260	Customer Service and Business Assistance	Fee Review	Cnte Mtg/Fee-Related Complaint	0.50	0.00	0.50	II,III,IV,XV
8	35 280	Policy Support	Advisory Group/Ethnic Comm	GB Ethnic Comm Advisory Group	0.40	0.00	0.40	II,IX
9	35 281	Policy Support	Advisory Group/Small Business	SBA Advisory Group Staff Support	0.50	0.00	0.50	IV,IX
10	35 283	Policy Support	Governing Board Policy	Brd sup/Respond to GB req	0.55	0.00	0.55	IX
11	35 345	Policy Support	Goods Mvmt&Financial Incentive	Goods Movement & Financial Incentives Progr	1.00	0.00	1.00	IX
12	35 350	Operational Support	Graphic Arts	Graphic Arts	2.00	0.00	2.00	IX
13	35 381	Customer Service and Business Assistance	Interagency Liaison	Interact Gov Agns/Promote SCAQMD	0.15	0.00	0.15	IX,XV
14	35 390	Customer Service and Business Assistance	Intergov/Geographic Deployment	Dev/Impl Local Govt Outreach	10.50	0.00	10.50	II,IX
15	35 412	Policy Support	Legislation/Federal	Lobbying/Analyses/Tracking/Out	0.25	0.00	0.25	IX
16	35 413	Policy Support	Legislation/Exec Office Support	Coord Legis w/ EO, EC, Mgmt	0.25	0.00	0.25	IX
17	35 414	Policy Support	Legislation-Effects	Lobbying/Analyses/Tracking/Out	0.80	0.00	0.80	IX,IX
18	35 416	Policy Support	Legislative Activities	Supp/Promote/Influence Legis/Adm	0.50	0.00	0.50	IX
19	35 491	Customer Service and Business Assistance	Outreach/Business	Chambers/Business Meetings	1.00	0.00	1.00	II,IV
20	35 492	Customer Service and Business Assistance	Public Education/Public Events	Pub Events/Conf/Rideshare Fair	2.00	0.00	2.00	II,V,IX,XV
21	35 494	Policy Support	Outreach/Collateral/Media	Edits, Brds, Talk shows, Commercl	5.60	0.00	5.60	IX
22	35 496	Customer Service and Business Assistance	Outreach/Visiting Dignitary	Tours/Briefings-Dignitary	0.25	0.00	0.25	IX
23	35 514	Customer Service and Business Assistance	Permit: Expired Permit Program	Assist w Permit Reinstatement	0.30	0.00	0.30	IV
24	35 555	Customer Service and Business Assistance	Public Information Center	Inform public of unhealthy air	1.00	0.00	1.00	II,V,IX
25	35 560	Develop Programs	Public Notification	Public notif of rules/hearings	0.50	0.00	0.50	II,IV,IX
26	35 565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Req for Info	0.10	0.00	0.10	IX
27	35 679	Customer Service and Business Assistance	Small Business Assistance	Small Business/Financial Assistance	1.00	0.00	1.00	III
28	35 680	Timely Review of Permits	Small Business/Permit Streamlin	Asst sm bus to comply/SCAQMD req	3.95	0.00	3.95	II,III,IV,V,XV
29	35 710	Customer Service and Business Assistance	Speakers Bureau	Coordinate/conduct speeches	0.10	0.00	0.10	IX
30	35 717	Policy Support	Student Interns	Student Interns	0.10	0.00	0.10	IX
31	35 791	Customer Service and Business Assistance	Toxics/AB2588	Outreach/AB 2588 Air Toxics	0.01	0.00	0.01	X
32	35 825	Operational Support	Union Negotiations	Official Labor/Mgmt Negotiate	0.01	0.00	0.01	IX
33	35 826	Operational Support	Union Steward Activities	Union Steward Activities	0.01	0.00	0.01	IX
34	35 855	Operational Support	Web Tasks	Create/edit/review web content	0.40	0.00	0.40	IX

Total Legislative & Public Affairs/Media Office

58.00	1.00	59.00
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**Legislative & Public Affairs/Media Office
Line Item Expenditure**

Major Object / Account # / Account Description		FY 2020-21 Actuals	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate *	FY 2022-23 Adopted Budget
Salary & Employee Benefits						
51000-52000	Salaries	\$ 5,276,989	\$ 5,252,802	\$ 5,430,661	\$ 5,363,134	\$ 5,668,371
53000-55000	Employee Benefits	3,189,038	3,589,869	3,589,869	3,545,231	3,438,203
Sub-total Salary & Employee Benefits		\$ 8,466,027	\$ 8,842,670	\$ 9,020,530	\$ 8,908,365	\$ 9,106,574
Services & Supplies						
67250	Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300	Rents & Leases Equipment	-	7,000	7,000	7,000	7,000
67350	Rents & Leases Structure	-	9,000	9,000	9,000	9,000
67400	Household	-	-	-	-	-
67450	Professional & Special Services	4,128,732	1,705,851	3,065,851	3,065,851	1,705,851
67460	Temporary Agency Services	38,586	114,000	84,000	84,000	114,000
67500	Public Notice & Advertising	-	26,600	26,600	26,600	26,600
67550	Demurrage	224	-	-	-	-
67600	Maintenance of Equipment	-	9,000	9,000	9,000	9,000
67650	Building Maintenance	-	-	-	-	-
67700	Auto Mileage	37	24,800	24,800	24,800	24,800
67750	Auto Service	-	-	-	-	-
67800	Travel	661	45,200	45,200	20,000	45,200
67850	Utilities	-	-	-	-	-
67900	Communications	55,834	47,000	42,000	42,000	47,000
67950	Interest Expense	-	-	-	-	-
68000	Clothing	1,099	-	-	-	-
68050	Laboratory Supplies	-	-	-	-	-
68060	Postage	3,334	137,800	130,616	100,616	137,800
68100	Office Expense	84,610	45,300	43,900	43,900	45,300
68200	Office Furniture	1,717	-	1,400	1,400	-
68250	Subscriptions & Books	29,859	18,200	29,856	29,856	18,200
68300	Small Tools, Instruments, Equipment	-	-	-	-	-
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	9,031	8,500	10,684	10,684	8,500
69550	Memberships	31,982	26,250	49,594	49,594	26,250
69600	Taxes	-	-	-	-	-
69650	Awards	90,342	49,681	49,681	49,681	49,681
69700	Miscellaneous Expenses	31,886	43,100	43,100	43,100	43,100
69750	Prior Year Expense	(145)	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		\$ 4,507,788	\$ 2,317,282	\$ 3,672,282	\$ 3,617,082	\$ 2,317,282
77000	Capital Outlays	\$ -	\$ -	\$ -	\$ -	\$ -
79050	Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures		\$ 12,973,815	\$ 11,159,952	\$ 12,692,812	\$ 12,525,447	\$ 11,423,856

* Estimates based on July 2021 through February 2022 actual expenditures and February 2022 budget amendments.

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PLANNING, RULE DEVELOPMENT AND IMPLEMENTATION

SARAH REES DEPUTY EXECUTIVE OFFICER

At a Glance:	
FY 2021-22 Adopted Budget	\$25.2M
FY 2022-23 Adopted Budget	\$24.9M
% of FY 2022-23 Adopted Budget	13.2%
Total FTEs FY 2022-23 Adopted Budget	141

DESCRIPTION OF MAJOR SERVICES:

Planning, Rule Development and Implementation (PRDI) 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
- 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 as 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 AND IMPLEMENTATION (cont.)

ACCOMPLISHMENTS:

Recent:

AB 617

- Adopted a Community Emissions Reduction Plan (CERP) Amendment for one 2019-designated community, began CERP implementation for the 2019-designated communities, and continued CERP implementation for the three 2018-designated communities
- Participated in AB 617 meetings with CARB, CAPCOA, and other external stakeholders
- Develop and adopt CERP for the 2020-designated community
- Completed technical evaluation for the 2021 community selection process

AB 2588

- Approved a Voluntary Risk Reduction Plan for Ultramar Refinery and designated Coastline High Performance Coatings as a Potentially High Risk Level facility. 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 80 advisories in 2021
- Finished MATES V analysis, wrote several chapters and appendices in the report, and developed an interactive data display
- Reviewed several permit requests, answered 130+ public phone inquiries and 150+ email inquiries, responded to media requests, and participated in several media interviews
- Developed tools to analyze PM2.5 and PM10 exceptional events, and drafted four exceptional event demonstrations (one PM2.5 demonstration, three PM10 demonstrations)
- Developed and adopted the 2020 South Coast PM10 Maintenance Plan for the 1987 PM10 Standard and the 2021 PM2.5 Redesignation Request and Maintenance Plan for the 2006 and 1997 24-hour PM2.5 Standards
- Completed deployment of public maps, interactive data displays, and analysis for AB 617.
- Developed software and templates to facilitate the issuance of air quality alerts from air districts in Southern California through the National Weather Service
- Evaluate air quality metrics, progress, and attainment of the standard. Prepared the annual air quality card. Wrote Chapter 2 and Appendix 2 for the Draft 2022 AQMP

Air Quality Modeling/Emissions Inventory

- Completed air toxics emissions inventories and photochemical modeling to estimate inhalation and multiple pathway cancer risks for MATES V
- Developed AB 617 community-based detailed emissions inventory for two communities
- Hosted Technical Advisory Group meeting to assist AB 617 community source attribution analysis
- Developed emissions inventory and demonstrated the maintenance of attainment of the 2006 and 1997 24-hour PM2.5 NAAQS and 1987 PM10 NAAQS for South Coast Air Basin

PLANNING, RULE DEVELOPMENT AND IMPLEMENTATION (cont.)

- Developed transportation conformity and motor vehicle emissions budget for the PM_{2.5} and PM₁₀ maintenance plans
- Submitted to U.S. EPA a technical clarification memo confirming the attainment demonstration of the 2012 annual PM_{2.5} NAAQS for the South Coast Air Basin using updated emissions inventory
- Updated emissions in key area source categories such as fuel combustion in residential and commercial buildings, and aircraft emissions from 41 airports
- Developed future years' business-as-usual (baseline) emissions inventories for the 2022 AQMP, which includes growth in socio-economic activities, reductions from regulations recently adopted by South Coast AQMD and CARB, and algorithms to project RECLAIM emissions to the years after the program sunsets
- Developed a modeling tool to estimate biogenic VOC emissions from urbanized areas in the Basin
- Evaluated the impact of meteorology on the Basin's ozone and PM air quality
- Developed control factors for various source categories including both stationary and mobile sources to attain the 2015 70ppb NAAQS
- Conducted a comprehensive numerical modeling to evaluate air quality changes during the COVID-19 shelter-in-place order
- Developed carrying capacity, maximum allowable emissions amount to attain ozone standards, for the 70ppb ozone standard
- Hosted the Science, Technology, Model Peer-Review (STMPR) meetings to discuss emissions inventory and attainment modeling approaches used in the 2022 AQMP
- 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, expanded reporting parameters pursuant to CARB's Criteria and Toxic Reporting Regulation, and enhanced the capability of on-line payments and certification
- Identified and notified approximately 1,600 facilities subject to South Coast AQMD's AER program.
- Reviewed data from AER reports ultimately generating approximately \$18 million in annual emission fees
- Reconciliation review of more than 250+ Emission Reports for RECLAIM facilities.
- Provided program information and training on report preparation and submittal through a virtual workshop; responded to over 600 inquiries from the AER hotline and email inbox related to assistance with preparing and submitting annual emissions reports
- Compiled and submitted CY2020 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 2021 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

- Held a 2022 AQMP Control Measures Workshop to provide an overview of the control measures and strategies being developed/considered for the 2022 AQMP and to solicit input from all stakeholders on control strategies

PLANNING, RULE DEVELOPMENT AND IMPLEMENTATION (cont.)

- Prepared and submitted a Certification of Nonattainment New Source Review and Clean Fuels for Boilers Compliance Demonstration for the 2015 8-hour ozone standard
- Held Advisory, Mobile Source, and Residential and Commercial Building Working Group meetings to develop strategies for the 2022 AQMP
- Supported development of the 2020 South Coast PM10 Maintenance Plan for the 1987 PM10 Standard in addressing various Clean Air Act requirements
- Supported development of the 2021 PM2.5 Redesignation Request and Maintenance Plan for the 2006 and 1997 24-hour PM2.5 Standards for South Coast Air Basin in addressing various Clean Air Act requirements
- 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
 - Continue rule effectiveness for vehicle scrapping and transportation programs

CEQA

- Prepared CEQA documents for 17 South Coast AQMD rules and plans, oversaw the preparation of CEQA documents for four 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 220 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

- Adopted Rule 2305 to reduce NOx and PM from warehouse and warehouse related activities
- Continued implementation of emission reduction measures included in the 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
- The first annual report on the progress implementing MOU measures were developed and submitted to U.S. EPA
- Continued development of indirect source rules on warehouses and railyards
- Continued MOU negotiation with the Ports of Los Angeles (LA) and Long Beach (LB) while beginning internal work on a potential indirect source rule for marine ports from December
- Continued development of emission reduction strategies for new or redevelopment projects
- Continued international outreach to Chinese and Japanese authorities in exploring partnership-building to reduce emissions from ocean-going vessels and port operations in general, including co-organizing an international virtual forum on Green Ports and Low Carbon City with Shenzhen and Hong Kong authorities

PLANNING, RULE DEVELOPMENT AND IMPLEMENTATION (cont.)

- Continued coordination with U.S. EPA, CARB, and other coastal air districts on OGV control strategies, and initiated studies with international stakeholders to further examine OGV NOx emission profile during low load operations
- Started rule development to address NOx and PM emissions from new intermodal railyards

Health Effects

- Released Final MATES V report as well as an interactive data visualization tool and air monitoring dashboard
- Provided health effects information in response to high-profile community concerns and completed five 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 Heavy-Duty Vehicle Inspection and Maintenance, Advanced Clean Fleets, TRUs, commercial harbor crafts, locomotives, etc. and provided comments and testimony

Stationary Source Rule Development

- Adopted Rules 1109.1 and 429.1, amended Rules 1304 and 2005, and rescinded Rule 1109 to establish NOx and CO limits for petroleum refineries and facilities with operations related to petroleum refineries
- Amended Rule 1111 to provide a compliance extension for specific furnaces
- Adopted Rule 118.1 and amended Rule 1470 to provide optional testing and maintenance schedule for water and sewage facilities with emergency standby engines located in very high fire severity zone
- Adopted Rule 1147.1 to establish NOx BARCT emission limits for aggregate dryers
- Amended Rule 1466 to reduce dust emissions containing toxic air contaminants
- Amended Rule 1469.1 to limit hexavalent chromium emissions from chromate spray coating operations
- Amended Rule 1469 to limit toxic air contaminants from metal finishing facilities
- Amended Rules 218 and 218.1 and adopted Rules 218.2 and 218.3 to establish Continuous Emission Monitoring Systems performance requirements
- Adopted Rule 1150.3 to establish NOx and CO limits for combustion equipment at landfills
- Adopted Rule 1407.1 to limit toxic air contaminants from chromium metal melting operations
- Conducted monthly RECLAIM and New Source Review meetings and held over 50 individual facility or industry-specific meetings. Revised 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

PLANNING, RULE DEVELOPMENT AND IMPLEMENTATION (cont.)

- 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 371 projects in their communities using approximately \$24.5M of motor vehicle revenues
- Conducted 15 AB 2766 remote training sessions for 100 representatives of 73 local governments
- Developed a new web-based portal and database program for AB 2766 annual report submittals and processing
- Assisted employers with Rule 2202 plans and processed about 1,200 Rule 2202 plan submittals
- Assisted Rule 2202 regulated employers with temporary protocols put in place during the COVID-19 pandemic
- Continued to implement a new online Employee Transportation Coordinator Training/Certification class using the Zoom remote meeting software
- Conducted 11 Rule 2202 ETC Training/Certification classes in which 110 new ETCs were trained.
- Continued to develop the EMovers platform for Rule 2202 online submittals and payment processing
- Completed approximately 25 public records requests for Rule 2202 information
- Initiated compilation of data for potential Rule 2202 amendment, including evaluation of a UCLA graduate student research project regarding AVR zones and regulated employers AVR scores
- Initiated the development of a new control measure for ZE infrastructure in support of the AQMP, including formation of a working group and coordination of planning efforts with stakeholders

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

Amend AB 1318 Mitigation Fees Fund Contract with Coachella Valley Association of Governments for the Coachella Valley Link project

ANTICIPATED:

AB 617

- Continue or begin implementation of adopted CERPs for the 6 communities designated in 2018, 2019, and 2020 (Years 1-3), which includes quarterly Community Steering Committee meetings
- 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

- Begin to engage in the Department of Toxic Substances Control's (DTSC) SB 673 rulemaking which will fold existing health risks, community vulnerability, and cumulative impacts into DTSC's permitting process

PLANNING, RULE DEVELOPMENT AND IMPLEMENTATION (cont.)

- Continue to work with California Air Resources Board (CARB) and through the CAPCOA Toxics and Risk Managers Committee (TARMAC) to update CARB AB 2588 Guidelines and develop uniform reporting guidance for various industries
- Work with CARB to develop guidance and outreach material for implementation of the Emission Inventory Criteria and Guidelines for the Air Toxics “Hot Spots” Program (CARB EICG). This work will also include ensuring that reporting requirements under South Coast AQMD’s AB 2588 program and CARB’s EICG are as streamlined as possible with other reporting requirements under CARB’s CTR regulation and South Coast AQMD’s AER program
- 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

- Continue to develop tools for PM2.5 and PM10 exceptional event demonstrations to streamline future demonstrations
- Continue to evaluate air quality metrics, progress, and attainment of the standard
- Continue supporting quality forecasting, advisories, and responding to public inquiries
- Finish development and deploy a new statistical air quality forecasting model to assist in the creation of the daily forecast
- Continue enhancing tools to disseminate the air quality forecasts, including interactive maps and plots. Transition to webpages that separate the hourly forecast (public-facing) from the 24-hour forecast (regulatory impacts)
- Finish development of a new system to deploy interactive advisories in html format to the web
- Finish development of an enhanced wildland and agricultural burning outlook
- Continue developing the real-time AQI map by integrating measurements from AQ sensors

Air Quality Modeling/Emissions Inventory

- Complete emissions inventory for the base year (2018), Reasonable Further Progress milestone years, future attainment years to be included in the 2022 AQMP
- Complete attainment scenario for the 2015 70ppb ozone standard for the South Coast and Coachella Valley air basins
- Continue collaboration with EPA, CARB, other regulatory agencies, and academic institutions to improve air quality models to be the state-of-the-science
- Host Science, Technology, Model Peer-Review (STMPR) meeting to finalize the 2022 AQMP
- Develop attainment demonstration for the 2012 annual PM2.5 NAAQS for the South Coast Air Basin, which will be submitted to U.S. EPA
- 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 submittals of emissions inventories and annual emissions fees
- Continue to improve and add additional functionality to the AER on-line reporting system to facilitate data entry for users and incorporate changes to facilitate emission reporting required under CARB’s CTR regulation

PLANNING, RULE DEVELOPMENT AND IMPLEMENTATION (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 stationary sources such as residential and commercial buildings
- Present 2022 AQMP in regional hearings and Board hearing, and submit the Plan into the SIP
- 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 and 1997 8-hour ozone standard
- Continue attracting external funding to implement incentive control measures included 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)
- Begin developing a policy document on analyzing cumulative impacts
- Continue support on upgrades to California Emission Estimator Model (CalEEMod)
- Continue commenting on CEQA Lead Agency and Responsible Agency projects and other agencies' CEQA documents

Facility-Based Mobile Source Measures

- Continue evaluating annual progress of airports' implementing MOU measures and work with U.S. EPA to acquire SIP credits for the emission reductions generated by the MOU measures
- Proposed rule for new intermodal railyards and proposed MOU(s)/rule for marine ports for Governing Board consideration in 2022
- Continue implementing compliance program for warehousing facilities and initiate compliance program(s) for facilities covered by any newly adopted indirect source rules and MOUs
- Track implementation of MOUs with the commercial airports to ensure progress
- 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 U.S. EPA, CARB, and other coastal air districts in coordinating OGV emissions reduction strategy/programs; and work with domestic and international partners in further understanding OGV in-use emissions profile
- Continue to collaborate with TAO regarding marine technology manufacturers and shipping lines to identify and demonstrate promising retrofit technologies and conduct OGV emissions testing

PLANNING, RULE DEVELOPMENT AND IMPLEMENTATION (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
- Quantify and 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 criteria pollutants, , commitments from Community Emission Reduction Plans, and air toxics
- A number of rule development projects expected to be adopted or amended within this fiscal year such as NOx landing rules with BARCT limits for miscellaneous combustion equipment, food ovens, and nitric acid processing, requirements for power plants and turbines, rules to reduce toxic air contaminants, and indirect source rules for ports and railroads

Socioeconomic Analysis

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

Transportation Programs

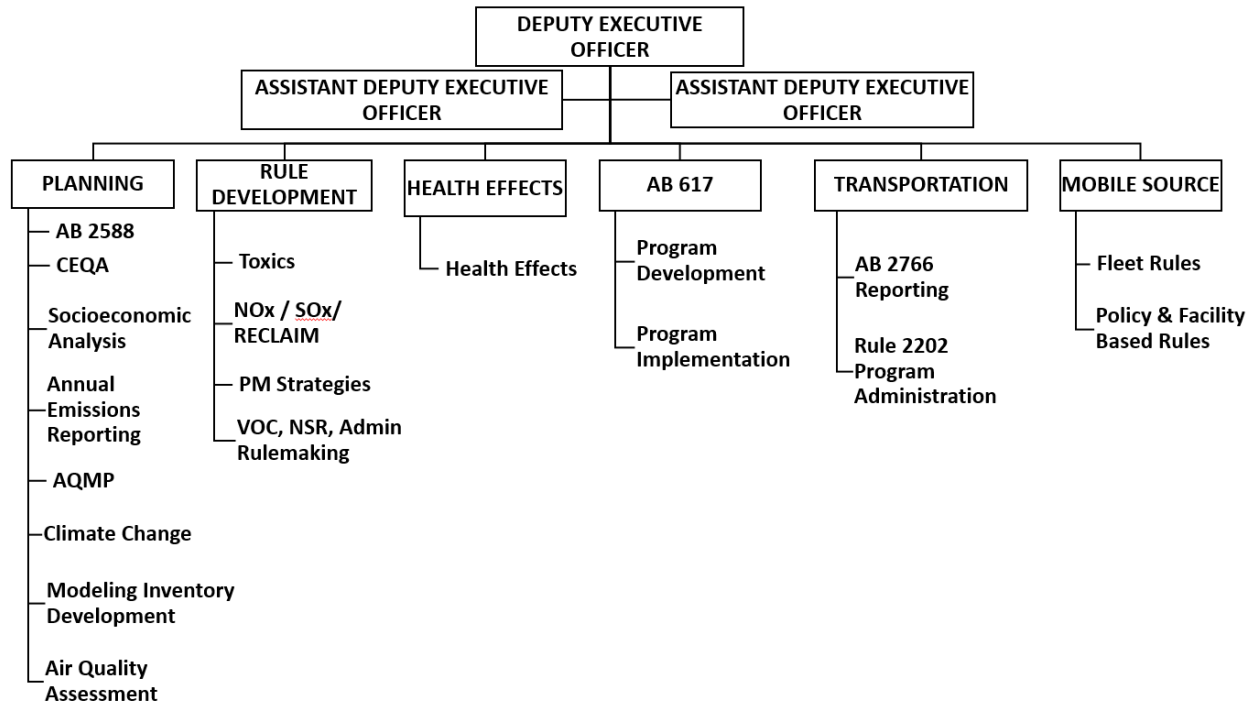
- Continue conducting Employee Transportation Coordinator certification sessions, and review and analyze Rule 2202 annual program submittals
- Complete the development and testing of EMovers, an on-line Rule 2202 plan submittal process.
- Amend Rule 2202
- Implement transition of AB 2766 Annual Reporting to the new web-based portal and database system
- Update AB 2766 Resource Guide to more closely align with statewide and regional mobile source emissions reduction direction
- Continue supporting the ZE infrastructure control measure, including working group meetings and coordination of planning efforts with stakeholders

Other

- Continue implementation of rules and compliance verification activities for area sources
- 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 AND IMPLEMENTATION (cont.)

ORGANIZATIONAL CHART:



POSITION SUMMARY: 141 FTEs

Planning, Rule Development & Implementation Units	Amended FY 2021-22	Change	Budget FY 2022-23
Office Administration	9	-	9
Planning	60	2	62
Rule Development	21	-	21
Transportation Programs	11	-	11
Health Effects	3	-	3
Mobile Source	9	-	9
AB 617	26	-	26
Total	139	-	141

PLANNING, RULE DEVELOPMENT AND IMPLEMENTATION (cont.)

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
2	Administrative Assistant II
10	Air Quality Engineer II
65	Air Quality Specialist
2	Assistant Deputy Executive Officer
1	Contracts Assistant
1	Deputy Executive Officer - Planning, Rule Development & Implementation
1	Health Effects Officer
3	Office Assistant
8	Planning and Rules Manager
25	Program Supervisor
8	Administrative Assistant I
3	Senior Administrative Assistant
4	Senior Air Quality Engineer
1	Senior Meteorologist
4	Senior Office Assistant
<u>3</u>	Senior Staff Specialist
141	Total FTEs

**Planning, Rule Development & Implementation
Work Program by Office**

#	Program Code	Program Category	Program	Activities	FTEs FY 2021-22	+/-	FTEs FY 2022-23	Revenue Categories
1	26 002	Develop Programs	AB2766/Mobile Source	AB2766 Mobile Source Outreach	3.25	0.00	3.25	IX
2	26 010	Develop Programs	AQMP	AQMP Special Studies	2.80	0.00	2.80	IV,V,IX,XV
3	26 013	Develop Programs	AAA-Irvine Activities	All American Asphalt Activities	0.00	0.20	0.20	XVII
4	26 019	Develop Programs	AB617-Prog Develop	AB617-Program Development	29.20	-2.35	26.85	IX
5	26 038	Develop Programs	Admin/Office Management	Coordinate Off/Admin Activities	5.30	0.90	6.20	Ib
6	26 050	Develop Rules	Admin/Rule Dev/PRA	Admin: Rule Development	1.10	-1.00	0.10	Ib
7	26 061	Monitoring Air Quality	Air Quality Evaluation	Air Quality Evaluation	2.75	-0.05	2.70	IX
8	26 068	Develop Programs	SCAQMD Projects	Prepare Environmental Assessments	4.35	0.00	4.35	II,IV,IX
9	26 071	Develop Rules	Arch Ctgs - Admin	Rdev/Aud/DB/TA/SCAQMD/Rpts/AER	0.50	-0.40	0.10	XVIII
10	26 072	Ensure Compliance	Arch Ctgs - End User	Compliance/Rpts/Rule Implementation	0.75	-0.75	0.00	XVIII
11	26 073	Ensure Compliance	Arch Ctgs - Other	Compliance/Rpts/Rule Implementation	1.00	-1.00	0.00	XVIII
12	26 074	Develop Rules	AB 197	AB 197	0.10	0.00	0.10	XVIII
13	26 076	Ensure Compliance	Area Sources/Compliance	Area Source Compliance	4.50	-4.50	0.00	III,IV,V,IX,XV
14	26 077	Develop Rules	Area Sources/Rulemaking	Dev/Eval/Impl Area Source Prog	0.25	-0.15	0.10	II,IX
15	26 083	Policy Support	Hlth Effects Air Pollution Fou	Health Effects Air Poll Foundation Support	0.10	0.00	0.10	Ia,II,IV
16	26 102	Develop Programs	CEQA Document Projects	Review/Prepare CEQA Comments	3.75	-0.50	3.25	II,IX
17	26 104	Develop Programs	CEQA Policy Development	ID/Develop/Impl CEQA Policy	0.50	0.00	0.50	IV,IX
18	26 106	Develop Programs	CEQA Resp Agy Proj	Review CEQA Docs/Perm Proj	0.50	0.00	0.50	II
19	26 121	Develop Programs	China Cln Shipping	China Partnership Cleaner Shpng	1.00	0.00	1.00	IX
20	26 148	Policy Support	Climate/Energy/Incentives	GHG/Climate Change Policy Development	0.50	0.00	0.50	IV,XVII
21	26 165	Develop Rules	Conformity	Monitor Transp. Conformity	0.25	0.00	0.25	V,IX
22	26 215	Ensure Compliance	AER Gen/Rev/Am/Aud	AER General/Review/Amend/Audit	8.70	-1.50	7.20	II,V
23	26 216	Ensure Compliance	AER Admin/Maint	AER Administration/Maintenance	1.00	1.50	2.50	II
24	26 217	Develop Programs	Emissions Inventory Studies	AER Hotline/Support	0.75	0.00	0.75	II,V,IX,XV
25	26 218	Develop Programs	AQMP/Emissions Inventory	Dev Emiss Inv: Forecasts/RFPs	1.25	0.00	1.25	II,IX
26	26 257	Develop Rules	Fac Based Mob Src	Facility Based Mobile Src Meas	7.25	0.00	7.25	IX
27	26 276	Policy Support	Advisory Group/Home Rule	Governing Board Advisory Group	0.50	-0.40	0.10	Ia
28	26 277	Policy Support	Advisory Group/AQMP	Governing Board AQMP Advisory Group	0.50	0.00	0.50	II,IX
29	26 278	Policy Support	Advisory Group/Sci,Tech,Model	Scientific/Tech/Model Peer Rev	0.40	0.00	0.40	II,IX
30	26 358	Ensure Compliance	GHG Rules-Compl	Green House Gas Rules-Compliance	1.00	-1.00	0.00	IV
31	26 362	Develop Rules	Health Effects	Study Health Effect/Toxicology	0.50	1.00	1.50	II,III,IX
32	26 368	Develop Programs	Incentive RFP Emis Red Projs	Incentive Projects Admin	1.00	0.00	1.00	XVII
33	26 371	Ensure Compliance	Indir Src Rule Cmpl	Indir Source Rule Compliance	0.00	2.50	2.50	XVII
34	26 385	Develop Rules	Criteria Pollutants/Mob Srcs	Dev/Impl Intercredit Trading	0.20	0.00	0.20	IV,IX
35	26 397	Develop Programs	Lead Agency Projects	Prep Envrmt Assmts/Perm Proj	2.00	-0.85	1.15	III
36	26 416	Policy Support	Legislative Activities	Supp/Promote/Influence Legis/Adm	0.50	0.00	0.50	Ia
37	26 443	Monitoring Air Quality	MATES V	MATES V	0.15	-0.05	0.10	XVII
38	26 444	Monitoring Air Quality	MATES V Refinery	MATES V Refinery	0.10	0.00	0.10	XVII
39	26 445	Monitoring Air Quality	Meteorology	ModelDev/Data Analysis/Forecast	2.00	0.70	2.70	II,V,IX

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

Program Code	Program Category	Program	Activities	FTEs FY 2021-22	+/-	FTEs FY 2022-23	Revenue Categories		
40	26	446	Operational Support	Mentorship Program	Mentor/Mentee Activities	0.00	0.10	IX	
41	26	449	Develop Rules	Mob Src/SCAQMD Rulemaking	Prepare SCAQMD Mob Src rulemaking proposals	1.00	1.10	IX	
42	26	451	Develop Programs	Mob Src/CARB/EPA Monitoring	CARB/US EPA Mob Src Fuel Policies	0.40	-0.30	IX	
43	26	452	Develop Programs	Mob Src/CEC/US DOE Monitoring	CEC/US DOE Mob Src rulemaking proposals	0.20	-0.10	IX,XVII	
44	26	460	Develop Rules	Regional Modeling	Rule Impact/Analyses/Model Dev	5.00	1.00	II,V,IX	
45	26	461	Timely Review of Permits	Permit & CEQA Modeling Review	Review Model Permit/Risk Assmt	1.00	-0.35	0.65	
46	26	503	Develop Programs	PM Strategies	PM10 Plan/Analyze/Strategy Dev	1.20	-1.10	II,V,XV	
47	26	565	Customer Service and Business Assistance	Public Records Act	Comply w/ Public Rec Requests	0.79	0.06	0.85	
48	26	620	Ensure Compliance	Refinery Pilot Project	Refinery Pilot Project	1.10	-1.00	0.10	
49	26	645	Ensure Compliance	Rule 1610 Plan Verification	Rule 1610 Plan Verification	0.50	-0.50	0.00	
50	26	646	Develop Rules	R1180 Community Mon	R1180 Comm Monitoring Refinery	0.20	0.00	0.20	
51	26	654	Develop Rules	Rulemaking/NOX	Rulemaking/NOx	3.35	-0.60	2.75	
52	26	655	Develop Rules	NSR/Adm Rulemaking	Amend/Develop NSR & Admin Rules	1.20	-1.10	1.80	
53	26	656	Develop Rules	Rulemaking/VOC	Dev/Amend VOC Rules	1.20	2.90	4.10	
54	26	659	Develop Rules	Rulemaking/Toxics	Develop/Amend Air Toxic Rules	10.15	-0.25	9.90	
55	26	661	Develop Rules	Rulemaking/RECLAIM	RECLAIM Amend Rules/Related Is	0.70	0.30	1.00	
56	26	685	Develop Programs	Socio-Economic	Apply econ models/Socio-econ	4.50	0.00	4.50	
57	26	717	Policy Support	Student Interns	Gov Bd/Student Intern Program	0.50	-0.40	0.10	
58	26	745	Develop Programs	Rideshare	Dist Rideshare/Telecommute Prog	0.55	0.00	0.55	
59	26	788	Customer Service and Business Assistance	AB2588 Mailing/Venue	AB2588 Mailing/Venue	0.50	0.00	0.50	
60	26	794	Ensure Compliance	Toxics/AB2588	AB2588/Toxics	11.80	0.00	11.80	
61	26	796	Ensure Compliance	AB2588/Support	AB2588/Support	0.50	0.00	0.50	
62	26	805	Operational Support	Training	Training	1.00	0.00	1.00	
63	26	816	Develop Programs	Transportation Regional Progs	Dev AQMP Meas/Coord w/Reg Agn	0.75	0.00	0.75	
64	26	825	Operational Support	Union Negotiations	Official Labor/Mgmt Negotiate	0.05	0.05	0.10	
65	26	826	Operational Support	Union Steward Activities	Rep Employees in Grievance Act	0.30	0.00	0.30	
66	26	833	Customer Service and Business Assistance	Rule 2202 ETC Training	Rule 2202 ETC Training	2.15	0.00	2.15	
67	26	834	Develop Programs	Rule 2202 Implement	Rule 2202 Proc/Sub Plans/Tech Eval	2.26	-0.01	2.25	
68	26	836	Develop Programs	Rule 2202 Support	R2202 Supt/Cmpt/Maint/WebSubmt	1.99	0.01	2.00	
69	26	855	Operational Support	Web Tasks	Create/edit/review web content	1.21	0.19	1.40	
70	26	880	Operational Support	Inclusion/Equity	Inclusion/Diversity/Equity	0.00	0.70	0.70	
Total Planning, Rule Development, and Implementation							148.00	(7.00)	141.00

Planning, Rule Development & Implementation						
Line Item Expenditure						
Major Object / Account # / Account Description		FY 2020-21 Actuals	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate *	FY 2022-23 Adopted Budget
Salary & Employee Benefits						
51000-52000	Salaries	\$ 14,519,503	\$ 14,402,446	\$ 13,462,442	\$ 13,295,044	\$ 14,893,366
53000-55000	Employee Benefits	8,139,686	8,971,998	8,971,998	8,860,436	8,295,536
Sub-total Salary & Employee Benefits		\$ 22,659,189	\$ 23,374,444	\$ 22,434,440	\$ 22,155,480	\$ 23,188,902
Services & Supplies						
67250	Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300	Rents & Leases Equipment	-	-	-	-	\$ -
67350	Rents & Leases Structure	-	1,000	1,000	1,000	\$ 1,000
67400	Household	-	-	-	-	\$ -
67450	Professional & Special Services	488,929	1,020,700	1,035,300	850,000	\$ 1,020,700
67460	Temporary Agency Services	29,797	20,000	20,000	20,000	\$ 20,000
67500	Public Notice & Advertising	122,760	205,000	205,000	150,000	\$ 205,000
67550	Demurrage	-	1,000	1,000	1,000	\$ 1,000
67600	Maintenance of Equipment	-	2,500	2,500	2,500	\$ 2,500
67650	Building Maintenance	-	1,000	1,000	1,000	\$ 1,000
67700	Auto Mileage	167	4,000	4,000	4,000	\$ 4,000
67750	Auto Service	-	-	-	-	\$ -
67800	Travel	681	50,000	35,000	20,000	\$ 50,000
67850	Utilities	-	-	-	-	\$ -
67900	Communications	10,828	40,584	10,584	10,584	\$ 40,584
67950	Interest Expense	-	-	-	-	\$ -
68000	Clothing	155	1,500	1,500	1,500	\$ 1,500
68050	Laboratory Supplies	-	-	-	-	\$ -
68060	Postage	53,781	60,000	60,000	60,000	\$ 60,000
68100	Office Expense	119,275	160,000	160,000	160,000	\$ 160,000
68200	Office Furniture	856	-	-	-	\$ -
68250	Subscriptions & Books	756	2,500	4,500	4,500	\$ 2,500
68300	Small Tools, Instruments, Equipment	-	-	-	-	\$ -
68400	Gas and Oil	-	-	-	-	\$ -
69500	Training/Conference/Tuition/ Board Exp.	7,352	25,000	25,000	25,000	\$ 25,000
69550	Memberships	6,273	4,000	4,000	4,000	\$ 4,000
69600	Taxes	-	-	-	-	\$ -
69650	Awards	-	-	-	-	\$ -
69700	Miscellaneous Expenses	16,871	125,000	57,000	50,000	\$ 125,000
69750	Prior Year Expense	-	-	-	-	\$ -
69800	Uncollectable Accounts Receivable	-	-	-	-	\$ -
89100	Principal Repayment	-	-	-	-	\$ -
Total Services & Supplies		\$ 858,482	\$ 1,723,784	\$ 1,627,384	\$ 1,365,084	\$ 1,723,784
77000	Capital Outlays	\$ -	\$ 70,000	\$ 100,000	\$ 100,000	\$ -
79050	Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures		\$ 23,517,671	\$ 25,168,228	\$ 24,161,824	\$ 23,620,564	\$ 24,912,686

* Estimates based on July 2021 through February 2022 actual expenditures and February 2022 budget amendments.

SCIENCE & TECHNOLOGY ADVANCEMENT

**MATT MIYASATO
CHIEF TECHNOLOGIST/DEPUTY EXECUTIVE OFFICER**

At a Glance:	
FY 2021-22 Adopted Budget	\$39.8M
FY 2022-23 Adopted Budget	\$40.8M
% of FY 2022-23 Adopted Budget	21.5%
Total FTEs FY 2022-23 Adopted Budget	238

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 EV Charging Incentive Program, 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 (AB 617), 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 close to \$200 million. In 2021, over 880 vouchers were issued under EFMP, totaling \$7.2 million in expenditures. For the VMP, staff worked with CARB and other administering air districts to continue program development and implementation. The first competitive solicitation of projects for the Combustion Freight and Marine (CFM) category was released in December 2019. \$3.98 million was awarded

SCIENCE & TECHNOLOGY ADVANCEMENT (cont.)

to 16 entities statewide. Additionally, staff released a second solicitation for the CFM category in June of 2021 that remains open. Also, staff released the first solicitation for the Zero-Emission Class 8 Trucks category and received more than \$45 million in project requests. Further, staff released the second solicitation for the Voucher Incentive Program (VIP) that replaces on-road trucks. A total of 30 vouchers were issued, totaling \$1.3M. Staff also supported AB 617 Community Steering Committee meetings with information on 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 \$85 million in projects in 2021, comprising of \$7.9 million in CF funds and \$48.6 million in awards from federal and state solicitations, and \$28.9 million in partners cost share; CF funds were leveraged with a ratio of 1:11. Projects in key technical areas that were initiated in 2021 and will continue through 2023 include heavy-duty electric drive technologies, near-zero emission medium and heavy-duty engines, local renewable natural gas production, and refueling infrastructure for alternative fuels (natural gas, electricity and hydrogen). Applied for and received \$53.3 million in CARB, CEC, U.S. EPA, and San Pedro Bay Port grants for developing and demonstrating heavy duty electric and fuel cell trucks and locomotives, as well as emission control systems for tanker vessels.
- Supported the development and demonstration of emission control technologies for locomotives, marine and ocean-going vessels (OGV). Engaged the technology developers, locomotive and vessel operators who have the expertise in engine and emission control technologies to develop innovative technologies that will result in reducing emissions.
- Applied and awarded \$14,339,390 U.S. EPA Targeted Airshed grant (TAG) for a zero-emission line-haul locomotive repower project, ZE school buses, long range hydrogen class 8 truck project, and commercial lawn & garden incentive program.
- 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 39 air monitoring sites resulting in 244,000 valid pollutant data points per month, collected and analyzed over 304 canisters and collected 7200 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, including "in-house" audits for air toxics; performed 2020 data certification and review.

SCIENCE & TECHNOLOGY ADVANCEMENT (cont.)

- Continued the District's semiannual audit program to improve quality assurance of lead (Pb), PM10 and PM2.5 measurements performed by District staff. Prepared corrective action plans in response to the 2020 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 recycling, battery recycling facilities, and oil and gas operations. 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.
- Provided incident response monitoring efforts to address air quality concerns during sewage spill in El Segundo, oil spill in Orange County, and odor event in Carson. Provided air monitoring data online and worked with stakeholder agencies and local governance collaboratively to address the situations and public concerns.
- Supported and verified compliance with current rules and regulations, analyzed over 240 samples for asbestos from demolition sites based on complaints and concerns about fallout (deposition), performed over 100 analyses on architectural and industrial maintenance coating products for VOC and Hazardous Air Pollutants (HAP) content; and conducted over 1,500 Source Test (ST) protocol and report evaluations, Continuous Emissions Monitoring System (CEMS) certifications, Laboratory Approval Program (LAP) application reviews and ST observations.
- Completed the final report for air toxic measurements 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. Continued conducting air monitoring in and around communities neighboring refineries using a combination of standardized and advanced 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.
- Deployed different particle and gas sensors in small networks for specific applications. A network of 90 sensors has been developed 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, published sensor evaluation toolkit on air quality project planning, operating air quality sensors and understanding the data. Sensor installation guides, data analysis and visualization tools, infographics, and examples of reports and analysis produced by partner communities provide a complete package of educational material. Also, approximately 350 sensors continue to measure particulate matter at the community level in 14 communities in the State of California that were installed as part of this project.
- Supported AB 617 community outreach efforts and community steering committees by participating in multiple community meetings for each AB 617 community. Also, staff continued developing and implementing community Emissions Reduction Plans (CERPs) and Community Air Monitoring Plans (CAMP). The CERPs and CAMPs are tailored to the air quality needs of each AB 617 community and developed with input from Community Steering Committees (CSCs). As part of CERP implementation, staff lead efforts on

SCIENCE & TECHNOLOGY ADVANCEMENT (cont.)

participatory budgeting for AB 617 funds and developing incentive project plans for air filtration and trucks. Additionally, as part of the CAMP implementation, staff continued 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. Staff also worked with the CSC and other stakeholders to develop a CAMP for the “Year Three” community.

- Continued the development and deployment 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. The South Coast AQMD has a fleet of five mobile platforms, most of which have already been deployed in AB 617 and other communities.
- 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 fenceline air monitoring plans and develop quality assurance project plans, with an emphasis on fenceline 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 Fenceline monitoring plans.
- 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.

SCIENCE & TECHNOLOGY ADVANCEMENT (cont.)

- 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 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. Our focus going forward will be demonstrations of large fleets of zero-emission trucks to determine the challenges of widespread adoption. 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. With the expected commercialization of battery electric HD trucks our technology focus will shift to fuel cell electric HD trucks and hydrogen infrastructure.
- Continue to seek funding opportunities for the design, development and demonstration of emissions reduction technologies for OGVs and zero-emission technologies for locomotives.
- 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 next installment of the Zero-Emission Class 8 Trucks category and continue processing applications for the second solicitation of the Combustion category under CARB's VMP.
- Conduct targeted outreach for incentive programs such as Commercial Lawn & Garden and Moyer, 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.
- 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.

SCIENCE & TECHNOLOGY ADVANCEMENT (cont.)

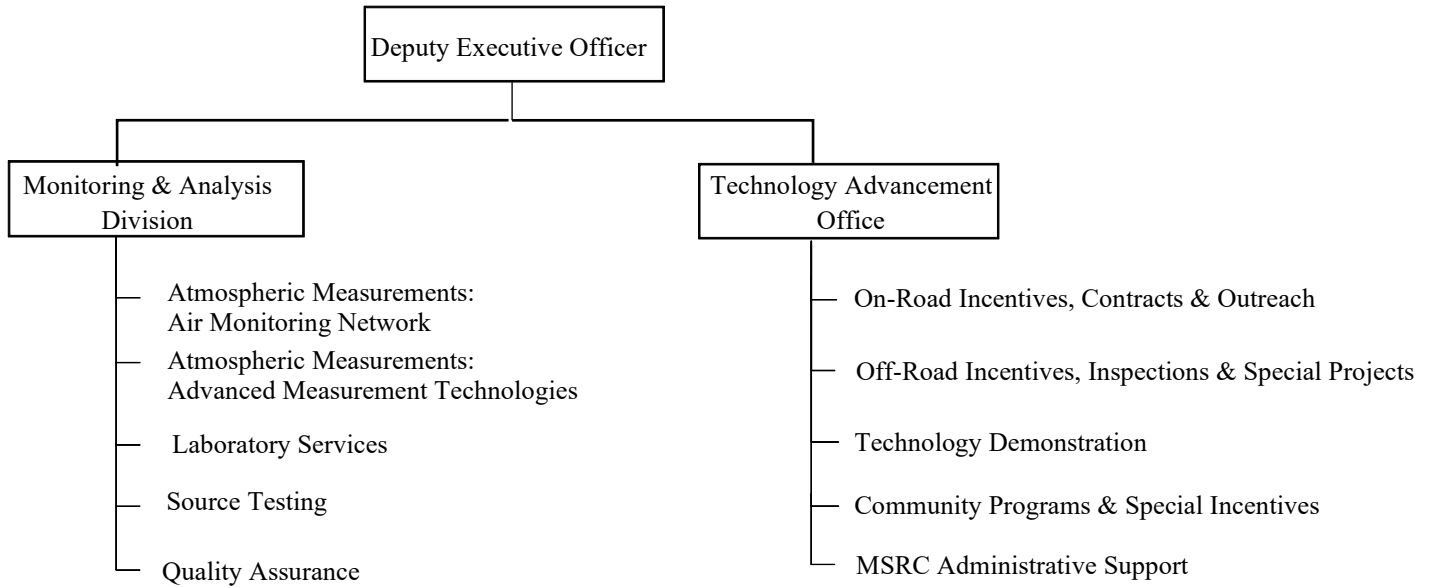
- Continue to work with EPA Region IX to receive funding opportunities as part of the American Rescue Plan to support the criteria pollutant network and environmental justice monitoring.
- Provide monitoring, source testing, and analysis for rule development related to upcoming amendments for Rules 1407.1 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.
- Provide support for the completion and implementation of the source test submittal 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.
- Start conducting mobile and fixed monitoring, as appropriate, in the Year Three community (South Los Angeles), and continue measurements in three Year One communities (Wilmington, Carson, West Long Beach; San Bernardino Muscoy; and East Los Angeles) and also both Year Two AB 617 communities (South East Los Angeles and East Coachella Valley) 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 West Rancho Dominguez and Carson.
- 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.

SCIENCE & TECHNOLOGY ADVANCEMENT (cont.)

- 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.
- 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 and PAMS Technical System Audit.
- Continue with full-scale testing of air quality sensors in AQ-SPEC and share testing results with the public. Continue AQ-SPEC program to evaluate sensor performance testing on a mobile platform.
- Implement pilot sensor library program focusing on AB 617 communities. 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 evaluate 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: 238 FTEs

Science & Technology Advancement Units	Amended FY 2021-22	Change	Budget FY 2022-23
Office Administration	14	-	14
Monitoring & Analysis	158	-	158
Technology Advancement	61	5	66
Total	233	5	238

SCIENCE & TECHNOLOGY ADVANCEMENT (cont.)

POSITION DETAIL:

<u>FTEs</u>	<u>Title</u>
7	Administrative Assistant I
1	Administrative Assistant II
26	Air Quality Chemist
9	Air Quality Engineer II
5	Air Quality Inspector II
22	Air Quality Instrument Specialist I
25	Air Quality Instrument Specialist II
38	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
3	Planning and Rules Manager
4	Principal Air Quality Chemist
2	Principal Air Quality Instrument Specialist
19	Program Supervisor
3	Senior Administrative Assistant
11	Senior Air Quality Chemist
3	Senior Air Quality Engineer
11	Senior Air Quality Instrument Specialist
1	Senior Enforcement Manager
4	Senior Office Assistant
1	Senior Public Affairs Specialist
2	Senior Staff Specialist
1	Source Testing Manager
2	Staff Assistant
3	Staff Specialist
1	Supervising Air Quality Engineer
1	Technology Implementation Manager
238	Total FTEs

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

#	Program Code	Program Category	Program	Activities	FTEs FY 2021-22	+/-	FTEs FY 2022-23	Revenue Categories
1	44 003	Advance Clean Air Technology	AB2766/MISRC	Mob Src Review Comm Prog Admin	0.50	0.00	0.50	IX
2	44 004	Advance Clean Air Technology	Advisory Group/Small Business	AB2766 Admin Discretionary Prog	3.00	0.00	3.00	IX
3	44 009	Develop Programs	AB 1318 Mitigation	AB 1318 Projects Admn/Impl	0.05	0.00	0.05	XVII
4	44 012	Advance Clean Air Technology	AQMP/Control Tech Assessment	Tech Supp: Quantify Cost Effec	0.85	-0.20	0.65	VIII
5	44 013	Monitoring Air Quality	AAA-Invine Activities	All American Asphalt Activities	0.00	0.40	0.40	XVII
6	44 015	Ensure Compliance	Acid Rain Program	Acid Rain CEMS Eval/Cert	0.20	0.00	0.20	II,IV
7	44 019	Monitoring Air Quality	AB617-Prog Develop	AB617-Program Development	39.60	-2.20	37.40	IX
8	44 030	Advance Clean Air Technology	AB134	AB134	4.00	-4.00	0.00	IX
9	44 038	Monitoring Air Quality	Admin/Office Mgmt/Monitoring	Overall Program Mgmt/Coord	0.90	0.00	0.90	Ib
10	44 039	Advance Clean Air Technology	Admin/Office Mgt/Tech Adv	Admin Support/Coordination	0.77	0.00	0.77	VIII
11	44 041	Policy Support	Admin/Office Mgmt/Policy Supp	Overall Policy Supp/Mgmt/Coord	0.49	-0.05	0.44	Ib
12	44 042	Ensure Compliance	Admin/Office Mgmt/Compliance	Compliance: Assign/Manage/Supp	0.37	0.00	0.37	Ib
13	44 043	Develop Rules	Admin/Office Mgmt/Rules	Rules: Assign/Manage/Supp	0.15	0.00	0.15	Ib
14	44 046	Monitoring Air Quality	Admin/Program Management	STA Program Administration	2.00	0.00	2.00	Ib
15	44 048	Advance Clean Air Technology	Admin/Prog Mgmt/Tech Advance	Overall TA Program Mgmt/Coord	1.55	0.00	1.55	VIII
16	44 063	Monitoring Air Quality	Ambient Air Analysis	Analyze Criteria/Tox/Pollutants	6.91	0.00	6.91	II,V,IX
17	44 064	Monitoring Air Quality	Ambient Network	Air Monitoring/Toxics Network	21.55	0.00	21.55	II,IV,V,IX
18	44 065	Monitoring Air Quality	Air Quality Data Management	AM Audit/Validation/Reporting	1.00	0.00	1.00	II,V,IX
19	44 067	Monitoring Air Quality	Ambient Lead Monitoring	Lead Monitoring/Analysis/Reporting	0.50	0.00	0.50	IV
20	44 069	Develop Programs	AQIP Evaluation	AQIP Contract Admn/Evaluation	0.10	0.00	0.10	IX
21	44 072	Ensure Compliance	Arch Ctgs - End User	Sample Analysis/Rpts	2.00	0.00	2.00	XVIII
22	44 073	Monitoring Air Quality	Arch Ctgs - Other	Sample Analysis/Rpts	2.00	0.00	2.00	XVIII
23	44 079	Monitoring Air Quality	AQ SPEC	AQ SPEC	6.19	1.00	7.19	XVII
24	44 081	Monitoring Air Quality	Air Filtration EPA	Air Filtration EPA/Admn/Impl	0.10	0.00	0.10	V
25	44 082	Monitoring Air Quality	Air Filtration Other	Air Filtration Other/Admn/Impl	0.20	0.00	0.20	XVII
26	44 086	Advance Clean Air Technology	Airshed FC Bus	Airshed FC Bus	0.25	0.00	0.25	V
27	44 087	Advance Clean Air Technology	Airshed OGV	Airshed OGV	0.25	0.00	0.25	V
28	44 088	Advance Clean Air Technology	ALISO CANYON SEP	ALISO CYN AIR FILTRATION SEP	0.25	0.00	0.25	XVII
29	44 091	Monitoring Air Quality	Aliso Cyn SEP MAD	Aliso Cyn SEP MAD	0.00	0.20	0.20	XVII
30	44 094	Advance Clean Air Technology	Capture and Control	Capture and Control Program	0.00	0.20	0.20	XV,XVII
31	44 095	Advance Clean Air Technology	CA Natural Gas Veh Partnership	CA Natural Gas Veh Partnership	0.05	0.00	0.05	VIII
32	44 096	Advance Clean Air Technology	CAPP Year 2-SB 856	CAPP Year 2-SB 856	7.75	1.00	8.75	IX
33	44 097	Advance Clean Air Technology	CAPP Year 3-AB 74	CAPP Year 3-AB 74	3.00	3.00	6.00	IX
34	44 105	Ensure Compliance	CEMS Certification	CEMS Review/Approval	5.00	0.00	5.00	II,III,VI
35	44 107	Develop Programs	CARB PilotPrj JETSI	CARB Pilot Project (JETSI)	0.00	1.05	1.05	XVII
36	44 108	Develop Programs	CEC PilotPrj JETSI	CEC Pilot Project (JETSI)	0.00	0.55	0.55	XVII
37	44 113	Monitoring Air Quality	Carson H2S Event 21	Carson-Dominguez Chnml H2S 21	0.00	1.50	1.50	XVII
38	44 121	Advance Clean Air Technology	China Cln Shipping	China Partnership Cleaner Shpng	0.40	0.00	0.40	IX
39	44 130	Advance Clean Air Technology	Clean Fuels/Contract Admn	Admin/Project Supp for TA Cont	3.00	0.00	3.00	VIII
40	44 132	Advance Clean Air Technology	Clean Fuels/Mobile Sources	Dev/Impl Mobile Src Proj/Demo	6.00	0.00	6.00	VIII
41	44 134	Advance Clean Air Technology	Clean Fuels/Stationary Combust	Dev/Demo Clean Combustion Tech	0.20	-0.10	0.10	VIII
42	44 135	Advance Clean Air Technology	Clean Fuels/Stationary Energy	Dev/Demo Alt Clean Energy	0.55	-0.54	0.01	VIII
43	44 136	Advance Clean Air Technology	Clean Fuels/Tech Transfer	Disseminate Low Emiss CF Tech	1.00	-0.31	0.69	VIII
44	44 151	Monitoring Air Quality	EPA-Com-Mobile Monitoring	EPA Com Scale Mobile Monitng	0.00	1.00	1.00	XVII
45	44 175	Ensure Compliance	DB/Computerization	Develop Systems/Database	0.44	0.00	0.44	II,IV,VI
46	44 187	Advance Clean Air Technology	DERA Sch Bus Repl	DERA Sch Bus Repl Admn/Impl	0.00	0.00	0.00	V

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

Program Code	Program Category	Program	Activities	FTEs FY 2021-22	+/-	FTEs FY 2022-23	Revenue Categories
47	44	188 Advance Clean Air Technology	DERA FY 13 Veh Repl	0.00	0.00	0.00	XVII
48	44	191 Advance Clean Air Technology	DERA FY16 Locomotive	0.05	0.00	0.05	V
49	44	194 Advance Clean Air Technology	DERA FY18 Dray Trck	0.10	0.00	0.10	XVII
50	44	196 Advance Clean Air Technology	DERA FY20 TRU	0.45	0.00	0.45	V
51	44	203 Advance Clean Air Technology	EFMP Program Support	5.00	0.00	5.00	XVII
52	44	248 Monitoring Air Quality	EPA Community Scale AQ-SPEC	1.00	0.00	1.00	V,XVII
53	44	258 Advance Clean Air Technology	FARMER Grant	1.50	-1.50	0.00	XVII
54	44	259 Advance Clean Air Technology	FARMER YEAR 2	0.00	0.50	0.50	XVII
55	44	261 Advance Clean Air Technology	FARMER YEAR 3	0.00	1.00	1.00	XVII
56	44	272 Advance Clean Air Technology	FY19 TAG Volvo	0.25	0.00	0.25	XVII
57	44	276 Policy Support	Advisory Group/Technology Adva	0.40	0.00	0.05	XVII
58	44	356 Advance Clean Air Technology	GGRF ZEDT Demo	0.05	-0.40	0.00	XVII
59	44	368 Develop Programs	Incentive RFP Emis Red Projs	0.25	-0.10	0.15	XVII
60	44	369 Advance Clean Air Technology	In Use Em Testing	0.30	-0.30	0.00	XVII
61	44	396 Develop Programs	Lawnmower Exchange	0.30	0.00	0.30	XVII
62	44	410 Policy Support	Legislation	0.50	0.00	0.50	XVII
63	44	450 Ensure Compliance	Microscopic Analysis	3.00	0.00	3.00	XVII
64	44	453 Advance Clean Air Technology	Mob Src: Emis Inven Method	0.00	0.00	0.00	XVII
65	44	456 Develop Rules	MS & AQMP Control Strategies	0.30	0.00	0.30	XVII
66	44	457 Advance Clean Air Technology	Mob Src/C Moyer Adm/Outreach	7.90	5.00	12.90	XVII
67	44	458 Develop Programs	Mobile Source Strategies	1.00	0.00	1.00	XVII
68	44	459 Advance Clean Air Technology	Mob Src/C Moyer/Impl/Prig Dev	4.25	0.00	4.25	XVII
69	44	460 Advance Clean Air Technology	VIP Admin	0.50	0.00	0.50	XVII
70	44	468 Monitoring Air Quality	NATTS(Nat'l Air Tox Trends Sta)	1.00	0.00	1.00	XVII
71	44	485 Monitoring Air Quality	OC Oil Spill 2021	0.00	0.10	0.10	XVII
72	44	489 Advance Clean Air Technology	One Stop Shop Proj	0.10	0.00	0.10	XV
73	44	500 Ensure Compliance	PM2.5 Program	10.30	0.00	10.30	II,V,IX
74	44	505 Monitoring Air Quality	PM Sampling Program (DHS)	8.41	0.00	8.41	V
75	44	507 Monitoring Air Quality	PM Sampling Spec	0.10	0.00	0.10	V
76	44	530 Monitoring Air Quality	Photochemical Assessment	3.00	0.00	3.00	V,IX
77	44	533 Advance Clean Air Technology	POLB AMECS Demo	0.10	0.00	0.10	XVII
78	44	542 Develop Programs	Prop 1B:Goods Movement	2.95	0.00	2.95	IX
79	44	545 Timely Review of Permits	Protocols/Reports/Plans	0.10	0.00	0.10	III,IV
80	44	546 Timely Review of Permits	Protocols/Reports/Plans	6.15	0.00	6.15	IV,VI
81	44	565 Customer Service and Business Assistance	Public Records Act	0.62	0.00	0.62	la
82	44	585 Monitoring Air Quality	Quality Assurance	6.00	0.00	6.00	II,V,IX
83	44	646 Monitoring Air Quality	R1180 Community Mon	13.00	-1.10	11.90	XVII
84	44	653 Develop Rules	Rulemaking/BACT	1.50	-1.50	0.00	II
85	44	657 Develop Rules	Rulemaking/Support PRA	1.20	-0.10	1.10	II
86	44	663 Monitoring Air Quality	Salton Sea Monit	0.25	0.00	0.25	XVII
87	44	677 Advance Clean Air Technology	School Bus/Lower Emission Prog	2.20	0.00	2.20	IX
88	44	700 Ensure Compliance	Source Testing/Compliance	2.25	0.00	2.25	VI
89	44	701 Customer Service and Business Assistance	Source Testing/Customer Svc	0.05	0.00	0.05	VI
90	44	702 Develop Programs	ST Methods Development	0.95	0.00	0.95	II
91	44	704 Ensure Compliance	ST/Sample Analysis/Compliance	4.00	0.00	4.00	VI
92	44	705 Develop Programs	ST Sample Analysis/Air Program	0.25	0.00	0.25	II

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

#	Program Code	Program Category	Program	Activities	FTEs FY 2021-22	+/-	FTEs FY 2022-23	Revenue Categories
93	44 706	Develop Rules	ST Sample Analysis/Air Program	Analyze ST Samples/Rules	0.25	0.00	0.25	II
94	44 707	Ensure Compliance	VOC Sample Analysis/Compliance	VOC Analysis & Rptg/Compliance	6.50	0.00	6.50	IV,XV
95	44 708	Develop Rules	VOC Sample Analysis/Rules	VOC Analysis & Rptg/Rules	0.25	0.00	0.25	II,XV
96	44 715	Monitoring Air Quality	Spec Monitoring/Emerg Response	Emergency Response	0.50	0.00	0.50	II
97	44 716	Ensure Compliance	Special Monitoring	Rule 403 Compliance Monitoring	2.20	-1.00	1.20	III,IV,IX,XV
98	44 725	Timely Review of Permits	Permit Processing/Support E&C	Assist EAC w/ Permit Process	0.35	0.00	0.35	III
99	44 734	Advance Clean Air Technology	Air Shed Volvo	Targeted Air Shed Volvo Admin	0.25	0.00	0.25	XVII
100	44 737	Advance Clean Air Technology	Air Shed Daimler	Targeted Air Shed Daimir Admin	0.40	-0.15	0.25	XVII
101	44 738	Advance Clean Air Technology	Target Air Shed EPA	Targeted Air Shed Admin/Impl	0.50	0.00	0.50	V,XVII
102	44 740	Advance Clean Air Technology	Tech Adv/Commercialization	Assess CFs/Adv Tech Potential	0.25	0.00	0.25	VIII
103	44 741	Advance Clean Air Technology	Tech Adv/Non-Combustion	Dev/Demo Non-Combustion Tech	0.20	0.00	0.20	VIII
104	44 794	Ensure Compliance	Toxics/AB2588	Eval Protocols/Methods/ST	2.00	0.00	2.00	X
105	44 795	Ensure Compliance	Toxics/Engineering	R1401 Toxics/HRA Prot/Rpt Eval	1.30	0.00	1.30	VI,X
106	44 816	Advance Clean Air Technology	Transportation Research	Transport Research/Adv Systems	0.10	0.00	0.10	VIII
107	44 825	Operational Support	Union Negotiations	Labor/Mgmt Negotiations	0.05	0.00	0.05	Ia
108	44 826	Operational Support	Union Steward Activities	Rep Employees in Grievance Act	0.05	0.00	0.05	Ia
109	44 827	Advance Clean Air Technology	VW-General Admin	VW-General Admin	2.75	0.00	2.75	XVII
110	44 840	Advance Clean Air Technology	VW-ZE Trucks-South Coast	VW-ZE Trucks-South Coast	1.00	0.00	1.00	XVII
111	44 841	Advance Clean Air Technology	VW-Combustion-South Coast	VW-Combustion-South Coast	1.00	0.00	1.00	XVII
112	44 856	Advance Clean Air Technology	ZANZEFF Volvo	ZANZEFF Volvo	0.40	0.00	0.40	XVII
113	44 880	Operational Support	Inclusion/Equity	Inclusion/Diversity/Equity	0.00	0.05	0.05	1a

Total Science & Technology Advancement	235.00	3.00	238.00
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Science & Technology Advancement Line Item Expenditure						
Major Object / Account # / Account Description		FY 2020-21 Actuals	FY 2021-22 Adopted Budget	FY 2021-22 Amended Budget	FY 2021-22 Estimate *	FY 2022-23 Adopted Budget
Salary & Employee Benefits						
51000-52000	Salaries	\$ 19,943,712	\$ 21,522,658	\$ 21,199,512	\$ 20,935,908	\$ 23,005,678
53000-55000	Employee Benefits	11,180,826	12,847,982	12,847,983	12,688,225	13,023,571
Sub-total Salary & Employee Benefits		\$ 31,124,538	\$ 34,370,639	\$ 34,047,495	\$ 33,624,133	\$ 36,029,249
Services & Supplies						
67250	Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
67300	Rents & Leases Equipment	6,133	36,800	61,425	61,425	36,800
67350	Rents & Leases Structure	469,083	443,000	462,991	462,991	443,000
67400	Household	1,694	500	3,700	3,700	500
67450	Professional & Special Services	1,403,363	1,705,000	2,173,859	1,600,000	1,705,000
67460	Temporary Agency Services	292,963	141,600	408,686	408,686	141,600
67500	Public Notice & Advertising	38,146	22,000	32,500	32,500	22,000
67550	Demurrage	68,026	55,000	77,455	77,455	55,000
67600	Maintenance of Equipment	620,705	205,000	665,023	665,023	205,000
67650	Building Maintenance	106,922	170,000	190,400	150,000	170,000
67700	Auto Mileage	31,659	18,909	116,909	76,909	18,909
67750	Auto Service	2,243	-	-	-	-
67800	Travel	1,683	48,403	68,643	68,643	48,403
67850	Utilities	4,815	30,000	30,000	10,000	30,000
67900	Communications	389,394	431,000	381,066	381,066	431,000
67950	Interest Expense	-	-	-	-	-
68000	Clothing	3,418	4,000	29,000	29,000	4,000
68050	Laboratory Supplies	403,213	545,000	610,175	500,000	545,000
68060	Postage	16,210	17,318	45,333	20,000	17,318
68100	Office Expense	252,112	66,393	293,538	243,538	66,393
68200	Office Furniture	27,658	-	26,582	26,582	-
68250	Subscriptions & Books	1,539	1,527	2,027	2,027	1,527
68300	Small Tools, Instruments, Equipment	234,811	162,246	348,932	348,932	162,246
68400	Gas and Oil	-	-	-	-	-
69500	Training/Conference/Tuition/ Board Exp.	9,318	107,000	93,120	50,000	107,000
69550	Memberships	23,100	2,250	162,250	150,000	2,250
69600	Taxes	411	2,000	2,000	2,000	2,000
69650	Awards	-	-	-	-	-
69700	Miscellaneous Expenses	5,387	2,600	19,825	19,825	2,600
69750	Prior Year Expense	(15,175)	-	-	-	-
69800	Uncollectable Accounts Receivable	-	-	-	-	-
89100	Principal Repayment	-	-	-	-	-
Sub-total Services & Supplies		\$ 4,398,829	\$ 4,217,546	\$ 6,305,439	\$ 5,390,302	\$ 4,217,546
77000	Capital Outlays	\$ 1,643,198	\$ 1,203,000	\$ 2,389,052	\$ 2,389,052	\$ 513,000
79050	Building Remodeling	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenditures		\$ 37,166,565	\$ 39,791,185	\$ 42,741,986	\$ 41,403,487	\$ 40,759,795

* Estimates based on July 2021 through February 2022 actual expenditures and February 2022 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 17,031,233 (2020)
 - Boundaries are Pacific Ocean to the west; San Gabriel, San Bernardino and San Jacinto Mountains to the north and east, and the San Diego County line to the south
 - Vehicle Registrations – 13,774,023 (2020); Average Daily Miles Traveled Per Vehicle – 27 (2020)
 - Two of the world’s busiest seaports are within its boundaries, Port of Los Angeles and Port of Long Beach, who combined handle almost 3,400 vessel calls (2020) and more than 17.3 million 20-foot long container units or 20-foot equivalent units (TEUs) annually (2020)
- Responsibilities include:
 - Monitoring air quality - 39 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 (25,004 operating locations with 66,652 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>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>	<u>2021</u>
Advance Clean Air Technology										
Contracts awarded	556	938	523	1,047	421	403	357	564	349	385
Total Funding awarded	\$ 82,536,619	\$ 207,181,573	\$ 216,085,526	\$ 123,181,473	\$ 153,900,867	\$ 137,406,323	\$ 170,391,084	\$213,005,034	\$127,879,802	\$202,126,095
Ensure Compliance with Clean Air Rules										
Inspections	34,191	32,535	29,501	22,871	24,037	21,419	24,692	24,289	27,595	25,658
Notices of Violations	1,211	965	956	811	499	632	1,626	2,724	2,076	838
Hearing Board Orders for Abatement	93	51	46	41	23	27	24	29	26	13
Hearing Board Appeals	7	3	7	-	3	3	1	2	3	2
Customer Service										
Public Information Requests	3,543	3,460	4,505	4,012	4,958	5,282	4,676	4,830	3,416	241
Community/Public Meetings attended	274	294	264	217	239	210	156	193	144	241
Small Business Assistance Contacts	2,574	2,266	1,850	1,711	1,865	2,834	4,073	3,043	3,357	3,840
Develop Programs to Achieve Clean Air										
Transportation Plans processed	1,392	1,371	1,333	1,329	1,337	1,348	1,356	1,357	1,335	1,319
Emission Inventory Updates	530	408	460	336	356	244	343	294	269	336
Develop Rules to Achieve Clean Air										
Rules Developed	8	20	24	24	16	15	28	44	14	19
Monitoring Air Quality										
Samples Analyzed by the Laboratory	29,520	32,520	29,340	30,824	32,400	38,541	36,342	33,258	30,225	25,501
Source Testing Analyses/Evaluations/Reviews	952	1,035	968	996	936	952	714	632	562	498
Timely Review of Permits										
Applications Processed	12,225	14,153	13,217	9,495	9,482	11,780	10,913	9,463	8,345	6,727
Applications Received-Small Business	732	615	514	629	594	535	605	541	485	438
Applications Received-All Others	11,682	11,709	11,156	9,961	9,894	8,376	9,172	8,131	8,070	6,767
Policy Support										
News Releases	57	61	62	76	89	86	120	99	126	179
Media Calls	520	1,131	774	532	1,450	1,201	-	-	-	-
Media Inquiries Completed	520	1,131	774	532	1,450	1,201	-	-	-	-
News Media Interactions*	-	-	-	-	-	-	1,235	633	672	2,204

*Tracking of News Media Interactions began in 2018. This will replace the tracking of media calls and media inquiries completed.

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 Equivalent (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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**South Coast
Air Quality Management District**

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South Coast
Air Quality
Management
District



Clean Fuels Program

2021 Annual Report
& 2022 Plan Update



Technology Advancement Office
Driving clean technology

Cover Photo Credits

Left to right; top to bottom

- Daimler Truck North America battery-electric Freightliner eCascadia class 8 tractor
- 150 kW DC fast charger installed at TEC Fontana dealership
- Peterbilt/Meritor Class 8 battery electric truck
- FirstElement Fuel Inc's hydrogen station at La Canada Flintridge
- 30 Level 2 chargers installed for South Coast AQMD fleet vehicles
- Kenworth-Toyota Class 8 fuel cell electric truck for Zero Emission Shore to Store Demonstration
- Center for Transportation and the Environment (CTE) Orange County Transportation Authority (OCTA) hydrogen fuel cell electric bus
- Five pilot Class 8 battery electric trucks were developed and demonstrated by Volvo
- Achates truck 10.8-liter near-zero NOx opposed piston diesel engine
- Cummins ISX12N 12L heavy-duty natural gas engine certified to 0.02 g/bhp-hr optional near zero NOx emissions standard
- DHE installed 1 MW of solar as part of the Volvo LIGHTS project

South Coast Air Quality Management District Governing Board

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<i>Vice Chair:</i>	VANESSA DELGADO Senate Rules Committee Appointee
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<i>Executive Officer:</i>	WAYNE NASTRI

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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 the 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 (NO_x) emission 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 powered 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 \$231.6 million into over \$1.14 billion in projects.

As technologies move towards commercialization, such as battery and fuel cell electric trucks, the Clean Fuels Program has been able to partner with large original equipment manufacturers (OEMs), such as Daimler, Volvo, Hyundai and Peterbilt to deploy these vehicles in larger numbers. These OEM partnerships allow the Program to leverage their research, product development, 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 to achieve emission reductions needed to attain national ambient air quality standards (NAAQS).

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. The TAO Clean Fuels Program has traditionally supported a portfolio of technologies at different technology readiness levels. This helps with the development of new technologies across many different mobile sectors in need of new technologies that provide emission reductions and health benefits. This approach enhances the region’s chances of achieving the NAAQS.

California Health and Safety Code (H&SC) 40448.5(e) calls for the Clean Fuels Program to consider factors such as: 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.

California 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 Program accomplishments 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 largely based 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 will be updated in 2022, 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) revised 2020 Mobile Source Strategy.

Ground level ozone (a key component of photochemical smog) is created by a chemical reaction between NO_x and volatile organic compound (VOC) emissions in sunlight. 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 secondary formation of PM_{2.5} [particulate matter measuring 2.5 microns or less in size, expressed as micrograms per cubic meter (μg/m³)].

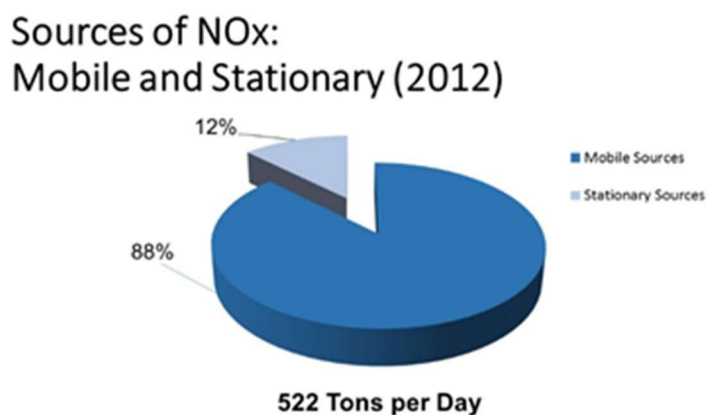
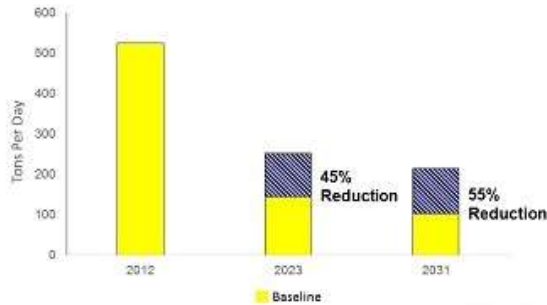


Figure 1: Sources of NO_x 2012 Base Year

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 is required by 2023 and an additional 55 percent reduction by 2031 to achieve NAAQS for (8-hour) ozone of 80 parts per billion (ppb) and 75 ppb, respectively. Figure 2 illustrates these needed NO_x reductions in the Basin. The majority of 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 California’s San Joaquin (Central 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 NOx Reductions Needed

For the first time, the 2016 AQMP identified a means to achieving the NAAQS through regulations and incentives for near-zero and zero emission mobile source 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.

Current state and federal efforts in developing regulations for on- and off-road vehicles and equipment are expected to significantly reduce NOx emissions, but are insufficient to achieve the 2023 and 2031 ozone attainment deadlines.

Clean Fuels Program

The Clean Fuels Program, established in California H&SC 40448.5, is an important mechanism to encourage and accelerate the advancement and commercialization of clean fuels in both stationary 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 2021 Clean Fuels Annual Report and Draft 2022 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.

2021 Annual Report

In CY 2021, the South Coast AQMD Clean Fuels Program executed 19 new contracts, projects or studies and modified 5 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. Table 2 shows our major funding partners in CY 2021. Table 3 lists the 24 projects or studies, which are further described in this report. The South Coast AQMD Clean Fuels Program contributed over \$10.6 million in partnership with other governmental organizations, private industry, academia and research institutes, and interested parties, with total project costs of approximately \$253 million. The \$10.6 million includes over \$4.3 million recognized into the Clean Fuels Fund as pass-through funds from project partners to facilitate project administration by the Clean Fuels Program. Table 4 provides information on this outside funding received into the Clean Fuels Fund. Additionally, in CY 2021, the Clean Fuels Program continued to leverage other outside funding opportunities, securing new awards totaling \$48.7 million from federal, state and local funding opportunities. Table 5 provides a comprehensive summary of these federal, state and local revenues awarded to the South Coast AQMD during CY 2021. Like the last several years, the significant project scope of a few key contracts executed in 2021 resulted in higher than average leveraging of Clean Fuels dollars. Typical historical leveraging is \$4 for every \$1 in Clean Fuels funding. In 2021, South Coast AQMD exceeded this upward trend with nearly \$39 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 NAAQS.

The projects or studies executed in 2021 included a diverse mix of advanced technologies. The following core areas of technology advancement for 2021 executed contracts (in order of funding percentage) include:

1. Electric and Hybrid Vehicle Technologies and Related Infrastructure (emphasizing battery electric and hybrid electric trucks developed by OEMs and container transport technologies with zero emission operations);
2. Hydrogen and Mobile Fuel Cell Technologies and Infrastructure;
3. Engine Systems/Technologies (emphasizing alternative and renewable fuels for truck and rail applications);
4. Technology Assessment and Transfer/Outreach;
5. Fuel / Emission Studies; and
6. Stationary Clean Fuels Technology

The chart on page 26 shows the distribution by percentage of executed agreements in 2021 across these core technologies.

During CY 2021, 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 battery electric and hybrid electric technologies and infrastructure to develop and demonstrate medium- and heavy-duty vehicles in support of transitioning to near-zero and zero emissions goods movement; 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 24 executed contracts and projects, 24 research, development, demonstration and deployment projects or studies and 7 technology assessment and transfer contracts were completed in 2021, as listed in Table 8. Appendix C includes two-page summaries of the technical projects completed in 2021. As of January 1, 2022, there were 109 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, 2022, after approval by the South Coast AQMD Board.

2022 Plan Update

The Clean Fuels Program is re-evaluated annually to develop the annual Plan Update based on a reassessment of the technology progress and direction for the agency. The Program continually seeks to support the development and deployment of 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 co-funding 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 2022 Plan Update. Assembly Bill (AB) 617¹ 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 deployment of cleaner technologies. Cleaner technologies such as near-zero and zero emission heavy-duty trucks are now included in the Community Emission Reduction Plans (CERPs) for these AB 617 communities, and an RFP for zero emission heavy-duty truck program will be released in 2022. CARB adopted two critical milestone regulations for reducing emissions from on-road heavy-duty mobile sources in 2020, the Advanced Clean Truck (ACT) regulation which mandates an increasingly higher percentage of zero emission truck sales starting in 2024 and the Omnibus Low NO_x regulation which requires lower exhaust NO_x standards on heavy-duty engines starting in 2024. CARB is also working on the Heavy-Duty Vehicle Inspection and Maintenance Program as well as the Advanced Clean Fleets regulation for Board consideration in 2022.

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

Despite these major efforts, NO_x emission reductions in the South Coast AQMD are still expected to fall short of the levels necessary to meet ozone attainment target deadlines.

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 significant emission reductions over the next five to ten years. Areas of focus include:

- developing and demonstrating technologies to reduce emissions from goods movement and port-related activities, including near-zero and zero emission drayage trucks and infrastructure;
- developing and demonstrating ultra-low NO_x, gaseous and liquid renewable fueled, large displacement/high efficiency engines and heavy-duty zero emission engine technologies;
- developing, demonstrating and deploying advanced, low-NO_x natural gas and propane engines as well as near-zero and zero emission technologies for high horsepower applications;
- mitigating criteria pollutant emissions from the production of 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 electric vehicle (EV) charging infrastructure to support light-, medium- and heavy-duty zero emission vehicles;
- ultra-fast charging for heavy duty battery electric vehicles; and
- developing and demonstrating zero emission microgrids that utilize electric energy storage systems and onsite clean power generation to support transportation electrification demands associated with goods movement and freight handling activities.

Table 9 (page 75) 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);
3. Electric/Hybrid Vehicle Technologies and Infrastructure (emphasizing battery 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 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 2022 total \$21.8 million of Clean Fuels funding, with the anticipation of total project costs of \$167.5 million, leveraging more than \$4 for every \$1 of Clean Fuel funds spent. Some proposed projects may also be funded by other funding sources, such as state and federal grants for clean fuel technologies, incentive programs such as AB 617 Community Air Protection (CAP) funding, Volkswagen Mitigation and Carl Moyer volatile organic compound (VOC), and NO_x mitigation funds.

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 non-governmental organizations (NGOs). 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 in CY 2019 staff recommended 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. With the addition of the Port representatives, there are currently 13 members on the Technology Advancement Advisory Group.

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 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 ($\mu\text{g}/\text{m}^3$)], 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

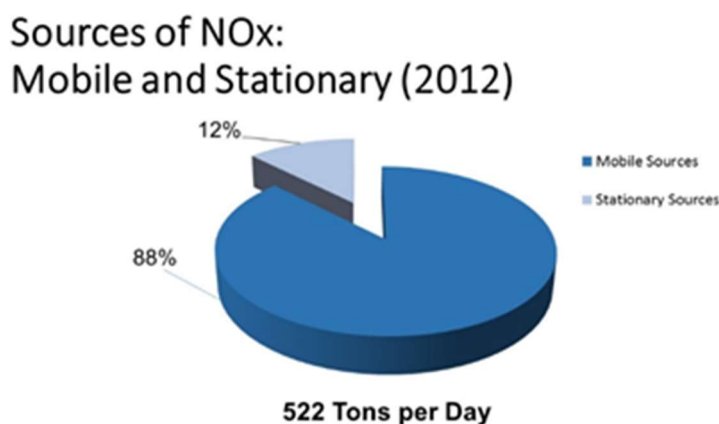
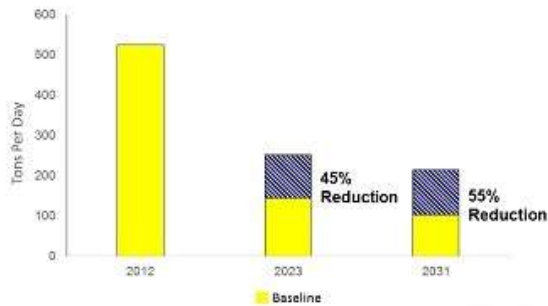


Figure 1: Sources of NO_x 2012 Base Year

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 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.

Emission Reductions Resulting from Clean Fuels Program

The Clean Fuels Program has encouraged projects that increase the utilization of clean-burning fuels over the 33-year lifetime of the program. Many of the technologies that were supported during the early years of the program, are only now seeing commercial deployments, e.g. fuel cell buses, while others saw great success only to be eventually phased out, e.g., methanol buses and vehicles. Of which all the technologies that the Clean Fuels Program have supported, there are two more recent technologies that have been commercialized and are providing emissions benefits through incentives programs, namely the ultra-low NOx (near-zero emission or NZE) natural gas engines and zero emission (ZE) trucks.

The Clean Fuels Program has been supporting the development of low and near-zero emission heavy-duty natural gas engines since the early 2000's. In 2003, South Coast AQMD conducted a joint project with the California Energy Commission (CEC), the U.S. DOE and the National Renewable Energy Laboratory (NREL) to advance development of heavy-duty natural gas engines to meet the upcoming 2010, 0.2 g/bhp-hr NOx standard. The result was the Cummins-Westport, Inc (CWI) 8.9-liter engine that certified to 0.2 g NOx/bhp-hr, three years before the mandated 2010 national standard. In 2013, recognizing the need for accelerated NOx reductions in the heavy-duty sector, South Coast AQMD, CEC, and SoCalGas issued a joint solicitation to develop and demonstrate a NZE engine for commercial use. CWI won that bid and developed and commercialized the 0.02 g/bhp-hr NOx 8.9-liter natural gas engine (L9N), the first of its kind. Additional projects with CEC, SoCalGas and Clean Energy produced the CWI 11.9-liter NZE engine (ISX12N) certified in 2018 for port fleet operations, also first of its kind, including a 20-truck demonstration project at the San Pedro Bay Ports. These engines are now commercially available and offered by all of the major truck manufacturers.

The Clean Fuels Program has also been supporting the development of ZE heavy-duty vehicles including battery electric trucks (BETs) and fuel cell electric trucks (FCETs). The DOE funded Zero Emission Cargo Transport 1 (ZECT 1) project developed and demonstrated class 8 battery electric trucks. The ZECT 1 project gave birth to many other EV and hybrid truck projects, including ones later funded by CARB's Greenhouse Gas Reduction Fund (GGRF) Zero Emission Drayage Truck (ZEDT) project, which demonstrated 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. More recently, the Clean Fuels Program has co-funded large Daimler and Volvo battery electric truck projects. Daimler has deployed 14 Class 8 eCascadia and six Class 6 eM2 trucks in 2019 and installed seven DC fast charging stations at fleet locations. Volvo is also deploying 23

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

Class 8 trucks and installing DC fast charging infrastructure as part of their Low Impact Green Heavy Transport Solutions (LIGHTS). Finally, South Coast AQMD was awarded the joint CARB-CEC Pilot project to demonstrate 100 battery electric trucks and charging infrastructure for two fleets, NFI and Schneider. Both the Volvo VNR battery electric truck and DTNA's eCascadia will be widely commercially available in the next few years. Examples of some of the vehicles that South Coast AQMD has helped develop and demonstrated with funding from various partners are show in the figure below. The pathway to cleaner air is clear, for near- and mid- term, near-zero NOx engines, hybrids and clean diesel are expected to provide the greatest reduction where in the long term, battery electric and hydrogen fuel cell will play a dominant role.



Figure 3: Clean Fuel Technology Trucks that South Coast AQMD and Partners have Helped Develop and Demonstrated

To quantify some of the emissions benefit from NZE and ZE truck deployments, Table 1 summarizes the emissions reductions as result of the technologies directly supported by the Clean Fuels Program.

South Coast AQMD staff compiled incentive program data from our Technology Incentives Group to calculate the NO_x emissions reductions associated with deployment of NZE and ZE heavy-duty vehicles in the Basin. Note that all that programs below required scrappage, that meant each vehicle deployed eliminated an older diesel truck, and the emission reductions are based on the program guidelines established by CARB.

Table 1: Emissions Benefit from NZE and ZE Truck Deployments

South Coast AQMD Incentive Programs	NZE (# of Trucks)	ZE (# of Trucks)	NO _x Reductions (tpy)
VW*	47	93	28
Lower Emission School Bus	280	95	70
Proposition 1B	925	112	444
Carl Moyer	255	10	109
Total	1,507	310	651

Although the emission reductions may seem modest, these technologies represent almost 4% of the total emission reductions for on-road heavy-duty diesel trucks in 2023³, and the numbers will only continue to grow, thanks in part to the support by 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 2021, the funds available through each of these mechanisms were as follows:

- Mobile sources (DMV revenues) \$13,719,320
- Stationary sources (emission fee surcharge) \$279,570

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 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 4 lists the supplemental grants and revenues totaling over \$4.3 million for contracts executed in CY 2021.

Table 5 lists the federal, state and other revenue totaling \$48.7 million awarded to the South Coast AQMD in 2021 for projects that are part of the overall Clean Fuels Program's RD³ efforts, even if for

³ 1.69 tpd reductions vs. 44.5 tpd in on-road heavy-duty diesel inventory in 2023.

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 \$231.6 million into over \$1.14 billion in projects. For 2021, the Clean Fuels Program leveraged \$1 of Clean Fuels Funds to nearly \$39 of outside funding. This atypical leverage was the result of a few key significant project awards in 2021. Specifically, the \$31.5 million heavy-duty battery electric truck project, which includes a nearly \$20 million award to the South Coast AQMD from US EPA Airshed grant as well as two projects with substantial cofunding of \$117 million from CARB and CEC. 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 2021 are listed in Table 2.

2021 Overview

This report summarizes the progress of the South Coast AQMD Clean Fuels Program for CY 2021. 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 2021. During the period between January 1 and December 31, 2021, the South Coast AQMD executed 19 new contracts/agreements, projects or studies and modified 5 continuing projects adding dollars during CY 2021 that support clean fuels and advanced zero, near-zero and low emission technologies (see Table 3). The South Coast AQMD Clean Fuels Program contribution for these projects was \$10.6 million, inclusive of approximately \$4.3 million received into the Clean Fuels Fund as cost-share for contracts executed in this reporting period. Total project costs are almost \$253 million. The Clean Fuels contribution and total number of contracts executed in 2021 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 2022 for a resurgence in business activity, more completed projects and newly executed projects.

The projects executed in 2021 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 4), 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 \$48.7 million in 2021, see Table 5). For example, in 2021, the South Coast AQMD was awarded nearly \$30 million by CARB, CEC and project partners for a zero-emission drayage truck and infrastructure pilot project, \$10.7 million from CARB and CEC to develop and demonstrate capture and control system for oil tankers, \$4.1 million from US EPA for a zero-emission freight line-haul locomotive and \$3.6 million from US EPA for long-range class 8 fuel cell trucks with total project costs of over \$103 million. These projects will advance the commercialization of electric and fuel cell trucks, 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 2022 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 2021 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 2022.

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 PONs to solicit project ideas and concepts as well as the issuance of RFIs 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. Automakers continue development efforts and collaborate to broaden application of fuel cells to increase manufacturing scale and reduce cost to commercialize fuel cell vehicles. However, although progress is being made, 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 107 stations funded by CEC and CARB by the end of 2021, partially funded by South Coast AQMD for those in our region, there is one legacy and 489 retail operational in California. Station development over the past year has been slower than previously projected, partly due to delays in station permitting, construction, and opening caused by the COVID-19 pandemic. CEC and CARB staffs expect that California will exceed the 100-station goal in Assembly Bill 8 in 2023, with more than 179 stations by 2027. 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: 2021 Annual Assessment of Time and Cost Needed to Attain 100 Hydrogen Refueling Stations in California*⁴ released in December 2021 covering 2021 findings states that there were 9,647 fuel cell vehicles registered in California by October 2021. However, CARB's 2017 Annual Evaluation projects 37,400 fuel cell electric vehicles (FCEVs) in California by 2023 and 61,000 by the end of 2027, after accounting for estimated vehicle retirements. 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 for 200 heavy-duty stations to support 70,000 fuel cell trucks by 2035.

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 \$1,000,000 is 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 is also supported by the \$1,200,000 Clean Fuels funding committed to the CEC co-funded heavy-duty Shell station on Port of Long Beach (POLB) property leased to Toyota. 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 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.

⁴<https://www.energy.ca.gov/publications/2021/joint-agency-staff-report-assembly-bill-8-2021-annual-assessment-time-and-cost>

The battery and fuel cell dominant fuel cell trucks have a range of 150-200 miles.

Engine Systems/Technologies

Medium- and heavy-duty on-road vehicles contributed approximately 33 percent of the Basin's NOx based on 2016 AQMP data. More importantly, on-road heavy-duty diesel trucks account for 33 percent of the on-road mobile source PM2.5, a known toxic air contaminant (TAC). Furthermore, according to CARB, trucks and buses are responsible for 37 percent of California's 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 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 POLB 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) 617⁵, 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 ACT Conference and Expo 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 40 for a description of the technology assessment and transfer contracts executed in CY 2021 as well as a listing of the 7 conferences, workshops and events funded in CY 2021). 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.

⁵ <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 4 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 4: Stages of Clean Fuels Program Projects

Due to the nature of these advanced technology R D³ 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 and Demonstrations for Heavy-Duty Vehicles
 - CWI: 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;
 - Kenworth CNG Hybrid Electric Drayage Truck project;
 - DOE ZECT II project – KW developed one fuel cell truck & one CNG hybrid truck;
 - CARB GGRF project – KW developed advanced CNG hybrid truck by improving ZECT II CNG hybrid; and
 - US Hybrid NZE Plug-In Hybrid demonstration with DOE/NREL/CEC.
- 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 Nexo, 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;
 - Fuel cell Class 8 trucks under ZECT II Program; and
 - Kenworth, TransPower, US Hybrid, Cummins developed and demonstrated total 6 fuel cell trucks
- Electric and Hybrid Electric Vehicle Development and Demonstrations
 - Daimler Class 6 and 8 battery electric trucks with Penske and NFI;
 - Volvo LIGHTS Class 8 battery electric trucks demonstration with TEC Fontana, DHE, and NFI;

- Volvo Switch-On Class 8 battery electric truck deployment with multiple fleets;
 - Daimler and Volvo Class 8 battery electric truck large scale deployment with NFI and Schneider;
 - Hybrid electric delivery trucks with NREL, FedEx and UPS;
 - Plug-in hybrid work truck with Odyne Systems;
 - DOE funded Develop and Demonstrate Medium- Heavy-Duty Plug-in Hybrid Electric Vehicles for Work Truck Applications;
 - 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;
 - CARB GGRF Class 8 battery electric truck demonstration;
 - Peterbilt develop and demonstrated 14 trucks; and
 - BYD develop and demonstrated 25 trucks.
- Aftertreatment Technologies for Heavy-Duty Vehicles
- Johnson Matthey and Engelhard trap demonstrations on buses and construction equipment;
 - Johnson Matthey SCRT and SCCRT NOx and PM reduction control devices on heavy-duty on-road trucks; and
 - 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 2021 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 2 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 2021 Project Summaries by Core Technologies contained within this report, as well as Table 5 which lists federal, state and local funding awarded to the South Coast AQMD in CY 2021 for RD³ projects (which will likely result in executed project contracts in 2022).

Table 2: South Coast AQMD Major Funding Partners in CY 2021

Research Funding Organizations	Major Manufacturers/Technology Providers
California Air Resources Board	Daimler Trucks North America LLC
California Energy Commission	Volvo Technology of America LLC
Department of Energy	SunLine Transit Agency
National Renewable Energy Laboratory	Local Entities & Utilities
U.S. Environmental Protection Agency	Mobile Source Reduction Committee
	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 2021. 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 2021 include: (a) Volvo Switch-On: Develop and Deploy Seventy Heavy-Duty Battery Electric Vehicles; (b) Deployment of Five New Flyer Zero-Emission Fuel Cell Buses at Sunline Transit Agency; and (c) Develop and Demonstrate Zero Emission Freight Shore 2 Store with Freightliner and Toyota Fuel Cell Trucks.

Volvo Switch-On: Develop and Deploy Seventy Heavy-Duty Battery Electric Vehicles

The \$91 million CARB funded ZANZEFF Volvo Low Impact Green Heavy Transport Solutions (LIGHTS) project developed, demonstrated and deployed 25 pilot and production Class 8 battery electric trucks at two fleets in the Inland Empire, two TEC dealerships in Fontana and La Mirada, and leased trucks at seven additional fleets. The Switch-On project is a \$30 million follow-up project deploying 70 certified Volvo VNR Electric Class 8 trucks at seven fleets in disadvantaged communities. U.S. EPA awarded South Coast AQMD \$20 million in Targeted Airshed grant funding. South Coast AQMD provided \$2 million from the Clean Fuels Fund towards infrastructure. Two of these fleets include DHE and NFI in Ontario, demonstration partners in the Volvo LIGHTS project. Other participating fleets include Performance Team (Santa Fe Springs), CEVA, McLane and Amazon. Each fleet will be replacing Class 8 diesel trucks currently performing drayage service to the San Pedro Bay Ports. The Switch-On project will provide 153 tons of NO_x, 1.317 tons of PM 2.5 and 53,160 tons of CO₂ over the 10-year lifetime of the trucks.



Figure 5: Volvo VNR Electric Class 8 Truck Deployed at Multiple Fleets in South Coast Air Basin

The trucks are in three configurations including straight trucks and tractors, with Gross Vehicle Weight (GVW) configurations ranging from 32,000 to 60,000 pounds, and axle configurations of 4x2, 6x2, and 6x4. These configurations accommodate various freight sectors and end-user market needs, and target urban, regional distribution, and drayage applications.

The Switch-On project takes advantage of 150 kW direct current (DC) fast charging infrastructure installed at DHE and NFI for the Volvo LIGHTS project, and their prior experience with the Volvo VNR Electric trucks. In addition, DHE and NFI have undergone facility improvements and electrical infrastructure upgrades and installed battery storage and 1 MW and 633 kW of solar respectively. The other participating fleets will install 150 kW or 350 kW DC fast charging infrastructure at their fleets.

The Switch-On project utilizes Volvo's maintenance and customer support and dealer networks at the TEC Fontana and La Mirada dealerships, which were upgraded to handle maintenance of battery electric trucks and have 150 kW DC fast chargers for trucks coming in for service or opportunity charging.

Volvo's Gold Service contract handles all maintenance issues for 72 months and will enable fleets to have a 10 year deployment to assist commercialization of heavy-duty battery electric trucks. In addition, this will assist fleets in complying with CARB's Advanced Clean Fleets regulation, which requires fleets to retain a certain percentage of zero emission trucks starting in 2024. Volvo and the fleets are providing cost share towards each truck which enables the EPA funding to fund additional trucks. South Coast AQMD's Clean Fuels funding is critical to support the installation of 150 kW or higher power charging infrastructure. The cost of installing high power fast charging infrastructure is a significant barrier to enabling fleets to deploy battery electric trucks. The trucks utilize CCS1 for charging infrastructure, which is the North American standard for heavy-duty vehicles. The trucks will be capable of DC fast charging at up to 250 kW.

The VNR Electric trucks for DHE, NFI, and Amazon will have increased vehicle range due to the development of more efficient Gen 3 battery packs. The battery chemistry used in the VNR Electric platform minimizes total cost of ownership by balancing power requirement with charging cycles, with sufficient power density to prevent costly battery replacement from premature degradation and minimal impact on payload capacity. The battery design was optimized to maintain or improve the fleet's productivity and duty cycle applications based on the fleet's operations, routes, and locations of available charging infrastructure.

Having battery electric trucks operating within disadvantaged communities will provide significant health and air quality benefits to residents living in these communities, and support fleets in compliance with South Coast AQMD's Rule 2305 – Warehouse Actions and Investments to Reduce Emissions (WAIRE) Program, which includes compliance and reporting requirement for warehouse owners and operators. Community based organized Reach Out in Upland will create and implement a community engagement strategy to educate residents about battery electric truck technologies and fleet operations. Energetics will collect and analyze fleet data on 1) utilization, 2) energy consumption, and 3) vehicle tailpipe emissions between conventional baseline and battery electric vehicles. Vehicle and fleet-level usage and performance parameters will include mileage, vehicle load, vehicle route, engine hours, idling hours, and energy use. These efforts will ensure that lessons learned and benefits of the Switch-On project will be captured and disseminated to a broad variety of audiences.

Deployment of Five New Flyer Zero-Emission Fuel Cell Buses at Sunline Transit Agency

Despite decades of aggressive efforts to improve air quality within the Basin, this region continues to have some of the nation's worst air quality. Currently, the SCAB and Coachella Valley portion of the Salton Sea Air Basin (SSAB) have areas in non-attainment for ozone and particulate matter (PM2.5). SunLine Transit Agency operates in Riverside County, which, according to the NAAQS, is an ozone "non-attainment" area. In 2020, South Coast AQMD was awarded a \$5.9M EPA Targeted Air Shed Grant to replace Sunline fleet of five 2008 model year CNG transit buses with zero emission buses to improve local air quality and assist in achieving NAAQS ozone "attainment" designation for this area. These zero-emission buses produce no criteria emissions of NOx, VOC, CO, and PM2.5 and have significantly reduced GHG emissions, especially with the use of renewable fuels. This project also assists Sunline in complying with CARB Innovative Clean Transit (ICT), requiring all public transit agencies to gradually transition to 100% zero-emission buses by 2030. SunLine has been an early adopter of advanced transit technologies and already operates both fuel cell electric buses (FCEBs) and battery electric buses (BEBs).

New Flyer will build and deliver 5 hydrogen FCEBs equipped with Ballard Power Systems' ("Ballard") HD85 fuel cell system. This latest state-of-the-art technology has been deployed in small volumes to date. The learnings from past deployments position New Flyer to supply robust and reliable zero-emission buses that can be rapidly deployed to generate emission reductions in regular service operations. The project involves procurement, delivery, and commissioning of the buses within a five-year period. Sunline will conduct a minimum of 1-year of data collection after the buses' deployment and will operate the buses on a variety of routes passing through disadvantaged communities to the end of the buses 12-year lifetime. This deployment project also creates a load on Sunline's recently upgraded 900 kg/day hydrogen fueling station. These new FCEBs will bring SunLine's fleet to 21 FCEBs overall, resulting in the station being utilized at more than 65% of its full capacity and creating a reference site for at-scale deployment of FCEBs for other transit agencies. The station can operate more cost-effectively at a broader scale, providing an important reference site to demonstrate the at-scale cost of onsite hydrogen electrolysis. Operation of the station on a larger scale will also uniquely enable SunLine to learn about operational hydrogen fueling considerations. SunLine also plans to provide public access to their hydrogen fueling infrastructure to support other local early adopters of hydrogen fuel cell technology. Integration of the transit fueling operations with public dispensers that share common infrastructure is an additional innovative aspect of SunLine's planned scale-up of their hydrogen fueling operations that this project will be associated with. As public fueling demand grows, SunLine plans to continue to scale its hydrogen supply by adding liquid hydrogen or added electrolyzer capacity, which will provide opportunities to explore multiple integrated fueling technologies.



Figure 6: SunLine Transit Agency Fuel Cell Buses

The total project cost includes a total award of \$5,906,601 from the EPA, \$806,204 in-kind voluntary cash match in the form of hydrogen fuel, and bus operation and maintenance costs from Sunline, and \$204,921 voluntary cost-share for the bus procurement from South Coast AQMD. The budget avoids the costly investment in hydrogen fueling infrastructure by leveraging SunLine's existing hydrogen fueling station. This allows the grant funds to be focused on zero-emission bus procurements, maximizing emission reductions of ozone precursor pollutants and GHGs and directly benefitting the Coachella Valley residents, a disadvantaged community.



Figure 7: SunLine Transit Agency Onsite Hydrogen Fueling Infrastructure

Develop and Demonstrate Zero Emission Freight Shore 2 Store with and Toyota Fuel Cell Trucks

The Port of Los Angeles (POLA) Zero Emissions Freight "Shore To Store" Project (S2S) was awarded \$41M CARB ZANZEFF funding to structure operations for future zero emission goods movement, reduce GHG, criteria pollutant, and toxic air contaminant emissions in and around freight facilities; and provide economic, environmental, and public health benefits to disadvantaged communities (DAC).

Funding for this \$82.5M project is provided by CARB, CEC (in-kind match), Toyota, Kenworth, Port of Hueneme, Shell, Southern Counties Express, Total Transportation Services (TTSI), UPS and South Coast AQMD.

Ten Kenworth zero-emission Class 8 hydrogen fuel cell electric on-road trucks utilizing the Kenworth



Figure 8: Kenworth – Toyota Class 8 FCET fueling at Shell Ontario Heavy-Duty Hydrogen station July 2021

T680 platform, integrated with Toyota's fuel cell drive technology will be based in disadvantaged communities and operated in revenue service: three by the United Parcel Services (UPS), two by Total Transportation Services Inc. (TTSI), one by Southern Counties Express (SCE), and four by Toyota Logistics Services (TLS) throughout the Los Angeles basin ports, inland locations such as Riverside County, and the Port of Hueneme (POH). Additionally, POH will demonstrate two electric yard tractors, and TLS will demonstrate two zero-emission forklifts at their facility. All 10 trucks were in service as of October 29, 2021 and will complete the minimum 90-day

operation by February 2022. TLS will operate one truck at least one year, through May 2022. The CARB Experimental Permit was renewed through October 2022.

Two new large-capacity, heavy-duty hydrogen fueling stations built by Equilon Enterprises LLC (d/b/a



Figure 9: Kenworth – Toyota Class 8 FCET (white/blue)) escorting the US Capital Christmas tree (green truck) from the Rose Bowl to Redlands on November 6, 2021. (Credit: Toyota)

Tree “Sugar Bear” from the cutting ceremony in Six Rivers National Forest, California to Washington, DC, one of the ten demonstration FCETs was invited to escort the Kenworth truck transporting the tree for the leg of the journey from Pasadena (Rose Bowl) to Redlands, CA.

As heavy-duty hydrogen stations are demonstrated, continued public research is needed to evaluate multiple aspects. Fueling protocols, dispenser design and station throughput and reliability are just some examples that will be evaluated with operating data reported through NREL. Data collected from the ten FCETs will also be collected and evaluated by NREL.

Shell Oil Products USA) in Ontario and Wilmington plus three additional stations at Toyota facilities around Los Angeles demonstrate an integrated, five-station, heavy-duty hydrogen fueling network. Stations at Toyota Logistics Services in Long Beach and Toyota Technical Center in Gardena serve as important research and development locations. The fifth heavy-duty station on POLB property is leased to Toyota at 785 Edison Ave., Long Beach, CA 90813 (as an in-kind match share by CEC & Shell).

Project partners will also support educational and outreach opportunities during the project that do not interfere with fleet logistics. Since Kenworth’s T680 was chosen to convey the US Capital Christmas

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CLEAN FUELS PROGRAM

2021 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 7), 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, 2021.

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, 2021, a total of 24 contracts/agreements, projects or studies that support clean fuels were executed or amended (adding dollars), as shown in Table 3. 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 10. 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 2021 reporting period are shown below with the total projected project costs:

- | | |
|--|---------------|
| • South Coast AQMD Clean Fuels Fund Contribution | \$10,665,745 |
| • Total Cost of Clean Fuels Projects | \$252,950,852 |

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 2021-22 Budget on May 7, 2021, it included \$1 million from Clean Fuels recognized in TAO’s budget for technical assistance, workshops, conferences, co-sponsorships 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, 2021, are included within this report. Any portion of the Clean Fuels Funds not spent by the end of Fiscal Year 202-22 ending June 30, 2022, 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 \$4.3 million is listed within Table 4.

For Clean Fuels executed and amended contracts, projects and studies in 2021, the average South Coast AQMD contribution was leveraged with nearly \$39 of outside investment. The typical historical leverage amount is \$4 for every \$1 of South Coast AQMD Clean Fuels funds, but from 2016 to 2021 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 2021, the distribution of funds for South Coast AQMD executed contracts, purchases and contract amendments with additional funding for the Clean Fuels Program totaling approximately \$10.6 million are shown in the figure below.

Additionally, the South Coast AQMD continued to seek funding opportunities and was awarded an additional \$48.7 million in CY 2021 for RD³ projects as listed in Table 5.

As of January 1, 2022, there were 109 open Clean Fuels Fund contracts. Appendix B lists these contracts by core technology.

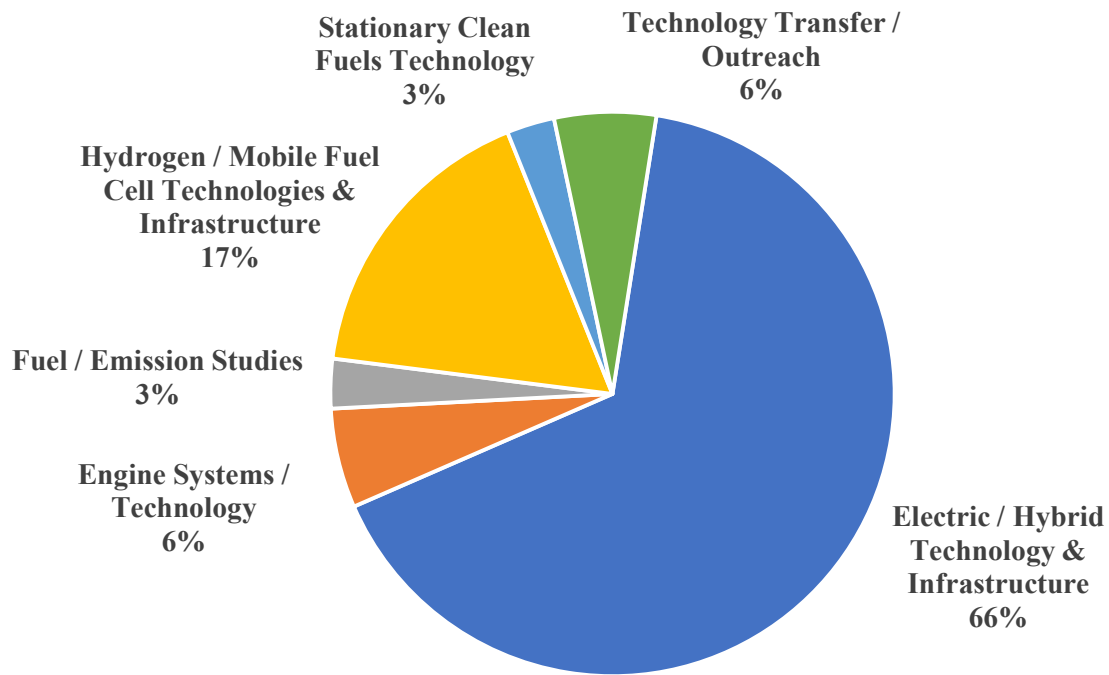


Figure 10: Distribution of Funds for Executed Clean Fuels Projects CY 2021 (\$10.6M)

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, 2021, 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 24 new and continuing contracts/agreements, projects and studies that received South Coast AQMD funding in CY 2021 are summarized in Table 3 (beginning on the next page), together with the funding authorized by the South Coast AQMD and by the collaborating project partners.

Table 3: Contracts Executed or Amended (w/\$) between January 1 & December 31, 2021

Contract	Contractor	Project Title	Start Term	End Term	South Coast AQMD \$	Project Total \$
Electric / Hybrid Technologies and Infrastructure						
19278	Volvo Group North America, LLC	Low Impact Green Heavy Transport Solutions (LIGHTS)- Develop and Demonstrate Zero Emission Heavy-Duty Trucks, Freight Handling Equipment, EV Infrastructure and Renewable Energy	04/17/19	06/30/22	0	1,098,963
20296	Daimler Trucks North America LLC	Deploy Zero Emission Electric Delivery Trucks	05/27/21	12/31/24	4,010,000	12,310,000
21077	Daimler Trucks North America LLC	Develop and Demonstrate up to 8 Heavy-Duty Battery Electric Trucks and Transportable Fast-Charging	03/11/21	03/31/23	1,000,000	6,742,000
21153	Volvo Group North America, LLC	Switch-On: Develop and Deploy Seventy Heavy-Duty Battery Electric Vehicles	06/10/21	09/30/24	2,000,000	31,540,000
Engine Systems / Technologies						
20199	Agility Fuel Solutions LLC	Develop a Near-Zero Natural Gas and Propane Conversion System for On-Road Medium-Duty Vehicles	07/01/21	06/30/22	607,825	1,834,000
Fuel / Emission Studies						
21103	University of California Riverside	Perform Investigation Study of E15 Gasoline Fuel Effects	03/09/21	06/08/22	200,000	1,300,000
21169	West Virginia University Research Corp	Evaluation of Vehicle Maintenance Costs Between NG and Diesel Fueled On-Road Heavy-Duty Vehicles	09/29/21	03/28/24	100,000	250,000
Hydrogen / Mobile Fuel Cell Technologies and Infrastructure						
20033	Port of Long Beach	Sustainable Terminals Accelerating Regional Transportation (START) Phase I	06/04/21	04/30/22	500,000	102,964,064
20169	Port of Los Angeles	Develop & Demonstrate Near-Zero and Zero Emissions Vehicles and Equipment at the Ports	06/28/21	11/30/22	1,000,000	83,548,872
21313	SunLine Transit Agency	Deployment of 5 Zero-Emission Fuel Cell Transit Buses	08/27/21	09/30/25	204,921	6,761,125
21336	Frontier Energy, Inc.	Participate in California Fuel Cell Partnership for Calendar Year 2021	01/01/21	12/31/21	70,000	1,300,000

Table 3: Contracts Executed or Amended (w/\$) between January 1 & December 31, 2021 (cont'd)

Contract	Contractor	Project Title	Start Term	End Term	South Coast AQMD \$	Project Total \$
21386	National Renewable Energy Laboratory	CA Hydrogen Heavy-Duty Infrastructure Research Consortium H2@Scale Initiative	09/03/21	09/02/23	25,000	1,171,000
Stationary Clean Fuels Technologies						
21266	University of California Irvine	Develop Model for Connected Network of Microgrids	08/17/21	02/16/24	290,000	370,000
Technology Assessment and Transfer / Outreach						
12376	University of California, Riverside/CE-CERT	Technical Assistance with Alternative Fuels, Biofuels, Emissions Testing & Zero-Emission Transportation Technology	06/13/14	05/31/24	75,000	75,000
19078	Green Paradigm Consulting, Inc.	Technical Assistance with Alternative Fuels, EVs, Charging & Infrastructure and Renewable Energy	09/07/18	09/30/24	50,000	50,000
19227	Gladstein, Neandross & Associates LLC	Technical Assistance with Alternative Fuels & Fueling Infrastructure, Emissions Analysis & On-Road Sources	02/01/19	01/31/22	100,000	100,000
20085	CALSTART Inc	Technical Assistance for Development & Demonstration of Infrastructure and Mobile Source Applications	11/08/19	11/07/23	100,000	100,000
21260	Fred Minassian	Technical Assistance with Incentive and Research and Development Programs	04/13/21	10/12/21	75,000	75,000
22096	AEE Solutions LLC	Technical Assistance with Heavy-Duty Vehicle Emission Testing, Test Methods and Analysis of Real-World Activity Data	11/08/21	11/07/23	100,000	100,000
Various	Various	Cosponsor 7 Conferences, Workshops & Events plus 2 Memberships	01/01/21	12/31/21	132,091	1,234,920
Direct Pay	Prizm Imaging	Procure Outreach Materials	01/01/21	12/31/21	4,577	4,577
Direct Pay	Various	Advanced Technology Program Expenses	01/01/21	12/31/21	21,331	21,331
						\$252,950,852

Table 4: Supplemental Grants/Revenue Received into the Clean Fuels Fund (31) in CY 2021

Revenue Agreement #	Revenue Source	Project Title	Contractor	SCAQMD Contract #	Award Total \$
20309	US EPA Airshed Grant	Delivery Truck Replacement Project	Daimler Trucks North America LLC	20296	4,010,000
20132	Southern California Gas Company	Develop a Near-Zero Natural Gas and Propane Conversion System for On-Road Medium-Duty Vehicles	Agility Fuel Solutions LLC	20199	154,325
21069	Southern California Gas Company	Evaluate Vehicle Maintenance Costs between NG and Diesel Fueled On-Road Heavy Duty Vehicles	West Virginia University Research Corp	21169	150,000
<i>Table 4 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 (2021).</i>					\$4,314,325

Table 5: Summary of Federal, State and Local Funding Awarded or Recognized in CY 2021

Awarding Entity or Program	Award (*) or Board Date	Purpose	Contractors	Award Total/ Fund
California Air Resources Board	01/08/21	Develop and Demonstrate Capture and Control System for Oil Tankers	STAX Engineering, Inc.	\$10,000,000 Fund 83
San Pedro Bay Ports	01/08/21	Develop and Demonstrate Capture and Control System for Oil Tankers	STAX Engineering, Inc.	\$666,667 Fund 83
US EPA CATI Grant	06/04/21	Develop and Demonstrate Two Class 8 Hydrogen Fuel Cell Trucks	Hyundai Motor Company	\$500,000 Fund 31
California Air Resources Board	06/04/21	Zero-Emission Drayage Truck and Infrastructure Pilot Project	Various	\$16,019,316 Fund 67
California Energy Commission	06/04/21	Zero-Emission Drayage Truck and Infrastructure Pilot Project	Various	\$10,964,955 Fund 67
Port of Long Beach	06/04/21	Zero-Emission Drayage Truck and Infrastructure Pilot Project	Various	\$1,500,000 Fund 67
Port of Los Angeles	06/04/21	Zero-Emission Drayage Truck and Infrastructure Pilot Project	Various	\$1,500,000 Fund 67
California Air Resources Board	09/03/21	Establish Wildfire Smoke Clean Air Centers Incentive Pilot Program	Various	\$250,000 Fund 75
US EPA Airshed Grant	12/03/21	Zero-Emission Freight Line-Haul Locomotive Repower with Supporting Charging Infrastructure	BNSF	\$4,967,000 Fund 17

**Table 5: Summary of Federal, State and Local Funding Awarded or Recognized in CY 2021
(cont'd)**

Awarding Entity or Program	Award (*) or Board Date	Purpose	Contractors	Award Total/ Fund
US EPA Airshed Grant	12/03/21	Long-Range Class 8 Fuel Cell Truck Demonstration	Hyundai Motor Company	\$3,500,000 Fund 17
<p><i>Table 5 provides a comprehensive summary of revenue <u>awarded</u> to South Coast AQMD during the reporting CY (2021) 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>				\$48,682,950

Project Summaries by Core Technologies

The following summaries describe the contracts, projects and studies executed, or amended with additional dollars, in CY 2021. They are listed in the order found in Table 3 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.

Electric / Hybrid Technologies and Infrastructure

19278: Low Impact Green Heavy Transport Solutions (LIGHTS) - Develop and Demonstrate Zero Emissions Heavy-Duty Trucks, Freight Handling Equipment, EV Infrastructure and Renewable Energy

Contractor: Volvo Group North America	South Coast AQMD Cost-Share	\$ 0
	Cosponsors:	
	CARB <i>(received as pass-through funds into Fund 67)</i>	596,963
	U.S. EPA <i>(received as pass-through funds into Fund 67)</i>	600,000
Term: 4/17/19 – 6/30/22	Total Cost:	\$ 1,096,963

Volvo Group North America and South Coast AQMD secured a CARB ZANZEFF grant for the Volvo LIGHTS project to demonstrate 23 Class 8 battery electric trucks at two freight handling facilities, Dependable Highway Express (DHE) in Ontario and NFI Industries in Chino. The Volvo LIGHTS project also includes the demonstration of 29 battery electric forklifts, yard tractors and support EVs; 56 Level 2 and DC fast chargers; and production of 1.8 million MWh annually of solar. This contract amendment is for installation of 832 kW of solar at NFI and for the deployment of two additional battery electric trucks, utilizing CARB and U.S. EPA funds respectively.

20296: Deploy Zero Emission Electric Delivery Trucks

Contractor: Daimler Trucks North America	South Coast AQMD Cost-Share	\$ 0
	Cosponsors:	
	US EPA <i>(received as pass-through funds into Fund 31)</i>	4,010,000
	DTNA	3,260,000
	HVIP/SCE Charge Ready	5,040,000
Term: 5/27/21 – 12/31/24	Total Cost:	\$ 12,310,000

Daimler Trucks North America (DTNA) to develop and deploy its first commercial-ready Class 8 (eCascadia) and Class 6 (eM2) battery electric vehicles with major fleet operators in the Basin beginning in 2022. Twenty eCascadia and 15 eM2 heavy-duty trucks will be distributed amongst U.S. Foods, JB Hunt, Ryder Truck, and Schneider. Fleet operators will secure DC Fast Charge infrastructure with technical support from DTNA and financial support from Southern California Edison's Charge Ready program.

21077: Develop and Demonstrate up to 8 Heavy-Duty Battery Electric Trucks and Transportable Fast-Charging

Contractor: Daimler Trucks North America	South Coast AQMD Cost-Share	\$ 1,000,000
	Cosponsors:	
	DTNA	4,919,500
	BAAQMD	322,500
	SCE and PG&E	500,000
Term: 3/11/21 – 3/31/23	Total Cost:	\$ 6,742,000

Daimler Trucks North America (DTNA) to develop a Commercial Experience (CX) project to demonstrate up to eight pre-commercial-ready battery electric Class 8 (eCascadia) and Class 6 (eM2) trucks with 12-18 major fleets in the South Coast Air Basin and in the Bay Area AQMD. This project will provide DTNA customers with 2 to 9 months of vehicle use and to experience EV recharging using a transportable DC Fast Charge system from Charge Point that will minimize costs and installation challenges associated with in-ground charging infrastructure. The project is expected to stimulate customer interest in and accelerate customer orders for commercial product.

21153: Switch-On: Develop and Deploy Seventy Heavy-Duty Battery Electric Vehicles

Contractor: Volvo Group North America, LLC	South Coast AQMD Cost-Share	\$ 2,000,000
	Cosponsors:	
	U.S. EPA	19,460,000
	Volvo/Fleets	10,000,000
Term: 6/10/21 – 9/30/24	Total Cost:	\$ 31,460,000

The Switch-On project builds on the progress achieved from the Volvo LIGHTS project by deploying 70 commercial Class 8 battery electric trucks at six fleets for drayage and freight applications. Trucks will be deployed in 2022 and 2023 and EV charging infrastructure will be installed at each fleet to support fleet operations. Data collection and analysis will be conducted by Volvo and their subcontractor Energetics through March 2024. Volvo will provide a final report to U.S. EPA detailing the experiences of fleets with commercial battery electric trucks and lessons learned.

Engine Systems / Technologies

20199: Develop a Near-Zero Natural Gas and Propane Conversion System for On-Road Medium-Duty Vehicles

Contractor: Agility Fuel Solutions LLC	South Coast AQMD Cost-Share	\$ 453,500
	Cosponsors:	
	SoCalGas <i>(received as pass-through funds into Fund 31)</i>	154,325
Term: 07/01/21 – 12/31/22	Total Cost:	\$ 1,834,000

In October 2019, South Coast AQMD's Governing Board (Board) approved three projects to develop the new Ford 7.3-liter near zero NOx engine natural gas and propane conversion systems, including an award to Agility Fuel Solutions (Agility). Due to the lack of Ford Qualified Vehicle Modifiers (QVM) program approvals, staff was unable to finalize the contract with Agility. The Ford QVM program assures that vehicles converted through the program are converted to Ford standards and the given QVM can carry the added alternative fuel components and emissions warranty. Agility has demonstrated their commercialization strategy as well as aftermarket service and warranty capability for their current large fleet of low-NOx natural gas and propane vehicles that include the Ford 6.8-liter natural gas trucks converted under the QVM program. Agility Fuel Solutions will develop all hardware and software necessary to operate and certify the next generation Ford 7.3L engine on both CNG and propane (liquid petroleum gas or LPG). Agility will secure MY 2021 CARB Executive Orders for the 7.3L running on CNG and LPG at the lowest OLNS (Optional Low NOx Standard) of 0.02 g/bhp-hr NOx, with a demonstration target of 0.01 g/bhp-hr over a certification test cycle.

Fuel / Emissions Studies

21103: Perform Investigation Study of E15 Gasoline Fuel Effects

Contractor: University of California, Riverside	South Coast AQMD Cost-Share	\$ 200,000
	Cosponsors:	
	CARB	500,000
	RFA/Growth Energy	600,000
Term: 03/09/21 – 06/08/22	Total Cost:	\$ 1,300,000

CARB's, Renewable Fuels Association (RFA), Growth Energy and UCR have partnered together and are proposing to evaluate criteria and toxic pollutant emissions from twenty gasoline vehicles of different model years, emission standards, manufacturers and engine technology on both E10 and E15 fuels for the purpose of approving the use of E15 in California. Triplicate testing will be conducted using U.S. EPA's Federal Test Procedure-75 typically used for passenger cars. Emission measurements will include regulated pollutants, fuel economy, carbonyl compounds and VOCs. UCR proposes to expand the scope and add in-depth characterization of the secondary organic aerosols (SOA) forming potential from a subset of ten vehicles that best represent vehicle populations in the Basin. Both primary and secondary aerosols will be characterized in each experiment. UCR will perform a SOA formation potential study on a subset of ten vehicles that best represent the fleet of the Basin. The data gathered

will add additional information of impact of E15 on air quality in our region. There are three novel aspects for this program: (1) characterizing SOA forming potential from current generation gasoline vehicles, including port fuel injection (PFI), gasoline direct injection (GDI), and possible hybrid technologies, (2) compare the SOA forming potential between the typical CA E10 fuel and the candidate E15 blend to potentially be introduced to the CA gasoline pool, and (3) show environmental, air quality, and health benefits from the introduction of a gasoline fuel containing higher content of biofuel.

21169 Evaluation of Vehicle Maintenance Costs Between NG and Diesel Fueled On-Road Heavy-Duty Vehicles

Contractor: West Virginia University Research Corp	South Coast AQMD Cost-Share	\$ 100,000
	Cosponsors:	
	SoCalGas (received as pass-through funds into Fund 31)	150,000
Term: 09/29/21 – 03/08/24	Total Cost:	\$ 250,000

South Coast AQMD has been supporting the rapid deployment of near-zero emission 0.02 g/bhp-hr NO_x vehicles through its incentive programs since the first near-zero heavy-duty natural gas engines became commercially available in 2015. In evaluating natural gas vehicle (NGV) total cost of ownership (TCO), maintenance costs are often cited as a potential advantage that reduces NGV TCO relative to comparable diesel-powered vehicles due to lack of exhaust aftertreatment systems. There is no recent data that clearly compares the relative maintenance costs of NGVs and diesel trucks, especially for advanced natural gas and diesel technologies introduced in the last decade. The Basin includes one of the largest NGV fleets, including near-zero emission NGVs. Combined with the unique urban duty cycle Basin, a more detailed and regionally focused maintenance study is necessary to help understand the TCO and drive greater adoption of the NGVs. West Virginia University-Center for Alternative Fuels Engines (WVU) and Emissions is to perform a comparative evaluation of vehicle maintenance costs between natural gas and diesel fueled vehicles. The WVU project will enable correlation of vehicle maintenance costs to already available fleet information, real-world vehicle activity and in-use emissions data.

Hydrogen / Mobile Fuel Cell Technologies and Infrastructure

20033: Sustainable Terminals Accelerating Regional Transportation (START) Phase I

Contractor: Port of Long Beach	South Coast AQMD Cost-Share	\$ 500,000
	Cosponsors:	
	CARB	50,000,000
	Ports/Project Partners	52,464,064
Term: 6/4/21 – 4/30/22	Total Cost:	\$ 102,964,064

CARB provided funding to POLB for their START project to demonstrate 102 zero and near-zero emission vehicles, vessels, and cargo handling equipment across an intermodal freight network at the Ports of Long Beach, Oakland and Stockton and partnership with South Coast, Bay Area, and San

Joaquin Valley air quality agencies. This project will assist in the transition to zero emission operations, reduce GHG and criteria pollutants, and provide economic, environmental and public health benefits to residents in disadvantaged communities. This demonstration includes battery electric yard tractors, top handlers, forklifts, Class 8 trucks, RTG cranes, electric drive tugboat, rail car mover, and low NOx ocean going vessels. This project was originally planned to be completed in April 2022 and is now being extended by CARB.

20169: Develop & Demonstrate Near-Zero and Zero Emissions Vehicles and Equipment at the Ports

Contractor: Port of Los Angeles	South Coast AQMD Cost-Share	\$ 1,000,000
	Cosponsors:	
	CARB	41,122,260
	CEC	25,999,331
	Toyota	9,740,000
	Others: --Kenworth Truck Company --Port of Hueneme --Shell Oil Products USA --Southern Counties Express --Total Transportation Services --UPS,	4,685,433
Term: 07/21/21 – 11/30/22	Total Cost:	\$ 82,547,024

The POLA's Shore to Store (S2S) Project is to develop and demonstrate ten Kenworth zero emissions Class 8 hydrogen fuel cell electric trucks, integrated with Toyota's fuel cell drive technology, along with the two hydrogen fueling stations that will be built in Ontario and Wilmington. All deployments will be based in disadvantaged communities. The hydrogen fuel cell electric trucks will be operated by UPS, Total Transportation Services, Inc., Southern Counties Express and Toyota Logistics Services (TLS) throughout the Los Angeles basin ports, inland locations such as Riverside County and the Port of Hueneme (POH). Additionally, POH will demonstrate two electric yard tractors, and TLS will demonstrate two zero emissions forklifts at their facility.

21313: Deployment of 5 Zero-Emission Fuel Cell Transit Buses

Contractor: SunLine Transit Agency	South Coast AQMD Cost-Share	\$ 204,921
	Cosponsors:	
	US EPA <i>(received as pass-through funds into Fund 17)</i>	5,750,0000
	SunLine Transit Agency	806,204
Term: 08/27/21 – 09/30/25	Total Cost:	\$ 6,761,125

SunLine Transit Agency provides transit services to the Coachella Valley, an ozone non-attainment area, including Eastern Coachella Valley, which is a Year 2 Community under South Coast AQMD's AB 617 Program. SunLine has recently commissioned their onsite renewable hydrogen fueling station

at a 900 kg per day capacity, which is the largest onsite hydrogen generation station at any U.S. transit agency, and their existing fleet SunLine's goal is to accelerate the transition to a fully zero emission bus fleet by 2035 to comply with CARB's Innovative Clean Transit (ICT) regulation. South Coast AQMD is partnering with SunLine Transit Agency to purchase and deliver up to five fuel cell transit buses. The newly upgraded hydrogen fueling station has a capacity for 30 buses, with a total of 21 buses now utilizing the station. Buses will operate on several routes in disadvantaged communities and replace older model year CNG transit buses. SunLine expects to operate up to five fuel cell transit buses for their 12-year equipment lifetime.

21336: Participate in California Fuel Cell Partnership for Calendar Year 2021

Contractor: Frontier Energy Inc	South Coast AQMD Cost-Share	\$ 70,000
	Cosponsors:	
	7 automakers, 3 public agencies, 7 industry stakeholders, 35 Full & Associate Members	1,288,000
Term: 01/01/21 – 12/31/21	Total Cost:	\$ 1,358,000

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 2021, South Coast AQMD contributed \$70,000 for Executive membership.

21386: California Hydrogen Heavy-Duty Infrastructure Research Consortium H2@Scale Initiative

Contractor: National Renewable Energy Laboratory	South Coast AQMD Cost-Share	\$ 25,000
	Cosponsors:	
	Fuel Cell Technologies Office, U.S. DOE	999,000
	CEC	25,000
	GO-Biz, CARB (In-kind)	65,000
Term: 06/30/20 – 04/01/22	Total Cost:	\$ 1,114,000

A team of California public agencies (CARB, CEC, Governor's Office of Business and Economic Development (GO-Biz), South Coast AQMD) and national laboratories formed a research partnership in 2017 focused on near-term hydrogen infrastructure development, deployment, and operation needs in California and was awarded DOE H2@Scale CRADA funds that year. The research partnership framework was intended to continue beyond that project for a long-lasting strategic partnership with the DOE, agencies, and national laboratories. As California has begun in earnest to expand its light-duty focus to include the medium- and heavy-duty fuel cell electric vehicle market, the research partnership submitted a project proposal to DOE's H2@Scale CRADA Call AOI 1: Fueling Components for Heavy-Duty Vehicles. This project will continue to conduct hydrogen infrastructure research efforts, focused on California heavy-duty hydrogen infrastructure priorities. Tasks include

heavy-duty reference station design, fueling performance test device design, and modeling of heavy-duty station capacity.

Stationary Clean Fuels Technologies

21266: Develop Model for Connected Network of Microgrids

Contractor: University of California, Irvine	South Coast AQMD Cost-Share	\$ 290,000
	Cosponsors:	
	University of California, Irvine	80,000
Term: 08/17/21 – 02/16/24	Total Cost:	\$ 370,000

The proposed project will develop a model to assess air quality impacts of connected microgrids serving the SCAB by evaluating the use of various power generation technologies in microgrids and alternative transportation (battery electric and fuel cell) vehicles operating under microgrid control. In the project, university campuses, ports, shopping centers and critical facilities will be modeled to assess air quality impacts resulting from widespread deployment of microgrids. The study will include evaluating air quality impacts during both grids connected and islanded modes, including public safety power shutoff events, and estimating overall NOx benefits by emission reduction factors of microgrids such as system efficiency, energy storage, electricity delivery losses and combined heat and power system. Potential aggregated NOx emission reductions using connected and islanded operations may be up to 6 tons per day, comparable to the NOx emission reductions from the recently adopted Omnibus Regulation for heavy-duty engines. For mobile sources, electrolysis facilities could allow a more sustainable and economic hydrogen supply for fuel cell electric vehicles.

Technology Assessment and Transfer / Outreach

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	\$ 75,000
Term: 06/13/14 – 05/31/24	Total Cost:	\$ 75,000

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
Term: 09/07/18 – 09/30/24	Total Cost:	\$ 857,236

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 amendment is for technical and administrative support to enable the range of activities involved in implementing the Clean Fuels Program. The contract also includes assistance in implementing complementary programs including CARB's GGRF Zero Emission Drayage Truck project and ZANZEFF Volvo LIGHTS project, and U.S. EPA's Targeted Airshed Volvo Switch-On project.

19227: Technical Assistance with Alternative Fuels and Fueling Infrastructure, Emissions Analysis and On-Road Sources

Contractor: Gladstein, Neandross & Associates LLC	South Coast AQMD Cost-Share	\$ 100,000
Term: 02/01/19 – 01/31/22	Total Cost:	\$ 300,000

This contract leverages staff resources with specialized outside expertise. Gladstein, Neandross & Associates LLC (GNA) has previously assisted South Coast AQMD with implementing a wide-array of incentive programs to deploy lower-emitting heavy-duty vehicles and advanced transportation technologies. Under this contract, GNA will provide technical expertise across a broad spectrum of emission reduction technologies, including alternative and renewable fuels and fueling infrastructure, emissions analysis and heavy-duty on-road sources on an-as-needed basis. This contract amendment is for assistance in preparation of proposals for zero emission trucks and charging infrastructure.

20085: Technical Assistance for Development and Demonstration of Infrastructure and Mobile Source Applications

Contractor: CALSTART Inc.	South Coast AQMD Cost-Share	\$ 100,000
Term: 11/08/19 – 11/07/23	Total Cost:	\$ 250,000

This contract is to leverage staff resources with specialized outside expertise. CALSTART Inc. is a nonprofit that specializes in clean transportation technologies, fuels, and systems. CALSTART Inc. manages a wide range of national clean transportation and grant programs in close partnership with federal, state and regional agencies that address national and international issues related to creating the next generation of jobs and reducing emissions from transportation. CALSTART has been working as an effective catalyst for the global advanced transportation technology industry for over a decade and works closely with key public and private sector stakeholders in the industry. This contract amendment is for assistance on deployment and demonstration of infrastructure and mobile source applications.

21260: Technical Assistance with Incentive and Research and Development Programs

Contractor: Fred Minassian	South Coast AQMD Cost-Share	\$ 75,000
Term: 04/13/21 – 10/12/22	Total Cost:	\$ 75,000

This contract leverages staff resources with specialized outside expertise. Over the course of his 35+ year career, Mr. Minassian has been involved with many aspects of air quality management and policy-making, including implementing and managing incentive programs, overseeing research projects and serving in a variety of advisory roles. He managed numerous research and development (R&D) projects including on-road emissions, development of low-NOx heavy-duty engines, and development of electric and hybrid electric vehicles. He then served as Technology Implementation Manager where he was responsible for the successful implementation of incentive programs such as the Carl Moyer, Lower-Emission School Bus, Prop 1B, Replace Your Ride and the NOx and PM credit generation programs. After his retirement from South Coast AQMD employment as Assistant Deputy Executive Officer for Science and Technology Advancement, he served as Board Assistant for Board Member Judith Mitchell at South Coast AQMD and CARB boards for a period of fourteen months. Fred has B.S. and M.S. degrees in Chemical Engineering from the Engineering Academy of Denmark, and the California State University, Northridge, respectively. Under this contract, Mr. Minassian will provide technical expertise across a broad spectrum of incentive and R&D programs to be implemented under Technology Advancement Office (TAO) activities on an-as-needed basis. Mr. Minassian has expert, in-depth understanding of both the incentive and R&D programs.

22096: Technical Assistance with Heavy-Duty Vehicle Emissions Testing, Test Methods and Analysis of Real-World Activity Data

Contractor: AEE Solutions, LLC	SCAQMD Cost-Share	\$ 100,000
Term: 11/08/21 – 11/07/23	Total Cost:	\$ 100,000

This contract leverages staff resources with specialized outside expertise. Under this contract, AEE Solutions, LLC, will provide technical assistance for the in-use emissions study under this existing Board-approved technical assistance contract. Specifically, AEE Solutions will assist in the: 1) development of test vehicle selection, activity and emissions protocols, 2) recruitment of 200 heavy-duty test vehicles, 3) preparation of a technology assessment plan to identify the impact of current and near-future technology on engine performance, emissions and fuel usage, 4) identification of engine and aftertreatment issues and how to mitigate them, and 5) matching of vehicle technologies to vocations for which technology benefits can be maximized.

Various: Cosponsor 7 Conferences, Workshops and Events plus 2 Memberships

Contractor: Various	South Coast AQMD Cost-Share	\$ 132,091
	Cosponsors:	
	Various	1,102,829
Term: 01/01/21 – 12/31/21	Total Cost:	\$ 1,234,920

The South Coast AQMD regularly participates in and hosts or cosponsors conferences, workshops and miscellaneous events. In CY 2021, South Coast AQMD provided funding for 7 conferences, workshops and events and 2 memberships in key stakeholder organizations, as follows: Clean Fuels Advisory Group Retreat in January and September 2021; the PEMS Conference in March 2021; Special Awards

at the California State Science Fair in April; the ACT Conference and Expo in August 2021; the International Colloquium on Environmentally Preferred Advanced Generation (ICEPAG) 2021 Hydrogen: Fueling the Sustainable Future in September 2021; the Asilomar 2021 Conference on Transportation & Energy in October 2021; and the 2021 Southern California Chinese-American Environmental Protection Association 30-Year Anniversary and Annual Convention in November 2021. Additionally, for 2021, two memberships were renewed for participation in California Stationary Fuel Cell Collaborative, consists of a Core Group comprised of representatives of California agencies associated with fuel cell technology and an Industrial Advisory Panel (IAP) to explore, support, and facilitate the deployment of fuel cell technologies as a means of reducing or eliminating air pollutants and greenhouse gas emissions; increasing energy efficiency; enhancing resiliency, public health and energy independence; and assisting the state of California in realizing a sustainable energy future; 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	\$ 4,577
Term: 01/01/21 – 12/31/21	Total Cost:	\$ 4,577

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 2021, 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: Advanced Technology Program Expenses

Contractor: Various	South Coast AQMD Cost-Share	\$ 21,331
Term: 01/01/21 – 12/31/21	Total Cost:	\$ 21,331

The South Coast AQMD advanced technology program showcases new clean-fuel technologies 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 technologies. This direct pay covers cost of annual EV charging fees and use tax on purchase of hydrogen fueling equipment.

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CLEAN FUELS PROGRAM

Progress and Results in 2021

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 8 provides a list of 30 projects and contracts completed in 2021. Summaries of the completed technical projects are included in Appendix C. Selected projects completed in 2021 which represent a range of key technologies from near-term to long-term are highlighted below: (a) Zero Emission Cargo Transport (ZECT) Program; (b) Demonstrate Zero Emission Cargo Handling Vehicles at POLB; and (c) Develop and Demonstrate Zero-Emission Fuel Cell Electric Buses.

Zero Emission Cargo Transport (ZECT) Program

Heavy-duty diesel-powered trucks are a prime contributor to NO_x and ozone emissions in the Basin and carbon dioxide from fossil-fueled internal combustion engines (ICEs) contribute to global GHG emissions. Accelerating the widespread deployment of zero and near-zero tailpipe emission vehicles, powered by low carbon intensity energy will significantly reduce NO_x, ground level ozone and GHGs.

The ZECT program, developed through the US Department of Energy (USDOE), provided the South Coast AQMD with \$4.17 million in 2012 to advance battery electric Class 8 tractors used in cargo transportation. The program intended to develop 13 trucks with four manufactures using battery-electric and hydrogen fuel cell technologies; two of the companies dropped out of the project in the early stages. South Coast AQMD secured two contracts each with two California-based integrators: TransPower (Escondido, CA now with Meritor) and US Hybrid (Torrance, CA now with Ideanomics) to build all battery-electric tractors (BET), and plug-in hybrid-electric tractors (PHET) with all-electric-range (AER) and clean alternative fuel. Vehicles were demonstrated in “real-world” operations with local drayage fleets operating in the San Pedro Bay Ports complex. Total project costs were \$9.375 million. Project closure was March 31, 2020.



Figure 11: San Pedro Bay Ports Complex (J. Gritchen, LB Press telegram)

ZECT-1 was the first of two “ZECT” programs. ZECT-1 focused on advancing the BET technology. With less emphasis placed on electric vehicle supply equipment (EVSE) charging infrastructure, all vehicles were designed to charge with a low cost 60 kW marine-grade charging system selected and installed by TransPower. NREL provided third-party data analysis, and independent chassis dynamometer work was performed by the University of California at Riverside (UCR).

ZECT-1 has successfully demonstrated and advanced BET and PHET technologies. BET system efficiencies nearly doubled to 2.2 kWh/mi from a comparable 2011 study and freight customers began considering zero-emission goods movement. Further impact of the ZECT-1 is that it attracted major OEMs to initiate commercial-ready Class 6 and 8 battery-electric product development and demonstration efforts, with expected commercial releases in 2022 and 2023. Each platform met or exceeded the power and torque of 9-liter diesel tractors, demonstrated good gradeability and load hauling capability with range (under 100 miles) and systems troubleshooting being limiting factors. Both integrators started with Lithium Iron Phosphate (LFP) and ended with Nickel Manganese Cobalt (NMC) batteries. Poor battery quality, poor battery supplier reliability, greater range without payload loss were driving forces to change from LFP to NMC systems. Below are the BET and PHET platforms developed under ZECT-1.

Figure 12: BETs



Figure 13: PHETs



Table 6: 2012 ZECT-I Demonstration Portfolio

	Battery Electric Trucks		Plug-In Hybrid Electric Trucks	
Developer	TransPower	US Hybrid	TransPower	US Hybrid
No. of Trucks	4	2	2	3
Hybrid Architecture	N/A	N/A	Series	Parallel
Chassis Make and Model	International Prostar	International Prostar	International Prostar	Peterbilt 384
Traction Motor/kW	D-PMag*/300	D-PMag/320	D-PMag/300	D-PMag/240
Transmission	Auto-Manual	Direct Drive	Auto-Manual	Automatic
Auxiliary Power Unit	N/A	N/A	3.7 liter CNG	8.9 liter LNG
Batt. (kWh)/Fuel (DGE)	215-311	180-240	138/60 (CNG)	80/72 (LNG)
Charger/Power (kW)	On-Board ICU/70	On-Board/60	On-Board ICU/70	On-Board/20
Charge/Fuel Time	2.5–4 hrs	3-4 hrs	2 hrs /15 min	3-4 hrs /15 min
Vehicle Range / AER	75-150	70-100	200 /30-40	250+ /30

*D-PMag is Dual Permanent Magnet Motor

BETs: TransPower developed its ElecTruck™ or Electric Drayage Demonstration (EDD) trucks. These trucks employed two tandem-mounted 150 kW Permanent Magnet (PM) electric traction drive motors designed and supplied by Quantum Technologies (used in the Fisker-Karma hybrid-electric vehicle). An Eaton 10-speed manual transmission with computer-controlled actuation produced the “automated manual transmission” feature. Drive batteries started with 215 kWh LFP and later to 311 kWh NMC. EDDs used a combined Inverter/Charger Unit (ICU), company-designed battery modules and Battery Management System (BMS) and a proprietary vehicle control system to optimize vehicle efficiency, maximize battery life, and protect key components from excessive temperatures, voltage spikes, or current surges.



Figure 14: First Four EDD Trucks – March 2015

Figure 14 shows the four EDD trucks; three additional EDDs were developed with CEC funds under separate contract. EDD trucks accumulated more than 43,000 in-use miles with various fleet operators, including TTSI, California Cartage Company, National Retail Trucking, 3 Rivers Trucking, SA Recycling, Knight Transportation Services, Pasha Stevedoring and Terminals, BAE Systems, and Terminalift. Data collected from this project showed runs averaging about 50-60 miles and an average energy efficiency of 2.3 kWh/mi with loads.

Another advancement that resulted from the early work on ZECT-1 was that TransPower integrated improved electric drive systems adding 308 kWh of Nissan NMC batteries into 12 Peterbilt 579 Class 8. Also, the EDD trucks served as the base system for a hydrogen fuel cell range extender project under separate funding from CARB.



Figure 15: eTruck-1 with 180 kWh LFP 11-Pack



Figure 16: eTruck-2 with 280 kWh NMC 6-Pack

US Hybrid built two BETs or eTrucks™ under ZECT-1 (Figures 15 & 16). Initially, a single, less costly 320 kW Induction drive motor was selected, but in 2014 following their study of how to meet necessary and continuous power and torque requirements, changed to a DPM. US Hybrid used a direct drive transmission to reduce drivetrain losses. US Hybrid’s first eTruck, deployed into drayage demonstration in 2015, used 180 kWh of LFP batteries configured into 11 battery packs mounted along the rail. Preliminary testing showed an average energy efficiency of 3.3 kWh/mi and 50 mile range under full load. eTruck-2 used 280 kWh of NMC batteries, configured into 6 battery packs, to produce 100 mile range and an overall average efficiency of 2.2 kWh/mile.



Figure 17 TransPower’s PHET-2 Rear Mounted ICE

PHETs: TransPower built two series-hybrid PHET’s based on its BET platform. The series-hybrid used a Ford 3.7-liter spark-ignited, CNG-fueled, automotive ICE with a three-way catalyst as a “gen-set”, to supplement the drive batteries. The small ICE was mounted “behind-the-cab” as seen in Figure 17. US Hybrid developed a parallel-hybrid PHET using a conventional 300 h.p. Cummins ISL-G, 8.9-liter, spark-ignited LNG-powered ICE paired with a 240 kW electric motor, an automatic Allison transmission and 30-miles of AER (see Figures 18 & 19). The electronically controlled pneumatic driven clutch allowed the electric motor to be decoupled from the engine and permit electric only operation seamlessly and fully transparent to the driver. The parallel-hybrid performed like a 13-liter diesel tractor. Each PHET had a different outcome. The series-hybrid was battery dominant, the parallel-hybrid was engine dominant. The series-hybrid met “proof-of-concept” in UCR chassis dynamometer studies, extending battery life and battery electric range, but was less effective in-use, and generated higher than expected emissions because engine codes could not be obtained to fully utilize variable-valve-timing, relegating the ICE to a stationary not automotive application. The parallel-hybrid fulfilled operator’s needs with more than



Figure 18: Two US Hybrid PHETs at TTSI

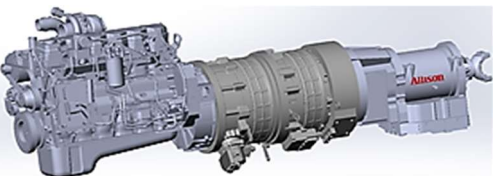


Figure 19: Parallel Hybrid Powertrain: 8.9L ISLG, Dual Electric Motors, Allison Transmission

sufficient power and torque, and in UCR chassis dynamometer studies indicated improved efficiency and emission reductions with AER drive batteries. However, operators rarely recharged the drive batteries, relying on the ICE to maintain state-of-charge, hence minimizing the potential efficiencies and emission reductions.

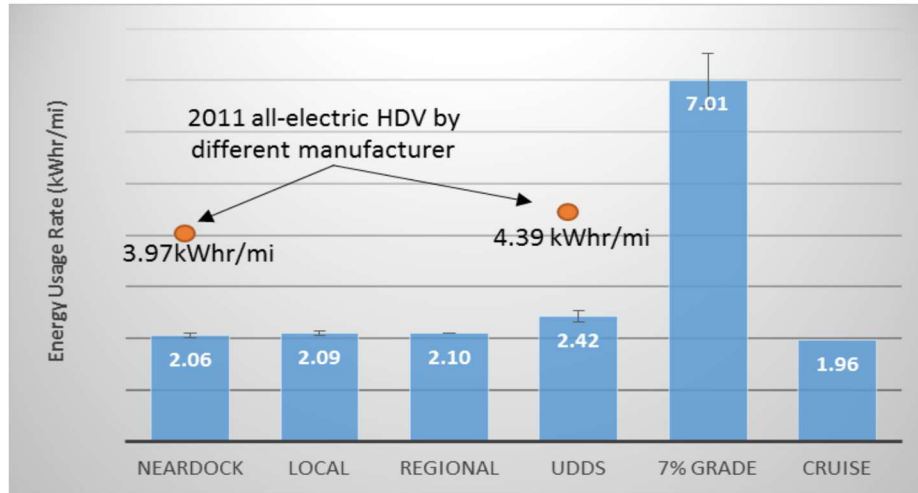


Figure 20: Energy Efficiencies ZECT-1 BETs vs 2011 BET Demonstration

Demonstrate Zero Emission Cargo Handling Vehicle at POLB

POLB completed its C-PORT (Commercialization of POLB Off-Road Technology Demonstration) project in 2021. POLB received \$5.3M in a CARB ZANZEFF grant for its first demonstration of zero emission cargo handling equipment. This included the demonstration of three battery electric top handlers, one battery electric yard tractor and one fuel cell yard tractor.



Figure 21: POLB Demonstrated Battery Electric Top Handlers and Yard Tractor, and a Fuel Cell Yard Tractor

C-PORT required the collaboration of a significant number of project partners. Three Taylor battery electric top handlers developed by BYD; one Kalmar battery electric yard tractor developed by TransPower/Meritor, and one China National Heavy Duty Truck Group Co. fuel cell yard tractor developed by Loop Energy. SSA Marine demonstrated two Taylor and BYD battery electric top handlers at Pier J, and Long Beach Container Terminal (LBCT) demonstrated one Taylor and BYD battery electric top handler and one Kalmar and TransPower/Meritor battery electric yard tractor at Pier E. The project originally included the design, development and demonstration of one fuel cell yard tractor at LBCT. Prior to the demonstration phase, the fuel cell yard tractor developed by CNHTC and Loop Energy was not demonstrated due to a lack of engineering documentation to fully address POLB’s safety and design concerns. The scope change in the C-PORT project reduced the CARB grant funding to \$5.25M with a 50% match share requirement.

Other project partners included: disadvantaged community/equity partners California State University, Long Beach Center for International Trade and Transport, Green Education, Long Beach City College, Long Beach Unified School District Cabrillo High School Academy of Global Logistics; labor partner International Longshore & Warehouse Union; project management partner Momentum; and data collection partners Tetra Tech and University California Riverside College of Engineering Center for Environmental Research and Technology.

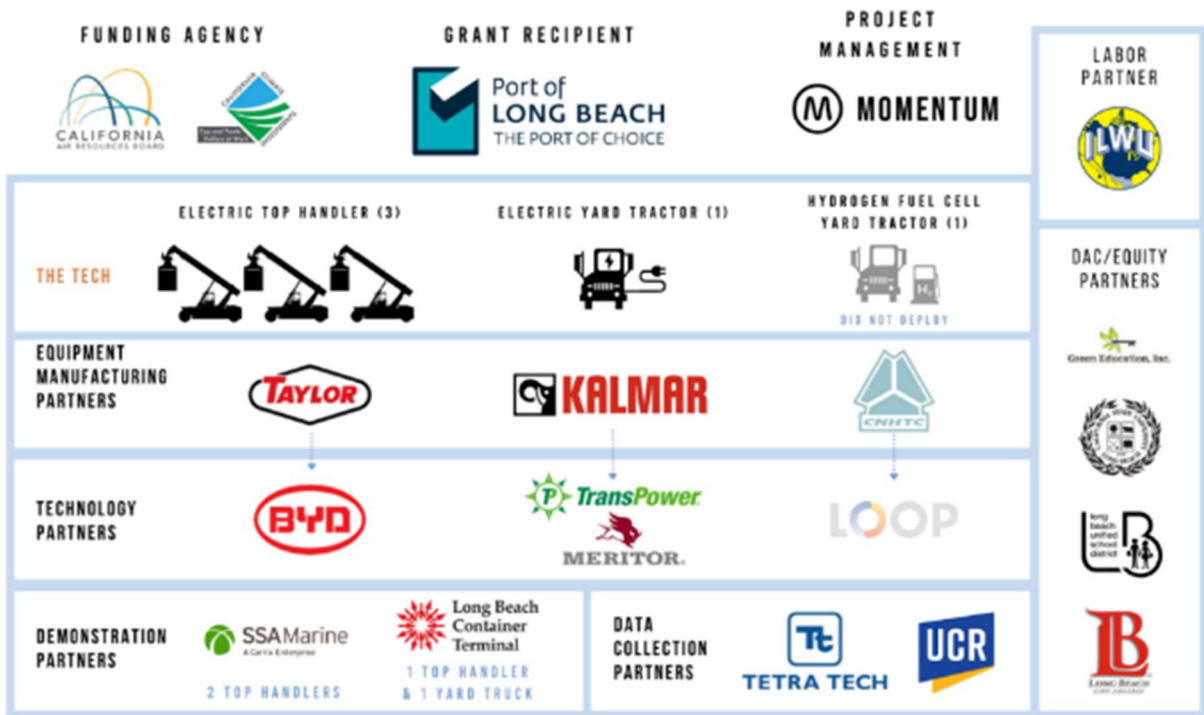


Figure 22: C-PORT Project Sponsors

C-PORT overall goals during its demonstration included: 1) advance economic viability of two types of pre-commercial zero emission cargo handling equipment towards commercialization, 2) demonstration zero emission cargo handling equipment under tough duty cycles in the Port setting, 3) achieve significant GHG and emission reductions, and 4) communicate benefits of zero emission cargo handling equipment at POLB to residents in disadvantaged communities (DAC).

These goals were achieved through the design, manufacture, and demonstration of three battery electric top handlers in operations at two Port terminals, 2) design, manufacture, and demonstration of one battery electric yard tractor and one hydrogen fuel cell yard tractor in a single Port terminal (the fuel cell yard tractor was ultimately removed from the demonstration due to safety concerns), 3) install EVSE to support operation of battery electric cargo handling equipment, and 4) demonstration equipment in revenue service for at least six months and collect real-world data on equipment performance.

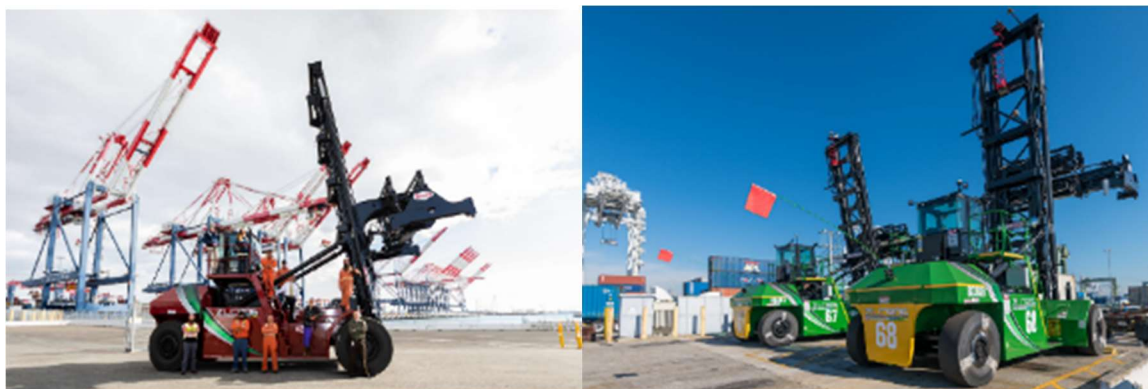


Figure 23: LBCT (Left) and SSA (Right) Demonstrated Taylor and BYD Battery Electric Top Handlers

One battery electric top handler (Taylor and BYD) and one battery electric yard tractor (Kalmar and TransPower/Meritor) were demonstrated at LBCT, which is a mostly autonomous zero emission terminal that used the battery electric cargo handling equipment against rail-limited ad hoc operations. SSA Marine demonstrated two battery electric top handlers (Taylor and BYD) in a more typical seaport container terminal, requiring cargo handling equipment to operate two full shifts entirely.



Figure 24: Kalmar and TransPower/Meritor Battery Electric Yard Tractor (Left) and CNHTC/Sinotruck and Loop Energy Fuel Cell Tractor (Right) Demonstrated at LBCT

To support the battery electric cargo handling equipment, C-PORT required installation of four EVSE. Three 200 kW BYD DC fast chargers were installed for three top handlers and one 200 kW TransPower DC fast charger was installed for the yard tractor. One BYD and one TransPower 200 kW DC fast charger were installed at LBCT, and two 200 kW BYD DC fast chargers were installed at SSA Marine. Battery electric cargo handling equipment and EVSE deployed are shown in Table 7.

Table 7: Battery Electric Cargo Handling Equipment and EVSE by Terminal

User	OEM	Vendor	Equipment	Quantity	Infrastructure
LBCT	Taylor	BYD	Battery-Electric Top Handler	1	200 kW
	Kalmar	TransPower/ Meritor	Battery-Electric Yard Tractor	1	200 kW
	CNHTC	Loop Energy	Fuel-Cell Electric Yard Tractor	1	Mobile fueler
SSA Marine	Taylor	BYD	Battery-Electric Top Handler	2	2 x 200 kW

Port staff assisted in EVSE installation and these were the first EVSE that POLB has deployed. Due to time constraints for the CARB grant, the typical Port design, bid, and build process was not followed and a more dynamic process utilizing OEM and technology providers and performing the work in-house enabled the EVSE installation to be completed more quickly.

C-PORT included educational and workforce development. Green Education led the effort to proactively engage and educate residents of DACs by developing educational materials, conducting 10 citywide community workshops and organizing the 2018 Green Prize Festival to promote interest in zero emission Port technologies. POLB collaborated with Long Beach City College and Academy of Global Logistics (AGL) to develop and execute a capstone project to promote critical thinking around zero emission transformation at POLB. AGL introduced high school students to career opportunities in global trade and logistics through a wide range of training and educational certification programs offered by Long Beach City College and California State University Long Beach. The capstone project focused on how POLB can achieve its 2030 zero emission goal without disrupting economics and job creation at POLB.

The battery electric top handlers were not able to meet the performance requirements of two shifts at SSA Marine terminal, but the battery electric top handler was suitable for work at LBCT. SSA Marine is a busy container terminal where the top handlers have a challenging duty cycle and are required to operate two entire shifts. Operators found that the battery electric top handlers did not maintain enough battery life to be comfortably used for two full shifts. The greatest battery discharge during the demonstration was 91% for 7.61 hours and the longest day was 12.43 hours, with 29% of the days showing operations longer than 7.61 hours for diesel top handlers.

Based on POLA and POLB 2019 Emission Inventories, deploying the battery electric top handlers and yard tractor results in 237,186 MT CO₂e in GHG reductions, 445.1 tons of NO_x, 85.8 tons of total hydrocarbons (THC), and 7.2 tons of PM₁₀.

Taylor reported that the next generation of their battery electric top handler will be a commercial unit featuring technology directly evolved from the C-PORT project. Kalmar reported that information from C-PORT will be used to improve the next generation of their battery electric yard tractors which will go into production in 2022.

Develop and Demonstrate Zero-Emission Fuel Cell Electric Buses

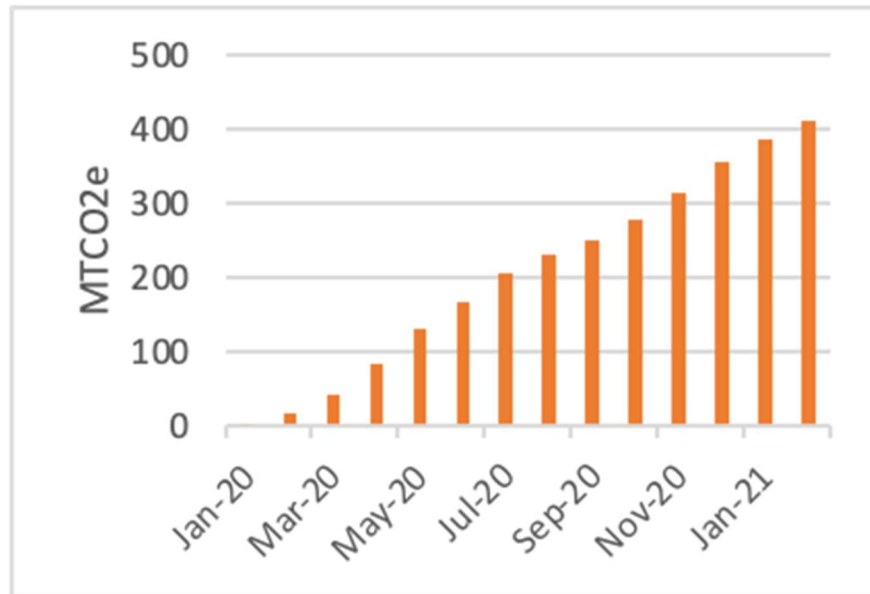
As part of a larger deployment with AC Transit in the Bay Area AQMD jurisdiction, Center for Transportation and Environment (CTE) received a \$22.3 million CARB GGRF grant and \$1 million from South Coast AQMD's Clean Fuels Fund. South Coast AQMD funding went towards the fuel cell buses. Orange County Transportation Authority (OCTA) deployed 10 New Flyer fuel cell transit buses for \$12.9 million, as well as \$989,000 for facility upgrades and \$5.4 million for the hydrogen station, capable of fueling up to 50 fuel cell buses. These prototype buses were placed into daily operations and provided OCTA an opportunity to learn how fuel cell buses could be successfully integrated into their operations. AC Transit also deployed 10 New Flyer fuel cell buses and had previous experience with fuel cell buses and an existing hydrogen station, which they upgraded for this project. The deployment of 20 buses allowed for some savings on the buses as well as to validate vehicle performance, reduce costs, rapid refueling, extended range, and reduced curb and axle weight to increase passenger carrying capacity. The OCTA New Flyer fuel cell bus is shown in Figure 25 below.



Figure 25: New Flyer XHE60 Xcelsior Fuel Cell Bus Deployed at OCTA

Construction of the hydrogen station and delivery of the buses allowed buses to enter into revenue service at AC Transit in January 2020 and at OCTA in February 2020. During one year of revenue service at both transit agencies, the buses accumulated 570,057 miles, 628 metric tons of GHG reductions, and 1.15 tons of weighted emission reductions. In the first year of deployment, the two fleets had an average fuel economy of 8.46 miles per kg, or roughly 9.56 miles per diesel gallon equivalent. This is about twice the average fuel economy of diesel (4.15 miles per diesel gallon) or CNG buses. Figure 26 below illustrates that the buses were able to offset a combined total of 413 metric tons of GHG reductions compared to their respective diesel fleets. The energy efficiency of the fuel cell buses was more than twice of comparable CNG buses.

Figure 26: Cumulative GHG Reductions in First Year of Deployment



The most significant metric used to rate the performance of transit buses is average vehicle availability. The average availability of the fuel cell buses was around 70%, with maximum availability of 80% for any month. Typical transit fleet operators target 85% vehicle availability to provide reliable service. As the technology matures and maintenance becomes routine, fuel cell buses are expected to meet an 85% vehicle availability target.

Another key challenge is minimizing overall environmental impacts by sourcing renewable hydrogen, which is not widely available. Emission reductions were calculated based on the realized carbon intensity of hydrogen fuel supply. Although the fuel cell buses are capable of traveling the same number of miles as diesel buses, their lower vehicle availability meant that the buses did not meet the expected target mileage. This project will provide 11.32 tons of NOx, 2.35 tons of ROG, 0.53 tons of PM 10, and 13,550 metric tons of GHG reductions during the 12-year lifetime for the 10 fuel cell buses deployed at OCTA.



Figure 27: OCTA Hydrogen Station

OCTA Hydrogen Station Statistics

- Developed by Trillium and Air Products
- Liquid hydrogen delivery
- 1600 kg/day @ 350 bar
- Capacity for up to 50 fuel cell buses
- Fueling time: 6 – 10 minutes per bus
- 280 kg peak back to back fills

The project succeeded in validating vehicle performance with increased reliability, durability, and utilization.

- Consistent in-service deployment of 47,787 service hours for the 20 buses.
- 50% reduction in cost compared to AC Transit's current generation of buses. The cost of the 20 fuel cell buses average \$1,288,626 when pricing was negotiated in 2017 upon receipt of CARB grant funding. Previous generation fuel cell buses prior to 2014 were about \$2.5 million per bus. The 2019 California state contract value of buses is now set at \$1,014,979 per bus.
- Fill rates for fuel cell buses were about 2.98 kg per minute for OCTA and 3.16 kg per minute for AC Transit, allowing transit agencies to fill a 36 kg tank in 12 minutes. This falls within the acceptable dwell time of 10-15 minutes for conventional diesel and CNG fleets.
- Increased range, reduced curb weight allowing for higher payloads, shorter fueling times compared to battery electric buses
- Range of up to 300 miles on a single fill of hydrogen were observed in this project
- Reductions of vehicle curb and axle weights (AC Transit bus weighs 32,360 lbs. and OCTA bus weights 33,120 lbs.) enabled these buses to carry more passengers

Newer fuel cells with higher power density, more compact energy storage systems with higher capacity, and use of composite materials in future bus designs will further decrease overall vehicle weight and enable fuel cell buses to meet California's 20,000 lb axle weight limit regulation. Current axle weights are about 21,000 lbs.

In addition, several transit agencies in the Basin have expressed interest in integrating fuel cell buses into their fleets including Santa Monica Big Blue Bus, Foothill Transit, Long Beach Transit, OmniTrans, and SunLine Transit. There are two American bus OEMs, New Flyer, and ENC, that are Buy America compliant so that buses can be purchased as part of other federal funding programs. New Flyer's XHE40 and XHE60 Xcelsior fuel cell buses completed Altoona testing in 2019, making them eligible for purchase through California and federal funding programs. Costs for fuel cell buses have dropped steadily since 2004 when fuel cell bus costs exceeded \$3 million. OEM estimates are now around \$1 million per bus and will continue to decrease as more fuel cell buses are deployed.

Table 8: Projects Completed between January 1 & December 31, 2021

Contract	Contractor	Project Title	Date
Electric / Hybrid Electric Technologies and Infrastructure			
17065	Clean Fuel Connection, Inc.	Installation Services for Installation of EV Chargers at South Coast AQMD Headquarters	Dec 2021
17316	Center for Transportation and the Environment	Develop and Demonstrate 10 Zero-Emission Fuel Cell Electric Buses	Sept 2021
18075†	Selman Chevrolet Company	Lease Two 2017 Chevrolet Bolt All-Electric Vehicles for Three Years	Feb 2021
18151	Rail Propulsion System	Develop & Demonstrate Battery Electric Switcher Locomotive	Dec 2021
18280†	Honda of Pasadena	Three-Year Lease of One Honda 2018 Clarity Plug-In Vehicle	Jun 2021
18397	Port of Long Beach	Demonstrate Zero Emission Cargo Handling Vehicle at POLB	May 2021
20248	Los Angeles County Economic Development Corp	Economic and Workforce Impact Analysis of Electric Revolution in Southern California	Jan 2021
Engine Systems / Technologies			
20122	Landi Renzo USA Corp	Develop and Commercialize a Near-Zero Natural Gas Conversion System for On-Road Medium-Duty Vehicles	Jul 2021
Fuel / Emission Studies			
17245†	West Virginia University Research Corp	In-Use Emissions Testing and Fuel Usage Profile of On-Road Heavy-Duty Vehicles	Sept 2021
17352	California State University Maritime Academy	Develop and Demonstrate Vessel Performance Management Software and Equipment	Jun 2021
18090†	University of California Riverside	Study Secondary Organic Aerosol Formation from Heavy-Duty Diesel & Natural Gas Vehicles	Oct 2021
19208	University of California Riverside	Conduct Emission Study on Use of Alternative Diesel Blends in Off-Road Heavy-Duty Engines	Jul 2021
20058	University of California Riverside	Evaluate Meteorological Factors and Trends Contributing to Recent Poor Air Quality in Basin	Sept 2021
Hydrogen / Mobile Fuel Cell Technologies and Infrastructure			
15618	FirstElement, Inc.	Installation of Eight Hydrogen Stations in Various Cities (two renewable, 6 delivered)	Feb 2021
15635	Center for Transportation and the Environment	ZECT II - Development & Demonstration of 1 Class 8 Fuel Cell Range Extended Electric Drayage Truck	Sept 2021
16251	H2 Frontier Inc.	Develop & Demonstrate Commercial Mobile Hydrogen Fueler	May 2021
17317†	American Honda Motor Co., Inc.	Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle	Mar 2021
17343†	American Honda Motor Co., Inc.	Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle	Feb 2021

Table 8: Projects Completed between January 1 & December 31, 2021 (cont'd)

Contract	Contractor	Project Title	Date
Hydrogen / Mobile Fuel Cell Technologies and Infrastructure (cont'd)			
17385†	American Honda Motor Co., Inc.	Three Year Lease of One Honda 2017 Clarity Fuel Cell Vehicle	May 2021
18158	National Renewable Energy Laboratory	California Hydrogen Infrastructure Research Consortium H2 @ Scale Initiative	Mar 2021
19172†	Longo Toyota	Three Year Lease of Two 2018 Toyota Mirai Fuel Cell Vehicles	Oct 2021
20108	University of California Irvine	Develop Optimal Operation Model for Renewable Electrolytic Fuel Production	Jun 2021
21336	Frontier Energy, Inc.	Participate in California Fuel Cell Partnership (CaFCP) for Calendar Year 2021	Dec 2021
Fueling Infrastructure and Deployment (NG / RNG)			
17092†	Kore Infrastructure LLC	RNG Production & Vehicle Demonstration	Oct 2021
Technology Assessment and Transfer / Outreach			
17358†	AEE Solutions LLC	Technical Assistance with Heavy-Duty Vehicle Emissions Testing, Analyses & Engine Development	May 2021
20348†	Gladstein, Neandross & Associates LLC	Cosponsor the 2021 Renewable Gas 360 Symposium and Webinar Series	March 2021
21078†	Charging Interface Initiative e.V.	Cosponsor High Power Charging for Commercial Vehicles Event	Jan 2021
21203†	University of California Riverside	Cosponsor the 2021 Portable Emissions Measurement Systems Conference	Aug 2021
21357†	University of California Davis	Cosponsor the Asilomar 2021 Conference on Transportation & Energy	Oct 2021
22044†	Gladstein, Neandross & Associates LLC	Cosponsor the 2021 Advanced Clean Transportation (ACT) Expo	Sept 2021
22073†	University of California Irvine	Cosponsor ICEPAG 2021	Dec 2021

†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.

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CLEAN FUELS PROGRAM

2022 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 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 as 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 2022 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 will be updated in 2022, 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 8-hour ozone standards of 80 ppb and 75 ppb, respectively. The majority of NO_x reductions must come from mobile sources, including both on- and off-road vehicle and equipment. Notably, South Coast AQMD is currently only one of two regions in the nation designated as an extreme nonattainment area (the other region is California's 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 ozone standard for the Coachella Valley region of the South Coast AQMD to "extreme" status. Hotter temperatures and other meteorological changes impacted by climate change in this 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 stationary 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. To support the fleet turnover the Clean Fuels Program's emphasis continues on commercialization of larger heavy-duty (HD) low NO_x engines and large

deployment projects of zero emission HD trucks like the Joint Electric Truck Scaling Initiative (JETSI) Pilot Project.⁶

While zero emission technologies, battery and fuel cell electric vehicles are making strides towards commercialization the number of battery electric HD trucks that will be deployed in time to meet the 2023 and 2031 ozone standards will fall short of what is required. The impacts and challenges of large deployments of battery electric vehicles are not yet fully understood or have been addressed. Vehicle and infrastructure costs, fleet adoption, impacts to the electrical grid, OEM supply chain and re-tooling of assembly plants and support networks for vehicle maintenance and service, development and standardization of ultra fast megawatt charging and fleet integration of limited range battery electric vehicles into their logistics and business model are some of the challenges that must be dealt with before widespread deployments of battery electric HD trucks become a reality. Efforts to address these challenges are being undertaken by projects like the JETSI 100 truck deployment and EPRI's RHETTA project for ultra fast megawatt charging development are the first trials to address the complex challenges of integrating large fleets of zero emission vehicles. In addition to these efforts once completed the findings and results will need to be studied, resolutions developed, funded and implemented.

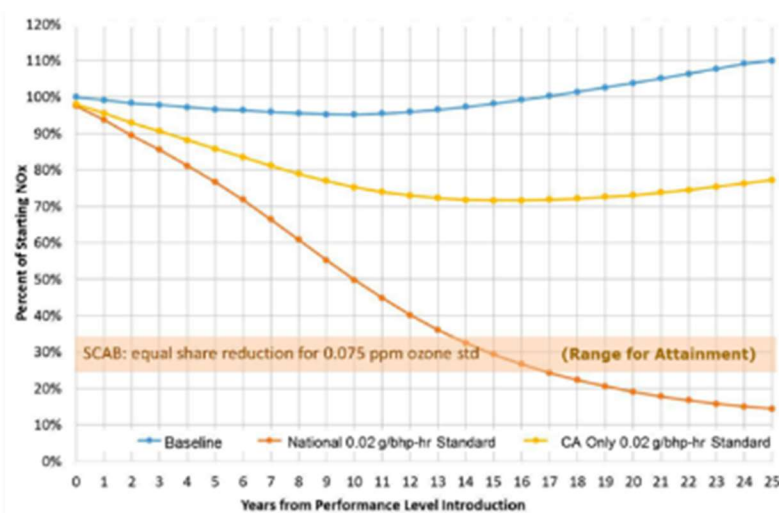
In light of the projected limited deployment of zero emission battery electric vehicles and infrastructure in the near term and the development and commercialization of fuel cell electric vehicles and infrastructure in the mid term our strategy is to continue development of near-zero low NOx engines to meet the NAAQS. On June 3, 2016, South Coast AQMD petitioned the U.S. EPA to initiate rulemaking for a lower national NOx standard for on-road heavy-duty engines to achieve additional mobile source emission reductions. A national NOx standard (as opposed to a California standard) for on-road heavy-duty vehicles is estimated to result in 70 to 90 percent NOx emission reductions from this source category in 14 to 25 years, respectively. CARB estimates that 60 percent of total on-road heavy-duty vehicle miles traveled in the Basin are from vehicles purchased outside of California, which points to the need for a more stringent federal as well as state standard for on-road heavy-duty vehicles.

U.S. EPA has since acknowledged the 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. The progress was stalled in 2020 but EPA recently confirmed the deadline given by the president's Executive Order to finalize low NOx rulemaking by the end of 2022 for lower NOx standard with model year 2027. In the summer of 2020 CARB adopted its own Low NOx Omnibus rule. The new regulation imposes lower NOx standards starting in model year 2024, that will harmonize with U.S. EPA's Cleaner Truck Initiative's national NOx standard of 0.02 g/bhp-hr in 2027, 90% below today's NOx standard. Although both regulations are welcome news, their implementation and effectiveness are too late to help the South Coast AQMD meet its 2023 federal ozone attainment deadline. So, despite the milestone progress, commercialization and deployment of cost-effective near-zero engines are still needed to meet near-term goals.

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.

⁶ The project, known as Joint Electric Truck Scaling Initiative, or JETSI, is the largest commercial deployment of battery-electric trucks in North America to date, helping to significantly increase the number of zero-emission heavy-duty trucks available for goods movement while achieving necessary emission reductions. This is the first battery-electric truck project jointly financed by CARB and the CEC, and the largest investment of its kind.

Figure 28 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 28: NOx Reduction Comparison: No New Regulations vs Low NOx Standard in California only vs National Standard

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. Findings from the MATES V report, finalized in June 2021, showed that air toxics cancer risk based on modeling data has decreased by over 50% since MATES IV, with an average multi-pathway air toxics cancer risk at 454-in-a-million. The highest risk locations are at LAX and the Ports along goods movement and transportation corridors. Diesel PM continues to be the major contributor accounting for over 60% of the overall air toxics cancer risk. For the first time, chronic non-cancer risk was estimated with a chronic hazard index of 5.9 across the 10 stations in the MATES V study. 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 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 \$231.6 million toward projects exceeding \$1.14 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, and Community Air Protection Program), with cumulative funding of

\$250 million annually. Starting in 2022, there will also be AB 617 incentive funding reserved for zero emission trucks in AB 617 communities which was identified as a funding priority in their CERPs. 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 technologies that are discussed in detail later 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.

Figure 29 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 29: Technology Readiness Levels

Many of the technologies that address the Basin's needed NOx reductions align with the state's GHG reduction efforts. U.S. EPA (2021)⁷ noted that the transportation sector contributed 29 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.

⁷ U.S. Greenhouse Gas Emissions and Sinks 1990-2019. 2021. <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>

Program and Funding Scope

This 2022 Plan Update includes projects to research, develop, demonstrate and advance deployment 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 2022 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 includes findings from MATES V and revised emission inventories from the recently released EMFAC 2021.

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 2021, 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 2022 are expected to result in commercially available products in the 2023-2025 timeframe, and technologies being demonstrated generally are in the process of being verified or 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 2022 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 2022-2026. 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 2027 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 2022 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 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 and provide incentive funding for priorities designated in CERPs by six 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 2022.

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; the agency is dedicated to assisting federal and state government programs to deploy light-, medium-, and heavy-duty fuel cell electric vehicles (FCEV) 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 commercial lease of its 2017 Honda Clarity FCV. The 2019 Hyundai Nexo was the second FCV offered for sale and lease in California. 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 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 is enabling 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 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 California Fuel Cell Partnership's (CaFCP's) *2030 Vision*⁸ 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. The CaFCP's *Heavy-Duty Vision* released in July 2021 describes 70,000 fuel cell electric trucks supported by 200 heavy-duty hydrogen stations operating in California and beyond.

In 2019, the Clean Fuels Program awarded \$1.2 million to Equilon (Shell) as part of the H2Freight project for a new 1,000 kg/day heavy-duty hydrogen fueling station using hydrogen produced by a new tri-generation fuel cell on POLB property leased by Toyota. As part of the \$83 million Shore-to-Store project led by the POLA, for which the Clean Fuels Program committed \$1 million, Toyota and Kenworth deployed 10 Class 8 fuel cell trucks and Equilon (Shell) built two large capacity hydrogen fueling stations in Wilmington and Ontario. Kenworth leveraged the development on the fuel cell truck demonstrated in South Coast AQMD's ZECT 2 project and integrated Toyota's fuel cells into the Kenworth trucks. These fuel cell trucks are 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.

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 with next generation fuel cell module - easy to package system design and other innovative integration strategies. Also, Volvo and Daimler this year announced a joint venture to develop fuel cell powered trucks. South Coast AQMD has created many alliances with large OEMs and will continue to fund projects with these OEMs over the next year to develop heavy-duty fuel cell trucks. In June 2021, South Coast AQMD recognized \$500k from U.S. EPA to demonstrate two Hyundai Class 8 fuel cell trucks with a range of up to 500 miles for regional and long-haul operations.

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, CTE, in partnership with New Flyer, Trillium, and OCTA, deployed 10 40-foot New Flyer XHE40 fuel cell transit buses and installed 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). SunLine Transit Agency was the recipient

⁸ CaFCP's *The California Fuel Cell Revolution, A Vision For Advancing Economic, Social, and Environmental Priorities* (Vision 2030), September 4, 2018.

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 21 fuel cell (in process to accept 5 fuel cell buses) and four battery electric transit buses as well as a recently upgraded 900 kg/day hydrogen station capable of supporting up to 30 fuel cell transit buses. In August 2021, the Clean Fuels Program committed \$531,166 to a \$2 million project to develop and demonstrate two medium-duty fuel cell buses at Sunline.

The 2022 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. scalable and cost-effective fuel cell powertrain components);
- 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 FCVs 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 FCV OEMs to develop an understanding of their progress in overcoming barriers to economically competitive FCVs 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, 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, Cummins Westport, Inc. (CWI) achieved a new ultra-low NOx threshold by commercializing the first on-road heavy-duty engine to be certified to CARB's optional low NOx standard of 0.02g NOx/bhp-hr. The 8.9 liter (8.9L) ISL-G natural gas engine demonstrated that an ICE could achieve NOx exhaust emission levels 90 percent cleaner than the existing federal standard; and powering these vehicles with low Carbon Intensity renewable fuels or biomethane, to help address GHG objectives, became a game changer for the heavy-duty transportation sector. The 8.9L engine works well in refuse and other vocational trucks as well as transit and school buses. In 2017, CWI, 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 expanded the scope of this near-zero technology. 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 ensuring the viability of near-zero engine options for all market segments. For trucks that cannot utilize the Cummins near-zero emission engines, the 2022 Plan Update includes potential projects to develop, demonstrate and certify natural gas and propane engines in the 6-8L range, several options has been made available for medium-duty truck and bus platforms. Although no near-zero emission diesel technology is commercially available today, South Coast AQMD has been working closely

with CARB, U.S. EPA 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 Cylinder Deactivation (CDA) with West Virginia University. The 2022 Plan Update includes 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 using renewable fuel sources are feasible via advanced engine and aftertreatment or optimized engine design and calibration. At the same time, applications that require high power/torque levels are also the applications where zero emission technologies and supporting infrastructures will take longer to become commercially available, and development of near-zero emission technologies would be critical to support those applications. 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 near-term emission reductions using an optimized powertrain systems approach. At the same time, the aggressive GHG emissions reduction targets set forth by both CARB and EPA have invigorated interest in revisiting low- and zero carbon alternative fuels for those high power/torque applications as well as off-road applications. While the GHG benefit is easy to assess, it is important to understand the criteria emissions impact where optimized engine systems are required from earlier learnings to ensure reduction of both criteria and GHG can be met. 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 2022 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 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 on- and off-road applications;
- evaluation of alternative engine systems such as plug-in hybrid vehicles;
- development and demonstration of engine systems that employ advanced engine design features, CDA, improved exhaust or recirculation systems, and aftertreatment devices.
- further development of robust aftertreatment systems which can maintain certified emissions levels throughout useful life.

U.S. EPA's recent initiation to create a new national low NO_x standard for on-highway heavy-duty engines starting in 2027 will further motivate manufacturers to develop lower-NO_x emitting technologies expected to result in greater NO_x emission reductions than a "California only" low NO_x standard for on-road heavy-duty engines.

Electric/Hybrid Technologies and Infrastructure

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. South Coast AQMD supports projects to address concerns regarding cost, battery life, all-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 including drayage, short regional haul, and last mile delivery. 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 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 EVs 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 EVs has generally been with the Combined Charging System Combo 1 (CCS1) connector in North America. Although Volvo and ABB obtained UL certification of the Combined Charging System Combo 2 (CCS2) connector in 2020, which is a connector standard predominantly used in Europe and other parts of the world, the CCS1 connector continues to be the standard connector for charging up to 350 kW DC. A Megawatt Charging System connector is under development by the Charging Interface Initiative (CharIN) for Class 6 -8 EVs for charging up to 4.5 MW DC, although there are no EVs which are currently capable of accepting charging above 350 kW DC. 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 increase exponentially compared to light-duty infrastructure. Each year there are more commercially available options for medium- and heavy-duty on-road EVs and off-road equipment, charging infrastructure to support these EVs and equipment, and an ability to fund larger scale deployment projects for medium- and heavy-duty EVs, equipment, and infrastructure.

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 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, locomotives with hydrogen fuel cells, hybrid and, battery electric technologies, 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* (2017) 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) Pilot Project with deployment of 100 Daimler and Volvo Class 8 battery electric trucks for drayage and regional haul at NFI and Schneider funded by \$16M from CARB and \$11M from CEC; 2) Switch-On Project with deployment of 70 Volvo Class 8 battery electric drayage/freight trucks 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, 3) deployment of two additional Class 8 battery electric drayage trucks as part of the CARB funded Volvo LIGHTS project through a \$500,000 U.S. EPA Clean Air Technology Initiative grant, 4) deployment of two Volvo Class 8

battery electric trucks and 150 kW DC fast chargers at Producers Dairy in Fresno as part of the CARB funded GGRF Zero Emission Drayage Truck Project, 5) Daimler Commercial Experience project to demonstrate eight Class 6 and 8 battery electric trucks and fast charging infrastructure funded with \$1 million by the South Coast AQMD Clean Fuels Fund.

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 Los Angeles Department of Water and Power (LADWP) include funding for medium- and heavy-duty vehicles and infrastructure.

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 NO_x control. CARB adopted new test procedures for medium-duty and heavy-duty hybrid powertrains to certify to engine standards in CARB's proposed Heavy-Duty On-Road "Omnibus" Low NO_x 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 as capable of being deployed without the need for incentives, by providing fuel economy benefits which could provide another potential cost-effective pathway for reducing NO_x emissions in the near term. Furthermore, CARB's Advance Clean Trucks and Advance Clean Fleets regulations both allow sales of plug-in hybrid vehicle that's capable of zero-emission operation as a compliance pathway for meeting the zero emission mandate.

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;
- large scale deployments of commercial battery electric vehicles and infrastructure (i.e. 50 or more vehicles) to prove feasibility and develop tools for fleets to assist in successful operation for drayage and short regional haul operations;
- 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, yard tractors, or top-handler with wireless charger;
- 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, 3) put in place infrastructure that will ultimately be needed to accommodate transportation fuels with very low gaseous and GHG emissions, and 4) support local production of clean, low carbon intensity, renewable transportation fuels.

CNG and LNG refueling stations continue to be positioned to support both public and private fleet applications. Funding has been applied to provide refueling at key points for all classes of vehicles, with an emphasis on heavy-duty natural gas vehicle users travelling on major goods movement corridors, including local ports, and along I-15 and The Greater Interstate Clean Transportation Corridor (ICTC) Network. 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 a continuing and growing interest for partial or complete transition to renewable fuels, particularly natural gas delivered through existing natural gas pipelines. Funding has been provided to support local production and use of renewable natural gas to incentivize turnover to near-zero natural gas-powered heavy-duty vehicles. The growing interest in low carbon, renewable transportation fuels that also power ultra-low to zero emission vehicles will expand the scope of this category to provide support of local production and distribution of such fuels and help accelerate fleet turnover. 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 co-funded for infrastructure development are:

- development and demonstration of low carbon intensity renewable transportation fuels including renewable natural gas, renewable hydrogen, and renewable electricity from zero emission sources and from renewable feedstocks, such as biomass and biowaste;

- development and demonstration of advanced, cost-effective methods for manufacturing synthesis gas for conversion to renewable natural gas and renewable (biomass-based) hydrogen;
- enhancement of safety and emissions reductions from natural gas refueling equipment;
- expansion of fueling infrastructure, fueling stations, and equipment, with an emphasis on renewable energy sources; 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 NOx emissions are small compared to mobile sources in the Basin, there are applications where cleaner fuel technologies or processes can be applied to reduce NOx, 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 NOx, 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 NOx reduction. SCR requires the injection of ammonia or urea that is reacted over a catalyst bed to reduce the NOx formation 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 NOx ceramic burner on an oil heater without the use of reagents such as ammonia nor urea which is anticipated to achieve SCR NOx 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 NOx burners without the use of reagents. As discussed in engine systems, the use of low and zero carbon fuels could also be used in stationary applications; it is easier to develop optimized engine systems and stationary sources typically operate in steady-state modes.

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 to be 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 and fuels (e.g., new innovative low NOx 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 reduce total cost of ownership (TCO); 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, renewable diesel, 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 NO_x emissions while reducing other criteria pollutant emissions. South Coast AQMD has participated in several renewable diesel and ethanol-blend gasoline studies led by CARB in an effort to approve these fuels in California, the results of these studies are expected in 2022. 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, natural gas and other alternative fuels. In 2015, South Coast AQMD funded chamber studies as part of the 200 Vehicle Study 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, the results are due to be published in 2022. 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. The results from these studies suggest the addition of a particulate filter for controlling particulate emissions from GDI 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; the NO_x reduction from natural gas fueled vehicles, especially ones certified to near-zero emission levels, are significant compared to diesel baseline. The results of the study also contributed to the new EMFAC 2021 emissions model. In 2020, CARB adopted Omnibus regulation to the next lower level NO_x 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 NO_x across the entire vehicle population via onboard emission sensors. The 3B-MAW will be a game changer for future combustion technologies, as it addresses the short-falls of previous in-use testing methods and should address the issue of gap between in-use emissions and certification standard, an issue commonly seen in the Basin where many heavy-duty vehicles operate in low-speed, low load modes. 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.

Senate Bill 210 was signed in the law in 2019 which directs CARB to develop 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 a large population of trucks which is critical for

success of this program. Remote sensing technology, which can be setup near roadside and on freeway over passes has gained the spotlight for enabling a new suite of technology for assess emissions in-use. In August 2021, CARB staff shared findings from the pilot program. On-board diagnostics (OBD) and Roadside Emissions Monitoring Device (REMD) testing would likely be the best combination of technologies for a future statewide vehicle compliance and enforcement program as OBD testing technologies have proven to be capable of reliably collecting OBD parameters of interest and diagnosing emissions related vehicle issues. REMD testing has good inter-system correlation and repeatability for NO_x, and repairs for identified emissions related issues were found to be feasible and effective at reducing emissions. Automated License Plate Recognition (ALPR) camera technologies were also able to capture 80% of license plates to assist in enforcement efforts. A statewide vehicle compliance program would likely be phased in with vehicle screening starting in January 2023, enforcement of compliance certificate requirements in July 2023, and periodic testing and certified devices for OBD submissions in 2024. CARB would take a HD I/M Proposed Regulation for a statewide vehicle compliance program to their Board for consideration in December 2021. The new HD I/M rule should address the concerns of high emitters in the legacy fleet which are expected to remain service well into 2030s, further reducing emissions in our region.

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. 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. Findings from the MATES V report finalized in August 2021 showed that air toxics cancer risk based on modeling data has decreased over 50% since MATES IV, with average multi-pathway air toxics cancer risk at 454-in-a-million. Highest risk locations are at LAX and the Ports along goods movement and transportation corridors. Diesel PM continues to be the major contributor to air toxics cancer risk. For the first time, chronic non-cancer risk was estimated with a chronic hazard index of 5.9 across the 10 stations in 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 various low and zero carbon initiatives have stirred up a new round of interest in alternative fuel combinations such as ethanol, hydrogen and other engineered bio/renewable fuels. 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, the study was impacted by Covid-19 shut downs but recently has resumed testing with results available in early 2022. 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 and other alternative fuels, 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 on-road and off-road equipment emissions. Existing diesel emissions can be greatly reduced with introduction of natural gas RNG, biofuels, synthetic and low carbon fuels into the engine or via aftertreatment controls such as PM traps, 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 using low sulfur fuel. 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, particulate matter (PM and PN) emissions from GDI fueled light-duty vehicles, natural gas fueled medium- and heavy-duty vehicle have gathered attention due to lack of a particulate filter. While relative PM level are low and below the applicable standard, concerns on ultra-fine emissions needs to be assessed. South Coast AQMD have been and will continue to fund studies to help mitigate particulate matter related concerns to gasoline and natural gas fueled engines.

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 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 AB 617 or disadvantaged communities, local governments, funding

agencies, technical audiences). As part of AB 617⁹, which requires reduce 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. Incentivizing the deployment of zero emission heavy-duty trucks has been included in the CERPs and an RFP for zero emission heavy-duty truck incentive funding will be released in 2022 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 \$21.8 million for all potential projects. The actual project expenditures for 2022 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 2022 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.

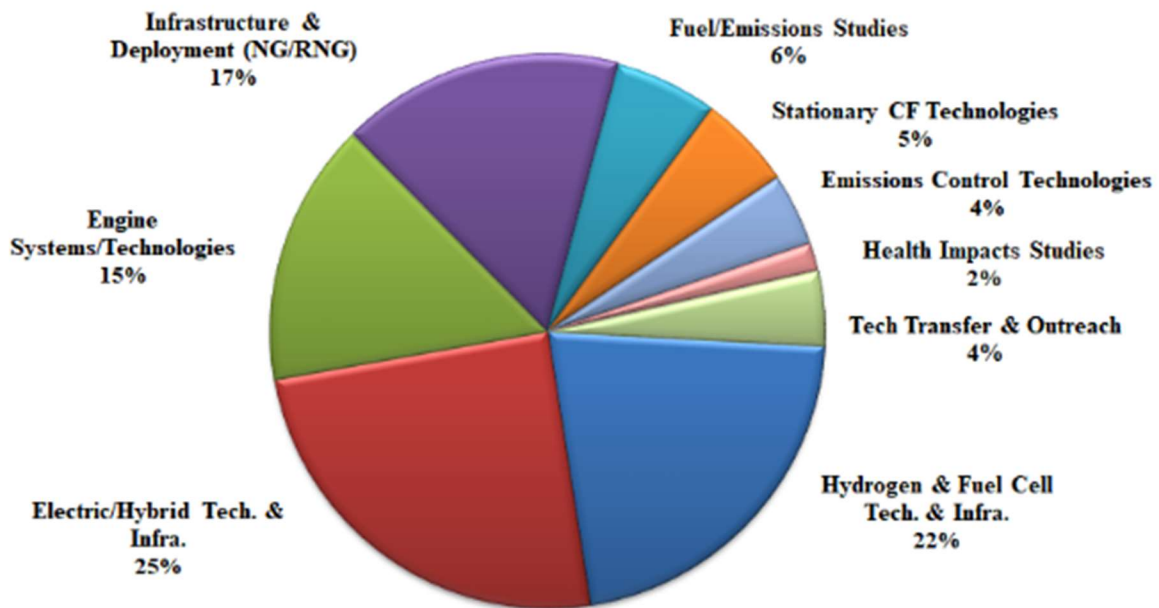


Figure 30: Projected Cost Distribution for Potential South Coast AQMD Projects in 2022 (\$21.8M)

⁹ <https://ww2.arb.ca.gov/our-work/programs/community-air-protection-program/about>

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CLEAN FUELS PROGRAM

Program Plan Update for 2022

This section presents the Clean Fuels Program Plan Update for 2022. 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 9 summarizes potential projects for 2022 as well as the distribution of South Coast AQMD costs in some areas as compared to 2021. 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 2022 Draft Plan Update, 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 2022, 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 bus 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 2021-22 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 9.

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 9: Summary of Potential Projects for 2022

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	50,000	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	30,000	75,000
Subtotal	\$4,724,500	\$19,375,000

Engine Systems/Technologies

Develop and Demonstrate Advanced Gaseous- and Liquid-Fueled Medium- and Heavy-Duty Engines & Vehicle Technologies to Achieve Ultra-Low Emissions	3,000,000	21,000,000
Develop and Demonstrate Alternative Fuel and Clean Conventional Fueled Light-Duty Vehicles	176,300	1,000,000
Develop and Demonstrate Low Emissions Locomotive Technologies and After Treatment Systems	176,300	1,000,000
Subtotal	\$3,352,600	\$23,000,000

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	2,600,000	52,090,000
Demonstrate Alternative Energy Storage	300,000	2,000,000
Demonstrate Light-Duty Battery Electric Vehicles and Plug-In Hybrid Vehicles	75,000	200,000
Subtotal	\$5,375,000	\$77,090,000

Fueling Infrastructure and Deployment (Natural Gas/Renewable Fuels)

Demonstrate Near-Zero Emission Natural Gas Vehicles in Various Applications	1,400,000	19,000,000
Develop, Maintain and Expand Renewable Fuel Infrastructure	200,000	2,100,000
Demonstrate Renewable Transportation Fuel Manufacturing and Distribution Technologies	2,000,000	10,000,000
Subtotal	\$3,600,000	\$31,100,000

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	200,000	500,000
Subtotal	\$1,200,000	\$5,000,000

Table 9: Summary of Potential Projects for 2022 (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	400,000	1,500,000
Subtotal	\$1,300,000	\$5,000,000
Emissions Control Technologies		
Develop and Demonstrate Advanced Aftertreatment Technologies On Highways	500,000	2,000,000
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	600,000	1,000,000
Support Implementation of Various Clean Fuels Vehicle Incentive Programs	350,000	400,000
Subtotal	950,000	\$1,400,000
TOTALS FOR POTENTIAL PROJECTS	\$21,781,000	\$167,565,000

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: \$50,000

Expected Total Cost: \$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 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. Tasks completed 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. DOE awarded new H2@Scale funding in 2021 to focus on heavy-duty tasks to develop heavy-duty reference station design, model heavy-duty station capacity with high flowrates and provide near-real-time verification of fuel quality with on-site hydrogen contaminant detectors (HCDs) for use at both light-duty (LD) and HD stations. 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 *H2 Fuel Cell Electric Trucks, A Vision for Freight Movement in California – and Beyond* document released in July 2021 establishing a vision for 70,000 Class 8 FC trucks supported by 200 hydrogen refueling stations by 2035, including barriers that need to be overcome, CARB's Advanced Clean Truck Regulation adopted in June 2020, and anticipated adoption of the Advanced Clean Fleets Regulation in 2022.

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 NO_x and VOC emissions 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 stationary power generation are considered an enabling technology and potentially cost-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 to produce power and hydrogen from renewable feedstocks (e.g., biomass, digester gas) and store hydrogen in larger scale.

Innovative Refueling Appliances: Home or small scale refueling/recharging is an attractive advancement for alternative clean fuels for potential applications. This project would evaluate an innovative hydrogen 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.

CARB projections for on-road FCVs counts are now 30,800 in 2024 and 61,000 in 2027 in California¹⁰ and the majority of these do not include medium- and heavy-duty vehicles deployed in the Basin. To meet demand, number of hydrogen fueling infrastructures need to be significantly increased and become more reliable in terms of uptime and supply. 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 the Governor's 2018 Executive Order to establish 200 light-duty stations by 2025, increase investment in heavy-duty hydrogen stations to support CARB's Advanced Clean Truck Regulation, and anticipated adoption of the Advanced Clean Fleets Regulation in 2022.

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 several fleet rules in effect 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

¹⁰ California Air Resources Board. *2021 Annual Evaluation of Fuel Cell Vehicle Deployment & Hydrogen Fuel Station Network Development* (AB 8 Report). September 2021.

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 demonstrating 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 to reduce costs and potentially enhance the 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's Advanced Clean Truck and Fleet and Innovative Clean Transit Bus Regulations will also increase deployment of medium- and heavy-duty FCVs. Fleets are useful demonstration sites because economies of scale exist in central refueling, training skilled personnel to operate and maintain FCVs, monitoring and collecting data on vehicle performance, and OEM technical and customer support. In some cases, medium- and heavy-duty FCVs could leverage the growing network of hydrogen stations and provide an early base load of fuel consumption until the number of passenger FCVs 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. Both ZECT I and ZECT II enabled the largest strides in Technology Readiness Level (TRL) of hybrid, battery electric and fuel cell heavy-duty trucks on the overall vehicle design and architecture. Especially, the fuel cell drayage truck's TRL prior to this project was at a strong Level 4 with several proof-of-concept vehicles constructed and it has advanced the TRL to a Level 7 with ZECT II. The Clean Fuels Program cost-shared the demonstration of transit buses at OCTA which was completed in September 2021. In 2020, US EPA Targeted Airshed Grant Program awarded South Coast AQMD five fuel cell transit buses to be deployed at SunLine Transit which was also cost-shared by the Clean Fuels Program.

This category may include projects in the following applications:

<p>On-Road:</p> <ul style="list-style-type: none"> • Transit Buses • Shuttle Buses • Medium- & Heavy-Duty Trucks 	<p>Off-Road:</p> <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. CARB is revising the Advanced Clean Fleets for adoption in 2022 to impose 100% zero emission vehicle fleet targets for last mile delivery, drayage and public fleets in 2035. 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 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 demonstrate improvements in reliability and durability of powertrain systems and hydrogen storage systems. 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, higher density and lower cost batteries, and increased production volumes.

Proposed Project: Demonstrate Light-Duty Fuel Cell Vehicles

Expected South Coast AQMD Cost: \$30,000

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 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.

Fleets are useful demonstration sites because economies of scale exist in central refueling, training skilled personnel to operate and maintain FCVs, monitoring and collecting data on vehicle performance, and 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 commercial FCVs in California, and Toyota redesigned the 2020 Mirai as a five-passenger sedan. The first commercial FCV leases are ending, and solo carpool lane access extends only for vehicles with MY 2019 and later, with all Clean Air Vehicle decals expiring between 2023 – 2025, unless legislation is adopted to continue. 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. CARB is revising the Advanced Clean Fleets for adoption in 2022 to impose 100% zero emission vehicle fleet targets for last mile delivery, drayage and public fleets in 2035, with acquisition requirements proposed to start in 2024. 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: \$3,000,000

Expected Total Cost: \$21,000,000

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 diesel or natural gas engine 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 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 significantly reduce NOx emissions;
- 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; and
- development and demonstration of optimized engine systems for use with low- and zero carbon alternative fuels.

Anticipated fuels for these projects include but are not limited to alternative fuels (fossil fuel-based and renewable natural gas, propane, hydrogen blends, ethanol, 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 optimized combustion technologies. Several key diesel engine development projects that have demonstrated the ability to achieve 0.02 g/bhp-hr NOx under laboratory conditions are near the on-road truck demonstration stage. Truck integration and packaging are another critical step towards commercialization. Prototype trucks are typically placed in revenue service to collect real-world performance data as well as end user feedback for production engines. Furthermore, with the new in-use and low-load emissions requirements within the CARB Omnibus and the EPA CTI regulations, we expect these new generation of low-emission engines to comply with the low emissions standard for their full useful life.

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 for long-haul applications are beginning to be introduced. However, vehicle range, lack or limited accessible public infrastructure, lack of experience with alternative fuel engine technologies, limited selection of appropriate alternative fuel engine products, and high initial cost have made it difficult for more fleets to adopt and depoly larger quantity of alternative fuel vehicles. For example, in recent years, several large trucking fleets have expressed interest in using alternative fuels but requires higher horsepower engines that able to fulfill the full range of needs. However, at this time the choice of engines over 400 HP or more was not available. 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 for long-haul applications. The applications that require high power/torque levels such as long haul are also the applications where zero emission technologies and supporting infrastructures will take longer to become commercially available. South Coast has been supporting effort for developing high power natural gas engines that address that gap. Moreover, as incentive funding shifts away as clean combustion technologies reaches full commercial readiness, development of cost-effective technologies that do not rely on incentives are key to drive additional market penetration and emissions reduction. 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. Cost-effective hybrid technologies that offer 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 achieve the CARB 2024-2026 NOx standard of 0.05 g/bhp-hr while maintain reasonable cost and a feasible pathway to 0.02 g/bhp-hr. Even though lower NOx engines are due to arrive in 2024 and 2027, due to the slow turn over, the legacy 2010+ diesel fleet will remain in service well into the 2030s. Thus, continued development of cost-effective low emission engine technologies are key to reduce the impact of legacy fleets in our region.

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, renewable 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, renewable diesel and hydrogen, and other novel technologies including electric hybrids. 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;
- assessment of other clean technologies; and
- 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 Emissions Locomotive Technologies and After Treatment Systems

Expected South Coast AQMD Cost: \$176,300

Expected Total Cost: \$1,000,000

Description of Technology and Application:

This project aims to support the development and demonstration of gaseous and liquid-fueled locomotive engines. With the upcoming revision of locomotive regulations and the plan to establish Tier 5 or cleaner locomotive emission standards, railroads are exploring the possibility of transitioning from diesel to cleaner fuels or installing aftertreatments to the existing locomotives. The railroad is also considering alternative fuels for its potential economic benefit as compared with diesel fuel. The requirements of locomotive engines as primary generators of electricity to power the locomotive poses serious challenges. From an operational standpoint, there is a significant difference between natural gas and diesel energy density, a fuel tender would be needed to provide a sufficient amount of fuel for an acceptable range. 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 are in early-stage of commercialization, especially in the marine sector. The development of engines and systems to fill this need is currently on-going in the locomotive sector. Engines emissions are expected to be below the current 0.2g/bhp-hr NO_x 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 fewer maintenance costs and better reliability. Depending on the type of combustion strategy, aftertreatments are likely needed to achieve Tier 4 or cleaner emission standards. Urea-based selective catalytic reduction (SCR) or exhaust gas recirculation (EGR) can be used to reduce NO_x emissions and methane slip. Similar low and zero carbon fueled engines could migrate as a retrofit option.

Potential Air Quality Benefits:

This project is expected to reduce emissions of around 97 tons per year of NO_x for each locomotive. The reduction of PM and GHG emissions 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: \$2,400,000

Expected Total Cost: \$22,800,000

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. U.S. EPA (2021)¹¹ estimated that transportation was responsible for 29 percent of the nation's carbon emissions, while the electricity sector emissions accounted for 25 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 5¹² percent of vehicles in the U.S. and drive 9¹³ percent of all vehicle miles traveled each year yet are responsible for more than 25¹⁴ 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 developed 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 ability to operate in zero emission mode, and some leveraging advanced concepts such as geofencing and EcoDrive to maximize emission reductions in disadvantaged communities. Vehicle based hybrid systems continue to progress for additional emission reductions and efficiency improvements. Engine powertrain based hybrid systems began to emerge since the introduction of optional hybrid powertrain test procedures. Hybrid powertrain based projects are further described under the Engine Systems section.

Vehicle categories to be considered for potential or future demonstration and deployment projects include drayage/freight/regional haul trucks, utility trucks, last mile 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,

¹¹ U.S. Greenhouse Gas Emissions and Sinks 1990-2019. 2021. <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>

¹² <https://www.bts.gov/content/number-us-aircraft-vehicles-vessels-and-other-conveyances>

¹³ <https://www.bts.gov/content/us-vehicle-miles>

¹⁴ <https://www.bts.gov/content/fuel-consumption-mode-transportation-physical-units>

especially from renewable sources, LPG, hydrogen, gas-to-liquid (GTL) and hydrogen-natural gas blends, but conventional fuels such as gasoline, renewable diesel, or even modified biodiesel may be considered if 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. The Volvo LIGHTS project included the demonstration of a zero emission freight handling system including 29 battery electric yard tractors and forklifts at fleets DHE and NFI. Volvo Construction Equipment just recently finished demonstrating small battery electric compact excavator and wheel loader in California which are now ready for commercial release in 2021. Several other manufacturers have released battery electric and hybrid equipment, and more are becoming commercially available. CARB has introduced the Clean Off-Road Equipment Voucher Incentive Project (CORE) which have been seeing great success in deploying zero-emission cargo handling equipment and switch locomotives. The most recent funding plan suggested CORE will be including off-road construction equipment in the future. 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 such as yard tractors, forklifts and top-handlers, and construction equipment such as excavators and wheel loaders);
- 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 broader 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: \$2,600,000

Expected Total Cost: \$52,090,000

Description of Technology and Application:

There is a critical need to address gaps in EV charging infrastructure availability. Almost half (44 percent) of the 2,084,118¹⁵ EVs sold in the U.S. since 2010 were in California, and of those sales in California, almost half (44 percent) of CVRP¹⁶ rebates issued as of April 2021 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 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 EVs 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 EVs has generally been with the CCS1 connector in North America. Although Volvo and ABB obtained UL certification of the CCS2 connector in 2020, which is a connector standard predominantly used in Europe and other parts of the world, the CCS1 connector continues to be the standard connector for charging up to 350 kW DC. A Megawatt Charging System connector is under development by the Charging Interface Initiative (CharIN) for Class 6 -8 EVs for charging up to 4.5 MW DC, although there are no EVs which are currently capable of accepting charging above 350 kW DC. 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 EVs and off-road equipment, charging infrastructure to support these EVs and equipment, and an ability to fund larger scale deployment projects for medium- and heavy-duty EVs, equipment, and infrastructure. As the deployment of medium- and heavy-duty EVs and off-road equipment has increased, there is an increasing reliance on the use of standardized charging connectors that are UL or Nationally Recognized Testing Laboratory (NRTL) certified charging infrastructure, as opposed to proprietary charging infrastructure and connectors which can only be used with EVs 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

¹⁵ California Energy Commission *Zero Emission Vehicle and Charger Statistics. Q2 2021 Data Update* (posted August 5, 2021). <http://www.energy.ca.gov/zevstats>

¹⁶ <https://cleanvehiclerebate.org/eng/rebate-statistics>

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 EcoDrive 2.0 through the connector vehicle corridor in Carson that was set up as part of the CEC funded Eco FRATIS¹⁷ 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;
- deploy DC fast charging infrastructure (up to 350 kW) in conjunction with energy storage and/or solar to support large scale deployments of 50 or more battery electric trucks at a single fleet location;
- 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 impacts 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.

¹⁷ <https://www.aapa-ports.org/files/PDFs/ITS%20POLA%204.24.2019.pdf>

Proposed Project: Demonstrate Alternative Energy Storage

Expected South Coast AQMD Cost: \$300,000

Expected Total Cost: \$2,000,000

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, maintenance and durability), gauge market preparedness, evaluate costs relative to current lithium-ion batteries and provide a pathway to commercialization. The use of alternative energy storage and generation (i.e. solar) could also be in combination with a large scale deployment of 50 or more battery electric trucks and charging infrastructure at a single fleet location for energy storage optimization for grid reliability and offset electricity demand charges.

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: \$75,000

Expected Total Cost: \$200,000

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. Thirty networked Level 2 chargers were added through the Southern California Edison Charge Ready Fleet program in 2020, which will help South Coast AQMD acquire 8500 GVW and over ZEVs like light-duty trucks and vans to comply with the proposed CARB Advanced Clean Fleet regulation.

Light-duty BEVs and PHEVs are available from most established OEMs and several new OEMs. Current legislation extends solo carpool lane access only for MY 2019 and later vehicles, with all Clean Air Vehicle decals expiring between 2023 - 2025, unless legislation is adopted to continue.

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: \$1,400,000

Expected Total Cost: \$19,000,000

Description of Technology and Application:

Natural gas vehicles (NGVs) have been very successful in reducing emissions in the Basin due to the deployment by fleet owners and operators of heavy-duty vehicles utilizing this clean fuel. Currently, increasing number of on-road heavy-duty natural gas engines are being certified to CARB's optional low-NOx standards which are significantly lower in NOx emissions 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. Under Engine Systems, South Coast AQMD is support efforts for development high-powered natural gas vehicles to support long-haul applications. Increasing natural gas engine availability for the full range of applications would increase NGV deployment in long-haul applications where diesel engine has been the only option.

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 Renewable Fuel Infrastructure

Expected South Coast AQMD Cost: \$200,000

Expected Total Cost: \$2,100,000

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: \$2,000,000

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 further efforts associated with landfill and waste diversion, greenhouse gas reduction, energy diversity and petroleum dependency. Locally produced renewable fuels further reduce 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, including the reduced fuel price and operational costs, the incentives to purchase and deploy alternative or renewable energy 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). These renewable fuels can be converted from various waste biomass feed stocks, including municipal solid wastes, green waste, and biosolids produced at waste water treatment facilities generated from 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 supply 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: \$1,000,000

Expected Total Cost: \$4,500,000

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 Southern California. Both Daimler and Volvo obtained CARB certification of their Class 6 and/or 8 battery electric trucks in 2020, with these trucks eligible for HVIP and other incentives and commercially available for sale. South Coast AQMD also received \$16M in CARB and \$11M in CEC funding, as well as \$34M in co-funding from project partners for the deployment of 100 Daimler and Volvo Class 8 battery electric trucks for drayage and regional haul applications. 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 (BETs) each carrying 300+ kW hours of battery-stored energy or fuel cell trucks (FCTs) 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 is sold to the fleet through a power purchase agreement, the financial challenge of 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 on 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 kWh the batteries would require 30 MW hours/day of energy. For a 100-vehicle fleet of FCTs the hydrogen requirement is 2,000 kg/day. 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 provide grid resilience and potentially 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 Zero or Near-Zero Emission Energy Generation Alternatives

Expected South Coast AQMD Cost: \$200,000

Expected Total Cost: \$500,000

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 pumps. Besides renewable technologies, electrolyzer technology could be used to generate hydrogen, a clean fuel. Hydrogen, when used in internal combustion engines, can potentially reduce tail-pipe emissions of NO_x, 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 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 could 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 to help provide grid resiliency, especially as the transportation sector becomes more reliant on the electrical grid.

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: \$500,000

Expected Total Cost: \$2,000,000

Description of Technology and Application:

Hybrid electric, hybrid hydraulic, plug-in electric hybrid and battery-electric and fuel cell electric vehicles 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 (and propane) technology penetrates the different segments, in-use assessment of real-world benefit is needed especially now CARB has introduced a new in-use testing metric.

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 but it's limited and outdated. For the upcoming EMFAC 2021, more complete natural gas engine modules have been included for the first time with emissions data gathered from the current South Coast AQMD funded in-use emissions characterization effort. CARB and EPA low-NOx regulations focused on addressing the gap of in-use and certification values by introducing a new methodology that includes emissions from all operations. While staff expects the in-use emissions from new engines to perform closer to certification values, there are still significant population of the MY 2010+ legacy fleet is expected to remain in service well over 2030s. There is always a need to better assess real world truck emissions, fuel economy, and their activity 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 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. This duty-cycle requirement, often based on traditional vehicles are used for planning purposes for building medium- and heavy-duty public refueling stations. Furthermore, some of the standardized test cycle, like the chassis dyno based cycle, can be used to evaluate the efficiency of the zero-emissions vehicles and compare directly with the diesel and natural gas vehicle.

Another proposed project would be the characterization of intermediate volatility organic compound (IVOC) emissions which is critical in assessing ozone and secondary organic aerosol (SOA) precursor production rates. Diesel vehicle exhaust and unburned diesel fuel are major sources of and contribute to the formation of urban ozone and SOA, which is an important component of PM2.5. Natural-gas vehicles are also a concern due to lack of particulate filter, however, the actual impact based on current and projected population are to be further studied.

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 Related Environmental Impacts

Expected South Coast AQMD Cost: \$400,000

Expected Total Cost: \$1,500,000

Description of Technology and Application:

The use of renewable fuels such as 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 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, the data is due to be released soon to support the approval of E15. South Coast AQMD also has been monitoring efforts in using ethanol as a primary fuel for medium- and heavy-duty application in optimized engine systems that allows both criteria and GHG reduction which could be another pathway for reducing emissions due to abundance of ethanol from the light duty sector.

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 have 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 its emissions impact on the latest ICE technologies needs to be reassessed. Hydrogen fueled ICE was studied heavily in the early 2000's and results have 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 low NOx standards. Therefore, emissions impact assessment is needed on the latest ICE technologies.

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: \$400,000

Expected Total Cost: \$1,500,000

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 through various vehicle usage optimization strategies. 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. Similar efforts have already been proposed by CARB as part of HD I/M regulation. Moreover, the same telematic systems are being installed on zero-emission trucks where fleet and charging management are more important than ever, cloud based fleet management concept are being proposed by researchers to maximize the range and air quality benefits of zero-emission trucks.

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
- fleet and charger management concepts 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 the Community Emission Reduction Plans (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 for On-High Way

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 the 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. The proposed Clean Truck Initiative by the EPA as well as the adopted CARB Omnibus Regulation will require aftertreatment systems to maintain certification to a much longer useful life via new in-use testing metrics. Technology durability and in-use performance will need to be studied.

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, and waste haulers. 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 Methodology and Evaluate and Demonstrate Onboard 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 NOx emissions inventory in the Basin. To meet the 2023 and 2031 ozone standards, NOx 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 NOx 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 NOx regulation, in addition to the lower certification values, a low load test cycle and revisions to the not-to-exceed compliance tests. A NOx sensor data reporting is 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. CARB's newly proposed HD I/M rule will be looking at address in-use emissions from the older legacy fleets, one of the pathways is also using onboard sensors.

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 NOx 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 don't usually require repowering (engine replacement) or remanufacturing to meet the cleaner emission standards as the engine being retired. Unfortunately, this does not take advantage of recently developed clean technologies.

Exhaust gas cleanup strategies, such as EGR, SCR, DPF, 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 as well as other clean alternative fuels in off-road applications including yard hostlers, locomotives, commercial harbor craft, gantry cranes, waste haulers and construction equipment;
- implementing lower emission engines requirement in repower applications for both on-road and off-road applications; and
- applying stationary best available control technologies, such as EGR, SCR, scrubbers, DPF, 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. Similar studies should also be conducted on natural gas medium- and heavy-duty vehicles to understand potential emissions impact.

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 Particulate Matter

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, as well as modeling to characterize risks, including measurements and analysis of ultrafine particle concentrations typically emitted or subsequently formed from vehicle exhaust. Findings from the MATES V report finalized in June 2021 showed that air toxics cancer risk based on modeling data has decreased by about 50% since MATES IV, with average multi-pathway air toxics cancer risk at 454-in-a-million. Highest risk locations are at LAX and the Ports along goods movement and transportation corridors. Diesel PM continues to be the major contributor to air toxics cancer risk. For the first time, chronic non-cancer risk was estimated with a chronic hazard index of 5.9 across the 10 stations in 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: \$600,000

Expected Total Cost: \$1,000,000

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: \$350,000

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 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 1,900 rebates, totaling \$553,596. 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 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
*Dr. Bill Robertson.....	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 18, 2022

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
*Ken Kelly	National Renewable Energy Laboratory
Dwight Robinson	Mortimer & Wallace, Inc.

*Newly appointed member

² Members as of March 4, 2022

Appendix B

Open Clean Fuels Contracts as of January 1, 2022

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Contract	Contractor	Project Title	Start Term	End Term	South Coast AQMD \$	Project Total \$
Electric / Hybrid Electric Technologies and Infrastructure						
14184	Clean Fuel Connection, Inc.	DC Fast Charging Network Provider	04/04/14	06/30/23	390,000	1,210,000
16081	Broadband Telecom 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
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	03/31/22	1,741,184	11,065,938
17244	Kenworth Truck Company	Development & Demonstration of four Class 8 CNG Hybrid Electric Drayage Trucks	09/08/17	06/30/22	2,239,106	6,492,238
18129	Electric Power Research Institute	Versatile Plug-In Auxiliary Power System Demonstration	06/28/18	04/30/23	125,000	273,000
18232	Hyster-Yale Group Inc	Electric Top-Pick Development, Integration & Demonstration	09/14/18	06/30/23	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
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
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 (SCPPA)	Disburse Donated Mercedes-Benz USA, LLC Electric Vehicle Chargers	01/10/19	01/10/22	0	0
19190	Daimler Trucks North America LLC	Zero Emission Trucks and EV Infrastructure Project	12/18/18	06/17/22	8,230,072	31,340,144
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

Contract	Contractor	Project Title	Start Term	End Term	South Coast AQMD \$	Project Total \$
Electric / Hybrid Electric Technologies and Infrastructure (cont'd)						
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
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	06/30/22	4,000,000	92,345,863
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	Hosnarea 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
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
19295	Ivan Garcia	Disburse donated Mercedes-Benz USA, LLC. Electric Vehicle Chargers	04/11/19	04/10/22	0	0

Contract	Contractor	Project Title	Start Term	End Term	South Coast AQMD \$	Project Total \$
Electric / Hybrid Electric Technologies and Infrastructure (cont'd)						
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 Hyundai 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	09/30/22	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
20296	Daimler Trucks North America LLC	Deploy Zero Emission Electric Delivery Trucks	05/27/21	12/31/24	0	12,310,000
21077	Daimler Trucks North America LLC	Develop and Demonstrate up to 8 Heavy-Duty Battery Electric Trucks and Transportable Fast-Charging	03/11/21	03/31/23	1,000,000	6,742,000
21153	Volvo Group North America, LLC	Switch-On: Develop and Deploy Seventy Heavy-Duty Battery Electric Vehicles	06/10/21	09/30/24	2,000,000	31,540,000
Engine Systems and Technologies						
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
18194	CALSTART	Develop and Demonstrate Near-Zero Emission Opposed Piston Engine	05/30/18	06/30/22	1,000,000	15,550,000
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
20158	University of California Riverside	OnBoard Nox and PM Measurement Method	05/19/20	05/18/22	201,087	688,587
20199	Agility Fuel Solutions LLC	Develop a Near-Zero Natural Gas and Propane Conversion System for On-Road Medium-Duty Vehicles	07/01/21	06/30/22	453,500	1,834,000

Contract	Contractor	Project Title	Start Term	End Term	South Coast AQMD \$	Project Total \$
Engine Systems and Technologies (cont'd)						
20316	US Hybrid	Natural Gas Engine & Vehicles Research & Development - Plug-In Hybrid CNG Drayage Truck (PHET)	06/02/20	12/01/23	500,000	2,853,006
Fuel / Emission Studies						
17276	University of California Riverside, Ce-Cert	Development of ECO-ITS Strategies for Cargo Containers	08/03/17	01/31/22	543,000	2,190,233
17286	University of California Riverside	In-Use Emissions Testing and Fuel Usage Profile of On-Road Heavy-Duty Vehicles	06/09/17	03/31/22	300,000	1,625,000
21103	University of California Riverside	Perform Investigation Study of E15 Gasoline Fuel Effects	03/09/21	06/08/22	200,000	1,300,000
21169	West Virginia University Research Corp	Evaluation of Vehicle Maintenance Costs Between NG and Diesel Fueled On-Road Heavy-Duty Vehicles	09/29/21	03/28/24	100,000	250,000
Fueling Infrastructure and Deployment (NG / RNG)						
18336	ABC Unified School District	FY2017-18 Alternative Fuel School Bus Replacement Program (3 CNG Buses)	10/05/18	11/30/34	117,900	676,500
18337	Alta Loma School District	FY 2017-18 Alternative Fuel School Bus Replacement Program (2 CNG Buses)	10/05/18	11/30/34	78,600	423,000
18344	Bellflower Unified School District	FY 2017-18 Alternative Fuel School Bus Replacement Program (1 CNG Bus)	09/07/18	11/30/34	39,300	225,500
18346	Chaffey Joint Union High School District	FY 2017-18 Alternative Fuel School Bus Replacement Program (6 CNG Buses)	10/05/18	11/30/34	235,800	1,269,000
18348	Cypress School District	FY 2017-18 Alternative Fuel School Bus Replacement Program (1 CNG Bus)	09/07/18	11/30/34	39,300	211,500
18349	Downey Unified School District	FY 2017-18 alternative Fuel School Bus Replacement Program (4 CNG Buses)	09/14/18	11/30/36	157,200	902,000
18350	Fountain Valley School District	FY2017-18 Alternative Fuel School Bus Replacement Program (1 CNG Bus)	09/07/18	11/30/34	39,300	211,500
18351	Fullerton Joint Union High School District	FY2017-18 Alternative Fuel School Bus Replacement Program (4 CNG Buses)	10/05/18	11/30/34	157,200	846,000
18355	Huntington Beach Union High School District	FY2017-18 Alternative Fuel School Bus Replacement Program (15 CNG Buses)	10/05/18	11/30/34	589,500	3,382,500
18363	Orange Unified School District	FY 2017-18 Alternative Fuel School Bus Replacement Program (1 CNG Bus)	09/14/18	11/30/34	39,300	225,500
18364	Placentia-Yorba Linda Unified School District	FY2017-18 Alternative Fuel School Bus Replacement Program (6 CNG Buses)	10/05/18	11/30/34	235,800	1,353,000

Contract	Contractor	Project Title	Start Term	End Term	South Coast AQMD \$	Project Total \$
Fueling Infrastructure and Deployment (NG / RNG) (cont'd)						
18365	Pupil Transportation Cooperative	FY 2017-18 Alternative Fuel School Bus Replacement Program (5 CNG Buses)	10/05/18	11/30/34	196,500	1,127,500
18367	Rialto Unified School District	FY 2017-18 Alternative Fuel School Bus Replacement Program (13 CNG Buses)	10/05/18	11/30/34	510,900	2,931,500
18368	Rim Of The World Unified School District	FY2017-18 Alternative Fuel School Bus Replacement Program (3 CNG Buses)	10/05/18	11/30/34	513,600	676,500
18369	Rowland Unified School District	FY 2017-18 Alternative Fuel School Bus Replacement Program (3 CNG Buses & 1 Propane Bus)	11/02/18	11/30/34	117,900	770,000
18374	Upland Unified School District	FY 2017-18 Alternative Fuel School Bus Replacement Program (4 CNG Buses)	10/12/18	11/30/34	157,200	902,000
20178	Whittier Union High School District	FY 2017-18 Alternative Fuel School Bus Replacement Program	02/21/20	11/30/34	196,500	1,052,500
21099	CR & R, Inc.	Renewable Natural Gas Production and Vehicle Demonstration Project	03/03/20	09/30/22	166,250	166,250
21140	Inland Kenworth (US) Inc	SCAQMD Approved Participating Dealership in TRUCK TRADE DOWN PROGRAM	01/07/21	12/31/23	0	0
21141	Velocity Truck Centers	SCAQMD Approved Participating Dealership in TRUCK TRADE DOWN PROGRAM	03/04/21	12/31/23	0	0
21142	TEC of California, Inc.	SCAQMD Approved Participating Dealership in TRUCK TRADE DOWN PROGRAM	04/15/21	12/31/23	0	0
Hydrogen and Mobile Fuel Cell Technologies and Infrastructure						
15150	Air Products and Chemicals, Inc.	Install/Upgrade Eight H2 Fueling Stations throughout SCAG (including SCAQMD's HQs H2 station)	10/10/14	04/09/22	1,000,000	17,335,439
15366	Engineering, Procurement & Construction, LLC.	Operate and Maitain Publicly Accessible Hydrogen Fueling Station at SCAQMD's Diamond Bar HQs	10/10/14	04/09/22	0	0
15611	Ontario CNG Station, Inc.	Installation of Ontario Renewable Hydrogen Fueling Station	07/10/15	07/09/22	200,000	2,510,000
16025	Center for Transportation and the Environment	Develop & Demonstrate Fuel Cell Hybrid Electric Medium-Duty Trucks	02/05/16	11/30/23	980,000	7,014,050
17059	CALSTART Inc	Develop and Demonstrate Fuel Cell Extended Range Powertrain for Parcel Delivery Trucks	10/27/16	02/28/22	589,750	1,574,250
17312	Cummins EP NA Inc	ZECT II - Develop Fuel Cell Range-Extended Drayage Truck	11/20/17	05/30/24	125,995	2,093,146
18150	California Department of Food and Agriculture	Conduct Hydrogen Station Site Evaluations for Hydrogen Station Equipment Performance	06/28/18	02/27/22	100,000	805,000

Contract	Contractor	Project Title	Start Term	End Term	South Coast AQMD \$	Project Total \$
Hydrogen and Mobile Fuel Cell Technologies and Infrastructure (cont'd)						
19248	Tustin Hyundai	Three Year Lease of 2019 Fuel Cell Hyundai Nexso	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
20033	Port of Long Beach	Sustainable Terminals Accelerating Regional Transportation (START) Phase I	06/04/21	04/30/22	500,000	102,964,064
20038	University of California Irvine	Expansion of the UCI Hydrogen Refueling Station	10/18/19	02/17/27	400,000	1,800,000
20169	Port of Los Angeles	Develop & Demonstrate Near-Zero and Zero Emissions Vehicles and Equipment at the Ports	06/28/21	11/30/22	1,000,000	83,548,872
20244	Cummins Electrified Power NA Inc	Demonstrate Fuel Cell Range-Extended Drayage Trucks	12/16/19	06/30/22	582,305	4,985,665
21313	Sunline Transit Agency	Deployment of 5 Zero-Emission Fuel Cell Transit Buses	08/27/21	09/30/25	204,921	6,761,125
21386	National Renewable Energy Laboratory	CA Hydrogen Heavy-Duty Infrastructure Research Consortium H2@Scale Initiative	09/03/21	09/02/23	25,000	1,171,000
Stationary Sources - Clean Fuels						
21266	University of California Irvine	Develop Model for Connected Network of Microgrids	08/17/21	02/16/24	290,000	370,000
Technology Assessments 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
12376	University of California Riverside	Technical Assistance with Alternative Fuels, Biofuels, Emissions Testing, and Zero-Emission Transportation Technology	06/01/14	05/31/24	300,000	300,000
15380	ICF Resources LLC	Technical Assistance with Goods Movement, Alternative Fuels and Zero-Emission Transportation Technologies	12/12/14	12/11/22	30,000	30,000
16262	University of California Davis	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	06/30/22	200,000	200,000

Contract	Contractor	Project Title	Start Term	End Term	South Coast AQMD \$	Project Total \$
Technology Assessments and Transfer / Outreach (cont'd)						
19078	Green Paradigm Consulting, Inc.	Technical Assistance with Alternative Fuels, Evs, Charging & Infrastructure and Renewable Energy	09/07/18	09/30/24	200,000	857,236
19227	Gladstein, Neandross & Associates LLC	Technical Assistance with Alternative Fuels & Fueling Infrastructure, Emissions Analysis & On-Road Sources	02/01/19	01/31/22	300,000	300,000
19302	Jerald Cole	Technical Assistance with Hydrogen Infrastructure and Related Projects	04/24/19	04/23/23	50,000	50,000
20085	CALSTART Inc	Technical Assistance for Development & Demonstration of Infrastructure and Mobile Source Applications	11/08/19	11/07/23	250,000	250,000
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
21260	Fred Minassian	Technical Assistance with Incentive and Research and Development Programs	04/13/21	10/12/22	75,000	75,000
22032	Southern California Chinese American Environmental Protection Association	Cosponsor the 2021 Southern California Chinese-American Environmental Protection Association 30-Year Anniversary and Annual Convention	08/20/21	05/31/22	1,500	20,000
22096	AEE Solutions LLC	Technical Assistance with Heavy-Duty Vehicle Emission Testing, Test Methods and Analysis of Real-World Activity Data	11/08/21	11/07/23	100,000	100,000

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Appendix C

Final Reports for 2021

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South Coast AQMD Contract #17065

December 2021

Installation Services for Installation of EV Chargers at South Coast AQMD Headquarters

Contractor

Clean Fuel Connection, Inc. (CFCI)

Cosponsors

South Coast AQMD

Project Officer

Patricia Kwon

Background

Clean Fuel Connection, Inc. (CFCI) was chosen by a competitive RFP process for installation of ninety-two (92) Level 2 electric vehicle supply equipment (EVSE) at South Coast AQMD headquarters. Goss Engineering, Inc. was also hired through a competitive RFP process to provide required engineering services prior to the release of an RFP for installation of EV chargers, preparation of construction plans to obtain a permit from the City of Diamond Bar, and engineering services as required during the installation of EV chargers from October 2016 through December 2017.

Project Objective

CFCI performed the installation services as outlined in the City of Diamond Bar's approved construction plans and line drawings. These installation services included six ADA accessible chargers for both the front lobby entrance and the side entrance closest to conference room GB which is commonly used for public meetings and workshops. These services included working with the hardware provider Broadband Telecom Power, Inc. (BTC), Goss Engineering, and the City of Diamond Bar for permitting approvals.

Additional services included obtaining electrical and trenching permits from the City of Diamond Bar, providing a phased construction plan for work to be performed in different areas of the parking lot to minimize disruption, and performing the final job walk with South Coast AQMD staff and CFCI based on completing items on the final punch list. This also included ensuring compliance with the State of California Governor's Office of Planning and Research and Division of the State Architect EVSE universal charging access guidelines, as well as the

American with Disabilities Act accessibility requirements, SB 854 requirements for Public Works projects, and all applicable building, electrical and safety codes.

Technology Description

Due to the wide range of cutting-edge alternative fuel technologies that are demonstrated at the South Coast AQMD headquarters facility, even a moderately large scale construction project impacting six areas of the parking lot including upgrade and replacement of three transformers and seven electrical panels, presents technical challenges. In addition, there was an inability to shut down power at the facility for even a short thirty-minute interval due to the need to have continuous power at the facility for Air Quality Management Plan modeling runs and laboratory analyses for resolving toxics issues at metal processing plants in Paramount. Due to the need to comply with South Coast AQMD's Rule 1470 (prohibiting use of a backup natural gas generator to provide power during routine maintenance), replacement of the transformer in the main electrical room took place with the power still on through a "hot connect" procedure.

Status

CFCI played a critical role in the installation of 92 Level 2 EV charging ports at South Coast AQMD headquarters. Electrical upgrades and hardware installation occurred between October 2016 and April 2017, with minor construction tasks completed in December 2017. CFCI remained under a warranty and maintenance agreement until December 2021.



Locations of EV charging stations installed at South Coast AQMD headquarters

Results

Coordination between Goss Engineering who developed the approved plans, hardware provider BTC, and the City of Diamond Bar Plan Check department enabled the construction project to be carried out successfully and with a minimum of delays despite technical challenges, delays in receiving equipment, and unprecedented heavy rainfall.



EV charging stations under the solar carport

EV charging transactions in December 2017 showed there were over 1,329 charging sessions dispensing 15,309 kWh of electricity for EV chargers serving South Coast AQMD staff, visitors, and the general public. These EV chargers continue to be utilized but to a lesser extent since the COVID pandemic closed South Coast AQMD facilities to the public in March 2020 and have not yet re-opened to the public.

Benefits

This project showcases the benefits of providing Level 2 EV charging for staff, visitors, and the general public at a large workplace location. On average, South Coast AQMD staff have a twenty-mile one-way commute to work, with some staff having as much as a 45-mile one-way commute. Without workplace charging, staff would be unable to drive their EVs to work and make it home. This results in increased zero emission vehicle miles traveled, particularly during critical morning and evening commuting hours when congestion impacts are at their greatest.

Project Costs

Installation services for this project totaled \$805,219 and were within the budget for this project. Hardware and Greenlots EVSE networking software were provided under a separate BTC contract for \$367,425. Engineering services to obtain City permits were provided under a separate contract with Goss Engineering

for \$50,000. Total costs for the EVSE installation were \$1.2M.

Commercialization and Applications

The utilization of engineering services to define the installation phase of the project and assist in providing calculations and revised plans to the City of Diamond Bar assisted greatly in allowing the installation to stay within budget and to be completed within the desired time frame. It is recommended that for the installation of workplace charging at large facilities such as South Coast AQMD headquarters that an engineering firm be available to provide the necessary technical assistance at key points during the project. In particular, the engineering services were critical to define the load of existing panels and ensure proper specifications and upsizing of transformers, panels, conduit, and wiring. This upsizing incorporated not only the planned installation of 92 EVSE but also anticipated future deployments of EV chargers that were likely to occur within the next 5-10 years to future proof the facility. This future proofing enabled staff to later serve as a site host for a new 50 kW DC fast charger with CHAdeMO and CCS1 connectors at the front lobby parking area to better serve EVs capable of fast charging. Another critical service was having an installation warranty with CFCI and a maintenance contract with hardware provider BTC and networking software provider Greenlots to address post installation EVSE issues.

South Coast AQMD Contract #17316

September 2021

Develop and Demonstrate 10 Zero-Emission Fuel Cell Electric Buses

Contractor

Center for Transportation and the Environment (CTE)
Orange County Transportation Authority (OCTA)
New Flyer
Air Products
Trillium

Cosponsors

California Air Resources Board (CARB)
South Coast AQMD

Project Officer

Patricia Kwon

Background

As part of the CARB-funded Fuel Cell Electric Bus Commercialization Consortium Project (FCEBCC), this project furthers the development of fuel cell technology for transit agencies nationwide. CTE partnered with Orange County Transportation Authority (OCTA) to incorporate ten (10) prototype fuel cell electric transit buses into daily operation, which reduces carbon emissions and air pollutants in the South Coast Air Quality Management District (South Coast AQMD).

Project Objective

The purpose of the FCEBCC project was to help accelerate the commercialization of zero-emission buses. Besides working to reduce greenhouse gas emissions, strengthen the economy, and improve public health and the environment, this project was also intended to create a financial incentive for industries to invest in clean technologies and develop innovative ways to reduce pollution through the cap-and-trade program.

Technology Description

While battery-electric vehicle adoption has steadily increased, hydrogen fuel cell electric buses (FCEB) are also a necessary technology for the mass

adoption of zero-emission technologies. FCEBs have an electric drive system that feature a traction motor powered by a battery. The energy supply for an FCEB is on board the bus, where hydrogen, stored in tanks, is converted to electricity using a fuel cell. The electricity from the fuel cell is used to recharge the batteries.

Status

This project is complete and the final report is on file with the technical details of the project. The project did not encounter any fatal issues, although the project timeline was extended due to infrastructure deployment and bus delivery delays. The first bus was delivered to OCTA in September of 2018, the station was commissioned in January of 2020 and buses completed 40-hour testing in December of 2020.



New Flyer Xcelsior XHE40 fuel cell bus at OCTA

Results

In the first year of deployment, the two fleets had an average fuel economy of 8.46 miles per kg, or roughly 9.56 miles per diesel gallon equivalent. This is about twice that of typical diesel and compressed natural gas (CNG) buses. **Figure 1** illustrates that the buses were able to offset a combined total of 413 Metric Tons CO₂e compared to their respective baseline fleets (CNG for OCTA, diesel for AC Transit). The energy efficiency of the fuel cell buses was greater than 2x that of comparable CNG buses. However, perhaps the biggest obstacle to adoption of FCEBs seen as a result of this project is vehicle availability.

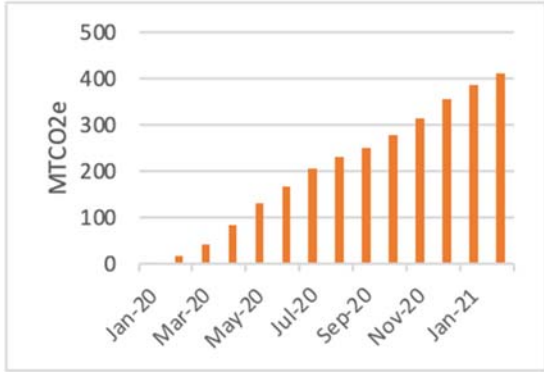


Figure 1. Cumulative GHG Emission Reductions of FCEBs over first year of deployment, from February 09, 2020 through February 28, 2021.

The average fleet availability through the first year of deployment was around 70%, with a maximum availability by month between the two fleets of 80%. Typical transit fleet operators target 85% vehicle availability in order to provide reliable service. As the technology matures and maintenance becomes more routine, FCEBs are expected to meet these targets.

Benefits

A key challenge with the overall environmental impacts of fuel cell vehicles is the difficulty of sourcing hydrogen produced renewably. Despite this issue, the FCEBs were still able to provide environmental benefits by eliminating the release of key criteria pollutants such as nitrogen oxides (NOx), reactive organic gases (ROG), and particulate matter (PM10) compared to the agencies’ baseline conventional diesel and CNG fleets. The expected annual emission reductions from the project application, and the actual realized reductions from the first year of deployment, are presented in the following table.

	GHG (MTCO2e)	NOx (tons)	ROG (tons)	PM10 (tons)
Expected	348	0.47	0.15	0.023
Actual	413	0.29	0.09	0.014

The expected emission reduction calculations assumed a general carbon intensity of the hydrogen fuel supply for California, while the actual calculations are based on the realized carbon intensity of fuel supply, which was significantly

lower. The expected emission reduction calculations also assumed the FCEBs would travel the same number of miles as their baseline fleets. However, due to early maintenance issues, the buses did not meet the target mileage. The agencies expect the buses to meet their respective mileage targets as the maintenance becomes more routine.

Several other transit agencies in the South Coast Air Basin have also expressed interest in integrating fuel cell buses into their fleets including: Big Blue Bus, Foothill Transit, Long Beach Transit, OmniTrans, and SunLine Transit. Assuming these agencies are able to deploy 100 buses in total, replacing conventional diesel vehicles, this technology has the potential to reduce up to 73,450 MTCO2e in the South Coast Air Basin over the lifetime of the vehicles.

Project Costs

The following table summarizes the project budget and actual expenditure.

		SCAQMD Share	Total
Budget	Buses	\$1,000,000	\$13,338,000
	Facility Upgrades	-	\$414,819
	Station	-	\$5,486,895
Actual	Buses	\$1,000,000	\$12,978,382
	Facility Upgrades	-	\$989,377
	Station	-	\$5,403,097

Commercialization and Applications

This project has already had an impact on the commercialization of FCEBs. There are two American original equipment manufacturers, New Flyer and ENC, that are Buy America compliant and these buses can therefore be purchased as part of other federal funding programs. New Flyer’s XHE40 and XHE60 Xcelsior FCEBs also completed Altoona testing in early 2019, in parallel to this project, which made these buses eligible for purchase through federal, as well as California funding programs, which will only further their adoption. FCEB costs have also dropped steadily since 2004, when FCEB demo bus costs exceeded \$3 million. OEM estimates for a 40-bus order are now around \$1 million.

Develop & Demonstrate Battery Electric Switcher Locomotive

Contractor

Rail Propulsion Systems

Cosponsors

Coast Rail Services
 South Coast AQMD
 US Environmental Protection Agency (EPA)

Project Officer

David Cook

Background

Prior to the start of this project in 2018, there had been several attempts to develop and market battery-based hybrid or pure electric locomotives. Due primarily to the low energy density of the batteries used, new product reliability issues and poor cost benefit relative to the abundance of diesel locomotives available on the used market, these projects were unsuccessful in bringing a battery locomotive to market.

In 2017, following the implementation and subsequent EPA certification of the Blended Aftertreatment System (BATS) emissions reduction upgrade for existing passenger locomotives, Rail Propulsion Systems (RPS) proposed to South Coast AQMD a project for the design, development, and demonstration of a battery locomotive energy system. In 2018 South Coast AQMD notified RPS of available funding (\$210,000) and RPS offered to provide the additional funds, access to the facilities, locomotive platform, and batteries required to support the project.

Project Objective

The goal of this project was to utilize available funds from South Coast AQMD along with contributions from RPS to demonstrate and assess the viability of a battery locomotive conversion. Further, this project utilized existing “2nd life”



Figure 1. The Simple Battery Switcher Locomotive

batteries both for economic reasons and to assess viability for use of 2nd life batteries in certain applications as a deferment of, or an alternative to, costly and inefficient recycling of the batteries after being removed from first life services such as electric passenger vehicles. The project required RPS to design, develop and implement a large (300 kW-hr) battery system, power electronics, and related subsystems necessary to convert a diesel locomotive platform to a zero-emissions battery locomotive on a limited budget. Following the conversion, RPS was to assess and report on the performance of the battery locomotive followed by an option for additional in-service operation.

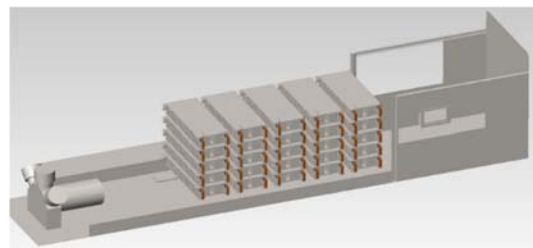


Figure 2. Battery module cans in locomotive chassis

Technology Description

The RPS conversion package for the Simple Switcher project consists of an air cooled, modular, rack-based battery system, battery management, power electronics, motor driven cooling blowers and air compressor, and a lab view based locomotive control system. The

battery system contains approximately 300kW-hrs of second life Lithium-Ion batteries packaged into fifteen modules that could be individually removed and serviced or replaced. The battery management system consists of local monitoring units that measure the current, voltage and temperature of the batteries in a given module. This data is communicated to and monitored by a central controller unit that conveys data to the power electronics and locomotive control system to process fault indications and command power contactors to isolate specific modules if necessary. The power electronics receive inputs from the locomotive control system and battery management controller which are then processed to manage the flow of current from and to the battery system. The LabVIEW based locomotive controller receives command inputs from the operator control stand for throttle and direction and processes them into outputs to command the traction motor power contactors and the current input from the power electronics.

Status

The Simple Switcher completed the performance test requirements of the project, successfully pulling trains of up to five loaded hopper cars in the railyard. Though the testing was successful, the operators on site assessed that, in its current configuration, the 1201 was not sufficient for daily in-service use. The compressed air system on the locomotive did not have sufficient capacity to support the flow and pressure requirements necessary to affectively charge and control the trainline braking system on consists of greater than five cars. Furthermore, the locomotive control system specified in this project was determined to be too simplistic and lacked the ruggedness and features necessary for daily switching use. These two items would need to be addressed through redesign or upgrades requiring additional funds beyond the scope of work of this contract.

Results and Benefits

RPS successfully designed, manufactured and demonstrated that its battery locomotive conversion package is capable of powering a locomotive in place of a conventional internal combustion engine and generator package. The systems and related subsystems created in this

project will be further improved and utilized on future RPS battery locomotives. An on-site charging station and related training for the operators were both successfully completed as well. Conversely, the budget constraints for this project did not allow for sufficient upgrade of other systems on the test locomotive resulting in a reduction in the amount of in-service testing that was ultimately conducted as part of the project. Primarily, a more robust compressed air system and a more capable locomotive control system are both required. As for the assessment of 2nd life batteries, the results of the testing found the project batteries to be sufficient in energy density and remaining cycle life to support the project locomotive. Ultimately, the labor involved with harvesting and repurposing the second life batteries may outway the perceived cost benefit when compared to sourcing new batteries of alternate compositions that have lower energy density but much higher cycle life performance. Ultimately, replacing diesel switcher locomotives with zero emissions alternatives has the potential to significantly reduce emissions and improve air quality in metropolitan areas particularly in EJ communities where most rail yards are located.

Project Costs

Participant	Funding
South Coast AQMD <i>(pass-thru from US EPA)</i>	\$210,000
Rail Propulsion Systems	\$2,059,603
Total	\$2,269,603

Commercialization and Applications

The Simple Battery Switcher project provided a basis for requirements necessary to develop and market battery electric locomotives that would be acceptable to switching railyard operations and commuter rail service. Based on current battery and system development and manufacturing costs, it is estimated that battery switchers can be made available to the market for a retail cost of \$4-6M and passenger locomotives for a cost of \$12-15M for commuter applications. RPS is prepared to deliver battery switcher locomotives by early 2023 or sooner and battery commuter locomotives by 2025

South Coast AQMD Contract #18397

May 2021

Demonstrate Zero-Emission Cargo Handling Vehicle at Port of Long Beach

Contractor

City of Long Beach Harbor Department
Port of Long Beach (POLB)

Cosponsors

California Air Resources Board (CARB)
South Coast AQMD

Project Officer

Patricia Kwon

Background

C-PORT: The Commercialization of POLB Off-Road Technology (C-PORT) Demonstration demonstrated the first zero-emission human-operated cargo-handling equipment (CHE) at the Port of Long Beach (POLB). C-PORT is focused on demonstrating zero emission battery electric yard tractors and top handlers since these represent 60% of the CHE utilized at the POLB. Utilizing battery electric yard tractors and top handlers would be a critical way to achieve the POLB's emission reduction goals as well as meeting the goals in the POLB's Clean Air Action Plan Update. The Clean Air Action Plan set a goal for zero emission CHE by 2030.

Project Objective

C-PORT's objectives were to design, manufacture, and deploy three battery electric top handlers, one battery electric yard tractor, and one hydrogen fuel cell yard tractor across two port terminals with differing duty cycles; install sufficient infrastructure to support charging and operation of zero emission equipment in revenue service; and demonstrate the proposed equipment in revenue service for at least six months, collecting real-world data on equipment performance. The project also included important stakeholder and community engagement, workforce development and educational components.

Technology Description

Three battery electric top handlers were manufactured as a collaboration between original

equipment manufacturer (OEM) Taylor Machine Works, Inc., and the technology developer, BYD Motors, Inc. The battery-electric yard tractor was manufactured as a collaboration between Kalmar USA (OEM) and TransPower/Meritor, Inc. (technology developer). Each OEM provided its own 200kW proprietary charger at a one-to-one vehicle to charger ratio. The fuel cell yard tractor was manufactured as a collaboration between China National Heavy Duty Truck Group Co., Ltd. (OEM) and Loop Energy, Inc. (technology developer). Each of these vehicles represent the first zero emission technologies deployed from these OEMs. The fuel cell yard tractor was not demonstrated due to the lack of engineering documentation to fully address the POLB's safety and design concerns.



Figure 1. Battery-Electric Kalmar Yard Tractor



Figure 2. Battery-Electric Taylor Top Handler

Status

C-PORT was a 38-month long project, commencing in June of 2018 and completed in August of 2021. A final report is on file with complete technical details.

Results

The demonstration of battery electric top handlers and yard tractors was successfully completed. The battery electric yard tractor was able to meet the performance requirements at the Long Beach Container Terminal (LBCT). The battery electric top handlers were not able to meet the performance requirements for the long shifts at the SSA Marine Terminal at the POLB. However, the battery electric top handler deployed at the LBCT was suitable for the required work.

SSA Marine is a busy container terminal where the top handlers have a challenging duty-cycle and are required to operate two entire shifts. As such, operators found that due to the nature of the work and limitations around opportunity charging, the units did not maintain enough battery life to be comfortably used for the full two shifts. The greatest measured battery discharge (usage) during the demonstration was 91% during operations for 7.61 hours. The longest day for the tested SSA Marine diesel top handler was 12.43 hours. A full 29% of the days in which data was collected showed operations longer than 7.61 hours.

Table 1. Daily averages for battery electric and diesel top handlers (top two) and yard tractor (bottom)

	Electric SSA Marine Top Handler #1	Electric SSA Marine Top Handler #2	LBCT Top Handler
Daily Averages			
Energy Use (kWh)	382	301	63
SOC Use (%)	38	43	7
Hourly Electricity Use Rate (kWh/hr)	67	57	28
Time Operational (Hours)	5.2	4.7	2.6
Speed (mph)	3	2.5	0.5
Distance (miles/day)	18	13	1

	SSA Marine Diesel Top Handler (a)	SSA Marine Diesel Top Handler (b)
Daily Averages		
Engine Load (%)	41	22
Engine Torque (%)	27	41.3
Time Operational (hours)	5	4.8
Speed (mph)	1.6	1.4
Distance (miles/day)	7.4	8.5
Fuel Consumption (gal/day)	29	21.7

	Electric Yard Tractor	Diesel Yard Tractor
Daily Averages		
95 kWh	28% engine load	
56% of SOC use	57% engine torque	
15 kWh/hr	6.6 liters per hour of fuel per day	
6 hours	7 hours	
8 mph	5.5 mph	
42 miles per day	44 miles per day	

Table 2. Greenhouse gas (GHG) and criteria pollutant emission reductions from the demonstration

	Net GHG Reductions based on the Demonstration Period	Estimated Avoided NOx Emissions	Estimated Avoided THC Emissions	Estimated Avoided PM Emissions
Units	MTCO ₂ e	ton	ton	ton
SSA Top Handler 80367	49.0	0.32	0.00048	0.010
SSA Top Handler 80368	44.3	0.28	0.00041	0.009
LBCT Top Handler BYD	17.4	0.09	0.00013	0.003
LBCT Yard Tractor Kalmar	11.1	0.03	0.00000	0.0000007
Total	121.7	0.72	0.00103	0.022

Benefits

The project demonstrated that the vehicles were able to provide the expected operational benefits (GHG savings/operating hour). Based on the POLA & POLB 2019 Emission Inventories, deploying battery electric technologies across the entire fleet of yard tractors and top handlers would be equivalent to reducing annual emissions by 237,186 metric tons of CO₂e, 445.1 tons of NO_x, 85.8 tons of THC, and 7.2 tons of PM10.

Project Costs

The total project cost was \$7,784,086. The California Air Resources Board (CARB) awarded \$5,339,820 through its Off-Road Advanced Technology Demonstration Project grant program. Of the required match funding, South Coast AQMD provided \$350,000 and the balance of \$2,184,266.74 was funded by the POLB.

Commercialization and Applications

The project provided an important first step in full commercialization of these, and other battery electric CHE. Battery electric off-road vehicles, mobile equipment, and CHE are rapidly developing markets, and the knowledge gleaned from C-PORT will be applied to future products developed by Taylor and Kalmar.

Taylor has reported that the next generation of battery electric ZLC-996 series top handler will be a commercialized unit which will feature technology directly evolved from the precommercial C-PORT unit. Kalmar has reported that the information gleaned from C-PORT will be used to improve the next generation of battery electric yard tractors going into production in late 2022.

Economic and Workforce Impact Analysis of Electric Revolution in Southern California

Contractor

The Los Angeles County Economic Development Corporation

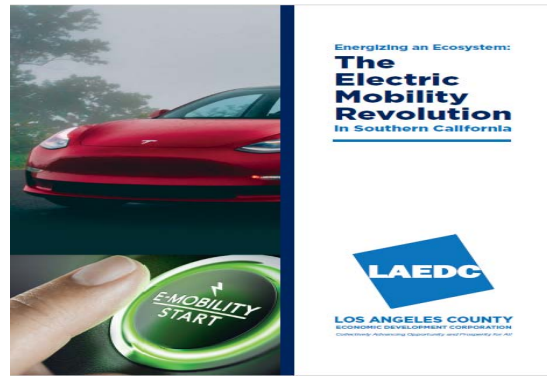
Cosponsors

Southern California Edison
Southern California Association of Governments (SCAG)
Los Angeles County Metropolitan Transportation Authority (LA Metro)
Los Angeles Department of Water and Power
South Coast AQMD

Project Officer

Seungbum Ha

Technology Description



The final LAEDC Electric Vehicle report is divided into five sections followed by a conclusion.

Background

The Energizing an Ecosystem: The Electric Mobility Revolution in Southern California (hereafter the LAEDC Electric Vehicle or EV report) was a collaboration between the LAEDC and five regional partners to analyze the electric vehicle ecosystem in the state of California as a whole and the five-county (Los Angeles, Orange, Ventura, San Bernardino and Riverside counties) Southern California region specifically. The purpose of this report was to build on existing LAEDC industry cluster development around electric mobility in addition to LAEDC research expertise in industry cluster and workforce analysis. This report was commissioned as of September 2019.

Project Objective

The objective of this project was to define and assess the size and scope of the electric vehicle cluster in California from the perspective of firms and employment. The report was also to provide analysis of the scope of electric vehicle (EV) adoption thus far in the state; state and local goals and resources for adoption; the environmental concerns motivating adoption; and policies and programs that could be enacted to further the industrial and workforce development of the EV cluster in California.

The introductory stage qualitative sets the framework for a return of the automotive industry in California in the form of electric and alternative energy mobility. This section also includes a summary of the major findings of the report.

Section two of the report provides an asset mapping of all major firms in the state of California operating in the EV cluster. These firms were broken into three broad categories: passenger (light duty) vehicle companies; bus, truck, and tram companies; and charging and alternative fuel companies. Each category also included a summary of pertinent public and private initiatives and resources.

The third section focuses on the scope of EV deployment in the 5-county Southern California region, with an emphasis on City of Los Angeles and County of Los Angeles strategic plans for EV adoption and the environmental concerns the single out Southern California as a region for concentrated EV adoption and industry cluster development.

Section four provides a definition of the electric vehicle ecosystem across 17 industries as defined by the North American Industry Classification System (NAICS). Estimates and forecasts are given

for the electric vehicle cluster and for specific occupations in the cluster. Finally, consideration is given to jobs that might be lost as result of the EV cluster’s growth.

The final section of the report recommends certain policies, such as new commissions, incentives, and data tools, to motivate the continued growth and success of the EV cluster in California.

Status

This report was released publicly on March 4th, 2020, at the 2020 Veloz Forum in Sacramento, California.

Results

Major Findings

New EVs to Reach 7 million by 2030

Annual New Registrations	565,300
Annual % Change	25%

EV Companies in California

Passenger Vehicle

Companies

Headquarters	13
Design & Tech Studios	19
Manufacturing	4
R&D	6

Bus, Truck & Tram

Companies

Headquarters	16
Other Offices	17

EV Charging and Alternative Energy

Companies

Headquarters	31
Other Offices	6

EV Employment

	2018	2023f
California	275,600	312,000
SoCal	119,200	152,200

EV Wages

	EV Jobs	Average
California	\$91,300	\$68,500
SoCal	\$80,900	\$54,900

Estimates by LAEDC

Benefits

This report is intended to enhance the understanding of the EV cluster in California by estimating the scope of business development in the cluster; the extent to which the cluster does and can provide for meaningful job creation; and advocating for policies and programs to enhance EV adoption and EV-related economic development. This report should aid both public and private sector actors as a data tool demonstrating the significance of the EV ecosystem as a catalyst for long-term economic

growth. These anticipated benefits have not changed from the original inception and commencement of this project.

Project Costs

Project Costs by Funder

Contributor	Amount
SoCal Edison	\$35,000
LA Metro	\$25,000
SCAQMD	\$10,000
LA DWP	\$25,000
SCAG	\$25,000
Total	\$120,000

Project Costs by Item

Item	Task Description	Cost
Module 1	EV industry landscape analysis	\$16,500
Module 2	Regional EV supply, demand and externality assessment	\$22,040
Module 3	Regional workforce impact analysis	\$34,460
Module 4	EV Policy Analysis	\$22,000
Infographic printing (estimate)		\$500
Copy editor		\$2,000
Rpt design-(estimate)		\$7,500
LAEDC Strategic Initiatives		\$15,000
Total		\$120,000

Commercialization and Applications

This report is the first of its kind in the state of California in that it takes a comprehensive look at the electric vehicle ecosystem from an industry and workforce standpoint. Most other reports analyze the scope of vehicle adoption and related incentives from a consumption standpoint. This report was created to be a public resource to all parties interested in electric vehicles as a unique industry cluster and who are invested in seeing this cluster grow not just to accomplish environmental policy aims but for economic development and job creation goals.

Develop and Commercialize a Near-Zero Natural Gas Conversion System for On-Road Medium-Duty Vehicles

Contractor

Landi Renzo USA Corporation (LRUSA)

Cosponsors

South Coast AQMD
 US Environmental Protection Agency (EPA)
 California Air Resources Board (CARB)

Project Officer

Joseph Lopat

Background

Landi Renzo approached South Coast AQMD in August 2018 to discuss a potential partnership regarding the development of a near-zero emissions 7.3L compressed natural gas (CNG) engine for the automotive industry. Landi Renzo has significant experience in the field of emissions having been a manufacturer of ecological fuel systems and engines for nearly 70 years. Given the strong and growing interest in near-zero nitrogen oxide (NOx) emission engines for commercial use, there is a robust market potential for CNG engines for medium-duty vehicles. CNG is plentiful and can be sourced domestically as renewable natural gas (RNG) is a strong contributor in combating climate change. Based on previous studies it has been shown that fleets using CNG engines can meet air quality regulations more cost effectively.

Project Objective

The objective of this project was to advance existing CNG engine and aftertreatment technologies to achieve engine NOx emission levels that are at least 90% lower than 2010 heavy-duty NOx emission standards. With this goal in mind, the objective was to modify a recently introduced 7.3-liter gasoline engine and demonstrate a 0.02 g/bhp-hr NOx CARB and EPA certified CNG engine for medium-duty vehicle applications. The initial plans involved changing

controller software and utilizing the latest catalyst technology.

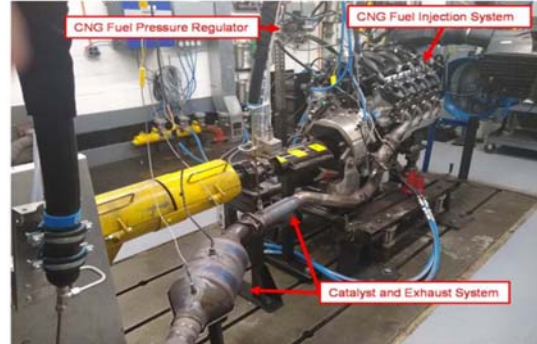


Figure 1: LRUSA / Ford 7.3L CNG Engine on Dynamometer

Technology Description

The LRUSA CNG system consisted of a CNG fuel system containing a pressure regulator, engine feed lines, high pressure filter and supply, and fuel rail and injectors. All of these were installed on a Ford 7.3-liter engine within a Ford F-450 vehicle and a Ford E-450 vehicle. An original equipment manufacturer (OEM) specified catalyst and exhaust system was used. It was acknowledged that there were other potential projects of this nature that could involve modifications to the exhaust aftertreatment system.

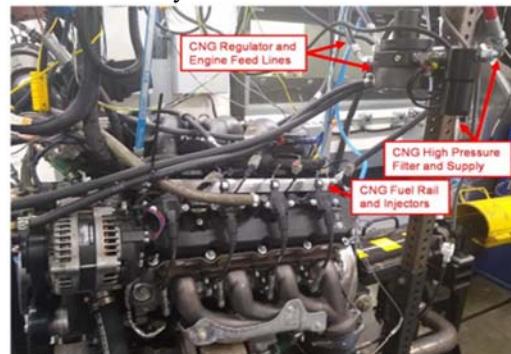


Figure 2: Close up of LRUSA CNG Fuel System Components

Status

The LRUSA 7.3-liter CNG engine project completed all eight (8) tasks associated with a successful project per the South Coast AQMD contract. It should be noted that the ultra-low NOx goal of 0.02 g/bhp-hr was not achieved with the 7.3L engine’s stock exhaust aftertreatment system. The certification results of 0.038 g/bhp-hr still resulted in achieving a lower NOx standard.

Results and Benefits

In January 2020, Landi Renzo USA completed engine durability and OEM compliance testing of the Ford 7.3-liter CNG engine. The test satisfied the requirements specified by Ford in their Qualified Vehicle Modifier Bulletin Q185-R1 (Found at <https://fordbbas.com/bulletins>). Engine emissions development, emissions testing, and on-board diagnostics testing was completed per the test plan arranged with EPA in early February 2020. On March 25, 2020, the EPA issued LRUSA a Certificate of Conformity with the Clean Air Act for the Ford 7.3-liter CNG engine. In April 2020, the demonstration vehicle was completed and shipped to the Ford wind tunnel in Allen Park, MI to undergo chassis-level durability and OEM compliance testing. The vehicle was also reviewed and scored by Ford QVM staff to ensure that the design, build, and components meet or exceed the performance and quality standards set forth by the QVM program. After the OEM chassis-level testing was completed, the vehicle returned to California to continue on-road testing and development. Official CARB testing in our CFR 1065 compliant lab with CARB certification fuel was completed June 2020, and achieved NOx emissions of 0.038 g/bhp-hr. Despite all the delays caused by the Covid-19 pandemic, LRUSA received a conditional CARB EO November 17, 2020.

or pulling forward the production of Ford’s catalyst system for an ultra-low NOx 7.3-liter gasoline engine for use in a Landi near-zero NOx system. Because of the time and resource constraints and the realities of working around the Covid-19 crisis, LRUSA was limited to utilizing the stock exhaust aftertreatment components for testing. LRUSA believes that with an improved aftertreatment system and further calibration development, a CNG system based on the 7.3-liter engine could achieve the goal of a near-zero NOx system. The Landi Renzo USA 7.3L CNG/RNG engine is currently the cleanest engine available for medium duty vehicles and allowed several fleets to meet their sustainability goals. These fleets include shuttle bus vehicles, food and beverage delivery trucks, general delivery vehicles etc. The Landi Renzo USA 7.3L engine covers a wide array of vocational vehicles that operate in high non-attainment areas, such as airports (e.g., shuttle buses). This is particularly key as Landi Renzo exclusively supplies to the #1 bus dealer in the United States.

Project Costs

Participant	Funding
South Coast AQMD	\$600,000
Landi Renzo USA	\$900,000
Total	\$1,500,000

Commercialization and Applications

Landi Renzo and Ford initially identified two possible development paths to meet the near-zero NOx target using either 7.3-liter chassis cert catalyst systems (used on lower gross vehicle weight rating chassis such as the MY2021 E-350)

Develop and Demonstrate Vessel Performance Management Software and Equipment

Contractor

California State University Maritime Academy
SkySail GmbH
Krohne Messtechnik GmbH
Alliance Marine Inc.

Cosponsors

Bay Area Air Quality Management District
South Coast AQMD
Cal State University Maritime Academy Maritime Administration

Project Officer

Naveen Berry

Technology Description

The V-PER Performance Monitoring System receives input from various peripheral instruments and measurements i.e. fuel meters, anemometers, shaft torque, gyro compass, and engine/ship speed. The integration of the existing navigation, weather, and engineering data, combined with data from the new V-PER inertial measuring unit (IMU) are used to reflect real-time conditions experienced by the vessel such that the Master can make more informed decisions on economically and environmentally sound operations via course and speed selection or vessel trim.

Status

The installation of commercially available marine monitoring equipment combined with standardized emissions testing practices resulted in a highly complex logistical process impacting the original performance period objective. The conceptual phase of securing extramural funding support occupied most of 2017. Additionally, challenges presented themselves in acquisitions, software installation and vessel logistics which consumed all of 2018 and much of 2019. Control system electronic communication issues were difficult to identify and address which caused a delay in the finalization of this project. Though functional, we anticipate full capability to be realized in the spring of 2020 with significant sea time usage by the summer of 2020 on our blue water cruise on the Training Ship Golden Bear.

Background

This project, funded by the Bay Area Air Quality Management District (BAAQMD) and South Coast AQMD along with others, constituted much of the first phase of a proposed multi-year project to incorporate and evaluate emissions reduction strategies. The SkySail V-PER project was associated with the California State University Maritime Academy's (Cal Maritime) Golden Bear Research Center (GBRC) and centered on the 500-foot long United States Training Ship (USTS) Golden Bear.

Project Objective

The V-PER performance management package, a novel marine monitoring system, focused on a decrease in exhaust emissions associated with decreased fuel consumption. The package was to be installed and qualitatively evaluated on the USTS Golden Bear by Cal State Maritime staff. This required associated upgrades be made to fuel sensors essential to the operation and evaluation of that equipment. Along with these upgrades, a baseline emissions qualitative profile for the vessel was developed and shared with sponsors. Though it is understood that the deliverable for this phase will be a qualitative evaluation, it is hoped that the work will lead to additional phases and a more lengthy quantitative assessment phase.

Picture of technology that has been supported with SCAQMD/Technology Advancement cosponsorship, if applicable. The picture, preferably a photograph, should clearly illustrate the technology. The size of the image should be about 3x3 to fit this two column format. The picture of the technology should be positioned on the front page

Results

Though the time frame for the project extended beyond what was originally anticipated, it is now

moving toward a successful conclusion. The project will continue with a longitudinal evaluation of SkySail V-PER along with additional assessments being made.

Location of the primary Human Machine Interface (HMI) for the SkySail V-PER in a central location adjacent to engine and navigational controls will provide the Master and Bridge personnel with convenient real-time feedback on propulsion responses to course and speed changes as well as adjustments to vessel loading (Figure 1).

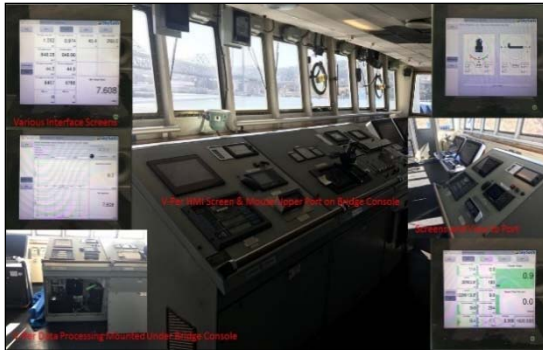


Figure 1: V-PER Installed on Training Ship Golden Bear Bridge

The HMI display is a clean and clear screen providing the viewer dimmable access to well laid out and intuitive pages. If there is any initial criticism of the provided display, it is that it is not a touch screen and requires a separate mouse or track-ball plus keyboard for input. Given current hardware technology and availability, this lack of a more cleanly integrated HMI component is somewhat surprising. Several of the intended users have expressed disappointment that a mouse and keyboard connection had to be provided on the console. Final assessment of this interface will be made after several more months of use through mid-2020.

Though the HMI provided an attractive, single-screen interface for the speed, wind direction, vessel trim and course, there was no added value given that all this data was available at nearly the same location on the bridge. As a monitoring tool, it is understood that further efforts would be required to gain engine and fuel data to fully realize the system potential.

All involved parties eagerly anticipate availability for the upcoming 2020 summer cruise in order to enhance vessel management in what is primarily an optimization effort. The Master and Chief Engineer, along with their crew must take port schedules,

weather, fuel consumption and regulatory requirements into account in finding the best and safest path for delivering their cargos or completing a mission. These new tools and immediate feedback promise to greatly enhance that optimization capability.

Benefits

The primary benefit of the V-PER will be the ability to accurately monitor and assess vessel conditions affecting fuel consumption and associated exhaust emissions. Location of the primary HMI for the SkySail V-PER in a central location adjacent to engine and navigational controls will provide the Master and Bridge personnel with convenient real-time feedback on propulsion responses to course and speed changes as well as adjustments to vessel loading. This real-time data, provided in a clear and easy-to-read format, will likely be an appreciated tool in the day-to-day voyage planning.

Project Costs

The project costs totaled \$135,230.14. Of this amount, South Coast AQMD and BAAQMD each paid \$50,086. CSU Maritime Academy had a cost share of \$35,058.14. The project came in at \$2,194.14 over budget. This additional amount was cost shared by CSU Maritime Academy. The cost overage is a result of unexpected customs duties of \$1,491.08, along with supplies and materials, and the associated overhead costs.

Commercialization and Applications

The SkySail V-PER performance management software system and associated wind energy propulsion equipment are commercially available, but in limited use. The intent of this project was to demonstrate and evaluate the commercial advantages that might be achieved by shipowners and operators employing these and similar technologies. Our detailed benchmarking of significant installation challenges provided to our sponsors should be of significant value to entities interested in acquiring and utilizing performance management systems and will help inform commercial or market viability of the products. Further detailed quantitative assessments and results identifying reduced consumption and emissions results will ultimately determine the market competitiveness of this system.

Conduct Emission Study on Use of Alternative Diesel Blends in Off-Road Heavy-Duty Engines

Contractor

University of California Riverside, Center for Environmental Research and Technology.

Cosponsors

California Air Resources Board (CARB)
South Coast AQMD

Project Officer

Joseph Lopat

Background

On-road and off-road diesel engines have long been recognized as major sources of oxides of nitrogen (NO_x), particulate matter (PM) and other toxic pollutants. The use of alternative diesel fuel formulations, such as renewable diesel will address California's efforts in reducing NO_x and PM emissions from diesel engines and improve local and regional air quality. Although there are many studies characterizing combustion performance and emissions of renewable diesel and biodiesel, there is a lack of literature on the emissions characterization of renewable diesel-biodiesel blends. This is particularly true for blends in higher cetane diesel fuels, such as the California Air Resources Board (CARB) Ultra Low Sulfur Diesel (ULSD), which is the focus of CARB's Low Emission Diesel (LED) regulatory effort. There is also limited information available on the impacts of renewable diesel and renewable diesel blends in new technology diesel engines that are equipped with diesel particulate filters (DPFs) and selective catalytic reductors (SCR) or in off-road engines, where the benefits of renewable diesel fuel might be more long lasting due to their less stringent emissions standards over time. The characterization of toxic pollutants from these fuel blends is also limited and needs to be expanded.

Project Objective

The goals of this study were to confirm and quantify the NO_x, PM, ultrafine particles, and polycyclic aromatic hydrocarbons (PAHs) and their nitrated derivatives (nitro-PAHs) from the renewable diesel use in legacy off-road engines,

as well as the potential benefits of renewable diesel in modern on-road engines with robust aftertreatment controls.

Technology Description

For this program, 2 heavy-duty diesel engines were used, including a legacy off-road John Deere engine without aftertreatment controls and a modern on-road Cummins engine equipped with diesel oxidation catalyst (DOC), DPF, and SCR systems. The off-road engine is typically used for construction applications. The on-road Cummins engine was selected because Cummins represents a good share of the California diesel engine market in Class 7 or Class 8 trucks. The test fuels included a reference CARB ULSD, used as a baseline fuel, a neat 100 percent or 99 percent renewable diesel fuel (R100/R99), a blend of 65 percent renewable diesel and 35 percent biodiesel (R65/B35), and a blend of 50 percent renewable diesel and 50 percent biodiesel (R50/B50). Testing was performed using federal testing procedures (FTP), the non-road-tested cycle (NRTC), and steady state ramped modal cycles. For the John Deere engine, a 5-mode D2 ISO 8718 cycle was used.

Status

This project was successfully completed in March 2021. Comprehensive data analysis for the toxic pollutants was completed in May 2021.



Figure 1: John Deere off-road engine in testing lab

Results

Results showed important NO_x reductions with renewable diesel for the off-road engine compared to CARB ULSD. The R65/B35 showed no statistically significant differences compared to the CARB ULSD for the D2 and for the NRTC. The R50/B50 showed statistically significant increases in NO_x emissions for the D2 and NRTC compared to the CARB ULSD. For the on-road

Cummins engine, no statistically significant differences were seen between the CARB ULSD and R100 over either the FTP or ramped modal cycles (RMCs). R65/B35 and R50/B50 showed statistically significant increases in NOx compared to CARB ULSD. The use of renewable diesel will likely provide NOx emission benefits from older construction engines with no aftertreatment and will not adversely affect air quality and ozone formation from newer on-road engines.

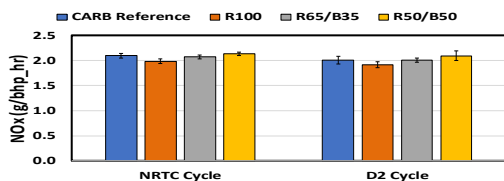


Table 1: NOx emissions for the John Deere engine

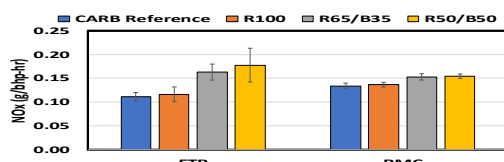


Table 2: NOx emissions for the Cummins engine

For the John Deere engine, PM emissions showed large reductions with R100 and the biodiesel blends. For the Cummins engine, PM mass emissions were found in very low levels due to the presence of DPF. Total and solid particle number emissions were generally lower for the biofuels compared to CARB ULSD. The biodiesel blends resulted in larger reductions of total and solid particle number emissions due to the oxygen content in the biodiesel molecule.

Formaldehyde and acetaldehyde were the predominant aldehydes in the tailpipe for both engines. Trends for lower carbonyl emissions were observed for the biofuels. Total gas- and particle-phase PAH emissions were significantly lower for the John Deere engine compared to the DOC/DPF-equipped engine. This finding suggests that modern heavy-duty diesel (HDD) engines equipped with robust aftertreatment controls will reduce the emissions exposures from toxic, mutagenic, and carcinogenic compounds that contribute to adverse health effects. For both engines, the use of biofuels showed reductions in particle- and gas-phase PAH emissions compared to CARB ULSD. These reductions were more pronounced with the higher biodiesel blends. Nitrate PAH emissions were seen in significantly lower levels than their parent PAHs. Nitrate PAH emissions showed mixed results

with the biofuels with no consistent fuel trends. However, nitro-PAH concentrations for the DPF-equipped Cummins engine were relatively higher than those of the John Deere engine without aftertreatment controls. This phenomenon was due to the de-novo formation of nitro-PAHs inside the DPF system via nitration reactions of the parent PAHs, suggesting that DPF-equipped engines may form elevated emissions of the highly toxic and carcinogenic nitro-PAHs.

Overall, renewable diesel and its blends with biodiesel showed lower carcinogenic potential, as well as reduced ozone forming potential compared to CARB ULSD. Our findings suggest that these fuels can provide a strong pathway for emissions and emissions toxicity reductions from heavy-duty diesel applications in the South Coast Air Basin.

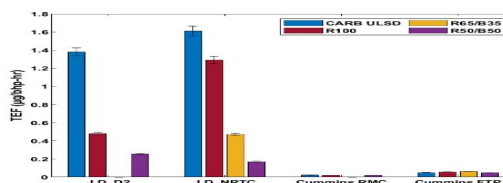


Table 3: Total grams produced per brake HP per hour

Benefits

It is important to understand the emissions from current and older HDD engines with renewable diesel. Our findings suggest that these fuels can provide a strong pathway for emissions and emissions toxicity reductions from heavy-duty diesel applications in the South Coast Air Basin. This study provides a roadmap for the widespread use of these fuel formulations not only for on-road diesel engines, but also for off-road applications including construction, agricultural, marine, and locomotives. These fuels can also help achieve CARB LED standard and contribute to the Governor’s diesel emissions reduction target for California.

Project Costs

	SCAQMD
Testing & Reporting	\$261,000

Commercialization and Applications

It is expected that liquid renewable diesel fuels will play a major role in heavy-duty transportation for in off-road diesel applications. Their use will likely provide emissions and air quality benefits and will likely reduce emissions toxicity and adverse health effect.

Evaluate Meteorological Factors and Trends Contributing to Recent Poor Air Quality in the Basin

Contractor

University of California, Riverside

Cosponsors

South Coast AQMD

Project Officer

Sang-Mi Lee

Background

The South Coast Air Basin (SCAB) of California has achieved tremendous reductions in ozone and particulate matter (PM, particularly fine PM, or PM_{2.5}) levels over the last decades but has recently experienced a leveling off of the reductions and even an uptick in ozone in 2016 and 2017. The immediate question is why? Also, how much of this uptick is related to meteorological factors versus a response to emissions changes from mobile and stationary sources?

Project Objective

The main objective of this project was to find why the ambient ozone and PM_{2.5} levels in the South Coast Air Basin have plateaued in the past few years and to provide a robust understanding of the likely causes that led to the worsening of ozone and PM air quality in recent years. The results from the study will assist staff in better understanding the complex dynamics of air pollution and weather impacts and also help to develop more effective control strategies to improve air quality under changing climate conditions.

Technology Description

The study employed long-term records of air quality data, emissions inventories and detailed meteorological information (from observations and models) to separate the contribution of meteorology and climate impacts from the effects of emission changes due to cleaner technologies

and air quality agencies' regulations. The study also used satellite-derived data on trace species loadings (e.g., nitrogen dioxide (NO₂), formaldehyde (HCHO) and ozone (O₃)) in conjunction with modeling techniques, which include more traditional chemical transport modeling and meteorological detrending approaches, as well as "big-data" (e.g., machine learning) approaches.

Status

The study was expected to be complete by September of 2021. A no-cost extension was granted to accommodate the setbacks in research progress due to the COVID pandemic. Progress reports have been periodically provided to South Coast AQMD, and most tasks have been completed. The final report is being finalized and will be provided to South Coast AQMD staff for final review.

Results

Preliminary results show that temperature is the dominant parameter that drives ozone high concentrations. Four different approaches were used in this study. The linear regression models, chemical transport models, and machine learning techniques indicate that higher temperatures lead to higher ozone concentrations, and as a result, general global warming is increasing the potential for high ozone events. High temperatures are also generally accompanied with stagnation that promotes pollutant concentration buildup. Meteorological conditions during La Nina phenomenon also contribute to a higher concentration of ozone. The effect of meteorological conditions on PM_{2.5} concentration is more widely variable, as higher temperatures may lead to lowering ammonium nitrate concentrations while increasing other particulate matter components.

Using the four different approaches to accomplish the main objective provides a higher level of confidence in the findings of the study. Results are

consistent and complementary among the four approaches.

Benefits

The project results provide a comprehensive analysis on the factors that lead to increasing ozone concentrations despite the decrease in ozone precursor emissions. While there are uncertainties associated with the use of any one of the analysis techniques employed in the study (regression modeling, chemical transport modeling, satellite observations, machine learning), results improve our understanding of why ozone may have increased in the past few years.

Project Costs

The total cost of the study was \$188,798. The first three quarterly reports were provided earlier in 2020, and payment for \$113,277 was processed. The remaining \$75,521 will be paid once the final report is submitted and approved.

Commercialization and Applications

This report will be posted on South Coast AQMD's website and made available to the general public. Several organizations have already expressed high interest in learning the results and conclusions of the report. This report will help South Coast AQMD and the people living in the South Coast Air Basin to better understand ozone dynamics and the meteorological parameters that affects smog formation.

South Coast AQMD Contract # 15635

September 2021

ZECT II-Development and Demonstration of 1 Class 8 Fuel Cell Range Extended Electric Drayage Truck

Contractor

Center for Transportation and the Environment
(CTE)

Cosponsors

US Department of Energy (DOE)
California Energy Commission (CEC)
Ports Technology Advancement Program (TAP)
South Coast AQMD

Project Officer

Seungbum Ha

Background

The Fuel Cell Technologies Office (FCTO) is a key component of the Department of Energy's (DOE) Energy Efficiency and Renewable Energy (EERE) portfolio. The FCTO aims to provide clean, safe, secure, affordable, and reliable energy from diverse domestic resources, providing the benefits of increased energy security and reduced criteria pollutants and greenhouse gas (GHG) emissions.

In April 2014, DOE released DE-FOA-0001106: Zero Emission Cargo Transport II (ZECT II) Demonstration. This funding opportunity sought "to focus on accelerating the introduction and penetration of Zero Emission Carbon Transportation II (ZECT II) technologies." The FOA defined ZECT technologies as, "those that produce zero emissions from the transport vehicle (or other equipment) which propels cargo for all or large portions of their duty cycle."

South Coast AQMD wrote a proposal combining the DOE funding with funding from the California Energy Commission (CEC) and the Ports Technology Advancement Program (TAP). South Coast AQMD proposed to build and demonstrate trucks from three different teams as well as provide a single fueling infrastructure for all three teams. The Center for Transportation and the Environment (CTE) partnered with BAE Systems; Kenworth, a division of PACCAR; Total Transportation Services (TTSI); Ballard Power Systems; and

World CNG to form one team for this project. The other two teams were led by Transpower and US Hybrid.

In February 2016, South Coast AQMD executed a contract with CTE to lead the team developing the Kenworth/BAE truck as well as the fueling infrastructure for all three teams.



Figure 1: Zero Emission Electric Drayage Truck with Fuel Cell Range Extender

Project Objective

The goal of this project was to build a robust zero-emission, heavy-duty Class 8 drayage fuel cell truck that can effectively demonstrate reliable service transporting up to 80,000 lbs. on multiple service routes with differing duty cycles. The intent was to leverage the success of tier one technology companies experienced at building fuel cell, hybrid-electric propulsion systems for heavy-duty transit buses. Working in partnership with Kenworth, a leading heavy-duty truck original equipment manufacturer (OEM), the project engineered and built a prototype vehicle that was then demonstrated and evaluated over a 24-month deployment on regularly scheduled routes serving outlying communities off the I-710 freeway in Los Angeles. Performance and operations data collected during the demonstration phase will help identify the pathways and barriers to commercialization.

Technology Description

The purpose of this project is to accelerate deployment of zero-emission cargo transport technologies that reduce harmful diesel emissions, petroleum consumption, and GHGs in surrounding communities along goods movement corridors. To achieve this purpose, the project team developed a zero-emission battery electric Class 8 drayage truck

with a hydrogen fuel cell range extender. This prototype truck then demonstrated its use in goods movement operations between the Ports of Los Angeles and Long Beach and the near-dock rail yards and warehouses.

To develop the initial truck prototype, the project team adapted a hybrid electric fuel cell propulsion system that is currently used for transit buses so that it was suitable for a Class 8 truck used in a drayage application. The power output of the electric drive train was two electric motors with 270 kW combined power output, comparable to a current Class 8 truck engine's power output. One absorption chiller (AC) traction motor was mounted on each rear drive axle, and the electric drive train was designed to be fully redundant. The vehicle operates using 100 kWh Li-ion batteries, engaging the 85 kW (net) fuel cell system only when the batteries reach a specified state-of-charge (SOC). The hydrogen storage capacity is 30 kg (25 kg usable), which will provide approximately 112 miles of range between refueling.

Status

The team achieved the primary goal of the project, which was to make significant strides developing zero-emission technologies for heavy-duty Class 8 trucks that would accelerate the improvement of air quality in southern California transportation corridors.

Results

Kenworth and BAE Systems collaborated to develop the preliminary vehicle design including mechanical layout and installation drawings. The preliminary design was based on the defined operational requirements as well as duty cycle information from a diesel-equivalent vehicle. To finalize the vehicle design, a combined critical design review and pre-production meeting was held at Kenworth Research and Development Center in Renton, WA.



Figure 2: Overview of truck layout

Air Products' mobile refueler performed consistently throughout the demonstration, but mobile fueling infrastructure adds cost, time, and risk that can only be justified for a small, temporary

demonstration. An advantage for larger future deployments and for the heavy-duty vehicle market in general is investing in permanent on-site infrastructure. This will contribute to the cost-reduction goals achieved by mass deployment and shared resources. Expanding fueling infrastructure also guarantees the demand that hydrogen suppliers require to lower costs.

Benefits

The specific design and development assessments and observations included the determination that the supply base is not yet ready for this technology. It was observed that the routing design is integral to the chassis layout, that there are currently too many connections (high voltage, low voltage, CAN, cooling, etc.), and that the high voltage interlocks are vital for functional safety. It was noted that minimizing to two voltages was difficult, cooling was a big challenge, and the battery management systems need self-diagnostics and auto-recovery. It was also determined that the power electronics firmware must become more automated, that human-machine-interface (HMI) is critical and that the procedures and infrastructure for vehicle testing are complex.

Project Costs

The total project cost was \$7,109,384. South Coast AQMD provided \$821,198. An additional \$3,554,691 was provided by the DOE. The CEC provided \$2,400,000 and \$283,495 was provided by the Port's TAP program. The contractor provided the remaining \$50,000 as their cost share.

Commercialization and Applications

Overall, the ZECT demonstration has laid the foundations for the commercialization of fuel cell electric heavy-duty trucks by successfully deploying the vehicle into TTSI's daily drayage operations. The lessons learned from demonstrating this prototype vehicle have informed improvements to both vehicle system design and manufacturing processes. By utilizing permanent on-site fueling infrastructure or existing public fueling infrastructure, increasing availability of off-the-shelf components, and achieving gains in efficiency of next generation technology, fuel cell electric trucks can enter the market at costs competitive with gasoline and diesel equivalents. The penetration of these zero-emission technologies into the heavy-duty market will maximize the impact to emissions reductions and help achieve local air quality targets on time.

Participate in California Fuel Cell Partnership for CY 2021

Contractor

Frontier Energy Inc.

Cosponsors

South Coast AQMD
Automakers, energy companies, local, state federal public agencies, technology companies, universities, transit agencies and others.

Project Officer

Lisa Mirisola

Background

Originally established with eight members in 1999, the California Fuel Cell Partnership (CaFCP) is a collaboration in which private and public entities are independent participants. It is not a joint venture, legal partnership, or unincorporated association. Therefore, each participant contracts with Frontier Energy (previously Bevilacqua-Knight, Inc./BK) for their portion of CaFCP administration. South Coast AQMD joined the CaFCP in April 2000. The CaFCP currently includes 17 Champion members (executive board level), 9 Champion members (steering team level), and 44 associate members. The focus is on furthering commercialization of fuel cell vehicles, fueling infrastructure technologies and renewable and decarbonized hydrogen production.

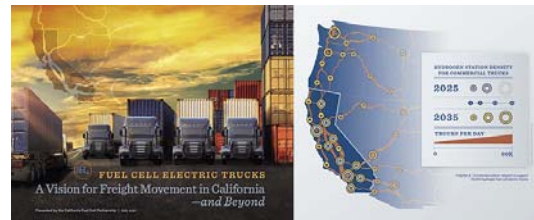
Project Objectives

The goals for 2021 included the following:

- Identify technology challenges and information gaps within the state's hydrogen station network, and work collaboratively with members to advance the market
- Coordinate and collaborate on approaches to achieving an initial 200 hydrogen stations expanding to a state-wide sustainable infrastructure network in California
- Identify new concepts and approaches to initiate exponential station network growth for light- and heavy-duty applications
- Communicate progress of fuel cell electric vehicles (FCEVs) and hydrogen to current and new stakeholder audiences
- Increase awareness and market participation of fuel cell electric trucks and buses, including supporting the deployment of pilot projects
- Coordinate nationally and internationally to share and align approaches

Status

The members of the CaFCP intend to continue their cooperative efforts within California and have plans to expand activities in 2022 to advance the zero-emission vehicle (ZEV) technology benefits in-state and nationally. The final report covers the South Coast AQMD for 2021 membership. This contract was completed on schedule.



Graphic 1 - CaFCP published its truck vision in August, calling for 200 stations serving 70,000 heavy-duty fuel cell electric trucks by 2035.

Technology Description

Many CaFCP members together or individually are operating fuel cell passenger cars, transit buses, drayage trucks and associated fueling infrastructure in California. Passenger cars include Honda's Clarity, Hyundai's Nexo and Toyota's second generation Mirai. Fuel cell bus operators include AC Transit, Sunline Transit, Orange County Transportation Authority and UC Irvine Student Transportation for a combined 46 buses, with 96 in the coming year or two, including Foothill Transit, Long Beach Transit, Golden Empire Transit, and others. More transit agencies are expected to adopt fuel cell buses over the next 5 to 10 years as they implement the Innovative Clean Transit regulation. Class 8 fuel cell drayage trucks include a Ballard powered BAE/Kenworth truck, the Hydrogenics fuel cell powered TransPower truck, Hyundai Xcient trucks and Toyota's Portal trucks.

Results

Specific accomplishments include:

- Since 2015, more than 12,000 consumers and fleets have purchased or leased passenger FCEVs
- Transit agencies have 48 fuel cell electric buses in operation and more than 96 funded

- 48 plus light-duty retail hydrogen stations in operation in California and 124 in development; 4 bus stations in operation and 3 in early development, and 2 truck stations in operation, 2 in development and another 5 funded
- CaFCP staff and members continue to conduct targeted outreach and education throughout California and provide information to non-California requestors
- CaFCP operates and maintains the Station Operational Status System (SOSS) that the 40-plus open retail hydrogen stations use to report status. This data, in turn, feeds real-time information (address, availability, etc.) to fuel cell electric vehicle (FCEV) drivers through a CaFCP mobile website and other apps and systems. SOSS data also supports the new ZEV infrastructure credit in the Low Carbon Fuel Standard program
- CaFCP actively engages in medium- & heavy-duty FCEV codes & standards coordination, specifically through sponsoring SAE J2600 (fueling connection) for inclusion of high-flow H35 fueling geometry for fuel cell electric bus (FCEB) fueling and fueling protocol standard development
- Published a truck vision document in 2021 which calls for 200 stations serving 70,000 trucks by 2035. Early discussions are under way for an implementation road map for California and western states.

Benefits

Compared to conventional vehicles, fuel cell vehicles offer zero smog-forming emissions, reduced water pollution from oil leaks, higher efficiency, and much quieter and smoother operation. When renewable fuels and electricity are used as a source for hydrogen, fuel cell vehicles also encourage greater energy diversity and lower greenhouse gas emissions (CO₂).

By combining efforts, the CaFCP can accelerate and improve the commercialization process for all categories of vehicles: passenger, bus, truck, etc. The members have a shared vision about the potential of fuel cells as a practical solution to many of California's environmental issues and similar issues around the world. The CaFCP provides a unique forum where infrastructure, technical and interface challenges can be identified early, discussed, and potentially resolved through cooperative efforts.

Project Costs

Auto members provide vehicles along with the staff and facilities to support them. Energy members engage in fueling infrastructure activities, including hydrogen production. CaFCP's annual operating budget is about \$1.4 million, and includes operating costs, program administration, joint studies and public outreach and education. All members make annual contributions towards the common budget with executive government members making an annual contribution of approximately \$40,000. Some members contribute additional in-kind products and services to accelerate specific project and program activities.

Commercialization and Applications

Research and scaling of technology by multiple entities will be needed to reduce the cost of fuel cells and improve fuel storage and infrastructure. CaFCP has played a vital role in demonstrating fuel cell vehicle reliability and durability, fueling infrastructure and storage options, and increasing public knowledge and acceptance of the vehicles and fueling.

CaFCP's goals relate to preparing for and supporting market launch through coordinated individual and collective effort. CaFCP members, individually or in groups:

- Prepare for larger-scale manufacturing, which encompasses cost reduction, supply chain and production
- Reduce costs of station equipment, increase supply of renewable hydrogen at lower cost, and develop new retail station approaches
- Support cost reduction through incentives and targeted research, development, and demonstration projects
- Continue research, development, and demonstration of advanced concepts in renewable and other low-carbon hydrogen
- Provide education and outreach to public and community stakeholders on the role of FCEVs and hydrogen in the evolution to electric drive

In 2022, the primary goals are the same as the 2021 goals listed above but have been shifting to be more inclusive of heavy-duty vehicle applications due to the adoption of regulations for transit bus fleets and heavy-duty trucks as well as the technology's potential to significantly improve emissions in these applications.

South Coast AQMD Contract #15618

February 2021

Installation of Eight Hydrogen Stations in Various Cities

Contractor

FirstElement Fuel, Inc.

Cosponsors

California Energy Commission
South Coast AQMD

Project Officer

Patricia Kwon

Background

The California Energy Commission (CEC) issued solicitation PON-13-607 to provide funding opportunities under the ARFVT Program for projects which expand the network of publicly accessible hydrogen fueling stations to serve the current population of fuel cell vehicles (FCVs) and to also accommodate the planned large-scale roll-out of FCVs commencing between 2015 and 2016.

South Coast AQMD is a co-sponsor for this project.

Project Objective

The objective of this project is to build and install eight public access hydrogen fueling stations in the cities of South Pasadena, Los Angeles (2 stations), Long Beach, Costa Mesa, La Canada Flintridge, Laguna Niguel and Lake Forest.

Six of the stations will have delivered hydrogen with 33% renewable content, and the remaining two stations will have 100% renewable hydrogen delivered. The fueling stations will be capable of delivering up to 100 kg of hydrogen per day nominal capacity, with a 35 kg per hour peak Type A fill. They will be designed to be easily expandable in the future. The stations will be able to fuel multiple vehicles back-to-back without delay to avoid congestion.

Technology Description

Hydrogen fuel cell electric drive technology offers tremendous potential for the light-duty passenger vehicle market and medium- and heavy-duty truck and bus markets. These vehicles have zero tailpipe

emissions, and the carbon footprint is nearly the same as plug-in electric vehicles.

The hydrogen stations installed under this contract must use a minimum average of 33% renewable hydrogen on a per kg basis through direct physical pathways (on-site or offsite production).

Status

Seven out of eight public access hydrogen fueling stations have been installed and are currently in operation. The following table summarizes the completion dates along with key milestone dates of our project. Note that final reports are on file with complete technical details of the project.

Station	Develop	Delivery	Testing	Completion
South Pasadena	8/26/2016	1/17/2017	2/22/2017	4/10/2017
Los Angeles (Hollywood)	11/16/2015	3/28/2016	4/30/2016	11/10/2016
Los Angeles (PDR)	11/16/2015	4/12/2016	5/29/2016	8/18/2016
Long Beach	6/22/2015	9/9/2015	10/30/2015	2/22/2016
Costa Mesa	8/3/2015	10/13/2015	12/2/2015	1/21/2016
La Canada Flintridge	8/20/2015	10/14/2015	12/9/2015	1/25/2016
Laguna Niguel				
Lake Forest	8/6/2015	10/14/2015	2/27/2016	3/18/2016

The location of the remaining one station (Laguna Niguel) was relocated and the CEC approved location for this station was not located within South Coast AQMD jurisdiction.



Photo of installed Hydrogen Station at La Canada Flintridge. Source: FirstElement Fuel, Inc.

Results

Per California Senate Bill 1505, Environmental Standards for Hydrogen Production, at least one

third of the hydrogen sold by FirstElement’s state funded hydrogen refueling stations will be produced from renewable sources. Hydrogen is supplied to the hydrogen fueling stations from Air Products’ hydrogen production facilities in Wilmington/Carson, CA. Renewable biogas will be procured as feedstock for the facilities, resulting in delivered hydrogen product that meets the requirements of this PON and the 33.3% renewable hydrogen requirements of California SB 1505. Renewable hydrogen at 100% is achievable through the same supply pathway, however at a higher cost.

Air Products currently has a contract for sourcing of the renewable biogas that meets Public Resources Code Section 2574(b)(1). Air Products’ biogas supply for this project is being sourced outside of California and transported to California with connection to a natural gas pipeline in the Western Electricity Coordinating Council (WECC) region that delivers gas into California.

As of July 1, 2019, FirstElement began purchasing and retiring attributes directly through a third party to better increase our renewable supply.

Benefits

The Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation Model (GREET) produced by Argonne National Laboratory was used to determine the energy sources and greenhouse gas emissions data presented in the table below. As shown, over two-thirds of the energy feedstock is renewable, very little petroleum is used, and the only tailpipe emissions are water compared to the myriad of pollutants emitted by the combustion of gasoline. The entire well-to-wheels process results in zero greenhouse gas emissions due to our procurement of very low carbon intensity biogas feedstock.

Energy Sources	Zero Station (Gaseous Hydrogen)	Multi-Hose True Zero Station (Liquid Hydrogen)	Gasoline Vehicle
Petroleum	5.20%	1.40%	75.50%
Natural Gas	16.70%	31.60%	18.90%
Coal	0.40%	0.50%	0.20%
Renewable	77.70%	66.80%	7.10%
Total GHGs	<i>0 grams/mile</i>	<i>0 grams/mile</i>	<i>428 grams/mile</i>
Tailpipe Emissions	<i>Pure Water</i>	<i>Pure Water</i>	<i>VOC, CO, NO_x, PM₁₀, PM_{2.5}, SO_x, CH₄, N₂O</i>

Project Costs

The table below provides the summary of project costs for the program.

Station	CEC	SCAQMD	Match
South Pasadena	1,451,000	100,000	925,822
Los Angeles (Hollywood)	1,451,000	200,000	591,408
Los Angeles (PDR)	1,451,000	200,000	600,161
Long Beach	1,451,000	100,000	765,719
Costa Mesa	1,451,000	100,000	589,103
La Canada Flintridge	1,451,000	100,000	712,515
Laguna Niguel	-	-	-
Lake Forest	1,451,000	100,000	742,899
Total	\$ 10,157,000	\$ 900,000	\$ 4,927,628

Commercialization and Applications

By adding eight additional stations to the California Hydrogen Fueling Station Network, FirstElement has helped establish the infrastructure needed for the large scale roll out of Fuel Cell Vehicles. As of January 12, 2021, our stations, as part of the network of publicly accessible hydrogen fueling stations, served approximately 8,931 light-duty passenger fuel cell cars.

As this network expands, we see the continued roll out of this technology encouraging growth in the light-duty passenger markets as well as establishing the foundation for growth in the medium- and heavy-duty truck and bus markets.

Develop and Demonstrate Commercial Mobile Hydrogen Fueler

Contractor

H2 Frontier Inc

Cosponsors

California Energy Commission (CEC)
 South Coast AQMD
 US Hybrid
 H2Frontier
 Gas Technology Institute (GTI)

Project Officer

Lisa Mirisola/Patricia Kwon

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 promoting the transition of the mobile transportation sector towards zero emission technologies. These new technologies are necessary to attain the federal criteria pollutant standards as well as the state greenhouse gas targets. California has the most extensive fleet of fuel cell vehicles in the nation, supported by the nation’s largest network of hydrogen fueling stations. Even though additional stations are expected to become available over the next few years there is little or no redundancy in the network. Consequently, the impact of a station going out of service due to planned (or unplanned) maintenance can leave fuel cell vehicle owners without a convenient reliable source of fuel until the station comes back on-line.

Project Objective

H2 Frontier Inc. proposed to design, fabricate, test, and deploy a fully operational, commercial mobile hydrogen fueler in response to the California Energy Commission’s (CEC) recent Program Opportunity Notice 13-607 (Alternative and Renewable Fuel and Vehicle Technology Program, Subject Area-Hydrogen Refueling Infrastructure). The mobile fueler would be designed to provide back-up to stations during extended maintenance or

upgrade and support fuel cell vehicle ride-and-drive events, while providing a fueling experience that would be similar to a full-scale station.

Technology Description

The mobile fueler was not only intended to be a stand-alone station for remote filling but designed to provide the flexibility to integrate itself into stations that may have temporary dispensing issues. The design connects to the onsite hydrogen storage supply and can connect to existing hydrogen dispensers to fill onboard storage. Another design option to be explored on a case-by-case basis was the ability of the fueler to tow and connect to a secondary tube trailer to expand its capacity for any high demand locations thus helping to limit the need to remove it from the designated site to replenish on-board storage. The mobile hydrogen fueler would use renewable fuel when possible and would be deployed at hydrogen stations as needed.

Configured on board a medium-duty, Ford F550 truck platform, with hydrogen storage, compression, and dispensing capabilities, the mobile fueler was designed to be completely self-contained, with no need for external power, pre-cooling, or delivered hydrogen supplies. Additionally, the mobile fueler would have the capability to fill either 350 bar or 700 bar vehicle tanks while meeting U.S. DOT on-road vehicle requirements, along with the intent of SAE J2601 and SAE 2719 hydrogen fueling interface and hydrogen quality requirements and guidelines. The expected life of the equipment design was ten years, assuming 80% availability.

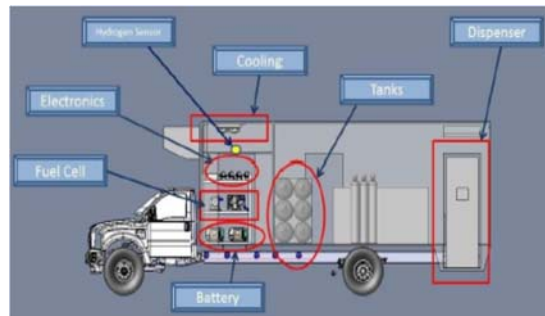


Figure 1: Mobile Refueler Design Layout

Status

The first task was to design the system, prepare the platform and specify the specific equipment. This task was completed. However, the design did not conform to revised SAE J2601 and automakers would not approve their new fuel cell vehicles to fuel with the obsolete design.

H2Frontier exited the project, but the team with CEC Grant Agreement ARV-14-003 determined that it would be necessary for the refueler to comply with the SAE International J2601:2014 fueling protocol for it to serve the industry appropriately. SAE International J2601:2014 is a fueling standard that defines conditions, such as the required hydrogen pressure and temperature, for filling light-duty FCEVs. At that time, the team focused on securing the additional funding necessary to expand the project scope to comply with the advanced fueling protocol.

The project team investigated several opportunities to secure additional funding for the project. They held discussions with private companies with needs for mobile refueling solutions, and with state agencies that have mandates for acquiring and operating fuel cell electric vehicles. The project team also contacted private station operators and constructed several design iterations and plans to develop a path forward that would satisfy all entities associated with the project and related end use. Unfortunately, the project team was not able to acquire the additional funds during the project period and, without the necessary funding to provide a viable system to the industry, the project concluded when it reached the term end date without constructing and deploying a mobile hydrogen refueler.

GTI submitted the Final Report CEC-600-2021-006 to CEC April 2021.



Figure 2: Base Truck Ford F650 with Custom Body

Benefits

In addition to criteria emission reductions, this project represented an investment in clean economical FCEV transportation to help meet California’s climate goals.

Project Costs

This project was not completed. The proposed total project costs to develop and deploy the commercial mobile hydrogen fueler were estimated at \$1,665,654. The proposed project costs were broken down as follows:

	CEC Funding	Partner Cost-Share
Gas Technology Institute	\$224,677	\$15,064
U.S. Hybrid	\$400,000	\$375,913
H2 Frontier, Inc.	\$375,000	75,000
South Coast AQMD		200,000
Totals	\$999,677	\$665,977

The first task was completed for \$45,000. The remaining \$155,000 of Clean Fuels funds from South Coast AQMD were de-obligated.

Commercialization and Applications

New designs are being developed to address current fueling, safety and other standards.

South Coast AQMD Contract #18158

March 2021

California Hydrogen Infrastructure Research Consortium H2 @ Scale Initiative

Contractor

Alliance for Sustainable Energy, LLC,
National Renewable Energy Laboratory (NREL)

Cosponsors

US Department of Energy (DOE)
South Coast AQMD
California Air Resources Board (CARB)
California Energy Commission (CEC)
CA Go-Biz

Project Officer

Lisa Mirisola

Background

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 fuel cell electric vehicle deployment. This leadership has advanced a hydrogen network that is not duplicated anywhere in the United States and is unique in the world for its focus on providing a retail fueling experience. 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 United States.

Project Objective

California agencies identified tasks based on top research needs and priorities for the benefit of state and national efforts to deploy a hydrogen fueling infrastructure and has identified a need to leverage national laboratory research capabilities and staff to support these efforts. The consortium used these tasks as the first step in a strategic partnership, balancing near-term research needs with accelerating earlier-stage research into the market. Specific focus was placed on sharing and translating lessons learned to other jurisdictions,

which is a priority in a partnership between state and federal agencies and laboratories.

Technology Description

California agencies prioritized a certain set of tasks for the benefit of state and national efforts to deploy a hydrogen fueling infrastructure. The set of tasks focused on the near-term challenges for California hydrogen infrastructure development, deployment, and operation.

The set of tasks included hydrogen station data analysis, insights into medium and heavy-duty vehicles running on hydrogen, hydrogen contaminant detectors for use at hydrogen fueling stations, hydrogen nozzle freeze lock evaluation (component failure scenarios), hydrogen topics for integration into California energy management strategy, and a technical assistance project that analyzed liquid hydrogen modeling for a hydrogen station capacity tool.

Status

The project was completed in April 2021. The final report is on file with complete technical details of all the project tasks.

For example, it was determined that understanding the conditions where nozzle freeze-lock occurs will help mitigate the issue in commercial hydrogen fueling stations. The observed trends can help station providers predict days when nozzle freeze-lock might occur and implement proactive countermeasures.



Figure 1. Nozzle Freeze-lock Chamber and Atmosphere Generating Cart at NREL

The medium/heavy-duty task was originally intended to analyze and report on retail and

experimental fueling of medium-/heavy-duty trucks, which were not operational in time for this project. The task was redirected towards a topical overview of medium/heavy duty truck fueling which resulted in a report and a presentation suitable for a webinar on April 7, 2021 that was shared with the California partners for their use as needed.

Results

Results have been presented as part of DOE’s Annual Merit Review 2018-2021, DOE H2@Scale Working Group, and at the 2019 Fuel Cell Seminar and Energy Exposition.

The markets for trucks and light duty vehicles complement each other with the larger number of light duty vehicles providing the possibility for many parts being produced thus bringing down the prices for components used in trucking, while the trucks use a lot of hydrogen fuel encouraging increased hydrogen production and bringing down the price of hydrogen for light duty vehicles.

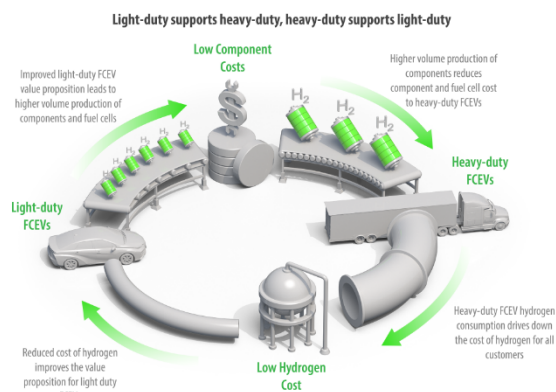


Figure 2. Light-duty fuel cell vehicles support heavy-duty cell vehicles simultaneously reducing component costs and hydrogen fuel costs as fuel cell manufacturing and hydrogen production scale increases

Benefits

This consortium coordinates research efforts that support the DOE’s and California’s hydrogen goals and requirements, shares lessons learned with other states and stakeholders to inform implementation efforts outside of California, supports shifting the hydrogen infrastructure progress from a government push into a market pull, advances the station technology and operation to meet the next waves of vehicle demand, and leverages existing core capabilities and researchers at national labs.

Project Costs

Project Partner	Co-Funding
Fuel Cell Technologies Office	\$700,000**
California Air Resources	\$100,000
California Energy Commission	\$100,00
South Coast AQMD	\$100,000
California Go-Biz	In kind
Total	\$1,000,000

**subject to partial award, funding may be scale

The California Air Resources Board was unable to enter into a joint Cooperative Research and Development Agreement (CRADA), so CARB executed an individual CRADA with NREL for their portion.

Commercialization and Applications

To provide a more comprehensive picture of when nozzle freeze-lock occurs, NREL recommends both repeated testing and evaluating multiple nozzle manufacturers. Statistical significance and trends could be further expanded upon. New heavy-duty high flow rate nozzles will also need testing. Testing with freeze mitigation technology, such as nitrogen purging, could help determine if mitigation strategies are effective.

Hydrogen contaminant detectors are not expected to meet all requirements of SAE J2719.

Follow-on tasks focusing on heavy-duty applications proposed to DOE for H2@Scale 2020 funding were approved and a new contract is under final review. Three new tasks have been set. The first new task is an HD Reference Station Design led by Sandia National Lab. The second task is an HD Station Test Device Design to analyze hydrogen fueling performance and the third task is the development of a HD Station Capacity Tool. A fourth task under a separate agreement, is an H2 Contaminant Detector Design focused on water vapor contaminant sensing at stations. This task was determined as necessary as more electrolysis stations are expected and there will be a need to ensure compatibility of hydrogen contaminant detector (HCD) pneumatic systems with regulated contaminants with validating HCDs in the field at a California station.

Develop Optimal Operation Model for Renewable Electrolytic Fuel Production

Contractor

University of California, Irvine

Cosponsors

South Coast AQMD

California Energy Commission (CEC)

US Department of Energy (DOE)

Project Officer

Seungbum Ha

Background

There is a growing interest in the use of renewable electrolytic hydrogen (green hydrogen) and methane as substitutes for natural gas. In the case of pure hydrogen, the fuel would be used as a blend stock at fractions that may be as high as 20%. The allowable blend fraction for renewable synthetic methane (also referred to as synthetic natural gas or SNG) could be as high as 100%. Both fuels have the potential to change the pollutant emissions of combustion systems with NO_x being the constituent of concern.

Project Objective

The objective of the project was to assess the potential local and regional NO_x emissions and air quality impacts of electrolytic fuel production systems injecting hydrogen or synthetic methane onto the natural gas grid.

Technology Description

Electrolyzers use electric power to split water into hydrogen and oxygen through a catalytic electrochemical process. When the input electricity is renewable, the product hydrogen is a renewable fuel, also called green hydrogen. Green hydrogen (GH₂) can be combined with biogenic CO₂ to create methane in a process called methanation. The result is a renewable substitute for natural gas also referred to as synthetic natural gas (SNG). Both GH₂ (up to a blend limit that may reach 20%) and SNG (potentially up to a blend limit of 100%) can be injected onto the natural gas grid to reduce the carbon intensity of system gas.

Status

Three hypothetical electrolyzer projects were defined (size, location, electric supply sources). The (RoDEO) model developed and run by the National Renewable Energy Laboratory (NREL) was used to optimize the operating schedules of the electrolyzers to minimize hydrogen production cost based on the cost of input electricity. The result of this analysis confirmed the general feasibility of producing natural gas substitutes within the target price range and provided estimates of the quantities of produced fuel to be injected onto the natural gas grid.

Results

Air quality analysis was conducted at the local and regional levels assuming hydrogen reaches the maximum allowed blend limit of 20% by volume to bound the impacts. Impacts were assessed based on NO_x emissions impacts of hydrogen methane blends and methane-CO₂ (SNG proxy) blends measured in parallel projects. SNG shows reduction in NO_x formation for all burner types and so does not present an air quality concern. In contrast, some common burner types show reduced NO_x formation with hydrogen blends and other burner types show increases. An inventory of burner types and replacement trends is needed to ensure that deployment of hydrogen blends for greenhouse gas (GHG) mitigation does not lead to upward pressure on secondary 8-hour ozone and PM_{2.5} levels in the South Coast Air Basin. The best and worst case 8-hour ozone results are shown below.

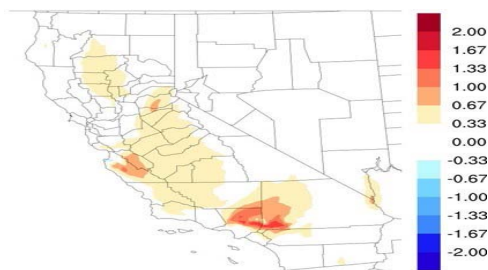


Figure 1: Worst-case increase in summer average MD8H ozone (ppb) for 20% hydrogen blend on the gas grid

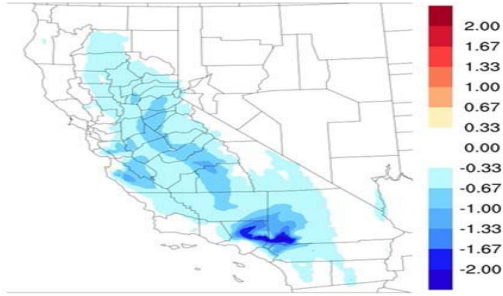


Figure 2: Best-case decrease in summer average MD&H ozone (ppb) for 20% hydrogen blend on the gas grid

and regulations for deployment of these important resources fully considers air quality impact along with safety, reliability and GHG reductions is key to achieving an equitable energy transition. This project is important to establishing the foundations for the development of air quality policies to support a truly sustainable deployment of renewable hydrogen and methane.

Benefits

The work shed light on the potential for upward pressure on NOx and secondary ozone and PM2.5 concentrations that could result from injecting hydrogen into the natural gas grid while also showing the reduced NOx is possible from hydrogen blends. Given the potential GHG benefits of green hydrogen, future technical and policy analysis should focus on ensuring that hydrogen deployment results in net negative emissions. This can be accomplished by design specifications for hydrogen-ready burners and combustors, aftertreatment requirements and deployment of non- combustion conversion devices such as fuel cells.

Project Costs

The total planned project cost was \$500,000 with \$100,000 to be provided by South Coast AQMD and \$400,000 from other related efforts funded by the California Energy Commission and the U.S. Department of Energy. The project was completed within the agreed budget.

Commercialization and Applications

Introduction of zero and low-carbon fuels to decarbonize the fuel provided over the natural gas grid is a key strategy for achieving deep decarbonization. A growing number of national strategies including those of Canada, the United Kingdom and the European Union are embracing these solutions. The current U.S. Department of Energy Hydrogen Shot and the local green hydrogen initiative, HyDeal LA, demonstrate growing momentum for the deployment of these solutions driven in large part by rapidly declining costs of decarbonized gaseous fuel.

Proceedings are ongoing at the California Public Utilities Commission to establish regulatory frameworks for the introduction of hydrogen and synthetic methane on the gas grid as they have done for biomethane. Ensuring that the policies

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 Benefits

Criteria Pollutant Emission Reduction potential continues to receive the highest priority for projects that facilitate 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 leverages funds available through several state and federal programs, as well as overall health benefits in reducing exposure to Ozone and PM2.5, especially in 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 the assessed importance of a particular technology. Some key metrics that are considered include Infrastructure Constructability, which evaluates the potential of fuel or energy for the technology and readiness of associated infrastructure, and Technology Readiness, which includes research and development of the technology and large scale deployments that consider ability for near-term implementation and operational compatibility for 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 technology research, development, demonstration and deployment projects. In an effort to accelerate the demonstration and deployment, especially of pre-commercialization technologies, local, state and federal incentive programs are crucial, but may be underfunded to enable large scale deployments.

Staff has developed an approach to evaluating 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 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 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 Satisfactory to Excellent for Technology Maturity, Poor to Excellent for 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 Zero-Emission Trucks	●	●	●	●	○	○	●	●	●
Medium- and Heavy-Duty Zero-Emission Buses	●	●	●	●	○	●	○	●	●
Light-Duty Zero-Emission Vehicles	●	●	●	●	●	●	●	○	●
Plug-In Hybrid Light-Duty Vehicles with Zero-Emission Range	●	○	●	●	●	●	●	●	●
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 Emission Medium- and Heavy-Duty Renewable Diesel Vehicles	●	●	●	●	○	●	●	●	●
Renewable Gaseous and Alternative Fuel Ultra-Low Emission Medium- and Heavy-Duty Vehicles	●	●	●	●	●	●	●	●	●
Ultra-Low Emission 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

3B-MAW—3-bin moving average windows	CHE—cargo handling equipment
AB—Assembly Bill	CMAQ—community multi-scale air quality
AC—absorption chiller	CNG—compressed natural gas
ACT – American Clean Truck regulation	CNGVP—California Natural Gas Vehicle Partnership
ADA—American with Disabilities Act	CO ₂ —carbon dioxide
AER—all-electric range	CO—carbon monoxide
AFRC—air/fuel ratio control	ComZEV—Commercial Zero-Emission Vehicle
AFVs—alternative fuel vehicles	CPA—Certified Public Accountant
AGL – Academy of Global Logistics	C-PORT – Commercialization of POLB Off-Road Technology
ALPR – automated license plate recognition	CPUC—California Public Utilities Commission
APCD—Air Pollution Control District	CRADA-Cooperative Research and Development Agreement
AQMD—Air Quality Management District	CRDS—cavity ring-down spectroscopy
AQMP—Air Quality Management Plan	CRT—continuously regenerating technology
ARB—Air Resources Board	CSC—city suburban cycle
ARRA—American Recovery & Reinvestment Act	CTE – Center for Transportation and the Environment
AWMA—Air & Waste Management Association	CVAG—Coachella Valley Association of Governments
BACT—best available control technology	CWI—Cummins Westport, Inc.
BATS – blended aftertreatment system	CY—calendar year
BEB—battery electric bus	DAC – disadvantaged community
BET – battery electric tractor	DC—direct connection
BET—battery electric truck	DC – direct current
BEV—battery electric vehicle	DCFC—direct connection fast charger
BSNO _x —brake specific NO _x	DCM—dichloromethane
BMEP – brake mean effective pressure	DEF—diesel exhaust fluid
BMS—battery management system	DEG—diesel equivalent gallons
CAP – Clean Air Protection	DERA – Diesel Emissions Reduction Act
CAAP—Clean Air Action Plan	DGE—diesel gallon equivalents
CAFR—Comprehensive Annual Financial Report	DF—deterioration factor
CaFCP—California Fuel Cell Partnership	DME—dimethyl ether
CARB—California Air Resources Board	DMS—Division of Measurement Standards
CATI—Clean Air Technology Initiative	DMV—Department of Motor Vehicles
CBD—Central Business District (cycle) - a Dyno test cycle for buses	DOC—diesel oxidation catalysts
CCF—California Clean Fuels	DOE—Department of Energy
CCHP—combined cooling, heat and power	DOT—Department of Transportation
CCV—closed crankcase ventilation	DPF—diesel particulate filters
CDA—cylinder deactivation	D-PMag – dual permanent magnet motor
CDFR/DMS—California Department of Food & Agriculture/Division of Measurement Standards	DPT3—Local Drayage Port Truck (cycle) - where 3=local (whereas 2=near-dock, etc.)
CEC—California Energy Commission	DRC—Desert Resource Center
CE-CERT—College of Engineering – Center for Environmental Research and Technology	DRI—Desert Research Institute
CEMS—continuous emission monitoring system	ECM—emission control monitoring
CERP – Community Emission Reduction Plan	EDD—electric drayage demonstration
CEQA—The California Environmental Quality Act	EDTA—Electric Drive Transportation Association
CFCI—Clean Fuel Connection, Inc.	EERE – Energy Efficiency and Renewable Energy
CFD—computational fluid dynamic	EGR—exhaust gas recirculation
CHBC—California Hydrogen Business Council	EIA—Energy Information Administration

LIST OF ACRONYMS (cont'd)

EIN—Energy Independence Now	HHDDT—heavy heavy-duty diesel truck schedule
EMFAC—Emission FACTors	HMI – Human Machine Interface
EPRI—Electric Power Research Institute	HPLC—high-performance liquid chromatography
E-rEV—extended-range electric vehicles	HRSC – heat recovery steam cycle
ESD—emergency shut down	HT—high throughput
ESS—energy storage system	HTFCs—high-temperature fuel cells
EV—electric vehicle	H2NIP—Hydrogen Network Investment Plan
EVSE—electric vehicle supply equipment	HTPH—high throughput pretreatment and enzymatic hydrolysis
FCEB – fuel cell electric bus	HyPPO—Hydrogen Progress, Priorities and Opportunities report
FCET – fuel cell electric truck	Hz—Hertz
FCEBCC - Fuel Cell Electric Bus Commercialization Consortium	ICE—internal combustion engine
FCEV – fuel cell electric vehicle	ICEV—internal combustion engine vehicle
FCTO – Fuel Cell Technologies Office	ICT – Innovative Clean Transit Regulation
FCV—fuel cell vehicle	ICU—inverter-charger unit
FTA—Federal Transit Administration	ICTC—Interstate Clean Transportation Corridor
FTP—federal test procedures	ITS – intelligent transportation system
G2V—grid-to-vehicle	IVOC—intermediate volatility organic compound
g/bhp-hr—grams per brake horsepower per hour	JETSI - Joint Electric Truck Scaling Initiative
GC/MS—gas chromatography/mass spectrometry	kg—kilogram
GCW—gross combination weight	kWh – kilowatt-hour
GCVW—gross container vehicle weight	LADOT—City of Los Angeles Dept. of Transportation
GDI—gasoline direct injection	LADWP—Los Angeles Department of Water and Power
GGE—gasoline gallon equivalents	LAEDC – Los Angeles Economic Development Corporation
GGRF—Greenhouse Gas Reduction Relief Fund	LA Metro – Los Angeles County Metropolitan Transportation Authority
GH2 – green hydrogen	LBCT – Long Beach Container Terminal
GHG—greenhouse gas	LCA—life cycle assessment
GNA—Gladstein, Neandross & Associates, LLC	LCFS—Low Carbon Fuel Standard
Go-Biz – Governor’s Office of Business and Economic Development	LED – low emission diesel
GPCI – Green Paradigm Consulting, Inc.	LFP – lithium iron phosphate
GPU—gas processing unit	Li—lithium ion
GREET- Greenhouse Gasses, Regulated Emissions and Energy Use in Transportation	LIGHTS – Low Impact Green Heavy Transport Solutions
GTI – Gas Technology Institute	LIMS—Laboratory Information Management System
GTL—gas to liquid	LLC—low load cycle
GVW – gross vehicle weight	LLNL—Lawrence Livermore National Laboratory
GVWR—gross vehicle weight rating	LNG—liquefied natural gas
H&SC—California Health and Safety Code	LO-SCR—light-off selective catalytic reduction
HCCI—Homogeneous Charge Combustion Ignition	LPG—liquefied petroleum gas or propane
HCD – hydrogen contaminant detector	LRUSA – Landi Renzo USA Corporation
HCHO - formaldehyde	LSM—linear synchronous motor
HCNG—hydrogen-compressed natural gas (blend)	LSV—low-speed vehicle
HD – heavy duty	LUV—local-use vehicle
HDD – heavy-duty diesel	LVP—low vapor pressure
HDDT—highway dynamometer driving schedule	MATES—Multiple Air Toxics Exposure Study
HD-FTP—Heavy-Duty Federal Test Procedure	MCE—multi cylinder engine
HD I/M – heavy-duty inspection and maintenance	
HD-OBD—heavy-duty on-board diagnostics	

LIST OF ACRONYMS (cont'd)

MCFC—molten carbonate fuel cells	OCTA—Orange County Transit Authority
MD—medium duty	OEHHA—Office of Environmental Health Hazard Assessment
MECA—Manufacturers of Emission Controls Association	OEM—original equipment manufacturer
MOA—Memorandum of Agreement	One-off—industry term for prototype or concept vehicle
MOVES—Motor Vehicle Emission Simulator	PAH—polycyclic aromatic hydrocarbons
MPa—MegaPascal	PbA—lead acid
MPFI—Multi-Port Fuel Injection	PCM—powertrain control module
MPG—miles per gallon	PEMFC—proton exchange membrane fuel cell
MPGde—miles per gallon diesel equivalent	PEMS—portable emissions measurement system
MSRC—Mobile Source Air Pollution Reduction Review Committee	PEV—plug-in electric vehicle
MSW—municipal solid wastes	PFI – port fuel injection
MY—model year	PHET – plug in hybrid electric tractor
MTA—Metropolitan Transportation Authority (Los Angeles County “Metro”)	PHET—plug-in hybrid electric truck
NAAQS—National Ambient Air Quality Standards	PHEV—plug-in hybrid vehicle
NAFA—National Association of Fleet Administrators	PM—particulate matter
NAICS – North American Industry Classification System	PM – permanent magnet
NFPA—National Fire Protection Association	PM2.5—particulate matter ≤ 2.5 microns
NCP—nonconformance penalty	PM10—particulate matter ≤ 10 microns
NEV—neighborhood electric vehicles	POH – Port of Hueneme
NextSTEPS—Next Sustainable Transportation Energy Pathways	POLA – Port of Los Angeles
NG/NGV—natural gas/natural gas vehicle	POLB – Port of Long Beach
NGO—non-governmental organization	PON – Program Opportunity Notice
NH3—ammonia	POS—point of sale
Nitro-PAHs – nitrated polycyclic aromatic hydrocarbons	ppm—parts per million
NHTSA—National Highway Traffic Safety Administration	ppb—parts per billion
NMC – nickel manganese cobalt	PSI—Power Solutions International
NMHC—non-methane hydrocarbon	PTR-MS—proton transfer reaction-mass spectrometry
NO—nitrogen monoxide	QVM – qualified vehicle modifiers
NO ₂ —nitrogen dioxide	R&D – research and development
NO + NO ₂ —nitrous oxide	RD&D—research, development and demonstration
NOPA—Notice of Proposed Award	RDD&D (or RD3)—research, development, demonstration and deployment
NOx—oxides of nitrogen	REMD – roadside emissions monitoring device
NRC—National Research Council	RFA – Renewable Fuels Association
NREL—National Renewables Energy Laboratory	RFI – Request for Information
NRTC – non-road-tested cycle	RFP—Request for Proposal
NSPS—new source performance standard	RFS—renewable fuel standards
NSR—new source review	RI—reactive intermediates
NZ—near zero	RMC – ramped modal cycle
NZE – near zero emission	RMC-SET— ramped modal cycle supplemental emissions test
O ₃ - ozone	RNG—renewable natural gas
OBD—on-board diagnostics	ROG – reactive organic gases
OCS—overhead catenary system	RPS – Rail Propulsion Systems
	RTP/SCS—Regional Transportation Plan/Sustainable Communities Strategy

LIST OF ACRONYMS (cont'd)

S2S – Shore to Store	UCR—University of California, Riverside
SAE—Society of Automotive Engineers	UCR/CE-CERT—UCR/College of Engineering/Center for Environmental Research & Technology
SB—Senate Bill	UCLA—University of California, Los Angeles
SCAB—South Coast Air Basin or “Basin”	UDDS—urban dynamometer driving schedule
SCAG – Southern California Association of Governments	$\mu\text{g}/\text{m}^3$ —microgram per cubic meter
SCAQMD—South Coast Air Quality Management District	ULEV—ultra low emission vehicle
SCFM—standard cubic feet per minute	ULSD – ultra low sulfur diesel
SCE – single cylinder engine	UPS—United Postal Service
SCE—Southern California Edison	U.S.—United States
SCE – Southern Counties Express	U.S.EPA—United States Environmental Protection Agency
SCR—selective catalytic reduction	USTS – United States Training Ship
SCRT - Selective Catalytic Regenerating Technology	V2B—vehicle-to-building
SCCRT - Selective Catalytic Continuously Regenerating Technology	V2G—vehicle-to-grid
SHR—steam hydrogasification reaction	V2G/B—vehicle-to-building functionality
SI—spark ignited	VMT—vehicle miles traveled
SI-EGR—spark-ignited, stoichiometric, cooled exhaust gas recirculation	VOC—volatile organic compounds
SIP—State Implementation Plan	V-PER – vessel performance management package
SJVAPCD—San Joaquin Valley Air Pollution Control District	VPP—virtual power plant
SMR – steam methane reforming	WAIRE - Warehouse Actions and Investments to Reduce Emissions Program
SNG – synthetic natural gas	WGS – water gas shift
SOAs—secondary organic aerosols	WVU—West Virginia University
SOC – state-of-charge	ZANZEFF – Zero and Near Zero Emission Freight Facilities
SoCalGas—Southern California Gas Company (A Sempra Energy Utility)	ZE – zero emission
SOFC – solid oxide fuel cells	ZEB – zero-emission bus
START – Sustainable Terminals Accelerating Regional Transportation	ZECT—Zero Emission Cargo Transport
SULEV—super ultra-low emission vehicle	ZEDT – Zero Emission Drayage Truck
SUV—sports utility vehicle	ZEV—zero emissions vehicle
SwRI – Southwest Research Institute	
TAC – toxic air contaminants	
TAO—Technology Advancement Office	
TAP— (Ports’) Technology Advancement Program	
TC—total carbon	
TCO – total cost of ownership	
TEMS—transportable emissions measurement system	
THC—total hydrocarbons	
TLS – Toyota Logistics Services	
TO—task order	
tpd—tons per day	
TRB—Transportation Research Board	
TRL—technology readiness level	
TSI—Three Squares, Inc.	
TTSI—Total Transportation Services, Inc.	
TWC—three-way catalyst	
UCI – University of California, Irvine	



South Coast Air Quality Management District

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BOARD MEETING DATE: March 4, 2022

AGENDA NO. 32

PROPOSAL: Approve Annual RECLAIM Audit Report for 2020 Compliance Year

SYNOPSIS: The Annual RECLAIM Audit Report for 2020 for the NOx and SOx RECLAIM program is prepared in accordance with Rule 2015 - Backstop Provisions. This report assesses emission reductions, availability and average annual prices of RECLAIM Trading Credits (RTCs), job impacts, compliance issues, and other measures of performance for the twenty-seventh 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 2020 Compliance Year is also included in the report. This action is to approve the Annual RECLAIM Audit Report for 2020.

COMMITTEE: Stationary Source, February 18, 2022, Reviewed

RECOMMENDED ACTION:

Approve the Annual RECLAIM Audit Report for 2020 Compliance Year.

APPROVED
by the
South Coast Air Quality
Management District Board
Date: March 4, 2022
[Signature]
Clerk of the Board

[Signature]
Wayne Nastri
Executive Officer

JA:JW: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 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 2020 (which encompasses the time period for Cycle 1 from January 1, 2020 to December 31, 2020 and for Cycle 2 from July 1, 2020 to June 30, 2021). Based on audited emissions in this report and previous annual reports, staff has determined that RECLAIM met its emissions goals for Compliance Year 2020, 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 2020, audited NO_x emissions were 27 percent less than programmatic NO_x allocations and audited SO_x emissions were 35 percent less than programmatic SO_x allocations.

Audit Findings

The audit of the RECLAIM Program's Compliance Year 2020 and trades of RTCs that occurred during calendar year 2021 show:

- **Overall Compliance** – Audited NO_x and SO_x emissions from RECLAIM facilities were significantly below programmatic allocations;
- **Universe** – The RECLAIM universe consisted of 246 facilities as of June 30, 2020. No new facilities were included, no facilities were excluded, and six facilities in the RECLAIM universe shut down during Compliance Year 2020. Thus, 240 active facilities were in the RECLAIM universe on June 30, 2021, the end of Compliance Year 2020.

Of the six facilities that shutdown, two facilities removed their RECLAIM equipment and sold their remaining property to new owners for real estate development, three facilities cited financial reasons, and one facility cited their shutdown was due to the coronavirus (COVID-19) global pandemic. All six facilities

permanently ceasing operations were in NOx RECLAIM and two facilities were in both NOx and SOx RECLAIM.

- **Facility Compliance** – 93 percent of NOx facilities and 100 percent of SOx facilities in RECLAIM complied with their allocations during the 2020 compliance year. Seventeen facilities (seven percent of total facilities) exceeded their NOx allocations, and no facility exceeded its SOx allocations during Compliance Year 2020. The 17 facilities that exceeded their NOx allocations had total NOx emissions of 64.3 tons and did not have adequate allocations to offset 16.3 of those tons. The exceedances represent 0.22 percent of total RECLAIM NOx universe allocations and 25.3 percent of total NOx emissions from the 17 facilities. Pursuant to Rule 2010(b)(1)(A), all affected 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 2020 allocations.
- **Job Impacts** – Based on a survey of RECLAIM facilities, the RECLAIM program had minimal impact on employment during the 2020 compliance year, which is consistent with previous years. RECLAIM facilities reported an overall net loss of 3,687 jobs, representing about 4 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. No facility cited RECLAIM as a factor contributing to the addition of any jobs during Compliance Year 2020. No RECLAIM facility reported job losses due to RECLAIM during Compliance Year 2020. 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 2021 was slightly lower in terms of number of trades (2.3 percent), slightly lower in volume for discrete-year RTCs (1.8 percent) and lower in volume of infinite-year block (IYB) RTCs excluding swaps (50.6 percent), when compared to calendar year 2020. However, market activity in calendar year 2021 was higher with respect to total value (20.9 percent) compared to calendar year 2020. A total of \$1.56 billion in RTCs has been traded since the adoption of RECLAIM, of which \$22.0 million occurred in calendar year 2021 (compared to \$18.2 million in calendar year 2020), excluding swaps.

The annual average prices of traded discrete-year SOx RTCs and IYB SOx RTCs for Compliance Years 2020 thru 2022 were below the applicable review thresholds for average RTC prices.

The annual average prices of discrete-year NOx RTCs for Compliance Years 2021 and 2022 exceeded the Rule 2015 backstop threshold of \$15,000 per ton. However,

the annual average price of traded discrete-year NOx RTCs for Compliance Years 2020 was below the applicable review threshold for average RTC prices and the annual average prices of traded IYB NOx RTCs for Compliance Years 2020 thru 2022 were below the applicable review thresholds for average RTC prices.

The annual average prices of RTCs traded during calendar years 2020 and 2021 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 2020 and 2021

Year Traded	Average Price (\$/ton)				Review Thresholds (\$/ton)	
	2019 NOx RTC	2020 NOx RTC	2021 NOx RTC	2022 NOx RTC	Rule 2015 (b)(6)	Health and Safety Code §39616(f)
2020	\$4,287	\$8,323	\$9,418	None traded	\$15,000	\$49,737
2021		\$5,603	\$18,846 ¹	\$33,085 ¹		
Year Traded	2019 SOx RTC	2020 SOx RTC	2021 SOx RTC	2022 SOx RTC	Rule 2015 (b)(6)	Health and Safety Code §39616(f)
2020	\$4,387	\$2,300	None traded	None traded	\$15,000	\$35,811
2021		None traded	\$3,000	None traded		

Table 2 – Average Prices for IYB RTCs Traded During Calendar Years 2020 and 2021

RTCs	Average Price (\$/ton)		Review Threshold (\$/ton) [Health and Safety Code §39616(f)]
	Traded in 2020	Traded in 2021	
NOx	\$116,405	\$94,576	\$746,056
SOx	\$32,251	None traded	\$537,160

- **Role of Investors** – Investors remained active in the RTC market, and their involvement in 2021 was comparable to prior years. Investors were involved in 131 of the 184 discrete NOx trades with price, and none of the 1 discrete SOx trades with price. With respect to IYB trades, investors’ participation was notable, and were involved in 10 of the 14 IYB NOx trades with price. There were no IYB SOx RTCs traded with price. Compared to calendar year 2020, investor holdings of total IYB

¹ Rule 2015(b)(6) specifies that, if the annual average price of discrete-year NOx or SOx RTCs exceeds \$15,000 per ton, within six months of the determination thereof the Executive Officer shall, in addition to the annual report, submit to CARB and USEPA results of an evaluation and review of the compliance and enforcement aspects of the RECLAIM program, to include at a minimum the following assessments: the deterrent effect of Rule 2004(d)(1) through (d)(4), Prohibition of Emissions in Excess of Annual Allocation, the rates of compliance with applicable emission caps, the rate of compliance with monitoring, recordkeeping, and reporting requirements, South Coast AQMD’s ability to obtain appropriate penalties in cases of noncompliance, and whether the program provides appropriate incentives to comply.

NOx RTCs increased slightly from 1.3 percent to 2.0 percent and remained the same at 4.2 percent for IYB SOx RTCs at the end of calendar year 2021. Investors purchase RTCs, and they 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 2020 Compliance Year
2. Board Presentation

ATTACHMENT 1

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Annual RECLAIM Audit Report for 2020 Compliance Year

March 4, 2022

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SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

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EXECUTIVE OFFICER
Wayne Nastri

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LIST OF ABBREVIATIONS

AAQS	Ambient Air Quality Standards
ACEMS	Alternative Continuous Emissions Monitoring System(s)
AER	Annual Emission Report
APEP	Annual Permit Emissions Program
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
SCEMS	Semi-Continuous Emission Monitoring System
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) 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 2020 (January 1 through December 31, 2020 for Cycle 1 and July 1, 2020 through June 30, 2021 for Cycle 2 facilities). This annual audit report covers activities for the twenty-seventh 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, 2020, the overall changes in RECLAIM participants were 134 facilities included into the program, 73 facilities excluded from the program, and 209 facilities ceased operation. Thus, the RECLAIM universe consisted of 246 active facilities at the end of Compliance Year 2019 (December 31, 2019 for Cycle 1 facilities and June 30, 2020 for Cycle 2 facilities). During Compliance Year 2020 (January 1, 2020 through December 31, 2020 for Cycle 1 facilities and July 1, 2020 through June 30, 2021 for Cycle 2 facilities), no facilities were included into the RECLAIM universe, no facilities were excluded, and six facilities (two facilities in both the NO_x and SO_x universes and four in the NO_x universe only) shut down and are no longer in the active RECLAIM universe. These changes resulted in a net decrease of six facilities in the universe, bringing the total number of active RECLAIM facilities to 240 as of the end of Compliance Year 2020.

Chapter 2: RTC Allocations and Trading

On November 5, 2010, the Board adopted amendments to SO_x RECLAIM to phase in SO_x 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 percent (or 5.7 tons per day) in SO_x allocations.

On December 4, 2015, the 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 percent (or 12 tons per day) when fully implemented for Compliance Year 2022 and beyond. Through Compliance Year 2020, the fifth year of implementation, the NOx allocation supply was reduced by 22.6 percent (or 6.0 tons per day). The only remaining changes in RTC supply during Compliance Year 2020 were due to allocation adjustments for clean fuel production pursuant to Rule 2002(c)(12) which decreased overall NOx RTC supply by 6.2 tons and SOx RTC supply by 4.8 tons.

Since the inception of the RECLAIM program in 1994, a total value of \$1.56 billion dollars has been traded in the RTC trading market, excluding swap trades (trades exchanging different types of RTCs, that maybe of equal value or different values). During calendar year 2021, there were 293 RTC trade registrations, including swap trades. There were 260 RTC trade registrations with a total value of \$22.0 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 2021 a total of 1,716 tons of discrete-year NOx RTCs, 475 tons of discrete-year SOx RTCs, 81 tons of IYB NOx RTCs and 6 tons of IYB SOx RTCs were traded. The RTC trading market activity decreased during calendar year 2021 compared to calendar year 2020, in number of trades (by 2.3%), and in volume both for discrete-year RTCs (by 1.8%) and IYB RTCs (by 50.6%). However, the RTC trading market increased in total value (by 20.9%) from calendar year 2020 to 2021.

Discrete-year RTC trades with price (i.e., price >\$0.00) registered during calendar year 2021 include trades for Compliance Years 2020, 2021, 2022, and 2023 NOx RTCs, and Compliance Year 2021 SOx RTCs, excluding swap trades. The annual average prices of discrete-year NOx RTCs traded during calendar year 2021 were \$5,603, \$18,846, \$33,085, and \$37,808 per ton for Compliance Years 2020, 2021, 2022, and 2023 RTCs, respectively. The annual average price for discrete-year SOx RTCs traded during the same period was \$3,000 per ton for Compliance Years 2021 RTCs.

The annual average price of Compliance Year 2021, 2022, and 2023 NOx RTCs exceeded the Rule 2015 backstop threshold of \$15,000 per ton while SOx RTC prices remained below the threshold. Prices for discrete-year NOx and SOx RTCs for all compliance years are still below the \$49,737 per ton of NOx and \$35,811 per ton of SOx discrete-year RTCs pre-determined overall program review thresholds established by the Board pursuant to Health and Safety Code §39616(f)¹.

The annual average price during calendar year 2021 for IYB NOx RTCs was \$94,576 per ton. During calendar year 2021, no IYB SOx RTCs were traded with price. Therefore, annual average IYB RTC prices did not exceed the \$746,056 per ton of IYB NOx RTCs or the \$537,160 per ton of IYB SOx RTCs

¹ September 7, 2007 Board Agenda item No. 43 regarding Health and Safety Code §39616(f) can be found at: <http://www3.aqmd.gov/hb/2007/September/070943a.html>

pre-determined overall program review thresholds established by the Board pursuant to Health and Safety Code §39616(f).

Investors were active in the RTC market during calendar year 2021. They were involved in 131 of the 184 discrete-year NOx trade registrations and were not involved in the 1 discrete-year SOx trade registration with price. Investors were also involved in 10 of the 14 IYB NOx. There were no IYB SOx trades with price. Investors were involved in 56 percent of total value and 62 percent of total volume for discrete-year NOx trades. Investors were not involved in discrete-year SOx trades for this calendar year. At the end of calendar year 2021, investors' holdings of IYB NOx RTCs increased slightly to 2.0 percent of total NOx RECLAIM RTCs from 1.2 percent in 2020. Investors' holdings of IYB SOx RTCs stayed consistent at 4.2 percent of the total SOx RECLAIM RTCs when compared to investor's holdings in calendar year 2020.

Chapter 3: Emission Reductions Achieved

For Compliance Year 2020, aggregate NOx emissions were below total allocations by 27 percent and aggregate SOx emissions were below total allocations by 35 percent. No emissions associated with breakdowns were excluded from reconciliation with facility allocations in Compliance Year 2020. 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 2020. With respect to the Rule 2015 backstop provisions, Compliance Year 2020 aggregate NOx and SOx emissions were both well below aggregate allocations and, as such, did not trigger the requirement to review the RECLAIM program.

Chapter 4: New Source Review Activity

The annual program audit assesses New Source Review (NSR) activity from RECLAIM facilities 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 2020, a total of three NOx RECLAIM facilities had NSR NOx emission increases, and no SOx RECLAIM facilities had an NSR SOx emission increase due to expansion or modification. Consistent with all prior compliance years, there were sufficient NOx and SOx RTCs available to allow for expansion, modification, and modernization by RECLAIM facilities.

RECLAIM is required to comply with federal NSR emissions offset requirements at a 1.2-to-1 offset ratio programmatically for NOx emission increases and a 1-to-1 offset ratio for SOx emission increases on a programmatic basis. In Compliance Year 2020, RECLAIM demonstrated federal equivalency with a programmatic NOx offset ratio of 365-to-1 based on the compliance year's total unused allocations and total NSR emission increases for NOx. There were no SOx 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 SOx offset ratio for any compliance year, provided aggregate SOx emissions under RECLAIM are lower than or equal to aggregate SOx allocations for that compliance year. As shown in Chapter 3 (Table 3-2 and Figure 3-2), there was a surplus of SOx RTCs during

Compliance Year 2020. Therefore, RECLAIM more than complied with the federally-required SOx offset ratio and further quantification of the SOx 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 2020 audit results, 242 of the 259 (93%) NOx RECLAIM facilities complied with their NOx allocations, and 31 of the 31 SOx facilities (100%) complied with their SOx allocations based on South Coast AQMD audit results. So, 17 facilities exceeded their allocations (17 facilities exceeded their NOx allocations, and no facility exceeded its SOx allocation). The 17 facilities that exceeded their NOx allocations had aggregate NOx emissions of 64.3 tons and did not have adequate allocations to offset 16.3 tons (or 25.3%) of their combined emissions. The NOx exceedance amounts are relatively small compared to the overall NOx allocations for Compliance Year 2020 (0.22% of total NOx allocations). The exceedances from these facilities did not impact the overall RECLAIM emission reduction goals. The overall RECLAIM NOx and SOx emission reduction targets and goals were met for Compliance Year 2020 (*i.e.*, aggregate emissions for all RECLAIM facilities were well below aggregate allocations). Pursuant to Rule 2010(b)(1)(A), all affected facilities had their respective exceedances deducted from their annual allocations for the compliance year subsequent to the date of South Coast AQMD determination that the facilities exceeded their Compliance Year 2020 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 determining 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 2020 employment survey data gathered from APEP reports, RECLAIM facilities reported a net loss of 3,687 jobs, representing 4.04 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 job losses at Cycle 1 facilities. No RECLAIM facility cited RECLAIM as a factor contributing to the addition of any jobs during Compliance Year 2020. No facility reported job losses due to RECLAIM, during Compliance Year 2020.

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 2020 NO_x and SO_x emissions decreased 15 percent and 16 percent, respectively, relative to Compliance Year 2019. Quarterly calendar year 2020 NO_x emissions fluctuated within twelve percent of the mean NO_x emissions for the year. Quarterly calendar year 2020 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 percent 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 2021, 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.

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 2020 Compliance Year Audit.

This report presents the annual program audit and progress report of RECLAIM's twenty-seventh compliance year (January 1 through December 31, 2020 for Cycle 1 and July 1, 2020 through June 30, 2021 for Cycle 2 RECLAIM facilities), also known as Compliance Year 2020. 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, 2020 (covered under the Annual RECLAIM Audit Report for 2019 Compliance Year), then discusses changes to the RECLAIM universe of sources in detail through the end of Compliance Year 2020.
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 NOx and SOx.
6. **Reported Job Impacts**
This chapter addresses job impacts and facilities permanently ceasing operation of all emission sources.
7. **Air Quality and Public Health Impacts**
This chapter discusses air quality trends in the South Coast Air Basin, seasonal emission trends for RECLAIM sources, per capita exposure to air pollution, and the toxic impacts of RECLAIM sources.

CHAPTER 1 RECLAIM UNIVERSE

Summary

When RECLAIM was adopted in October 1993, a total of 394 facilities were identified as the initial “universe” of sources subject to the requirements of RECLAIM. From program adoption through June 30, 2020, the overall changes in RECLAIM participants were 134 facilities included into the program, 73 facilities excluded from the program, and 209 facilities ceased operation. Thus, the RECLAIM universe consisted of 246 active facilities at the end of Compliance Year 2019 (December 31, 2019 for Cycle 1 facilities and June 30, 2020 for Cycle 2 facilities). During Compliance Year 2020 (January 1, 2020 through December 31, 2020 for Cycle 1 facilities and July 1, 2020 through June 30, 2021 for Cycle 2 facilities), no facilities were included into the RECLAIM universe, no facilities were excluded, and six facilities (two facilities in both the NOx and SOx universes and four in the NOx universe only) shut down and are no longer in the active RECLAIM universe. These changes resulted in a net decrease of six facilities in the universe, bringing the total number of active RECLAIM facilities to 240 as of the end of Compliance Year 2020.

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 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 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 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 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, 2020 (the last day of Compliance Year 2019 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 209 facilities. Thus, the net change in the RECLAIM universe from October 15, 1993, through June 30, 2020 was a decrease of 148 facilities from 394 to 246 facilities. In Compliance Year 2020 (January 1, 2020 through December 31, 2020 for Cycle 1 facilities and July 1, 2020 through June 30, 2021 for Cycle 2 facilities), no facilities were included, no facilities were excluded, and six facilities shut down. These changes brought the total number of facilities in the RECLAIM universe to 240 facilities. The Compliance Year 2020 RECLAIM universe includes 212 NO_x only, no SO_x-only, and 28 both NO_x and SO_x RECLAIM facilities. The list of active facilities in the RECLAIM universe as of the end of Compliance Year 2020 is provided in Appendix A.

Facility Inclusions and Exclusions

No RECLAIM facilities were included in or excluded from the RECLAIM universe during Compliance Year 2020.

Facilities Permanently Ceasing Operations

Six NO_x RECLAIM facilities permanently ceased operations in Compliance Year 2020. Two of these facilities removed all equipment requiring a South Coast AQMD permit to operate, shut down, and sold the property to new owners for real estate development. Three facilities cited financial reasons for shutdown, and one facility cited their shutdown was due to the coronavirus (COVID-19)

global pandemic. Appendix C lists these facilities and provides brief descriptions of the reported reasons for their closures.

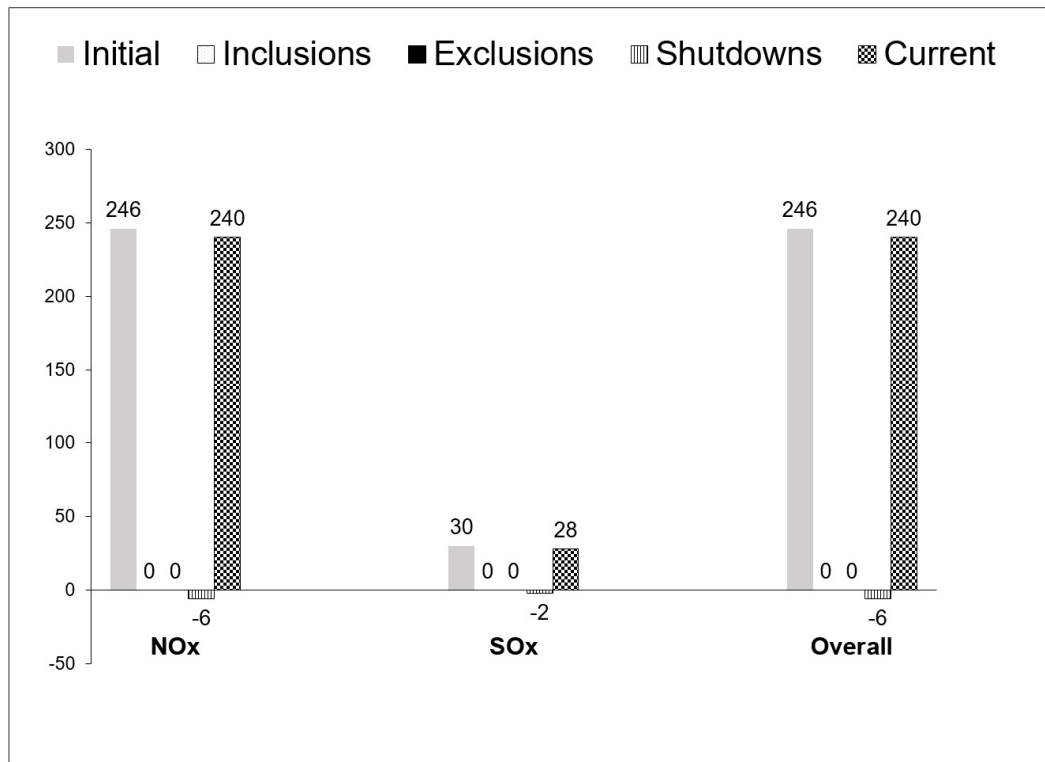
The above-mentioned changes to the RECLAIM universe resulted in a net decrease of six facilities in the RECLAIM universe during Compliance Year 2020. Table 1-1 summarizes overall changes in the RECLAIM universe between the start of the program and end of Compliance Year 2020 (December 31, 2020 for Cycle 1 facilities and June 30, 2021 for Cycle 2 facilities). Changes to the RECLAIM universe that occurred in Compliance Year 2020 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 2019	134	13	134
Exclusions – October 15, 1993, through Compliance Year 2019	-72	-4	-73
Shutdowns – October 15, 1993, through Compliance Year 2019	-208	-20	-209
Universe – June 30, 2020	246	30	246
Inclusions – Compliance Year 2020	0	0	0
Exclusions – Compliance Year 2020	0	0	0
Shutdowns – Compliance Year 2020	-6	-2	-6
Universe – End of Compliance Year 2020	240	28	240

* “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 2020



CHAPTER 2

RTC ALLOCATIONS AND TRADING

Summary

On November 5, 2010, the 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 percent (or 5.7 tons per day) in SOx allocations. On December 4, 2015, the 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 percent (or 12 tons per day) when fully implemented for Compliance Year 2022 and beyond. For Compliance Year 2020, the fifth year of implementation, the NOx allocation supply was reduced by 22.6 percent (or 6.0 tons per day). The only remaining changes in RTC supply during Compliance Year 2020 were due to allocation adjustments for clean fuel production pursuant to Rule 2002(c)(12) which decreased overall NOx RTC supply by 6.2 tons and SOx RTC supply by 4.8 tons.

Since the inception of the RECLAIM program in 1994, a total value of \$1.56 billion dollars has been traded in the RTC trading market, excluding swap trades (trades exchanging different types of RTCs, that maybe of equal value or different values). During calendar year 2021, there were 293 RTC trade registrations, including swap trades. There were 260 RTC trade registrations with a total value of \$22.0 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 2021 a total of 1,716 tons of discrete-year NOx RTCs, 475 tons of discrete-year SOx RTCs, 81 tons of IYB NOx RTCs and 6 tons of IYB SOx RTCs were traded. The RTC trading market activity decreased during calendar year 2021 compared to calendar year 2020, in number of trades (by 2.3%), and in volume both for discrete-year RTCs (by 1.8%) and IYB RTCs (by 50.6%). However, the RTC trading market increased in total value (by 20.9%) from calendar year 2020 to 2021.

Discrete-year RTC trades with price (i.e., price >\$0.00) registered during calendar year 2021 include trades for Compliance Years 2020, 2021, 2022, and 2023 NOx RTCs, and Compliance Year 2021 SOx RTCs, excluding swap trades. The annual average prices of discrete-year NOx RTCs traded during calendar year 2021 were \$5,603, \$18,846, \$33,085, and \$37,808 per ton for Compliance Years 2020, 2021, 2022, and 2023 RTCs, respectively. The annual average price for discrete-year SOx RTCs traded during the same period was \$3,000 per ton for Compliance Years 2021 RTCs.

The annual average price of Compliance Year 2021, 2022, and 2023 NOx RTCs exceeded the Rule 2015 backstop threshold of \$15,000 per ton while SOx RTC prices remained below the threshold. Prices for discrete-year NOx and SOx RTCs for all compliance years are still below the \$49,737 per ton of NOx and

\$35,811 per ton of SOx discrete-year RTCs pre-determined overall program review thresholds established by the Board pursuant to Health and Safety Code §39616(f)¹.

The annual average price during calendar year 2021 for IYB NOx RTCs was \$94,576 per ton. During calendar year 2021, no IYB SOx RTCs were traded with price. Therefore, annual average IYB RTC prices did not exceed the \$746,056 per ton of IYB NOx RTCs or the \$537,160 per ton of IYB SOx RTCs pre-determined overall program review thresholds established by the Board pursuant to Health and Safety Code §39616(f).

Investors were active in the RTC market during calendar year 2021. They were involved in 131 of the 184 discrete-year NOx trade registrations and were not involved with the 1 discrete-year SOx trade registrations with price. Investors were also involved in 10 of the 14 IYB NOx. There were no IYB SOx trades with price. Investors were involved in 56 percent of total value and 62 percent of total volume for discrete-year NOx trades. Investors were not involved in discrete-year SOx trades for this calendar year. At the end of calendar year 2021, investors' holdings of IYB NOx RTCs increased slightly to 2.0 percent of total NOx RECLAIM RTCs from 1.2 percent in 2020. Investors' holdings of IYB SOx RTCs stayed consistent at 4.2 percent of the total SOx RECLAIM RTCs when compared to investor's holdings in calendar year 2020.

Background

On January 5, 2018, the South Coast AQMD 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. Prior to this amendment, South Coast AQMD issued 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 was calculated based on each facility's historical 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 qualified² external offsets previously provided by the facility, and any unused ERCs generated at and held by the facility. Facilities entering RECLAIM after 1994 were 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 the 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

¹ September 7, 2007 Board Agenda item No. 43 regarding Health and Safety Code §39616(f) can be found at: <http://www3.aqmd.gov/hb/2007/September/070943a.html>

² Only external offsets provided at a one-to-one offset ratio after the base year were used as the basis for allocation quantification purposes.

December 31 of each year, and Cycle 2 with a compliance period of July 1 of each year through June 30 of the following year. Each RECLAIM facility is assigned to either Cycle 1 or Cycle 2 and the RTCs it is issued (if any) have corresponding periods of validity.

The issuance of allocations for future years provides RECLAIM facilities guidance regarding their future emission reduction requirements. Facilities can plan their compliance strategies by reducing actual emissions or securing needed RTCs through trade registrations (or a combination of the two), based on their operational needs.

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 2020 data, new RTC trade data discussed in this chapter is for RTC trades that occurred during calendar year 2021.

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 facilities³, 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 Board may adopt additional rules that affect RTC supply. Changes in the RTC supply during Compliance Year 2020 are discussed below.

Allocations Adjustments Due to Inclusion and Exclusion of Facilities

As noted above, the South Coast AQMD Board discontinued facility inclusions into RECLAIM. Previous to this amendment, facilities existing prior to October 1993 and entering RECLAIM after 1994 may have received allocations just like facilities that were included at the beginning of the program. However, allocations issued for these facilities were only applicable for the compliance year of entry and forward. In addition, these facilities were 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

³ 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.

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.

As discussed in Chapter 1, the South Coast AQMD Board amended Rule 2001 on October 5, 2018, to allow qualifying facilities to opt-out of the RECLAIM program. Based on continuing conversations with U.S. EPA, the 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 RTCs⁴. No facilities were excluded during Compliance Year 2020. Therefore, there were no changes to the NO_x or SO_x supplies in Compliance Year 2020 due to facility exclusions from RECLAIM.

On January 5, 2018, the South Coast AQMD 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 2020. Therefore, there are no changes to the NO_x or SO_x RTC supplies in Compliance Year 2020 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 NO_x 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.

Six RECLAIM facilities shut down during Compliance Year 2020, one of which was listed in Table 8 of Rule 2002. No adjustment of this facility's NO_x RTC Allocations was required pursuant to Rule 2002(i)(3) because all facility NO_x sources operated since calendar year 2015 were permitted with BARCT-equivalent emission limits. Therefore, there were no changes to the NO_x RTC supplies in Compliance Year 2020 due to facility shutdowns. Most of the shutdown facilities sold their RTC credits.

⁴ Except for shutdown facilities that are subject to Rule 2002(i); see discussion in the next section.

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 NO_x and 42.3 tons of SO_x for Compliance Year 1999, 101.8 tons of NO_x and 41.4 tons of SO_x for Compliance Year 2000, and 98.4 tons of NO_x and 40.2 tons of SO_x for each subsequent Compliance Year on the basis of those projections. These refineries are required to submit, at the end of each compliance year in their Annual Permit Emissions Program (APEP) report, records to substantiate actual emission increases due solely to the production of reformulated gasoline. If actual emission increases for a subject year are different than the projected amount, the RTCs issued are adjusted accordingly (*i.e.*, excess RTCs issued are deducted if emissions were less than projected; conversely, additional RTCs are issued if emissions were higher than projected).

As a result of the amendment to Rule 2002 in January 2005 to further reduce RECLAIM 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 2020, 6.2 tons of NO_x RTCs (0.08% of total NO_x allocation for Compliance Year 2020) and 4.8 tons of SO_x RTCs (0.22% of total SO_x allocation for Compliance Year 2020) were deducted from refineries' Compliance Year 2020 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 accordingly⁵. There were no changes in RTC allocations due to activity corrections in Compliance Year 2020.

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

⁵ 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.

– 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 2020.

Net Changes in RTC Supplies

The changes to RTC supplies described in the above sections resulted in a net decrease of 6.2 tons of NOx RTCs (0.08% of the total) and a decrease of 4.8 tons of SOx RTCs (0.22% of the total) for Compliance Year 2020. Table 2-1 summarizes the changes in NOx and SOx RTC supplies that occurred in Compliance Year 2020 pursuant to Rule 2002.

**Table 2-1
Changes in NOx and SOx RTC Supplies during Compliance Year 2020 (tons per year)**

Source	NOx	SOx
Universe changes	0	0
Clean Fuel/Reformulated Gasoline	-6.2	-4.8
Activity corrections	0	0
MSERCs	0	0
Net change	-6.2	-4.8

Note: The data in this table represents the changes that occurred over the course of Compliance Year 2020 to the Compliance Year 2020 aggregate NOx and SOx RTC supplies originally issued pursuant to Rule 2002, not the difference between 2020 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 Board implemented CMB-10 by adopting changes to the RECLAIM program that resulted in a 22.5 percent 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.

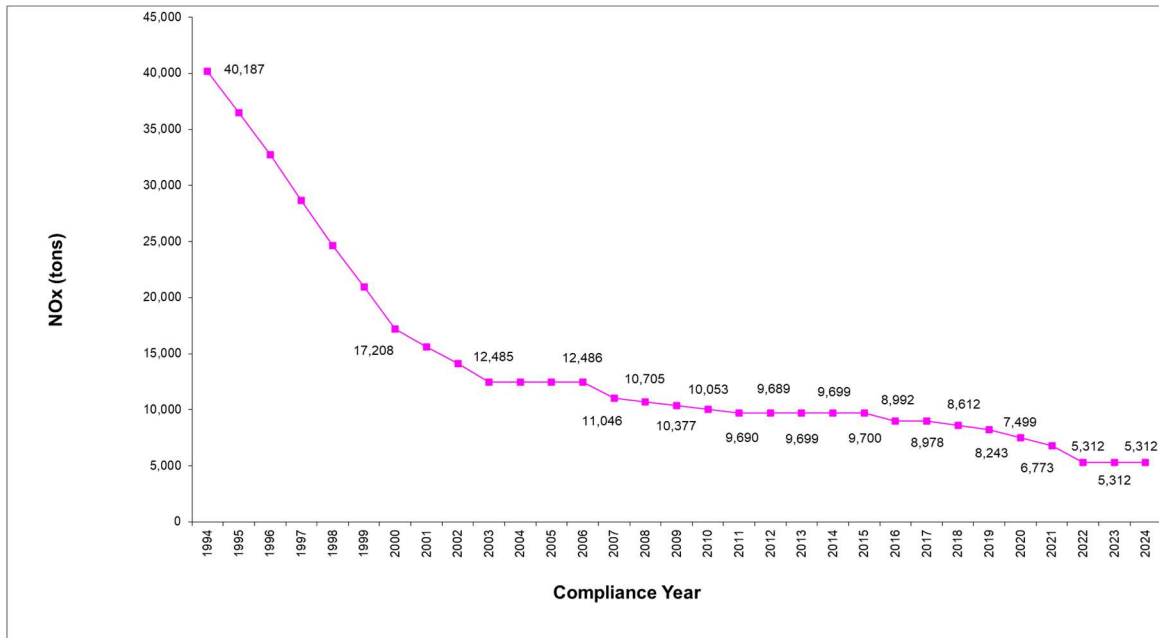
On November 5, 2010, the Board adopted changes to the RECLAIM program implementing the 2007 AQMP Control Measure CMB-02 – Further SOx Reductions for RECLAIM (SOx). These amendments resulted in a BARCT-based

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.

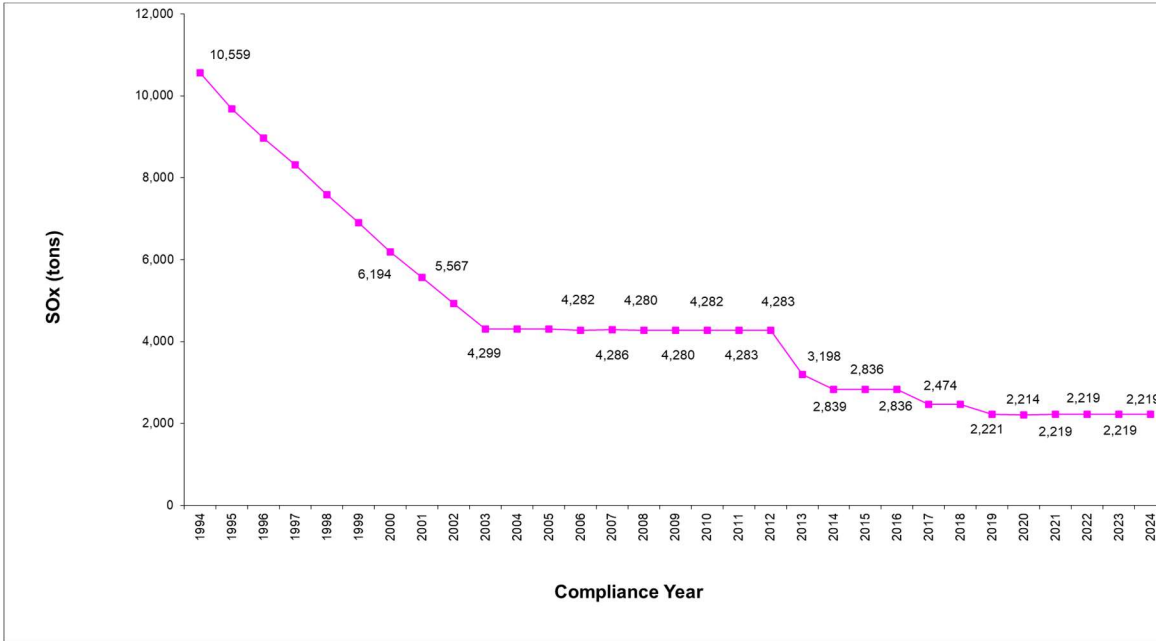
Similarly, the 2012 AQMP adopted by the Board in 2012, included Control Measure CMB-01- Further NOx Reductions for RECLAIM that identified a new group of RECLAIM NOx emitting equipment that should be reviewed for new BARCT. The rulemaking process for the amendment to the NOx RECLAIM program implementing CMB-01 started in 2012. On December 4, 2015, the 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 2024, 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 discrete-year 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

As noted in the Summary above and Table 2-14, the annual average price of Compliance Year 2021, 2022, and 2023 NOx RTCs at \$18,846, \$33,085, and \$37,808 per ton, respectively, exceeded the Rule 2015 backstop threshold of

\$15,000 per ton, while SOx RTC prices remained below the threshold. Additionally, as reported in Informational Item #4 – [“Twelve-month and Three-month Rolling Average Price of Compliance Years 2021 and 2022 NOx and SOx RTCs \(October – December 2021\)”](#), at the January 21, 2022 meeting of the Stationary Source Committee, the 12-month and 3-month rolling average NOx RTC prices for Compliance Year 2020 NOx RTCs for the reporting month of January 2022 of \$33,085 per ton and \$38,803 per ton, respectively, also exceeded the \$22,500 per ton 12-month and \$35,000 per ton 3-month rolling average thresholds specified by Rule 2002(f)(1)(H).

Rule 2015(b)(6) specifies that, if the annual average price of discrete-year NOx or SOx RTCs exceeds \$15,000 per ton, within six months of the determination⁶ thereof the Executive Officer shall, in addition to the annual report, submit to CARB and USEPA results of an evaluation and review of the compliance and enforcement aspects of the RECLAIM program, to include at a minimum the following assessments:

- the deterrent effect of Rule 2004(d)(1) through (d)(4), Prohibition of Emissions in Excess of Annual Allocation,
- the rates of compliance with applicable emission caps,
- the rate of compliance with monitoring, recordkeeping, and reporting requirements,
- South Coast AQMD’s ability to obtain appropriate penalties in cases of noncompliance, and
- whether the program provides appropriate incentives to comply.

Rule 2015(b)(6) specifies that the Executive Officer shall submit, with the results of the evaluation, either a recommendation that paragraphs (d)(1) through (d)(4) be continued without change, or amendments to the RECLAIM rules setting forth revisions to paragraphs (d)(1) through (d)(4) of Rule 2004 if the South Coast AQMD’s Board determines that revisions are appropriate in light of the results of the evaluation.

Rule 2002(f)(1)(H) also specifies that in the event 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 Board and 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.

Additionally, pursuant to Rule 2002, if the 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 Board concurrence.

⁶ The Executive Officer will notify CARB and USEPA no later than the September 2022 Board meeting, which is six months from the determination presented in this March 2022 annual report.

At its January 21, 2022, meeting, the Executive Officer notified the Stationary Source Committee that the Executive Officer will conduct an assessment of the RECLAIM Program including control technology implementation and socioeconomic impacts due to Compliance Year 2022 NOx RTCs' exceedance of the 12-month and 3-month rolling average thresholds specified Rule 2002. This assessment is targeted to be completed by July 1, 2022.

The 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.

For RTC trades occurring in calendar year 2021, the overall program review thresholds⁷ in 2021 dollars, pursuant to Health and Safety Code §39616(f), are \$49,737 per ton of discrete-year NOx RTCs, \$35,811 per ton of discrete-year SOx RTCs, \$746,056 per ton of IYB NOx RTCs, and \$537,160 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 2021 was slightly lower than the market activity in calendar year 2020 in terms of the number of trades. Table 2-2 compares NOx and SOx trade registrations for calendar years 2021 and 2020.

Table 2-2
Trade Registrations in Calendar Years 2021 and 2020, Including Swaps

RTC	2021	2020
NOx	280	279
SOx	13	21
Total	293	300

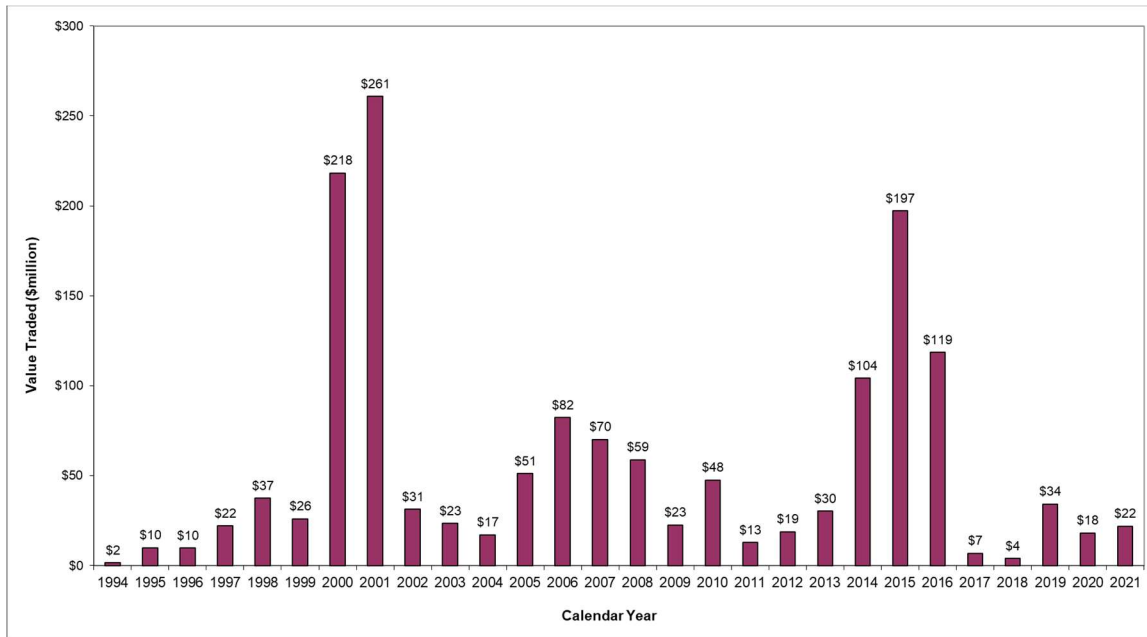
The total value of RTCs traded in calendar year 2021 was significantly higher than in calendar year 2020, excluding swap trades. Table 2-3 compares the value of NOx and SOx RTCs traded in calendar years 2021 and 2020. Figure 2-3 illustrates the annual value of RTCs traded in RECLAIM since the inception of the program.

⁷ These program review thresholds were adjusted using the August 2021 Consumer Price Index (CPI), due to the unavailability of the December 2021 CPI by the end of January 2022 when this report was compiled.

Table 2-3
Value Traded in Calendar Years 2021 and 2020, Excluding Swaps (millions of dollars)

RTC	2021	2020
NOx	\$21.87	\$17.52
SOx	\$0.11	\$0.67
Total	\$21.98	\$18.19

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 lower for NOx but moderately higher for SOx in calendar year 2021 than in calendar year 2020, while trades of IYB RTCs of both NOx and SOx in calendar year 2021 were significantly lower than the trading volume in 2020. Tables 2-4 and 2-5 compare 2021 and 2020 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 2021 by pollutant. Additional information on the discrete-year and IYB trading activities, value, and volume are discussed later in this chapter.

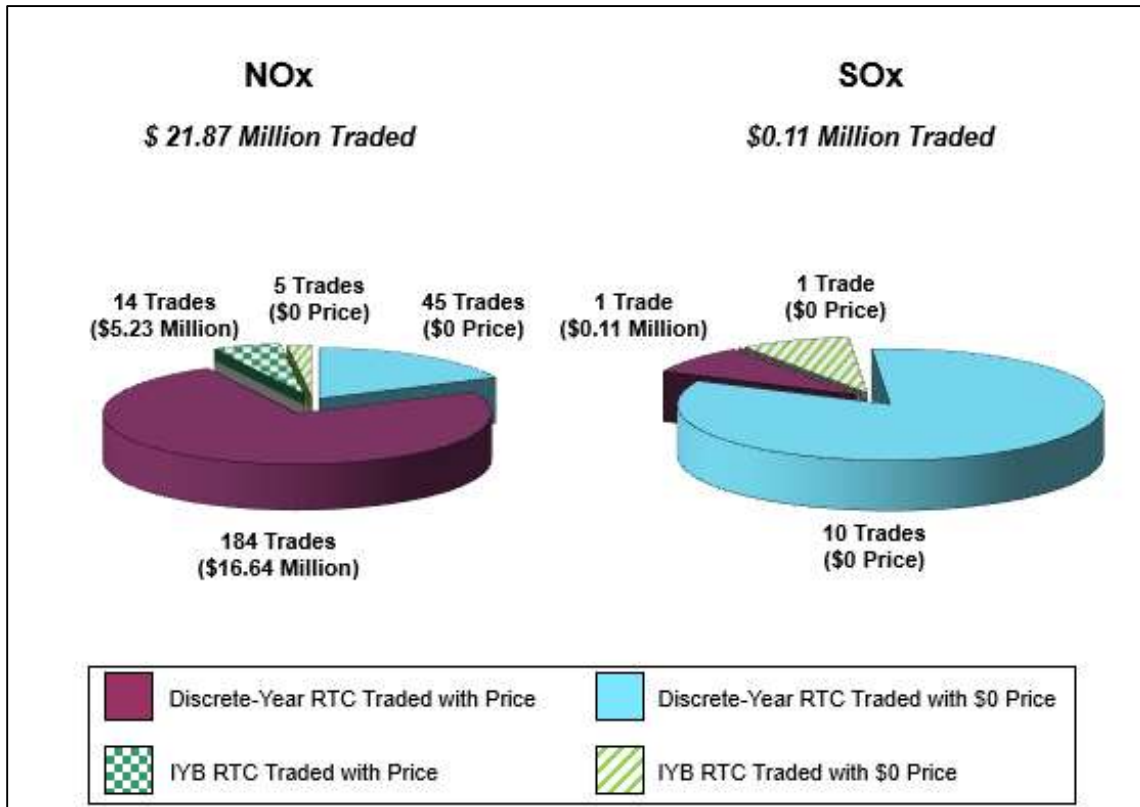
Table 2-4
Volume of Discrete-Year RTCs Traded in Calendar Years 2021 and 2020, Excluding Swaps (tons)

RTC	2021	2020
NOx	1,716	1,854
SOx	475	377
Total	2,191	2,231

Table 2-5
Volume of IYB RTCs Traded in Calendar Years 2021 and 2020, Excluding Swaps (tons)

RTC	2021	2020
NOx	81	156
SOx	6	20
Total	87	176

Figure 2-4
Calendar Year 2021 Overall Trading Activity (Excluding Swaps)



There were 61 trades with zero price in calendar year 2021. 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 2021, 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 2021, there were a total of 229 discrete-year NOx RTC trades and 11 discrete-year SOx RTC trades, excluding swap trades. The trading of discrete-year NOx RTCs included RTCs for Compliance Years 2020 through 2023 (see Table 2-14). The trading of discrete-year SOx RTCs included RTCs for Compliance Years 2020 through 2022, though 2021 credit trades were the only trades with price (see Table 2-15). Table 2-6 compares the number of trade registrations in 2021 and 2020, both with price and with zero price.

**Table 2-6
Discrete-Year Trade Registrations in Calendar Years 2021 and 2020 by Price,
Excluding Swaps**

Year	RTC	With Price	With \$0 Price	Total
2021	NOx	184	45	229
	SOx	1	10	11
	Total	185	55	240
2020	NOx	189	41	230
	SOx	5	7	12
	Total	194	48	242

Total discrete-year RTC trading values significantly increased for NOx and significantly decreased for SOx on a relative basis in calendar year 2021 when compared to calendar year 2020. Table 2-7 compares the total value of the discrete-year RTC trades in 2021 and 2020.

**Table 2-7
Discrete-Year RTC Value Traded in 2021 and 2020, Excluding Swaps (millions of dollars)**

RTC	2021	2020
NOx	\$16.64	\$7.46
SOx	\$0.11	\$0.22
Total	\$16.75	\$7.68

In calendar year 2021, the overall quantities of discrete-year NOx RTCs traded slightly decreased compared to calendar year 2020, while the quantities of

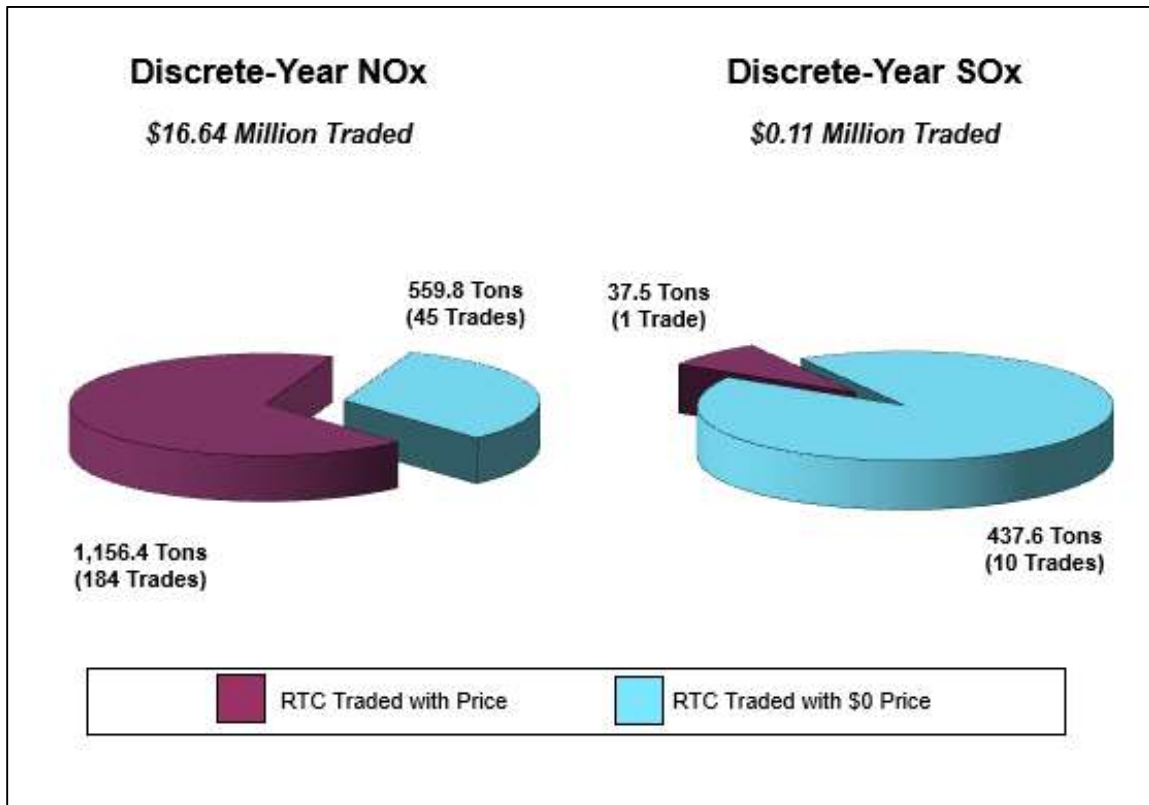
discrete-year SOx RTCs traded significantly increased. Table 2-8 compares the volume of NOx and SOx RTCs traded in calendar years 2021 and 2020, excluding swap trades. Figure 2-5 illustrates the trading activity of discrete-year RTCs (excluding swaps) for calendar year 2021.

Table 2-8
Discrete-Year RTC Volume Traded in Calendar Years 2021 and 2020 by Price, Excluding Swaps (tons)

Year	RTC	With Price	With \$0 Price	Total
2021	NOx	1,156	560	1,716
	SOx	38	438	475*
	Total	1,194	997*	2,191
2020	NOx	1,267	586	1,854
	SOx	52	325	377
	Total	1,319	911	2,231

* Due to rounding, some totals may not correspond with the sum of the separate figures.

Figure 2-5
Calendar Year 2021 Trading Activity for Discrete-Year RTCs (Excluding Swaps)



IYB RTC Trading Activity

In calendar year 2021, there were 19 IYB NOx trades and one IYB SOx trade, excluding swaps. The IYB NOx trades included RTCs with Compliance Years 2021 through 2024 as start years, while the IYB SOx trade was for RTCs with a Compliance Year 2022 start year. Table 2-9 compares the number of IYB RTC trade registrations from 2021 and 2020.

Table 2-9
IYB Trade Registrations in Calendar Years 2021 and 2020 by Price

Year	RTC	With Price	With \$0 Price	Total
2021	NOx	14	5	19
	SOx	0	1	1
	Total	14	6	20
2020	NOx	18	13	31
	SOx	2	2	4
	Total	20	15	35

Total IYB RTC trade values significantly decreased in calendar year 2021 compared to calendar year 2020. Table 2-10 compares the NOx and SOx IYB RTC trade values in calendar years 2021 and 2020.

Table 2-10
IYB RTC Value Traded in 2021 and 2020, Excluding Swaps (millions of dollars)

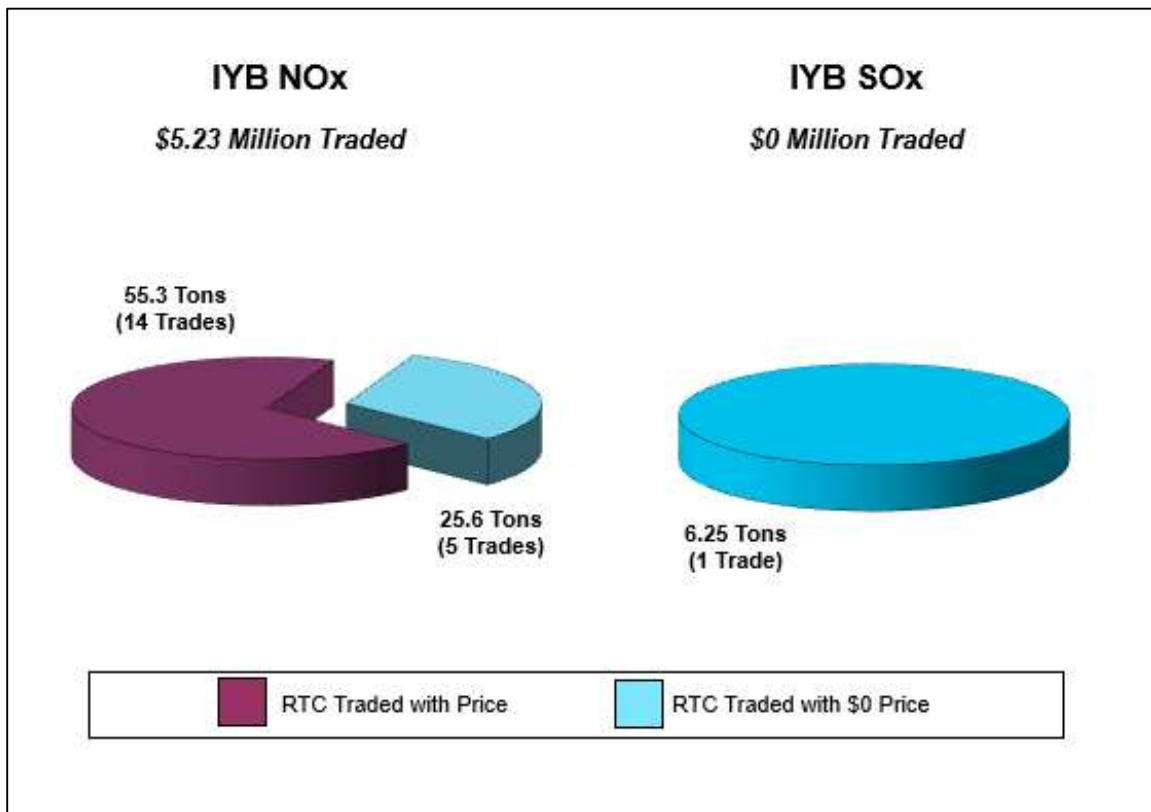
RTC	2021	2020
NOx	\$5.23	\$10.06
SOx	\$0	\$0.45
Total	\$5.23	\$10.51

In calendar year 2021, the total volume of IYB RTCs traded (excluding swap trades) decreased significantly compared to calendar year 2020. Table 2-11 compares the NOx and SOx IYB RTCs trade volumes in calendar years 2021 and 2020. 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 2021 IYB RTC trading activity excluding swap trades.

Table 2-11
IYB RTC Volume Traded in Calendar Years 2021 and 2020 by Price, Excluding Swaps (tons)

Year	RTC	With Price	With \$0 Price	Total
2021	NOx	55	26	81
	SOx	0	6	6
	Total	55	32	87
2020	NOx	86	70	156
	SOx	14	6	20
	Total	100	76	176

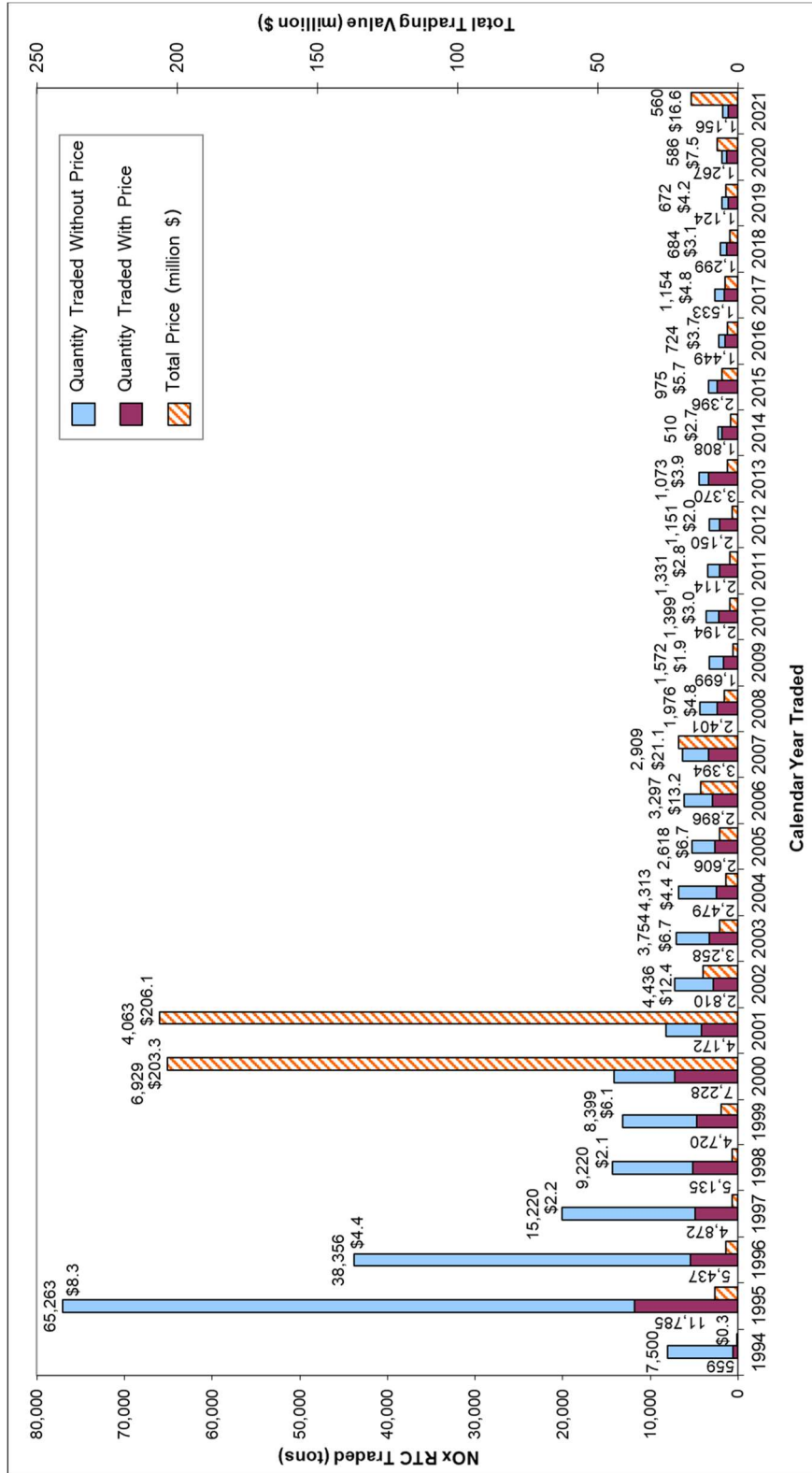
Figure 2-6
Calendar Year 2021 Trading Activity for IYB RTCs (Excluding Swaps)



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)**

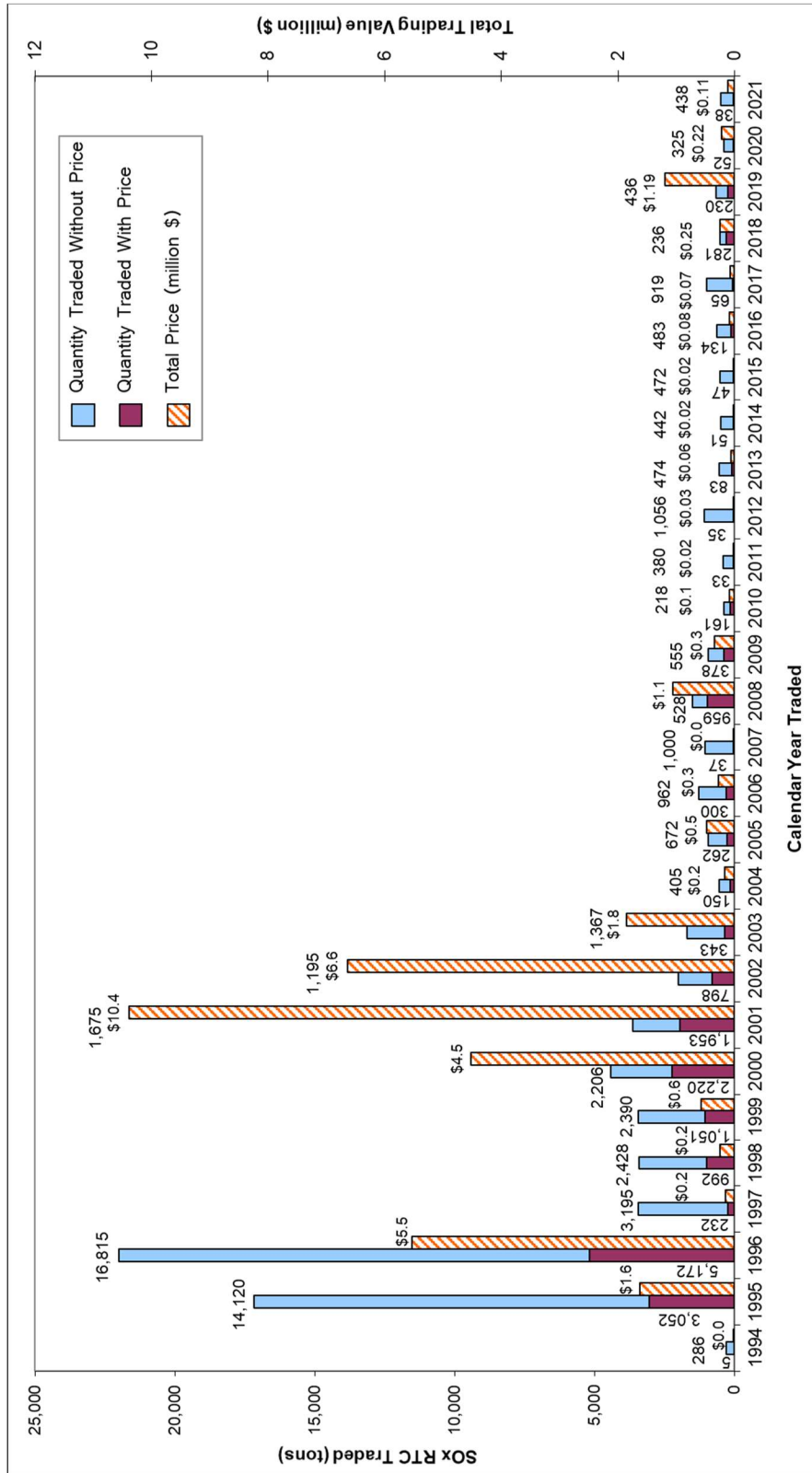


Figure 2-9
IYB NOx RTC Trades (Excluding Swaps)

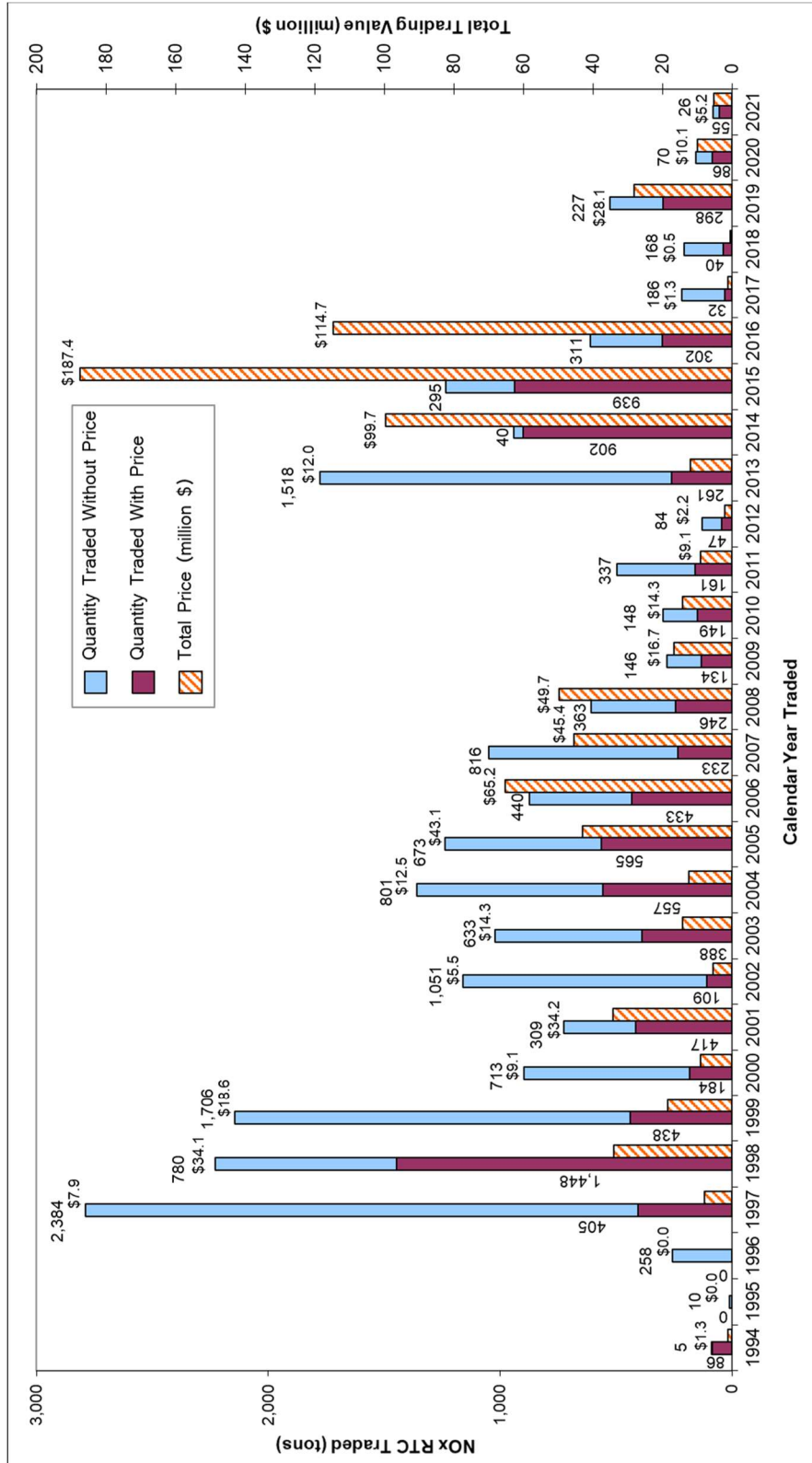
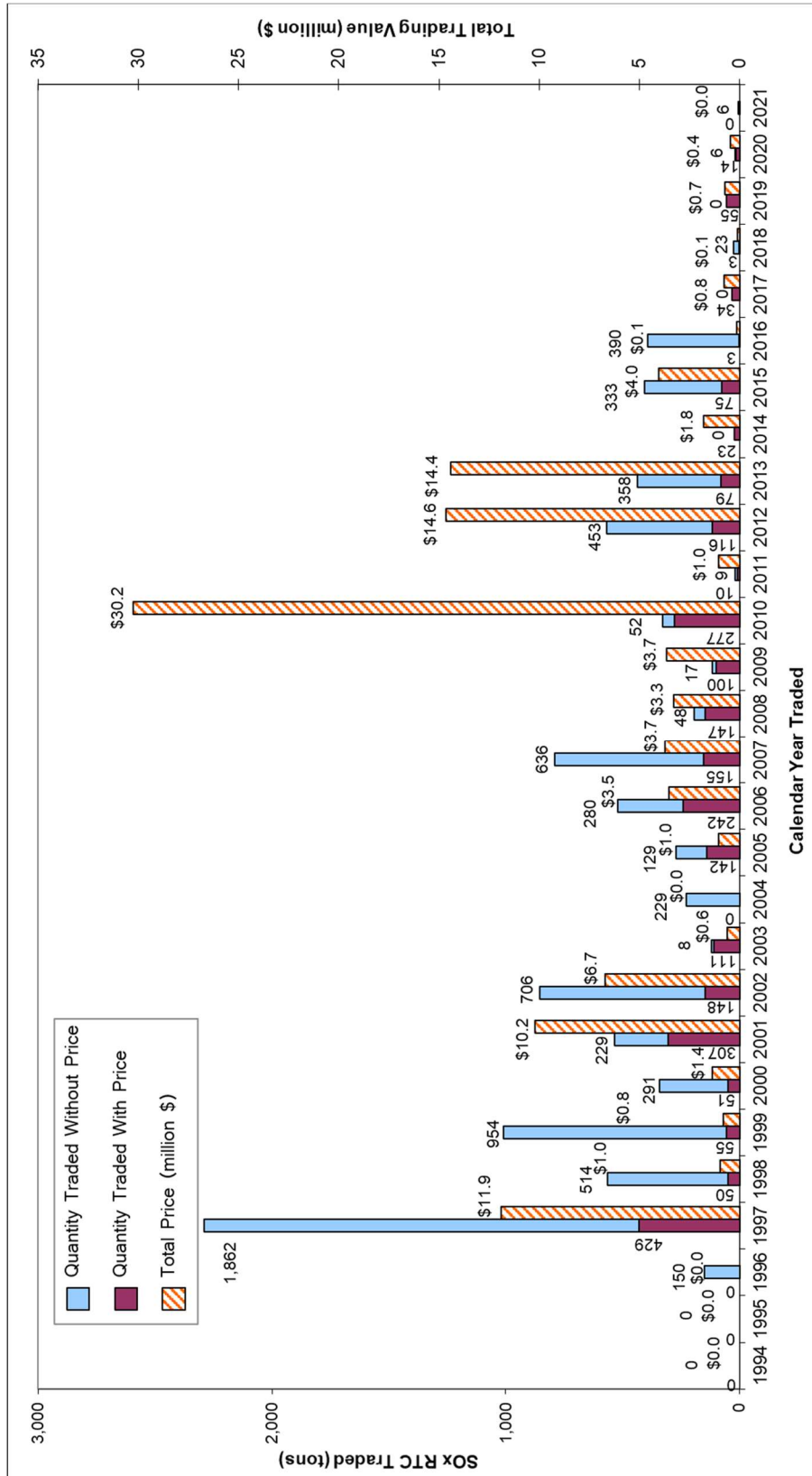


Figure 2-10
 IYB SOx RTC Trades (Excluding Swaps)



Swap Trades

In addition to traditional trades of RTCs for a price, RTC swaps also occur between trading partners. Most swap trades are exchanges of RTCs with different zones, cycles, expiration years, and/or pollutants. Some swaps involve a combination of RTCs and cash payment as a premium. There are 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 2021, thirty-three trade registrations included RTC swaps with a total value of about \$3.4 million. Twenty-one 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 \$2.5 million. Two trades involved swapping the same amount of inland credits for coastal credits with a price premium. The total value of these trades was \$0.1 million. Two trades involved swapping NOx credits for a greater quantity of SOx credits. The total value of these trades was \$0.1 million. One swap trade involved a forward contract, in which one party agreed to sell RTCs during 2019 and purchase the same volume and vintage of RTCs back from the other party in 2021 at zero price. The seven remaining trades were between facilities or RTC holders under common ownership. The total value of the remaining seven trades is \$0.7 million. Upon further investigation, staff concluded that these seven transactions were not at arm's-length, and that the prices reported for the transfer of RTCs for these seven 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 2021 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
2021	\$3.40	35.4	200.0	31	32

* 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
2021	\$0.04	0	40.0	1	1

* 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 2016 through 2021. The table shows that the annual average price of discrete Compliance Year 2021, 2022, and 2023 NOx RTCs exceeded the Rule 2015 backstop threshold of \$15,000 per ton while SOx RTC prices remained below the threshold. Annual average prices for all discrete-year NOx and SOx RTCs vintages were below the \$49,737 per ton of NOx and \$35,811 per ton of SOx discrete-year RTCs pre-determined overall program review thresholds established by the Board pursuant to Health and Safety Code §39616(f).

Table 2-14
Annual Average Prices for Discrete-Year NOx RTCs during Calendar Years 2016 through 2021 (price per ton)

RTC Compliance Year	Calendar Year during which RTCs Traded					
	2016	2017	2018	2019	2020	2021
2014						
2015	1,625.75					
2016	2,926.90	2,202.90				
2017	6,606.21	4,181.75	1,871.76			
2018		10,639.19	3,788.31	2,261.39		
2019			5,645.67	5,409.79	4,286.74	
2020			5,673.91	12,189.81	8,322.89	5,603.36
2021				8,677.54	9,417.56	18,846.39
2022						33,085.16
2023						37,808.27
2024						

Table 2-15
Annual Average Prices for Discrete-Year SOx RTCs during Calendar Years 2016 through 2021 (price per ton)

RTC Compliance Year	Calendar Year during which RTCs Traded					
	2016	2017	2018	2019	2020	2021
2014						
2015	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						3,000.00
2022						
2023						
2024						

Rolling Average NOx and SOx RTCs Price Report

On December 4, 2015, the 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)(l) was subsequently removed by the 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 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 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 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.”

A November 5, 2010 amendment to Rule 2002 established a \$50,000 per ton of SOx RTC threshold based on the twelve-month rolling average prices for current compliance year SOx RTCs calculated and reported by the Executive Officer during the period of January 1, 2017 through February 1, 2020. Although no longer required, the Executive Officer continues to calculate and report twelve-month average SOx RTC prices for informational purposes. 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 below the applicable reporting thresholds.

**Table 2-16
Twelve-Month Rolling Average Prices of Compliance Year 2021 Discrete-Year NOx RTCs**

Reporting Month	12-Month Period	Average Price (\$/ton)
January 2021	January 2020 through December 2020	\$9,418
February 2021	February 2020 through January 2021	\$9,488
March 2021	March 2020 through February 2021	\$9,321
April 2021	April 2020 through March 2021	\$9,439
May 2021	May 2020 through April 2021	\$12,470
June 2021	June 2020 through May 2021	\$14,545
July 2021	July 2020 through June 2021	\$16,898
August 2021	August 2020 through July 2021	\$17,072
September 2021	September 2020 through August 2021	\$17,091
October 2021	October 2020 through September 2021	\$17,455
November 2021	November 2020 through October 2021	\$17,529
December 2021	December 2020 through November 2021	\$17,523
January 2022	January 2021 through December 2021	\$18,846

Table 2-17
Three-Month Rolling Average Prices of Compliance Year 2021 Discrete-Year NOx RTCs

Reporting Month	3-Month Period	Average Price (\$/ton)
January 2021	October 2020 through December 2020	\$13,400
February 2021	November 2020 through January 2021	\$13,218
March 2021	December 2020 through February 2021	\$12,238
April 2021	January 2021 through March 2021	\$13,079
May 2021	February 2021 through April 2021	\$14,900
June 2021	March 2021 through May 2022	\$14,900
July 2021	April 2021 through June 2021	\$17,201
August 2021	May 2021 through July 2021	\$17,921
September 2021	June 2021 through August 2021	\$17,575
October 2021	July 2021 through September 2021	\$17,974
November 2021	August 2021 through October 2021	\$17,865
December 2021	September 2021 through November 2021	\$18,346
January 2022	October 2021 through December 2021	\$20,636

Table 2-18
Twelve-Month Rolling Average Prices of Compliance Year 2021 Discrete-Year SOx RTCs

Reporting Month	12-Month Period	Average Price (\$/ton)
January 2021	January 2020 through December 2020	-
February 2021	February 2020 through January 2021	-
March 2021	March 2020 through February 2021	-
April 2021	April 2020 through March 2021	-
May 2021	May 2020 through April 2021	-
June 2021	June 2020 through May 2021	-
July 2021	July 2020 through June 2021	-
August 2021	August 2020 through July 2021	-
September 2021	September 2020 through August 2021	-
October 2021	October 2020 through September 2021	-
November 2021	November 2020 through October 2021	-
December 2021	December 2020 through November 2021	-
January 2022	January 2021 through December 2021	\$3,000

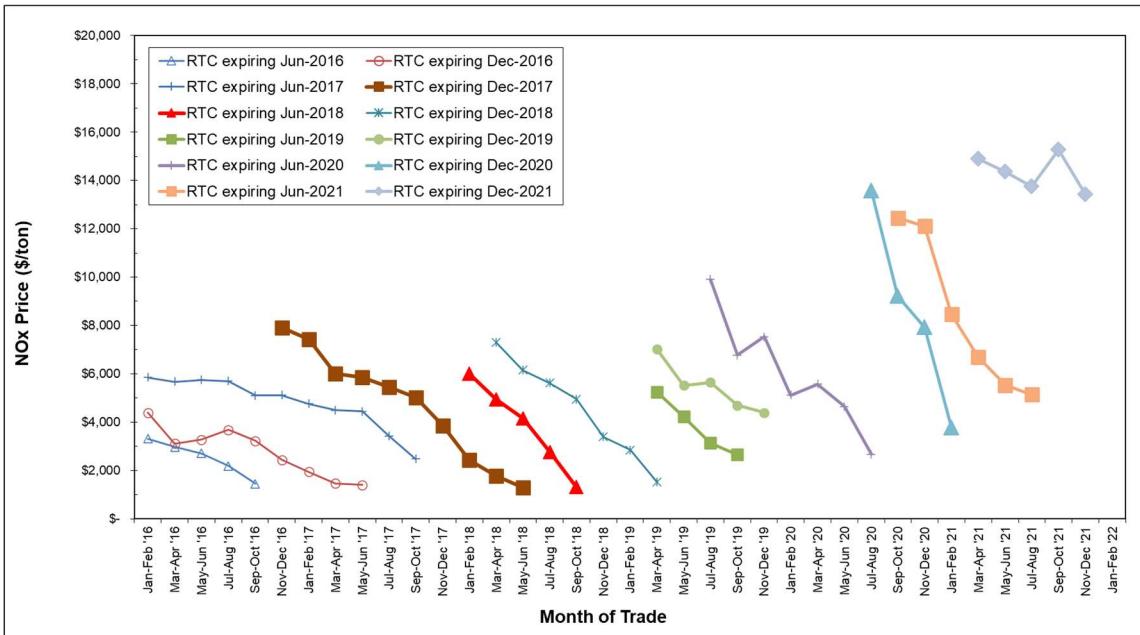
Average Price for NOx RTCs Nearing Expiration

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.

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. Prices for discrete Compliance Year 2020 RTCs expiring in December 2020 and June 2021 followed the historic declining price trend. However, the price of Compliance Year 2021 RTCs expiring December 2021 remained relatively high through the end of calendar year 2021 indicating a tightening supply. Although the price for these expired Compliance Year 2021 RTCs is expected to fall during the reconciliation period for Cycle 1 facilities ending March 1, 2022, current indications are that the price of Compliance Year 2021 RTCs will remain well above the price of RTCs for previous compliance years shown on this chart.

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 2021, there was only one discrete-year SOx trade with price, for Compliance Year 2021 RTCs. The credits were priced at \$3000 per ton.

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 2021 was \$94,576 per ton, which is lower than the annual average price of \$116,405 per ton traded in calendar year 2020. There were no IYB SOx RTCs traded in calendar year 2021. 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 2021, the annual average IYB RTC prices did not exceed the \$746,056 per ton of NOx RTCs or the \$537,160 per ton of SOx RTCs program review thresholds established by the 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
2021	\$5.23	55.3	14	\$94,576

* 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
2021	\$0.0	0.0	0	N/A

* 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, in subsequent working group meetings and discussion with USEPA, several issues were identified in transitioning the New Source Review component of the program. These 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 led to a significant increase in demand for IYB

NOx RTCs relative to calendar year 2017 and 2018 levels as shown in Table 2-19.

The total volumes traded and values of IYB NOx RTCs spiked in calendar year 2019 and have fallen each of the past two years but remain significantly higher than in calendar years 2017 and 2018. The price for IYB NOx RTCs also spiked in calendar year 2019 and remained high in calendar years 2020 and 2021.

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 was one report submitted in calendar year 2021 identifying an agreed upon contingent right to buy or sell RTCs. This contingent right was constantly modified as time progressed, but its rights were not exercised in calendar year 2021. However, one contingent right to purchase NOx RTCs signed and agreed upon last year was exercised through four separate trades during calendar year 2021.

In addition to reconciling emissions at RECLAIM facilities, RTCs are also used by RTC holders to satisfy variance conditions and offset emissions for other projects. Three RTC trades of this type occurred during calendar year 2021. In the first case, a non-RECLAIM facility retired 1.2 tons of NOx RTCs to comply with a Supplemental Environmental Impact Report mandated Mitigation Monitoring Program. In the other two cases, a RECLAIM facility retired SOx RTCs to satisfy variance conditions: once for Compliance Year 2021, and another for Compliance Year 2022 for a total of 0.32 tons.

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 2021, investors were actively involved in 131 of the 184 discrete-year NOx RTC trades with price and none of the one discrete-year SOx RTC trades with price. Investors were involved in 10 of the 14 IYB NOx trades with price. This year, there were no IYB SOx trades with price.

Investors' involvement in discrete-year NOx and SOx trades registered with price in calendar year 2021 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 56 percent and 0 percent, 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 62 percent and 0 percent 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 31 percent and zero percent of IYB NOx and SOx trades by value, and in 39 percent and zero percent of IYB NOx and SOx trades by volume, respectively.

**Figure 2-12
Calendar Year 2021 Investor-Involved Discrete-Year NOx and SOx Trades Based on Value Traded**

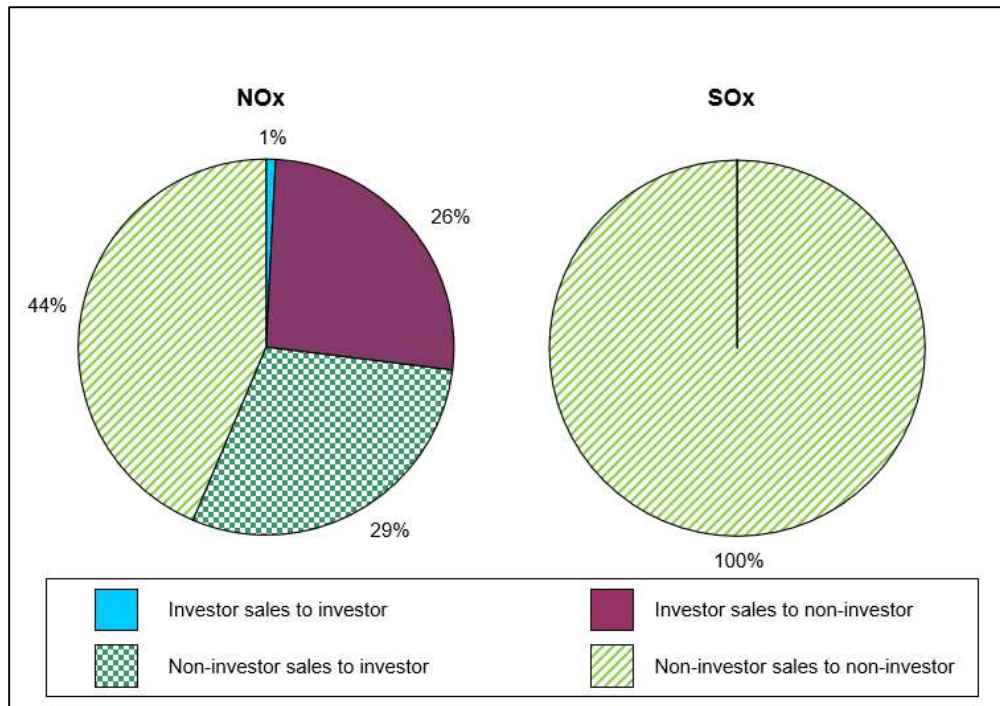


Figure 2-13
Calendar Year 2021 Investor-Involved Discrete-Year NOx and SOx Trades Based on Volume Traded with Price

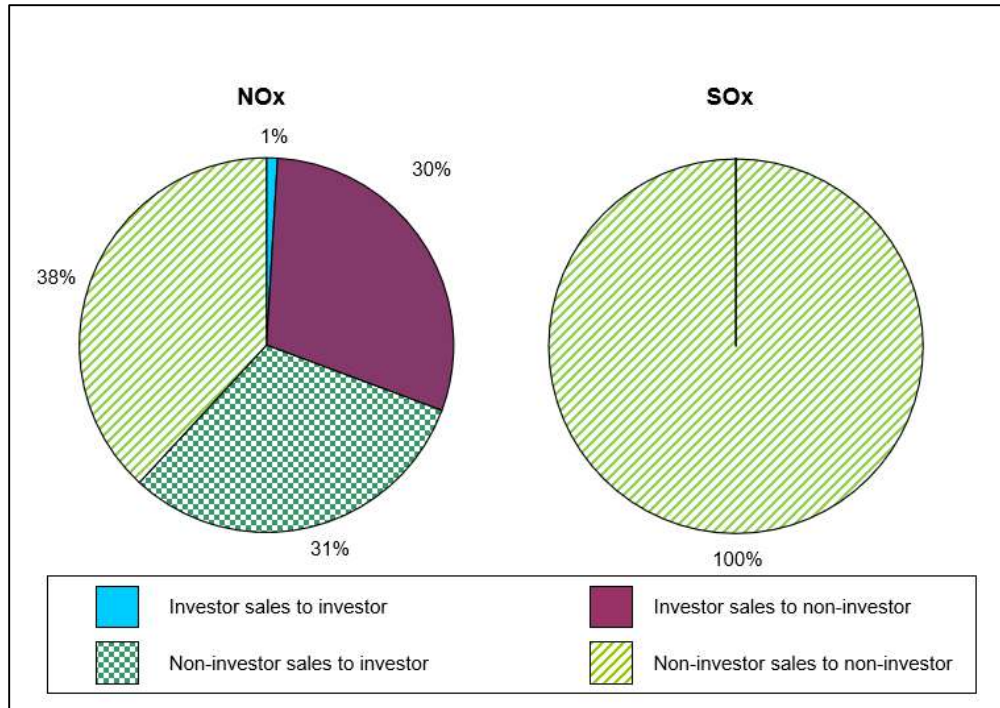


Figure 2-14
Calendar Year 2021 Investor-Involved IYB NOx and SOx Trades Based on Value Traded

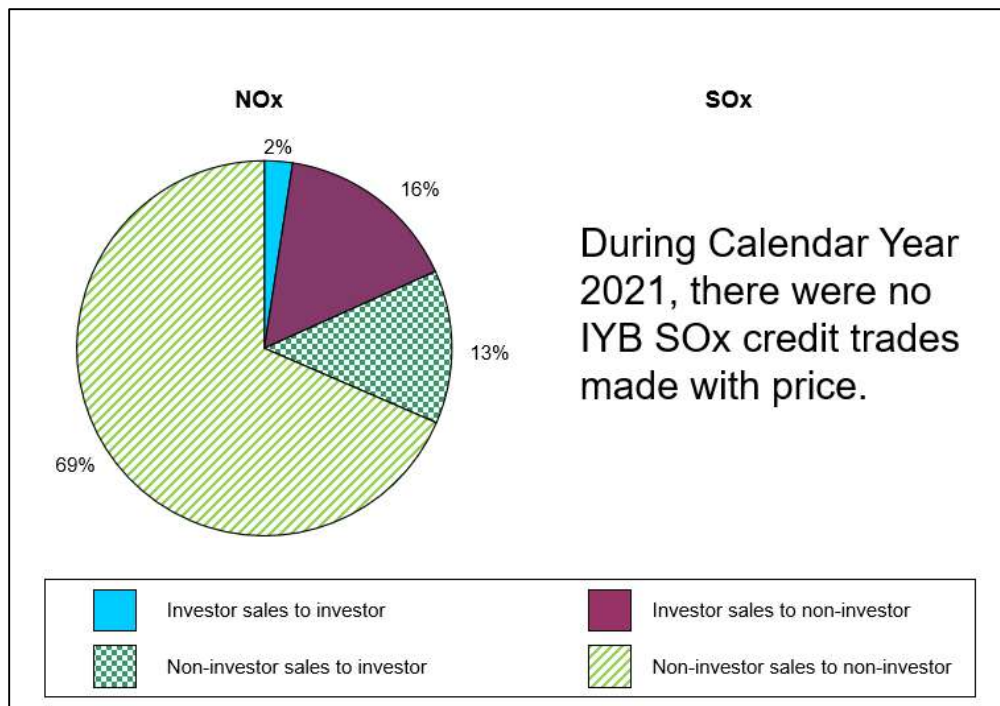
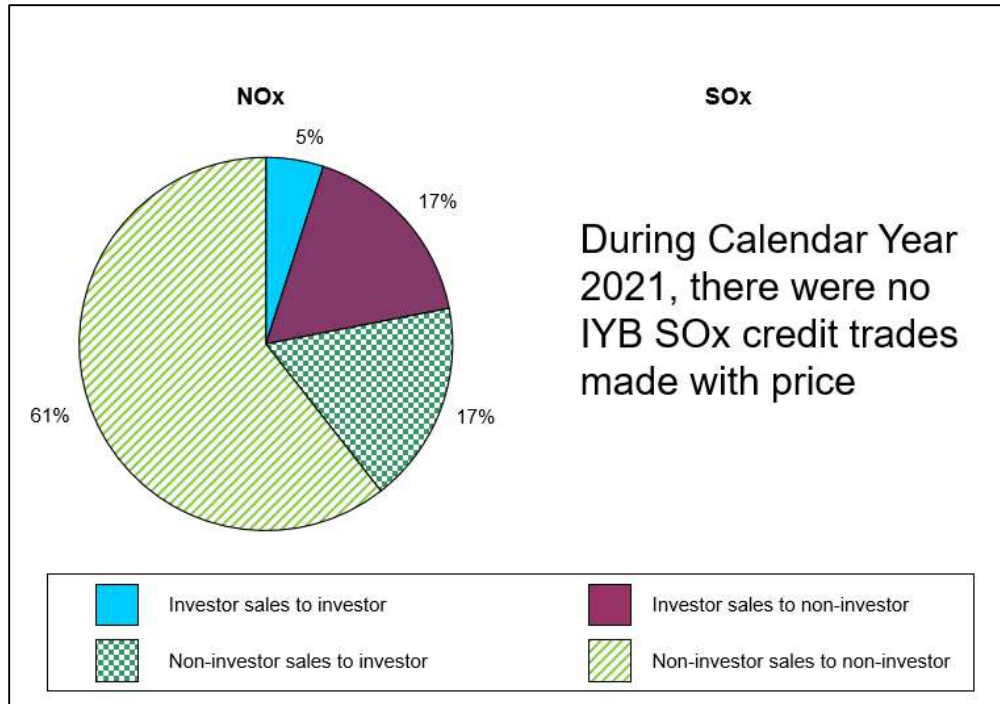


Figure 2-15
Calendar Year 2021 Investor-Involved IYB NOx and SOx Trades Based on Volume Traded with Price



As of the end of calendar year 2021, investors' holding of IYB NOx RTCs went up to 2.0 percent when compared to the end of calendar year 2020 at 1.3 percent. Mutual fund investors are no longer holders of IYB NOx RTCs, down from highs of 3.3 percent at the end of calendar year 2011 and 1.4% at the end of calendar year 2014. Investors' holding of IYB SOx RTCs stayed consistent at 4.2 percent when compared to the end of calendar year 2020. 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. Four NOx only and two NOx/SOx RECLAIM facilities shut down during Compliance Year 2020. The NOx/SOx facility that is listed in Rule 2002 Table 8 sold all of its NOx and SOx IYB RTCs more than five years ago. The other NOx/SOx facility continues to hold 0.4 tons and 0.1 tons of NOx and SOx IYB RTCs, respectively, in its allocation account. One NOx only facility continues to hold 1.1 tons of NOx IYB RTCs. The other three NOx only facilities sold all NOx IYB RTCs prior to shutting down. One sold all NOx IYB RTCs more than ten years ago and had no NOx emissions in the last six years. Another sold 1.9 tons of NOx IYB RTCs three years ago. The last NOx only facility sold 0.6 tons of NOx IYB RTCs just prior to shutting down.

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 percent of their emissions. For Compliance Year 2020, the total RECLAIM NOx emissions were 5,506 tons, while the total NOx RTC allocation was 7,499 tons. This NOx RTC surplus of 1,993 tons (36% of allocation and 27% of emissions) is well above the 10 percent 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 percent until Compliance Year 2022.

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 NOx RTCs held by investors (2.0% at the end of calendar year 2021), their impact on RTC availability and prices can be significant because of their participation in a majority of the trades, which may allow them to be in a strong position to influence prices. Investor's percentage share remain unmoved even as the general price of RTCs begins to climb past the \$15,000 per ton threshold.

CHAPTER 3 EMISSION REDUCTIONS ACHIEVED

Summary

For Compliance Year 2020, aggregate NOx emissions were below total allocations by 27 percent and aggregate SOx emissions were below total allocations by 35 percent. No emissions associated with breakdowns were excluded from reconciliation with facility allocations in Compliance Year 2020. 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 2020. With respect to the Rule 2015 backstop provisions, Compliance Year 2020 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 percent (2,811 tons per year, or 7.7 tons per day) from all RECLAIM facilities by Compliance Year 2011, with the biggest single-year reduction of 11.7 percent in Compliance Year 2007. The 2015 amendments will reduce NOx allocations by 45.2 percent (4,380 tons per year, or 12.0 tons per day) by Compliance Year 2022. The reductions are phased-in from Compliance Year 2016 through Compliance Year 2022 with 6 tons per day of the NOx Allocation reduction occurring through Compliance Year 2020.

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 percent (2,081 tons per year, or 5.7 tons per day) overall reduction, with the reductions phased-in from Compliance Year 2013 through 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 2020. No facility audits for Compliance Years 1994 through 2018 were reopened during the past year, so the aggregate audited NOx and SOx emissions for these years are unchanged from the previous annual report. However, the Compliance Year 2019 audit of one NOx only facility was reopened with a resulting reduction in aggregate Compliance Year 2019 NOx emissions from 6,597 tons down to 6,458 tons. 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 2020 were reduced by 2,195 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 three compliance years. Compliance Year 2020 NOx emissions were more than 1700 tons below this range at 5,506 tons. Compliance Year 2020 NOx emissions were below total allocations by 27 percent.

Table 3-1
Annual NOx Emissions for Compliance Years 1994 through 2020

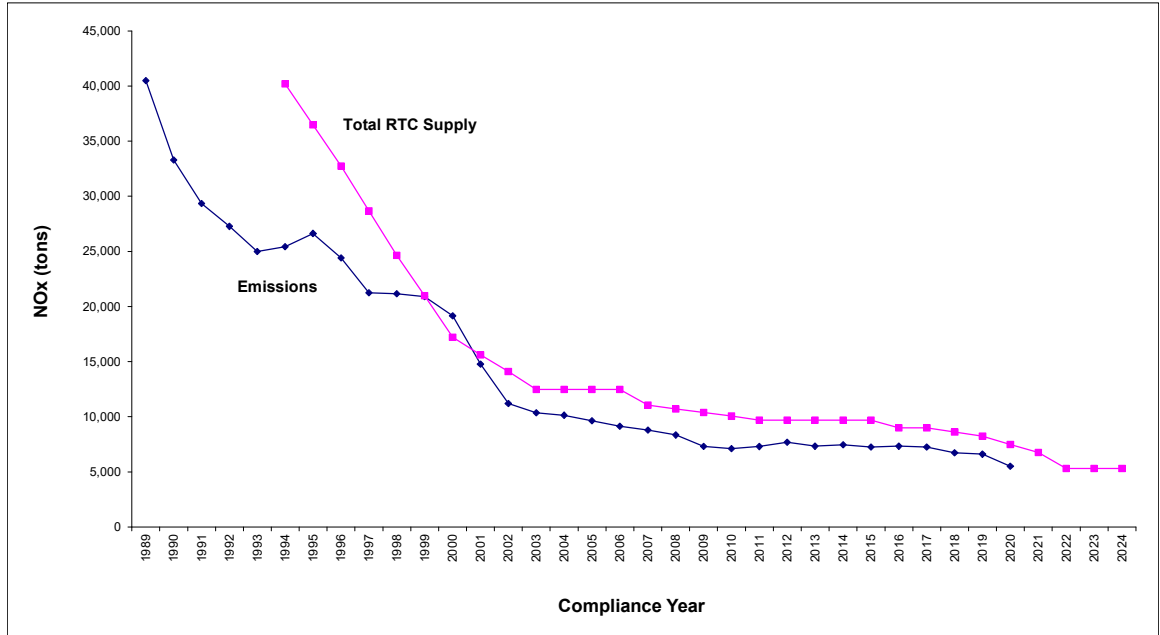
Compliance Year	Audited Annual NOx Emissions ¹ (tons)	Audited Annual NOx Emissions Change from 1994 (%)	Total NOx RTCs ² (tons)	Unused NOx RTCs (tons)	Unused NOx RTCs (%)
1994	25,420	0%	40,187	14,767	37%
1995	26,632	4.8%	36,484	9,852	27%
1996	24,414	-4.0%	32,742	8,328	25%
1997	21,258	-16%	28,657	7,399	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	6,458 ³	-75%	8,243	1,785	22%
2020	5,506	-78%	7,499	1,993	27%

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.

³ Audited annual NOx emissions including revised audited NOx emissions for one reopened audit.

**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 percent. Since then, 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). With the large reduction in SOx allocations between Compliance Years 2013 and 2018, and the relatively flat SOx emissions during the same period, the amount of unused SOx RTCs was reduced to 14 percent for Compliance Year 2018. SOx emissions decreased significantly during Compliance Years 2019 and 2020, with Compliance year 2020 SOx emissions almost 600 tons less than the lowest annual emissions between Compliance Years 2013 through 2018. With this decrease in SOx emissions, the amount of unused RTCs increased to 35 percent. 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.

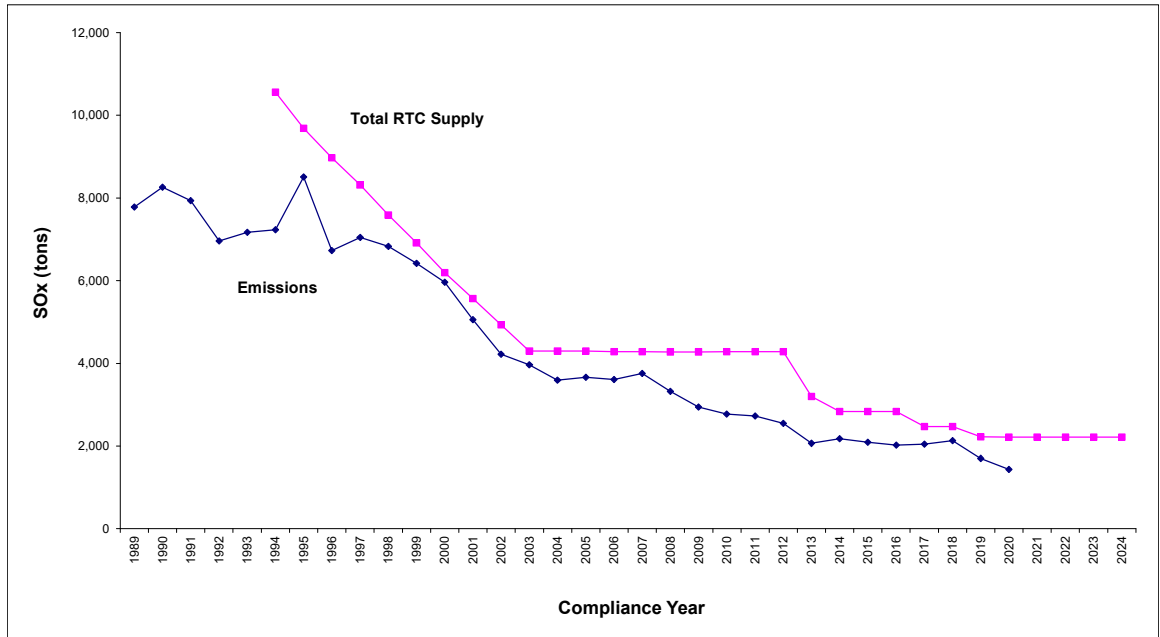
Table 3-2
Annual SOx Emissions for Compliance Years 1994 through 2020

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%
2020	1,436	-80%	2,214	778	35%

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 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 – Applicability 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”).

On December 4, 2020, the Board amended two rules: one rule subsumed by Regulation XIII, Rule 1302 – Definitions, and one rule not subsumed by

¹ See Tables 1 and 2 of Rule 2001.

² Pursuant to both the March 3, 2017 Board adopted resolution during the adoption of the 2016 AQMP, and California State Assembly Bill (AB) 617 approved in July 2017.

RECLAIM, Rule 2000 – General. These amendments were initiated as a response to USEPA’s granting of South Coast AQMD’s request to voluntarily reclassify the Coachella Valley from Severe-15 to Extreme nonattainment for the 1997 8-hour Ozone National Ambient Air Quality Standard (NAAQS), with a new attainment date of June 15, 2024. Due to the granting of the reclassification request on July 10, 2019, both Rule 1302 and Rule 2000 were amended to incorporate revisions required by the federal Clean Air Act to reduce the Major Polluting Facility and federal Major Modifications thresholds for VOC and NO_x, which are ozone precursors. The federal Clean Air Act establishes lower thresholds for a Major Polluting Facility and Major Modification based on the attainment status of the air basin. A facility that is above the Major Polluting Facility and Major Modification thresholds for VOC or NO_x would be subject to certain federal permitting requirements.

Amendments to Rule 1302 lowered the threshold for a Major Polluting Facility from 25 tons per year for a Severe-15 nonattainment area, to 10 tons per year for an Extreme nonattainment area for VOC or NO_x emissions, and lowered the Major Modification threshold from 25 tons per year to 1 pound per day of VOC or NO_x emissions. For Rule 2000, the definition of a Major Modification in the Coachella Valley was changed from 25 tons per year to one pound per day for NO_x or VOC emissions. Other administrative changes were made to Rules 1302 and 2000 to remove outdated rule provisions, correct rule references, and to improve rule clarity. Since amendments to both subsumed Rule 1302 and Rule 2000, which was not subsumed by RECLAIM’s Rule 2001, were administrative changes to definitions subjecting certain facilities to federal permitting requirements and were applied equally to both RECLAIM sources and non-RECLAIM sources, they did not result in any disproportionate impacts.

Additionally, three other rules, not subsumed under RECLAIM Rule 2001, were amended or adopted by the Board during Compliance Year 2020: Rule 1111 – Reduction of NO_x Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces amended September 4, 2020, Rule 1179.1 – Emission Reductions From Combustion Equipment at Publicly Owned Treatment Works Facilities, adopted October 2, 2020, and Rule 1150.3 – Emissions of Oxides of Nitrogen from Combustion Equipment at Landfills, adopted February, 5, 2021.

Amended Rule 1111 provided a 12-month extension, to September 30, 2021, for the mitigation fee alternate compliance option for weatherized furnaces, and the exemption for high altitude condensing and non-condensing furnace installations (furnaces installed at or above elevations of 4,200 feet above sea level). To provide additional compliance options for installations in high altitude areas, amended Rule 1111 allowed installations of dual fuel systems with noncompliant 40 ng/J NO_x furnaces until September 30, 2022. Rule 1111 also required recordkeeping of sales and installations for manufacturers, distributors, and installers of 40 ng/J NO_x furnaces for operation as propane-firing only, and dual fuel systems with noncompliant 40 ng/J NO_x furnaces. Additional labeling and system design requirements were included to ensure proper operation of the dual fuel system with a noncompliant 40 ng/J NO_x furnace by prioritizing heat pump operation and lockout of the switchover temperature settings at the point of manufacture with a required external temperature sensor installed with every system. Finally, modifications were made to the Clean Air Furnace Rebate program to increase funding and consumer rebates.

The last two rules not subsumed but adopted in Compliance Year 2020 were Rules 1179.1 and 1150.3. During the rulemaking process in 2018 for Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional and Commercial Boilers, Steam Generators, and Process Heaters and Rule 1146.1 – Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters, representatives from the Southern California Association of Publicly Owned Treatment Works highlighted topics unique to treating municipal wastewater such as the use of digester gas instead of natural gas in combustion equipment and financial constraints due to public funding, in addition to the fact that publicly owned treatment works (POTWs) provide an essential public service. In response, South Coast AQMD staff recommended that provisions for combustion equipment at POTWs and municipal solid waste (MSW) landfills be separated from existing source-specific rules, and consolidated into separate rules for combustion equipment at POTWs and MSW landfills.

Consequently, adopted Rule 1179.1 established NO_x and CO emission limits for boilers, process heaters, and engines burning digester gas or those units capable of burning digester and natural gas, and VOC emission limits for engines at POTW facilities. Emission limits for these units are the same as those in Rules 1146, 1146.1, and Rule 1110.2 – Emissions from Gaseous - and Liquid-Fueled Engines for engines. Rule 1179.1 also included NO_x and CO emission limits for small boilers and process heaters at or below 2 MMBtu/hour using digester gas, which were previously unregulated. Since turbines at POTWs were exempt from Rule 1134 – Emissions of Oxides of Nitrogen from Stationary Gas Turbines, Rule 1179.1 established NO_x and CO emission limits for turbines burning digester and natural gas, and units capable of burning digester and natural gas. Based on the BARCT analysis, turbines greater than or equal to 0.3 MW are required to meet a NO_x emission limit of 18.8 ppm. Rule 1179.1 also established NO_x and CO emission limits for digester gas and dual fuel turbines that are less than 0.3 MW. Other provisions in Rule 1179.1 included equipment-specific averaging times, startup and shutdown requirements, and monitoring, reporting and recordkeeping requirements.

Adopted Rule 1150.3 established NO_x and CO emission limits for boilers, process heaters, and turbines at MSW landfills and landfill gas to energy facilities, which process landfill gas to generate electricity for sale. Rule 1150.3 consolidated requirements from existing source-specific rules and incorporated new requirements for turbines. Since turbines located at landfills were previously exempt from Rule 1134, Rule 1150.3 filled a regulatory gap by establishing emission limits. Based on a detailed BARCT analysis, Rule 1150.3 required landfill gas-fired boilers and process heaters meet a NO_x emission limit of 9 ppmv and a CO emission limit of 400 ppmv, and landfill gas-fired turbines, rated greater than or equal to 0.3 MW, meet a NO_x emission limit of 12.5 ppmv and a CO emission limit of 130 ppmv. Rule 1150.3 also established a NO_x emission limit of 9 ppmv for landfill gas and dual fuel turbines rated less than 0.3 MW. Other provisions of Rule 1150.3 included equipment-specific averaging times, startup and shutdown requirements, source testing requirements, and monitoring, reporting and recordkeeping requirements.

Since Rules 1111, 1179.1, and 1150.3 were not subsumed under RECLAIM and contained no exemptions from their applicability to RECLAIM NO_x or SO_x

sources, the requirements of these amended or adopted 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 NO_x and SO_x sources under RECLAIM with NO_x and SO_x sources of non-RECLAIM facilities.

Consequently, during Compliance Year 2020, both rules subsumed by RECLAIM, and rules not subsumed by RECLAIM that were recently amended or 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 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 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 NOx 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 NOx-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 final 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 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 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.

Finally, as mentioned in the “Comparison to Command-and-Control Rules” section of this chapter, another programmatic rule, Rule 2000 – General, was amended on December 4, 2020, for the transition in order to ensure consistency with the Clean Air Act and Regulation XIII’s Rule 1302. Revisions to Rule 2000 were incorporated to reduce federal Major Modifications thresholds for VOC and NOx emission in the Coachella Valley from 25 tons per year to one pound per day as required by the federal Clean Air Act.

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 is 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 NOx sources out of RECLAIM. The following 23 Landing Rules were amended or adopted by the Board to facilitate the transition:

- Rule 218 – Continuous Emission Monitoring,
- Rule 218.2 – Continuous Emission Monitoring System: General Provisions,
- Rule 218.3 – Continuous Emission Monitoring System: Performance Specifications,
- Rule 429 – Start-Up and Shutdown Exemption Provisions for Oxides of Nitrogen,
- Rule 429.1 – Start-Up and Shutdown Provisions at Petroleum Refineries and Related Operations,
- Rule 429.2 – Startup and Shutdown Exemption Provisions for Oxides of Nitrogen from Electricity Generating Facilities,

- Rule 1100 – Implementation Schedule for NOx Facilities,
- Rule 1109 – Emissions of Oxides of Nitrogen from Boilers and Process Heaters in Petroleum Refineries (rescinded),
- Rule 1109.1 – Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations,
- 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 1147 – NOx Reductions from Miscellaneous Sources,
- Rule 1147.1 – NOx Reductions from Aggregate Dryers,
- Rule 2000 – General,
- Rule 2001 – Applicability,
- Rule 2002 – Allocations for Oxides of Nitrogen (NOx) and Oxides of Sulfur (SOx), and
- Rule 2005 – New Source Review for RECLAIM.

A summary of each Landing Rule is 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 Rule 218 – CEMS	Revises provisions for continuous emission monitoring systems for non-RECLAIM facilities and facilities exiting RECLAIM. 1. For Rule 218 facilities: <ul style="list-style-type: none"> • Provides a phase-out provision to transition facilities subject to Rules 218, 218.1, and

Rule(s)	Focus Area	Description
	<p><i>Applicability:</i> Equipment that require CEMS at non-RECLAIM facilities</p> <p>Rule 218.2 – CEMS General Provisions</p> <p><i>Applicability:</i> Administrative requirements for CEMS, ACEMS, and SCEMS for owners or operators of a CEMS, ACEMS, or SCEMS at former RECLAIM and non-RECLAIM facilities</p> <p>Rule 218.3 – CEMS Performance Specifications</p> <p><i>Applicability:</i> Performance specifications on certification and quality assurance and quality control programs for owners or operators of a CEMS, ACEMS, or SCEMS at RECLAIM and non-RECLAIM facilities</p>	<p>2012 into the revised provisions for CEMS which are specified in Rules 218.2 and 218.3. <i>(Amended March 5, 2021)</i></p> <p>2. For Rule 218.2 facilities:</p> <ul style="list-style-type: none"> • Provides implementation schedule for transition. • Provides CEMS administrative requirements and revises the provisions retained from Rule 218 with key modifications on the certification process for CEMS modification and the requirements for reporting. • Incorporates a new provision that would require CEMS to be in continuous operation, except during the defined CEMS maintenance and repair period, and allow CEMS to be shut down when the unit (emission source) goes offline for at least one week. <i>(Adopted March 5, 2021)</i> <p>3. For Rule 218.3 facilities:</p> <ul style="list-style-type: none"> • Provides implementation schedule for transition. • Provides CEMS performance specifications and revises the provisions retained from Rule 218.1 with key modifications on <ul style="list-style-type: none"> ➢ span range, ➢ data acquisition and handling system, ➢ relative accuracy test audit, ➢ and calibration gas requirements. • Incorporates a new provision to provide specifications on <ul style="list-style-type: none"> ➢ the data handling method for data measured below 10 percent or above 95 percent of the upper span value, ➢ emission data averaging method, ➢ CEMS data availability requirements, and, ➢ CEMS out-of-control period and alternative data acquisition. <i>(Adopted March 5, 2021)</i> <p><i>[Estimated emission reductions: 0 tons of NOx per day.]</i></p>
<p>429, 429.1 and 429.2</p>	<p>Start-up and Shutdown Provisions of Oxides of Nitrogen from:</p> <p>Rule 429 - Start-Up and Shutdown Exemption Provisions for Oxides of Nitrogen</p>	<p>Revises NOx emission provisions for start-up and shutdown events.</p> <p>Proposed amendments to Rule 429 will update startup and shutdown provisions for a variety of combustion equipment regulated under source-specific rules <i>(In Progress – 2nd Qtr. 2022)</i></p>

Rule(s)	Focus Area	Description
		<ul style="list-style-type: none"> • Establishes reporting and recordkeeping practices. • Establishes exemptions for electric generating units subject to the State Water Resources Control Board’s Once-Through-Cooling Policy (OTC Policy) from startup and shutdown duration limits, limits to number of scheduled startups, and installation of a temperature measuring device until December 31, 2029. <i>(Adopted January 7, 2022)</i> <i>[Estimated emission reductions: 0 tons of NOx per day.]</i>
1100	<p>Implementation Schedule for NOx Facilities</p> <p><i>Applicability:</i> Equipment specified in Rules 1146, 1146.1, and 1110.2</p>	<p>Establishes implementation schedule for RECLAIM and prior RECLAIM sources to meet applicable provisions of Landing Rules:</p> <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> <p>This rule will be amended as necessary as a companion rule to a Landing Rule as it is amended or adopted.</p>
1109 <i>(rescinded)</i> and 1109.1	<p>Refinery and Related Industries Equipment</p> <p><i>Applicability:</i> Boilers and process heaters emitting NOx at refineries.</p> <p>1109.1 – Petroleum Refineries and Related Operations</p> <p><i>Applicability:</i> Equipment emitting NOx at refineries and related operations (<i>i.e.</i>,</p>	<p>Establishes NOx emission limits to reflect BARCT for equipment located at a refinery.</p> <ol style="list-style-type: none"> 1. For Rule 1109 facilities: <ul style="list-style-type: none"> • Rule 1109 rescinded upon adoption of Rule 1109.1. <i>(Rule rescinded November 5, 2021)</i> 1. For Rule 1109.1 facilities: <ul style="list-style-type: none"> • Includes two alternative compliance plans to achieve the BARCT NOx concentration limits in Table 1 and Table 2 (B-Plan and B-Cap) of Rule 1109.1, and an alternative implementation schedule plan (I-Plan). The

Rule(s)	Focus Area	Description
	asphalt plants, biofuel plants, hydrogen production plants, facilities that operate petroleum coke calciners, sulfuric acid plants, and sulfur recovery plants at petroleum refineries)	B-Plan, B-Cap, and I-Plan provide compliance flexibility while achieving the same NOx reductions that would occur if an operator were to directly meet the NOx limits in Table 1 and Table 2 of Rule 1109.1. <ul style="list-style-type: none"> • Includes provisions for using alternative compliance plans, the approval process, and when an approved plan must be modified. • Includes interim NOx limits for units that would apply after the facility transitions out of RECLAIM and until the unit is in full compliance with Rule 1109.1 to ensure no backsliding of emissions per the federal Clean Air Act Section 110(l). • includes monitoring, recordkeeping, and reporting requirements and exemptions for low-use units and other units that are exempt from the rule. <p style="text-align: right;"><i>(Adopted November 5, 2021)</i></p> <p><i>[Estimated emission reductions: 7.7 to 7.9 tons of NOx per day.]</i></p>
1110.2	Emissions from Gaseous - and Liquid-Fueled Engines <i>Applicability:</i> All stationary and portable engines over 50 rated brake horsepower	<ol style="list-style-type: none"> 1. Maintains existing BARCT levels for NOx, 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 NOx per day.]</i></p>
1117	Emissions from Container Glass Melting and Sodium Silicate Furnaces	<ol style="list-style-type: none"> 1. Updates NOx and SOx emission limits to reflect current BARCT for container glass melting and sodium silicate furnaces:

Rule(s)	Focus Area	Description
	<p><i>Applicability:</i> Container glass melting and sodium silicate furnaces</p>	<ul style="list-style-type: none"> • 0.75 lb. of NOx per ton of glass pulled on a rolling 30-day average for container glass melting furnaces, • 0.50 lb. of NOx per ton of product pulled on a rolling 30-day average for sodium silicate furnaces, as well as • 1.1 lbs. of SOx per ton of material pulled on a rolling 30-day average for both container glass melting and sodium silicate furnaces. <ol style="list-style-type: none"> 2. Revises monitoring, reporting, and recordkeeping requirements. 3. Includes provisions to reduce emissions for idling, startup, and shutdown of furnaces. 4. Includes NOx emission limits for auxiliary combustion equipment associated with container glass melting operations: <ul style="list-style-type: none"> • 30 ppmvd NOx 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 NOx per day, and 0 tons of SOx per day (since the rule does not impose a more stringent SOx limit than is already required to be achieved).]</i></p>
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

Rule(s)	Focus Area	Description
		<p>system is installed and the turbine operates less than one thousand hours per year.</p> <ol style="list-style-type: none"> 3. Revises monitoring, reporting, and recordkeeping requirements. 4. Provides exemptions for units that are shown to be not cost effective for retrofit or replacement such as: <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>
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> <ol style="list-style-type: none"> 1. Removes ammonia emission limits, 2. Removes startup and shutdown provisions addressed in Rule 429.2. 3. For engines at Santa Catalina Island: <ul style="list-style-type: none"> • Removes option allowing replacement of existing diesel engines on Santa Catalina Island with new diesel engines and establishes a two-step process to reduce NOx emissions from all electric generating units on the island as follows: <ul style="list-style-type: none"> ➤ meet an initial NOx emission cap of 50 tons per year in 2024, then lower the cap to 45 tons per year in 2025 (Represents replacing two or three diesel engines with Tier 4 Final engines); and ➤ meet a final NOx emission cap of 13 tons per year beginning in 2026.

Rule(s)	Focus Area	Description
		<ul style="list-style-type: none"> • Requires new diesel engines to meet the BARCT emissions limits in Table 2. • Revises the NOx concentration averaging period for new diesel engines from one hour to three hours. • Prohibits installation of any new diesel engines on Santa Catalina Island on and after January 1, 2024. <p>4. Adds Rule 218.2 monitoring, recordkeeping and reporting provisions.</p> <p>5. Allows backup units until July 1, 2026, to source test in lieu of complying with Rules 218.2 and 218.3.</p> <p>6. Allows a sunset date of December 31, 2029, for electric generating units subject to the State Water Resources Control Board’s Once-Through-Cooling Policy to be exempt from Rule 1135 emission limits.</p> <p style="text-align: right;"><i>(Amended January 7, 2022)</i></p> <p><i>[Estimated emission reductions: 0 tons of NOx per day.]</i></p>
<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>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>

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Rule(s)	Focus Area	Description
	<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 Btu/hr and less than or equal to 2 MMBtu/hr</p>	
1147	<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 at non-RECLAIM, RECLAIM, and former RECLAIM facilities</p>	<ol style="list-style-type: none"> 1. Moves NOx emissions associated with aggregate dryers to Rules 1147.1, and NOx emissions associated with metal melting and heating furnaces to Rule 1147.2. 2. Establishes NOx emission limits to reflect current BARCT. <p style="text-align: right;"><i>(In Progress – 2nd Qtr. 2022)</i></p>
1147.1	<p>NOx Reductions from Aggregate Dryers</p> <p><i>Applicability:</i> Owners or operators of gaseous fuel-fired aggregate dryers with NOx emissions ≥ 1 lb. per day with rated heat input greater than 2MMBtu/hr at non-RECLAIM, RECLAIM, and former RECLAIM facilities</p>	<ol style="list-style-type: none"> 1. Establishes NOx emission limit of 30 ppm and CO emission limit of 1,000 ppm for gaseous fuel fired aggregate dryers and specifies implementation timeframes. 2. Establishes interim NOx emission limits of: <ul style="list-style-type: none"> • 40 ppm for non-RECLAIM facilities, and • 102 ppm for former RECLAIM facilities. 3. Provides periodic source testing based on equipment size: <ul style="list-style-type: none"> • < 10 MMBtu/hr – every 5 calendar years, • < 40 and ≥ 10 MMBtu/hr– every 3 calendar years, and • ≥ 40 MMBtu/hr – every calendar year. 4. Allows for aggregate dryers rated ≥ 40 MMBtu/hr that have not operated for at least 6 consecutive months to conduct a source test no later than 90 days after date of resumed operation. 5. Requires aggregate dryers at a non-RECLAIM or former RECLAIM facilities with an existing CEMS or equivalent to retain the system and comply with the requirements of Rules 218.2 and 218.3. 6. Provides exemption for tunnel dryers subject to Rule 1147. <p style="text-align: right;"><i>(Adopted August 6, 2021)</i></p> <p><i>[Estimated emission reductions: 0.04 tons of NOx per day.]</i></p>
1147.2	<p>NOx Reductions from Metal Melting and Heating Furnaces</p>	<p>Moves metal melting, metal heat treating, metal heating, and metal forging furnace operations from Rule 1147 to Rule 1147.2 to establish NOx emission limits to reflect current BARCT.</p>

ANNUAL RECLAIM AUDIT

Rule(s)	Focus Area	Description
	<i>Applicability:</i> Metal melting, metal heat treating, metal heating, and metal forging furnaces	<i>(In Progress – 2nd Qtr. 2022)</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>(In Progress – 3rd Qtr. 2022)</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. 2022)</i>
2000	Definitions governing the RECLAIM program <i>Applicability:</i> Definition of terms found in Regulation XX - RECLAIM	1. For all RECLAIM sources: <ul style="list-style-type: none"> Reclassifies the definition of a Major Modification for VOC or NOx emissions in the Coachella Valley by changing the threshold for NOx or VOC emissions from 25 tons per year to one pound per day to ensure consistency with Reg. XIII’s Rule 1302 and the requirements of the Clean Air Act. <i>(Amended December 4, 2020)</i>
2001	Applicability of RECLAIM criteria to new and existing facilities <i>Applicability:</i> Establishes criteria for inclusion into RECLAIM and identifies provisions in current rules that do not apply to facilities operating under the RECLAIM program	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>
2002	Allocations for Oxides of Nitrogen (NOx) and Oxides of Sulfur (SOx) <i>Applicability:</i> Facilities operating under the RECLAIM program	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. <i>(Amended January 5, 2018)</i> 1. Provides option for facilities that received an initial determination notification to stay in RECLAIM for a limited time.

Rule(s)	Focus Area	Description
		<p>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> <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>	<p>Allows for New Source Review provisions to address facilities that are transitioning from RECLAIM to command-and-control. Amendments to Regulation XIII may be needed to address New Source Review provisions for facilities that transition out of RECLAIM.</p> <p>1. Allows a RECLAIM facility replacing existing basic equipment that is combined with the installation or modification of air pollution control equipment to:</p> <ul style="list-style-type: none"> • Comply with a command-and-control NOx emission limit for a Regulation XI rule (Rule 1109.1), • Apply the BACT requirement for a SOx emission increase under Rule 1303 – Requirements, instead of BACT under Rule 2005, and • Use the limited BACT exemption in Rule 1304 subdivision (f). <p style="text-align: right;"><i>(Amended November 5, 2021)</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 2022. 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 2020, no additional RTCs are required to offset breakdown emissions pursuant to Rule 2015(d)(3).

**Table 3-4
Breakdown Emission Comparison for Compliance Year 2020**

Pollutant	Compliance Year 2020 Unused RTCs (tons)	Unmitigated Breakdown Emissions¹ (tons)	Remaining Compliance Year 2020 RTCs (tons)
NOx	1,993	0	1,993
SOx	778	0	778

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 RTCs³. 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 activities⁴. However, the 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 2020, no facilities were included or excluded from the NOx or SOx universes, and six facilities (four NOx only facilities and two NOx and SOx facilities) shut down. Compliance Year 2020 NOx and SOx audited emissions and initial Compliance Year 2020 allocations for facilities that were shut down during Compliance Year 2020 are summarized in Tables 3-5 and 3-6.

**Table 3-5
NOx Emissions Impact from the Changes in Universe (Tons)**

Category	Compliance Year 2020 NOx Emissions (tons)	Initial Compliance Year 2020 NOx Allocations (tons)
Shutdown Facilities	2.2	4.2
Excluded Facilities	Not applicable	Not applicable
RECLAIM Universe	5,506	7,499

**Table 3-6
SOx Emissions Impact from the Changes in Universe (Tons)**

Category	Compliance Year 2020 SOx Emissions (tons)	Initial Compliance Year 2020 SOx Allocations (tons)
Shutdown Facilities	0.3	1.5
Excluded Facilities	Not applicable	Not applicable
RECLAIM Universe	1,436	2,214

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 2020 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 2020.

³ 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).

⁴ 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 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 2020, 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 2020, RECLAIM demonstrated federal equivalency with a programmatic NO_x offset ratio of 365-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 2020. 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.*, NO_x 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, SO_x is a precursor to PM_{2.5}. The Basin is in Serious Non-attainment with the 2006 Federal 24-hour average 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 SO_x 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 SO_x and state NNI requirements for both SO_x and NO_x. 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. The

¹ Federal NSR applies to federal major sources (sources with the potential to emit at least 10 tons of NO_x or 70 tons of SO_x per year for the South Coast Air Basin) and state NNI requirements apply to all NO_x sources and to SO_x 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 NO_x or SO_x emissions, some RECLAIM facilities have actual emissions much less than 4 tons per year).

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 NO_x on an aggregate basis as explained earlier. This annual program audit report assesses NSR permitting activities for Compliance Year 2020 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 2020 shows that RECLAIM facilities were able to expand and modify their operations while complying with NSR requirements. During Compliance Year 2020, a total of three NO_x RECLAIM facilities (one in Cycle 1 and two in Cycle 2) were issued permits to operate, which resulted in a total of 5.475 tons per year of NO_x emission increases from starting operations of new or modified sources. There were no SO_x 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 (NO_x: 1,993 tons, SO_x: 778 tons; see Chapter 3) in the RECLAIM universe available for use to offset emission increases at the appropriate offset ratios.

NSR Compliance Demonstration

RECLAIM is designed to programmatically comply with the federal NSR offset requirements. Meeting the NSR requirement (offset ratio of 1.2-to-1 for NO_x and at least 1-to-1 for SO_x) 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 paragraph under the title "NSR Activity", permits to operate issued to three RECLAIM facilities resulted in 5.475 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 2020), 1,993 tons of Compliance Year 2020 NOx RTCs remained unused. Therefore, the Compliance Year 2020 NOx programmatic offset ratio calculated from this methodology is 365-to-1 as shown below:

$$\begin{aligned} \text{NOx Offset Ratio} &= \left(1 + \frac{1,993 \text{ tons}}{5.475 \text{ tons}} \right)\text{-to-1} \\ &= 365\text{-to-1} \end{aligned}$$

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 365-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 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 identified in Table 3-2 (Annual SOx Emissions for Compliance Years 1994 through 2020), there were 778 tons of excess (unused) SOx RTCs for Compliance Year 2020. 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 2020 shows that RECLAIM complies with both state NNI and federal NSR requirements. South Coast AQMD staff will continue to monitor NSR activity under RECLAIM 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 2020, one RECLAIM facility was subject to the 40-ton modeling requirement 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).

The one facility had initial NOx allocations in 1994 and exceeded their initial allocations by more than 40 tons in Compliance Year 2020. The facility submitted modeling that demonstrated that NOx emissions from their major sources during 2020 will not cause an exceedance of any state or federal NO₂ AAQS.

CHAPTER 5 COMPLIANCE

Summary

Based on South Coast AQMD Compliance Year 2020 audit results, 242 of the 259 (93%) NO_x RECLAIM facilities complied with their NO_x allocations, and 31 of the 31 SO_x facilities (100%) complied with their SO_x allocations based on South Coast AQMD audit results. So, 17 facilities exceeded their allocations (17 facilities exceeded their NO_x allocations, and no facility exceeded its SO_x allocation). The 17 facilities that exceeded their NO_x allocations had aggregate NO_x emissions of 64.3 tons and did not have adequate allocations to offset 16.3 tons (or 25.3%) of their combined emissions. The NO_x exceedance amounts are relatively small compared to the overall NO_x allocations for Compliance Year 2020 (0.22% of total NO_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 2020 (i.e., aggregate emissions for all RECLAIM facilities were well below aggregate allocations). Pursuant to Rule 2010(b)(1)(A), all affected facilities had their respective exceedances deducted from their annual allocations for the compliance year subsequent to the date of South Coast AQMD determination that the facilities exceeded their Compliance Year 2020 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 2020, 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 2020, 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 17 RECLAIM facilities failed to reconcile their emissions (17 facilities that exceeded their NO_x Allocations and no facility that exceeded its SO_x allocations). Eleven of these 17 facilities failed to acquire adequate RTCs to offset their reported emissions. The remaining six facilities exceeded allocations based on their audited emissions. The list of facilities that failed to reconcile their emissions during Compliance Year 2020 is provided in Appendix D.

Based on audit findings, 11 facilities were found to have under-reported their NO_x emissions and didn't hold sufficient NO_x RTCs to reconcile their audited emissions. Among the 11 facilities found to have under-reported their emissions, the reasons for the under-reporting include one or more of the following causes:

- data entry error,
- use of incorrect emission factor, brake horsepower (BHP), or operating time in emission calculation,
- failed to report emissions for all NO_x sources, and
- failed to properly apply missing data procedures.

Overall, the Compliance Year 2020 allocation compliance rates for facilities are 93 percent (242 out of 259 facilities) for NO_x RECLAIM and 100 percent (31 out of 31 facilities) for SO_x RECLAIM¹. For purposes of comparison, the allocation compliance rates for Compliance Year 2019 were 95 percent and 97 percent for NO_x and SO_x RECLAIM facilities, respectively. In Compliance Year 2020, the 17 facilities that had NO_x emissions in excess of their individual NO_x allocations had 64.3 tons of NO_x emissions and didn't have adequate RTCs to cover 16.3 tons of those tons (or 25.3% of their total emissions). The NO_x exceedance amounts are relatively small compared to the overall allocations for Compliance Year 2020 (0.22% of aggregate NO_x allocations). Pursuant to Rule 2010(b)(1)(A), all affected facilities had their NO_x Allocation exceedance deducted from their annual emissions allocations for the compliance year subsequent to South Coast AQMD's determination that the facilities exceeded their Compliance Year 2020 allocations.

¹ Compliance rates for both NO_x and SO_x are based on 259 NO_x and 31 SO_x completed audits, respectively.

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, 89 NO_x facilities and 15 SO_x facilities used MDP in reporting portions of their annual emissions during Compliance Year 2020. In terms of mass emissions, 3.3 percent of the total reported NO_x emissions and 6.6 percent of the total reported SO_x emissions in the APEP reports were calculated using MDP for Compliance Year 2020. 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)
2020	3.3% (89 ; 184)	6.6% (15 ; 93)

* 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, 89 facilities reported NOx emissions using MDP in Compliance Year 2020. Even though the number of facilities is higher than in 1995, the percentage of emissions reported using MDP during Compliance Year 2020 is much lower than it was in 1995 (3% compared to 23%). Additionally, in

terms of quantity, NO_x emissions determined by the use of MDP in Compliance Year 2020 were about 3 percent of those in Compliance Year 1995 (184 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 3 percent of reported NO_x annual emissions were calculated using MDP in Compliance Year 2020. 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 3 percent 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 2020, a significant portion of NO_x MDP emissions data (74%) and of SO_x MDP emissions data (95%) 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 2020, even though the number of major sources monitored by either CEMS or ACEMS represent 18 percent and 66 percent of all permitted RECLAIM NOx and SOx sources, respectively, reported emissions revealed that 78 percent of all RECLAIM NOx emissions and 97 percent 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 percent 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 ±20 percent for pollutant concentration, ±15 percent for stack flow rate, and ±20 percent 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 2020 and 2021 calendar years’ passing rates, respectively, for submitted RATAs of certified CEMS for NOx and SOx concentration, total sulfur in fuel gas concentrations, stack flow rate (in-stack monitors and F-factor based calculations), and NOx and SOx mass emissions. However, the tables do not include SOx mass emissions calculated from total sulfur analyzer systems because such systems serve numerous devices, and therefore are not suitable for mass emissions-based RATA testing. As noted in the footnotes for each table, the calendar year 2020 and 2021 passing rates are calculated from RATA data submitted before January 10, 2021 and January 14, 2022, 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 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 rates 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.

**Table 5-4
Passing Rates Based on RATAs of Certified CEMS in 2021¹**

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
462	100	139	100	20	100	42	100	471	100	439	100	136	100

¹ The calculation of passing includes all RATAs submitted by January 14, 2022.

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 percent. 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 2021, 98 percent 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 determining 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 2020 employment survey data gathered from APEP reports, RECLAIM facilities reported a net loss of 3,687 jobs, representing 4.04 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 job losses at Cycle 1 facilities. No RECLAIM facility cited RECLAIM as a factor contributing to the addition of any jobs during Compliance Year 2020. No facility reported job losses due to RECLAIM, during Compliance Year 2020.

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 2020 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 2020 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 2020.

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 2020 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 2020 APEP reports and follow-up contacts with facilities. A total of 118 facilities reported 5,559 job gains, while 144 facilities reported a total of 9,246 job losses. Net job losses were reported in all of the three categories: manufacturing (971), sales of products (27), and non-manufacturing (2,689). Table 6-1 shows a total net loss of 3,687 jobs, which represents a net decrease of 4.04 percent at RECLAIM facilities during Compliance Year 2020. A comparison of reported job impacts between Cycle 1 and Cycle 2 facilities during Compliance Year 2020 shows that Cycle 1 facilities (January 1, 2020 – December 31, 2020) reported an overall job loss of 7.96 percent while Cycle 2 facilities (July 1, 2020 – June 30, 2021) reported an overall job loss of 0.48 percent. This trend coincides with the novel coronavirus (COVID-19) global pandemic and its widely reported impact on employment as the reason for Cycle 1 job losses being greater than Cycle 2 losses. This trend in employment numbers is also suggested in the 2020 - 2021 employment data for the State of California.¹

Table 6-1
Job Impacts at RECLAIM Facilities for Compliance Year 2020

Description	Manufacture	Sales of Products	Non-Manufacture	Total*
Initial Jobs	37,928	483	52,951	91,362
Overall Job Gain	2,509	58	2,992	5,559
Overall Job Loss	3,480	85	5,681	9,246
Final Jobs	36,957	456	50,262	87,675
Net Job Change	-971	-27	-2,689	-3,687
Percent (%) Job Change	-2.56%	-5.59%	-5.08%	-4.04%
Facilities Reporting Job Gains	77	19	72	118
Facilities Reporting Job Losses	110	27	81	144

* 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 four of the six RECLAIM facilities that ceased operations in Compliance Year 2020, as listed in Appendix C, are included in Table 6-1. All six facilities that ceased operations cited economic reasons for their closures. Two of the facilities were replaced with real estate redevelopments, and three facilities cited financial concerns as their reasons for shutting down: one stated the cost of manufacturing was too high, one cited a declining demand for products, and one cited the depletion of raw materials. The last facility cited COVID-19 driven mandates as their reason for shutting down. According to their APEP reports, the shutdown of these six facilities led to a total loss of 137 jobs (129 manufacturing jobs, 0 sales jobs, and 8 non-manufacturing jobs).

¹ The 2020 California employment data is available from the State of California Employment Development Department's website at: <https://www.labormarketinfo.edd.ca.gov/geography/lmi-by-geography.html>.

No RECLAIM facilities attributed job gains or losses to RECLAIM for Compliance Year 2020.

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 2020 NOx and SOx emissions decreased 15 percent and 16 percent, respectively, relative to Compliance Year 2019. Quarterly calendar year 2020 NOx emissions fluctuated within twelve percent of the mean NOx emissions for the year. Quarterly calendar year 2020 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 percent 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 2021, 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.

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

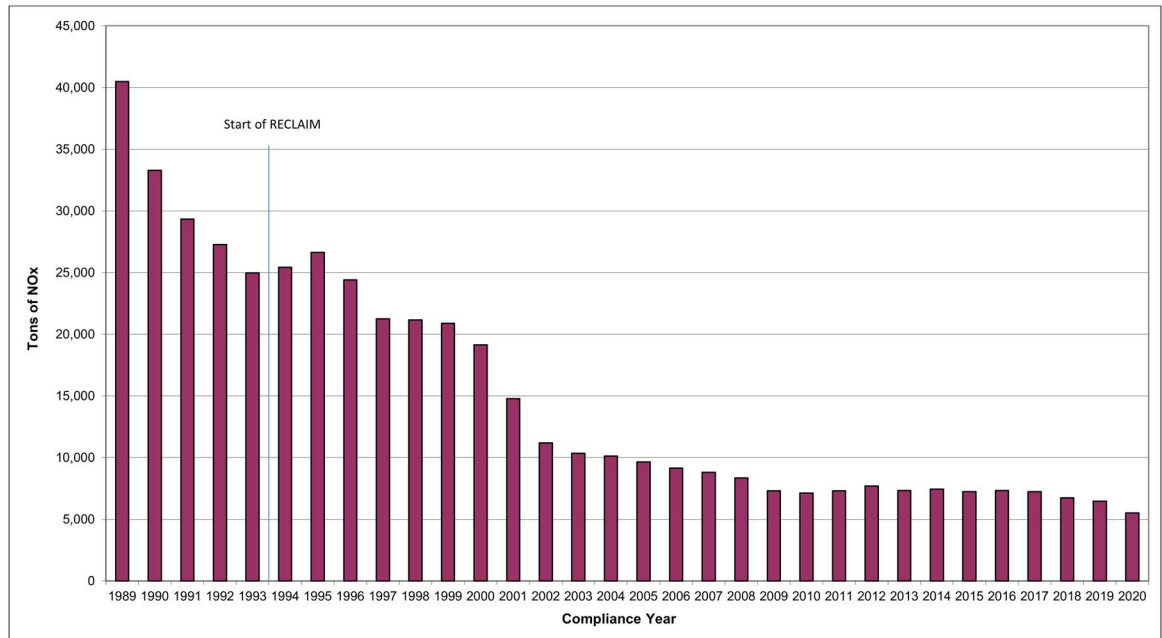
Coast AQMD's website¹, and include all the quarterly emissions maps presented in previous annual program audit reports. This chapter addresses:

- 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.

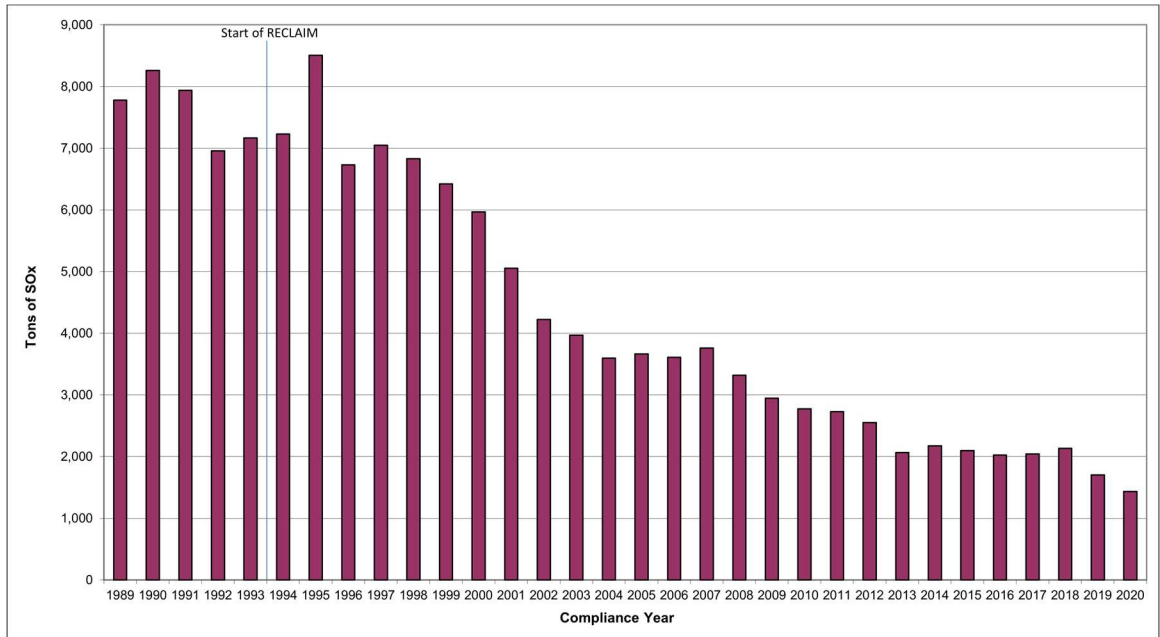
Figure 7-1
NOx Emission Trend for RECLAIM Sources



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 2018 fluctuated within a narrow range; all are within 7 percent of their average of 7,272 tons per year. The NOx emissions for Compliance Year 2019 were at a low of 6,458 tons per year, representing a 4 percent decrease from Compliance Year 2018. NOx emissions for Compliance Year 2020 fell even further to a record low of 5,506 tons per year, a further 15 percent reduction from Compliance Year 2019. 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 2020 saw a large drop to a record low 1,436 tons per year, a 16 percent reduction compared to 1,701 tons per year in Compliance Year 2019. From 2013 to 2018, SOx emissions had been fluctuating within a narrow range (2,024 – 2,176 tons per year or $\leq \pm 4$ percent 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 2020 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 2020 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 2020 mean quarterly NOx emission level, which is the average of the aggregate audited emissions for each of the four quarters, and the 2020 audited quarterly emissions. Figure 7-4 compares the 2020 quarterly NOx emissions with the quarterly emissions from 2009 through 2019. During calendar year 2020, quarterly NOx emissions varied from eight percent below the mean in the second quarter (April through June) to about twelve percent above the mean in the first quarter (January through March). Figure 7-4 shows that the calendar year 2020 quarterly emissions profile is roughly consistent with previous years under RECLAIM, albeit with reduced NOx emissions. Emissions from NOx Major Sources, which accounts for more than 90 percent of all RECLAIM NOx emissions, dropped considerably during the second through fourth quarters of 2020, relative not only to the first quarter of 2020 but also relative to calendar year 2019, coincident with the COVID-19 global pandemic. Figures 7-3 and 7-4, along with the qualitative analysis performed above show that in calendar year 2020 there has not been a significant shift in NOx emissions from the winter months to the summer months.

Figure 7-3
Calendar Year 2020 NOx Quarterly Emissions

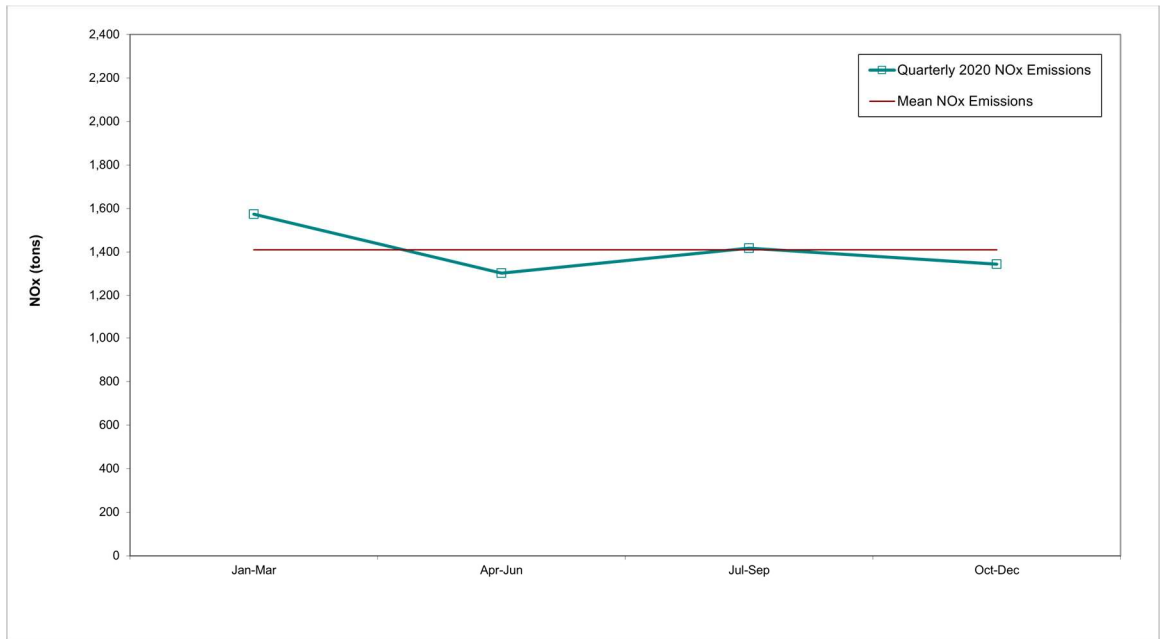
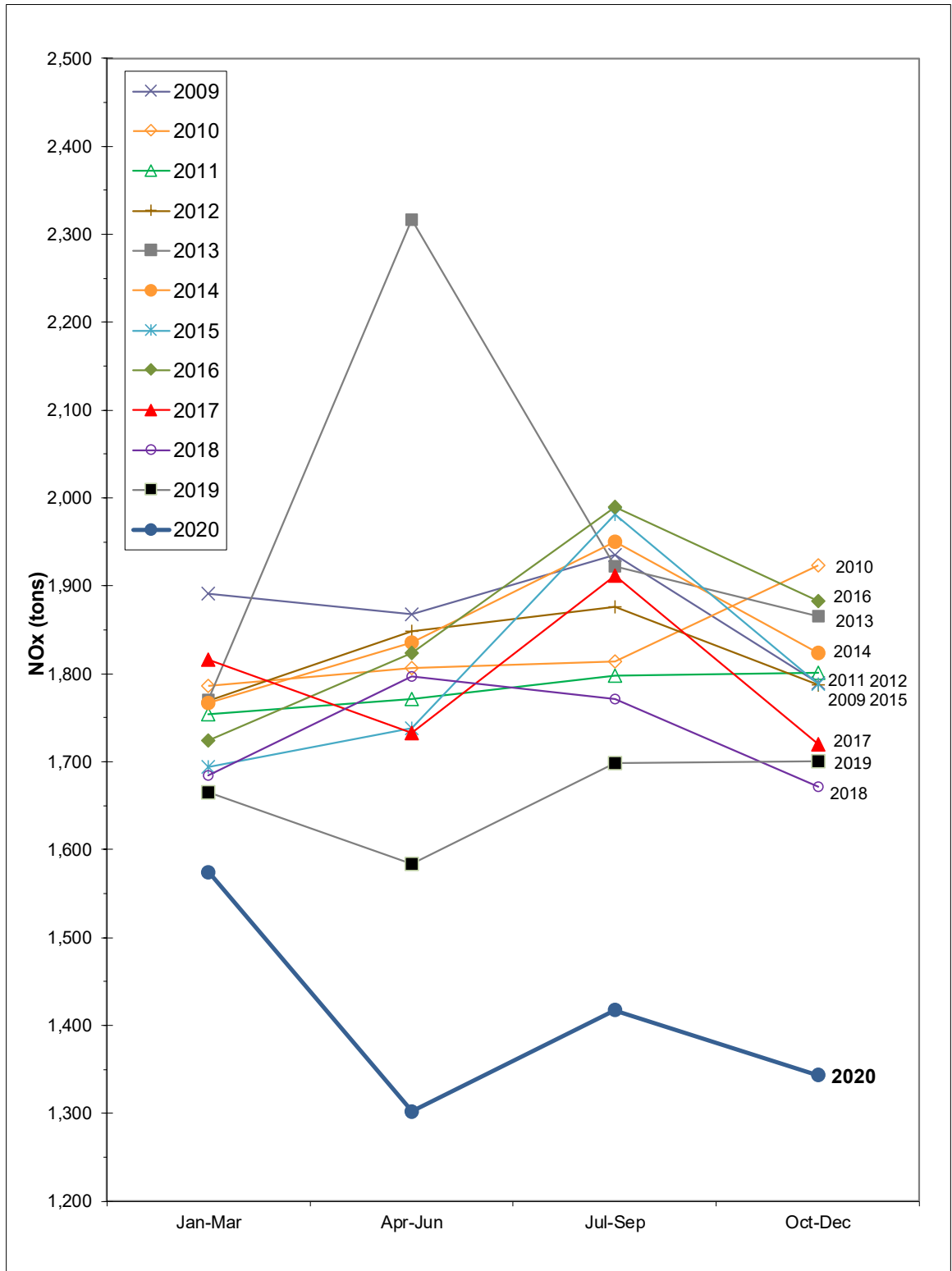


Figure 7-4
Quarterly NOx Emissions from Calendar Years 2009 through 2020



Similar to Figure 7-3 and 7-4 for NOx quarterly emissions, Figure 7-5 presents the 2020 mean quarterly SOx emissions and the 2020 audited quarterly emissions, while Figure 7-6 compares the 2020 quarterly SOx emissions with the quarterly emissions from 2009 through 2019. Figure 7-5 shows that quarterly SOx emissions during calendar year 2020 varied from fifteen percent below the mean in the second quarter (April through June) to about fourteen percent above the mean in the third quarter (July through September). Figure 7-6 shows that the calendar year 2020 quarterly emissions profile is roughly consistent with previous years under RECLAIM. Both Figures 7-5 and 7-6, along with the qualitative analysis performed above, show that in calendar year 2020 there was not a significant shift in SOx emissions from the winter months to the summer months.

Figure 7-5
Calendar Year 2020 SOx Quarterly Emissions

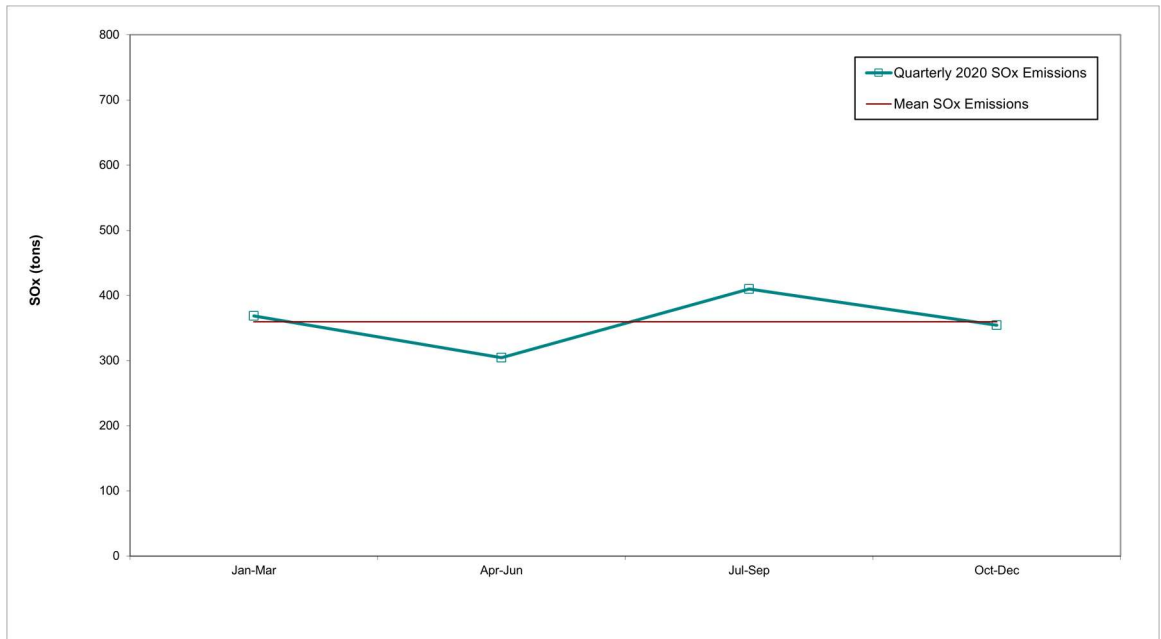
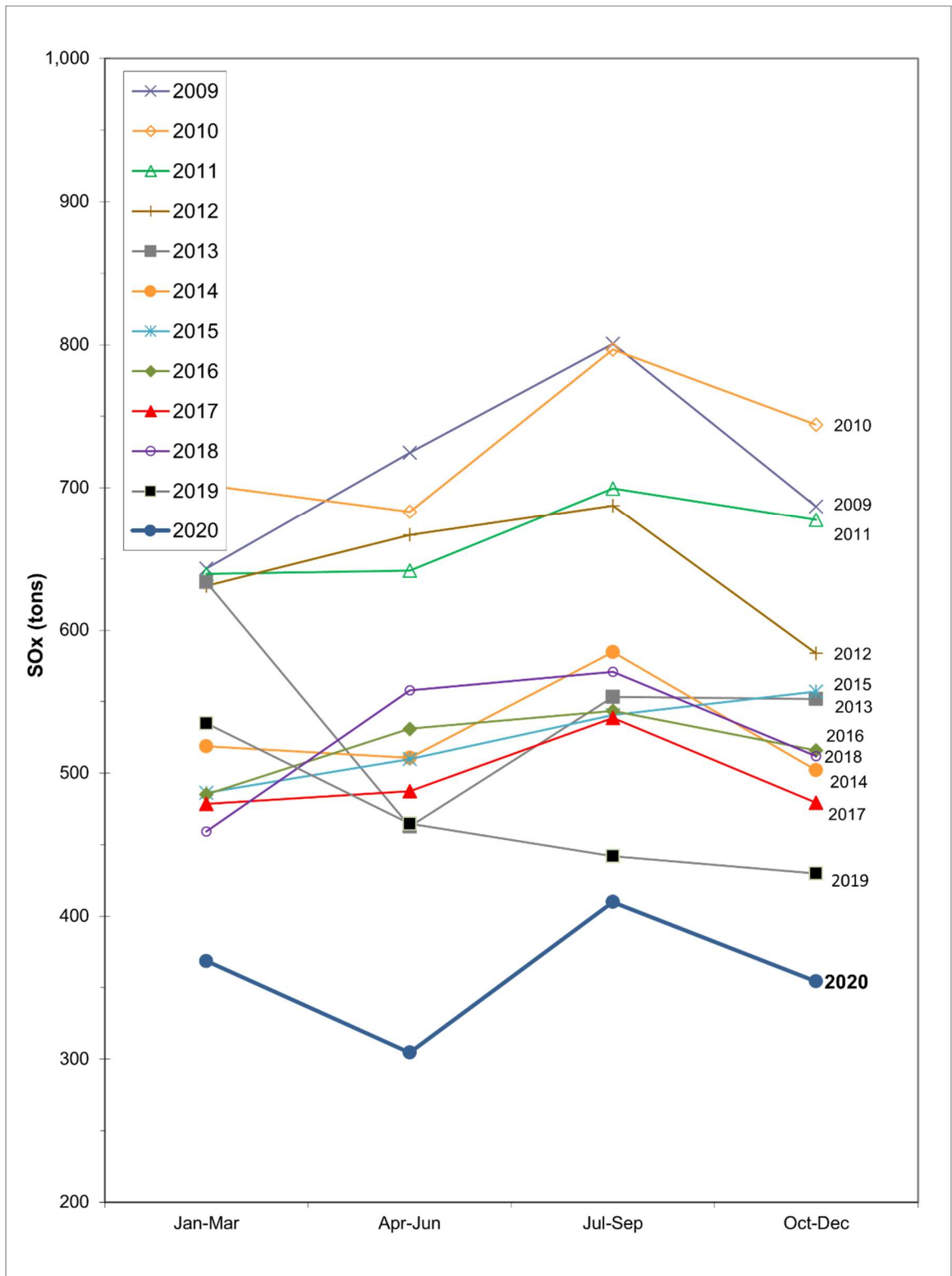


Figure 7-6
Quarterly SOx Emissions from Calendar Years 2009 through 2020



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 130 days and 135 days, respectively, in 2021. 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 2021 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 2021 decreased when compared to 2020.

Table 7-1
Summary of Ozone Data³

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	120	154	128	N/A	0.19	0.144
2002	116	147	132	N/A	0.169	0.144
2003	125	153	133	N/A	0.194	0.153
2004	105	152	114	N/A	0.163	0.145
2005	99	138	116	N/A	0.182	0.145
2006	102	130	114	N/A	0.175	0.142
2007	96	127	108	N/A	0.171	0.137
2008	102	140	119	N/A	0.176	0.131
2009	102	131	113	N/A	0.176	0.128
2010	79	124	102	N/A	0.143	0.123
2011	90	125	106	N/A	0.160	0.136
2012	97	140	111	N/A	0.147	0.112
2013	68	119	87	N/A	0.151	0.122
2014	74	131	92	N/A	0.141	0.11
2015	71	115	81	113	0.144	0.127
2016	83	132	103	132	0.163	0.121
2017	109	148	121	145	0.158	0.136
2018	84	141	108	141	0.142	0.125
2019	82	129	101	126	0.137	0.117
2020	133	160	142	157	0.185	0.139
2021	91	135	113	130	0.148	0.12

The CCAA, which was enacted in 1988, established targets for reducing overall population exposure to severe non-attainment pollutants in the Basin—a 25 percent reduction by December 31, 1994, a 40 percent reduction by December 31, 1997, and a 50 percent 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”⁴) to ozone

³ The reported number of days exceeding each ozone standard and basin maximum concentrations for 2001 to 2020 statistics have been revised in accordance with updated rounding methodologies, consistent with the methodology used for ongoing Air Quality Management Plan (AQMP) development. 2021 exceedance statistics and maximum concentrations are based on preliminary data and are subject to change.

⁴ SCAQMD staff divides the air basin into a grid of square cells and interpolates recorded ozone data from ambient air quality monitors to determine ozone levels experienced in each of these cells. The total person-hours in a county experiencing ozone higher than the state ozone standard is determined by summing over the whole county the products of the number of hours exceeding the state ozone standard per grid cell with the number of residents in the corresponding cell. The per capita ozone exposures are then calculated by dividing the sum of person-hours by the total population within a county. Similar calculations are used to determine the Basin-wide per capita exposure by summing and dividing over the whole Basin.

concentrations above the state 1-hour standard of 0.09 ppm. Table 7-2 shows the 1986-88 baseline per capita exposure, the actual per capita exposures each year since 1994 (RECLAIM’s initial year), and the 1997 and 2000 targets set by the CCAA for each of the four counties in the district and the Basin overall. As shown in Table 7-2, the CCAA 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 2020, the 2021 per capita exposures were significantly lower for all regions. For calendar year 2021, the actual per capita exposure for the Basin was 1.93 hours, which represents a 97.6 percent 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
2021 actual	1.93	0.40	0.04	2.15	9.64
1997 target ²	48.3	45.5	16.3	56.5	115.6
2000 target ³	40.2	37.9	13.6	47	96.3

¹ Average over three years, 1986 through 1988.

² 60% of the 1986-88 baseline exposures.

³ 50% of the 1986-88 baseline exposures.

Table 7-2 shows that actual per capita exposures during all the years mentioned were well under the 1997 and 2000 target exposures limits. It should also be noted that air quality in the Basin is a complex function of meteorological conditions and an array of different emission sources, including mobile, area, RECLAIM stationary sources, and non-RECLAIM stationary sources. Therefore, the reduction of per capita exposure beyond the projected level is not necessarily wholly attributable to implementation of the RECLAIM program in lieu of the command-and-control regulations.

Toxic Impacts

Based on a comprehensive toxic impact analysis performed during program development, it was concluded that RECLAIM would not result in any significant impacts on air toxic emissions. Nevertheless, to ensure that the implementation of RECLAIM does not result in adverse toxic impacts, each annual program audit is required to assess any increase in the public health exposure to air toxics potentially caused by RECLAIM.

One of the safeguards to ensure that the implementation of RECLAIM does not result in adverse air toxic health impacts is that RECLAIM sources are subject to the same air toxic statutes and regulations (e.g., 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 VOC 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 procedures⁵ 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 2020 Annual Report on the AB2588 Air Toxics "Hot Spots" program⁶, staff has reviewed and approved 354 HRAs as of the end calendar of year 2020. About 95 percent of the facilities have cancer risks below 10 in a million and 95 percent 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 62 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, 30 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 fifth version of MATES (*i.e.*, MATES V) was conducted over a one-year period from May 2018 to April 2019, and the final MATES V report was released in August 2021⁷. Monitoring conducted at that time indicated that the basin-wide population-weighted air toxics exposure was reduced by 54 percent since MATES IV (conducted from July 2012 to June 2013). 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.

⁵ The toxics prioritization procedures can be found at: <http://www.aqmd.gov/home/regulations/compliance/toxic-hot-spots-ab-2588>.

⁶ The 2020 AB2588 Annual Report can be found at: https://www.aqmd.gov/docs/default-source/planning/risk-assessment/ab2588_annual_report_2020.pdf.

⁷ The Final MATES V Report can be found at: <http://www.aqmd.gov/docs/default-source/planning/mates-v/mates-v-final-report-9-24-21.pdf>.

APPENDIX A

RECLAIM UNIVERSE OF SOURCES

The RECLAIM universe of active sources as of the end of Compliance Year 2020 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

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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
148896	2	CALIFORNIA RESOURCES PRODUCTION CORP	NOx
148897	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
126536	1	CPP - POMONA	NOx
63180	1	DARLING INGREDIENTS INC.	NOx

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Facility ID	Cycle	Facility Name	Program
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
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/LGHTHP 6 ICEGEN	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, LLC	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
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 EXTRUSION USA, LLC	NOx
124808	2	INEOS POLYPROPYLENE LLC	NOx/SOx
129816	2	INLAND EMPIRE ENERGY CENTER, LLC	NOx
157363	2	INTERNATIONAL PAPER CO	NOx
16338	1	KAISER ALUMINUM FABRICATED PRODUCTS, LLC	NOx

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Facility ID	Cycle	Facility Name	Program
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
12372	1	MISSION CLAY PRODUCTS	NOx
155877	1	MOLSON COORS USA LLC	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
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

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Facility ID	Cycle	Facility Name	Program
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
800417	2	PLAINS WEST COAST TERMINALS LLC	NOx
11435	2	PQ LLC	NOx/SOx
7416	1	LINDE INC.	NOx
42630	1	LINDE INC.	NOx
136	2	PRESS FORGE CO	NOx
105903	1	PRIME WHEEL	NOx
8547	1	QUEMETCO INC	NOx/SOx
19167	2	R J. NOBLE COMPANY	NOx
20604	2	RALPHS GROCERY CO	NOx
193132	1	RAYTHEON COMPANY	NOx
193134	2	RAYTHEON COMPANY	NOx
193153	2	RAYTHEON COMPANY	NOx
20203	2	RECONSERVE OF CALIFORNIA-LOS ANGELES INC	NOx
189040	1	RED COLLAR PET FOODS, INC	NOx
180410	2	REICHHOLD LLC 2	NOx
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

ANNUAL RECLAIM AUDIT

Facility ID	Cycle	Facility Name	Program
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
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

ANNUAL RECLAIM AUDIT

Facility ID	Cycle	Facility Name	Program
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
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
191677	1	VORTEQ PACIFIC	NOx
146536	1	WALNUT CREEK ENERGY, LLC	NOx/SOx
42775	1	WEST NEWPORT OIL CO	NOx/SOx
127299	2	WILDFLOWER ENERGY LP/INDIGO GEN., LLC	NOx
193318	2	ZENITH ENERGY WEST COAST TERMINALS LLC	NOx
193323	1	ZENITH ENERGY WEST COAST TERMINALS LLC	NOx
193329	1	ZENITH ENERGY WEST COAST TERMINALS LLC	NOx
193330	2	ZENITH ENERGY WEST COAST TERMINALS LLC	NOx

APPENDIX B
FACILITY INCLUSIONS

As discussed in Chapter 1, no facilities were added to the RECLAIM universe in Compliance Year 2020. 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 2020. 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	47771
Facility Name	DELEO CLAY TILE CO INC
City and County	Lake Elsinore, Riverside County
SIC	3251
Pollutant(s)	NOx
1994 Allocation	34,506 lbs.
Reason for Shutdown	The facility had not produced clay tiles in many years and sold their remaining stock to the public. Their facility indicated that the cost of manufacturing, production, and raw materials was too high.

Facility ID	151899
Facility Name	CALIFORNIA RESOURCES PRODUCTION CORP
City and County	Newhall, Santa Clarita, Los Angeles County
SIC	1311
Pollutant(s)	NOx
1994 Allocation	110,785 lbs.
Reason for Shutdown	The facility's equipment was removed and the facility sold to a holding company as a residential tract. The facility stated that the shutdown was to create new residential housing, as a more attractive utility of the land.

Facility ID	179137
Facility Name	QG PRINTING II LLC
City and County	Riverside, Riverside County
SIC	2752
Pollutant(s)	NOx
1994 Allocation	7,800 lbs.
Reason for Shutdown	The facility stated a declining demand for products and a market downturn as the reason for shutdown.

ANNUAL RECLAIM AUDIT

Facility ID 183108
Facility Name URBAN COMMONS LLC EVOLUTION HOSPITALITY
City and County Long Beach, Los Angeles County
SIC 7996
Pollutant(s) NOx
1994 Allocation 5,610 lbs.
Reason for Shutdown This facility filed for bankruptcy after stating on their 2019 APEP that the facility was shut down due to COVID-19 driven mandates and business closure.

Facility ID 192551
Facility Name GLC FULLERTON LLC
City and County Fullerton, Orange County
SIC 2621
Pollutant(s) NOx, SOx
1994 Allocation 45,546 lbs. NOx
11,760 lbs. SOx
Reason for Shutdown The facility's equipment and building were removed, the facility was sold, and a new building was being constructed. The facility stated real estate redevelopment as the reason for shutdown.

Facility ID 800181
Facility Name CALIFORNIA PORTLAND CEMENT CO
City and County Colton, San Bernardino County
SIC 3241
Pollutant(s) NOx, SOx
1994 Allocation 4,748,896 lbs. NOx
256,612 lbs. SOx
Reason for Shutdown The facility reported that mineral resources were depleted beyond economical level, and the cost of South Coast AQMD regulations compared to other air districts was significantly higher.

APPENDIX D

FACILITIES THAT EXCEEDED THEIR ANNUAL ALLOCATION FOR COMPLIANCE YEAR 2020

The following is a list of facilities that did not have enough RTCs to cover their NOx emissions in Compliance Year 2020 based on the results of audits conducted by South Coast AQMD staff.

Facility ID	Facility Name	Compliance Year	Pollutant
20203	Reconserve of California-Los Angeles Inc.	2020	NOx
22607	California Dairies, Inc	2020	NOx
63180	Darling Ingredients Inc.	2020	NOx
124838	Exide Technologies, LLC	2020	NOx
126536	CPP - Pomona	2020	NOx
148236	Air Liquide Large Industries U.S., LP	2020	NOx
156741	Harbor Cogeneration Co, LLC	2020	NOx
157359	Henkel Electronic Materials, LLC	2020	NOx
179137	QG Printing II LLC	2020	NOx
182561	Colton Power, LP	2020	NOx
183415	Ontario International Airport Authority	2020	NOx
183832	AST Textile Group, Inc.	2020	NOx
184958	Broncs Inc. DBA West Coast Textiles	2020	NOx
186899	Enerly Holdings LLC/LGHTHP_6_ICEGEN	2020	NOx
188635	SFII Flyte, LLC	2020	NOx
192551	GLC Fullerton LLC	2020	NOx
800408	Northrop Grumman Systems	2020	NOx

APPENDIX E

REPORTED JOB IMPACTS ATTRIBUTED TO RECLAIM

Each year RECLAIM facility operators are asked to provide employment data in their APEP reports. The report asks company representatives to quantify job increases and/or decreases, and to report the positive and/or negative impacts of the RECLAIM program on employment at their facilities. This appendix is included in each Annual RECLAIM Audit Report to provide detailed information for facilities reporting that RECLAIM contributed to job gains or losses.

Facilities with reported job gains or losses attributed to RECLAIM:

No RECLAIM facilities reported job gains or losses attributed to RECLAIM for Compliance Year 2020.



Annual RECLAIM Audit Report for 2020 Compliance Year

South Coast Air Quality Management District
Board Meeting

March 4, 2022

The logo consists of several overlapping squares in yellow, red, and blue, with a thin vertical line passing through them.

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 sources of NO_x and SO_x (greater than 4 tons/year)
- Establishes declining annual emissions caps for each facility
- Allows options to reduce emissions or buy RECLAIM Trading Credits (RTCs) to meet obligation to hold RTCs greater than or equal to actual emissions

Compliance Year (CompYr) 2020 is the 27th 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 2020
 - Cycle 1: Jan 1, 2020 – Dec 31, 2020
 - Cycle 2: Jul 1, 2020 – Jun 30, 2021
- RECLAIM had 240 facilities at the end of CompYr 2020 (246 at end of CompYr 2019)

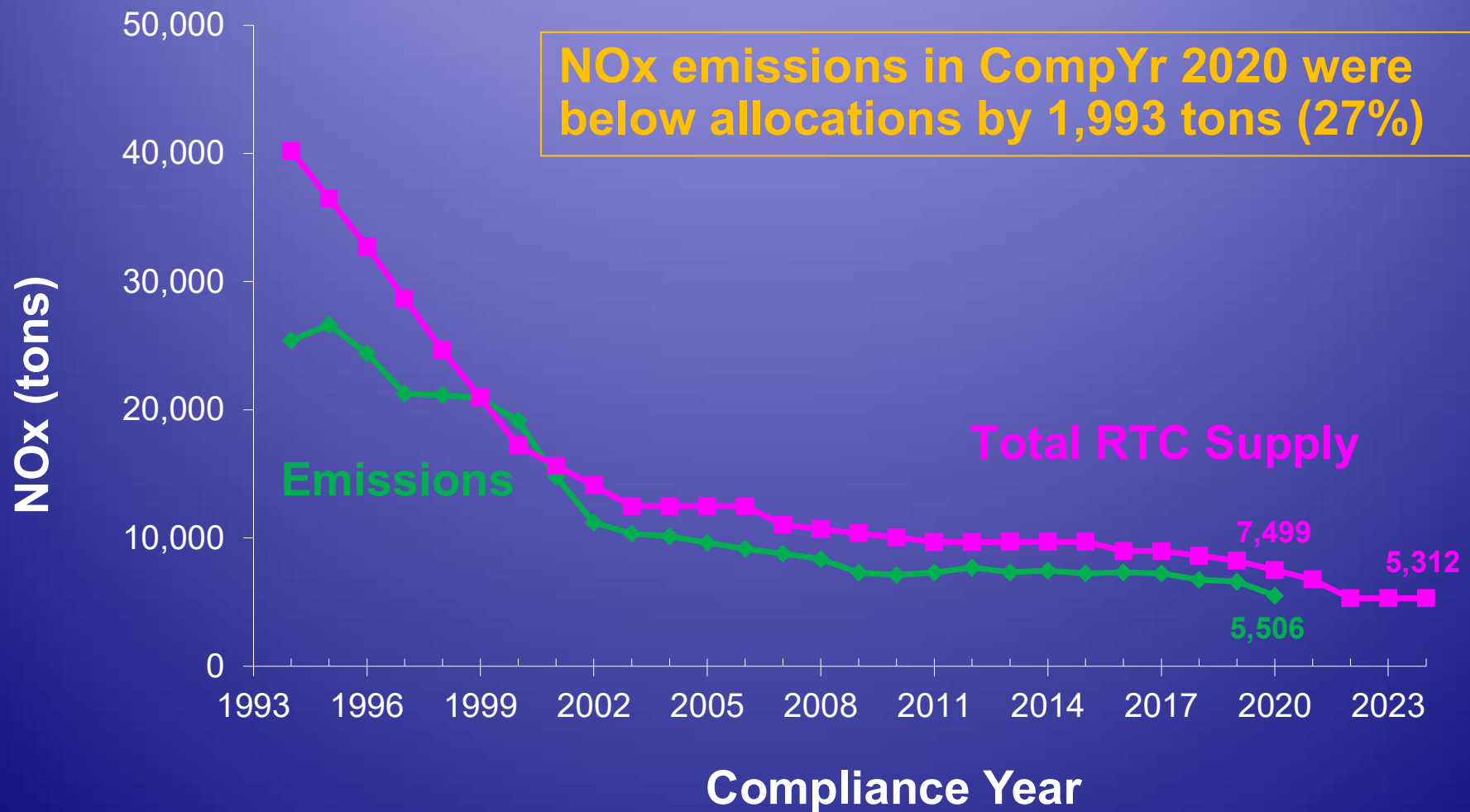


2020 Annual RECLAIM Audit Findings Compliance

- RECLAIM met overall NO_x and SO_x emissions goals:
 - NO_x emissions **27%** below allocations
 - SO_x emissions **35%** below allocations
- Allocation Shave
 - January 2005: NO_x Shave of 7.7 tons/day (tpd) implemented in 2007 – 2011
 - November 2010: SO_x Shave of 5.7 tpd implemented in 2013 – 2019
 - December 2015: Additional NO_x Shave of 12 tpd implemented in 2016 – 2022
 - Cumulative reduction of 6 tpd NO_x allocations from CompYr 2016 through CompYr 2020

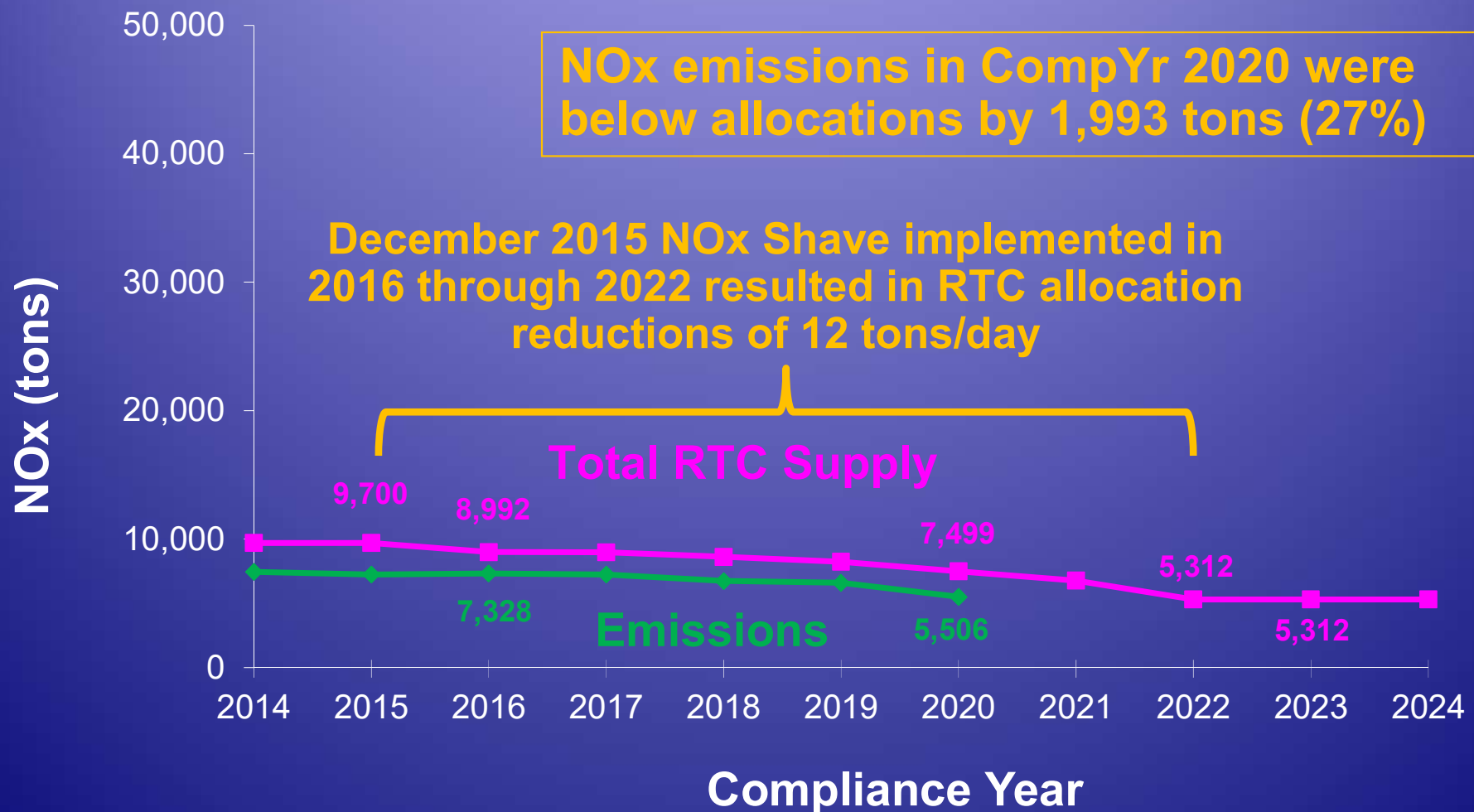
RECLAIM

NOx Emissions vs. Allocations Trends



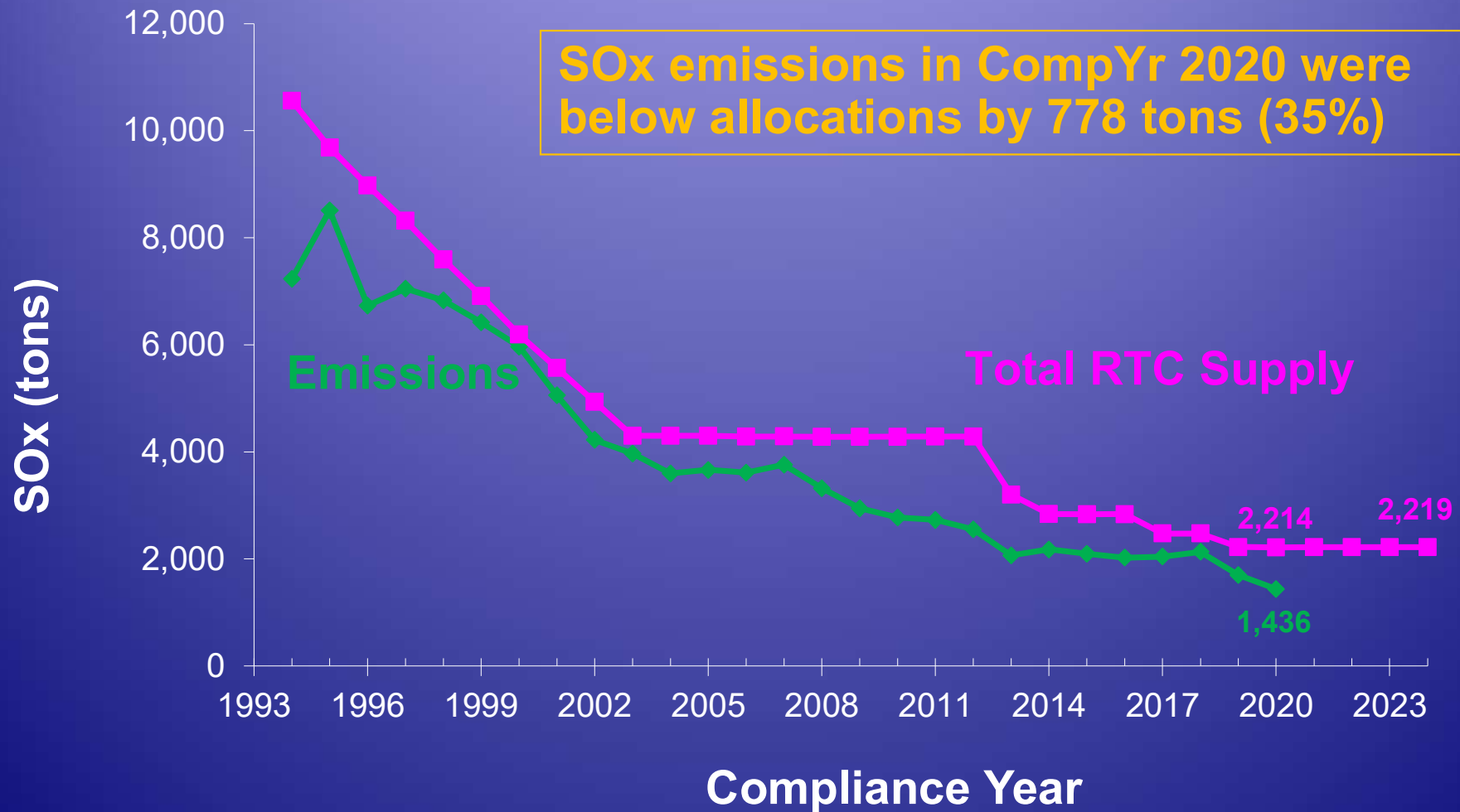
RECLAIM

NOx Emissions vs. Allocations Trends



RECLAIM

SOx Emissions vs. Allocations Trends





2020 Annual RECLAIM Audit Findings Compliance

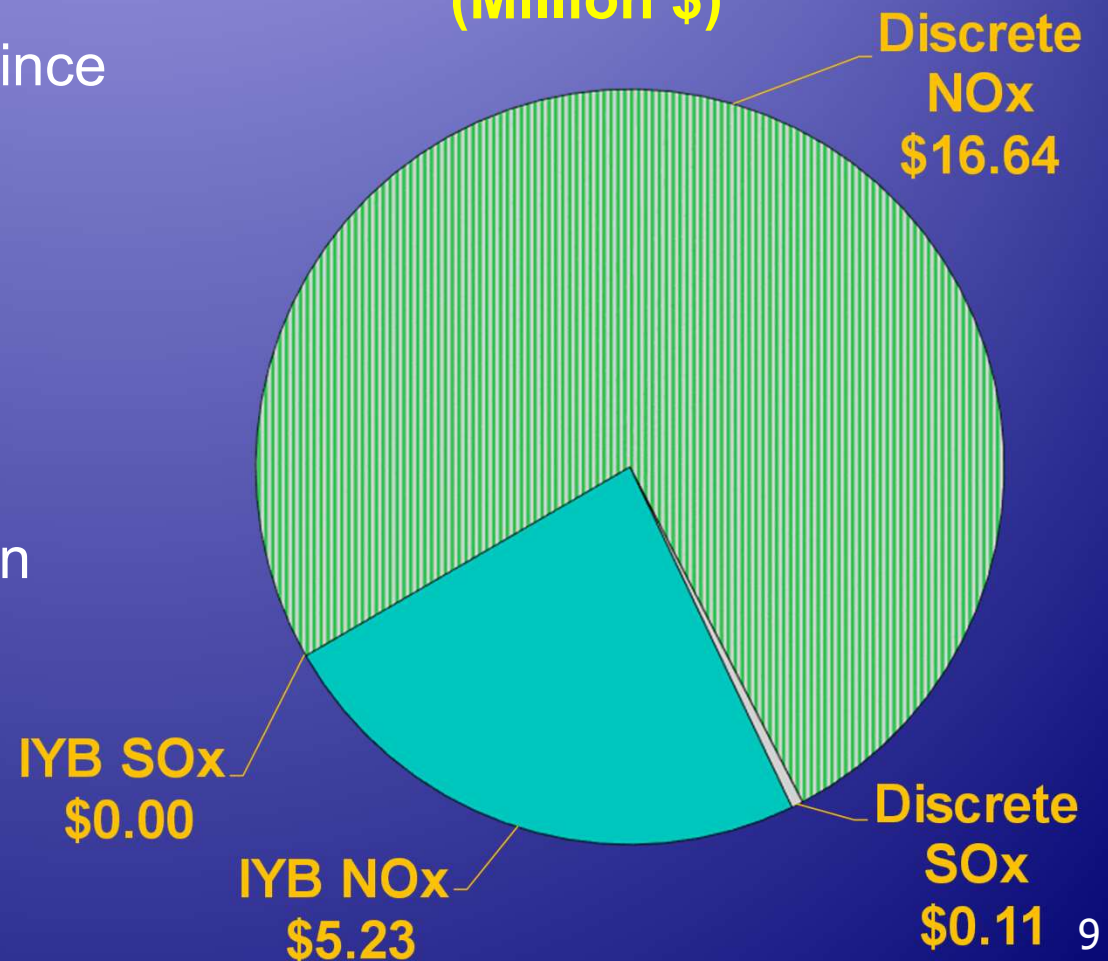
- High rate of facility compliance with RECLAIM allocations:
 - NOx Facilities – **93%**
 - SOx Facilities – **100%**
- Facilities exceeding their allocations
 - NOx – 17 facilities exceeded by 16.3 tons (0.22% of total allocations)
 - SOx – there were no SOx facilities exceeding their allocations

2020 Annual RECLAIM Audit Findings

Credit Trading and Prices

- \$1.56 billion of RTCs traded since program inception
- RTCs are traded as either Discrete-Year or Infinite-Year Block (IYB)
- \$22.0 million of RTCs traded in Calendar Year (CaYr) 2021 (\$18.19 million in CaYr 2020)

Value Traded in CaYr 2021
(Million \$)

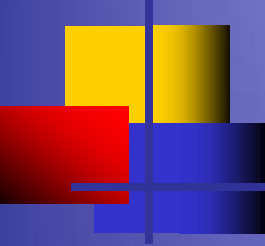


2020 Annual RECLAIM Audit Findings

Average Discrete-Year NOx RTC Prices

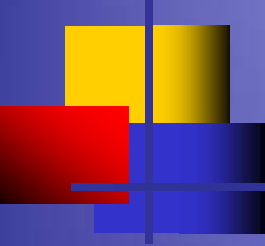


- Annual average prices in CaYr 2021:
 - Exceeded Rule 2015 threshold of \$15,000/ton
 - Did not exceed the Health and Safety Code threshold of \$49,737/ton*



2020 Annual RECLAIM Audit Findings Exceeding Rule 2015 Backstop Threshold

- Rule 2015 – if RTC price exceeds \$15,000/ton:
 - Submit to CARB and USEPA assessments of the compliance and enforcement aspects of the RECLAIM program
 - Do so within six months of Executive Officer determination
- Assessments to include:
 - Deterrent effect of Rule 2004
 - Rates of compliance with applicable emission caps
 - Rates of compliance with monitoring, recordkeeping, and reporting requirements



2020 Annual RECLAIM Audit Findings Exceeding Rule 2015 Backstop Threshold

- Assessments (cont.)
 - South Coast AQMD's ability to obtain appropriate penalties in cases of noncompliance
 - Whether the program provides appropriate incentives to comply
- Recommendation to the Board:
 - Deterrent effects of Rule 2004 be continued without change

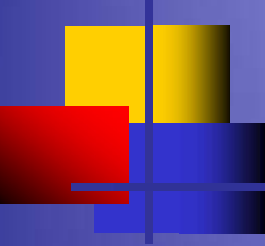
OR

Amend Rule 2004, if the Board determines that revisions are appropriate

2020 Annual RECLAIM Audit Findings

Exceeding Rule 2002 3-month & 12-month Rolling Average Thresholds

- CompYr 2022 NO_x RTCs exceeded Rule 2002 3-month and 12-month rolling average price thresholds
- CompYr 2022 NO_x RTCs rolling average prices versus thresholds (\$/ton):
 - **\$38,803 price** vs. \$35,000 threshold - 3 mo. rolling average
 - **\$33,085 price** vs. \$22,500 threshold - 12 mo. rolling average
- Executive Officer to assess:
 - More rigorous control technology implementation
 - Emission reductions
 - Cost-effectiveness
 - Market analysis
 - Socioeconomic impacts



2020 Annual RECLAIM Audit Findings Exceeding Rule 2002 3-month & 12-month Rolling Average Thresholds

- Notification made to Stationary Source Committee on January 21, 2022 that Executive Officer will:
 - Conduct an assessment of the RECLAIM Program
 - Report assessment results before July 1, 2022 to the Board
- Upon Board concurrence, the 4 tpd of Non-tradable/Non-usable NOX RTCs set aside as part of the remaining NOx shave for CompYr 2022 could be converted to Tradable/Usable NOx RTCs

2020 Annual RECLAIM Audit Findings

Average Discrete-Year SOx RTC Prices



- Annual average prices in CaYr 2021 below program review thresholds:

- \$15,000/ton [Rule 2015]
- \$35,811*/ton [Health and Safety Code]

* - Adjusted by August 2021 CPI 15

2020 Annual RECLAIM Audit Findings

Average IYB RTC Prices



- 2021 IYB RTC average prices remain below program review thresholds [Health and Safety Code]

■ NOx = \$746,056/ton*

■ SOx = \$537,160/ton*



2020 Annual RECLAIM Audit Findings

Investor Participation during CalYr 2021

- Investors are RTC holders that are not RECLAIM operators
- Investor participation remains active in CalYr 2021 trades.

RTC Type	Value		Volume	
	NOx	SOx	NOx	SOx
Discrete	56%	0%	62%	0%
IYB	31%	None Traded	39%	None Traded

- Investors' holdings at the end of CalYr 2021
 - 2.0% of IYB NOx RTCs (up from 1.3% in CalYr 2020)
 - 4.2% of IYB SOx RTCs (same as 4.2% in CalYr 2020)



2020 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 2022, the Board amended and/or adopted 23 “Landing Rules” to implement BARCT



2020 Annual RECLAIM Audit Findings

- RECLAIM facilities overall employment loss of about 4% (net loss of 3,687 jobs)
- Met federal NSR offset ratios
- No significant shift in seasonal emissions
- No evidence of increased health risk due to RECLAIM



2020 Annual RECLAIM Audit Findings Summary/Recommendations

Summary:

- Programmatic compliance achieved (NOx and SOx emissions were 27% and 35% below allocations, respectively)
- Individual facility compliance rate remained high (93% & 100% for NOx and SOx, respectively, based on 100% of facilities audited)
- Annual average discrete-year NOx prices for CompYr 2021 and 2022 RTC's traded in CalYr 2021 exceeded the \$15,000 per ton Rule 2015 backstop threshold
- RTC prices stayed below program review thresholds
- RECLAIM met all other requirements

Recommendation:

Approve the Annual RECLAIM Audit Report for 2020 Compliance Year