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

TECHNOLOGY COMMITTEE MEETING

Committee Members
Council Member Joe Buscaino, Chair
Supervisor Lisa Bartlett
Council Member Judith Mitchell
Council Member Carlos Rodriguez

February 21, 2020 ♦ 12:00 p.m. ♦ Conference Room CC8
21865 Copley Drive, Diamond Bar, CA 91765

Call-in for listening purposes only is available by dialing:
Toll Free: 866-244-8528
Listen Only Passcode: 5821432
In addition, a webcast is available for viewing and listening at:
http://www.aqmd.gov/home/library/webcasts

AGENDA

Members of the public may address this body concerning any agenda item before or during consideration of that item (Gov't. Code Section 54854.3(a)). Please provide a Request to Address the Committee card to the Committee Secretary if you wish to address the Committee on an agenda item. If no cards are available, please notify South Coast AQMD staff or a Board Member of your desire to speak. All agendas for regular meetings are posted at South Coast AQMD Headquarters, 21865 Copley Drive, Diamond Bar, California, at least 72 hours in advance of the regular meeting. Speakers may be limited to three (3) minutes each.

CALL TO ORDER

ACTION ITEMS – Items 1-6:

1. Execute Contracts to Replace Heavy-Duty Diesel Trucks with Near-Zero Emissions Natural Gas Trucks *(Motion Requested)*

Fan Xu
AQ Specialist

In October 2018, the Board approved awards totaling $14 million to replace 140 heavy-duty diesel trucks with near-zero emissions natural gas trucks. The clean trucks will be funded using $8 million in grant funds provided by the CEC plus $6 million in local match funds. Since approval of these awards, some fleets have declined their award or opted to switch to a fuel type not allowed under the CEC grant. These changes resulted in available funds that may be reallocated to other eligible trucks. These actions are to execute two contracts in the amount of $3,900,000 from the Community Air Protection AB 134 Fund (77) and, in the case of turnback funds, authorize the Executive Officer to execute additional contracts for eligible trucks meeting the CEC grant requirements from the applications received through the Proposition 1B-Goods Movement solicitation until all funds are exhausted.

2. Adopt Resolution Recognizing Funds for FY 2019-20 Carl Moyer Program Award, Issue Program Announcements for Carl Moyer Program and SOON Provision and Transfer Funds for Voucher Incentive Program *(Motion Requested)*

Vicki White
Technology Implementation Manager

These actions are to adopt a Resolution recognizing up to $37 million in Carl Moyer Program grant funds from CARB with its terms and conditions for FY 2019-20 and issue Program Announcements for "Year 22" of the Carl Moyer Program and SOON Provision to solicit applications for eligible zero and low emitting on- and off-road vehicles and equipment. This action is to also transfer $3 million from the Carl Moyer Program AB 923 Special Revenue Fund (80) to the Voucher Incentive Program Fund (59) to continue funding truck replacement projects on a first-come, first-served basis.

3. Recognize Revenue and Transfer and Appropriate Funds for Volkswagen Environmental Mitigation Trust *(Motion Requested)*

Ping Gui
Program Supervisor

In November 2018, the Board recognized $150 million in revenue from CARB for the Volkswagen (VW) Environmental Mitigation Trust and authorized the transfer of up to 10 percent into the General Fund to reimburse administrative costs for this program. Subsequently, CARB and the South Coast AQMD executed a project agreement for this program totaling $165 million, which included $150 million for projects and $15 million for administrative costs. These actions are to recognize up to $15 million in additional revenue from CARB, transfer $520,733 into the General Fund to reimburse FY 2018-19 Salaries & Employee Benefits and Service & Supplies, and transfer and appropriate up to $898,000 into Science & Technology Advancement's and Information Management's FYs 2019-20 and 2020-21 Budgets, Professional and

Special Services and Capital Outlays Major Objects, for administrative expenses to implement the VW Mitigation Program.

4. Approve and Adopt Technology Advancement Office Clean Fuels Program 2019 Annual Report and 2020 Plan Update, Resolution and Membership Changes for Clean Fuels Advisory Group and Receive and File Updated Membership of Technology Advancement Advisory Group *(Motion Requested)*

Joseph Impullitti
Technology Demonstration Manager

Each year by March 31, the South Coast AQMD must submit to the California Legislative Analyst an approved Annual Report for the past year and a Plan Update for the current calendar year for the Clean Fuels Program. This action is to approve and adopt the Technology Advancement Clean Fuels Program Annual Report for 2019 and 2020 Plan Update and the Resolution finding that proposed projects do not duplicate any past or present programs. These actions are to also approve and adopt membership changes to the SB 98 Clean Fuels Advisory Group and receive and file membership changes to the Technology Advancement Advisory Group.

5. Recognize Revenue, Amend Contract for Heavy-Duty Truck Replacements and Reimburse General Fund for Administrative Costs *(Motion Requested)*

Phil Barroca
Program Supervisor

In November 2019, South Coast AQMD received approval of a revised project scope for a FY 18 U.S. EPA Diesel Emissions Reductions Act (DERA) grant previously awarded. The approved project scope will allow for replacement of older on-road heavy-duty diesel trucks with new near-zero emissions natural gas-powered trucks in non-drayage applications. Since Proposition 1B eligible projects qualify for these DERA funds, staff proposes to award the funds to a previously approved Proposition 1B project. These actions are to recognize $1,601,523 in revenue from U.S. EPA DERA into the Advanced Technology Outreach and Education Fund (17), amend a contract for heavy-duty truck replacements adding DERA funds to reduce Proposition 1B-Goods Movement funding, and reimburse the General Fund for administrative costs up to $99,444 to implement the project.

6. Execute Contract to Conduct Airborne Measurements of NOx Emissions in the South Coast Air Basin *(Motion Requested)*

Sang-Mi Lee
Program Supervisor

Emission inventories are a critical component of South Coast AQMD's air quality modeling and control strategy development. The University of California, Berkeley (UC Berkeley) has proposed to conduct airborne flux measurements by aircraft, offering a robust method to evaluate NOx emission inventories. CARB has committed $700,000 for the parallel measurement of VOC fluxes during this field effort. This action is to execute a contract with the UC Berkeley to conduct airborne measurements of NOx emissions in the South Coast Air Basin at a cost not to exceed $300,000 from the Clean Fuels Program Fund (31).

OTHER MATTERS:

7. Other Business – *Any member of the Committee, or its staff, on his or her own initiative or in response to questions posed by the public, may ask a question for clarification, may make a brief announcement or report on his or her own activities, provide a reference to staff regarding factual information, request staff to report back at a subsequent meeting concerning any matter, or may take action to direct staff to place a matter of business on a future agenda. (Gov't. Code Section 54954.2*)

8. Public Comment Period
At the end of the regular meeting agenda, an opportunity is provided for the public to speak on any subject within the Committee's authority that is not on the agenda. Speakers may be limited to three (3) minutes each.

9. Next Meeting Date – Friday, March 20, 2020 at 12:00 pm

ADJOURNMENT

Americans with Disabilities Act and Language Accessibility
Disability and language-related accommodations can be requested to allow participation in the Technology Committee meeting. The agenda will be made available, upon request, in appropriate alternative formats to assist persons with a disability (Gov't Code Section 54954.2(a)). In addition, other documents may be requested in alternative formats and languages. Any disability or language-related accommodation must be requested as soon as practicable. Requests will be accommodated unless providing the accommodation would result in a fundamental alteration or undue burden to the District. Please contact Alejandra Vega at 909.396.2264 from 7:30 a.m. to 6:00 p.m., Tuesday through Friday, or send the request to avega@aqmd.gov.

Document Availability
All documents (i) constituting non-exempt public records, (ii) relating to an item on an agenda for a regular meeting, and (iii) having been distributed to at least a majority of the Committee after the agenda is posted, are available prior to the meeting for public review at the South Coast Air Quality Management District, Public Information Center, 21865 Copley Drive, Diamond Bar, CA 91765.

Back to Agenda

Go to SLIDES

DRAFT

Technology Committee Agenda #1

BOARD MEETING DATE: March 6, 2020 AGENDA NO.

PROPOSAL: Execute Contracts to Replace Heavy-Duty Diesel Trucks with Near-Zero Emissions Natural Gas Trucks

SYNOPSIS: In October 2018, the Board approved awards totaling $14 million to replace 140 heavy-duty diesel trucks with near-zero emissions natural gas trucks. The clean trucks will be funded using $8 million in grant funds provided by the CEC plus $6 million in local match funds. Since approval of these awards, some fleets have declined their award or opted to switch to a fuel type not allowed under the CEC grant. These changes resulted in available funds that may be reallocated to other eligible trucks. These actions are to execute two contracts in the amount of $3,900,000 from the Community Air Protection AB 134 Fund (77) and, in the case of turnback funds, authorize the Executive Officer to execute additional contracts for eligible trucks meeting the CEC grant requirements from the applications received through the Proposition 1B-Goods Movement solicitation until all funds are exhausted.

COMMITTEE: Technology, February 21, 2020; Recommend for Approval

RECOMMNEDED ACTIONS:

1. Authorize the Chairman to execute the following agreements from the Community Air Protection AB 134 Fund (77):
   a. A contract with National Ready Mixed Concrete Company to replace 29 diesel trucks with near-zero emissions natural gas trucks in an amount not to exceed $2,900,000; and
   b. A contract with Pacific Green Trucking, Inc., to replace 10 diesel trucks with near-zero emissions natural gas trucks in an amount not to exceed $1,000,000.
2. Authorize the Executive Officer, in case of turnback funds, to execute additional contracts (or contract amendments) from the Community Air Protection AB 134 Fund (77) for eligible trucks meeting the CEC grant requirements from the

applications received through the Proposition 1B-Goods Movement until the $8M in CEC funding and $6M in local match funds are exhausted.

Wayne Nastri
Executive Officer

MMM:NB:VW:TL:FX

Background

In October 2018, the Board approved awards totaling $14 million to replace 140 heavy-duty diesel trucks with near-zero emissions natural gas trucks. These clean trucks will be funded using $8 million in grant funds provided by the CEC plus $6 million in local match funds, comprising $2 million each from the Ports of Los Angeles and Long Beach and $2 million from the Community Air Protection AB134 Fund (77). Since approval of these awards, some fleets have declined their award or opted to switch to a fuel type not allowed under the CEC grant. A total amount of $3.9 million is now available for other eligible trucks.

In October 2019, the Board issued a Proposition 1B-Goods Movement Program Announcement to solicit additional projects to utilize turnback funds until all Proposition 1B funds are exhausted. Under the CEC grant, near-zero emissions natural gas trucks meeting the criteria of Proposition 1B-Goods Movement are eligible for funding. Staff has identified eligible trucks from applications received under Proposition 1B #PA2020-01.

Proposal

This action is to execute contracts with National Ready Mixed Concrete Company to replace 29 diesel trucks with near-zero emissions natural gas trucks and Pacific Green Trucking, Inc., to replace 10 diesel trucks with near-zero emissions natural gas trucks in amounts not to exceed $2,900,000 and $1,000,000, respectively, from the Community Air Protection AB 134 Fund (77).

In case of turnback funds and to meet tight CEC grant deadlines, this action is to also authorize the Executive Officer to execute additional contracts from the Community Air Protection AB 134 Fund (77) for eligible trucks meeting the CEC grant requirements from the applications received through the Proposition 1B-Goods Movement solicitation until the $8M in CEC funding and $6M in local match funds are exhausted.

Benefits to South Coast AQMD

The successful deployment of near-zero emissions natural gas trucks approved under the CEC grant will provide direct emission reductions of both NOx and PM. The

vehicles and equipment will operate for the life of the awarded contracts and beyond, thus providing long-term emission reductions and associated public health benefits. Some of the trucks will operate in and adjacent to disadvantaged and low-income communities, resulting in direct air quality benefits to communities most affected by goods movement.

Resource Impacts
Trucks to be funded under the CEC grant will not exceed $8M and the local match funds will not exceed $6 million. The contracts with National Ready Mixed Concrete Company and Pacific Green Trucking will not exceed available funds.

Back to Agenda

Agenda Item #1

Fan Xu

Execute Contracts to Replace
Heavy-Duty Diesel Trucks with
Near-Zero Emission Natural Gas Trucks

Background

- In October 2018, the Board approved awards for 140 near-zero emissions (NZE) natural gas trucks totaling $14 million
  - $8 million provided by the CEC
  - $6 million in local match funds: POLA, POLB and South Coast AQMD's Community Air Protection AB 134 Fund (77)
- Five fleets have declined their awards
- Currently, $3.9 million available for trucks
- CEC grant allows NZE natural gas trucks meeting Proposition 1B criteria to be funded

Proposal

- Award funding for two fleets eligible under the CEC grant identified through the recent Proposition 1B solicitation:
  - National Ready Mixed Concrete Company: 29 trucks
  - Pacific Green Trucking: 10 trucks
- Fund additional eligible truck projects in case any other trucks identified for the CEC grant are cancelled, until funds are exhausted

Recommended Actions

- Execute contracts with the two fleets to replace diesel trucks with NZE natural gas trucks from Community Air Protection AB 134 Fund (77):
  - National Ready Mixed Concrete Company: 29 trucks for $2.9 million
  - Pacific Green Trucking: 10 trucks for $1 million
- Authorize the Executive Officer, in case of turnback funds, to execute additional contracts for eligible trucks received through the Proposition 1B solicitation until all funds are exhausted

Back to Agenda

Go to SLIDES

DRAFT

Technology Committee Agenda #2

BOARD MEETING DATE: March 6, 2020 AGENDA NO.

PROPOSAL: Adopt Resolution Recognizing Funds for FY 2019-20 Carl Moyer Program Award, Issue Program Announcements for Carl Moyer Program and SOON Provision and Transfer Funds for Voucher Incentive Program

SYNOPSIS: These actions are to adopt a Resolution recognizing up to $37 million in Carl Moyer Program grant funds from CARB with its terms and conditions for FY 2019-20 and issue Program Announcements for "Year 22" of the Carl Moyer Program and SOON Provision to solicit applications for eligible zero and low emitting on- and off-road vehicles and equipment. This action is to also transfer $3 million from the Carl Moyer Program AB 923 Special Revenue Fund (80) to the Voucher Incentive Program Fund (59) to continue funding truck replacement projects on a first-come, first-served basis.

COMMITTEE: Technology, February 21, 2020; Recommended for Approval

RECOMMENDED ACTIONS:

1. Adopt the attached Resolution recognizing upon receipt up to $37 million from CARB into the Carl Moyer Program SB 1107 Fund (32);
2. Issue Program Announcement #PA2020-04 to solicit projects for the FY 2019-20 "Year 22" Carl Moyer Memorial Air Quality Standards Attainment Program;
3. Issue Program Announcement #PA2020-03 to solicit projects for the SOON Provision; and
4. Approve the transfer of $3 million from the Carl Moyer Program AB 923 Special Revenue Fund (80) to the Voucher Incentive Program Fund (59) to continue funding truck replacement projects on a first-come, first-served basis.

Wayne Nastri
Executive Officer

MMM:NB:VW

Background
The Carl Moyer Memorial Air Quality Standards Attainment Program (CMP) and the Surplus Off-Road Opt-in for NOx (SOON) Provision provide funding on an incentive basis for the incremental cost of purchasing cleaner-than-required engines and equipment. The CMP also allows funding for infrastructure projects that enable the deployment of advanced, cleaner technologies, including zero and near-zero emission vehicles, which are needed to support the State's and South Coast AQMD's air quality goals. Both programs are primarily funded with Carl Moyer Program SB 1107 (including additional funds resulting from AB 1274) and AB 923 funds. In previous years, additional funding from the Community Air Protection Program (CAPP) and other grants were used to fund eligible projects submitted through the Carl Moyer Program. This is the 22nd year of the CMP and the 16th year of the SOON Provision with funding from SB 1107 and AB 923. Program Announcements are needed to solicit applications for this year's CMP and SOON Provision.

The CMP On-Road Heavy-Duty Vehicles Voucher Incentive Program (VIP) is a streamlined funding program for small fleets (with 10 or fewer vehicles) to replace older trucks with newer, cleaner models. Since the start of this program in 2009, the South Coast has expended about $42 million in VIP funds for the replacement of 1,220 older diesel trucks with cleaner, lower-emitting vehicles. Additional funds are needed to transfer to the VIP Fund (59) to continue the successful implementation of this program.

Proposal
These actions are to adopt the attached Resolution recognizing upon receipt up to $37 million from CARB into the Carl Moyer Program SB 1107 Fund (32) for implementation of the FY 2019-20 "Year 22" CMP. CARB has tentatively allocated $36,223,063 to the South Coast AQMD for the CMP. Of this amount, $33,959,122 is designated for project funding and $2,263,941 for administrative and outreach efforts. In addition, $5,433,459 is required from the South Coast AQMD as the local match, which will be provided from AB 923 funds.

This action is to also issue Program Announcements #PA2020-04 and #PA2020-03 for the Carl Moyer Program and SOON Provision, respectively. The approximate amounts of available funding for these programs include $29 million for the Carl Moyer Program and $5 million for the SOON Provision. In the last three funding cycles of the CMP, the South Coast AQMD received additional funding beyond the CMP allocation of over $80 million for eligible projects under the CMP. These additional funds were allocated to South Coast AQMD from CAPP Incentives, CMP State Reserve, and the Funding Agricultural Replacement Measures for Emission Reductions (FARMER) Program. At least 87 percent of these funds were awarded to projects that will reduce emissions in disadvantaged and low-income communities. The South Coast AQMD anticipates

receiving additional funds for this year's CMP, which may include funds in support of CAPP projects and the FARMER Program. The South Coast AQMD will provide a detailed account of available and awarded funds for the CMP, including earned interest and returned project funds, AB 923 and any additional sources of funding at the time of awards recommendations.

The Carl Moyer PA will solicit applications from equipment owners for projects that involve the retrofit, repower or replacement of older, in-use on-road vehicles, off-road equipment (including agricultural equipment), locomotives, marine and other heavy-duty vehicles and equipment with cleaner technologies. The Carl Moyer PA will also solicit applications for infrastructure projects that support zero or near-zero emissions vehicles and equipment.

The SOON Provision is designed to achieve additional NOx emission reductions above those that would be obtained from CARB's In-Use Off-Road Diesel-Fueled Fleets Regulation. The SOON Provision PA will solicit projects that involve the retrofit, repower or replacement of off-road vehicles with cleaner technologies. As in previous years, South Coast AQMD will only fund diesel-to-diesel applications when alternative fuel engines/vehicles are not commercially available or certified by CARB, except for emergency vehicles.

The Carl Moyer Program Guidelines approved by CARB on April 27, 2017, and any subsequent updates or changes, will be utilized for the evaluation of projects submitted under the "Year 22" Carl Moyer and SOON Provision PAs. Applicants will be able to submit their applications for both the Carl Moyer Program and SOON Provision online. Proposals for all categories will be due by 1:00 pm on Tuesday, June 2, 2020. Staff expects to finalize the review and evaluation of the proposals and recommend awards for Board consideration at the October 2020 Board meeting. The Carl Moyer Program and SOON Provision PAs are attached.

Finally, this action is to approve the transfer of $3 million from the Carl Moyer Program AB 923 Special Revenue Fund (80) to the Voucher Incentive Program Fund (59) to continue funding truck replacement projects for small fleets on a first-come, first-served basis.

Funding Distribution

The CMP Guidelines include the requirement that at least 50 percent of the program funds be expended on projects that will reduce emissions in disproportionately impacted areas, with the allowance for air districts to track this on a cumulative basis. At least half of the funding allocated under SB 1107 and collected under AB 923 will be awarded to projects in disproportionately impacted areas. It has been the policy of the South Coast AQMD to allocate at least 50 percent of all funding available for the CMP and the SOON Provision, including roll-over funds from previous years and any

returned funds from projects that fall through, to projects that will reduce emissions in disproportionately impacted areas.

Staff will utilize the latest version of CalEnviroScreen for identification of projects in disadvantaged and/or low-income communities as well as identification of projects that are located within half a mile of a disadvantaged or low-income community, pursuant to the provisions of AB 1550, which in 2016 amended California Climate Investments for disadvantaged communities and established new investment minimums for low-income communities and households. A detailed distribution list of the recommended projects and a description of South Coast AQMD's outreach efforts during the solicitation period will be provided to the Board at the time of the awards recommendations.

Outreach
In accordance with South Coast AQMD's Procurement Policy and Procedure, a public notice advertising the PAs and inviting bids will be published in the Los Angeles Times, the Orange County Register, the San Bernardino Sun, and Riverside County's Press Enterprise newspapers to leverage the most cost-effective method of outreach to the South Coast Basin.

Additionally, potential bidders may be notified utilizing South Coast AQMD's own electronic listing of certified minority vendors. Notice of the PAs will be emailed to the Black and Latino Legislative Caucuses and various minority chambers of commerce and business associations, and placed on the Internet at South Coast AQMD's website (http://www.aqmd.gov where it can be viewed by making menu selection "Grants & Bids."

Program Guideline
At its July 8, 2005 meeting, the Board approved a long-term Program Guideline for the implementation of the Carl Moyer Program in the South Coast Air Basin. The proposed funding distribution for different equipment categories in this Board letter is made according to the criteria outlined in that Guideline with emphasis on the following priorities in order to achieve the highest emissions reductions:

- Goods Movement (40 percent allocation);
- Environmental Justice (50 percent allocation);
- Cost-Effectiveness;
- Low Emission Engine/Vehicle Preference;
- Early Commercialization of Advanced Technologies/Fuels;
- Fleet Rules; and
- School Buses.

Benefits to South Coast AQMD
The South Coast AQMD has supported a number of activities directed to the advancement of new technologies that will support progress in meeting air quality goals

for the region. The successful implementation of the Carl Moyer Program and the SOON Provision are direct results of these technology advancement activities. The vehicles and equipment funded under these Program Announcements will operate for many years, providing long-term emissions reductions.

Resource Impacts
CARB has tentatively allocated $36,223,063 to the South Coast AQMD for implementation of the FY 2019-20 "Year 22" CMP. Of this amount, $33,959,122 is designated for project funding and $2,263,941 for administrative and outreach efforts. These funds will be recognized into the Carl Moyer Program SB 1107 Fund (32). In addition, $5,433,459, which will be provided from AB 923 funds, is required as the local match from the South Coast AQMD.

The transfer from the Carl Moyer Program AB 923 Special Revenue Fund (80) to the Voucher Incentive Program Fund (59) will not exceed $3 million.

Attachments
1. Resolution
2. Carl Moyer Program Announcement #PA2020-04
3. SOON Provision Program Announcement #PA2020-03

RESOLUTION NO. 20-XXX

A Resolution of the South Coast Air Quality Management District Board Recognizing Funds and Accepting the Terms and Conditions of the FY 2019-20 Carl Moyer Grant Award

WHEREAS, under Health & Safety Code §40400 et seq., the South Coast Air Quality Management District (South Coast AQMD) is the local agency with the primary responsibility for the development, implementation, monitoring and enforcement of air pollution control strategies, clean fuels programs and motor vehicle use reduction measures; and

WHEREAS, the South Coast AQMD is authorized by Health & Safety Code §§40402, 40440, and 40448.5 as well as the Carl Moyer Memorial Air Quality Standards Attainment Program (§44275, et seq.) to implement programs to reduce transportation emissions, including programs to encourage the use of alternative fuels and zero and low-emission vehicles; to develop and implement other strategies and measures to reduce air contaminants and achieve the state and federal air quality standards; and

WHEREAS, the Governing Board has adopted several programs to reduce emissions from on-road and off-road vehicles, as well as emissions from other equipment, including the Lower Emission School Bus Program and the Carl Moyer Program; and

WHEREAS, the South Coast AQMD is designated as an extreme non-attainment area for ozone and as such is required to utilize all feasible means to meet national ambient air quality standards.

THEREFORE, BE IT RESOLVED that the Governing Board, in regular session assembled on March 6, 2020, does hereby authorize the Executive Officer to accept the terms and conditions of the FY 2019-20 (Year 22) Carl Moyer Program grant award and recognizes up to $37 million from CARB to administer and implement the Year 22 Carl Moyer Program.

BE IT FURTHER RESOLVED that the Executive Officer is authorized and directed to take all steps necessary to carry out this Resolution.

Date Faye Thomas, Clerk of the Boards

2020
CARL MOYER MEMORIAL
AIR QUALITY STANDARDS ATTAINMENT PROGRAM
PROGRAM ANNOUNCEMENT
"Year 22"

SOUTH COAST AQMD PROGRAM ANNOUNCEMENT
PA2020-04

The South Coast Air Quality Management District (South Coast AQMD) is pleased to announce the availability of funds for the Carl Moyer Memorial Air Quality Standards Attainment Program (hereafter "CMP"). The CMP has played a significant role in incentivizing equipment owners to purchase cleaner-than-required engines, vehicles and equipment. This year marks South Coast AQMD's 22nd year of CMP implementation.

The CMP is intended to obtain "surplus" emission reductions of Nitrogen Oxides (NOx), Particulate Matter (PM10) and Reactive Organic Gases (ROG) from heavy-duty vehicles and other equipment operating in California as early and as cost-effectively as possible. The CMP provides financial incentives to equipment owners to repower, retrofit or replace in-use heavy-duty vehicles and equipment with cleaner-than-required engine and equipment technologies that will achieve emission reductions that are real, surplus, quantifiable and enforceable.

COMPLIANCE WITH LABOR LAWS

If an application is deemed eligible, the applicant will be required to provide any labor violations that have occurred within the last three years to be further considered for an award. If awarded, the contractor will be required to notify South Coast AQMD in writing if they have been found by a court or federal or state agency to have violated labor laws. The contractor will complete a yearly certification in which they will either state that they have not been found by a court or federal or state agency to have violated labor laws or, if such violations have been found, the contractor will give South Coast AQMD details about those violations in the certification. If the contractor has previously provided that information to the South Coast AQMD, they will be required to reattach that previous notification to the certification and provide any additional details about those violations that have not previously been provided. The contractor's yearly certification will be due at the same time as the annual progress reports. South Coast AQMD reserves the right to terminate the contract with a contractor that has been found to have violated labor laws, and the contractor may be required to return any and all contract funds, as determined by South Coast AQMD. The contractor will also ensure that these requirements are included in all subcontracts.

SECTION I – OVERVIEW

PURPOSE

The purpose of this Program Announcement (PA) is to solicit project applications for the 2020 Carl Moyer Memorial Air Quality Standards Attainment Program (CMP). **The budget for this PA will be approximately $29 million from the CMP and AB 923 Funds. The South Coast AQMD expects to receive additional funds for this year's CMP, which may include funds in support of AB 617-**

Community Air Protection Program and the Funding Agricultural Replacement Measures for Emission Reductions (FARMER) Program.

All applications will be evaluated based on the criteria set forth in this PA, the CMP Guidelines, and any subsequent updates and modifications/advisories to the Guidelines. This PA was prepared based on the latest version of the CMP Guidelines approved by the California Air Resources Board (CARB) on April 27, 2017, which are available online at: http://www.arb.ca.gov/msprog/moyer/guidelines/current.htm.

This PA will identify the equipment categories, project options and eligibility criteria to qualify for grant funding under this year's CMP. Any tax obligation associated with an award is the responsibility of the grantee.

The detailed requirements for projects can be found in the CMP Guidelines. Applicants are encouraged to review the CMP Guidelines to confirm eligibility and understand the funding "caps" that may apply to certain types of projects. The South Coast AQMD will conduct workshops that provide additional opportunity for applicants to ask questions and seek clarification. The schedule of workshops is provided below.

In the preparation of this PA, the words "Applicant" and "Contractor" are used interchangeably. South Coast AQMD staff will evaluate all qualified applications and make recommendations to the Governing Board for final selection of project(s) to be funded. All eligible projects will be ranked based on the cost effectiveness of NOx, PM10 and ROG emissions reduced. Please note that depending upon the number of applications received in response to this PA, South Coast AQMD may prioritize the selection of projects to reduce emissions in and around DAC and low-income communities. While South Coast AQMD encourages all eligible applications, this means that some projects may not be selected based on their domicile address, regardless of their cost-effectiveness ranking.

At least 50 percent of South Coast AQMD's CMP funds will be targeted for projects that meet the criteria of a disadvantaged or low-income community projects. Other non-CMP funding sources may have DAC and/or low-income status requirements that may limit South Coast AQMD's ability to award such funding to projects that do not meet applicable geographic or income requirements. The Office of Environmental Health Hazard Assessment (OEHHA) in the California Environmental Protection Agency (CalEPA) has developed the California Communities Environmental Health Screening Tool: CalEnviroScreen Version 3.0 (CalEnviroScreen 3.0). The CalEnviroScreen 3.0 tool will be used by South Coast AQMD to identify projects that qualify as a DAC, which is defined as scoring in the top 25th percentile, and will strive to maximize the benefits to these communities from this PA. All applications will be assessed with the CalEnviroScreen tool to identify and verify if the project will benefit a DAC. This tool is available at: https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30

Be aware that there is a possibility that due to program priorities, cost effectiveness or funding category limitations (i.e., caps), project applicants may be offered only partial funding, and not all applications that meet the cost-effectiveness criteria may be funded.

FUNDING CATEGORIES

Below are the specific project categories identified for funding under this PA:

- On-Road Heavy-Duty Vehicles, including transit fleet vehicles, drayage trucks, solid waste vehicles, public agency/utility vehicles and emergency vehicles (fire apparatus)
- Off-Road Equipment, including:
  - Marine Engine Repower
  - Shore Power (if project is not subject to CARB's At-Berth Regulation)
  - Construction Equipment
  - Agricultural Mobile Equipment (loaders, tractors, water pulls, etc.)
  - Locomotives
  - Cargo Handling Equipment
- Infrastructure to fuel or power a zero or near zero emission, heavy-duty vehicle or equipment, including but not limited to: on-road heavy-duty vehicles, cargo handling equipment, and marine vessels (shore power).

On-Road Heavy-Duty Vehicles

Below are the key requirements for on-road, heavy-duty vehicle projects:

- Fleets must be fully compliant with all applicable fleet regulations.
- Eligible project types include vehicle replacement and repower/conversion projects; on-road retrofit projects will be considered on a case-by-case basis.
- For on-road vehicles, a project's new engines may not be diesel-fueled (with the exception of Emergency Apparatus).
- Eligible engine model years are from 2007 to 2010 for vehicles subject to the Statewide Truck & Bus Regulation, Drayage Truck Regulation, and Fleet Rule for Public Agencies and Utilities. Only vehicles with a compliance deadline of January 1, 2023 or later are eligible for funding.
- Eligible vehicle types include heavy-duty trucks and buses, transit buses, solid waste collection vehicles, public agency and utility fleet vehicles and emergency vehicles (however, emergency vehicles are only eligible under the replacement project type).
- In addition to the cost-effectiveness limit(s) prescribed by the CMP Guidelines, each vehicle/engine is also subject to a funding cap[1] based on various factors including weight class (i.e., gross vehicle weight rating (GVWR)), vehicle type, and the proposed technology. The maximum grant award will be based on the allowable cost effectiveness and the applicable funding cap(s), whichever is less.
- Projects must include commercially available technologies that are certified or verified by CARB.

Off-Road Heavy-Duty Equipment/Engines

Below are the key requirements for the off-road equipment category:

- Fleets must be fully compliant with all applicable regulations.
- Eligible project types include equipment replacement, engine repower and retrofit devices.
- Eligible equipment types include, but are not limited to, construction equipment, marine engines, shore power, locomotives, agricultural tractors, zero-emission rubber-tired gantry (RTG) cranes and other cargo handling equipment.

[1] Funding caps are provided in Tables 4-2 through 4-7 in the CMP Guidelines.

- Large fleets are no longer eligible for CMP funding after December 31, 2019. However, large fleets that have received prior Carl Moyer Program funding after January 1, 2017, are only eligible for zero-emission project funding.

Infrastructure

Infrastructure projects that enable the deployment of alternative, advanced, and cleaner technologies to support the State's air quality goals are also eligible for CMP funding. Depending upon the number of applications received, the South Coast AQMD may have to limit the available CMP funding that will be allocated to infrastructure projects. Specifically, projects in this category involve the installation of fueling or energy infrastructure that will be used to fuel or power zero or near-zero emission, heavy-duty vehicles or equipment. Infrastructure designed to exclusively fuel or charge light-duty vehicles is not eligible for CMP funding.

Infrastructure projects will be selected on a competitive basis with consideration for location within a disadvantaged or low-income community, renewable fuel source, public access, site availability for the life of the project, fleet commitments to utilize the infrastructure, cost-share and other factors that will determine the level of utilization of the infrastructure. The priority for project selection may change based on technology development/commercialization and requirements of any additional funds that may become available. Infrastructure projects are not subject to a cost-effectiveness limit. Applicants must provide a minimum of two bids from qualified installers for the infrastructure project as part of the application, and if applicable, justification for selection of the higher of the two bids. Applicants shall describe the process used or that will be used to solicit and select the final bid. Infrastructure projects may also require a case by case review by CARB. Applicants must demonstrate that they either own the land on which the project will be located, or control it through a long-term lease, easement or other legal arrangement, for the duration of the project life.

Eligible infrastructure projects include, but are not limited to:

- Battery charging stations: New, conversion of existing, and expansion to existing battery charging stations for heavy-duty vehicles and equipment (not for light-duty vehicles)
- Alternative Fueling Station: New, conversion of existing, or expansion of existing hydrogen or natural gas fueling station for heavy duty vehicles and equipment
- Stationary Agricultural Station: Pump electrification
- Shore Power: Shore-side electrification for projects not subject to CARB's shore power regulation. Only a port authority, terminal operator, or marine vessel owner is eligible for this type of infrastructure project.

A vehicle or equipment project is not required to be submitted as a condition of eligibility for infrastructure funding, however, priority will be given to such projects.

Purchase orders or other purchase commitments to design and install the proposed infrastructure shall not be placed until after the date of award approval by the South Coast AQMD Governing Board. Further, any purchase commitments placed after South Coast AQMD Governing Board approval but in advance of a fully executed contract are placed at the applicant's own risk.

Regulatory Compliance
All applicants must be fully compliant with all applicable regulations in order to be eligible for consideration for CMP funding. Refer to CARB's fleet rule Web pages that provide detailed information on compliance with these regulations. These web links are listed below in Section VI.

GENERAL PROGRAM INFORMATION
The CMP award amount shall not exceed the project's incremental cost, applicable funding caps and/or cost-effectiveness limit(s). The "Step 1" cost-effectiveness limit, $30,000 per weighted ton of emissions reduced, applies to projects that bring vehicles and equipment up to current standards. The "Step 2" cost-effectiveness limit, $100,000 per weighted ton of emissions reduced, applies to projects that are zero-emission or meet the cleanest certified optional standard applicable (by source category).

All projects must meet the criteria stated in this PA and the CMP Guidelines in effect at the time of contract execution. A project's cost effectiveness is determined based on the annualized cost of the project and the amount of NOx, ROG and PM10 emission reductions that will be achieved by the project. Project cost effectiveness is currently calculated according to the following formula:

$$\frac{\text{Annualized Cost (\$/year)}}{\text{[NOx reduction + 20 (combustion PM10 reduction) + ROG reduction] (tons/year)}}$$

For projects that involve advanced technologies, the cost effectiveness will be calculated using the CMP's two-step calculation approach.[2]

All projects are expected to be operational within eighteen (18) months of contract execution or by May 20, 2022, whichever is earlier. Some projects may have earlier in-service operational date requirements, if they are subject to CARB regulations.

It is the applicant's responsibility to ensure that the most current information and requirements are reflected in a submitted project application. Applicants should check the CARB website for updates and advisories to the guidelines (www.arb.ca.gov/msprog/moyer/moyer.htm).

In cases of conflict between CARB guidelines and South Coast AQMD criteria, the more stringent criteria will prevail. South Coast AQMD will post any new information and requirements on its CMP Web page at www.aqmd.gov/moyer.

Projects subject to CARB regulations must submit a copy of the most recent CARB compliance report(s) or other documentation that provides South Coast AQMD with clear understanding of the fleet's compliance status.

All emission reductions resulting from funded projects will be credited to the Carl Moyer Program. A grant shall not be made that provides the applicant with funds in excess of the maximum eligible amount, in accordance with CMP guidelines.

[2] Detailed guidance for the new two-step calculation approach, as well as all CMP emissions reduction and cost effectiveness calculations is available at: https://www.arb.ca.gov/msprog/moyer/guidelines/2017gl/2017_gl_appendix_c.pdf.

A project may be leveraged with other funding sources. The applicant must disclose all funding sources at the time of application and will be required to report all funding sources prior to invoice payment. Other funding sources may include but are not limited to: federal funding programs that reduce greenhouse gas (GHG) emissions, funding provided by the Alternative and Renewable Fuel and Vehicle Technology Program, Air Quality Improvement Program, or CARB's Low Carbon Transportation Investment funds to reduce GHG emissions. The sum of all grants and other funds applied toward the project shall (1) not exceed the total project cost for public agency applicants and (2) not exceed 85% of the total project cost for non-public agency applicants. In other words, the grantee[3] must pay at least 15 percent of the project cost from non-public sources.

The emission reductions paid for by the CMP shall not be claimed by the other funding sources.

ELIGIBILITY INFORMATION

Emission reductions obtained through CMP projects must be real, surplus, quantifiable and enforceable. The emission reductions must not be required by any federal, state or local regulation, memorandum of agreement/understanding, settlement agreement, mitigation requirement or other legal mandate.

Engines operating under a regulatory compliance extension granted by CARB, an air district or the United States Environmental Protection Agency (U.S. EPA) are not eligible for funding.

Key program requirements for on- and off-road equipment categories are highlighted below; however, applicants are responsible for consulting the CMP guidelines for additional program limitations/requirements. For repower and replacement projects, the replacement engine must result in a minimum of 15 percent NOx reduction.

ON-ROAD VEHICLES

For purposes of the CMP, the following on-road vehicle classifications are used:

Vehicle Classification	GVWR
Light Heavy-Duty (LHD)	14,001 to 19,500 pounds
Medium Heavy-Duty (MHD)	19,501 to 33,000 pounds
Heavy Heavy-Duty (HHD)	Over 33,000 pounds

The proposed vehicle must be in the same weight class as the existing vehicle (LHD, MHD or HHD). The engine must be certified to the applicable heavy-duty intended service class as shown on the engine certification Executive Order. However, the following cases may be allowed: 1) MHD engines may be installed in HHD vehicles with GVWR up to 36,300 lbs. (10 percent higher than 33,000 lbs. GVWR) with written warranty verification by engine and chassis manufacturer, or 2) HHD engines may be installed in MHD vehicles if necessary for vocational purposes but only if the GVWR are within 10 percent of the HHD intended service class (i.e., GVWR of 29,701 lbs. or greater).

[3] Public agencies are exempt from this requirement.

Executive Orders for on-road vehicles may be downloaded at:
http://www.arb.ca.gov/msprog/onroad/cert/cert.php.

Project emission reductions will be based on the lower of two 12-month periods of California usage during the previous twenty-four months. Fleet averages cannot be used.

Replacement
This project type involves the replacement of an older, in-use vehicle with a newer, cleaner vehicle. The replacement engine must be 2013 or newer engine model year certified by CARB at or below the optional low NOx standard of 0.10 g/bhp-hr and PM emission standard of 0.01 g/bhp-hr. In alignment with South Coast AQMD's 2016 AQMP, all on-road projects under the CMP must select the optional low-NOx, hybrid or zero-emission technologies for fleet sizes of greater than 10 vehicles. Fleet size is determined based on the number of vehicles with a GVWR of 14,001 lbs or greater.

The South Coast AQMD requires that all on-road projects be operated within the South Coast AQMD jurisdiction for at least 75% of the time. Applicants must clearly demonstrate their compliance status with the applicable CARB regulation (i.e., Statewide Truck & Bus Regulation, Drayage Truck Regulation, Fleet Rule for Public Agencies & Utilities, Transit Bus Regulation, TRU ATCM, etc.) at the time of application submittal.

Please note that if you are an owner of a fleet with 10 or fewer vehicles (greater than 14,000 lbs. GVWR), you may be eligible for funding through the On-Road Voucher Incentive Program (VIP). Please refer to the South Coast AQMD's VIP Web page to explore funding opportunities for replacement at: www.aqmd.gov/vip.

In addition, the following on-road projects will be considered on a case-by-case basis:

- On-road vehicles with a GVWR between 8,501 and 14,000 pounds,
- Retrofits that reduce NOx by at least 15 percent; for engines that are certified above 0.01 g/bhp-hr PM, the retrofit must also reduce PM emissions by 85 percent,
- Zero-emission transport refrigeration units (TRUs). Hybrid TRU projects are not eligible.

Emergency Vehicles
Authorized emergency vehicles, as described in California Vehicle Code 165, including but not limited to fire apparatus, pumpers, ladder trucks, water tenders, and prisoner transport buses, are exempt from CARB regulations and therefore eligible for CMP funding. Eligible emergency vehicle projects are those in which an older, more polluting emergency vehicle is replaced with a new or used replacement vehicle with an engine meeting the current model year California emission standards. The older, replaced vehicle must be destroyed. Emergency vehicles are eligible for up to 80 percent of the eligible costs as outlined in the program guidelines.

A fire truck reuse option is also available on a case-by-case basis. The fire truck reuse option allows fire departments to give away the existing old vehicle and destroy another older vehicle in its place.

Repowers
This project type involves the repower of an existing, in-use engine with a new, cleaner engine. The replacement engine must be CARB-certified at or below the optional low-NOx emissions level of 0.10

g/bhp-hr NOx and 0.01 g/bhp-hr PM10. Repowers may be funded in various applications. However, due to technological constraints presented with the limited feasibility of newer engines with advanced emissions control equipment fitting into older chassis and maintaining durability, repowers with diesel engines are not eligible for on-road vehicles.

To ensure durability, certain repower projects may require prototype testing. If the project has been previously completed by the manufacturer, prototype testing is not required. The prototype testing must comply with the engine manufacturer quality assurance process that is equivalent to an Original Equipment Manufacturer (OEM) package. In these cases, a prototype vehicle (or vehicles) is thoroughly reviewed and tested to ensure that the installation meets OEM requirements, and the successful prototype installation is then replicated in other vehicles with the same chassis and engine combination. Per the CMP guidelines, air districts may approve repower projects that meet the OEM quality assurance process described above, subject to the following:

- Moyer Program funding may not be used for any costs associated with the prototype vehicle or vehicles.
- Repower contracts may not be executed until the prototype testing specified by the engine manufacturer is successfully completed.
- Written documentation from the engine manufacturer confirming that the prototype was successful must be maintained in the project file.
- If the proposed repower has been done previously by the manufacturer on the same chassis/engine configuration, prototype testing is not required. The manufacturer must provide written confirmation that the previous work was performed successfully and met OEM requirements.

Conversions

Conversions involve the replacement or modification of the original engine or vehicle to include either a cleaner engine or other system that provides motive power and change of the fuel type used. Hybrid conversion systems using internal combustion engines must be certified according to "California Certification and Installation Procedures for Medium-and Heavy-Duty Vehicle Hybrid Conversion Systems." The baseline engine model year for hybrid conversions must be 2010 or newer. The conversion system manufacturer must provide written confirmation that the funded vehicle would not exceed the certified allowable limit. All-electric conversion systems must receive an exemption Executive Order per Vehicle Code section 27156.

OFF-ROAD COMPRESSION-IGNITION EQUIPMENT

This category includes off-road, mobile compression ignition equipment with engines greater than 25 horsepower. Off-road heavy-duty equipment/engines include, but are not limited to, construction equipment, agricultural tractors, marine engines, shore power and locomotive equipment. Portable equipment is not eligible for CMP funding. The following off-road equipment projects may be eligible for funding:

- Repower: The replacement of an existing engine with a newer emission-certified engine, or zero-emission system, instead of rebuilding the existing engine to its original specifications.
- Retrofit: The installation of a CARB-verified emission control system on an existing engine. Examples include, but are not limited to, particulate filters and diesel oxidation catalysts.

- Equipment Replacement: The purchase of new or used equipment with an engine certified to the current emission standard (Tier 4 Final) or zero-emission technology to replace an older, fully functional piece of equipment that is to be scrapped.

For off-road replacement and repower projects (excluding marine engines), the CMP guidelines specify that the horsepower rating of the new (or replacement) engine must not be greater than 125 percent of the original manufacturer rated horsepower of the old (or existing) engine. If the new engine is greater than 125 percent, then the eligible funding amount will be based on the cost of an engine or equipment with a horsepower rating that is no higher than 125 percent of the existing engine horsepower rating. The applicant must pay the additional costs associated with the higher horsepower engine and obtain a price quote for an engine or equipment that is within the 125 percent range for the funding determination. In addition, verifiable records on the existing engine must be provided with the application to accurately identify the engine manufacture year and horsepower (e.g., photographs of engine labels, statement from engine manufacturers, etc.).

Construction Equipment

Fleets must be in compliance with CARB's In-Use Off-Road Diesel Vehicle Regulation (Off-Road Regulation) in order to be eligible for funding. Large fleets are no longer eligible for new diesel engine funding after December 31, 2019. However, large fleets that have received prior Carl Moyer Program funding after January 1, 2017, are only eligible for zero-emission project funding.

Applicants must submit information regarding fleet size and compliance status. **This must include the Diesel Off-Road On-line Reporting System (DOORS) ID of the fleet, the DOORS Compliance Snapshot, the DOORS equipment list, and the DOORS Equipment Identification Number (EIN) of the funded equipment.** All documentation submitted must be signed and dated by the applicant and include language certifying that the fleet list provided is accurate and complete.

Off-road projects fall into three distinct categories: 1) repower existing equipment with an emission-certified engine, 2) retrofit with a verified-diesel emission control strategy (VDECS), and 3) replacement of an older, fully functional piece of equipment (that is to be scrapped) by equipment with an engine certified as meeting the current off-road emission standards, or cleaner.

Marine Vessel Projects

Marine vessel project types include engine repower and shore power. Only existing engines on a marine vessel with a fully functioning non-resettable hour meter are eligible for CMP funding.

Marine Engine Repower

Vessels not subject to the in-use compliance requirements of CARB's Commercial Harbor Craft (CHC) Regulation such as fishing vessels, pilot boats and work boats are eligible. Vessels subject to the in-use compliance requirements of CARB's Commercial Harbor Craft (CHC) regulation (i.e., barge, crew/supply, dredge, excursion, ferry, towboat and tugboats) are also eligible as long as the vessel is fully compliant with the CHC Regulation (i.e., engines meet Tier 2 standards). Based on the vessel's operation, the newer engine's emissions must be surplus to the currently required U.S. EPA marine engine emission standard (i.e., Tier 3, Tier 4, etc.). Remanufacture kits, which are comprised of engine component parts that, when installed, reduce the engine's emissions, are subject to the same

requirements as engine repower projects. For all marine engine repower projects, the replacement engine must provide at least a 15 percent NOx reduction relative to the baseline engine.

Shore Power Projects
Limited CMP funding opportunities remain for shore power projects due to the applicability of CARB's At-Berth Regulation. Applicants must submit their CARB-approved Initial Terminal Plan to document compliance with CARB's Shore Power regulation. The proposed projects must provide emission reductions that are surplus to regulatory requirements. Projects not subject to CARB's regulation are eligible.

Locomotives
All new locomotives and replacement engines must be certified to Tier 4 standards or cleaner to be eligible for CMP funding. There are very limited CMP funding opportunities for Class 1 freight railroads. Such a project will be subject to a case-by-case approval by CARB. Class 3 freight railroads and passenger railroads are not subject to any CARB fleet regulations and are therefore eligible for CMP funding.

The following project types are eligible for CMP funding:

1. Locomotive replacement (the reuse and/or recycling of the baseline chassis is allowed if the baseline engine is destroyed)
2. U.S. EPA-certified engine remanufacture kit or repower
3. Head-end power (HEP) unit (apply as an off-road engine project).

DEFINITIONS

Alternative Fuel
Alternative fuels include compressed natural gas (CNG), liquefied natural gas (LNG), hydrogen (H2), methanol, ethanol, propane (LPG) and electric technologies. Experimental technologies and fuels will be referred to CARB for evaluation and possible eligibility in the Program.

Equipment Replacement
Equipment replacement means the replacement of an older vehicle or piece of equipment that still has remaining useful life with a newer, cleaner vehicle or piece of equipment. For this project type, applicant must have owned and operated the old equipment in California for the previous two years.

Repower
Vehicle repower means the replacement of an in-use engine with another, cleaner engine (more than 15 percent cleaner).

Retrofit
An emission control system employed exclusively with an in-use engine, vehicle or piece of equipment. CARB guidance requires the applicant to select the highest level technology certified for that engine that provides the most emission reductions. For many projects, this includes a diesel emission control device that reduces both PM and NOx emissions. In order to be eligible for CMP funding, the retrofit device must be verified for the specific engine family found on the equipment and

achieve the highest level emission reductions when compared to other verified retrofit devices. If a specific device reduces both NOx and PM, but the PM reduction from a retrofit is required by a regulation, only the NOx reduction may be eligible for funding.

South Coast AQMD Jurisdiction

The 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 area of 10,743 square miles is home to approximately 17 million people–about half the population of the whole state of California. It is the second most populated urban area in the United States and one of the smoggiest. Visit http://www.aqmd.gov/nav/about/jurisdiction for more information.

IMPORTANT PROGRAM INFORMATION

- Applicants **must** provide proof of ownership with their application. This may include vehicle/equipment title, bill of sale, or in the case of marine vessel projects, the U.S. Coast Guard registration documentation.

- Project equipment must operate a minimum of 75% of the time within the boundaries of the South Coast Air Basin (SCAB). An exemption is provided to line-haul locomotives, which are allowed an operational minimum of 51% operation within the SCAB.

- Applicants **must** provide vendor quotes with their application to document the cost of the low- or zero-emission vehicle/equipment project. Applicants may be awarded up to the designated percentage of total cost for the specified type of project (new purchase, repower replacement and/or retrofit), subject to funding caps and program cost-effectiveness limits. Eligible costs include installation labor and sales tax. **All quotes must have been obtained within 90 days prior to the application submittal date.**

- Applicants must provide legible engine tag photos of the baseline engine(s) or manufacturer specifications that document the engine serial number, horsepower, model year and engine family number, emissions certification level and CARB Executive Order (if controlled).

- A number of the CARB fleet rules and air quality regulations impact CMP eligibility. Compliance with existing CARB regulations is a pre-requisite for CMP funding. Only emission reductions in excess of regulatory requirements can be considered for CMP funding. If applicants are applying for CMP funds to reduce emissions before the required compliance date (i.e., early reductions), the equipment must demonstrate sufficient years of operation before the regulatory compliance deadline. Applicants are responsible for ensuring that they are in full compliance with all applicable regulations and that vehicle/equipment requests under the CMP provide surplus emission reductions. As noted earlier, applicants must provide documentation of their regulatory compliance status.

- Any **tax obligation** associated with the award is the responsibility of the grantee.

- All projects must be operational within eighteen (18) months of contract execution or May 20, 2022, whichever is earlier.

- All project invoices must be submitted for payment no later than May 20, 2022. Projects which have not invoiced by the applicable date may forfeit their funding.

- No third-party contracts will be executed.

- Pre- and post-inspection of all vehicles/engines/equipment approved for funding will be conducted, as required. Applicants must make all equipment available **locally (i.e., within the South Coast AQMD boundaries)** for inspections unless specified during contract preparation. Documentation of compliance with existing regulatory requirements is required at the time of pre-inspection.

- **Local** destruction of the engine and/or equipment being replaced is required for repower or replacement projects.

- The project's cost effectiveness will be based on the historical usage of the existing equipment for the previous two years. The usage for off-road equipment projects will be based on hours (except for locomotive projects, which require annual fuel consumption), and the usage for on-road vehicle projects will be based on mileage. The applicant must provide the historical usage records for the equipment as part of the application. If historical usage documentation is not available, the proposed annual usage provided by the applicant will be used to determine the project's cost effectiveness and specified as a requirement in the contract. For on-road projects, the emission reductions will be based on the lower of the two 12-month periods of California usage during the previous twenty-four months. Fleet averages cannot be used.

PROGRAM ADMINISTRATION

The CMP will be administered locally by the South Coast AQMD through its Technology Advancement Office. The South Coast AQMD reserves the right to allocate the CMP funds among the program categories or to specific projects in accordance with South Coast AQMD priorities. Additionally, the South Coast AQMD reserves the right to partially fund a project, such as the case where a project is found to exceed the cost effectiveness limit.

All qualified applications submitted in response to this PA will first be evaluated for completeness. South Coast AQMD staff will notify each applicant of an incomplete application and request the additional information within thirty (30) business days of the application submittal due date. South Coast AQMD will send letters to applicants regarding missing information. Applicants will have at least seven (7) business days to provide any missing information requested in the letter. It will be the applicant's responsibility to submit the missing or incomplete information within the time specified by South Coast AQMD staff. Only completed applications can move forward in the evaluation process; applications that remain incomplete after the seven-day response period will be rejected and will not be evaluated or further considered under the CMP.

Each project will be evaluated for its status as a Disadvantaged Community (DAC) or low-income community, as discussed in Section IV below. Each project will also be evaluated for cost effectiveness and ranked accordingly, except for infrastructure projects. Infrastructure projects are not subject to a cost-effectiveness limit, but instead will be evaluated on a competitive basis using metrics

that include, but are not limited to: fleet usage commitments, public access, project type (i.e., public, private, solar, wind, renewable natural gas), expected vehicle usage/throughput and cost share. Funding category allocations will be determined based on the evaluation and selection criteria in Section IV and subject to approval by the South Coast AQMD Governing Board.

Applications for fuel and engine technologies that are not certified, verified or approved by CARB, or falling outside the categories specifically discussed in this PA, may be referred to CARB for determination of CMP eligibility on a case-by-case basis. Please discuss these projects with South Coast AQMD staff prior to application submittal. Projects submitted for CARB case-by-case review will require the applicant to provide additional justification and documentation regarding the project and the applicant's justification for such consideration.

SCHEDULE OF EVENTS

Issue PA2020-04	March 6, 2020
Workshops	April – May 2020
All Applications Due by 1:00 pm	**Tuesday, June 2, 2020**
Awards Consideration by the Board	November 2020
Contract Execution	February - March 2021

ALL APPLICATIONS MUST BE RECEIVED ELECTRONICALLY OR ON PAPER AT THE SOUTH COAST AQMD HEADQUARTERS NO LATER THAN 1:00 P.M. ON TUESDAY, JUNE 2, 2020

Electronic submission using South Coast AQMD's new CMP Online Application Program (OAP) is preferred and is available at: www.aqmd.gov/moyer.

If a paper copy application is being submitted, postmarks will not be accepted as compliant with the deadline; the paper copy applications must be received at the South Coast AQMD Headquarters reception desk by the above deadline. Fax or email applications will not be accepted. Applicants may hand deliver applications to the South Coast AQMD by submitting the application to the South Coast AQMD reception desk. The application will be date and time-stamped and the person delivering the application will be given a receipt.

Paper applications must be legible. Illegible applications will be rejected.

South Coast AQMD will hold workshops during the application period to provide background and assistance with program requirements, eligibility and a tutorial for the OAP. These workshops are scheduled as follows:

ON-ROAD HEAVY-DUTY VEHICLE/INFRASTRUCTURE/MARINE VESSEL/SHORE POWER /CHE ELECTRIFICATION WORKSHOP

- **Wednesday, April 8, 2020 – 10 a.m. to Noon**

Port of Los Angeles Board Room
425 South Palos Verdes Street
San Pedro, CA 90731

OFF-ROAD AGRICULTURAL EQUIPMENT/ENGINES WORKSHOP

- **Wednesday, April 15, 2020 – 10 a.m. to 1 p.m.**
  Coachella Valley Mosquito & Vector Control District, Board Room
  43420 Trader Place
  Indio, CA 92201

ON-ROAD HEAVY-DUTY VEHICLE/INFRASTRUCTURE/OFF-ROAD HEAVY-DUTY EQUIPMENT WORKSHOP

- **Wednesday, April 22, 2020 – 10 a.m to 1 p.m.**
  Resurrection Church, Parish Hall
  3324 E. Opal Street
  Los Angeles, CA 90023

ON-ROAD HEAVY-DUTY VEHICLE/INFRASTRUCTURE/OFF-ROAD HEAVY-DUTY EQUIPMENT WORKSHOP

- **Thursday, May 7, 2020 – 9 a.m to Noon**
  Salt Lake Park, The Lounge
  3401 E. Florence Avenue
  Huntington Park, CA 90255

ON-ROAD HEAVY-DUTY VEHICLE/INFRASTRUCTURE/OFF-ROAD HEAVY-DUTY EQUIPMENT WORKSHOP

- **Tuesday, May 12, 2020 – 9 a.m to Noon**
  San Bernardino Valley College, Building B100
  701 South Mount Vernon Avenue
  San Bernardino, CA 92410

SCHEDULE OF CMP GENERAL WORKSHOPS:

- **Wednesday, April 29, 2020 - 9 a.m. to Noon**
  South Coast AQMD Headquarters, Conference Room CC6
  21865 Copley Drive
  Diamond Bar, CA 91765
- **Wednesday, May 6, 2020 – 9 a.m. to Noon**
  South Coast AQMD Headquarters, Conference Room CC6
  21865 Copley Drive
  Diamond Bar, CA 91765

Training and assistance with the online application system will be included in these workshops.

STATEMENT OF COMPLIANCE

Government Code Section 12990 and California Administrative Code, Title II, Division 4, Chapter 5, require employers to agree not to unlawfully discriminate against any employee or applicant because of race, religion, color, national origin, ancestry, physical handicap, medical condition, marital status, sex, or age. A statement of compliance with this clause is included in all South Coast AQMD contracts.

CONTACT FOR ADDITIONAL INFORMATION

Questions regarding the content or intent of this PA, procedural matters or locations of workshops should be addressed to:

Walter Shen
Science and Technology Advancement
South Coast Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765
Phone (909) 396-2487/FAX (909) 396-3252
wshen@aqmd.gov

SECTION II - WORK STATEMENT/SCHEDULE OF DELIVERABLES

Applicants must sign the Application form indicating their understanding of the requirements for submittal of additional project information to finalize a contract and that all vehicles, engines or equipment must be in operation within eighteen (18) months of contract execution or by May 20, 2022, whichever is earlier. **Unsigned applications may be deemed ineligible and may NOT be considered for funding.**

WORK STATEMENT

The scope of work involves a series of tasks and deliverables that demonstrate compliance with the requirements of the CMP as administered by CARB and the South Coast AQMD. The project applicant is responsible for developing detailed project plans and ordering equipment that complies with the program criteria and guideline requirements. In addition, alternative fuel project applicants must discuss their plan for refueling the proposed vehicles/equipment, and if appropriate, should provide a letter of agreement from their fuel provider (see Application forms).

At a minimum, any contract for funding the proposed project must meet the following criteria:

- Provide emission reductions that are real, surplus, quantifiable and enforceable in accordance with CMP guideline requirements.
- Meet the cost-effectiveness limit, as described in this PA and the CMP Guidelines, and subsequent CMP Advisories.
- For repower and replacement projects, the replacement engine must achieve an annual NOx emissions benefit of at least 15 percent to receive any funding for NOx reductions.
- Commit that project engines or equipment operate in service for the full project life, a minimum of three years[4], and at least 75 percent of annual operation must occur within the

[4] On-road projects may have a one-year minimum life, though it is difficult to qualify for meaningful grant funding with

South Coast AQMD except for line-haul locomotives. The line-haul locomotives may be eligible for funding with a minimum of 51% annual operation within the South Coast AQMD.

- The cost-effectiveness calculation is based on the percent operation within the South Coast AQMD boundary. Project life is the number of years used to determine the cost effectiveness and is equal to the contract term. The contract will include the percent operation as a minimum requirement (75% for all projects, except line-haul locomotives, which are allowed a 51% minimum).
- Commit that all vehicles/engines/equipment are in operation within 18 months of contract execution or by May 20, 2022, whichever is earlier.
- Provide for appropriate recordkeeping during the project life (i.e., annual mileage, fuel consumption and/or hours of operation), including submission of annual reports as detailed below.
- Ensure that the project complies with all applicable rules and regulations, and the resulting emission reductions from the project are not required as a mitigation measure to reduce adverse environmental impacts that are identified in an environmental document prepared in accordance with the California Environmental Quality Act or the National Environmental Policy Act.
- If requested, contractor must provide a financial statement and bank reference, or other evidence of financial ability to fulfill contract requirements.
- If requested, contractor must make all equipment and records available to the South Coast AQMD or CARB for audit and inspections.

DELIVERABLES

The contract will describe how the project will be monitored and what type of information must be submitted as part of the reporting requirements. At a minimum, the South Coast AQMD expects to receive an annual report for each year during the full contract term, or project life, which provides the annual miles or hours of operation[5], where the vehicle or equipment was operated, and operational and maintenance issues encountered and how they were resolved. South Coast AQMD reserves the right to verify the information provided.

Reporting forms are available online at: www.aqmd.gov/moyer.

SECTION III - APPLICATION SUBMITTAL REQUIREMENTS

Applicants are encouraged to apply for CMP funding using the South Coast AQMD's new CMP Online Application Program at: www.aqmd.gov/moyer. Applicants may also complete and submit a paper application with the appropriate application forms, which are listed in Appendix A. In addition, all Business Information Forms[6], including Conflict of Interest and Project Cost information, as described below, must also be submitted with the application. It is the responsibility of the applicant to ensure that all information submitted is accurate and complete.

such a short project life. In addition, off-road projects for small fleets may have a two-year minimum project life.

[5] Locomotive projects shall report annual fuel consumption.

[6] www.aqmd.gov/moyer

Submit the original plus three (3) complete paper copies and one digital copy of the entire application package. Do not include a copy of this PA in your application.

CONFLICT OF INTEREST

Applicant must address any potential conflicts of interest with other clients affected by actions performed by the firm on behalf of the South Coast AQMD. Although the applicant will not be automatically disqualified by reason of work performed for such firms, the South Coast AQMD reserves the right to consider the nature and extent of such work in evaluating the application. Conflicts of interest will be screened on a case-by-case basis by the South Coast AQMD General Counsel's Office. Conflict of interest provisions of the state law, including the Political Reform Act, may apply to work performed pursuant to this contract. Please discuss potential conflicts of interest on the Application Statement Form in Appendix A.

PROJECT COST

Applicants must provide cost information that specifies the amount of funding requested and the basis for that request by attaching vendor quotes to the application. The vendor quotes must be dated within 90 days of the application submittal date. Applicants need to inform vendors of the time frame of the award process so that they can estimate prices based on the future/projected order/purchase date.

Purchase orders or other purchase commitments shall not be placed until after the date of award approval by the South Coast AQMD Governing Board. Purchase orders may be placed after South Coast AQMD Governing Board approval and in advance of a fully executed contract, but these orders/commitments are placed at the applicant's own risk[7].

The CMP will fund only a percentage of the cost of the low emission or zero-emission technology based on the type of project**.** The proposed low-emission or zero-emission technology must be certified, verified or approved by CARB in most cases[8]. No administrative or operational costs will be funded.

All project costs must be clearly indicated in the application. In addition, applicants must disclose all sources of co-funding, including the name of the funding source and amount of funding in the application. **Applicants are cautioned that the project life period used in calculating emissions reductions will be used to determine the length of their annual reporting obligation.** In other words, a project applicant using a ten-year life for the emissions reduction calculations will be required to operate, track and report activity for the project vehicle for the full ten years. The contract term will also be ten years.

Applicants are not required to calculate a project's cost effectiveness. Methodologies for calculating cost effectiveness are provided in the CARB Moyer Guidelines at: https://www.arb.ca.gov/msprog/moyer/guidelines/2017gl/2017_gl_appendix_c.pdf.

[7] Any purchase order/purchase commitment placed prior to the South Coast AQMD Governing Board approval of the project are prohibited by the CMP. However, orders/commitments placed after South Coast AQMD Governing Board approval but in advance of a fully executed contract are at the purchaser's own risk.

[8] Note that an experimental permit from CARB may be considered, but the project will require special CARB approval.

APPLICATION SUBMISSION

All applications must be submitted according to specifications set forth herein. Failure to adhere to these specifications may be cause for rejection of the application without evaluation.

Staff Contact Information: South Coast AQMD staff contacts for each category are listed in Table 1 below. Applicants are strongly encouraged to contact South Coast AQMD staff to discuss their project prior to submitting an application to ensure program eligibility.

For Paper Copy Applications - Application Forms: (*This section does not pertain to applicants using the South Coast AQMD's CMP Online Application System.*) The application forms are identified in Appendix A. These must be completed and submitted with other required documents (i.e., Business Information Forms, activity documentation, project quotes, ownership records, registration, etc.) discussed in the application and below.

A separate Form A-1 is required for each category (i.e., on-road, marine, off-road, locomotive, etc.). For example, if an applicant is requesting funding for marine engine repowers and off-road construction equipment, then two (2) separate Form A-1 applications must be submitted – one for each category. In addition to each Form A-1, the applicable category Form is required for each piece of equipment for which grant funding is requested (i.e., B-1, C-1, etc.). For example:

Example Application Package:

Applicant X plans to submit a request for CMP funding to replace three vehicles and two locomotives. The forms required are:

- Form A-1(General Application Form), which includes:
  - Application Checklist
  - Application Statement
  - Business Information Forms (see details below)
- Complete a Form B-1(On-Road Heavy-Duty Vehicle Replacement), one for each vehicle to be replaced
- Complete a Form E-1(Locomotive Replacement), one for each locomotive to be replaced

Business Information Forms: Consists of business information forms that **must** be completed and submitted with the Application. Please note, if recommended for an award, you will be required to submit an updated Campaign Contribution Disclosure form at a later date. Download these forms at www.aqmd.gov/moyer.

Submit the original plus three (3) complete paper copies and one digital copy of all the entire application package.

Methods for Delivery:

1. Electronic Submittal: The preferred method of delivery for this solicitation is through South Coast AQMD's CMP Online Application Program (OAP), available at: www.aqmd.gov/moyer. This online system allows applicants to submit applications electronically to the South Coast

AQMD prior to the date and time specified below. South Coast AQMD "Business Information Forms" requiring signatures must be scanned and uploaded to the electronic application in PDF format. The system will not allow applications to be submitted after the due date and time.

First-time users must register as a new user to access the system. Applicants will receive a confirmation email after all required documents have been successfully uploaded. A tutorial of the system will be provided at the pre-application workshops and you may contact the Project Officer listed in Table 1 if you would like additional assistance.

2. Paper Copy Submittals – Although not preferred, an applicant may deliver the application in person or via a courier service or U.S. Mail. Applicants **shall submit the original plus three (3) complete signed copies of the application package (all forms and documents), as well as an electronic copy of the application and its supporting documents on a CD or flash drive,** in a sealed envelope, plainly marked in the upper left-hand corner with the name and address of the applicant and the words "**Program Announcement PA2020-04**. All paper copy applications shall be submitted in an environmentally friendly format: stapled, not bound, black and white print; no three-ring, spiral or plastic binders, and no card stock or colored paper. All application forms may be accessed from the South Coast AQMD's Carl Moyer Program homepage at www.aqmd.gov/moyer.

Due Date - All applications must be received, either via the OAP or on paper, no later than **1:00 p.m., on Tuesday, June 2, 2020.** Postmarks are not accepted as proof of deadline compliance. **Faxed or emailed applications will not be accepted**. Applications must be directed to:

Procurement Unit
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Any correction or resubmission done by the applicant will not extend the submittal due date.

Grounds for Rejection - An application may be immediately rejected if:

- It is not prepared in the format described
- It is not signed by an individual authorized to represent the firm
- Does not include current cost quotes, Contractor Statement Forms and other forms required in this PA.

Missing Information – Within thirty (30) business days of the application submittal due date of June 2, 2020, South Coast AQMD will email letters to applicants regarding the missing or incomplete information. Applicants will have seven (7) business days to provide any missing information requested in the letter. It will be the applicant's responsibility to submit the missing or incomplete information within the time specified by South Coast AQMD staff. Only complete applications can move forward in the evaluation process.

Disposition of Applications - The South Coast AQMD reserves the right to reject any or all applications. All responses become the property of the South Coast AQMD. One copy of each

application not selected for funding shall be retained for one year. Additional copies and materials will be returned only if requested and at the applicant's expense.

SECTION IV - APPLICATION EVALUATION/CONTRACTOR SELECTION CRITERIA

South Coast AQMD staff will evaluate all qualified applications and make recommendations to the Governing Board for final selection of project(s) to be funded. Each project will be evaluated based on two primary criteria: (1) the cost effectiveness of NOx, PM10 and ROG reduced, and (2) the project's status with respect to the disadvantaged community and low-income criteria prescribed by CARB.

Note: Infrastructure projects are not subject to a cost-effectiveness limit but instead will be evaluated on a competitive basis using metrics that include, but are not limited to: fleet usage commitments, public access, project type (i.e., public, private, solar, wind, renewable), expected vehicle usage/throughput and cost share.

Be aware that there is a possibility that due to program priorities, cost effectiveness or funding category limitations (i.e., caps), project applicants may be offered only partial funding, and not all applications that meet the cost-effectiveness criteria may be funded.

At least 50 percent of South Coast AQMD's CMP funds are targeted for projects that meet the criteria of a disadvantaged or low-income community. The Office of Environmental Health Hazard Assessment (OEHHA) in the California Environmental Protection Agency (CalEPA) has developed the California Communities Environmental Health Screening Tool: CalEnviroScreen Version 3.0 (CalEnviroScreen 3.0). The CalEnviroScreen 3.0 tool will be used by South Coast AQMD to identify projects that qualify as a DAC, which is defined as scoring in the top 25th percentile, and will strive to maximize the benefits to these communities from this PA. All applications will be assessed with the CalEnviroScreen tool to identify and verify if the project will benefit a DAC. This tool is available at: https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30

SECTION V - PAYMENT TERMS

For all projects except shore power projects, full payment will be made upon installation and commencement of operation of the funded equipment. For shore power projects, a progress payment schedule may be established that allows payment upon completion of key milestones, as delineated in the contract.

SECTION VI: SOUTH COAST AQMD STAFF CONTACTS AND ADDITIONAL RESOURCES

The South Coast AQMD staff contacts are listed in Table 1 by project category. Copies of the Program Announcement, Application Forms and a sample South Coast AQMD CMP contract may be accessed at: www.aqmd.gov/moyer.

Table 1: CMP Staff Contacts

Project Category	Staff Contact	Phone Number	Email

On-Road Heavy-Duty Vehicles	Tom Lee	(909) 396-2270	tlee@aqmd.gov
Off-Road Equipment	Walter Shen Greg Ushijima	(909) 396-2487 (909) 396-3301	wshen@aqmd.gov gushijima@aqmd.gov
Cargo Handling Equipment Electrification	Greg Ushijima	(909) 396-3301	gushijima@aqmd.gov
Marine Vessels	Ping Gui	(909) 396-3187	pgui@aqmd.gov
Shore Power	Greg Ushijima	(909) 396-3301	gushijima@aqmd.gov
Locomotives	Greg Ushijima Walter Shen	(909) 396-3301 (909) 396-2487	gushijima@aqmd.gov wshen@aqmd.gov
Infrastructure	Yuh Jiun Tan Tom Lee	(909) 396-2463 (909) 396-2270	ytan@aqmd.gov tlee@aqmd.gov

WEBSITE LINKS TO CARB RULES THAT AFFECT CMP ELIGIBILITY

On-Road Private (truck and bus) @ **http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm**

Drayage Truck Regulatory @ **https://www.arb.ca.gov/msprog/onroad/porttruck/porttruck.htm**

Public/Utility Fleets @ **http://www.arb.ca.gov/msprog/publicfleets/publicfleets.htm**

In-Use Off-Road @ **http://www.arb.ca.gov/msprog/ordiesel/ordiesel.htm**

Harbor Craft @ **http://www.arb.ca.gov/ports/marinevess/harborcraft.htm**

Cargo Handling Equipment @ **http://www.arb.ca.gov/ports/cargo/cargo.htm**

Shore Power @ **http://www.arb.ca.gov/ports/shorepower/shorepower.htm**

APPENDIX A

Table of Contents

South Coast AQMD encourages applicants to utilize the CMP Online Application Program to submit applications to the Year 21 CMP. The CMP Online Application Program is available at the South Coast AQMD Carl Moyer Program website at www.aqmd.gov/moyer. If you choose to submit a paper application, please utilize the application forms and other documents identified below. Each document listed below is available on South Coast AQMD's CMP website for download.

1. Application Checklist – one per applicant.

2. Form A-1: General Application (includes Checklist and Application Statement). Provide a complete set of Form A-1 documents for each equipment category (i.e., locomotive, marine, off-road, etc.). Read the Application Statement carefully – it is a certification of the applicant's understanding for each item listed.

3. Category Application Form specific to your project category (one per unit, or use excel templates referenced in the form for multiple unit projects)

   a) Form B-1: On-Road Heavy-Duty Vehicles, Replacement

   b) Form B-2: On-Road Heavy-Duty Vehicles, Repower

   c) Form B-3: Emergency Vehicles (Fire Apparatus)

   d) Form C-1: Off-Road Equipment Replacement

   e) Form C-2: Off-Road Equipment (Repower, Repower with Retrofit)

   f) Form C-3: Off-Road Equipment Retrofit

   g) Form C-4: Cargo Handling Equipment (CHE) Electrification

   h) Form D-1: Marine Vessels, Repower

   i) Form D-2: Marine Vessels, Shore Power

   j) Form E-1 through E-3: Locomotives
      - Form E-1: Locomotive Replacement
      - Form E-2: US Engine Remanufacture Kit or Repower/Refurbishment
      - Form E-3: Head-end power (HEP) Unit

   k) Form F-1: Infrastructure

4. Business Information Forms – complete, sign and submit all of these forms with your application.

APPLICATION CHECKLIST

Applicants are encouraged to submit their application using South Coast AQMD's online system. If you are applying in person, use this checklist to organize your paper copy application. Each of the following application sections is required to be submitted if you submit a paper application:

- ☐ A cover letter stating your grant request, how many pieces of equipment and/or engines included in the proposed project, and the funding amount being requested (per engine equipment/vehicle/vessel and for the total overall project). For applications covering more than one category, organize this information by project category (i.e., marine, locomotive, on-road, etc.)
- ☐ This Application Checklist (signed below).
- ☐ General Application Form A-1. Provide a separate Form A-1 for each category (i.e., marine, locomotive, etc.) for which grant funding is requested. Form A-1 also includes the Application Statement (signed and initialed, as applicable)
- ☐ Completed and **signed** Business Information Forms.[9] Ensure that these forms use consistent business/company name that is aligned with how the applicant files taxes for the project equipment. Contracts awarded under the CMP rely on these forms to establish the contract parties.
- ☐ Category Application Form specific to your project category (i.e., locomotive, off-road, marine, etc.), along with the following attachments/enclosures:
  - ☐ For multiple unit applications, applicants have the option to provide the information required by the applicable application form/category using an Excel spreadsheet.
  - ☐ Vendor quotes that have been obtained within 90 days prior to the application submittal date.
  - ☐ CARB Executive Orders for each engine. Download at (for the zero-emission vehicle or equipment, please provide a CARB's Approval Letter):
    On-road: http://www.arb.ca.gov/msprog/onroad/cert/cert.php
    Off-road: http://www.arb.ca.gov/diesel/cv.htm
  - ☐ Previous two years of historical records documenting equipment usage, retroactive to the date of application.

[9] These forms may be downloaded at: www.aqmd.gov/moyer.

Once completed, submit the original plus three (3) complete signed copies of the application package (all forms and documents), as well as an electronic copy of the application and its supporting documents on a CD or flash drive, in accordance with the Application Submittal Instructions. I understand that all documents, as listed above, are required in order to have a complete application package in order to be considered for funding under the Carl Moyer Program.

Signature	Date

Carl Moyer and SOON Application
Form A-1
General Application Form (page 1 of 3)

The SCAQMD is accepting applications for projects throughout its jurisdiction. All applications will be evaluated based on their cost-effectiveness and their disproportionate impact score as discussed in Section IV "Application Evaluation/ Contractor Selection Criteria" contained in Program Announcement. For additional information about SCAQMD's policies and application information, visit: www.aqmd.gov/moyer. In general, this program will follow CARB Carl Moyer Program guidelines, which are available at: http://www.arb.ca.gov/msprog/moyer/moyer.htm.

The submittal of an application does not guarantee approval for funding, but will be used to determine the potential emission reductions and eligible grant funding amount for the proposed project. Any equipment purchased prior to project approval by the SCAQMD Governing Board will not be eligible for funding. Applicant may, at their own risk, issue a purchase order for approved equipment prior to contract execution. Other than a purchase order, **no other work shall proceed** until a fully executed contract, i.e. signed by the applicant and SCAQMD Board Chairman and a pre-inspection, is completed.

Organization Information

Legal Name of Organization *

The legal organization name must be that of the legal equipment owner.

Organization Address

Mailing Address *

Street Address/P.O. Box

City *

State *

Zip *

County *

Primary Contact Name and Information

First Name

Last Name

Email Address
(A valid Email address is required. Eg. john@gmail.com)

Phone Number

Fax Number

Person Authorized to Sign Application and Execute Grant Agreement

First Name

Last Name

Email Address
(A valid Email address is required. Eg. john@gmail.com)

Phone Number

Fax Number

Third Party Information

Name of Person Who Completed the Application

What is Your Position?

How much are you being paid to complete this application for the owner or to assist in the proposed project?

What is the source of funds being used to pay you?

Signature of Third Party Person Who Completed the Application:

Date:

All information provided in this application will be used by SCAQMD staff to evaluate the eligibility of this application to receive program funds. SCAQMD staff reserves the right to request additional information and can deny the application if such requested information is not provided by the requested deadline. Incomplete or illegible applications will be returned to applicant or vendor, without evaluation. An incomplete application is an application that is missing information critical to the evaluation of the project.

Please read and check each item below to indicate understanding and agreement:

- ☐ I understand that this application is for evaluation purposes only and does not guarantee project funding. Only a fully executed Grant Agreement between the equipment owner and the District constitutes an obligation to fund a project.
- ☐ I certify to the best of my knowledge and under penalty of perjury that the information contained in this application is true and accurate.
- ☐ I understand that all vehicles/equipment, both existing and new, must be made available within the SCAQMD boundaries for inspection, unless otherwise approved by SCAQMD's Project Officer.
- ☐ The vehicle/engine will be used within the SCAQMD boundaries (with the emission reduction system operating) for at least the projected usage shown in this application, and no less than 75 percent of the time.
- ☐ I understand that it is my responsibility to ensure that all technologies are either verified or certified by the California Air Resources Board (CARB) to reduce NOx and/or PM pollutants. CARB Verification Letters and/or Executive Orders are attached, as applicable.
- ☐ I understand that for repower projects, I am required to install the highest level available verified diesel emission control device (VDECS), and that the costs of this device and associated installation are a CMP eligible expense. These costs may be included in the project grant request up to the maximum cost-effectiveness limit.
- ☐ I understand that there may be conditions placed upon receiving a grant and agree to refund the grant (or pro-rated portion thereof) if it is found that at any time I do not meet those conditions and if directed by the SCAQMD in accordance with the contract agreement.
- ☐ I understand that, for this equipment, I am required to disclose if I have applied for or received incentive funding from another entity or program. Failure to do so will disqualify me from Carl Moyer Program Funding.
- ☐ In the event that the vehicle(s)/equipment do not complete the minimum term of any agreement eventually reached from this application, I agree to ensure the equivalent project emissions reductions, or to return grant funds to the SCAQMD as required by the contract.
- ☐ I understand that all on-road engines in my fleet that are eligible for a low-NOx software upgrade (reflash) must be reflashed within 60 days of receipt of contract execution. I may self-certify that the reflash has been performed by submitting a receipt of the completed reflash or a picture of the "Low NOx Reflash Label" from the reflashed engine to SCAQMD.
- ☐ I understand that third party contracts are not permitted. A third party may, however complete an application on an owner's behalf. Third parties are required to list how much compensation, if any, they are receiving to prepare the application(s), and to certify that no Carl Moyer Program funds are being used for this compensation.
- ☐ I understand that off-road equipment applicants subject to CARB's In-Use Off-Road Diesel Vehicle Regulation (Off-Road Regulation) must submit information regarding fleet size and compliance status. This must include the Diesel Off-Road On-line Reporting System (DOORS) ID of the fleet and the DOORS Equipment Identification Number (EIN) of the funded equipment.
- ☐ I understand that additional project information may be requested during project review and must be submitted prior to final evaluation.
- ☐ I understand that all vehicles, engines or equipment funded by this program must be operational within eighteen (18) months of contract execution, or by the vehicle in service date as specified in the Statement of Work, whichever is earlier.
- ☐ All project applicants must submit documentation that supports the activity claimed in the application (i.e., fuel receipts, mileage logs and/or hour-meter readings covering the last two years). This documentation is attached.
- ☐ The grant contract language cannot be modified without the written consent of all parties. I have reviewed and accept the sample contract language.
- ☐ I understand that an IRS Form 1099 may be issued to me for incentive funds received under the Moyer Program. I understand that it is my

responsibility to determine the tax liability associated with participating in the Moyer Program.

I understand that an SCAQMD-funded Global Positioning System (GPS) unit will be installed on vehicles/equipment not operating within SCAQMD boundaries full time. I will submit data as requested and otherwise cooperate with all data reporting requirements. I also understand that the additional cost of the GPS unit will be added to the project cost when calculating cost-effectiveness, though the SCAQMD will pay for this system directly. ☐

I understand that the SCAQMD has the right to conduct unannounced inspections for the full project life to ensure the project equipment is fully operational at the activity level committed to by the contract. ☐

I understand that all emission reductions resulting from Carl Moyer funded projects will be retired and the Carl Moyer Program claims all emission reductions from its funded projects. I also understand that there is no double counting or splitting of emission reductions if I receive additional incentive funding. ☐

I understand that a tamper proof, non-resettable digital hour meter/odometer must be installed on all vehicles/equipment and that the digital hour meter/odometer will record the hours/miles accumulated within the SCAQMD boundaries. This cost is my responsibility. ☐

I understand that any tax credits claimed must be deducted from the CMP request. ☐
Please check one:

☐ I do not plan to claim a tax credit or deduction for costs funded by the CMP.

☐ I do plan to claim a tax credit or deduction for costs funded by the CMP.

If so please indicate amount here: $

☐ I plan to claim a tax credit or deduction only for the portion of incremental costs not funded by the CMP.

If so please indicate amount here: $

I have checked this box to indicate that there are no potential conflicts of interest with other clients affected by actions performed by the firm on behalf of SCAQMD. If I have not checked this box, I have attached a description to this application of the potential conflict of interest, which will be screened on a case-by-case basis by the SCAQMD District Counsel's Office. ☐

I understand and certify that I am currently in compliance with all federal, state and local air quality rules and regulations at the time of application submittal, and I am not aware of any outstanding or pending enforcement actions. ☐

Please indicate the Total Funding Requested (for the entire project, including all equipment/vehicle replacements, repowers, etc.): $ _____

By signing below, I cerify under penalty of perjury that the information provided in this application is accurate and true.

Please print the name of the signing authority (first and last name)

Signature of signing authority:

Please enter the application submission date:

__/__/____

APPLICATION CHECKLIST

Applicants are encouraged to submit their application using SCAQMD's online system. If you are applying in person, use this checklist to organize your paper copy application. Each of the following application sections is required to be submitted if you submit a paper application:

- ☐ A cover letter stating your grant request, how many pieces of equipment and/or engines included in the proposed project, and the funding amount being requested (per engine and for the total project). For applications covering more than one category, organize this information into project category (i.e., marine, locomotive, on-road, etc.)
- ☐ This Application Checklist (signed below).
- ☐ General Application Form A-1. Provide a separate Form A-1 for each category (i.e., marine, locomotive, etc.) for which grant funding is requested. Form A-1 also includes the following documents:
  - ☐ Application Statement (signed and initialed as applicable)
  - ☐ Completed and **signed** Business Information Forms[1]
- ☐ Category Application Form specific to your project category (i.e., locomotive, off-road, marine, etc.), along with the following attachments/enclosures:
  - ☐ Optional Excel Worksheet associated with applicable application form/category (you may use this form for multiple unit projects, if desired)
  - ☐ Vendor quotes dated no earlier than 90 days prior to the date of application submittal
  - ☐ CARB Executive Orders for each engine. Download at:
    On-road: http://www.arb.ca.gov/msprog/onroad/cert/cert.php
    Off-road: http://www.arb.ca.gov/diesel/cv.htm
  - ☐ Previous two years of historical records documenting equipment usage, retroactive to the date of application.

Once completed, please submit one original plus three (3) complete signed copies of the application package (all forms and documents), as well as an electronic copy of the application and its supporting documents on a CD or flash drive.

I understand that all documents, as listed above, are required in order to have a complete application package in order to be considered for funding under the Carl Moyer Program.

_____ _____

Signature Date

[1] These forms may be downloaded at: www.aqmd.gov/moyer

Carl Moyer Program Application
Form B-1
On-Road Heavy-Duty Vehicle Replacement

If you have any questions regarding this program or the application process, please contact Tom Lee at (909) 396-2270, tlee@aqmd.gov.

Existing Vehicle Information

Registered Owner:

Does the vehicle have a clean title (no lienholder on the title)? ○ Yes ○ No

Is this a public vehicle? ○ Yes ○ No

Has this equipment received Carl Moyer Program funds in the past? ○ Yes ○ No

Is the vehicle location the same as the applicant address? ○ Yes ○ No

If not, provide vehicle domiciling address:

Provide the vocation of the vehicle:

Vehicle Identification Number (VIN)		License Plate #	
Vehicle Fleet/Unit Number (If applicable)		Vehicle Model Year	
Vehicle Make		Vehicle Gross Weight Rating (GVWR)	
Vehicle Model			

Existing Engine Information

Engine Fuel Type		Engine Model	
Engine Make		ARB Engine Family Number	
Engine Model Year		Engine Serial Number	
		Engine Executive Order (EO) Number	

Carl Moyer Program Application
Form B-1
On-Road Heavy-Duty Vehicle Replacement

Project Information

ARB Fleet Regulation this vehicle is subject (Drayage,Truck and Bus Reg Solid Waste Collecton Vehilces, Public Fleet, Transit, etc.)

Provide TRUCRS ID Number or DTR number

Amount requested from SCAQMD for this vehicle ($)

Total Vehicle/Project Cost (From Quote: must equal)

What is your current fleet size? (Should reflect all diesel fuel vehicles with a GVWR greater than 14,000 lbs.)

If applicable did you register your fleet through ARB's TRUCRS Database by January 31, 2019? A Compliance Certificate will be required if the fleet is subject to Truck and Bus Reg. ○ Yes ○ No

Identify other funding sources to be used for this project

Applicant Co-Funding Amount

Operation Information

Percent operation in California (%)

Percent Operation in District (%)
SCAQMD District Boundaries
http://www.aqmd.gov/home/about/jurisdiction

Proposed Project Life (this is the number of years that the equipment must operate as specified in your SCAQMD contract)

Maximum Project Life for On-Road Projects:

Replacements	**7 Years**
Transit Bus Replacements	**12 Years**
Repowers	**7 Years**
School Bus Replacements	**10 Years**
Electric Conversions	**5 Years**
Emergency Vehicles	**14 Years**
Other on-Road Projects	**3 Years**

Carl Moyer Program Application
Form B-1
On-Road Heavy-Duty Vehicle Replacement

Replacement Vehicle and Vendor Information

Replacement Vehicle Cost (including taxes)		Is this a public fleet vehicle?	○ Yes ○ No
Replacement Vehicle Make		Replacement Vehicle Model	
Replacement Vehicle Model Year		Replacement Vehicle GVWR	
Vendor		Vendor Contact Name	
Vendor Address		Vendor Phone Number	
Vendor City		Vendor State	
Vendor Zip			

Replacement Engine Information

Engine Fuel Type		Engine Make	
Engine Model		Engine Model Year	
Engine Family Number		ARB Certification Executive Order (EO) Number (if zero-emission, attach ARB Approval Letter)	

Download the EO at: http://www.arb.ca.gov/msprog/onroad/cert/cert.php

The proposed engine for the project must be consistent with the Intended Service Class per the EO (MHD Intended Service Class engines cannot be used for projects which have the HHD vehicle classifications). Applicant must ATTACH a copy of the referenced Executive Order with the application. Download the EO at: http://www.arb.ca.gov/msprog/onroad/cert/cert.php

Carl Moyer Program Application
Form B-1

On-Road Heavy-Duty Vehicle Replacement

Engine Activity Information

Please provide projected annual usage for the new equipment over the proposed life of the project. This projection should be based on actual usage data for the baseline, or existing, equipment. Applicants requesting evaluation based on fuel consumption MUST provide both mileage and fuel records from the past 24 months. Supporting documentation may be in the form of maintenance records, fuel receipts, logs, or other paperwork for each piece of baseline equipment covering at least the past 24 months. No such documentation is required for project evaluations based solely on mileage.

Activity Information

Existing Engine - Annual operation details for the past 24-months

	March 2020 Mileage	March 2019 Mileage	March 2018 Mileage
Odometer Reading			

Miles Travelled – List the cities / zip codes the vehicle typically travels:

Carl Moyer Program Application Form B-1

On-Road Heavy-Duty Vehicle Replacement Attachments

The following attachments must be submitted for this proposal:

- Insurance Documentation (showing coverage from March 2017 through March 2019)
- Photo of the vehicle GVWR and VIN
- Photo of the engine model year, engine serial number and the engine family number
- Vehicle California DMV registration (showing continuous coverage from March 2017 through March 2019)
    - *For seasonal drivers: vehicle must have been registered in California for three to six continuous months per 12 month period for the previous 24 months.*
- Engine Executive Order(s) and Retrofit Device Executive Order(s)(For both the current and proposed new equipment)
- Quotes (must be within 90 days of application submittal and include applicable taxes and fees)
- Equipment Usage Documentation (for past 24 – months: must support the readings listed under activity Information)
- ARB Approval Letter (for Zero-Emission projects)
- Business Information Request Form
- Campaign Contribution Disclosure
- W-9 Form Direct
- Deposit Form
- Business Status Certification
- Certification of Debarment, Suspension and Other Responsibility Matters
- ARB's Compliance Certificate or Printout from Drayage Truck Registry with vehicle VIN listed
- Vehicle Title

Carl Moyer Program Application
Form B-2
On-Road Heavy-Duty Equipment
Repower Only : Vehicle Information

If you have any questions regarding this program or the application process, please contact Tom Lee at (909) 396-2270, tlee@aqmd.gov.

Existing Vehicle Information

Registered Owner

Has this equipment received Carl Moyer Program funds in the past? Yes No

Is the vehicle location address the same as the applicant address? If not, please complete below. Yes No

Street Address (if no address, please provide intersection)

City

County

State

Zip

Vehicle Type

If other, please describe:

Vehicle Identification Number (VIN)

Vehicle Make

Vehicle Model

Vehicle Model Year

Gross Vehicle Weight Rating (GVWR)

License Plate #

Unit Number

Carl Moyer Program Application
Form B-2
On-Road Heavy-Duty Equipment
Repower Only : Project Details

Name of California State Fleet Regulation this vehicle is subject to

Provide TRUCRS ID or DTR Number

Amount requested from SCAQMD for the project (includes all vehicles in proposal)

What is your current fleet size? (Should reflect all diesel fuel vehicles with a GVWR greater than 14,000 lbs.)

If applicable did you register your fleet through ARB's TRUCRS Database by January 31, 2019? ◯ Yes ◯ No

Total Funding Requested

Identify other funding sources to be used for this project:

Total Project Cost (From Quote: MUST EQUAL QUOTE)

Applicant Co-Funding Amount

Operation Information

Percent operation in California (%)

Percent Operation in District (%)
SCAQMD District Boundaries http://www.aqmd.gov/home/about/jurisdiction

Proposed Project Life (this is the number of years that the equipment must operate as specified in your SCAQMD contract)

Maximum Project Life for On-Road Projects

Replacements	7 years
Transit Bus Replacements	12 years
Repowers	7 Years
School Bus Replacements	10 years
Electric Conversions	5 years
Emergency Vehicles	14 years
Other On-Road Projects	3 years

Carl Moyer Program Application
Form B-2
On-Road Heavy-Duty Equipment
Repower Only : Engine Information

Baseline Engine Information

Engine Fuel Type		Engine Model	
Engine Make		Engine Serial Number	
Engine Model Year		ARB Engine Family Number	

New Engine Information

New Engine Fuel Type			
New Engine Make		New Engine Model	
New Engine Model Year			
New Engine ARB Engine Family Number			

ARB Certification Executive Order (EO) Number (if zero-emission, attach ARB Approval Letter)	

Funding Information

New Engine Cost (Including Tax)		New Engine Installation Cost	
Grant Request Amount for this Repower			
Vendor		Vendor Contact Name	
Vendor Phone Number		Vendor Address	
Vendor City		Vendor State	
Vendor Zip			

The proposed engine for the project must be consistent with the Intended Service Class per the EO (MHD Intended Service Class engines cannot be used for projects which have the HHD vehicle classifications). Applicant must ATTACH a copy of the referenced Executive Order with the application. Download the EO at: http://www.arb.ca.gov/msprog/onroad/cert/cert.php

Carl Moyer Program Application
Form B-2
On-Road Heavy-Duty Equipment
Repower Only : Engine Activity Information

Please provide projected annual usage for the new equipment over the proposed life of the project. This projection should be based on actual usage data for the baseline, or existing, equipment. Applicants requesting evaluation based on fuel consumption MUST provide both mileage and fuel records from the past 24 months. Supporting documentation may be in the form of maintenance records, fuel receipts, logs, or other paperwork for each piece of baseline equipment covering at least the past 24 months. No such documentation is required for project evaluations based solely on mileage.

Activity Information

Baseline Engine - Annual operation details for the past 24-months

	March 2020	March 2019	March 2018
Odometer Reading			
Fuel Use (gallons/year)			

Mile Traveled - List the cities/ zip codes the vehicle typically travels:

Carl Moyer Program Application
Form B-2
On-Road Heavy-Duty Equipment
Repower Only : Attachments

The following attachments must be submitted for this proposal:

- Insurance Documentation (showing coverage from March 2017 through March 2019)
- Photo of the vehicle GVWR and VIN
- Photo of the engine model year, engine serial number and the engine family number
- Vehicle California DMV registration (showing continuous coverage from March 2017 through March 2019)
    - *For seasonal drivers: vehicle must have been registered in California for three to six continuous months per 12 month period for the previous 24 months.*
- Engine Executive Order(s) and Retrofit Device Executive Order(s)(For both the current and proposed new equipment)
- Quotes (must be within 90 days of application submittal and include applicable taxes and fees)
- Equipment Usage Documentation (for past 24 – months: must support the readings listed under activity Information)
- ARB Approval Letter (for Zero-Emission projects)
- Business Information Request Form
- Campaign Contribution Disclosure
- W-9 Form Direct
- Deposit Form
- Business Status Certification Certification of Debarment, Suspension and
- Other Responsibility Matters
- ARB's Compliance Certificate or Printout from Drayage Truck Registry with vehicle VIN listed

Carl Moyer Program Application
Form B-3
On-Road Emergency Equipment (Fire Apparatus)
New Only : Equipment Information

If you have any questions regarding this program or the application process, please contact Tom Lee at (909) 396-2270, tlee@aqmd.gov.

Existing Vehicle Information

Registered Owner

Has this equipment received Carl Moyer Program funds in the past? Yes No

Is the vehicle location address the same as the applicant address? If not, please complete below. Yes No

Street Address (if no address, please provide intersection)

City

County

State

Zip

Vehicle Type

If other, please describe:

Is the vehicle an Authorized Emergency Vehicle?
(Authorized emergency vehicles as described in the California Vehicle Code, sections 27156.2 and 165? including, but not limited to pumpers, ladder trucks, and water tenders) Yes No

Proposed Project Life (in years)
This is the number of years that the equipment must operate as specified in your SCAQMD contract. (The maximum project life available for fire apparatus is 14 years and represents the average remaining useful life of the vehicle.)

Vehicle Identification Number (VIN)

Vehicle Make

Vehicle Model

Vehicle Model Year

Gross Vehicle Weight Rating (GVWR)

License Plate #

Unit Number

I have attached proof of California registration for the past 24-months and a copy of the Title, proving ownership (without lien holder) for each project vehicle. Yes No

Is 2 to 1 Replacement Applied? Yes No

Replacement Vehicle and Vendor Information

New Vehicle Make

New Vehicle Model

New Vehicle Model Year

New Vehicle Cost

New Vehicle GVWR

Vendor

Vendor Contact Name

Vendor Phone Number

Vendor Address

Vendor City

Vendor State

Carl Moyer Program Application
Form B-3
On-Road Emergency Equipment (Fire Apparatus)
New Only : Project Details

Describe type of apparatus:

Are the project vehicle(s) being submitted for funding under this category exempt from ARB Regulations?
Authorized emergency vehicle(s) are described under California Vehicle Code Sections 27156.2 and 165.

( ) Yes ( ) No

Is this a public fleet vehicle?

( ) Yes ( ) No

Grant Request Amount

Total Funding Requested

Identify other funding sources to be used for this project

Total Project Cost (From Quote: MUST EQUAL QUOTE)

Applicant Co-Funding Amount

Operation Information

Percent operation in California (%)

Percent Operation in District (%)

Carl Moyer Program Application
Form B-3
On-Road Emergency Equipment (Fire Apparatus)
New Only : Engine Information

Baseline Engine Information

Engine Fuel Type

Engine Make

Engine Model Year

Engine Model

Engine Serial Number

ARB Engine Family Number

ARB Certification Executive Order (EO) Number (if zero-emission, attach ARB Approval Letter)

Download the EO at: http://www.arb.ca.gov/msprog/onroad/cert/cert.php

New Engine Information

Engine Fuel Type

Engine Make

Engine Model Year

Engine Model

ARB Engine Family Number

ARB Certification Executive Order (EO) Number (if zero-emission, attach ARB Approval Letter)

The proposed engine for the project must be consistent with the Intended Service Class per the EO (MHD Intended Service Class engines cannot be used for projects which have the HHD vehicle classifications). Applicant must ATTACH a copy of the referenced Executive Order with the application. Download the EO at: http://www.arb.ca.gov/msprog/onroad/cert/cert.php

Carl Moyer Program Application
Form B-3
On-Road Emergency Equipment (Fire Apparatus)
New Only : Engine Activity Information

Please provide projected annual usage for the new equipment over the proposed life of the project. This projection should be based on actual usage data for the baseline, or existing, equipment. Applicants requesting evaluation based on fuel consumption MUST provide both mileage and fuel records from the past 24 months. Supporting documentation may be in the form of maintenance records, fuel receipts, logs, or other paperwork for each piece of baseline equipment covering at least the past 24 months. No such documentation is required for project evaluations based solely on mileage.

Activity Information

Baseline Engine - Annual operation details for the past 24-months. If fuel based evaluation you must also provide mileage.

	March 2020	March 2019	March 2018	Estimated Annual Future Usage
Odometer Reading				
Fuel Use (gallons/year)				

Carl Moyer Program Application
Form B-3
On-Road Emergency Equipment (Fire Apparatus)
New Only : Attachments

The following attachments may be submitted for this proposal:

- Vehicle Registration
- Vehicle Title
- Equipment Usage Documentation (for past 24 – months: must support the readings listed under activity Information)
- ARB Approval Letter (for Zero-Emission)
- Fuel/Mileage Logs
- Engine Executive Order(s) and Retrofit Device Executive Order(s)
- Quotes (must be within 90 days of application submittal)
- Business Information Request Form
- Campaign Contribution Disclosure
- W-9 Form
- Direct Deposit Form
- Miscellaneous Documents
- Business Status Certification
- Certification of Debarment, Suspension and Other Responsibility Matters

Carl Moyer and SOON Application
Form C-1
Off-Road Equipment Replacement
Equipment Information (page 1 of 2)

If you have any questions regarding this program or the application process, please contact Walter Shen by phone at (909) 396-2487 or by email at wshen@aqmd.gov.

Large Off-Road Fleets have limited eligibility for Carl Moyer Program funding, but may apply for SOON Program funding using this application. For more information, please visit www.aqmd.gov/SOON.

Please complete ONE (1) Form for each piece of equipment.

Existing Equipment Information

Are you applying under Carl Moyer Program OR the Surplus Off-Road NOx Program?

Has this equipment received Carl Moyer Program funds in the past? ○ Yes ○ No

For Large Fleets Only - have you received Carl Moyer funding after January 1, 2017? ○ Yes ○ No

What is the primary function of this equipment?

Is the vehicle location address the same as the applicant address? If not, please complete below. ○ Yes ○ No

Street Address (if no address, provide intersection)

City

County

State

Zip

Vehicle Type

If other, please describe:

Equipment Category

Equipment Type

If other equipment type, please describe

Equipment Make

Equipment Model

Equipment Model Year

Equipment Serial Number or VIN

Unit Number or EIN#(for non-Ag Operations)

Is 2 to 1 Replacement Applied? ○ Yes ○ No

Number of Main Engines

Number of Auxiliary Engines

Is this equipment used in Agricultural operations? ○ Yes ○ No

What percentage of equipment operations are in Agriculture?

Carl Moyer and SOON Application
Form C-1
Off-Road Equipment Replacement
Equipment Information (page 2 of 2)

New Equipment and Vendor Information

Unit Number		Equipment Category	
Equipment Type			

If other equipment type, please describe

Equipment Make		Equipment Model	
Equipment Model Year			
Vendor		Vendor Contact Name	
Vendor Phone Number		Vendor Address Vendor	
Vendor City		State	
Vendor Zip			

All cost estimates must be based on quotes that have been obtained within 90 days prior to the closing date of the Program Announcement. Attach all quotes to the application.

Number of engines for this New Equipment Unit:

Main (Front) Engine(s)		Auxiliary (Rear) Engine(s)	
New Replacement Unit Cost $		Tax $	
Total Cost for this Replacement $		Applicant Co-Funding Amount (If Any) $	
Applicant Grant Request (If Any) $			

Carl Moyer and SOON Application
Form C-1
Off-Road Equipment Replacement
Project Details

Is equipment currently subject to CARB's Off-Road Regulation? ◯ Yes ◯ No

What is the total horsepower of all vehicles in the fleet?

Enter DOORS Fleet Number

All Off-Road equipment applicants subject to CARB's In-Use Off-Road Diesel Vehicle Regulation must submit their DOORS fleet compliance snapshot and fleet vehicle list.

You may contact the DOORS hotline at (877) 593-6677 for assistance.

SOON applications must also submit the fleet average calculation. Please visit https://arb.ca.gov/msprog/ordiesel/fac.htm for more information.

Total Funding Requested (for this Replacement ONLY)

Identify other funding sources to be used for this project

Total Project Cost (From Quote: MUST EQUAL QUOTE)

Applicant Co-Funding Amount

Operation Information

Is existing equipment in operable condition? ◯ Yes ◯ No

How many years has the applicant owned the existing equipment?

Does this vehicle have a functioning, non-resettable hour meter? ◯ Yes ◯ No

Percent Operation in California

Percent Operation in District
Note: See http://www.aqmd.gov/home/about/jurisdiction for a jurisdiction map.

Proposed Project Life (this is the number of years that the equipment must operate as specified in your SCAQMD contract)

Carl Moyer and SOON Application
Form C-1
Off-Road Equipment Replacement
Engine Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Existing/Baseline Engine Information

Baseline Engine Type	◯ Main ◯ Auxiliary		
Baseline Engine Fuel Type			
Baseline Engine Make		Baseline Engine Model	
Baseline Engine Model Year		Baseline Engine Serial Number	
Baseline Engine Horsepower		Baseline Engine Family Number	
Old Engine (Baseline) Emissions Tier			

New Engine Information

New Engine Fuel Type			
New Engine Make		New Engine Model	
New Engine Model Year		New Engine Serial Number	
New Engine Horsepower		New Engine Family Number	
New Engine (Reduced) Emissions Tier			

Carl Moyer and SOON Application
Form C-1
Off-Road Equipment Replacement
Engine Activity Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Project application must include documentation of existing equipment usage for the previous 24 months prior to the application date.

Baseline Engine - Annual operation details for the past 24-months

	Jan - Date of Application Submittal 2020	Jan - Dec 2019	Mar - Dec 2018	Estimated Annual Future Usage
Hours				

Carl Moyer and SOON Application
Form C-1
Off-Road Equipment Replacement
Attachments

The following attachments must be submitted for this application:

- Insurance Documentation
- Engine Executive Order(s) and Retrofit Device Executive Order(s)
- Quotes (must be within 90 days of application submittal)
- Equipment Usage Documentation (for past 24 – months including, but not limited to, maintenance records, hour meter readings)
- Photo showing the baseline engine (old) engine model year, engine serial #, HP, engine family # (if available)
- Equipment Ownership (Bill of Sale)
- SOON Fleet Average Calculation (please go to https://arb.ca.gov/msprog/ordiesel/fac.htm) - only for applicants applying for SOON funding (only if applying under SOON Program)
- DOORS Fleet Compliance Snapshot including vehicle list
- Business Information Request Form
- Campaign Contribution Disclosure
- Business Status Cert
- W-9 Form
- Direct Deposit Form
- Certification of Debarment, Suspension and Other Responsiblity Matters

Carl Moyer and SOON Application
Form C-2
Off-Road Equipment Repower
Equipment Information

If you have any questions regarding this program or the application process, please contact Walter Shen by phone at (909) 396-2487 or by email at: wshen@aqmd.gov

Large Off-Road Fleets have limited eligibility for Carl Moyer Program funding, but may apply for SOON Program funding using this application. For more information, please visit www.aqmd.gov/SOON.

Please complete ONE (1) form for each piece of equipment.

Existing Equipment Information

Are you applying under Carl Moyer Program OR the Surplus Off-Road NOx Program?

Has this equipment received Carl Moyer Program funds in the past? ◯ Yes ◯ No

For Large Fleets Only - have you received Carl Moyer funding after January 1, 2017? ◯ Yes ◯ No

What is the primary function of this equipment?

Is the vehicle location address the same as the applicant address? If not, please complete below. ◯ Yes ◯ No

Street Address (if no address, provide intersection)

City

County

State

Zip

Vehicle Type

If other, please describe:

Equipment Category

Equipment Type

If other equipment type, please describe

Equipment Make

Equipment Model

Equipment Model Year

Equipment Serial Number or VIN

Unit Number or EIN# (for non-Ag Operations)

Number of Main Engines

Number of Auxiliary Engines

Is this equipment used in Agricultural operations? ◯ Yes ◯ No

Carl Moyer and SOON Application
Form C-2
Off-Road Equipment Repower
Project Details

Is equipment currently subject to CARB's Off-Road Regulation? ◯ Yes ◯ No

What is the total horsepower of all vehicles in the fleet?

Enter DOORS Fleet Number

All Off-Road equipment applicants subject to CARB's In-Use Off-Road Diesel Vehicle Regulation must submit their DOORS fleet compliance snapshot and fleet vehicle list.

You may contact the DOORS hotline at (877) 593-6677 for assistance.

SOON applications must also submit the fleet average calculation. Please visit https://arb.ca.gov/msprog/ordiesel/fac.htm for more information.

Total Funding Requested (including Retrofit cost, if applicable)

Identify other funding sources to be used for this project

Total Project Cost (From Quote: MUST EQUAL QUOTE - incl. Retrofit if applicable)

Applicant Co-Funding Amount

Operation Information

Is existing equipment in operable condition? ◯ Yes ◯ No

How many years has the applicant owned the existing equipment?

Does this vehicle have a functioning, non-resettable hour meter? ◯ Yes ◯ No

Percent Operation in California

Percent Operation in District

Proposed Project Life (this is the number of years that the equipment must operate as specified in your SCAQMD contract)

Carl Moyer and SOON Application
Form C-2
Off-Road Equipment Repower
Engine Information (page 1 of 2)

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Existing/Baseline Engine Information

Baseline Engine Type ○ Main ○ Auxiliary

Baseline Engine Fuel Type

Baseline Engine Make

Baseline Engine Model

Baseline Engine Model Year

Baseline Engine Serial Number

Baseline Engine Horsepower

Baseline Engine Family Number

Old Engine (Baseline) Emissions Tier

Method proposed for rendering the baseline engine(s) inoperable

New Engine Information

New Engine Fuel Type

New Engine Make

New Engine Model

New Engine Model Year

New Engine Serial Number

New Engine Horsepower

New Engine Family Number

New Engine (Reduced) Emissions Tier

Is the New Engine a Family Emissions Limit (FEL) engine? ○ Yes ○ No

New Engine Cost Information

New Engine Unit Cost

Cost of Installation/Labor

Cost of New Engine Tax

Total Cost of Repower

Applicant Co-Funding Amount (if any)

Grant Request Amount for this Repower

All cost estimates must be based on quotes that have been obtained within 90 days prior to the closing date of the Program Announcement. Attach all quotes to the application.

New Engine Vendor Information

Vendor

Vendor Contact Name

Vendor Phone Number

Vendor Address

Vendor City

Vendor State

Vendor Zip

Carl Moyer and SOON Application
Form C-2
Off-Road Equipment Repower
Engine Information (page 2 of 2)

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Engine Retrofit Information

Will a retrofit device be added to this engine as part of this project? ◯ Yes ◯ No

Retrofit Device Make		Retrofit Device Model	
% PM Reduction		% NOX Reduction	
% ROG Reduction		Retrofit Device ARB Executive Order Number	
Project Life			

Retrofit Cost Information

Retrofit Device System Cost		Retrofit Device Installation Cost	
Total Cost of Retrofit		Amount requested for this retrofit	$

Carl Moyer and SOON Application
Form C-2
Off-Road Equipment Repower
Engine Activity Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Project application must include documentation of existing equipment usage for the previous 24 months prior to the application date.

Baseline Engine - Annual operation details for the past 24-months

	Jan - Date of Application Submittal 2020	Jan - Dec 2019	Mar - Dec 2018	Estimated Annual Future Usage
Hours				

Carl Moyer and SOON Application
Form C-2
Off-Road Equipment Repower
Attachment

The following attachments must be submitted for this application:

- Insurance Documentation
- Engine Executive Order(s) and Retrofit Device Executive Order(s)
- Quotes (must be within 90 day of application submittal)
- Equipment Usage Documentation (for past 24 – months including, but not limited to, maintenance records, hour meter readings)
- Photo showing the baseline (old) engine model year, engine serial #, horsepower, engine family # (if available)
- SOON Fleet Average Calculation (please go to https://arb.ca.gov/msprog/ordiesel/fac.htm) - only for applicants applying for SOON funding (only if applying under SOON Program)
- DOORS Fleet Compliance Snapshot - including vehicle list
- Business Information Request Form
- Campaign Contribution Disclosure
- W-9 Form
- Direct Deposit Form
- Business Status Certification
- Certification of Debarment, Suspension and Other Responsibility Matters

Carl Moyer and SOON Application
Form C-3
Off-Road Equipment Retrofit
Equipment Information

If you have questions regarding this program or the application process, please contact Walter Shen by phone at (909) 396-2487 or by email at: wshen@aqmd.gov.

Existing Equipment Information

Are you applying under Carl Moyer Program OR the Surplus Off-Road NOx Program?

Has this equipment received Carl Moyer Program funds in the past? ○ Yes ○ No

What is the primary function of this equipment?

Is the vehicle location address the same as the applicant address? If not, please complete below. ○ Yes ○ No

Street Address (if no address, provide intersection)

City

County

State

Zip

Vehicle Type

If other, please describe:

Equipment Category

Equipment Type

If other equipment type, please describe

Equipment Make

Equipment Model

Equipment Model Year

Equipment Serial Number or VIN

Unit Number

Number of Main Engines

Number of Auxiliary Engines

Is this equipment used in Agricultural operations? ○ Yes ○ No

Carl Moyer and SOON Application
Form C-3
Off-Road Equipment Retrofit
Project Details

Is equipment currently subject to CARB's Off-Road Regulation? ◯ Yes ◯ No

What is the total horsepower of all vehicles in the fleet?

Enter DOORS Fleet Number

All Off-Road equipment applicants subject to CARB's In-Use Off-Road Diesel Vehicle Regulation must submit their DOORS fleet compliance snapshot and fleet vehicle list.

You may contact the DOORS hotline at (877) 593-6677 for assistance.

SOON applications must also submit the fleet average calculation. Please visit https://arb.ca.gov/msprog/ordiesel/fac.htm for more information.

Total Funding Requested

Identify other funding sources to be used for this project

Total Project Cost (From Quote: MUST EQUAL QUOTE)

Applicant Co-Funding Amount

Operation Information

Is existing equipment in operable condition? ◯ Yes ◯ No

How many years has the applicant owned the existing equipment?

Does this vehicle have a functioning, non-resettable hour meter? ◯ Yes ◯ No

Percent Operation in California

Percent Operation in District
See http://www.aqmd.gov/home/about/jurisdiction for a jurisdiction map.

Proposed Project Life (this is the number of years that the equipment must operate as specified in your SCAQMD contract)

Carl Moyer and SOON Application
Form C-3
Off-Road Equipment Retrofit
Engine & Retrofit Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Existing/Baseline Engine Information

Baseline Engine Type	◯ Main ◯ Auxiliary		
Baseline Engine Fuel Type			
Baseline Engine Make		Baseline Engine Model	
Baseline Engine Model Year		Baseline Engine Serial Number	
Baseline Engine Horsepower		Baseline Engine Family Number	
Old Engine (Baseline) Emissions Tier			

Engine Retrofit Information

Retrofit Device Make		Retrofit Device Model	
Verification Level		Project Life	
Verified % PM Reduction		Verified % NOX Reduction	
Verified % ROG Reduction		Retrofit Device ARB Executive Order Number	
Retrofit Device Serial Number			

Retrofit Cost Information

Retrofit Device System Cost		Retrofit Device Installation Cost	
Tax Amount for Retrofit		Total Cost of Retrofit	
Maintenance Cost		Amount requested for this retrofit	
Retrofit Dealer Vendor			

All cost estimates must be based on quotes that have been obtained within 90 days prior to the closing date of the Program Announcement. Attach all quotes to the application. The data-logging cost of a retrofit project cannot be included in the eligible project cost.

Carl Moyer and SOON Application
Form C-3
Off-Road Equipment Retrofit
Engine Activity Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Project application must include documentation of existing equipment usage for the previous 24 months prior to the application date.

Baseline Engine - Annual operation details for past 24 months

	Jan - Date of Application Submittal 2020	Jan - Dec 2019	Mar - Dec 2018	Estimated Annual Future Usage
Hours				

Carl Moyer and SOON Application
Form C-3
Off-Road Equipment Retrofit
Attachments

The following attachments must be submitted for this application:

- Insurance Documentation
- Engine Executive Order(s) and Retrofit Device Executive Order(s)
- Quotes (must be within 90 days of application submittal)
- Equipment Usage Documentation (for past 24 – months)
- Other misc. attachments
- DOORS Vehicle List
- SOON Fleet Average Calculation (please go to https://arb.ca.gov/msprog/ordiesel/fac.htm) (only if applying under SOON Program)
- DOORS Fleet Compliance Snapshot
- Business Information Request Form
- Campaign Contribution Disclosure
- W-9 Form
- Business Status Certification
- Direct Deposit Form
- Certification of Debarment, Suspension and Other Responsibility Matters

Carl Moyer Program Application
Form C-4
Off-Road Cargo Handling Equipment Electrification : Equipment Information

If you have any questions regarding this program or the application process, please contact Greg Ushijima by phone at (909) 396-3301 or by email at: gushijima@aqmd.gov.

Please complete ONE form for each piece of equipment.

Existing Equipment Information

Has this equipment received Carl Moyer Program funds in the past? ○ Yes ○ No

Is equipment currently subject to CARB's Cargo Handling Equipment regulation?
Note: If you are unable to document that project equipment is not subject to the CARB regulation, then the project is ineligible. ○ Yes ○ No

What is the primary function of this equipment?

Is the vehicle location address the same as the applicant address? If not, please complete below. ○ Yes ○ No

Street Address (if no address, provide intersection)

City

County

State

Zip

Vehicle Type

If other, please describe:

Project Type

Equipment Category

Equipment Type

If other equipment type, please describe

Equipment Make

Equipment Model

Equipment Model Year

Equipment Serial Number or VIN

Unit Number

Carl Moyer and SOON Application
Form C-4
Off-Road Cargo Handling Equipment Electrification : Project Details

Total Funding Requested

Identify other funding sources to be used for this project

Total Project Cost (From Quote: MUST EQUAL QUOTE)

Applicant Co-Funding Amount

Operation Information

Is existing equipment in operable condition? ◯ Yes ◯ No

How many years has the applicant owned the existing equipment (must be greater than 2 years)?

Does the existing equipment have a functioning, non-resettable hour meter? ◯ Yes ◯ No

Proposed Project Life (this is the number of years that the equipment must operate as specified in your SCAQMD contract)

Please provide a full description of the proposed project. Include specifications for the equipment electrification and associated infrastructure. *SEE ATTACHMENTS*

Carl Moyer and SOON Application
Form C-4
Off-Road Cargo Handling Equipment Electrification : Engine & Retrofit Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Existing/Baseline Engine Information

Baseline Engine Type ◯ Main ◯ Auxiliary

Baseline Engine Fuel Type			
Baseline Engine Make		Baseline Engine Model	
Baseline Engine Model Year		Baseline Engine Serial Number	
Baseline Engine Horsepower		Baseline Engine Family Number	
Old Engine (Baseline) Emissions Tier			

Please provide a full description of the proposed project. Include specifications for the equipment electrification and associated infrastructure. *SEE ATTACHMENTS*

Electrification Vendor /Contractor Information

Vendor		Vendor Contact Name	
Vendor Phone Number		Vendor Address	
Vendor City		Vendor State	
Vendor Zip			

Retrofit Cost Information

Total Project Materials Cost		Total Project Labor Cost	
Total Project Cost			
Applicant Co-Funding Amount (if any)		Grant Request Amount	

Funding/Cost Information for this Electrification Project - You MUST attach a written estimate from the equipment vendor/contractor documenting the cost of the device; this quote must be obtained within 90 days prior to the closing date of the Program Announcement. Quote must itemize material costs and labor costs separately and must provide explanatory details on each line item. *SEE ATTACHMENTS*

Carl Moyer and SOON Application
Form C-4
Off-Road Cargo Handling Equipment Electrification : Engine Activity Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Project application must include documentation of existing equipment usage for the previous 24 months prior to the application date.

Baseline Engine - Annual operation details for the past 24 months

	Jan - Date of Application Submittal 2020	Jan - Dec 2019	Mar - Dec 2018	Estimated Annual Future Usage*
Hours				

*Please note: Estimated annual usage is only necessary if actual usage is not known. Approved projects will require the applicant to meet the estimated annual usage for the duration of the contract.

Carl Moyer and SOON Application
Form C-4
Off-Road Cargo Handling Equipment Electrification : Attachments

The following attachments must be submitted for this proposal:

- CARB's Cargo Handling Equipment Regulation
- DOORS Vehicle List
- SOON Fleet Average Calculation (please go to https://arb.ca.gov/msprog/ordiesel/fac.htm)
- Project Description
- Written Estimate for Project
- Business Information Request Form
- Campaign Contribution Disclosure
- W-9 Form
- Direct Deposit Form
- Business Status Certification
- Certification of Debarment, Suspension and Other Responsibility Matters
- Photo of Equipment, Equipment Tag, Current Hour Meter and Engine Tag

Carl Moyer Program Application
Form D-1
Marine Vessels
Repower : Equipment Information

If you have any questions regarding this program or the application process, please contact Ping Gui at (909) 396-3187 or pgui@aqmd.gov.

All Commercial Harbor Craft are currently subject to CARB's Commercial Harbor Craft regulation. Attach a copy of your most recent CARB Commercial Harbor Craft Initial Report, and all updates.

Existing Equipment Information

Has this equipment received Carl Moyer Program funds in the past? ◯ Yes ◯ No

Contract #

Amount Received

Vessel Name

Port/Harbor

Terminal

Pier

Physical Address of the Vessel (including City, State, Zip)

Vessel berth/slip number

Primary Vessel Use

If other vessel type, please describe

Secondary Vessel Use

If other secondary vessel type, please describe

Primary Vessel Hours per Year

Secondary Vessel Hours per Year

Vessel Make

Vessel Model

Vessel Model Year

Total number of main engines on the vessel

Total number of aux engines on the vessel

U.S. Coast Guard Documentation Number (IMO Lloyd's Number if oceangoing vessel, or CF# AND CA Department of Fish & Game license for fishing vessels manufactured out of the United States or less than five net tons displacement)

Does the project vessel utilize a wet exhaust system? ◯ Yes ◯ No

Carl Moyer Program Application
Form D-1
Marine Vessels
Repower : Project Details

Total Funding Requested (for Engine Repower(s) on This Marine Vessel)

Identify other funding sources to be used for this project

Total Project Cost (From Quote: MUST EQUAL QUOTE)

Applicant Co-Funding Amount

Operation Information

Percent Operation in California

Percent Operation in District

Note: For SCAQMD Marine Jurisdiction Map, please see next page.

Purchasing new transmission (if applicable) ○ Yes ○ No

Justification For Purchasing New Transmission

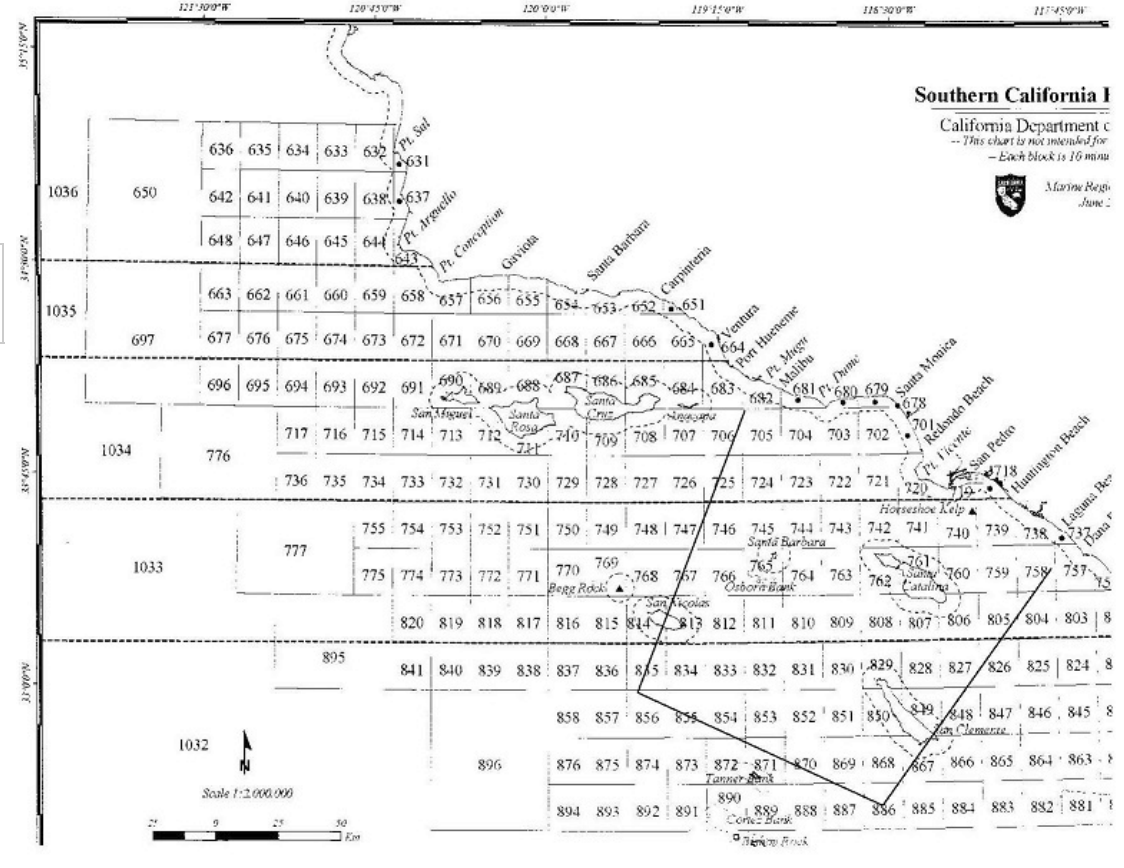
New Transmission Cost

Electronic Monitoring Unit: I understand that a new Electronic Monitoring Unit (EMU) will be installed as part of this Project. (This is a program requirement.) ○ Yes ○ No

The vessel is required to have a functioning non-resettable hour meter for the full project life. Select YES to indicate understanding and compliance: ○ Yes ○ No

Proposed Project Life (this is the number of years that the vessel must operate as specified in your SCAQMD contract)

Carl Moyer Program Application
Form D-1
Marine Vessels
Repower : SCAQMD Boundary Lines



Boundary points for the Box:

Southern Coastal Boundary - San Diego - Orange County Border
Northern Coastal Boundary - Ventura - Los Angeles County Border

Northern Tip: 33° N and 119° 30' W
Southern Tip: 32° 30'N and 118° 30' W

Distance between northern coastal point and northern tip: 80 miles approx.
Distance between southern coastal point and southern tip: 74 miles approx.

Carl Moyer Program Application
Form D-1
Marine Vessels
Repower : Engine Information

If you have more than one engine for your marine vessel, please make copies of this page and use one form for each engine.

Existing / Baseline Engine Information

Engine Fuel Type		Old Engine (Baseline) Emissions Tier	
Engine Make		Engine Model	
Engine Model Year		Engine Horsepower	
Engine Type	◯ Main ◯ Auxiliary	Engine Serial Number	
EPA Engine Family Number		Method proposed for rendering the replaced engine inoperable:	
Number of Cylinders		Liters	

Does the existing engine have a functioning hour meter? ◯ Yes ◯ No

New Reduced-Emission Engine Information

Engine Fuel Type			
Engine Make		Engine Model	
Engine Model Year		Engine Horsepower	
Engine Type	◯ Main ◯ Auxiliary	Engine Serial Number	
EPA Engine Family Number			
Emissions Tier Type	◯ Off Road ◯ Marine		
New Engine (Reduced) Emissions Tier			
Number of Cylinders		Liters	
New Engine Cost (Including Tax)		New Engine Installation/Labor Cost	

NOTE: You MUST attach a written estimate or quotation from the equipment vendor documenting the cost of the new equipment. This quote must be obtained within 90 days prior to the closing date of the Program Announcement. The quote must indicate the certification level of the new, replacement engine (i.e., Tier 3 or cleaner).

Vendor		Vendor Contact Name	
Vendor Address		Vendor City	
Vendor Zip		Vendor State	
Vendor Phone Number			

Carl Moyer Program Application
Form D-1
Marine Vessels
Repower : Engine Activity Information

If you have more than one engine for your marine vessel, please make copies of this page and use one form for each engine.

Project application must include documentation of existing equipment usage for the previous 24 months prior to the application date.

Activity Information

Engine Specific Usage - Annual Operation Details for the Past 24-months

	Jan - Date of Application Submittal in 2020	Jan - Dec 2019	Mar - Dec 2018	Estimated Annual Future Usage
Hours				

Carl Moyer Program Application
Form D-1

Marine Vessels

Repower : Attachments

The following attachments must be submitted for this application:

- Insurance Documentation
- Harbor Craft Regulation Initial Report
- Quotes (must be within 90 days of application submittal) Equipment Usage
- Documentation (for past 24 – months)
- Other Miscellaneous Attachments (optional and as required by the project officer)
- Business Information Request Form
- Campaign Contribution Disclosure
- W-9 Form
- Direct Deposit Form
- Business Status Cert
- Certification of Debarment, Suspension and Other Responsibility Matters

Carl Moyer Program Application
Form D-2
Marine Vessels
Shore Power : Equipment Information

If you have any questions regarding this program or the application process, please contact Greg Ushijima by phone at (909) 396-3301 or by email at: gushijima@aqmd.gov. Please complete one form for each Shore Power project.

Type of Project

Please note that if you are applying for the Purchase of Transformer and Associated Infrastructure ("Shore Side"), please use the Infrastructure application.

Vessel Retrofit to Accept Electrical Power ("Ship-Side") ☐

Type Of Applicant

Existing Equipment Information

Complete one equipment section for each vessel to be retrofitted. For transformer only projects please provide a detailed description of the vessels that typically use this terminal.
If your vessel type is a refrigerated cargo ship, container-ship or passenger ship, please attach your Vessel Plan as required by the ARB shore power regulation: http://www.arb.ca.gov/ports/shorepower/shorepower.htm

Vessel Name

Port/Harbor

Terminal

Pier

Vessel berth/slip number

Primary Vessel Function

If other vessel type, please describe

Vessel Make

Vessel Model

Vessel Model Year

Total number of main engines on the vessel

Total number of aux engines on the vessel

Lloyds Register or IMO Ship ID

US Coast Guard Documentation Number

If you are leasing the terminal, what is the time left on the current lease?

Average berthing time (hours) of the vessel, per visit (include time needed to connect and disconnect the vessel to shore power)

Vessel power (kW) requirements while at berth Average Power Requirement

Vessel power (kW) requirements while at berth Maximum Power Requirement

Carl Moyer Program Application
Form D-2
Marine Vessels
Shore Power : Project Details

Total Funding Requested

Total number of vessels in the fleet

Identify other funding sources to be used for this project

Total Project Cost (From Quote: MUST EQUAL QUOTE)

Applicant Co-Funding Amount

Identify other potential project partners (ex. Port)

Power supplier (ex. PG&E)

Where does the electrical power infrastructure begin, and end? *

Operation Information

Total number of annual vessel visits expected to use shore power

Total number of annual visits to the terminal

Total number of annual hours of usage for vessels expecting to use shorepower

Project Funding Information

You MUST attach a written estimate from the equipment vendor documenting the cost of the device; this quote must be obtained within 90 days prior to the closing date of the Program Announcement. **See Attachments Section.**

Transformer Poject Cost		Associated Infrastrucutre Cost	
Retrofit Equip. Cost (incl. tax)		Retrofit Equip. Installation Cost	
Total Project Costs			

You **MUST** attach a detailed written estimate/quote from the equipment vendor for the cost of the equipment and labor.

REQUEST: MAXIMUM ALLOWABLE

☐ Shore Power Vessel Retrofit ("ship-side"): 100% of retrofit cost & 50% of transformer cost.

REQUEST : OTHER

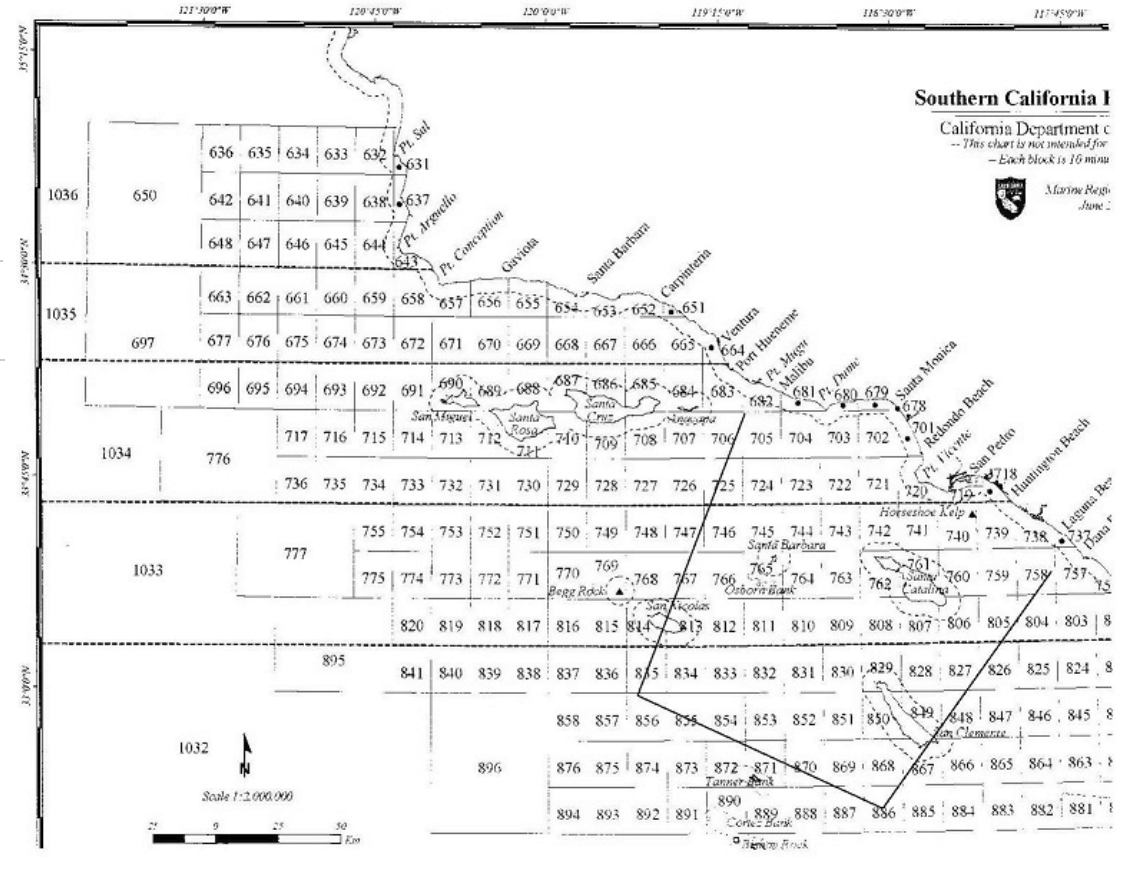
☐

(You may request less than the maximum allowable funding amount to improve cost-effectiveness of your project.)

Anticipated Project Completion Date

Please attach a detailed project schedule. ***SEE ATTACHMENTS PAGE***

Carl Moyer Program Application
Form D-2
Marine Vessels
Shore Power : SCAQMD Boundary Lines



Boundary points for the Box:

Southern Coastal Boundary - San Diego - Orange County Border
Northern Coastal Boundary - Ventura - Los Angeles County Border

Northern Tip: 33° N and 119° 30' W
Southern Tip: 32° 30'N and 118° 30' W

Distance between northern coastal point and northern tip: 80 miles approx.
Distance between southern coastal point and southern tip: 74 miles approx.

Carl Moyer Program Application
Form D-2
Marine Vessels
Shore Power : Engine Information

Existing/Baseline Engine Information

Please attach a detailed description of the vessels that will be using the shore power equipment. This description should include:

- Vessel type
- Ship size (in 20-foot equivalent units (TEU) capacity)
- Number and type of engines
- Power demand (total auxiliary power (kW) – not hotelling load)
- The number of auxiliary engines typically operating while at berth per vessel
- Number of annual visits
- Average berthing time (hours) of the vessel, per visit (include time needed to connect and disconnect the vessel to shore power). Be sure to consider the maximum time the auxiliary engines are in use.

Carl Moyer Program Application
Form D-2
Marine Vessels
Shore Power : Engine Activity Information

If you have more than one engine for your project, please make copies of this page and use one form for each engine.

Project application must include documentation of existing equipment usage for the previous 24 months prior to the application date.

Activity Information

Expected annual hours	
Expected annual fuel use	

"Current Berth Activity" Number of annual ship visits to the berth (attach the log of vessel visits for each of the specified years): For last 3 years

Last Year Vessel Visits	
Prior Year Vessel Visits	
2 Years Prior Year Vessel Visits	

Predicted (Future) Berth Activity:

Estimated annual ship visits using shore power:

2020	
2021 and beyond	

Estimated monthly hours of operation:

2020	
2021 and beyond	

Estimated monthly megawatt (MW) usage:

2020	
2021 and beyond	

Carl Moyer Program Application
Form D-2
Marine Vessels
Shore Power : Attachments

The following attachments must be submitted for this application:

- Detailed Project Proposal
- Other Miscellaneous Attachments (optional and as required by the project officer)
- ARB Shore Power Vessel Plan
- Vessel Logs
- Vessel Activity Information
- Written Estimate Or Quote
- Proposed Project Schedule
- Business Information Request Form
- Campaign Contribution Disclosure
- W-9 Form
- Direct Deposit Form
- Business Status Certification Form
- Certification of Debarment, Suspension and Other Responsibility Matters

Carl Moyer Program Application
Form E-1
Locomotive Replacement Equipment Information

For project criteria please refer to the locomotive chapter in the Carl Moyer Program Guidelines. If you have any questions regarding this program or the application process, please contact Greg Ushijima by phone at (909) 396-3301 or by email at: gushijima@aqmd.gov.

If you have more than one equipment for your project, please make copies of this form and use one form for each equipment.

Existing Locomotive Information

Has this locomotive received Carl Moyer Program funds in the past? ◯ Yes ◯ No

Equipment Location Address

Is the equipment location address the same as the applicant address? If not, please complete section below ◯ Yes ◯ No

Street Address

If no address, provide intersection

City

County

State

Zip

Vehicle Type

If other, please describe:

Locomotive type

Locomotive Make

Locomotive Model

Locomotive Model Year

Locomotive Serial Number

Unit number or other identifier

New Locomotive Information

Locomotive Make

Locomotive Model

Locomotive Model Year

Equipment Type

Locomotive Serial Number (If Available)

Will the locomotive have a functioning idle limit device (ILD) installed? ◯ Yes ◯ No

If other equipment type, please describe

# of Main Engines

# of Auxiliary Engines

New Locomotive Cost ($)

Locomotive Vendor Name

All cost estimates must be based on quotes that have been obtained within 90 days prior to the closing date of the Program Announcement. Attach all quotes to the application.

Carl Moyer Program Application
Form E-1
Locomotive Replacement
Project Details

Railroad Class

All cost estimates must be based on quotes that have been obtained within 90 days prior to the closing date of the Program Announcement. Attach all quotes to the application.

Total Funding Requested from SCAQMD

Identify other funding sources to be used for this project

Total Project Cost (From Quote: MUST EQUAL QUOTE)

Applicant Co-Funding Amount

Operation Information

Future/Projected Locomotive Activity Annual Fuel Usage (gallons per year)

If fuel usage is not available, please provide the future/projected locomotive activity in Megawatt Hour (MWh) per year.

Percent Operation in California

Percent Operation in District

Proposed Project Life (this is the number of years that the equipment must operate as specified in your SCAQMD contract)

Carl Moyer Program Application
Form E-1
Locomotive Replacement
Engine Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Existing/Baseline Engine Information

Engine Fuel Type			
Engine Make		Engine Model	
Engine Model Year		Engine Serial Number	
Engine Type	◯ Main ◯ Auxiliary	Engine Horsepower	
Existing Engine (Baseline) Emissions Tier			
Baseline Engine Family		US EPA Certificate of Conformity No	
CARB Executive Order No			

US EPA Certificate of Conformity MUST BE ATTACHED – SEE ATTACHMENTS SECTION

CARB Executive Order MUST BE ATTACHED – SEE ATTACHMENTS SECTION

Reduced Emission Replacement Engine Information

Engine Fuel Type			
Engine Make		Engine Model	
Engine Model Year			
Engine Serial Number		Engine Horsepower	
EPA Engine Family Name		New Engine (Reduced) Emissions Tier	
Engine Cost		Installation Cost	
Has this engine been certified by U.S. EPA?	◯ Yes ◯ No	U.S. EPA certified locomotive NOx emission rate (g/bhp-hr)	
U.S. EPA certified locomotive HC emission rate (g/bhp-hr)		U.S. EPA certified locomotive PM emission rate (g/bhp-hr)	

Carl Moyer Program Application
Form E-1
Locomotive Replacement
Engine Activity Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Project application must include documentation of existing equipment usage for the previous 24 months prior to the application date.

Please attach documentation to support the reported usage per year.

Annual Fuel Usage - Annual Operation Details for the Past 24-months

	Jan - Date of Application Submittal in 2020	Jan - Dec 2019	Mar - Dec 2018	Estimated Annual Future Usage
Fuel Use (gallons/year)				

If fuel usage is not available, please attach documentation of the megawatt hours used during the previous 24 months.

Carl Moyer Program Application
Form E-1
Locomotive Replacement
Attachments

The following attachments must be submitted for this application:

- Insurance Documentation
- Emissions certification documentation
- Quotes (must be within 90 days of application submittal)
- Equipment Usage Documentation (for past 24-months)
- Other Miscellaneous Attachments (optional and as required by the project officer)
- Engine Executive Order(s) and Retrofit Device Executive Order(s)
- Fuel Documentation
- Business Information Request Form
- Campaign Contribution Disclosure
- W-9 Form
- Direct Deposit Form
- Business Status Cert
- Certification of Debarment, Suspension and Other Responsibility Matters

Carl Moyer Program Application
Form E-2
Locomotive Engine Repower
Equipment Information

For project criteria please refer to the locomotive chapter in the Carl Moyer Program Guidelines.

If you have any questions regarding this program or the application process, please contact Greg Ushijima by phone at (909) 396-3301 or by email at gushijima@aqmd.gov.

If you have more than one equipment for your project, please make copies of this form and use one form for each equipment.

Existing Locomotive Information

Has this locomotive received Carl Moyer Program funds in the past? ◯ Yes ◯ No

Equipment Location Address

Is the equipment location address the same as the applicant address? If not, complete below: ◯ Yes ◯ No

Street Address (if no address, provide intersection)

City

County

State

Zip

Vehicle Type

If other, please describe:

Locomotive type

If other locomotive type, please describe

Locomotive Make

Locomotive Model

Locomotive Model Year

Locomotive Serial Number

Unit number or other identifier

Carl Moyer Program Application
Form E-2
Locomotive Engine Repower
Project Details

Railroad Class

All cost estimates must be based on quotes that have been obtained within 90 days prior to the closing date of the Program Announcement. Attach all quotes to the application.

Total Funding Requested from SCAQMD

Identify other funding sources to be used for this project

Total Project Cost (From Quote: MUST EQUAL QUOTE)

Applicant Co-Funding Amount

Operation Information

Percent Operation in California

Percent Operation in District

Proposed Project Life (this is the number of years that the equipment must operate as specified in your SCAQMD contract):

Carl Moyer Program Application
Form E-2
Locomotive Engine Repower
Engine Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Existing/Baseline Engine Information

Engine Fuel Type			
Engine Make		Engine Model	
Engine Model Year		Engine Serial Number	
Engine Type	◯ Main ◯ Auxiliary	Engine Horsepower	
Existing Engine (Baseline) Emissions Tier			
Baseline Engine Family		US EPA Certificate of Conformity No	
CARB Executive Order No			

US EPA Certificate of Conformity MUST BE ATTACHED – SEE ATTACHMENTS SECTION

CARB Executive Order MUST BE ATTACHED – SEE ATTACHMENTS SECTION

New Engine Information

Engine Fuel Type			
Engine Make		Engine Model	
Engine Model Year			
Engine Serial Number		Engine Horsepower	
EPA Engine Family Name		U.S. EPA Certified Locomotive Emission Level	
Engine Cost		Installation Cost	

All cost estimates must be based on quotes that have been obtained within 90 days prior to the closing date of the Program Announcement. Attach all quotes to the application.

Vendor Information

Vendor		Vendor Contact Name	
Vendor Address		Vendor City	
Vendor Zip		Vendor State	
Vendor Phone Number			

Carl Moyer Program Application
Form E-2
Locomotive Engine Repower
Engine Activity Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Project application must include documentation of existing equipment usage for the previous 24 months prior to the application date

Please attach documentation to support the reported gallons per year

Annual Fuel Usage - Annual Operational Details for the Past 24-months

	Jan - Date of Application Submittal in 2020	Jan - Dec 2019	Mar - Dec 2018	Estimated Annual Future Usage
Fuel Use (gallons/year)				

Carl Moyer Program Application
Form E-2
Locomotive Engine Repower
Attachments

The following attachments must be submitted for this application:

- Insurance Documentation
- Emissions certification documentation
- Quotes (must be within 90 days of application submittal)
- Equipment Usage Documentation (for past 24-months)
- Other Miscellanous Attachments (optional and as required by project officer)
- Engine Executive Order(s) and Retrofit Device Executive Order(s)
- Fuel Documentation
- Business Information Request Form
- Campaign Contribution Disclosure
- W-9 Form
- Business Status Cert
- Direct Deposit Form
- Certification of Debarment, Suspension and Other Responsibility Matters

Carl Moyer Program Application
Form E-3
Locomotive - Head End Power Unit
Equipment Information

For project criteria please refer to the locomotive chapter in the Carl Moyer Program Guidelines.

If you have any questions regarding this program or the application process, please contact Greg Ushijima by phone at (909) 396-3301 or by email at: gushijima@aqmd.gov.

If you have more than one equipment for your project, please make copies of this form and use one form for each equipment.

Existing Locomotive Information

Has this locomotive received Carl Moyer Program funds in the past? ◯ Yes ◯ No

Equipment Location Address

Is the equipment location address the same as the applicant address? If not, please complete below. ◯ Yes ◯ No

Street Address (if no address, provide intersection)		City	
County		State	
Zip		Vehicle Type	

If other, please describe:

Locomotive Make		Locomotive Model	
Locomotive Model Year		Locomotive Serial Number	
Unit number or other identifier			

Carl Moyer Program Application
Form E-3
Locomotive - Head End Power Unit
Project Details

Railroad Class

All cost estimates must be based on quotes that have been obtained within 90 days prior to the closing date of the Program Announcement. Attach all quotes to the application.

Total Funding Requested from the SCAQMD

Identify other funding sources to be used for this project

Total Project Cost (From Quote: MUST EQUAL QUOTE)

Applicant Co-Funding Amount

Operation Information

Percent Operation in California

Percent Operation in District

Proposed Project Life (this is the number of years that the equipment must operate as specified in your SCAQMD contract)

Carl Moyer Program Application
Form E-3
Locomotive - Head End Power Unit
Engine Activity Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Project application must include documentation of existing equipment usage for the previous 24 months prior to the application date.

Please attach documentation to support the reported gallons per year.

Annual Fuel Usage
Contact the SCAQMD Staff Lead to discuss your project and appropriate assumptions for this projection:

	Jan - Date of Application Submittal in 2020	Jan - Dec 2019	Mar - Dec 2018	Annual Fuel Usage (gallons per year)
Fuel Use (gallons/year)				

If fuel usage is not available, please attach documentation of the megawatt hours used during the previous 24 months.

ADDITIONAL PROJECT INFORMATION: Please provide a full description of the proposed project. Include an explanation of any project elements that are not adequately covered in the Application. SEE ATTACHMENTS PAGE.

Carl Moyer Program Application
Form E-3
Locomotive - Head End Power Unit
Engine Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Existing / Baseline Engine Information

Engine Fuel Type			
Engine Make		Engine Model	
Engine Model Year		Engine Serial Number	
Engine Type	◯ Main ◯ Auxiliary	Engine Horsepower	
Existing Engine (Baseline) Emissions Tier			
Baseline Engine Family		US EPA Certificate of Conformity No	
CARB Executive Order No			

Is the engine certified to off road or locomotive standards? ◯ Off Road ◯ Locomotive

CARB Executive Order MUST BE ATTACHED – SEE ATTACHMENTS SECTION

US EPA Certificate of Conformity MUST BE ATTACHED – SEE ATTACHMENTS SECTION

Reduced Emission Replacement Engine Information

Engine Fuel Type		Engine Type	◯ Main ◯ Auxiliary
Engine Make		Engine Model	
Engine Model Year			
Engine Serial Number		Engine Horsepower	
EPA Engine Family Name		New Engine (Reduced) Emissions Tier	
Engine Cost			
Does this Engine Have a US EPA Certificate of Conformity (PLEASE ATTACH THE CERTIFICATE IN THE ATTACHMENTS SECTION)	◯ Yes ◯ No	U.S. EPA certified locomotive NOx emission rate (g/bhp-hr)	
U.S. EPA certified locomotive HC emission rate (g/bhp-hr)		U.S. EPA certified locomotive PM emission rate (g/bhp-hr)	
Does this engine have a CARB Executive Order?	◯ Yes ◯ No	CARB Executive Order Number	

All cost estimates must be based on quotes that have been obtained within 90 days prior to the closing date of the Program Announcement. Attach all quotes to the application.

Carl Moyer Program Application
Form E-3
Locomotive - Head End Power Unit
Attachments

The following attachments must be submitted for this application:

- Additional Project Information (optional and as required by the project officer)
- US EPA Certificate of Conformity
- Insurance Documentation
- Emissions certification documentation
- Quotes (must be within 90 days of application submittal)
- Equipment Usage Documentation (for past 24-months)
- Other Miscellaneous Attachments (optional and as required by the project officer)
- Business Information Request Form
- Campaign Contribution Disclosure
- W-9 Form
- Business Status Cert
- Direct Deposit Form
- Certification Regarding Debarment, Suspension, and other Responsibility Matters

Carl Moyer Program – Application for Infrastructure

If you have any questions regarding this program or the application process, please contact Tom Lee by phone at (909) 396-2270 or by email at: tlee@aqmd.gov. Information on the eligible projects and cost for the program can be obtained from Carl Moyer Program Guidelines, Volume 1 Chapter 10[1].

Part 1: Applicant Information

Applicant Name:	Business Name:
Phone Number:	Email:
Address:	
City:	Zip Code:
Is the project location the same as the applicant address? □ Yes □ No (If not, please provide project location address below): Street Address:_____ City:_____ Zip Code:_____	

Part 2: Infrastructure Project Information

Eligible infrastructure projects are those that provide fuel or power to Carl Moyer Program (CMP) eligible vehicles and equipment (i.e., no light-duty vehicle charging stations). Note that a vehicle or equipment application is not required in order to be considered for infrastructure funding. Eligible projects include, but are not limited to, battery charging stations, alternative fuel stations, stationary agricultural stations and shore-side shore power projects.

Eligible costs are limited to the purchase and installation of the equipment for power delivery or fueling directly related to the infrastructure project and must utilize commercially available technologies. Eligible project costs include:

- Cost of design and engineering (i.e., labor, site preparation, Americans with Disabilities Act accessibility, signage).
- Cost of equipment (e.g., charging/fueling units, parts for electrical upgrade, energy storage equipment, materials).
- Cost of insulation directly related to the construction of the station.
- Meter/data loggers.
- On-site power generation system that fuels or powers covered sources (i.e., solar and wind power generation equipment).

Table 1. Maximum Percentage of Eligible Cost for Moyer Program Infrastructure Projects

Maximum Percentage of Eligible Cost	Infrastructure Projects
50%	All Projects
60%	Publicly Accessible Projects
65%	Projects with Solar/Wind Power Systems[2]
75%	Publicly Accessible Projects with Solar/Wind Power Systems[2]
100%	Public School Buses- Battery Charging and Alternative Fueling

[1] https://www.arb.ca.gov/msprog/moyer/guidelines/2017gl/2017_gl_chapter_10.pdf
[2] At least 50 percent of the energy provided to covered sources by the project must be generated from solar or wind.

Project Type:

☐ Battery Charging Station (e.g. airport, distribution centers, warehouses, ports)

Number of charging units _____

☐ New Station
☐ Expansion of existing non-residential charging stations to add capacity ☐ Other

☐ Alternative Fuel Station

Number of dispensers _____ dual hose ☐ Yes ☐No

☐ Hydrogen / ☐ Natural Gas / ☐ Renewable Natural Gas
☐ New Station
☐ Expansion of existing fueling stations
☐ Other

☐ Stationary Agricultural Pump (Pump Electrification)

☐ Shore Power (Shore-Side Electrification)
Shore-side electrification for projects not subject to CARB's Shore Power Regulation. Only a port authority, terminal operator, or marine vessel owner may apply.

☐ Infrastructure for Transport Refrigeration Unit

Number of plugs _____

☐ Truck Stop Electrification

Please select the following if applicable:

Publicly Accessible Project ☐ Yes ☐No

Solar/Wind Power System ☐ Yes ☐No

☐ Public School Buses -Battery Charger or Alternative Fuel

Project Description

Please fully describe your project below including, but not limited to:

A. *Annual usage projection such as expected usage- in kWhr per month, standard cubic feet natural gas per month, kg Hydrogen per month.*

B. *Technical specification, including a complete listing of all infrastructure equipment, hardware, and components, including (as applicable) component manufacturer and model number if known. In addition, the specification must provide minimum fuel storage capacities, compression and dispenser ratings, as well as number, make, and model of dispensers, hoses and card readers, etc. if known.*

C. *Chargers must be certified by a nationally recognized testing laboratory (i.e., Underwriter's Laboratories, Intertek) and provide design specifications including voltage, amperage, wattage, efficiency, compressor size, number of dispensers,, number of fuel nozzles or charge connections, dispensing rate, storage capacity, etc. D. An estimate of the annual connections to the chargers and average connection time.*

E. *For stations expanding to accommodate new load, provide information on the base load and justify the need for and amount of the new load that is needed to accommodate the growth in vehicles or equipment using the infrastructure.*

F. *Fleet commitment information, including number of vehicles/equipment planning to fuel or power at the new infrastructure, including the engine model year and certification level of each vehicle.*

G. *A site plan depicting the infrastructure location, including at a minimum the adjacent streets, entrance and exit locations, locations of dispenser islands or chargers, canopies, fuel storage tanks, compressors, walls and/or spill containment areas as appropriate.*

H. *A description of other project elements, including site amenities such as private access/public access islands, card reader payment options, overhead canopies, signage, traffic circulation plan, landscaping, fencing, security lighting, etc.*

Project Description (Attach extra pages as necessary):

Part 3: Project Installer and Vendor Information

In the section below, please provide information for each installer and vendor that will be involved with the infrastructure project:

Name of the Vendor:	Vendor Contact Name:
Phone Number:	Email:
Address:	City:
State:	Zip Code:
What is the scope of work for this installer/vendor?	
Name of the Vendor:	Vendor Contact Name:
Phone Number:	Email:
Address:	City:
State:	Zip Code:
What is the scope of work for this installer/vendor?	
Name of the Vendor:	
Phone Number:	Email:
Address:	City:
State:	Zip Code:
What is the scope of work for this installer/vendor?	
Is there another installer/vendor for your infrastructure project? ☐ Yes ☐No Is yes, please attach vendor information as an Attachment to this page.	

Part 4: Project Cost and Funding Request

All cost estimates must be based on quotes/bids. A minimum of two quotes/bids from licensed installers for the project is required. In addition, the applicant should summarize their solicitation and selection process (i.e., how will the winning bidder be selected by the applicant) in an attachment.

Attach all quotes/bids to the application. Provide the name of the vendor for the costs listed below.
Design and Engineering Cost $_____ Vendor _____
Total Equipment Cost $_____ Vendor _____
Installation Cost $_____ Vendor _____
Other Cost $_____ Vendor _____
For other costs, please describe and provide the cost for each item:
_____
_____
_____
Total Cost $_____ (From Quote: MUST EQUAL QUOTE)

Applicant Grant Request (total grant funds requested for the project): $_____

Proposed Project Life: _____
This is the number of years that the equipment must operate as specified in your SCAQMD contract (must be at least 3 years and no longer than 15 years, subject to CMP Guidelines).

Part 5: Disclosure of Amounts of Other Funding

Applicant must disclose all sources of funding (private, local, other State, Federal funding sources, etc.) for the project at the time of application.

Name of Funding Entity:	**Program Description:**	**Funding Amount:**	**Status *(Planned, Application Submitted or Application Granted)*:**
(Example: EPA)	*(DERA)*	*($25,000)*	*(Application Submitted)*

Supporting documentation:
Please identify and label all attached documents on the top of the page.

- Quotes/bids (At least two quotes/bids from licensed installers)
- Local Permits Obtained for the Project (if not yet obtained, please submit a plan)
- Land Ownership/Lease agreement (applicants must document that they either own the land on which the project will be located, or control it through a long-term lease for the duration of the project life)
- Documentation that sufficient power or fuel is being provided to the site (e.g. application, payment to the local utility company for power installation, or contract)
- Project Timeline/Schedule/Plan

- If public access, provide aerial map (i.e. Satellite view from an internet based map or city/county map)
- For Shorepower projects, provide the "Initial Terminal Plan"

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

Business Information Request

Dear South Coast AQMD Contractor/Supplier:

South Coast Air Quality Management District (South Coast AQMD) is committed to ensuring that our contractor/supplier records are current and accurate. If your firm is selected for award of a purchase order or contract, it is imperative that the information requested herein be supplied in a timely manner to facilitate payment of invoices. In order to process your payments, we need the enclosed information regarding your account. **Please review and complete the information identified on the following pages, remember to sign all documents for our files, and return them as soon as possible to the address below:**

Attention: Accounts Payable, Accounting Department
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4178

If you do not return this information, we will not be able to establish you as a vendor. This will delay any payments and would still necessitate your submittal of the enclosed information to our Accounting department before payment could be initiated. Completion of this document and enclosed forms would ensure that your payments are processed timely and accurately.

If you have any questions or need assistance in completing this information, please contact Accounting at (909) 396-3777. We appreciate your cooperation in completing this necessary information.

Sincerely,

Sujata Jain
Chief Financial Officer

DH:tm

Enclosures: Business Information Request
Disadvantaged Business Certification
W-9
Form 590 Withholding Exemption Certificate
Federal Contract Debarment Certification
Campaign Contributions Disclosure
Direct Deposit Authorization

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

BUSINESS INFORMATION REQUEST

Business Name	
Division of	
Subsidiary of	
Website Address	
Type of Business *Check One:*	☐ Individual ☐ DBA, Name _____, County Filed in _____ ☐ Corporation, ID No. _____ ☐ LLC/LLP, ID No. _____ ☐ Other _____

REMITTING ADDRESS INFORMATION

Address			
City/Town			
State/Province		Zip	
Phone	( ) - Ext	Fax	( ) -
Contact		Title	
E-mail Address			
Payment Name if Different			

All invoices must reference the corresponding Purchase Order Number(s)/Contract Number(s) if applicable and mailed to:

Attention: Accounts Payable, Accounting Department
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4178

BUSINESS STATUS CERTIFICATIONS

Federal guidance for utilization of disadvantaged business enterprises allows a vendor to be deemed a small business enterprise (SBE), minority business enterprise (MBE) or women business enterprise (WBE) if it meets the criteria below.

- is certified by the Small Business Administration or
- is certified by a state or federal agency or
- is an independent MBE(s) or WBE(s) business concern which is at least 51 percent owned and controlled by minority group member(s) who are citizens of the United States.

Statements of certification:

As a prime contractor to South Coast AQMD, _____ (name of business) will engage in good faith efforts to achieve the fair share in accordance with 40 CFR Section 33.301, and will follow the six affirmative steps listed below **for contracts or purchase orders funded in whole or in part by federal grants and contracts.**

1. Place qualified SBEs, MBEs, and WBEs on solicitation lists.
2. Assure that SBEs, MBEs, and WBEs are solicited whenever possible.
3. When economically feasible, divide total requirements into small tasks or quantities to permit greater participation by SBEs, MBEs, and WBEs.
4. Establish delivery schedules, if possible, to encourage participation by SBEs, MBEs, and WBEs.
5. Use services of Small Business Administration, Minority Business Development Agency of the Department of Commerce, and/or any agency authorized as a clearinghouse for SBEs, MBEs, and WBEs.
6. If subcontracts are to be let, take the above affirmative steps.

Self-Certification Verification: Also for use in awarding additional points, as applicable, in accordance with South Coast AQMD Procurement Policy and Procedure:

Check all that apply:

☐ Small Business Enterprise/Small Business Joint Venture
☐ Local business
☐ Minority-owned Business Enterprise
☐ Women-owned Business Enterprise
☐ Disabled Veteran-owned Business Enterprise/DVBE Joint Venture
☐ Most Favored Customer Pricing Certification

Percent of ownership: _____ %

Name of Qualifying Owner(s): _____ _____

State of California Public Works Contractor Registration No. _____. MUST BE INCLUDED IF BID PROPOSAL IS FOR PUBLIC WORKS PROJECT.

I, the undersigned, hereby declare that to the best of my knowledge the above information is accurate. Upon penalty of perjury, I certify information submitted is factual.

_____ _____
NAME ***TITLE***

_____ _____
TELEPHONE NUMBER ***DATE***

Definitions

Disabled Veteran-Owned Business Enterprise means a business that meets all of the following criteria:

- is a sole proprietorship or partnership of which is at least 51 percent owned by one or more disabled veterans, or in the case of any business whose stock is publicly held, at least 51 percent of the stock is owned by one or more disabled veterans; a subsidiary which is wholly owned by a parent corporation but only if at least 51 percent of the voting stock of the parent corporation is owned by one or more disabled veterans; or a joint venture in which at least 51 percent of the joint venture's management and control and earnings are held by one or more disabled veterans.
- the management and control of the daily business operations are by one or more disabled veterans. The disabled veterans who exercise management and control are not required to be the same disabled veterans as the owners of the business.
- is a sole proprietorship, corporation, partnership, or joint venture with its primary headquarters office located in the United States and which is not a branch or subsidiary of a foreign corporation, firm, or other foreign-based business.

Joint Venture means that one party to the joint venture is a DVBE and owns at least 51 percent of the joint venture. In the case of a joint venture formed for a single project this means that DVBE will receive at least 51 percent of the project dollars.

Local Business means a business that meets all of the following criteria:

- has an ongoing business within the boundary of South Coast AQMD at the time of bid application.
- performs 90 percent of the work within South Coast AQMD's jurisdiction.

Minority-Owned Business Enterprise means a business that meets all of the following criteria:

- is at least 51 percent owned by one or more minority persons or in the case of any business whose stock is publicly held, at least 51 percent of the stock is owned by one or more minority persons.
- is a business whose management and daily business operations are controlled or owned by one or more minority person.
- is a business which is a sole proprietorship, corporation, partnership, joint venture, an association, or a cooperative with its primary headquarters office located in the United States, which is not a branch or subsidiary of a foreign corporation, foreign firm, or other foreign business.

"Minority" person means a Black American, Hispanic American, Native American (including American Indian, Eskimo, Aleut, and Native Hawaiian), Asian-Indian American (including a person whose origins are from India, Pakistan, or Bangladesh), Asian-Pacific American (including a person whose origins are from Japan, China, the Philippines, Vietnam, Korea, Samoa, Guam, the United States Trust Territories of the Pacific, Northern Marianas, Laos, Cambodia, or Taiwan).

Small Business Enterprise means a business that meets the following criteria:

a. 1) an independently owned and operated business; 2) not dominant in its field of operation; 3) together with affiliates is either:

- **A service, construction, or non-manufacturer with 100 or fewer employees, and average annual gross receipts of ten million dollars ($10,000,000) or less over the previous three years, or**
- A manufacturer with 100 or fewer employees.

b. Manufacturer means a business that is both of the following:

1) Primarily engaged in the chemical or mechanical transformation of raw materials or processed substances into new products.

2) Classified between Codes 311000 to 339000, inclusive, of the North American Industrial Classification System (NAICS) Manual published by the United States Office of Management and Budget, 2007 edition.

Small Business Joint Venture means that one party to the joint venture is a Small Business and owns at least 51 percent of the joint venture. In the case of a joint venture formed for a single project this means that the Small Business will receive at least 51 percent of the project dollars.

Women-Owned Business Enterprise means a business that meets all of the following criteria:

- is at least 51 percent owned by one or more women or in the case of any business whose stock is publicly held, at least 51 percent of the stock is owned by one or more women.
- is a business whose management and daily business operations are controlled or owned by one or more women.
- is a business which is a sole proprietorship, corporation, partnership, or a joint venture, with its primary headquarters office located in the United States, which is not a branch or subsidiary of a foreign corporation, foreign firm, or other foreign business.

Most Favored Customer as used in this policy means that the South Coast AQMD will receive at least as favorable pricing, warranties, conditions, benefits and terms as other customers or clients making similar purchases or receiving similar services.

Form **W-9**
(Rev. October 2018)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

▶ Go to *www.irs.gov/FormW9* for instructions and the latest information.

Give Form to the requester. Do not send to the IRS.

Print or type. See Specific Instructions on page 3.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.

2 Business name/disregarded entity name, if different from above

3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only one of the following seven boxes.

☐ Individual/sole proprietor or single-member LLC ☐ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ▶ _____

Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is **not** disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner.

☐ Other (see instructions) ▶

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any) _____

Exemption from FATCA reporting code (if any) _____

(Applies to accounts maintained outside the U.S.)

5 Address (number, street, and apt. or suite no.) See instructions.

Requester's name and address (optional)

6 City, state, and ZIP code

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

Note: If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number

			–			–				

or

Employer identification number

		–							

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here Signature of U.S. person ▶ Date ▶

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to *www.irs.gov/FormW9*.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, *later.*

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),

2. Certify that you are not subject to backup withholding, or

3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and

4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting*, later, for further information.

Note: If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien;
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;
- An estate (other than a foreign estate); or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

In the cases below, the following person must give Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States.

- In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the entity;
- In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the trust; and
- In the case of a U.S. trust (other than a grantor trust), the U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person, do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Pub. 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items.

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.

2. The treaty article addressing the income.

3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.

4. The type and amount of income that qualifies for the exemption from tax.

5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

Backup Withholding

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 24% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,

2. You do not certify your TIN when required (see the instructions for Part II for details),

3. The IRS tells the requester that you furnished an incorrect TIN,

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or

5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code*, later, and the separate Instructions for the Requester of Form W-9 for more information.

Also see *Special rules for partnerships*, earlier.

What is FATCA Reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all United States account holders that are specified United States persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code*, later, and the Instructions for the Requester of Form W-9 for more information.

Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account; for example, if the grantor of a grantor trust dies.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of $50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a $500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Line 1

You must enter one of the following on this line; **do not** leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account (other than an account maintained by a foreign financial institution (FFI)), list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9. If you are providing Form W-9 to an FFI to document a joint account, each holder of the account that is a U.S. person must provide a Form W-9.

a. **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

Note: ITIN applicant: Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040/1040A/1040EZ you filed with your application.

b. **Sole proprietor or single-member LLC.** Enter your individual name as shown on your 1040/1040A/1040EZ on line 1. You may enter your business, trade, or "doing business as" (DBA) name on line 2.

c. **Partnership, LLC that is not a single-member LLC, C corporation, or S corporation.** Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

d. **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on line 2.

e. **Disregarded entity.** For U.S. federal tax purposes, an entity that is disregarded as an entity separate from its owner is treated as a "disregarded entity." See Regulations section 301.7701-2(c)(2)(iii). Enter the owner's name on line 1. The name of the entity entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2, "Business name/disregarded entity name." If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

Line 2

If you have a business name, trade name, DBA name, or disregarded entity name, you may enter it on line 2.

Line 3

Check the appropriate box on line 3 for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box on line 3.

IF the entity/person on line 1 is a(n) . . .	THEN check the box for . . .
• Corporation	Corporation
• Individual • Sole proprietorship, or • Single-member limited liability company (LLC) owned by an individual and disregarded for U.S. federal tax purposes.	Individual/sole proprietor or single-member LLC
• LLC treated as a partnership for U.S. federal tax purposes, • LLC that has filed Form 8832 or 2553 to be taxed as a corporation, or • LLC that is disregarded as an entity separate from its owner but the owner is another LLC that is not disregarded for U.S. federal tax purposes.	Limited liability company and enter the appropriate tax classification. (P= Partnership; C= C corporation; or S= S corporation)
• Partnership	Partnership
• Trust/estate	Trust/estate

Line 4, Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space on line 4 any code(s) that may apply to you.

Exempt payee code.

- Generally, individuals (including sole proprietors) are not exempt from backup withholding.
- Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.
- Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions.
- Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space in line 4.

1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)

2—The United States or any of its agencies or instrumentalities

3—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

4—A foreign government or any of its political subdivisions, agencies, or instrumentalities

5—A corporation

6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or possession

7—A futures commission merchant registered with the Commodity Futures Trading Commission

8—A real estate investment trust

9—An entity registered at all times during the tax year under the Investment Company Act of 1940

10—A common trust fund operated by a bank under section 584(a)

11—A financial institution

12—A middleman known in the investment community as a nominee or custodian

13—A trust exempt from tax under section 664 or described in section 4947

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 7
Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
Barter exchange transactions and patronage dividends	Exempt payees 1 through 4
Payments over $600 required to be reported and direct sales over $5,000[1]	Generally, exempt payees 1 through 5[2]
Payments made in settlement of payment card or third party network transactions	Exempt payees 1 through 4

[1] See Form 1099-MISC, Miscellaneous Income, and its instructions.

[2] However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(f), and payments for services paid by a federal executive agency.

Exemption from FATCA reporting code. The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) written or printed on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37)

B—The United States or any of its agencies or instrumentalities

C—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i)

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i)

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state

G—A real estate investment trust

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940

I—A common trust fund as defined in section 584(a)

J—A bank as defined in section 581

K—A broker

L—A trust exempt from tax under section 664 or described in section 4947(a)(1)

M—A tax exempt trust under a section 403(b) plan or section 457(g) plan

Note: You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed.

Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns. If this address differs from the one the requester already has on file, write NEW at the top. If a new address is provided, there is still a chance the old address will be used until the payor changes your address in their records.

Line 6

Enter your city, state, and ZIP code.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN.

If you are a single-member LLC that is disregarded as an entity separate from its owner, enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note: See *What Name and Number To Give the Requester*, later, for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at *www.SSA.gov*. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at *www.irs.gov/Businesses* and clicking on Employer Identification Number (EIN) under Starting a Business. Go to *www.irs.gov/Forms* to view, download, or print Form W-7 and/or Form SS-4. Or, you can go to *www.irs.gov/OrderForms* to place an order and have Form W-7 and/or SS-4 mailed to you within 10 business days.

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note: Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if item 1, 4, or 5 below indicates otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees, see *Exempt payee code*, earlier.

Signature requirements. Complete the certification as indicated in items 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), ABLE accounts (under section 529A), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account) other than an account maintained by an FFI	The actual owner of the account or, if combined funds, the first individual on the account[1]
3. Two or more U.S. persons (joint account maintained by an FFI)	Each holder of the account
4. Custodial account of a minor (Uniform Gift to Minors Act)	The minor[2]
5. a. The usual revocable savings trust (grantor is also trustee)	The grantor-trustee[1]
b. So-called trust account that is not a legal or valid trust under state law	The actual owner[1]
6. Sole proprietorship or disregarded entity owned by an individual	The owner[3]
7. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulations section 1.671-4(b)(2)(i)(A))	The grantor*
For this type of account:	**Give name and EIN of:**
8. Disregarded entity not owned by an individual	The owner
9. A valid trust, estate, or pension trust	Legal entity[4]
10. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
11. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
12. Partnership or multi-member LLC	The partnership
13. A broker or registered nominee	The broker or nominee
14. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
15. Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulations section 1.671-4(b)(2)(i)(B))	The trust

[1] List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

[2] Circle the minor's name and furnish the minor's SSN.

[3] You must show your individual name and you may also enter your business or DBA name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

[4] List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships*, earlier.

*Note: The grantor also must provide a Form W-9 to trustee of trust.

Note: If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records From Identity Theft

Identity theft occurs when someone uses your personal information such as your name, SSN, or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039.

For more information, see Pub. 5027, Identity Theft Information for Taxpayers.

Victims of identity theft who are experiencing economic harm or a systemic problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to *phishing@irs.gov*. You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at *spam@uce.gov* or report them at *www.ftc.gov/complaint*. You can contact the FTC at *www.ftc.gov/idtheft* or 877-IDTHEFT (877-438-4338). If you have been the victim of identity theft, see *www.IdentityTheft.gov* and Pub. 5027.

Visit *www.irs.gov/IdentityTheft* to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.

TAXABLE YEAR

CALIFORNIA FORM

2019 Withholding Exemption Certificate 590

The payee completes this form and submits it to the withholding agent. The withholding agent keeps this form with their records.

Withholding Agent Information

Name

Payee Information

Name

☐ SSN or ITIN ☐ FEIN ☐ CA Corp no. ☐ CA SOS file no.

Address (apt./ste., room, PO box, or PMB no.)

City (If you have a foreign address, see instructions.)

State

ZIP code

Exemption Reason

Check only one box.

By checking the appropriate box below, the payee certifies the reason for the exemption from the California income tax withholding requirements on payment(s) made to the entity or individual.

☐ **Individuals — Certification of Residency:**
I am a resident of California and I reside at the address shown above. If I become a nonresident at any time, I will promptly notify the withholding agent. See instructions for General Information D, Definitions.

☐ **Corporations:**
The corporation has a permanent place of business in California at the address shown above or is qualified through the California Secretary of State (SOS) to do business in California. The corporation will file a California tax return. If this corporation ceases to have a permanent place of business in California or ceases to do any of the above, I will promptly notify the withholding agent. See instructions for General Information D, Definitions.

☐ **Partnerships or Limited Liability Companies (LLCs):**
The partnership or LLC has a permanent place of business in California at the address shown above or is registered with the California SOS, and is subject to the laws of California. The partnership or LLC will file a California tax return. If the partnership or LLC ceases to do any of the above, I will promptly inform the withholding agent. For withholding purposes, a limited liability partnership (LLP) is treated like any other partnership.

☐ **Tax-Exempt Entities:**
The entity is exempt from tax under California Revenue and Taxation Code (R&TC) Section 23701 _____ (insert letter) or Internal Revenue Code Section 501(c) _____ (insert number). If this entity ceases to be exempt from tax, I will promptly notify the withholding agent. Individuals cannot be tax-exempt entities.

☐ **Insurance Companies, Individual Retirement Arrangements (IRAs), or Qualified Pension/Profit-Sharing Plans:**
The entity is an insurance company, IRA, or a federally qualified pension or profit-sharing plan.

☐ **California Trusts:**
At least one trustee and one noncontingent beneficiary of the above-named trust is a California resident. The trust will file a California fiduciary tax return. If the trustee or noncontingent beneficiary becomes a nonresident at any time, I will promptly notify the withholding agent.

☐ **Estates — Certification of Residency of Deceased Person:**
I am the executor of the above-named person's estate or trust. The decedent was a California resident at the time of death. The estate will file a California fiduciary tax return.

☐ **Nonmilitary Spouse of a Military Servicemember:**
I am a nonmilitary spouse of a military servicemember and I meet the Military Spouse Residency Relief Act (MSRRA) requirements. See instructions for General Information E, MSRRA.

CERTIFICATE OF PAYEE: Payee must complete and sign below.

To learn about your privacy rights, how we may use your information, and the consequences for not providing the requested information, go to **ftb.ca.gov/forms** and search for **1131**. To request this notice by mail, call 800.852.5711.

Under penalties of perjury, I declare that I have examined the information on this form, including accompanying schedules and statements, and to the best of my knowledge and belief, it is true, correct, and complete. I further declare under penalties of perjury that if the facts upon which this form are based change, I will promptly notify the withholding agent.

Type or print payee's name and title _____ Telephone (____)_____

Payee's signature ▶ _____ Date _____

2017 Instructions for Form 590

Withholding Exemption Certificate

References in these instructions are to the California Revenue and Taxation Code (R&TC).

General Information

Registered Domestic Partners (RDP) – For purposes of California income tax, references to a spouse, husband, or wife also refer to a Registered Domestic Partner (RDP) unless otherwise specified. For more information on RDPs, get FTB Pub. 737, Tax Information for Registered Domestic Partners.

A Purpose

Use Form 590, Withholding Exemption Certificate, to certify an exemption from nonresident withholding.

Form 590 does not apply to payments of backup withholding. For more information, go to **ftb.ca.gov** and search for **backup withholding**.

Form 590 does not apply to payments for wages to employees. Wage withholding is administered by the California Employment Development Department (EDD). For more information, go to **edd.ca.gov** or call **888**.745.3886.

Do not use Form 590 to certify an exemption from withholding if you are a **Seller of California real estate**. Sellers of California real estate use Form 593-C, Real Estate Withholding Certificate, to claim an exemption from the real estate withholding requirement.

The following are excluded from withholding and completing this form:

- The United States and any of its agencies or instrumentalities.
- A state, a possession of the United States, the District of Columbia, or any of its political subdivisions or instrumentalities.
- A foreign government or any of its political subdivisions, agencies, or instrumentalities.

B Income Subject to Withholding

California Revenue and Taxation Code (R&TC) Section 18662 requires withholding of income or franchise tax on payments of California source income made to nonresidents of California.

Withholding is required on the following, but is not limited to:

- Payments to nonresidents for services rendered in California.
- Distributions of California source income made to domestic nonresident partners, members, and S corporation shareholders and allocations of California source income made to foreign partners and members.
- Payments to nonresidents for rents if the payments are made in the course of the withholding agent's business.
- Payments to nonresidents for royalties from activities sourced to California.
- Distributions of California source income to nonresident beneficiaries from an estate or trust.
- Endorsement payments received for services performed in California.
- Prizes and winnings received by nonresidents for contests in California.

However, withholding is optional if the total payments of California source income are $1,500 or less during the calendar year.

For more information on withholding get FTB Pub. 1017, Resident and Nonresident Withholding Guidelines. To get a withholding publication, see Additional Information.

C Who Certifies this Form

Form 590 is certified by the payee. California residents or entities exempt from the withholding requirement should complete Form 590 and submit it to the withholding agent before payment is made. The withholding agent is then relieved of the withholding requirements if the agent relies in good faith on a completed and signed Form 590 unless notified by the Franchise Tax Board (FTB) that the form should not be relied upon.

An incomplete certificate is invalid and the withholding agent should not accept it. If the withholding agent receives an incomplete certificate, the withholding agent is required to withhold tax on payments made to the payee until a valid certificate is received. In lieu of a completed exemption certificate, the withholding agent may accept a letter from the payee as a substitute explaining why they are not subject to withholding. The letter must contain all the information required on the certificate in similar language, including the under penalty of perjury statement and the payee's taxpayer identification number (TIN). The withholding agent must retain a copy of the certificate or substitute for at least five years after the last payment to which the certificate applies, and provide it upon request to the FTB.

If an entertainer (or the entertainer's business entity) is paid for a performance, the entertainer's information must be provided. **Do not** submit the entertainer's agent or promoter information.

The grantor of a grantor trust shall be treated as the payee for withholding purposes. Therefore, if the payee is a grantor trust and one or more of the grantors is a nonresident, withholding is required. If all of the grantors on the trust are residents, no withholding is required. Resident grantors can check the box on Form 590 labeled "Individuals — Certification of Residency."

D Definitions

For California nonwage withholding purposes, **nonresident** includes all of the following:

- Individuals who are not residents of California.
- Corporations not qualified through the California Secretary of State (CA SOS) to do business in California or having no permanent place of business in California.
- Partnerships or limited liability companies (LLCs) with no permanent place of business in California.
- Any trust without a resident grantor, beneficiary, or trustee, or estates where the decedent was not a California resident.

Foreign refers to non-U.S.

For more information about determining resident status, get FTB Pub. 1031, Guidelines for Determining Resident Status. Military servicemembers have special rules for residency. For more information, get FTB Pub. 1032, Tax Information for Military Personnel.

Permanent Place of Business:
A corporation has a permanent place of business in California if it is organized and existing under the laws of California or it has qualified through the CA SOS to transact intrastate business. A corporation that has not qualified to transact intrastate business (e.g., a corporation engaged exclusively in interstate commerce) will be considered as having a permanent place of business in California only if it maintains a permanent office in California that is permanently staffed by its employees.

E Military Spouse Residency Relief Act (MSRRA)

Generally, for tax purposes you are considered to maintain your existing residence or domicile. If a military servicemember and nonmilitary spouse have the same state of domicile, the MSRRA provides:

- A spouse shall not be deemed to have lost a residence or domicile in any state solely by reason of being absent to be with the servicemember serving in compliance with military orders.
- A spouse shall not be deemed to have acquired a residence or domicile in any other state solely by reason of being there to be with the servicemember serving in compliance with military orders.

Domicile is defined as the one place:

- Where you maintain a true, fixed, and permanent home.
- To which you intend to return whenever you are absent.

A military servicemember's nonmilitary spouse is considered a nonresident for tax purposes if the servicemember and spouse have the same domicile outside of California and the spouse is in California solely to be with the servicemember who is serving in compliance with Permanent Change of Station orders.

California may require nonmilitary spouses of military servicemembers to provide proof that they meet the criteria for California personal income tax exemption as set forth in the MSRRA.

Income of a military servicemember's nonmilitary spouse for services performed in California is not California source income subject to state tax if the spouse is in California to be with the servicemember serving in compliance with military orders, and the servicemember and spouse have the same domicile in a state other than California.

For additional information or assistance in determining whether the applicant meets the MSRRA requirements, get FTB Pub. 1032.

Specific Instructions

Payee Instructions

Enter the withholding agent's name.

Enter the payee's information, including the TIN and check the appropriate TIN box.

You must provide a valid TIN as requested on this form. The following are acceptable TINs: social security number (SSN); individual taxpayer identification number (ITIN); federal employer identification number (FEIN); California corporation number (CA Corp no.); or CA SOS file number.

Private Mail Box (PMB) – Include the PMB in the address field. Write "PMB" first, then the box number. Example: 111 Main Street PMB 123.

Foreign Address – Follow the country's practice for entering the city, county, province, state, country, and postal code, as applicable, in the appropriate boxes. **Do not** abbreviate the country name.

Exemption Reason – Check the box that reflects the reason why the payee is exempt from the California income tax withholding requirement.

Withholding Agent Instructions

Do not send this form to the FTB. The withholding agent retains this form for a minimum of five years or until the payee's status changes, and must provide this form to the FTB upon request.

The payee must notify the withholding agent if any of the following situations occur:

- The individual payee becomes a nonresident.
- The corporation ceases to have a permanent place of business in California or ceases to be qualified to do business in California.
- The partnership ceases to have a permanent place of business in California.
- The LLC ceases to have a permanent place of business in California.
- The tax-exempt entity loses its tax-exempt status.

If any of these situations occur, then withholding may be required. For more information, get Form 592, Resident and Nonresident Withholding Statement, Form 592-B, Resident and Nonresident Withholding Tax Statement, and Form 592-V, Payment Voucher for Resident and Nonresident Withholding.

Additional Information

Website:	For more information go to **ftb.ca.gov** and search for **nonwage**. **MyFTB** offers secure online tax account information and services. For more information and to register, go to **ftb.ca.gov** and search for **myftb**.
Telephone:	**888**.792.4900 or 916.845.4900, Withholding Services and Compliance phone service
Fax:	916.845.9512
Mail:	WITHHOLDING SERVICES AND COMPLIANCE MS F182 FRANCHISE TAX BOARD PO BOX 942867 SACRAMENTO CA 94267-0651

For questions unrelated to withholding, or to download, view, and print California tax forms and publications, or to access the TTY/TDD numbers, see the information below.

Internet and Telephone Assistance

Website:	**ftb.ca.gov**
Telephone:	800.852.5711 from within the United States 916.845.6500 from outside the United States
TTY/TDD:	800.822.6268 for persons with hearing or speech impairments

Asistencia Por Internet y Teléfono

Sitio web:	**ftb.ca.gov**
Teléfono:	800.852.5711 dentro de los Estados Unidos 916.845.6500 fuera de los Estados Unidos
TTY/TDD:	800.822.6268 para personas con discapacidades auditivas o de habla

Certification Regarding
Debarment, Suspension, and Other Responsibility Matters

The prospective participant certifies to the best of its knowledge and belief that it and the principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three year period preceding this proposal been convicted of or had a civil judgement rendered against them or commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction: violation of Federal or State antitrust statute or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property:

(c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (b) of this certification; and

(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

I understand that a false statement on this certification may be grounds for rejection of this proposal or termination of the award. In addition, under 18 USC Sec. 1001, a false statement may result in a fine of up to $10,000 or imprisonment for up to 5 years, or both.

_____

Typed Name & Title of Authorized Representative

_____

Signature of Authorized Representative Date

❑ I am unable to certify to the above statements. My explanation is attached.

CAMPAIGN CONTRIBUTIONS DISCLOSURE

In accordance with California law, bidders and contracting parties are required to disclose, at the time the application is filed, information relating to any campaign contributions made to South Coast Air Quality Management District (South Coast AQMD) Board Members or members/alternates of the MSRC, including: the name of the party making the contribution (which includes any parent, subsidiary or otherwise related business entity, as defined below), the amount of the contribution, and the date the contribution was made. 2 C.C.R. §18438.8(b).

California law prohibits a party, or an agent, from making campaign contributions to South Coast AQMD Governing Board Members or members/alternates of the Mobile Source Air Pollution Reduction Review Committee (MSRC) of more than $250 while their contract or permit is pending before South Coast AQMD; and further prohibits a campaign contribution from being made for three (3) months following the date of the final decision by the Governing Board or the MSRC on a donor's contract or permit. Gov't Code §84308(d). For purposes of reaching the $250 limit, the campaign contributions of the bidder or contractor *plus* contributions by its parents, affiliates, and related companies of the contractor or bidder are added together. 2 C.C.R. §18438.5.

In addition, South Coast AQMD Board Members or members/alternates of the MSRC must abstain from voting on a contract or permit if they have received a campaign contribution from a party or participant to the proceeding, or agent, totaling more than $250 in the 12-month period prior to the consideration of the item by the Governing Board or the MSRC. Gov't Code §84308(c).

The list of current South Coast AQMD Governing Board Members can be found at South Coast AQMD website (www.aqmd.gov). The list of current MSRC members/alternates can be found at the MSRC website (http://www.cleantransportationfunding.org).

SECTION I.

Contractor (Legal Name): _____

DBA, Name _____, County Filed in_____

Corporation, ID No._____

LLC/LLP, ID No. _____

List any parent, subsidiaries, or otherwise affiliated business entities of Contractor:
(See definition below).

_____

_____

SECTION II.

Has Contractor and/or any parent, subsidiary, or affiliated company, or agent thereof, made a campaign contribution(s) totaling $250 or more in the aggregate to a current member of the South Coast Air Quality Management Governing Board or member/alternate of the MSRC in the 12 months preceding the date of execution of this disclosure?

☐ Yes ☐ No **If YES, complete Section II below and then sign and date the form. If NO, sign and date below. Include this form with your submittal.**

Campaign Contributions Disclosure, *continued:*

Name of Contributor _____

Governing Board Member or MSRC Member/Alternate	Amount of Contribution	Date of Contribution

Name of Contributor _____

Governing Board Member or MSRC Member/Alternate	Amount of Contribution	Date of Contribution

Name of Contributor _____

Governing Board Member or MSRC Member/Alternate	Amount of Contribution	Date of Contribution

Name of Contributor _____

Governing Board Member or MSRC Member/Alternate	Amount of Contribution	Date of Contribution

I declare the foregoing disclosures to be true and correct.

By: _____

Title: _____

Date: _____

DEFINITIONS

Parent, Subsidiary, or Otherwise Related Business Entity (2 Cal. Code of Regs., §18703.1(d).)

(1) Parent subsidiary. A parent subsidiary relationship exists when one corporation directly or indirectly owns shares possessing more than 50 percent of the voting power of another corporation.

(2) Otherwise related business entity. Business entities, including corporations, partnerships, joint ventures and any other organizations and enterprises operated for profit, which do not have a parent subsidiary relationship are otherwise related if any one of the following three tests is met:

(A) One business entity has a controlling ownership interest in the other business entity.

(B) There is shared management and control between the entities. In determining whether there is shared management and control, consideration should be given to the following factors:

(i) The same person or substantially the same person owns and manages the two entities;
(ii) There are common or commingled funds or assets;
(iii) The business entities share the use of the same offices or employees, or otherwise share activities, resources or personnel on a regular basis;
(iv) There is otherwise a regular and close working relationship between the entities; or

(C) A controlling owner (50% or greater interest as a shareholder or as a general partner) in one entity also is a controlling owner in the other entity.

South Coast Air Quality Management District

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

Direct Deposit Authorization

STEP 1: Please check all the appropriate boxes

- ☐ Individual (Employee, Governing Board Member)
- ☐ Vendor/Contractor
- ☐ Changed Information
- ☐ New Request
- ☐ Cancel Direct Deposit

STEP 2: Payee Information

Last Name	First Name	Middle Initial	Title

Vendor/Contractor Business Name (if applicable)

Address	Apartment or P.O. Box Number

City	State	Zip	Country

Taxpayer ID Number	Telephone Number	Email Address

Authorization

1. I authorize South Coast Air Quality Management District (South Coast AQMD) to direct deposit funds to my account in the financial institution as indicated below. I understand that the authorization may be rejected or discontinued by South Coast AQMD at any time. If any of the above information changes, I will promptly complete a new authorization agreement. If the direct deposit is not stopped before closing an account, funds payable to me will be returned to South Coast AQMD for distribution. This will delay my payment.
2. This authorization remains in effect until South Coast AQMD receives written notification of changes or cancellation from you.
3. I hereby release and hold harmless South Coast AQMD for any claims or liability to pay for any losses or costs related to insufficient fund transactions that result from failure within the Automated Clearing House network to correctly and timely deposit monies into my account.

STEP 3:

You must verify that your bank is a member of an Automated Clearing House (ACH). Failure to do so could delay the processing of your payment. You must attach a voided check or have your bank complete the bank information and the account holder must sign below.

To be Completed by your Bank

Staple Voided Check Here

Name of Bank/Institution		
Account Holder Name(s)		
☐ Saving ☐ Checking	Account Number	Routing Number
Bank Representative Printed Name	Bank Representative Signature	Date
ACCOUNT HOLDER SIGNATURE:		Date

For South Coast AQMD Use Only

Input By _____ Date _____

Surplus Off-Road Opt-In for NOx (SOON)

SOUTH COAST AQMD PROGRAM ANNOUNCEMENT
PA2020-03

The South Coast Air Quality Management District (South Coast AQMD) is soliciting project proposals for the following purpose according to terms and conditions attached. In this Program Announcement (PA) the words "Proposer," "Applicant," "Contractor," and "Consultant" are used interchangeably.

SECTION I – OVERVIEW

PURPOSE

The South Coast AQMD is seeking proposals for the Surplus Off-Road Opt-In for NOx (SOON) Provision of the California Air Resources Board's (CARB's) In-Use Off-Road Diesel-Fueled Fleets Regulation. The primary purpose of this Program is to provide financial incentives to assist in the purchase of zero or lower-emissions heavy-duty engine technologies to achieve near-term nitrogen oxides (NOx) emissions reductions from in-use off-road equipment. Since funding for the SOON Program is from the Carl Moyer Program (CMP), all CMP requirements apply to this Program, except where specifically noted, or where the South Coast AQMD implements more stringent program criteria as described in the Rule 2449 SOON Implementation Guidelines.

INTRODUCTION

The SOON Program is designed to achieve additional NOx reductions above those that would be obtained from the state off-road regulation. These reductions are critical to meeting the PM2.5 and ozone ambient air quality standards in the South Coast Air Basin.

Funding for Program Announcement PA2020-03 is from the CMP. **The budget for this PA will be approximately $5 million from the CMP and AB 923 Funds.** Project awards are contingent upon receiving the CMP funds from CARB. Additional sources of funding, such as AB 923, may be available and added to this Program.

Eligible projects qualified for the SOON Program must meet a maximum cost-effectiveness limit of $30,000 per ton of NOx emissions reduced and any additional South Coast AQMD criteria as stated in this PA. For advanced technology projects that are zero-emission, or alternatively meet the cleanest certified optional NOx standard applicable, South Coast AQMD may apply a cost-effectiveness limit of up to $100,000 per weighted ton of NOx emissions reduced, for the incremental emission reductions that go beyond current emission standards, as allowed by the CMP 2017 Guidelines. Projects exceeding the cost-effectiveness limit may receive partial funding up to the cost-effectiveness limit or will be deemed ineligible. Except where otherwise stated, projects must meet the requirements of the CMP 2017 Guidelines.

Applications submitted in response to this PA will be evaluated according to the approved 2017 CMP Guidelines. It is the applicant's responsibility to ensure that the most current information and requirements are reflected in a submitted application. Applicants should check the CARB website for any updates and/or advisories to the guidelines http://www.arb.ca.gov/msprog/moyer/guidelines/current.htm.

South Coast AQMD staff will evaluate all qualified SOON Program applications and make recommendations to the Governing Board for final selection of project(s) to be funded. All eligible projects will be ranked based on cost-effectiveness of NOx emissions reduced. Please note that depending upon the number of applications received in response to this PA, South Coast AQMD may prioritize the selection of projects to reduce emissions in and around DAC and low-income communities. While South Coast AQMD encourages all eligible applications, this means that some projects may not be selected based on their domicile address, regardless of their cost-effectiveness ranking.

At least 50 percent of South Coast AQMD's CMP funds will be targeted for projects that meet the criteria of a disadvantaged or low-income community project. Other non-CMP funding sources may have DAC and/or low-income status requirements that may limit South Coast AQMD's ability to award such funding to projects that do not meet applicable geographic or income requirements. The Office of Environmental Health Hazard Assessment (OEHHA) in the California Environmental Protection Agency (CalEPA) has developed the California Communities Environmental Health Screening Tool: CalEnviroScreen Version 3.0 (CalEnviroScreen 3.0). The CalEnviroScreen 3.0 tool will be used by South Coast AQMD to identify projects that qualify as a DAC, which is defined as scoring in the top 25th percentile, and will strive to maximize the benefits to these communities from this PA. All applications will be assessed with the CalEnviroScreen tool to identify and verify if the project will benefit a DAC. This tool is available at: https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30

South Coast AQMD SOON Program requirements may be more stringent than CARB's requirements and/or guidelines. For example, South Coast AQMD may have a lower cost-effectiveness ceiling for a particular project type. In case there is any conflict between CARB and South Coast AQMD criteria, the more stringent criteria will prevail. South Coast AQMD will post any new information and requirements on its SOON Web page at www.aqmd.gov/soon. It is the responsibility of the applicant to ensure that the most current information and requirements are reflected in a submitted application. Be aware that there is a possibility that due to program priorities, cost-effectiveness or funding category limitations (i.e., caps), project applications may be offered only partial funding, and not all applications that meet the cost-effectiveness criteria may be funded.

DEFINITIONS

1. Alternative Fuel
   Alternative fuels include compressed natural gas (CNG), liquefied natural gas (LNG), methanol, ethanol, propane (LPG) and electric technologies.

2. Base Rule
   Base rule is defined as the CARB In-Use Off-Road Diesel-Fueled Fleets Regulation without the SOON provisions (Title 13, Division 3, Chapter 9, Article 4.8, Section 2449 and 2449.1). Compliance with the Base Rule is required and is demonstrated by the DOORS Compliance Snapshot.

3. Compliance Plan
   Compliance plan is the future forecast of fleet average emissions using current fleet information and planned future repower, replacement, retirement and retrofit projects. An Excel spreadsheet template is available on the South Coast AQMD SOON webpage.

4. Contract Term
   Contract term is the duration for which the contract is valid. It encompasses both the project completion and project implementation periods.
   i. Project completion period is the first part of the Contract term starting from the date of Contract execution by both parties to the date the project post-inspection confirms that the project has become operational.
   ii. Project implementation period is the second part of the Contract term and equals the project life.

5. Cost-Effectiveness Limit
   The cost-effectiveness limit determines the maximum funding that can be provided to an individual vehicle repower, replacement or retrofit project for each ton of emissions reduced. Under the SOON Program the cost-effective is calculated based on tons of NOx reduced per year.

6. Current NOx Standard
   For all engine horsepower categories, the current NOx standard in 2020 is Tier 4 Final.

7. Dual-Fuel Technology
   Dual-fuel technology includes electric hybrids and technologies that utilize a combination of either CNG and diesel fuel or LNG and diesel fuel, provided they are certified by CARB. Experimental technologies and fuels will be referred to CARB for evaluation and possible eligibility in the program.

8. Incremental Cost
   Incremental cost is the percent of actual cost that is eligible for SOON funding. For repower projects, it is 85%; for replacement projects, it is 80%; and for NOx retrofit projects, it is 100%.

9. Project Life
   Project life is the period of the contract term during which the repowered, replacement or retrofitted vehicle is operated. The contractor must report the annual usage throughout the project life. In addition, project life is used to calculate the cost-effectiveness and funding amount for a project.

10. Replacement Project
    Replacement project is the purchase of a new or used vehicle to replace an existing vehicle. Only new vehicles meeting Tier 4 Final emissions standards are eligible for funding.

11. Repower Project
    Repower project is the replacement of an old engine of an existing vehicle with a newer engine certified to lower emission standards.

12. Retrofit Project
    Retrofit project is a modification made to an engine exhaust and/or fuel system such that the specifications of the retrofitted engine are different from the original engine.

GENERAL PROGRAM INFORMATION

The primary focus of the SOON Program is to achieve emission reductions from heavy-duty off-road vehicles and equipment operating in California as early and as cost-effectively as possible. The SOON

Program is intended to achieve additional NOx reductions which are needed to meet the PM2.5 and ozone ambient air quality standards in the South Coast Air Basin. The emission reductions expected through the deployment of zero or low-emissions engine or retrofit technologies under this Program must be real, surplus and quantifiable. Senate Bill 513 (Beall) removed many of the limitations associated with co-funding from other sources. The air district must verify the sum of all other incentive funds to ensure the Moyer funds will not exceed the total project cost. Applicants from non-public entities must provide at least 15 percent of the Moyer eligible project costs from non-public sources.

Replacement and repower projects are **limited to only** those involving a diesel baseline engine subject to the off-road regulation, and a lower emission or zero emission technology that is certified, verified or approved by CARB. **All projects must meet the program's cost-effectiveness limit(s) and be operational no later than May 20, 2022.** No administrative or vehicle operational costs are eligible.

It is expected that multiple awards will be granted under this PA, subject to the approval of the South Coast AQMD Governing Board.

All proposals will be evaluated based on criteria set forth in this PA. The South Coast AQMD will evaluate and/or verify information submitted by the applicant. At South Coast AQMD's discretion, consultants contracted by South Coast AQMD may conduct all or part of such evaluation and/or verification. Data verification during the evaluation and contracting process may cause initial cost-effectiveness rankings, and associated awards, to change. Furthermore, the South Coast AQMD reserves the right to make adjustments to awards based on the subsequent verification of information as well as changes in cost-effectiveness.

IMPORTANT PROGRAM INFORMATION

- Fleets with a total statewide equipment horsepower over 20,000 hp and with 40 percent or more of their vehicles at Tier 0 and Tier 1 emission levels as of January 1, 2008, are subject to the SOON Program and are required to apply for funding. Fleets not meeting both of the above criteria on January 1, 2008, may voluntarily participate in this Program and apply for funding.
- For this program cycle, all projects will be eligible for a maximum seven-year operational requirement within the jurisdiction of the South Coast Air Quality Management District. A shorter project life will be considered on a case-by-case basis and may be required by the CMP Guidelines for specific types of equipment. However, a shorter project life may affect the project's ranking relative to other projects and the amount of funding that can be provided.
- The annual hours used to calculate cost-effectiveness will be included in the contract. An extension of the contract or partial payback of funds may be required if the proposed annual hours are not achieved.
- For all repower projects, fleets are **not** required to, but may install the highest level verified diesel emission control system (VDECS) at their own cost.
- Retrofit projects which can achieve NOx reductions may be funded on a case-by-case basis.
- Applicants must demonstrate that during the contract period, vehicles equipped with NOx retrofits, repowered with new engines, or that have been replaced using SOON program funding, will not use a lower emission rate to calculate the fleet average index and target rate and BACT credit to meet compliance in the Diesel Off-Road Online Reporting System (DOORS). Actions taken using SOON program funding may be used for determining compliance **after** the completion of the SOON program project contract period for that vehicle. For example, if a Tier

2 vehicle is repowered with a Tier 4 engine with SOON Program funds for purposes of compliance with the off-road regulation, that vehicle is still treated as if it were a Tier 2 until the end of the contract period for the SOON program project.

- Applicants **must** provide vendor quotes with their application to document the cost of implementing the proposed technology. **All quotes must have been obtained within 90 days of application submittal. Applicants may be required to submit quotes from more than one technology provider.**
- For off-road replacement and repower projects, the CMP guidelines specify that the horsepower rating of the new (or replacement) engine must not be greater than 125 percent of the original manufacturer rated horsepower of the old (or existing) engine. If the new engine is greater than 125 percent, then the eligible funding amount will be based on the cost of an engine or equipment with a horsepower rating that is no higher than 125 percent of the existing engine horsepower rating. The applicant must pay the additional costs associated with the higher horsepower engine and obtain a price quote for an engine or equipment that is within the 125 percent range for the funding determination. In addition, verifiable records on the existing engine must be provided with the application to accurately identify the engine manufacture year and horsepower (e.g., photographs of engine labels, statement from engine manufacturers, etc.).
- Applicants must demonstrate that they are in full compliance with all applicable CARB regulations and that vehicle/equipment funding requests under this Program provide surplus emissions reductions. **Applicants are required to submit a compliance plan showing how they will comply with the targets of CARB's In-Use Off-Road Diesel-Fueled Fleets Regulation throughout the contract term, as well as how the new projects under this PA will meet SOON NOx targets in 2023.**
- Applicants must ensure that the vehicle/equipment to be purchased or installed is in compliance with all applicable federal, state and local air quality rules and regulations and that it will maintain compliance for the full contract term.
- Any associated tax obligation with the award is the responsibility of the grantee.
- No third-party contracts will be executed. The South Coast AQMD contract must be signed by the equipment owner.
- Pre- and post-inspection of all vehicles/engines/equipment approved for funding will be conducted by South Coast AQMD.
- Destruction of the engine/equipment being repowered or replaced is required.
- To avoid double dipping, applicants shall not apply for funding for the same equipment in any other air district.

POTENTIAL PROJECTS

All eligible projects must use CARB-certified technology or technology that has been verified/approved by CARB for real and quantifiable emission reductions that go beyond any regulatory requirement. The following projects are eligible for SOON funding:

Repower Project

For a repower project, the new engine must be certified for sale in California to the current NOx emission standard (Tier 4 Final). If an engine meeting the current emission standard is not available or cannot be installed:

- A Tier 3 Replacement Engine rated at 175 hp or higher can be used for the repower project.
- A Tier 3 Replacement rated at 175 horsepower or less can be used for repower projects provided it complies with U.S. Environmental Protection Agency (EPA) requirements related to replacing in-use engines contained in the Code of Federal Regulations, Title 40, Section 1068.240.
- For off-road equipment with similar modes of operation to on-road vehicles, other possible options include the replacement of an older diesel off-road engine with a new on-road engine certified to an emission standard equal to or cleaner than the Tier 4 Final off-road emission standard or a newer emission certified alternative fuel engine.

Retrofit Project

For a retrofit project, the retrofit technology **must provide a NOx benefit** and must be:

- Verified by CARB to reduce NOx or NOx plus PM for the specific engine for which funding is requested.
- In compliance with established durability and warranty requirements and cost-effectiveness criteria.

Diesel Particulate Filters (DPFs) and other devices that are not verified to reduce NOx are not eligible for SOON funding. The applicant will find more information on VDECS, including a list of currently verified DECS at http://www.arb.ca.gov/diesel/verdev/verdev.htm.

Replacement Project

For replacement projects, the replacement vehicle/equipment must be powered by a Tier 4 Final engine. If a vehicle/equipment with a Tier 4 Final engine will not be available within 6 months of the application submittal, vehicle/equipment with an Interim Tier 4 or Tier 3 engine may be purchased.

PROJECT CRITERIA

The South Coast AQMD retains the authority to impose more stringent additional requirements in order to address local concerns.

- Off-road CI equipment eligible for SOON Program funding includes equipment 25 hp (19 kilowatt) or greater. The complete definition can be found in CARB's In-Use Off-Road Diesel-Fueled Fleets Regulation at http://www.arb.ca.gov/msprog/ordiesel/ordiesel.htm.
- SOON Program grants can be no greater than a project's incremental cost (85% of quotation for repower projects, 80% of quotation for replacement projects). The incremental cost shall be reduced by the value of any current financial incentive that reduces the project price, including but not limited to tax credits or deductions, grants or other public financial assistance.
- Applicants must ensure that the vehicle/equipment to be purchased or installed is in compliance with all applicable federal, state and local air quality rules and regulations and that it will maintain compliance for the full contract term.
- The certification emission standard and Tier designation for the engine must be determined from the CARB's Executive Order issued for that engine, not by the engine model year. Executive orders for off-road engines may be found at http://www.arb.ca.gov/msprog/offroad/cert/cert.php.
- Reduced emission engines or retrofits must be certified/verified for sale in California and must comply with durability and warranty requirements. These may include new CARB-certified engines and verified diesel emission control strategies.

- New vehicles equipped with Tier 4 family emission limits (FEL) engines certified to Tier 3 or Interim Tier 4 standards are eligible for SOON Program funding. **However, those engines will have their cost-effectiveness calculated as though they were Tier 3 engines**.
- New engines manufactured under the "Flexibility Provisions for Equipment Manufacturers", as detailed in Title 13, CCR, section 2423(d), are ineligible for SOON Program funding to repower equipment.
- For replacement projects, existing equipment with engines manufactured under the flexibility provision, detailed in CCR, title 13, section 2423 (d), the baseline emission rates shall be determined by using the previous applicable Tier emission standard for the existing engine model year and horsepower rating.
- Class 7 diesel forklifts are the only diesel forklifts eligible for SOON Program funding and are subject to all off-road project criteria. The South Coast AQMD must obtain and verify documentation of the classification of the forklift prior to funding.
- If repower with an engine meeting the current applicable standard is technically infeasible, unsafe or cost prohibitive, the replacement engine must meet the most current practicable previously applicable emission standard and cost-effectiveness criteria and, if rated at less than 175 hp, must comply with the requirements related to replacing in-use engines contained in Title 40, Code of Federal Regulations, Section 1068.240.
- Replacement of an uncontrolled diesel off-road engine with a new on-road engine certified to an emission standard equal to or lower than the Tier 4 Final off-road emission standard or a newer emission-certified alternative fuel engine may be eligible for funding as off-road equipment with similar modes of operation as on-road vehicles on a case-by-case basis. Other equipment may be eligible for funding on a case-by-case basis. These repowers must meet all other applicable project criteria.
- Applicants must provide their DOORS Fleet Compliance Snapshot.
- Applicants must provide the DOORS EIN for each vehicle for which funding is requested.
- Applicants must provide proof they have owned each vehicle for which funding is requested for a replacement vehicle for at least two years.
- Applicants must provide a current Compliance Plan using the South Coast AQMD fleet calculator or the DOORS calculator demonstrating compliance with the off-road regulation throughout the anticipated contract period.
- Applicants must provide at least the most recent two (2) years of hour-meter readings.

Potential projects that fall outside of these criteria may be considered on a case-by-case basis if evidence provided to the air district suggests potential surplus, real, quantifiable and enforceable emission reduction benefits.

MAXIMUM ELIGIBLE FUNDING

The maximum eligible funding amount and project life for each SOON project type is summarized below.

Project	Maximum Funding	Maximum Project Life
Replacement	80% of vehicle/equipment cost	Five years, except:

		• Three years for excavators, skid steer loaders, and rough terrain forklifts
Repower	85% of engine cost plus parts and labor necessary for installation	Seven years
Retrofit	100% of retrofit device cost plus parts and labor for installation, plus estimated cost for maintenance during project life.	Five years

COST-EFFECTIVENESS EVALUATION DISCUSSION

The SOON Program is required to meet the requirements of the CMP by using the cost-effectiveness calculation methodology found in Appendix C of the CMP Guidelines (see Hhttp://www.arb.ca.gov/msprog/moyer/guidelines/current.htm). Under the SOON Program, only NOx emission reductions will be taken into consideration to calculate the cost-effectiveness.

REPORTING AND MONITORING

All participants in the SOON Program are required to keep appropriate records during the full contract period. Project life is the number of years used to determine the cost-effectiveness and is equivalent to the contract implementation period. All equipment must operate in the South Coast AQMD for the full project life. The South Coast AQMD shall conduct periodic reviews of each project's operating records to ensure that the engine is operated as stated in the program application. Annual records must contain the following, at a minimum:

- Total Hours of Operation
- Total Hours of Operation in the South Coast Air District
- Annual Maintenance and Repair Information

Records must be retained and updated throughout the project life and made available for South Coast AQMD inspection. The South Coast AQMD may conduct periodic reviews of each vehicle/equipment project's operating records to ensure that the vehicle is operated as required by the project requirements.

Equipment owner, if awarded CMP grant funds, will be required to submit annual reports for the life of the project, as described in Section II – Work Statement/Schedule of Deliverables.

PROGRAM ADMINISTRATION

The SOON Program will be administered locally by the South Coast AQMD through the Science and Technology Advancement Office.

FUNDING CATEGORIES
Only equipment identified in the CARB In-Use Off-Road Diesel-Fueled Fleets Regulation is eligible for this Program.

PROJECT EVALUATION/AWARDS
South Coast AQMD staff will evaluate all submitted proposals and make recommendations to the South Coast AQMD Governing Board for final selection of project(s) to be funded. Proposals will be evaluated for cost-effectiveness of NOx emissions reduced on an equipment-by-equipment basis, as well as a project's disproportional impact evaluation. (This is discussed further in Section IV).

SCHEDULE OF EVENTS

Release of PA2020-03	March 6, 2020
Workshop – 10AM to 1PM* Coachella Valley Mosquito and Vector Control Board Room 43420 Trader Place Indio, CA 92201	Wednesday, April 15, 2020 (Carl Moyer and SOON Program will be discussed at the workshop with an emphasis on agricultural projects)
Workshop – 10AM to 1PM* Resurrection Church, Parish Hall 3324 E. Opal Street Los Angeles, CA 90023	Wednesday, April 22, 2020
Workshop – 9AM to 12PM* Salt Lake Park, The Lounge 3401 E. Florence Avenue Huntington Park, CA 90255	Thursday, May 7, 2020
Workshop – 9AM to 12PM* San Bernardino Valley College, Building B100 701 South Mount Vernon Avenue San Bernardino, CA 92410	Tuesday, May 12, 2020
2 Workshops – 9AM to Noon* South Coast AQMD Headquarters Conference Room CC6 21865 Copley Drive Diamond Bar, CA 91765	Wednesday, April 29, 2020 Wednesday, May 6, 2020
All Applications Due	No later than 1:00 PM, Tuesday, June 2, 2020

Anticipated Award Consideration by South Coast AQMD Board	October-November 2020
*Training for the online application system will be included in these workshops.	

ALL PROPOSALS MUST BE RECEIVED ELECTRONICALLY OR ON PAPER AT THE SOUTH COAST AQMD HEADQUARTERS NO LATER THAN 1:00 P.M. ON TUESDAY, JUNE 2, 2020

Electronic submission using South Coast AQMD's new CMP Online Application Program (OAP) is preferred and is available at www.aqmd.gov/moyer.

Postmarks of paper copy applications will not be accepted. Faxed or email proposals will not be accepted. Proposers may hand-deliver proposals to the South Coast AQMD by submitting the proposal to the South Coast AQMD Public Information Center. The proposal will be date and time-stamped and the person delivering the proposal will be given a receipt.

South Coast AQMD may issue subsequent solicitations if insufficient applications are received in the initial solicitation.

STATEMENT OF COMPLIANCE
Government Code Section 12990 and California Administrative Code, Title II, Division 4, Chapter 5, require employers to agree not to unlawfully discriminate against any employee or applicant because of race, religion, color, national origin, ancestry, physical handicap, medical condition, marital status, sex, or age. A statement of compliance with this clause is included in all South Coast AQMD contracts.

SECTION II: WORK STATEMENT/SCHEDULE OF DELIVERABLES

All applicants that are selected for funding awards must complete the Work Statement and Schedule of Deliverables described below as part of the contracting process. Development of these materials for the initial application is NOT required; however, applicants must sign the application form indicating their understanding of the requirements for submittal of additional project information to finalize a contract and that all vehicles, engines or equipment must be in operation no later than **May 20, 2022.**

WORK STATEMENT
The scope of work involves a series of tasks and deliverables that demonstrate compliance with the requirements of the SOON Program as administered by CARB and the South Coast AQMD.

At a minimum, any proposed project must meet the following criteria:

- Emission reductions must be real, quantifiable, enforceable and surplus in accordance with CARB and South Coast AQMD guidelines.
- Cost-effectiveness of the project must meet the minimum requirement of the CMP guidelines.

- Project engines or equipment must operate in-service for the full project life.
- All vehicles/engines/equipment must be in operation no later than May 20, 2022.
- Appropriate annual usage records must be kept and reported to South Coast AQMD during the project life (i.e., annual hours of operation).
- A compliance plan that demonstrates compliance with the off-road regulation throughout the contract period must be provided.
- Ensure that the project complies with other local, state and federal programs, and resulting emission reductions from a specific project are not required as a mitigation measure to reduce adverse environmental impacts that are identified in an environmental document prepared in accordance with the California Environmental Quality Act or the National Environmental Policy Act.
- If requested, a contractor must provide a financial statement and bank reference, or other evidence of financial ability to fulfill contract requirements.

DELIVERABLES

The contract will describe how the project will be monitored and what type of information will be included in project progress reports. At a minimum, the South Coast AQMD expects to receive the following:

- An annual report, throughout the project life, which provides the annual hours of operation, where the vehicle(s) or equipment(s) was operated, annual fuel consumption, and operational and maintenance issues encountered and how they were resolved.
- An annual submission of the applicant's DOORS Fleet Compliance Snapshot demonstrating compliance with the off-road regulation.

South Coast AQMD reserves the right to verify the information provided.

SECTION III: PROPOSAL SUBMITTAL REQUIREMENTS

Proposers **must** complete the appropriate application forms committing that the information requested in Section II, Work Statement/Schedule of Deliverables, will be submitted if the Proposer's project is selected for funding.

In addition, Conflict of Interest and Project Cost information, as described below, must also be submitted with the application. It is the responsibility of the proposer to ensure that all information submitted is accurate and complete.

CONFLICT OF INTEREST

Applicant must address any potential conflicts of interest with other clients affected by actions performed by the firm on behalf of the South Coast AQMD. Although the proposer will not be automatically disqualified by reason of work performed for such firms, the South Coast AQMD reserves the right to consider the nature and extent of such work in evaluating the proposal. Conflicts of interest will be screened on a case-by-case basis by the South Coast AQMD District Counsel's Office. Conflict of interest provisions of the state law, including the Political Reform Act, may apply to work performed pursuant to this contract. Please discuss potential conflicts of interest on the application form entitled "Campaign Contributions Disclosure".

PROJECT COST
Applicants must provide cost information that specifies the amount of funding requested and the basis for that request by attaching vendor quotes to the application. Applicants need to inform vendors of the time frame of the award process so that they can accurately quote costs based on the anticipated order/purchase date. **Note that no purchase orders may be placed or work performed for projects awarded under this PA until after the date of award approval by the South Coast AQMD Governing Board. Any orders placed or payments made in advance of an executed contract with the South Coast AQMD are done at the risk of the applicant. The South Coast AQMD has no obligation to fund the project until a contract is fully executed by both parties.**

The SOON Program funds only the differential cost between existing technology and zero or lower-emissions technology. The proposed zero or lower-emissions technology must be CARB-certified in most cases.[1] Proposals will be ranked by cost-effectiveness on a vehicle/equipment-by-vehicle/equipment basis. The cost-effectiveness limit has been established at $30,000/ton of NOx emissions reduced and $100,000/ton of NOx emissions reduced for advanced technology that includes zero-emission or alternatively, meets the cleanest optional NOx standard certified. The cost-effectiveness level used for the selection of projects may be lower depending on the demand for program funds. No fueling infrastructure, administrative or operational costs will be funded.

All project costs must be clearly indicated in the application. In addition, applicants must include any sources of co-funding and the amount of each co-funding source in the application. **Applicants should be aware that the project life used in calculating the NOx emissions reductions will be used to determine the length of their annual reporting obligation and the length of their contract. For example, if a 7-year project life is used for the NOx emissions reduction calculation, then the applicant will be required to operate and track activity for the funded-vehicle/equipment for the full 7 years.**

PROPOSAL SUBMISSION
All proposals must be submitted according to specifications set forth herein.

Application Forms
Program application forms are provided after this document. These must be completed and submitted with other required documents (i.e., Certifications and Representations and vendor quotations) discussed in the application and below.

Certifications and Representations
Contained in this PA are six business forms which must also be completed and submitted with the application.

[1] Note that non-CARB certified engines/devices requiring an experimental permit from CARB may be considered, but the project will require special CARB approval.

Compliance Plan

Projects funded by SOON monies must result in NOx emissions reductions that are surplus to those that would be realized by fleets complying with the base rule. Fleets are required to submit a compliance plan in electronic format to demonstrate how they comply with both the base rule as well as the SOON provision of the rule. Fleet owners, at a minimum, must provide the following information for each year for the anticipated contract period:

- A vehicle list which includes, but is not limited to, vehicle type, manufacturer, model, model year, and whether the equipment is included in the base or SOON fleet for each piece of equipment in the fleet.
- Information including, but not limited to, calculations, fleet information, etc., showing compliance with the base rule fleet target levels or compliance with the BACT turnover and retrofit requirements. Either the CARB calculator (individual tabs for each future year) or the Excel SOON fleet calculator spreadsheet may be used.
- Information including, but not limited to, calculations, fleet information, etc., showing whether the vehicles funded by the SOON program are in compliance with the SOON NOx fleet average target levels.

SOON Compliance Plan documents and the Microsoft Excel SOON fleet calculator can be downloaded at the South Coast AQMD SOON website: www.aqmd.gov/soon. CARB's Fleet Average Calculators can be downloaded at the CARB website: https://www.arb.ca.gov/msprog/ordiesel/ordiesel.htm.

Methods of Delivery:

The proposer is encouraged to submit the application using the South Coast AQMD online system, available at www.aqmd.gov/moyer. This online system allows applicants to submit their application electronically to the South Coast AQMD prior to the date and time specified below. South Coast AQMD "Business Information Forms" requiring signatures must be scanned and uploaded to the online system in pdf format. First-time users must register as a new user. A tutorial of the system will be provided at the pre-application workshops and you may contact Walter Shen at wshen@aqmd.gov or (909) 396-2487 if you would like additional assistance.

An applicant may also deliver paper copies of the application in person, or via a courier service or U.S. Mail. The application package shall include **the original application and three (3) complete paper copies of the application, and an electronic copy (CD or flash drive) of the compliance plan and completed application** in a sealed envelope, plainly marked in the upper left-hand corner with the name and address of the proposer and the words "**Program Announcement PA2020-03"**. Paper applications shall be submitted in an eco-friendly format: stapled, not bound, black and white print; no three-ring, spiral or plastic binders, and no card stock or colored paper.

Due Date

All proposals submitted by paper or through the online application system must be received no later than **1:00 p.m., on Tuesday, June 2, 2020**. Postmarks for paper copies are not accepted as proof of deadline compliance. **Faxed or emailed proposals will not be accepted**. Paper proposals must be directed to:

Procurement Unit
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Any correction or resubmission done by the proposer will not extend the submittal due date.

Grounds for Rejection
A proposal may be immediately rejected if:

1. It is not prepared in the format described.
2. It is not signed by an individual authorized to represent the firm.
3. Does not include a current cost quote, Contractor Statement Forms, and other forms required in this PA.

Disposition of Proposals
The South Coast AQMD reserves the right to reject any or all proposals. All responses become the property of the South Coast AQMD. One copy of the proposal shall be retained for South Coast AQMD files. Additional copies and materials will be returned only if requested and at the proposer's expense.

Modification or Withdrawal
Once submitted, proposals cannot be altered without the prior written consent of South Coast AQMD.

SECTION IV: PROPOSAL EVALUATION/CONTRACTOR SELECTION CRITERIA

South Coast AQMD staff will evaluate all submitted proposals and make recommendations to the South Coast AQMD Governing Board for final selection of project(s) to be funded. Proposals will be evaluated based on the 2017 CMP Guidelines, including verification that the project meets the NOx cost-effectiveness limit(s) for this program. The cost-effectiveness determination will be done on a vehicle/equipment-by-vehicle/equipment basis. Be aware that there is a possibility that due to program priorities, cost-effectiveness and/or funding limitations, a project may be offered only partial funding, and not all proposals that meet the minimum cost-effectiveness criteria may be funded.

The evaluation will determine the ranking for each project based on the cost-effectiveness of NOx emissions reduced. Please note that depending upon the number of applications received in response to this PA, South Coast AQMD may prioritize the selection of projects to reduce emissions in and around DAC and low-income communities. While South Coast AQMD encourages all eligible applications, this means that some projects may not be selected based on their domicile address, regardless of their cost-effectiveness ranking.

At least 50 percent of the CMP funds must be used for projects that are located and operated within a disadvantaged and/or low-income community. South Coast AQMD uses the following method to meet these requirements.

1. All projects must meet the criteria in the 2017 CMP Guidelines and the cost-effectiveness limit of $30,000 per ton of NOx emissions reduced and $100,000/ton of NOx emissions reduced for advanced technology that are zero-emission or alternatively, meet the cleanest optional NOx standard certified.

2. Each project's domiciled address will be used to determine if the project is located within a disadvantaged or low-income community. The CalEnviroScreen 3.0 tool will be used by South Coast AQMD to determine if a project is located within a DAC and/or low-income community. This tool is available at: https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30
3. Projects that are not domiciled within a DAC and/or low-income community may still be considered if the application documentation shows that the vehicle/equipment was operated a majority of time in a DAC and/or low-income community.

All other projects will be ranked according to NOx cost-effectiveness, with the most cost-effective projects considered first and then in descending order for each funding category until the remainder of the funds are exhausted.

SECTION V: PAYMENT TERMS

For all projects, payment will be made upon installation and commencement of operation of the funded equipment for 85% of the submitted repower invoice (80% of the submitted replacement invoice) or the contract maximum amount, whichever is less.

CONTACT FOR ADDITIONAL INFORMATION

Questions regarding the content or intent of this PA, procedural matters, sample contract, and the compliance plan worksheet can be found at the South Coast AQMD SOON website (http://www.aqmd.gov/SOON), or can be addressed to:

Alyssa Yan
Science and Technology Advancement
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765
Phone: (909) 396-2024
ayan@aqmd.gov

The remainder of this page is left intentionally blank.

Application Forms

Carl Moyer and SOON Application
Form A-1
General Application Form (page 1 of 3)

The SCAQMD is accepting applications for projects throughout its jurisdiction. All applications will be evaluated based on their cost-effectiveness and their disproportionate impact score as discussed in Section IV "Application Evaluation/ Contractor Selection Criteria" contained in Program Announcement. For additional information about SCAQMD's policies and application information, visit: www.aqmd.gov/moyer. In general, this program will follow CARB Carl Moyer Program guidelines, which are available at: http://www.arb.ca.gov/msprog/moyer/moyer.htm.

The submittal of an application does not guarantee approval for funding, but will be used to determine the potential emission reductions and eligible grant funding amount for the proposed project. Any equipment purchased prior to project approval by the SCAQMD Governing Board will not be eligible for funding. Applicant may, at their own risk, issue a purchase order for approved equipment prior to contract execution. Other than a purchase order, **no other work shall proceed** until a fully executed contract, i.e. signed by the applicant and SCAQMD Board Chairman and a pre-inspection, is completed.

Organization Information

Legal Name of Organization *

The legal organization name must be that of the legal equipment owner.

Organization Address

Mailing Address *

Street Address/P.O. Box

City *

State *

Zip *

County *

Primary Contact Name and Information

First Name

Last Name

Email Address
(A valid Email address is required. Eg. john@gmail.com)

Phone Number

Fax Number

Person Authorized to Sign Application and Execute Grant Agreement

First Name

Last Name

Email Address
(A valid Email address is required. Eg. john@gmail.com)

Phone Number

Fax Number

Third Party Information

Name of Person Who Completed the Application

What is Your Position?

How much are you being paid to complete this application for the owner or to assist in the proposed project?

What is the source of funds being used to pay you?

Signature of Third Party Person Who Completed the Application:

Date:

All information provided in this application will be used by SCAQMD staff to evaluate the eligibility of this application to receive program funds. SCAQMD staff reserves the right to request additional information and can deny the application if such requested information is not provided by the requested deadline. Incomplete or illegible applications will be returned to applicant or vendor, without evaluation. An incomplete application is an application that is missing information critical to the evaluation of the project.

Please read and check each item below to indicate understanding and agreement:

- ☐ I understand that this application is for evaluation purposes only and does not guarantee project funding. Only a fully executed Grant Agreement between the equipment owner and the District constitutes an obligation to fund a project.
- ☐ I certify to the best of my knowledge and under penalty of perjury that the information contained in this application is true and accurate.
- ☐ I understand that all vehicles/equipment, both existing and new, must be made available within the SCAQMD boundaries for inspection, unless otherwise approved by SCAQMD's Project Officer.
- ☐ The vehicle/engine will be used within the SCAQMD boundaries (with the emission reduction system operating) for at least the projected usage shown in this application, and no less than 75 percent of the time.
- ☐ I understand that it is my responsibility to ensure that all technologies are either verified or certified by the California Air Resources Board (CARB) to reduce NOx and/or PM pollutants. CARB Verification Letters and/or Executive Orders are attached, as applicable.
- ☐ I understand that for repower projects, I am required to install the highest level available verified diesel emission control device (VDECS), and that the costs of this device and associated installation are a CMP eligible expense. These costs may be included in the project grant request up to the maximum cost-effectiveness limit.
- ☐ I understand that there may be conditions placed upon receiving a grant and agree to refund the grant (or pro-rated portion thereof) if it is found that at any time I do not meet those conditions and if directed by the SCAQMD in accordance with the contract agreement.
- ☐ I understand that, for this equipment, I am required to disclose if I have applied for or received incentive funding from another entity or program. Failure to do so will disqualify me from Carl Moyer Program Funding.
- ☐ In the event that the vehicle(s)/equipment do not complete the minimum term of any agreement eventually reached from this application, I agree to ensure the equivalent project emissions reductions, or to return grant funds to the SCAQMD as required by the contract.
- ☐ I understand that all on-road engines in my fleet that are eligible for a low-NOx software upgrade (reflash) must be reflashed within 60 days of receipt of contract execution. I may self-certify that the reflash has been performed by submitting a receipt of the completed reflash or a picture of the "Low NOx Reflash Label" from the reflashed engine to SCAQMD.
- ☐ I understand that third party contracts are not permitted. A third party may, however complete an application on an owner's behalf. Third parties are required to list how much compensation, if any, they are receiving to prepare the application(s), and to certify that no Carl Moyer Program funds are being used for this compensation.
- ☐ I understand that off-road equipment applicants subject to CARB's In-Use Off-Road Diesel Vehicle Regulation (Off-Road Regulation) must submit information regarding fleet size and compliance status. This must include the Diesel Off-Road On-line Reporting System (DOORS) ID of the fleet and the DOORS Equipment Identification Number (EIN) of the funded equipment.
- ☐ I understand that additional project information may be requested during project review and must be submitted prior to final evaluation.
- ☐ I understand that all vehicles, engines or equipment funded by this program must be operational within eighteen (18) months of contract execution, or by the vehicle in service date as specified in the Statement of Work, whichever is earlier.
- ☐ All project applicants must submit documentation that supports the activity claimed in the application (i.e., fuel receipts, mileage logs and/or hour-meter readings covering the last two years). This documentation is attached.
- ☐ The grant contract language cannot be modified without the written consent of all parties. I have reviewed and accept the sample contract language.
- ☐ I understand that an IRS Form 1099 may be issued to me for incentive funds received under the Moyer Program. I understand that it is my

responsibility to determine the tax liability associated with participating in the Moyer Program.

I understand that an SCAQMD-funded Global Positioning System (GPS) unit will be installed on vehicles/equipment not operating within SCAQMD boundaries full time. I will submit data as requested and otherwise cooperate with all data reporting requirements. I also understand that the additional cost of the GPS unit will be added to the project cost when calculating cost-effectiveness, though the SCAQMD will pay for this system directly. ☐

I understand that the SCAQMD has the right to conduct unannounced inspections for the full project life to ensure the project equipment is fully operational at the activity level committed to by the contract. ☐

I understand that all emission reductions resulting from Carl Moyer funded projects will be retired and the Carl Moyer Program claims all emission reductions from its funded projects. I also understand that there is no double counting or splitting of emission reductions if I receive additional incentive funding. ☐

I understand that a tamper proof, non-resettable digital hour meter/odometer must be installed on all vehicles/equipment and that the digital hour meter/odometer will record the hours/miles accumulated within the SCAQMD boundaries. This cost is my responsibility. ☐

I understand that any tax credits claimed must be deducted from the CMP request. ☐
Please check one:

☐ I do not plan to claim a tax credit or deduction for costs funded by the CMP.

☐ I do plan to claim a tax credit or deduction for costs funded by the CMP.

If so please indicate amount here: $

☐ I plan to claim a tax credit or deduction only for the portion of incremental costs not funded by the CMP.

If so please indicate amount here: $

I have checked this box to indicate that there are no potential conflicts of interest with other clients affected by actions performed by the firm on behalf of SCAQMD. If I have not checked this box, I have attached a description to this application of the potential conflict of interest, which will be screened on a case-by-case basis by the SCAQMD District Counsel's Office. ☐

I understand and certify that I am currently in compliance with all federal, state and local air quality rules and regulations at the time of application submittal, and I am not aware of any outstanding or pending enforcement actions. ☐

Please indicate the Total Funding Requested (for the entire project, including all equipment/vehicle replacements, repowers, etc.): $ _____

By signing below, I cerify under penalty of perjury that the information provided in this application is accurate and true.

Please print the name of the signing authority (first and last name)

Signature of signing authority:

Please enter the application submission date:

__/__/____

APPLICATION CHECKLIST

Applicants are encouraged to submit their application using SCAQMD's online system. If you are applying in person, use this checklist to organize your paper copy application. Each of the following application sections is required to be submitted if you submit a paper application:

- ☐ A cover letter stating your grant request, how many pieces of equipment and/or engines included in the proposed project, and the funding amount being requested (per engine and for the total project). For applications covering more than one category, organize this information into project category (i.e., marine, locomotive, on-road, etc.)
- ☐ This Application Checklist (signed below).
- ☐ General Application Form A-1. Provide a separate Form A-1 for each category (i.e., marine, locomotive, etc.) for which grant funding is requested. Form A-1 also includes the following documents:
  - ☐ Application Statement (signed and initialed as applicable)
  - ☐ Completed and **signed** Business Information Forms[1]
- ☐ Category Application Form specific to your project category (i.e., locomotive, off-road, marine, etc.), along with the following attachments/enclosures:
  - ☐ Optional Excel Worksheet associated with applicable application form/category (you may use this form for multiple unit projects, if desired)
  - ☐ Vendor quotes dated no earlier than 90 days prior to the date of application submittal
  - ☐ CARB Executive Orders for each engine. Download at:
    On-road: http://www.arb.ca.gov/msprog/onroad/cert/cert.php
    Off-road: http://www.arb.ca.gov/diesel/cv.htm
  - ☐ Previous two years of historical records documenting equipment usage, retroactive to the date of application.

Once completed, please submit one original plus three (3) complete signed copies of the application package (all forms and documents), as well as an electronic copy of the application and its supporting documents on a CD or flash drive.

I understand that all documents, as listed above, are required in order to have a complete application package in order to be considered for funding under the Carl Moyer Program.

_____ _____

Signature Date

[1] These forms may be downloaded at: www.aqmd.gov/moyer

Carl Moyer and SOON Application
Form C-1
Off-Road Equipment Replacement
Equipment Information (page 1 of 2)

If you have any questions regarding this program or the application process, please contact Walter Shen by phone at (909) 396-2487 or by email at wshen@aqmd.gov.

Large Off-Road Fleets have limited eligibility for Carl Moyer Program funding, but may apply for SOON Program funding using this application. For more information, please visit www.aqmd.gov/SOON.

Please complete ONE (1) Form for each piece of equipment.

Existing Equipment Information

Are you applying under Carl Moyer Program OR the Surplus Off-Road NOx Program?

Has this equipment received Carl Moyer Program funds in the past? ○ Yes ○ No

For Large Fleets Only - have you received Carl Moyer funding after January 1, 2017? ○ Yes ○ No

What is the primary function of this equipment?

Is the vehicle location address the same as the applicant address? If not, please complete below. ○ Yes ○ No

Street Address (if no address, provide intersection)

City

County

State

Zip

Vehicle Type

If other, please describe:

Equipment Category

Equipment Type

If other equipment type, please describe

Equipment Make

Equipment Model

Equipment Model Year

Equipment Serial Number or VIN

Unit Number or EIN#(for non-Ag Operations)

Is 2 to 1 Replacement Applied? ○ Yes ○ No

Number of Main Engines

Number of Auxiliary Engines

Is this equipment used in Agricultural operations? ○ Yes ○ No

What percentage of equipment operations are in Agriculture?

Carl Moyer and SOON Application
Form C-1
Off-Road Equipment Replacement
Equipment Information (page 2 of 2)

New Equipment and Vendor Information

Unit Number		Equipment Category	
Equipment Type			

If other equipment type, please describe

Equipment Make		Equipment Model	
Equipment Model Year			
Vendor		Vendor Contact Name	
Vendor Phone Number		Vendor Address Vendor	
Vendor City		State	
Vendor Zip			

All cost estimates must be based on quotes that have been obtained within 90 days prior to the closing date of the Program Announcement. Attach all quotes to the application.

Number of engines for this New Equipment Unit:

Main (Front) Engine(s)		Auxiliary (Rear) Engine(s)	
New Replacement Unit Cost $		Tax $	
Total Cost for this Replacement $		Applicant Co-Funding Amount (If Any) $	
Applicant Grant Request (If Any) $			

Carl Moyer and SOON Application
Form C-1
Off-Road Equipment Replacement
Project Details

Is equipment currently subject to CARB's Off-Road Regulation? ◯ Yes ◯ No

What is the total horsepower of all vehicles in the fleet?

Enter DOORS Fleet Number

All Off-Road equipment applicants subject to CARB's In-Use Off-Road Diesel Vehicle Regulation must submit their DOORS fleet compliance snapshot and fleet vehicle list.

You may contact the DOORS hotline at (877) 593-6677 for assistance.

SOON applications must also submit the fleet average calculation. Please visit https://arb.ca.gov/msprog/ordiesel/fac.htm for more information.

Total Funding Requested (for this Replacement ONLY)

Identify other funding sources to be used for this project

Total Project Cost (From Quote: MUST EQUAL QUOTE)

Applicant Co-Funding Amount

Operation Information

Is existing equipment in operable condition? ◯ Yes ◯ No

How many years has the applicant owned the existing equipment?

Does this vehicle have a functioning, non-resettable hour meter? ◯ Yes ◯ No

Percent Operation in California

Percent Operation in District
Note: See http://www.aqmd.gov/home/about/jurisdiction for a jurisdiction map.

Proposed Project Life (this is the number of years that the equipment must operate as specified in your SCAQMD contract)

Carl Moyer and SOON Application
Form C-1
Off-Road Equipment Replacement
Engine Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Existing/Baseline Engine Information

Baseline Engine Type	◯ Main ◯ Auxiliary		
Baseline Engine Fuel Type			
Baseline Engine Make		Baseline Engine Model	
Baseline Engine Model Year		Baseline Engine Serial Number	
Baseline Engine Horsepower		Baseline Engine Family Number	
Old Engine (Baseline) Emissions Tier			

New Engine Information

New Engine Fuel Type			
New Engine Make		New Engine Model	
New Engine Model Year		New Engine Serial Number	
New Engine Horsepower		New Engine Family Number	
New Engine (Reduced) Emissions Tier			

Carl Moyer and SOON Application
Form C-1
Off-Road Equipment Replacement
Engine Activity Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Project application must include documentation of existing equipment usage for the previous 24 months prior to the application date.

Baseline Engine - Annual operation details for the past 24-months

	Jan - Date of Application Submittal 2020	Jan - Dec 2019	Mar - Dec 2018	Estimated Annual Future Usage
Hours				

Carl Moyer and SOON Application
Form C-1
Off-Road Equipment Replacement
Attachments

The following attachments must be submitted for this application:

- Insurance Documentation
- Engine Executive Order(s) and Retrofit Device Executive Order(s)
- Quotes (must be within 90 days of application submittal)
- Equipment Usage Documentation (for past 24 – months including, but not limited to, maintenance records, hour meter readings)
- Photo showing the baseline engine (old) engine model year, engine serial #, HP, engine family # (if available)
- Equipment Ownership (Bill of Sale)
- SOON Fleet Average Calculation (please go to https://arb.ca.gov/msprog/ordiesel/fac.htm) - only for applicants applying for SOON funding (only if applying under SOON Program)
- DOORS Fleet Compliance Snapshot including vehicle list
- Business Information Request Form
- Campaign Contribution Disclosure
- Business Status Cert
- W-9 Form
- Direct Deposit Form
- Certification of Debarment, Suspension and Other Responsiblity Matters

Carl Moyer and SOON Application
Form C-2
Off-Road Equipment Repower
Equipment Information

If you have any questions regarding this program or the application process, please contact Walter Shen by phone at (909) 396-2487 or by email at: wshen@aqmd.gov

Large Off-Road Fleets have limited eligibility for Carl Moyer Program funding, but may apply for SOON Program funding using this application. For more information, please visit www.aqmd.gov/SOON.

Please complete ONE (1) form for each piece of equipment.

Existing Equipment Information

Are you applying under Carl Moyer Program OR the Surplus Off-Road NOx Program?

Has this equipment received Carl Moyer Program funds in the past? ◯ Yes ◯ No

For Large Fleets Only - have you received Carl Moyer funding after January 1, 2017? ◯ Yes ◯ No

What is the primary function of this equipment?

Is the vehicle location address the same as the applicant address? If not, please complete below. ◯ Yes ◯ No

Street Address (if no address, provide intersection)

City

County

State

Zip

Vehicle Type

If other, please describe:

Equipment Category

Equipment Type

If other equipment type, please describe

Equipment Make

Equipment Model

Equipment Model Year

Equipment Serial Number or VIN

Unit Number or EIN# (for non-Ag Operations)

Number of Main Engines

Number of Auxiliary Engines

Is this equipment used in Agricultural operations? ◯ Yes ◯ No

Carl Moyer and SOON Application
Form C-2
Off-Road Equipment Repower
Project Details

Is equipment currently subject to CARB's Off-Road Regulation? ◯ Yes ◯ No

What is the total horsepower of all vehicles in the fleet?

Enter DOORS Fleet Number

All Off-Road equipment applicants subject to CARB's In-Use Off-Road Diesel Vehicle Regulation must submit their DOORS fleet compliance snapshot and fleet vehicle list.

You may contact the DOORS hotline at (877) 593-6677 for assistance.

SOON applications must also submit the fleet average calculation. Please visit https://arb.ca.gov/msprog/ordiesel/fac.htm for more information.

Total Funding Requested (including Retrofit cost, if applicable)

Identify other funding sources to be used for this project

Total Project Cost (From Quote: MUST EQUAL QUOTE - incl. Retrofit if applicable)

Applicant Co-Funding Amount

Operation Information

Is existing equipment in operable condition? ◯ Yes ◯ No

How many years has the applicant owned the existing equipment?

Does this vehicle have a functioning, non-resettable hour meter? ◯ Yes ◯ No

Percent Operation in California

Percent Operation in District

Proposed Project Life (this is the number of years that the equipment must operate as specified in your SCAQMD contract)

Carl Moyer and SOON Application
Form C-2
Off-Road Equipment Repower
Engine Information (page 1 of 2)

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Existing/Baseline Engine Information

Baseline Engine Type ○ Main ○ Auxiliary

Baseline Engine Fuel Type

Baseline Engine Make

Baseline Engine Model

Baseline Engine Model Year

Baseline Engine Serial Number

Baseline Engine Horsepower

Baseline Engine Family Number

Old Engine (Baseline) Emissions Tier

Method proposed for rendering the baseline engine(s) inoperable

New Engine Information

New Engine Fuel Type

New Engine Make

New Engine Model

New Engine Model Year

New Engine Serial Number

New Engine Horsepower

New Engine Family Number

New Engine (Reduced) Emissions Tier

Is the New Engine a Family Emissions Limit (FEL) engine? ○ Yes ○ No

New Engine Cost Information

New Engine Unit Cost

Cost of Installation/Labor

Cost of New Engine Tax

Total Cost of Repower

Applicant Co-Funding Amount (if any)

Grant Request Amount for this Repower

All cost estimates must be based on quotes that have been obtained within 90 days prior to the closing date of the Program Announcement. Attach all quotes to the application.

New Engine Vendor Information

Vendor

Vendor Contact Name

Vendor Phone Number

Vendor Address

Vendor City

Vendor State

Vendor Zip

Carl Moyer and SOON Application
Form C-2
Off-Road Equipment Repower
Engine Information (page 2 of 2)

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Engine Retrofit Information

Will a retrofit device be added to this engine as part of this project? ◯ Yes ◯ No

Retrofit Device Make		Retrofit Device Model	
% PM Reduction		% NOX Reduction	
% ROG Reduction		Retrofit Device ARB Executive Order Number	
Project Life			

Retrofit Cost Information

Retrofit Device System Cost		Retrofit Device Installation Cost	
Total Cost of Retrofit		Amount requested for this retrofit	$

Carl Moyer and SOON Application
Form C-2
Off-Road Equipment Repower
Engine Activity Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Project application must include documentation of existing equipment usage for the previous 24 months prior to the application date.

Baseline Engine - Annual operation details for the past 24-months

	Jan - Date of Application Submittal 2020	Jan - Dec 2019	Mar - Dec 2018	Estimated Annual Future Usage
Hours				

Carl Moyer and SOON Application
Form C-2
Off-Road Equipment Repower
Attachment

The following attachments must be submitted for this application:

- Insurance Documentation
- Engine Executive Order(s) and Retrofit Device Executive Order(s)
- Quotes (must be within 90 day of application submittal)
- Equipment Usage Documentation (for past 24 – months including, but not limited to, maintenance records, hour meter readings)
- Photo showing the baseline (old) engine model year, engine serial #, horsepower, engine family # (if available)
- SOON Fleet Average Calculation (please go to https://arb.ca.gov/msprog/ordiesel/fac.htm) - only for applicants applying for SOON funding (only if applying under SOON Program)
- DOORS Fleet Compliance Snapshot - including vehicle list
- Business Information Request Form
- Campaign Contribution Disclosure
- W-9 Form
- Direct Deposit Form
- Business Status Certification
- Certification of Debarment, Suspension and Other Responsibility Matters

Carl Moyer and SOON Application
Form C-3
Off-Road Equipment Retrofit
Equipment Information

If you have questions regarding this program or the application process, please contact Walter Shen by phone at (909) 396-2487 or by email at: wshen@aqmd.gov.

Existing Equipment Information

Are you applying under Carl Moyer Program OR the Surplus Off-Road NOx Program?

Has this equipment received Carl Moyer Program funds in the past? ○ Yes ○ No

What is the primary function of this equipment?

Is the vehicle location address the same as the applicant address? If not, please complete below. ○ Yes ○ No

Street Address (if no address, provide intersection)

City

County

State

Zip

Vehicle Type

If other, please describe:

Equipment Category

Equipment Type

If other equipment type, please describe

Equipment Make

Equipment Model

Equipment Model Year

Equipment Serial Number or VIN

Unit Number

Number of Main Engines

Number of Auxiliary Engines

Is this equipment used in Agricultural operations? ○ Yes ○ No

Carl Moyer and SOON Application
Form C-3
Off-Road Equipment Retrofit
Project Details

Is equipment currently subject to CARB's Off-Road Regulation? ◯ Yes ◯ No

What is the total horsepower of all vehicles in the fleet?

Enter DOORS Fleet Number

All Off-Road equipment applicants subject to CARB's In-Use Off-Road Diesel Vehicle Regulation must submit their DOORS fleet compliance snapshot and fleet vehicle list.

You may contact the DOORS hotline at (877) 593-6677 for assistance.

SOON applications must also submit the fleet average calculation. Please visit https://arb.ca.gov/msprog/ordiesel/fac.htm for more information.

Total Funding Requested

Identify other funding sources to be used for this project

Total Project Cost (From Quote: MUST EQUAL QUOTE)

Applicant Co-Funding Amount

Operation Information

Is existing equipment in operable condition? ◯ Yes ◯ No

How many years has the applicant owned the existing equipment?

Does this vehicle have a functioning, non-resettable hour meter? ◯ Yes ◯ No

Percent Operation in California

Percent Operation in District
See http://www.aqmd.gov/home/about/jurisdiction for a jurisdiction map.

Proposed Project Life (this is the number of years that the equipment must operate as specified in your SCAQMD contract)

Carl Moyer and SOON Application
Form C-3
Off-Road Equipment Retrofit
Engine & Retrofit Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Existing/Baseline Engine Information

Baseline Engine Type	◯ Main ◯ Auxiliary		
Baseline Engine Fuel Type			
Baseline Engine Make		Baseline Engine Model	
Baseline Engine Model Year		Baseline Engine Serial Number	
Baseline Engine Horsepower		Baseline Engine Family Number	
Old Engine (Baseline) Emissions Tier			

Engine Retrofit Information

Retrofit Device Make		Retrofit Device Model	
Verification Level		Project Life	
Verified % PM Reduction		Verified % NOX Reduction	
Verified % ROG Reduction		Retrofit Device ARB Executive Order Number	
Retrofit Device Serial Number			

Retrofit Cost Information

Retrofit Device System Cost		Retrofit Device Installation Cost	
Tax Amount for Retrofit		Total Cost of Retrofit	
Maintenance Cost		Amount requested for this retrofit	
Retrofit Dealer Vendor			

All cost estimates must be based on quotes that have been obtained within 90 days prior to the closing date of the Program Announcement. Attach all quotes to the application. The data-logging cost of a retrofit project cannot be included in the eligible project cost.

Carl Moyer and SOON Application
Form C-3
Off-Road Equipment Retrofit
Engine Activity Information

If you have more than one engine for your project, please make copies of this form and use one form for each engine.

Project application must include documentation of existing equipment usage for the previous 24 months prior to the application date.

Baseline Engine - Annual operation details for past 24 months

	Jan - Date of Application Submittal 2020	Jan - Dec 2019	Mar - Dec 2018	Estimated Annual Future Usage
Hours				

Carl Moyer and SOON Application
Form C-3
Off-Road Equipment Retrofit
Attachments

The following attachments must be submitted for this application:

- Insurance Documentation
- Engine Executive Order(s) and Retrofit Device Executive Order(s)
- Quotes (must be within 90 days of application submittal)
- Equipment Usage Documentation (for past 24 – months)
- Other misc. attachments
- DOORS Vehicle List
- SOON Fleet Average Calculation (please go to https://arb.ca.gov/msprog/ordiesel/fac.htm) (only if applying under SOON Program)
- DOORS Fleet Compliance Snapshot
- Business Information Request Form
- Campaign Contribution Disclosure
- W-9 Form
- Business Status Certification
- Direct Deposit Form
- Certification of Debarment, Suspension and Other Responsibility Matters

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

Business Information Request

Dear South Coast AQMD Contractor/Supplier:

South Coast Air Quality Management District (South Coast AQMD) is committed to ensuring that our contractor/supplier records are current and accurate. If your firm is selected for award of a purchase order or contract, it is imperative that the information requested herein be supplied in a timely manner to facilitate payment of invoices. In order to process your payments, we need the enclosed information regarding your account. **Please review and complete the information identified on the following pages, remember to sign all documents for our files, and return them as soon as possible to the address below:**

Attention: Accounts Payable, Accounting Department
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4178

If you do not return this information, we will not be able to establish you as a vendor. This will delay any payments and would still necessitate your submittal of the enclosed information to our Accounting department before payment could be initiated. Completion of this document and enclosed forms would ensure that your payments are processed timely and accurately.

If you have any questions or need assistance in completing this information, please contact Accounting at (909) 396-3777. We appreciate your cooperation in completing this necessary information.

Sincerely,

Sujata Jain
Chief Financial Officer

DH:tm

Enclosures: Business Information Request
Disadvantaged Business Certification
W-9
Form 590 Withholding Exemption Certificate
Federal Contract Debarment Certification
Campaign Contributions Disclosure
Direct Deposit Authorization

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

BUSINESS INFORMATION REQUEST

Business Name	
Division of	
Subsidiary of	
Website Address	
Type of Business *Check One:*	☐ Individual ☐ DBA, Name _____, County Filed in _____ ☐ Corporation, ID No. _____ ☐ LLC/LLP, ID No. _____ ☐ Other _____

REMITTING ADDRESS INFORMATION

Address			
City/Town			
State/Province		Zip	
Phone	( ) - Ext	Fax	( ) -
Contact		Title	
E-mail Address			
Payment Name if Different			

All invoices must reference the corresponding Purchase Order Number(s)/Contract Number(s) if applicable and mailed to:

Attention: Accounts Payable, Accounting Department
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4178

BUSINESS STATUS CERTIFICATIONS

Federal guidance for utilization of disadvantaged business enterprises allows a vendor to be deemed a small business enterprise (SBE), minority business enterprise (MBE) or women business enterprise (WBE) if it meets the criteria below.

- is certified by the Small Business Administration or
- is certified by a state or federal agency or
- is an independent MBE(s) or WBE(s) business concern which is at least 51 percent owned and controlled by minority group member(s) who are citizens of the United States.

Statements of certification:

As a prime contractor to South Coast AQMD, _____ (name of business) will engage in good faith efforts to achieve the fair share in accordance with 40 CFR Section 33.301, and will follow the six affirmative steps listed below **for contracts or purchase orders funded in whole or in part by federal grants and contracts.**

1. Place qualified SBEs, MBEs, and WBEs on solicitation lists.
2. Assure that SBEs, MBEs, and WBEs are solicited whenever possible.
3. When economically feasible, divide total requirements into small tasks or quantities to permit greater participation by SBEs, MBEs, and WBEs.
4. Establish delivery schedules, if possible, to encourage participation by SBEs, MBEs, and WBEs.
5. Use services of Small Business Administration, Minority Business Development Agency of the Department of Commerce, and/or any agency authorized as a clearinghouse for SBEs, MBEs, and WBEs.
6. If subcontracts are to be let, take the above affirmative steps.

Self-Certification Verification: Also for use in awarding additional points, as applicable, in accordance with South Coast AQMD Procurement Policy and Procedure:

Check all that apply:

☐ Small Business Enterprise/Small Business Joint Venture
☐ Local business
☐ Minority-owned Business Enterprise
☐ Women-owned Business Enterprise
☐ Disabled Veteran-owned Business Enterprise/DVBE Joint Venture
☐ Most Favored Customer Pricing Certification

Percent of ownership: _____ %

Name of Qualifying Owner(s): _____ _____

State of California Public Works Contractor Registration No. _____. MUST BE INCLUDED IF BID PROPOSAL IS FOR PUBLIC WORKS PROJECT.

I, the undersigned, hereby declare that to the best of my knowledge the above information is accurate. Upon penalty of perjury, I certify information submitted is factual.

_____ _____
NAME ***TITLE***

_____ _____
TELEPHONE NUMBER ***DATE***

Definitions

Disabled Veteran-Owned Business Enterprise means a business that meets all of the following criteria:

- is a sole proprietorship or partnership of which is at least 51 percent owned by one or more disabled veterans, or in the case of any business whose stock is publicly held, at least 51 percent of the stock is owned by one or more disabled veterans; a subsidiary which is wholly owned by a parent corporation but only if at least 51 percent of the voting stock of the parent corporation is owned by one or more disabled veterans; or a joint venture in which at least 51 percent of the joint venture's management and control and earnings are held by one or more disabled veterans.
- the management and control of the daily business operations are by one or more disabled veterans. The disabled veterans who exercise management and control are not required to be the same disabled veterans as the owners of the business.
- is a sole proprietorship, corporation, partnership, or joint venture with its primary headquarters office located in the United States and which is not a branch or subsidiary of a foreign corporation, firm, or other foreign-based business.

Joint Venture means that one party to the joint venture is a DVBE and owns at least 51 percent of the joint venture. In the case of a joint venture formed for a single project this means that DVBE will receive at least 51 percent of the project dollars.

Local Business means a business that meets all of the following criteria:

- has an ongoing business within the boundary of South Coast AQMD at the time of bid application.
- performs 90 percent of the work within South Coast AQMD's jurisdiction.

Minority-Owned Business Enterprise means a business that meets all of the following criteria:

- is at least 51 percent owned by one or more minority persons or in the case of any business whose stock is publicly held, at least 51 percent of the stock is owned by one or more minority persons.
- is a business whose management and daily business operations are controlled or owned by one or more minority person.
- is a business which is a sole proprietorship, corporation, partnership, joint venture, an association, or a cooperative with its primary headquarters office located in the United States, which is not a branch or subsidiary of a foreign corporation, foreign firm, or other foreign business.

"Minority" person means a Black American, Hispanic American, Native American (including American Indian, Eskimo, Aleut, and Native Hawaiian), Asian-Indian American (including a person whose origins are from India, Pakistan, or Bangladesh), Asian-Pacific American (including a person whose origins are from Japan, China, the Philippines, Vietnam, Korea, Samoa, Guam, the United States Trust Territories of the Pacific, Northern Marianas, Laos, Cambodia, or Taiwan).

Small Business Enterprise means a business that meets the following criteria:

a. 1) an independently owned and operated business; 2) not dominant in its field of operation; 3) together with affiliates is either:

- **A service, construction, or non-manufacturer with 100 or fewer employees, and average annual gross receipts of ten million dollars ($10,000,000) or less over the previous three years, or**
- A manufacturer with 100 or fewer employees.

b. Manufacturer means a business that is both of the following:

1) Primarily engaged in the chemical or mechanical transformation of raw materials or processed substances into new products.

2) Classified between Codes 311000 to 339000, inclusive, of the North American Industrial Classification System (NAICS) Manual published by the United States Office of Management and Budget, 2007 edition.

Small Business Joint Venture means that one party to the joint venture is a Small Business and owns at least 51 percent of the joint venture. In the case of a joint venture formed for a single project this means that the Small Business will receive at least 51 percent of the project dollars.

Women-Owned Business Enterprise means a business that meets all of the following criteria:

- is at least 51 percent owned by one or more women or in the case of any business whose stock is publicly held, at least 51 percent of the stock is owned by one or more women.
- is a business whose management and daily business operations are controlled or owned by one or more women.
- is a business which is a sole proprietorship, corporation, partnership, or a joint venture, with its primary headquarters office located in the United States, which is not a branch or subsidiary of a foreign corporation, foreign firm, or other foreign business.

Most Favored Customer as used in this policy means that the South Coast AQMD will receive at least as favorable pricing, warranties, conditions, benefits and terms as other customers or clients making similar purchases or receiving similar services.

Form **W-9**
(Rev. October 2018)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

▶ Go to *www.irs.gov/FormW9* for instructions and the latest information.

Give Form to the requester. Do not send to the IRS.

Print or type. See Specific Instructions on page 3.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.

2 Business name/disregarded entity name, if different from above

3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only one of the following seven boxes.

☐ Individual/sole proprietor or single-member LLC ☐ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ▶ _____

Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is **not** disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner.

☐ Other (see instructions) ▶

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any) _____

Exemption from FATCA reporting code (if any) _____

(Applies to accounts maintained outside the U.S.)

5 Address (number, street, and apt. or suite no.) See instructions.

Requester's name and address (optional)

6 City, state, and ZIP code

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

Note: If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number

			–			–				

or

Employer identification number

		–							

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here Signature of U.S. person ▶ Date ▶

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to *www.irs.gov/FormW9*.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, *later.*

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),

2. Certify that you are not subject to backup withholding, or

3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and

4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting*, later, for further information.

Note: If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien;
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;
- An estate (other than a foreign estate); or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

In the cases below, the following person must give Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States.

- In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the entity;
- In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the trust; and
- In the case of a U.S. trust (other than a grantor trust), the U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person, do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Pub. 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items.

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.

2. The treaty article addressing the income.

3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.

4. The type and amount of income that qualifies for the exemption from tax.

5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

Backup Withholding

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 24% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,

2. You do not certify your TIN when required (see the instructions for Part II for details),

3. The IRS tells the requester that you furnished an incorrect TIN,

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or

5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code*, later, and the separate Instructions for the Requester of Form W-9 for more information.

Also see *Special rules for partnerships*, earlier.

What is FATCA Reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all United States account holders that are specified United States persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code*, later, and the Instructions for the Requester of Form W-9 for more information.

Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account; for example, if the grantor of a grantor trust dies.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of $50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a $500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Line 1

You must enter one of the following on this line; **do not** leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account (other than an account maintained by a foreign financial institution (FFI)), list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9. If you are providing Form W-9 to an FFI to document a joint account, each holder of the account that is a U.S. person must provide a Form W-9.

a. **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

Note: ITIN applicant: Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040/1040A/1040EZ you filed with your application.

b. **Sole proprietor or single-member LLC.** Enter your individual name as shown on your 1040/1040A/1040EZ on line 1. You may enter your business, trade, or "doing business as" (DBA) name on line 2.

c. **Partnership, LLC that is not a single-member LLC, C corporation, or S corporation.** Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

d. **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on line 2.

e. **Disregarded entity.** For U.S. federal tax purposes, an entity that is disregarded as an entity separate from its owner is treated as a "disregarded entity." See Regulations section 301.7701-2(c)(2)(iii). Enter the owner's name on line 1. The name of the entity entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2, "Business name/disregarded entity name." If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

Line 2

If you have a business name, trade name, DBA name, or disregarded entity name, you may enter it on line 2.

Line 3

Check the appropriate box on line 3 for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box on line 3.

IF the entity/person on line 1 is a(n) . . .	THEN check the box for . . .
• Corporation	Corporation
• Individual • Sole proprietorship, or • Single-member limited liability company (LLC) owned by an individual and disregarded for U.S. federal tax purposes.	Individual/sole proprietor or single-member LLC
• LLC treated as a partnership for U.S. federal tax purposes, • LLC that has filed Form 8832 or 2553 to be taxed as a corporation, or • LLC that is disregarded as an entity separate from its owner but the owner is another LLC that is not disregarded for U.S. federal tax purposes.	Limited liability company and enter the appropriate tax classification. (P= Partnership; C= C corporation; or S= S corporation)
• Partnership	Partnership
• Trust/estate	Trust/estate

Line 4, Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space on line 4 any code(s) that may apply to you.

Exempt payee code.

- Generally, individuals (including sole proprietors) are not exempt from backup withholding.
- Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.
- Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions.
- Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space in line 4.

1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)

2—The United States or any of its agencies or instrumentalities

3—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

4—A foreign government or any of its political subdivisions, agencies, or instrumentalities

5—A corporation

6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or possession

7—A futures commission merchant registered with the Commodity Futures Trading Commission

8—A real estate investment trust

9—An entity registered at all times during the tax year under the Investment Company Act of 1940

10—A common trust fund operated by a bank under section 584(a)

11—A financial institution

12—A middleman known in the investment community as a nominee or custodian

13—A trust exempt from tax under section 664 or described in section 4947

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 7
Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
Barter exchange transactions and patronage dividends	Exempt payees 1 through 4
Payments over $600 required to be reported and direct sales over $5,000[1]	Generally, exempt payees 1 through 5[2]
Payments made in settlement of payment card or third party network transactions	Exempt payees 1 through 4

[1] See Form 1099-MISC, Miscellaneous Income, and its instructions.

[2] However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(f), and payments for services paid by a federal executive agency.

Exemption from FATCA reporting code. The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) written or printed on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37)

B—The United States or any of its agencies or instrumentalities

C—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i)

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i)

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state

G—A real estate investment trust

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940

I—A common trust fund as defined in section 584(a)

J—A bank as defined in section 581

K—A broker

L—A trust exempt from tax under section 664 or described in section 4947(a)(1)

M—A tax exempt trust under a section 403(b) plan or section 457(g) plan

Note: You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed.

Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns. If this address differs from the one the requester already has on file, write NEW at the top. If a new address is provided, there is still a chance the old address will be used until the payor changes your address in their records.

Line 6

Enter your city, state, and ZIP code.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN.

If you are a single-member LLC that is disregarded as an entity separate from its owner, enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note: See *What Name and Number To Give the Requester*, later, for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at *www.SSA.gov*. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at *www.irs.gov/Businesses* and clicking on Employer Identification Number (EIN) under Starting a Business. Go to *www.irs.gov/Forms* to view, download, or print Form W-7 and/or Form SS-4. Or, you can go to *www.irs.gov/OrderForms* to place an order and have Form W-7 and/or SS-4 mailed to you within 10 business days.

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note: Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if item 1, 4, or 5 below indicates otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees, see *Exempt payee code*, earlier.

Signature requirements. Complete the certification as indicated in items 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), ABLE accounts (under section 529A), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account) other than an account maintained by an FFI	The actual owner of the account or, if combined funds, the first individual on the account[1]
3. Two or more U.S. persons (joint account maintained by an FFI)	Each holder of the account
4. Custodial account of a minor (Uniform Gift to Minors Act)	The minor[2]
5. a. The usual revocable savings trust (grantor is also trustee)	The grantor-trustee[1]
b. So-called trust account that is not a legal or valid trust under state law	The actual owner[1]
6. Sole proprietorship or disregarded entity owned by an individual	The owner[3]
7. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulations section 1.671-4(b)(2)(i)(A))	The grantor*
For this type of account:	**Give name and EIN of:**
8. Disregarded entity not owned by an individual	The owner
9. A valid trust, estate, or pension trust	Legal entity[4]
10. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
11. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
12. Partnership or multi-member LLC	The partnership
13. A broker or registered nominee	The broker or nominee
14. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
15. Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulations section 1.671-4(b)(2)(i)(B))	The trust

[1] List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

[2] Circle the minor's name and furnish the minor's SSN.

[3] You must show your individual name and you may also enter your business or DBA name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

[4] List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships*, earlier.

*Note: The grantor also must provide a Form W-9 to trustee of trust.

Note: If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records From Identity Theft

Identity theft occurs when someone uses your personal information such as your name, SSN, or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039.

For more information, see Pub. 5027, Identity Theft Information for Taxpayers.

Victims of identity theft who are experiencing economic harm or a systemic problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to *phishing@irs.gov*. You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at *spam@uce.gov* or report them at *www.ftc.gov/complaint*. You can contact the FTC at *www.ftc.gov/idtheft* or 877-IDTHEFT (877-438-4338). If you have been the victim of identity theft, see *www.IdentityTheft.gov* and Pub. 5027.

Visit *www.irs.gov/IdentityTheft* to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.

TAXABLE YEAR

CALIFORNIA FORM

2019 Withholding Exemption Certificate 590

The payee completes this form and submits it to the withholding agent. The withholding agent keeps this form with their records.

Withholding Agent Information

Name

Payee Information

Name

☐ SSN or ITIN ☐ FEIN ☐ CA Corp no. ☐ CA SOS file no.

Address (apt./ste., room, PO box, or PMB no.)

City (If you have a foreign address, see instructions.)

State

ZIP code

Exemption Reason

Check only one box.

By checking the appropriate box below, the payee certifies the reason for the exemption from the California income tax withholding requirements on payment(s) made to the entity or individual.

☐ **Individuals — Certification of Residency:**
I am a resident of California and I reside at the address shown above. If I become a nonresident at any time, I will promptly notify the withholding agent. See instructions for General Information D, Definitions.

☐ **Corporations:**
The corporation has a permanent place of business in California at the address shown above or is qualified through the California Secretary of State (SOS) to do business in California. The corporation will file a California tax return. If this corporation ceases to have a permanent place of business in California or ceases to do any of the above, I will promptly notify the withholding agent. See instructions for General Information D, Definitions.

☐ **Partnerships or Limited Liability Companies (LLCs):**
The partnership or LLC has a permanent place of business in California at the address shown above or is registered with the California SOS, and is subject to the laws of California. The partnership or LLC will file a California tax return. If the partnership or LLC ceases to do any of the above, I will promptly inform the withholding agent. For withholding purposes, a limited liability partnership (LLP) is treated like any other partnership.

☐ **Tax-Exempt Entities:**
The entity is exempt from tax under California Revenue and Taxation Code (R&TC) Section 23701 _____ (insert letter) or Internal Revenue Code Section 501(c) _____ (insert number). If this entity ceases to be exempt from tax, I will promptly notify the withholding agent. Individuals cannot be tax-exempt entities.

☐ **Insurance Companies, Individual Retirement Arrangements (IRAs), or Qualified Pension/Profit-Sharing Plans:**
The entity is an insurance company, IRA, or a federally qualified pension or profit-sharing plan.

☐ **California Trusts:**
At least one trustee and one noncontingent beneficiary of the above-named trust is a California resident. The trust will file a California fiduciary tax return. If the trustee or noncontingent beneficiary becomes a nonresident at any time, I will promptly notify the withholding agent.

☐ **Estates — Certification of Residency of Deceased Person:**
I am the executor of the above-named person's estate or trust. The decedent was a California resident at the time of death. The estate will file a California fiduciary tax return.

☐ **Nonmilitary Spouse of a Military Servicemember:**
I am a nonmilitary spouse of a military servicemember and I meet the Military Spouse Residency Relief Act (MSRRA) requirements. See instructions for General Information E, MSRRA.

CERTIFICATE OF PAYEE: Payee must complete and sign below.

To learn about your privacy rights, how we may use your information, and the consequences for not providing the requested information, go to **ftb.ca.gov/forms** and search for **1131**. To request this notice by mail, call 800.852.5711.

Under penalties of perjury, I declare that I have examined the information on this form, including accompanying schedules and statements, and to the best of my knowledge and belief, it is true, correct, and complete. I further declare under penalties of perjury that if the facts upon which this form are based change, I will promptly notify the withholding agent.

Type or print payee's name and title _____ Telephone (____)_____

Payee's signature ▶ _____ Date _____

2017 Instructions for Form 590

Withholding Exemption Certificate

References in these instructions are to the California Revenue and Taxation Code (R&TC).

General Information

Registered Domestic Partners (RDP) – For purposes of California income tax, references to a spouse, husband, or wife also refer to a Registered Domestic Partner (RDP) unless otherwise specified. For more information on RDPs, get FTB Pub. 737, Tax Information for Registered Domestic Partners.

A Purpose

Use Form 590, Withholding Exemption Certificate, to certify an exemption from nonresident withholding.

Form 590 does not apply to payments of backup withholding. For more information, go to **ftb.ca.gov** and search for **backup withholding**.

Form 590 does not apply to payments for wages to employees. Wage withholding is administered by the California Employment Development Department (EDD). For more information, go to **edd.ca.gov** or call **888**.745.3886.

Do not use Form 590 to certify an exemption from withholding if you are a **Seller of California real estate**. Sellers of California real estate use Form 593-C, Real Estate Withholding Certificate, to claim an exemption from the real estate withholding requirement.

The following are excluded from withholding and completing this form:

- The United States and any of its agencies or instrumentalities.
- A state, a possession of the United States, the District of Columbia, or any of its political subdivisions or instrumentalities.
- A foreign government or any of its political subdivisions, agencies, or instrumentalities.

B Income Subject to Withholding

California Revenue and Taxation Code (R&TC) Section 18662 requires withholding of income or franchise tax on payments of California source income made to nonresidents of California.

Withholding is required on the following, but is not limited to:

- Payments to nonresidents for services rendered in California.
- Distributions of California source income made to domestic nonresident partners, members, and S corporation shareholders and allocations of California source income made to foreign partners and members.
- Payments to nonresidents for rents if the payments are made in the course of the withholding agent's business.
- Payments to nonresidents for royalties from activities sourced to California.
- Distributions of California source income to nonresident beneficiaries from an estate or trust.
- Endorsement payments received for services performed in California.
- Prizes and winnings received by nonresidents for contests in California.

However, withholding is optional if the total payments of California source income are $1,500 or less during the calendar year.

For more information on withholding get FTB Pub. 1017, Resident and Nonresident Withholding Guidelines. To get a withholding publication, see Additional Information.

C Who Certifies this Form

Form 590 is certified by the payee. California residents or entities exempt from the withholding requirement should complete Form 590 and submit it to the withholding agent before payment is made. The withholding agent is then relieved of the withholding requirements if the agent relies in good faith on a completed and signed Form 590 unless notified by the Franchise Tax Board (FTB) that the form should not be relied upon.

An incomplete certificate is invalid and the withholding agent should not accept it. If the withholding agent receives an incomplete certificate, the withholding agent is required to withhold tax on payments made to the payee until a valid certificate is received. In lieu of a completed exemption certificate, the withholding agent may accept a letter from the payee as a substitute explaining why they are not subject to withholding. The letter must contain all the information required on the certificate in similar language, including the under penalty of perjury statement and the payee's taxpayer identification number (TIN). The withholding agent must retain a copy of the certificate or substitute for at least five years after the last payment to which the certificate applies, and provide it upon request to the FTB.

If an entertainer (or the entertainer's business entity) is paid for a performance, the entertainer's information must be provided. **Do not** submit the entertainer's agent or promoter information.

The grantor of a grantor trust shall be treated as the payee for withholding purposes. Therefore, if the payee is a grantor trust and one or more of the grantors is a nonresident, withholding is required. If all of the grantors on the trust are residents, no withholding is required. Resident grantors can check the box on Form 590 labeled "Individuals — Certification of Residency."

D Definitions

For California nonwage withholding purposes, **nonresident** includes all of the following:

- Individuals who are not residents of California.
- Corporations not qualified through the California Secretary of State (CA SOS) to do business in California or having no permanent place of business in California.
- Partnerships or limited liability companies (LLCs) with no permanent place of business in California.
- Any trust without a resident grantor, beneficiary, or trustee, or estates where the decedent was not a California resident.

Foreign refers to non-U.S.

For more information about determining resident status, get FTB Pub. 1031, Guidelines for Determining Resident Status. Military servicemembers have special rules for residency. For more information, get FTB Pub. 1032, Tax Information for Military Personnel.

Permanent Place of Business:
A corporation has a permanent place of business in California if it is organized and existing under the laws of California or it has qualified through the CA SOS to transact intrastate business. A corporation that has not qualified to transact intrastate business (e.g., a corporation engaged exclusively in interstate commerce) will be considered as having a permanent place of business in California only if it maintains a permanent office in California that is permanently staffed by its employees.

E Military Spouse Residency Relief Act (MSRRA)

Generally, for tax purposes you are considered to maintain your existing residence or domicile. If a military servicemember and nonmilitary spouse have the same state of domicile, the MSRRA provides:

- A spouse shall not be deemed to have lost a residence or domicile in any state solely by reason of being absent to be with the servicemember serving in compliance with military orders.
- A spouse shall not be deemed to have acquired a residence or domicile in any other state solely by reason of being there to be with the servicemember serving in compliance with military orders.

Domicile is defined as the one place:

- Where you maintain a true, fixed, and permanent home.
- To which you intend to return whenever you are absent.

A military servicemember's nonmilitary spouse is considered a nonresident for tax purposes if the servicemember and spouse have the same domicile outside of California and the spouse is in California solely to be with the servicemember who is serving in compliance with Permanent Change of Station orders.

California may require nonmilitary spouses of military servicemembers to provide proof that they meet the criteria for California personal income tax exemption as set forth in the MSRRA.

Income of a military servicemember's nonmilitary spouse for services performed in California is not California source income subject to state tax if the spouse is in California to be with the servicemember serving in compliance with military orders, and the servicemember and spouse have the same domicile in a state other than California.

For additional information or assistance in determining whether the applicant meets the MSRRA requirements, get FTB Pub. 1032.

Specific Instructions

Payee Instructions

Enter the withholding agent's name.

Enter the payee's information, including the TIN and check the appropriate TIN box.

You must provide a valid TIN as requested on this form. The following are acceptable TINs: social security number (SSN); individual taxpayer identification number (ITIN); federal employer identification number (FEIN); California corporation number (CA Corp no.); or CA SOS file number.

Private Mail Box (PMB) – Include the PMB in the address field. Write "PMB" first, then the box number. Example: 111 Main Street PMB 123.

Foreign Address – Follow the country's practice for entering the city, county, province, state, country, and postal code, as applicable, in the appropriate boxes. **Do not** abbreviate the country name.

Exemption Reason – Check the box that reflects the reason why the payee is exempt from the California income tax withholding requirement.

Withholding Agent Instructions

Do not send this form to the FTB. The withholding agent retains this form for a minimum of five years or until the payee's status changes, and must provide this form to the FTB upon request.

The payee must notify the withholding agent if any of the following situations occur:

- The individual payee becomes a nonresident.
- The corporation ceases to have a permanent place of business in California or ceases to be qualified to do business in California.
- The partnership ceases to have a permanent place of business in California.
- The LLC ceases to have a permanent place of business in California.
- The tax-exempt entity loses its tax-exempt status.

If any of these situations occur, then withholding may be required. For more information, get Form 592, Resident and Nonresident Withholding Statement, Form 592-B, Resident and Nonresident Withholding Tax Statement, and Form 592-V, Payment Voucher for Resident and Nonresident Withholding.

Additional Information

Website:	For more information go to **ftb.ca.gov** and search for **nonwage**. **MyFTB** offers secure online tax account information and services. For more information and to register, go to **ftb.ca.gov** and search for **myftb**.
Telephone:	**888**.792.4900 or 916.845.4900, Withholding Services and Compliance phone service
Fax:	916.845.9512
Mail:	WITHHOLDING SERVICES AND COMPLIANCE MS F182 FRANCHISE TAX BOARD PO BOX 942867 SACRAMENTO CA 94267-0651

For questions unrelated to withholding, or to download, view, and print California tax forms and publications, or to access the TTY/TDD numbers, see the information below.

Internet and Telephone Assistance

Website:	**ftb.ca.gov**
Telephone:	800.852.5711 from within the United States 916.845.6500 from outside the United States
TTY/TDD:	800.822.6268 for persons with hearing or speech impairments

Asistencia Por Internet y Teléfono

Sitio web:	**ftb.ca.gov**
Teléfono:	800.852.5711 dentro de los Estados Unidos 916.845.6500 fuera de los Estados Unidos
TTY/TDD:	800.822.6268 para personas con discapacidades auditivas o de habla

Certification Regarding
Debarment, Suspension, and Other Responsibility Matters

The prospective participant certifies to the best of its knowledge and belief that it and the principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three year period preceding this proposal been convicted of or had a civil judgement rendered against them or commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction: violation of Federal or State antitrust statute or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property:

(c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (b) of this certification; and

(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

I understand that a false statement on this certification may be grounds for rejection of this proposal or termination of the award. In addition, under 18 USC Sec. 1001, a false statement may result in a fine of up to $10,000 or imprisonment for up to 5 years, or both.

_____

Typed Name & Title of Authorized Representative

_____

Signature of Authorized Representative Date

❑ I am unable to certify to the above statements. My explanation is attached.

CAMPAIGN CONTRIBUTIONS DISCLOSURE

In accordance with California law, bidders and contracting parties are required to disclose, at the time the application is filed, information relating to any campaign contributions made to South Coast Air Quality Management District (South Coast AQMD) Board Members or members/alternates of the MSRC, including: the name of the party making the contribution (which includes any parent, subsidiary or otherwise related business entity, as defined below), the amount of the contribution, and the date the contribution was made. 2 C.C.R. §18438.8(b).

California law prohibits a party, or an agent, from making campaign contributions to South Coast AQMD Governing Board Members or members/alternates of the Mobile Source Air Pollution Reduction Review Committee (MSRC) of more than $250 while their contract or permit is pending before South Coast AQMD; and further prohibits a campaign contribution from being made for three (3) months following the date of the final decision by the Governing Board or the MSRC on a donor's contract or permit. Gov't Code §84308(d). For purposes of reaching the $250 limit, the campaign contributions of the bidder or contractor *plus* contributions by its parents, affiliates, and related companies of the contractor or bidder are added together. 2 C.C.R. §18438.5.

In addition, South Coast AQMD Board Members or members/alternates of the MSRC must abstain from voting on a contract or permit if they have received a campaign contribution from a party or participant to the proceeding, or agent, totaling more than $250 in the 12-month period prior to the consideration of the item by the Governing Board or the MSRC. Gov't Code §84308(c).

The list of current South Coast AQMD Governing Board Members can be found at South Coast AQMD website (www.aqmd.gov). The list of current MSRC members/alternates can be found at the MSRC website (http://www.cleantransportationfunding.org).

SECTION I.

Contractor (Legal Name): _____

DBA, Name _____, County Filed in_____

Corporation, ID No._____

LLC/LLP, ID No. _____

List any parent, subsidiaries, or otherwise affiliated business entities of Contractor:
(See definition below).

_____

_____

SECTION II.

Has Contractor and/or any parent, subsidiary, or affiliated company, or agent thereof, made a campaign contribution(s) totaling $250 or more in the aggregate to a current member of the South Coast Air Quality Management Governing Board or member/alternate of the MSRC in the 12 months preceding the date of execution of this disclosure?

☐ Yes ☐ No **If YES, complete Section II below and then sign and date the form. If NO, sign and date below. Include this form with your submittal.**

Campaign Contributions Disclosure, *continued:*

Name of Contributor _____

Governing Board Member or MSRC Member/Alternate	Amount of Contribution	Date of Contribution

Name of Contributor _____

Governing Board Member or MSRC Member/Alternate	Amount of Contribution	Date of Contribution

Name of Contributor _____

Governing Board Member or MSRC Member/Alternate	Amount of Contribution	Date of Contribution

Name of Contributor _____

Governing Board Member or MSRC Member/Alternate	Amount of Contribution	Date of Contribution

I declare the foregoing disclosures to be true and correct.

By: _____

Title: _____

Date: _____

DEFINITIONS

Parent, Subsidiary, or Otherwise Related Business Entity (2 Cal. Code of Regs., §18703.1(d).)

(1) Parent subsidiary. A parent subsidiary relationship exists when one corporation directly or indirectly owns shares possessing more than 50 percent of the voting power of another corporation.

(2) Otherwise related business entity. Business entities, including corporations, partnerships, joint ventures and any other organizations and enterprises operated for profit, which do not have a parent subsidiary relationship are otherwise related if any one of the following three tests is met:

(A) One business entity has a controlling ownership interest in the other business entity.

(B) There is shared management and control between the entities. In determining whether there is shared management and control, consideration should be given to the following factors:

(i) The same person or substantially the same person owns and manages the two entities;
(ii) There are common or commingled funds or assets;
(iii) The business entities share the use of the same offices or employees, or otherwise share activities, resources or personnel on a regular basis;
(iv) There is otherwise a regular and close working relationship between the entities; or

(C) A controlling owner (50% or greater interest as a shareholder or as a general partner) in one entity also is a controlling owner in the other entity.

South Coast Air Quality Management District

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

Direct Deposit Authorization

STEP 1: Please check all the appropriate boxes

- ☐ Individual (Employee, Governing Board Member)
- ☐ Vendor/Contractor
- ☐ Changed Information
- ☐ New Request
- ☐ Cancel Direct Deposit

STEP 2: Payee Information

Last Name	First Name	Middle Initial	Title

Vendor/Contractor Business Name (if applicable)

Address	Apartment or P.O. Box Number

City	State	Zip	Country

Taxpayer ID Number	Telephone Number	Email Address

Authorization

1. I authorize South Coast Air Quality Management District (South Coast AQMD) to direct deposit funds to my account in the financial institution as indicated below. I understand that the authorization may be rejected or discontinued by South Coast AQMD at any time. If any of the above information changes, I will promptly complete a new authorization agreement. If the direct deposit is not stopped before closing an account, funds payable to me will be returned to South Coast AQMD for distribution. This will delay my payment.
2. This authorization remains in effect until South Coast AQMD receives written notification of changes or cancellation from you.
3. I hereby release and hold harmless South Coast AQMD for any claims or liability to pay for any losses or costs related to insufficient fund transactions that result from failure within the Automated Clearing House network to correctly and timely deposit monies into my account.

STEP 3:

You must verify that your bank is a member of an Automated Clearing House (ACH). Failure to do so could delay the processing of your payment. You must attach a voided check or have your bank complete the bank information and the account holder must sign below.

To be Completed by your Bank

Staple Voided Check Here

Name of Bank/Institution		
Account Holder Name(s)		
☐ Saving ☐ Checking	Account Number	Routing Number
Bank Representative Printed Name	Bank Representative Signature	Date
ACCOUNT HOLDER SIGNATURE:		Date

For South Coast AQMD Use Only

Input By _____ Date _____

Back to Agenda

Agenda Item #2

Vicki White

Adopt Resolution Recognizing Funds
for FY 2019-20 Carl Moyer Program Award,
Issue Program Announcements and Transfer Funds

“Year 22” Carl Moyer Program Funding

	Funding Amount
Carl Moyer Project Funds	$33,959,122
Administrative Funds (6.25% of allocation)	$2,263,941
Total Allocated (from CARB):	$36,223,063
Required local match (AB 923)	$5,433,459
Total	$41,656,522

Proposed Funding for PAs

- $29M for “Year 22” Carl Moyer Program
- $5M for SOON Provision
- In addition, any unused Moyer funds from previous years, accrued interest and available AB 923 funds will be used to fund eligible projects
- Other funding sources, including Community Air Protection Program (CAPP) incentives, State Reserve and FARMER funds, may be used should these funds become available
- Detailed assignment of funds, including identification of each funding source, will be presented at the time of awards

Proposed FY 2019-20 Carl Moyer Project Categories

- On-road heavy-duty vehicles
  - Trucks (drayage and other)
  - Transit buses
  - Solid waste
  - Public agency/utility vehicles
  - Emergency vehicles (e.g., fire apparatus)
- Off-road equipment
  - Construction equipment
  - Agricultural tractors
  - Locomotives
  - Cargo handling equipment
  - Marine vessels (incl. shore power)

Proposed FY 2019-20 Carl Moyer Project Categories (cont'd)

Infrastructure Projects

- Support zero or near-zero emission, heavy-duty vehicles and equipment
- Projects located in disadvantaged or low-income communities will be prioritized
- Other factors considered: public access, EV charging, site availability for life of project, renewable fuel source, fleet commitments, and cost-share

Schedule

- Issue Carl Moyer & SOON PAs — March 6, 2020
- Application workshops — Apr-May 2020
- Application deadline (1 pm): — June 2, 2020
- Awards considered by Board: — Oct-Nov 2020

Projects will be evaluated based on the 2017 Carl Moyer Program Guidelines (including any subsequent updates or changes) and other applicable funding requirements

Funds Transfer

- The Voucher Incentive Program (VIP) is a streamlined funding program for small fleets (with 10 or fewer vehicles) to replace older diesel trucks with newer, cleaner models
- Since 2009, VIP has expended a total of $42M for the replacement of 1,220 older diesel trucks with lower-emitting vehicles
- Additional funds of $3M are needed to continue funding truck replacements for small fleets under VIP

Recommended Actions

- Adopt Resolution recognizing up to $37M from CARB into the Carl Moyer Program SB 1107 Fund (32)
- Issue Program Announcements to solicit projects for the FY 2019-20 “Year 22” Carl Moyer Program and SOON Provision
- Transfer $3M from the Carl Moyer Program AB 923 Fund (80) to the VIP Fund (59)

Back to Agenda

Go to SLIDES

DRAFT

Technology Committee Agenda #3

BOARD MEETING DATE: March 6, 2020 AGENDA NO.

PROPOSAL: Recognize Revenue and Transfer and Appropriate Funds for Volkswagen Environmental Mitigation Trust

SYNOPSIS: In November 2018, the Board recognized $150 million in revenue from CARB for the Volkswagen (VW) Environmental Mitigation Trust and authorized the transfer of up to 10 percent into the General Fund to reimburse administrative costs for this program. Subsequently, CARB and the South Coast AQMD executed a project agreement for this program totaling $165 million, which included $150 million for projects and $15 million for administrative costs. These actions are to recognize up to $15 million in additional revenue from CARB, transfer $520,733 into the General Fund to reimburse FY 2018-19 Salaries & Employee Benefits and Service & Supplies, and transfer and appropriate up to $898,000 into Science & Technology Advancement's and Information Management's FYs 2019-20 and 2020-21 Budgets, Professional and Special Services and Capital Outlays Major Objects, for administrative expenses to implement the VW Mitigation Program.

COMMITTEE: Technology, February 21, 2020; Recommended for Approval

RECOMMENDED ACTIONS:

1. Recognize revenue, upon receipt, up to $15,000,000 from CARB (through Wilmington Trust, N.A., Grant ID number G18-VWM-04) into the VW Mitigation Special Revenue Fund (79) to administer and implement two project funding categories identified in CARB's Beneficiary Mitigation Plan for the VW Environmental Mitigation Trust;
2. Transfer $520,733 from the VW Mitigation Special Revenue Fund (79) into the General Fund to reimburse Salaries & Employee Benefits and Service & Supplies Expense incurred in FY 2018-19 for initial administration of the VW Mitigation Program (see Tables 1 and 2); and
3. Transfer and appropriate up to $898,000 from the VW Mitigation Special Revenue Fund (79) into Science & Technology Advancement's and/or Information Management's FYs 2019-20 and/or 2020-21 Budgets, Professional and Special

Services and Capital Outlays Major Objects, for administrative expenses to implement the VW Mitigation Program (see Tables 3 and 4).

Wayne Nastri
Executive Officer

MMM:NB:VW/LCM:PG:DAH

Background

The South Coast AQMD is administering two of five categories for the Volkswagen (VW) Environmental Mitigation Trust on a statewide basis. In November 2018, the Board recognized, upon receipt, up to $150 million in revenue from CARB for the Volkswagen (VW) Environmental Mitigation Trust and authorized the transfer up to 10 percent into the General Fund to reimburse administrative costs for this program. In December 2018, as part of mid-year budget adjustments, the Board also approved five new positions to support the initial increased workload under this program. Subsequently, CARB and the South Coast AQMD executed a project agreement for this program totaling $165 million, which included $150 million for projects and $15 million for administrative costs. In November 2019, the first disbursement of the funds from the VW Trust was received totaling $9.6 million, comprised of $6.75 million in project funds and $2.85 million in administrative funds. Future revenue installments will be received based on parameters established in the grant. At this time, there is a need to recognize the additional revenue, reimburse costs incurred after CARB's approval (on May 28, 2018) of the Beneficiary Mitigation Plan as allowed by the project agreement, and appropriate VW administrative funds into budget accounts to continue carrying out day-to-day functions.

Proposal

These actions are to recognize the additional revenue, upon receipt, up to $15,000,000 from CARB into the VW Mitigation Special Revenue Fund (79) to administer and implement two project funding categories as well as to transfer $520,733 from the VW Mitigation Special Revenue Fund (79) into the General Fund to reimburse Salaries & Employee Benefits and Service and Supplies expenditures incurred in FY 2018-19 before revenue was received (see Tables 1 and 2).

Staff recommends appropriating funds into Science & Technology Advancement's (STA) and Information Management's (IM) budgets for FYs 2019-20 and 2021-21 to capture costs already incurred this fiscal year and allocate funds for projected costs through the end of the next fiscal year, after which funding will be appropriated as part of the annual budget process. This action is to transfer and appropriate up to $898,000 from the VW Mitigation Special Revenue Fund (79) into STA's and/or IM's FYs 2019-20 and 2020-21 Budgets, Professional and Special Services and Capital Outlays Major Objects, for administrative expenses to implement the VW Mitigation Program. This

transfer and appropriation will support day-to-day program needs without impacting either division's operational budgets. It also includes some one-time expenses, such as development of a web landing page per CARB requirements, procurement of licenses to build web applications and servers, and development of a grant management system (GMS) for submission and evaluation of VW applications. Other program specific expenses include contracting for technical assistance hosting and promoting webinars to assist eligible applicants in applying for funding. Tables 3 and 4 outline these estimated expenditures.

Benefits to South Coast AQMD

These funds will allow for successful administration through FY 2020-21 of the two project funding categories assigned by CARB to the South Coast AQMD on a statewide basis. The projects to be funded are intended to mitigate excess NOx emissions caused by VW vehicles. Over the ten-year life of this program, CARB estimates a reduction of 10,000 tons of NOx emissions. Co-benefits will also be achieved, reducing criteria air pollutants, toxic contaminants and GHGs. At least 50 percent of the funds are expected to benefit disadvantaged and low-income communities throughout the state. The program will also accelerate deployment of new commercially available near-zero and zero emissions heavy-duty truck technologies, a key strategy to reducing NOx emissions identified in the 2016 AQMP. Based on the overall statewide program, a portion of the benefits listed above will occur in the South Coast AQMD.

Resource Impacts

There are sufficient funds in the VW Mitigation Special Revenue Fund (79). The transfer to reimburse FY 2018-19 Salaries & Employee Benefits and Service and Supplies Expense will not exceed $520,733. The transfer and appropriation to the FYs 2019-20 and 2020-21 Budgets, Capital Outlays and Professional and Special Services Major Objects, will not exceed $898,000. Any funds not expended after the FY 2020-21 budget cycle will be returned to the VW Mitigation Special Revenue Fund (79). The budgets to continue implementation of the South Coast AQMD's VW Mitigation Program in future years will be included as part of the annual budget process.

Attachments

Table 1: FY 2018-19 Expenses Incurred for Salaries & Employee Benefits to Implement VW Mitigation Program

Table 2: FY 2018-19 Expenses Incurred for Services & Supplies to Implement VW Mitigation Program

Table 3: Proposed VW Mitigation Program Administrative Expenditures for STA's FYs 2019-20 and/or 2020-21

Table 4: Proposed VW Mitigation Program Administrative Expenditures for IM's FYs 2019-20 and/or 2020-21

Table 1
FY 2018-19 Expenses Incurred for Salaries & Employee Benefits
to Implement VW Mitigation Program

Account Description	FTEs	Program Code	Incurred Expenses
Salaries & Employee Benefits Major Object:			
VW Program Development	0.02	04827	$5,935
VW Program Development	0.01	08827	2,548
VW Program Development	0.41	27827	130,799
VW Program Development	1.06	44827	371,674
Total Salaries & Employee Benefits Major Object:	1.5		**$510,956**

Salaries & Employee Benefits were not included within the FY 2018-19 Budget or subsequent mid-year adjustments because the revenue was not received until after FY 2018-19 books were closed.

Table 2
FY 2018-19 Expenses Incurred for Services & Supplies
to Implement VW Mitigation Program

Account Description	Account Number	Program Code	Incurred Expenses
Services & Supplies Major Object:			
Professional & Special Services	67450	44827	$4,371
Auto Mileage	67700	44827	297
Travel	67800	44827	2,415
Travel Related Air Fare	67805	44827	490
Travel Related Lodging	67810	44827	2,176
Postage	68060	44827	23
Misc. Expenses	69700	44827	5
Total Services & Supplies Major Object:			**$9,777**

Table 3
Proposed VW Mitigation Program Administrative Expenditures
for STA's FYs 2019-20 and/or 2020-21

Account Description	Account Number	Program Code	Estimated Expenditures
Services & Supplies Major Object:			
Rents & Leases	67300	44827	$1,200
Professional & Special Services: Up to 4 webinars plus technical assistance & misc. professional services	67450	44827	100,000
Maintenance of Equipment	67600	44827	90,000
Auto Mileage	67700	44827	1,500
Travel	67800	44827	10,000
Postage	68060	44827	9,000
Office Expense	68100	44827	1,500
Miscellaneous	69700	44827	25,000
Total Services & Supplies Major Object:			**$238,200**
Capital Outlays Major Object:			
Develop Calculation Model in Support of GMS	77000	44827	$25,000
Total Capital Outlays Major Object:			**$25,000**
Total			**$263,200**

Expenditures may be appropriated in either Services & Supplies Major Object or Capital Outlays Major Object, as warranted.
Appropriations not expended in FY 2019-20 will be carried over into FY 2020-21, after which funding will be appropriated as part of the annual budget process.

Table 4
Proposed VW Mitigation Program Administrative Expenditures
for IM's FYs 2019-20 and/or 2020-21

Account Description	Account Number	Program Code	Estimated Expenditures
Services & Supplies Major Object:			
Professional & Special Services: Develop Web Landing Page per CARB Requirements	67450	27827	$22,800
Office Expense: Host Web Application Server and Procure Windows 2019 Data Center License for Building Web Application Servers & Procure SQL Server Standard Core Edition for Building Database Servers	68100	27827	122,000
Total Services & Supplies Major Object:			**$144,800**
Capital Outlays Major Object:			
Develop Grant Management System (GMS)	77000	27827	$400,000
Enhancements to GMS	77000	27827	90,000
Total Capital Outlays Major Object:			**$490,000**
Total			**$634,800**

Expenditures may be appropriated in either Services & Supplies Major Object or Capital Outlays Major Object, as warranted.
Appropriations not expended in FY 2019-20 will be carried over into FY 2020-21, after which funding will be appropriated as part of the annual budget process.

Back to Agenda

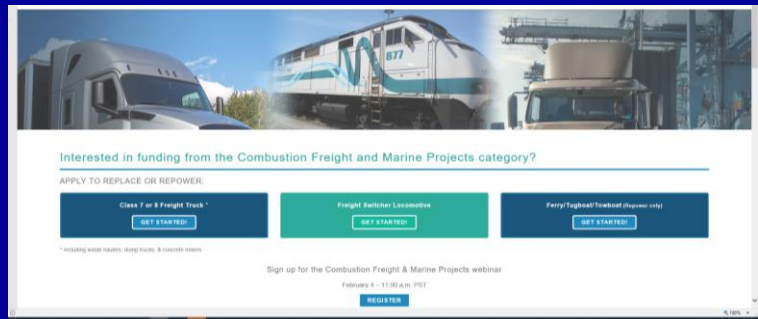
Agenda Item #3

Ping Gui

Recognize Revenue and Transfer and Appropriate Funds for Volkswagen Environmental Mitigation Trust

Background

- South Coast AQMD is administering two of five Volkswagen (VW) Mitigation funding categories on a statewide basis
- In November 2018, the Board recognized $150M in revenue and authorized the transfer of up to 10% into the General Fund for reimbursement of administrative costs
- Subsequently, the project agreement was executed for $165M ($150M-projects; $15M-admin)
- In November 2019, the first fund disbursement was received totaling $9.6M (including $2.85M in administrative funds)



Proposal

- Recognize additional VW revenue
- Reimburse FY 2018-19 Salaries & Employee Benefits and Services & Supplies incurred before any VW revenue was received
- Transfer and appropriate funds for administrative expenditures for FYs 2019-20 and/or 2020-21 Budgets
- Future expenses after 7/1/21 will be appropriated as part of the annual budget process

Recommended Actions

- Recognize additional revenue up to $15M from CARB into the VW Mitigation Special Revenue Fund (79);
- Transfer $520,733 from the VW Mitigation Special Revenue Fund (79) into the General Fund to reimburse Salaries & Employee Benefits and Services & Supplies incurred in FY 2018-19 before VW revenue was received
- Transfer and appropriate up to $898,000 from the VW Mitigation Special Revenue Fund (79) into Science & Technology Advancement's and/or Information Management's FYs 2019-20 and/or 2020-21 Budgets for administrative expenses

Salaries & Employee Benefits Incurred for VW in FY 2018-19

Work Program Code	FTEs	Incurred Expense
04827	0.02	$5,935
08827	0.01	2,548
27827	0.41	130,799
44827	1.06	371,674
TOTAL	**1.5**	**$510,956**

Services & Supplies Incurred for VW in FY 2018-19

Account Description	Account No.	Incurred Expense
Prof. & Special Services	67450	$4,371
Auto Mileage	67700	297
Travel Incl. Air Fare & Lodging	67800	5,081
Postage	68060	23
Misc. Expenses	69700	5
	TOTAL	**$9,777**

Proposed VW Administrative Expenditures STA's FYs 2019-20 and/or 2020-21 Budgets

Services & Supplies (S&S) Major Object	Account No.	Estimated Expenditures
Rents & Leases	67300	$1,200
Prof. & Special Services	67450	100,000
Maintenance of Equipment	67600	90,000
Auto Mileage	67700	1,500
Travel	67800	10,000
Postage	68060	9,000
Office Expense	68100	1,500
Miscellaneous	69700	25,000
Total S&S Major Object		**$238,200**

Capital Outlays Major Object	Account No.	Estimated Expenditures
Develop Calculation Model in Support of GMS	77000	$25,000
Total Capital Outlays Major Object		**$25,000**

Total All Major Objects	**STA**	**$263,200**

Note: Expenditures may be appropriated in either S&S Major Object or Capital Outlays Major Object, as warranted.

Proposed VW Administrative Expenditures IM's FYs 2019-20 and/or 2020-21 Budgets

Account Description	Account No.	Estimated Expenditure
Services & Supplies (S&S) Major Object:		
Prof. & Special Services	67450	$22,800
Office Expense	68100	122,000
Total S&S Major Object:		$144,800
Capital Outlays Major Object:		
Develop Grant Management System (GMS)	77000	$400,000
Enhancements to GMS	77000	90,000
Total Capital Outlays Major Object:		$490,000
Total (all Major Objects)		**$634,800**

Back to Agenda

Go to SLIDES

DRAFT

Technology Committee Agenda #4

BOARD MEETING DATE: March 6, 2020 AGENDA NO.

PROPOSAL: Approve and Adopt Technology Advancement Office Clean Fuels Program 2019 Annual Report and 2020 Plan Update, Resolution and Membership Changes for Clean Fuels Advisory Group and Receive and File Updated Membership of Technology Advancement Advisory Group

SYNOPSIS: Each year by March 31, the South Coast AQMD must submit to the California Legislative Analyst an approved Annual Report for the past year and a Plan Update for the current calendar year for the Clean Fuels Program. This action is to approve and adopt the Technology Advancement Clean Fuels Program Annual Report for 2019 and 2020 Plan Update and the Resolution finding that proposed projects do not duplicate any past or present programs. These actions are to also approve and adopt membership changes to the SB 98 Clean Fuels Advisory Group and receive and file membership changes to the Technology Advancement Advisory Group.

COMMITTEE: Technology, February 21, 2020; Recommended for Approval

RECOMMENDED ACTIONS:

1. Approve and adopt the attached Technology Advancement Office Clean Fuels Program 2019 Clean Fuels Annual Report and 2020 Plan Update and include it in the South Coast AQMD's Clean Fuels Program;
2. Adopt the attached Resolution finding that the Technology Advancement Office Clean Fuels Program Plan Update for 2020 and its proposed projects do not duplicate any past or present programs of specified organizations;
3. Approve and adopt membership changes to the SB 98 Clean Fuels Advisory Group; and
4. Receive and file membership changes to the Technology Advancement Advisory Group.

Wayne Nastri
Executive Officer

MMM:NB:JI/LCM:DAH

Background

Achieving federal and state ambient air quality standards within the South Coast Air Basin (Basin) will require emission reductions from both mobile and stationary sources beyond those available from existing technologies. The 2016 AQMP includes measures relying on a mix of currently available technologies as well as the expedited development and commercialization of lower-emitting mobile and stationary advanced technologies in the Basin to achieve these standards. The 2016 AQMP projects that a 45 percent reduction in NOx by 2023 and an additional 55 percent reduction by 2031 is required, the majority of which must come from mobile sources (both on- and off-road). This goal requires widespread deployment of clean air technologies as well as further commercialization of advanced technologies.

California Code, Health and Safety Code (H&SC) 40448.5(e), calls for the Clean Fuels Program to consider, among other factors, the current and projected economic costs and availability of fuels, 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, which can help the South Coast AQMD in achieving its clean air goals.

The Technology Advancement Office (TAO) Clean Fuels Program is an integral part of South Coast AQMD efforts to achieve the significant NOx reductions called for in the 2016 AQMP. In its first 32 years, from 1988 to 2018, the Clean Fuels Program leveraged $339 million into $1.52 billion in projects, mainly through public-private partnerships in conjunction with private industry, technology developers, academic institutions, research institutions and government agencies. This public-private partnership approach has enabled the South Coast AQMD to historically leverage public funds with outside investment in a ratio of about $4 of outside funding to every dollar of Clean Fuels funding. More than ever before, the Clean Fuels Program must both foster and accelerate advancement of transformative transportation, and off-road technologies where possible, with an emphasis on zero and near-zero emissions vehicle and fuel technologies. This is especially true given the region's economic dependence on thriving goods movement, along with the corresponding impact of that industry on environmental justice communities. The Clean Fuels Program and the Carl Moyer Program provide a unique synergy, with the Carl Moyer Program providing the necessary incentives to push market penetration of the technologies developed and demonstrated by the Clean Fuels Program. This synergy enables the South Coast

AQMD to act as a leader in both technology development and commercialization efforts targeting reduction of criteria pollutants.

The South Coast AQMD is required by H&SC Section 40448.5.1 to adopt a plan that describes the expected cost and benefits of proposed projects prior to any Clean Fuels Program expenditures and find that the proposed projects do not duplicate programs of other organizations specified in the H&SC provision. In 1999, SB 98 amended this provision by requiring annual updates to this Plan as well as a 30-day public notice to specified interested parties and the public prior to the annual public hearing at which the Board considers action on the Clean Fuels Program. SB 98 also requires the preparation of an annual report with specified contents that include the prior year's accomplishments. This annual report requires review by an advisory group and approval by the Board, prior to submittal to specified offices of the California Legislature each year. This legislation also specifies the make-up of the 13-member SB 98 Clean Fuels Advisory Group and its primary responsibility which is to make recommendations regarding the most cost-effective projects that advance and implement clean fuels technology and improve public health. The membership of the SB 98 Clean Fuels Advisory Group was initially approved by the Board in September 1999. Changes to the composition are reviewed by the Technology Committee on an as-needed basis, subject to full Board approval as required by the charter. Prior to the formation of the SB 98 Clean Fuels Advisory Group, the South Coast AQMD had formed the Technology Advancement Advisory Group (TAAG) to review and assess the Clean Fuels Program. The charter and membership of the TAAG was revised in 1999 with formation of the SB 98 Clean Fuels Advisory Group so the functions of the two advisory groups would be complementary. The TAAG's charter specifies membership changes must be approved by the Technology Committee.

Proposal

These actions are for the Board to approve and adopt the TAO Clean Fuels Program 2019 Annual Report and 2020 Plan Update and, as part of the Board's consideration of the 2020 Plan Update, to make a finding that the update and its proposed projects do not duplicate any past or present programs of specified organizations. The review process by the two advisory groups helps ensure that South Coast AQMD efforts do not duplicate projects. The advisory groups provide feedback to staff on the documents during in-person biannual meetings and through subsequent correspondence. The advisors are all experts in different fields, with the majority being current or retired members of national laboratories, state or federal agencies and/or academia. Staff diligently monitors specific technologies through efforts at state and federal collaboratives, partnerships and industrial coalitions. Staff also invites other technical experts to review the Annual Report and Plan Update. Through this effort, staff is confident there is no duplication of technology projects represented in the Plan Update, as required in the H&SC.

These actions are to also receive and file membership changes to the TAAG and approve and adopt membership changes to the SB 98 Clean Fuels Advisory Group, as required by their respective charters. This package includes a Resolution (Attachment A), proposed new advisory group members including their biographies (Attachment B), and one combined document comprising the TAO Clean Fuels Program 2019 Annual Report and 2020 Plan Update (Attachment C).

Clean Fuels Program Annual Report 2019
The Annual Report covers projects and progress of the Program for Calendar Year (CY) 2019. As discussed earlier, this report addresses all the requirements specified in H&SC 40448.5.1(d). Specifically, this report includes the following required elements:

- A description of the core technologies that the South Coast AQMD considers critical to ensure attainment and/or maintenance of ambient air quality standards and a description of the efforts made to overcome commercialization barriers;
- Staff analysis of the impact of TAO's Clean Fuels Program on the private sector and on research, development and commercialization efforts by major automobile and energy firms;
- A description of projects funded by the South Coast AQMD, including a list of recipients, key subcontractors (if known), cofunders, matching state or federal funds, and expected and actual results of each project advancing and implementing clean fuels technology and improving public health;
- The title and purpose of all projects undertaken pursuant to the Clean Fuels Program, the names of the contractors and key subcontractors involved in each project, and the amount of money expended or committed for each project;
- A summary of the progress made toward the goals of the Clean Fuels Program; and
- Funding priorities identified for the next year and relevant audit information for previous, current and future years covered by the report.

During CY 2019, the Clean Fuels Program executed 68 new projects or studies and modified 4 continuing contracts, adding additional dollars, to sponsor research, development, demonstration and deployment (RD^3) projects and technology assessment and transfer contracts for alternative and clean fuel technologies. The South Coast AQMD contribution to these projects was approximately $11.9 million, with total project costs of nearly $134 million, which includes coordinated funding from other governmental agencies, private sector, academia and research institutions. The $11.9 million includes $3.12 million recognized into the Clean Fuels Fund as pass-through funds from project partners to facilitate project administration by the Clean Fuels Program. This $3.12 million came from an U.S. EPA Airshed Grant for near-zero battery-electric shuttle buses. These projects address a wide range of air quality issues

with a diverse mix of advanced technologies. Figure 1 shows the distribution of funding committed from the Clean Fuels Program through executed agreements in 2019.

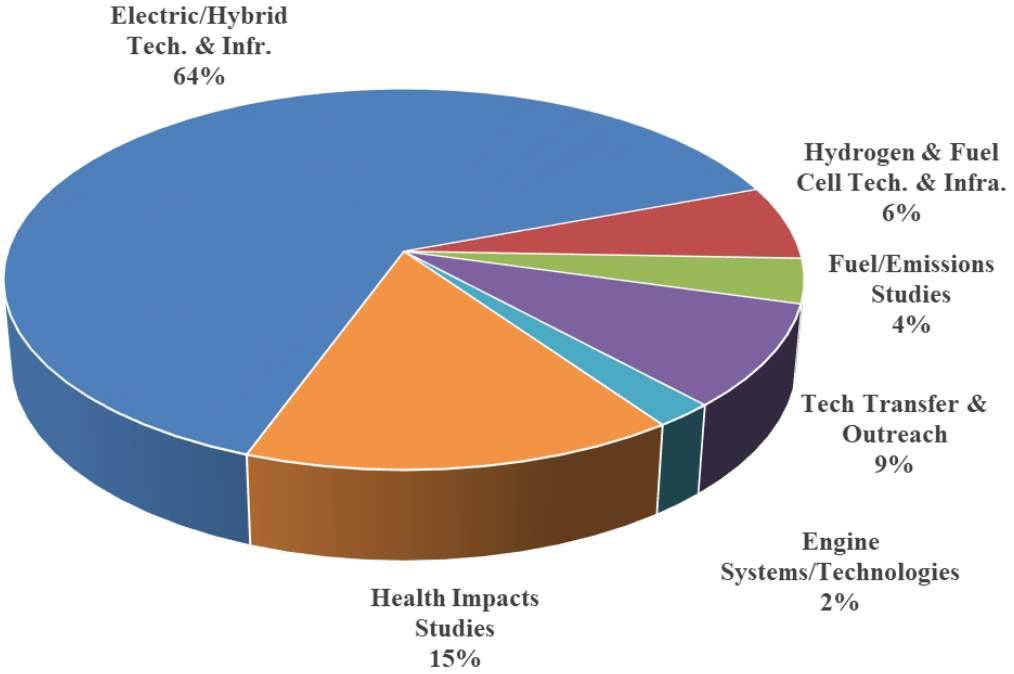


Figure 1: Distribution of Executed Clean Fuels Program Contracts in CY 2019 ($11.9M)

Executed agreements typically follow the Board awards due to the time necessary to negotiate contracts. During this phase, project awards may be reduced in scope, encounter delays in execution, or may not be contracted at all due to unforeseen difficulties following Board approval. As such, the funding distribution represents a "snapshot-in-time" of the Clean Fuels Program for the CY being reported.

During CY 2019, the South Coast AQMD supported a variety of projects and technologies, ranging from near-term to long-term RD^3 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 executed in CY 2019 included demonstrations of zero emission trucks and EV infrastructure, zero emission cargo handling vehicle demonstrations, deployment of pre-commercial battery electric shuttle buses, natural gas engine emissions and efficiency improvements, solid oxide fuel cell and gas turbine hybrid technology development and hydrogen fueling station expansions. Like the last few years, the significant project scopes of a few key contracts executed in the CY resulted in higher than average leveraging of Clean Fuels dollars. Typical leveraging has been $4 for every $1 in Clean Fuels funding. In 2019, leveraging was approximately $1 to $14.

In addition to the new projects, 15 RD^3 and 18 technology assessment and transfer/outreach projects were completed in CY 2019. Summaries of each of the

technical projects completed in 2019 are provided in Appendix C of the combined document.

The Clean Fuels Program in CY 2019 continued to leverage other outside opportunities with the South Coast AQMD securing new awards over $36 million from federal, state and local funding. While this revenue may not be recognized into the Clean Fuels Fund, it is part of the overall RD^3 effort implemented under the auspices of the Clean Fuels Program. Staff continues to aggressively pursue applicable funding opportunities that may focus on GHG reductions, energy efficiency and reductions in petroleum usage, while remaining committed to acting as a leader in developing advanced technologies that lower criteria and toxic pollutants. Leveraging dollars and applying for funds is critical given the magnitude of required funding identified in the 2016 AQMP that is needed to achieve federal ozone air quality standards.

Clean Fuels Program Plan Update 2020
Every year, staff re-evaluates the Clean Fuels Program to develop an update of the Plan which essentially serves to re-calibrate the technical direction of the Program. The attached 2020 Plan Update for the Clean Fuels Program identifies potential projects to be considered for funding during 2020 and beyond. The proposed projects reflect promising zero, near-zero and low emission technologies and applications that are emerging in the different source categories. This Plan Update includes several proposed projects, not all of which are expected to be funded in the current calendar year given the available budget. Some of the proposed projects for 2020 include, but are not limited to:

- Heavy-duty zero emission fuel cell trucks and infrastructure;
- Onboard sensor development for emissions monitoring and improved efficiency;
- Microgrid demonstrations to support zero emission infrastructure;
- Electric school bus and fleet charging demonstrations;
- 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.

In addition to identifying proposed projects to be considered for funding, this Plan Update confirms nine key technical areas of highest priority to the South Coast AQMD. These high priority areas are listed below based on the proposed funding distribution shown in Figure 2:

- Hydrogen and Mobile Fuel Cell Technologies and Infrastructure (especially large-scale refueling facilities);

- Engine Systems (emphasizing heavy-duty alternative and renewable fuel engines for truck and rail applications);
- Electric and 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 renewables and microgrids);
- Fuel and Emissions Studies;
- Emissions Control Technologies;
- Health Impacts Studies; and
- Technology Assessment and Transfer/Outreach.

It should be noted that these priorities represent the areas where South Coast AQMD funding is thought to have the greatest impact. In keeping with the diverse and flexible "technology portfolio" approach, however, these priorities may shift during the year to: (1) capture opportunities such as cost-sharing by the state government, the federal government or other entities; (2) address specific technology issues which affect residents within the South Coast AQMD jurisdiction; (3) incorporate findings from recent studies; or (4) further accelerate technology development, commercialization or market acceptance of promising technologies.

These technical priorities will necessarily be balanced by funding availability and the availability of qualified projects. Revenues from several sources support South Coast AQMD's Technology Advancement program. The principal revenue source is the Clean Fuels Program which, under H&SC Sections 40448.5 and 40512, and Vehicle Code Section 9250.11, establishes mechanisms to collect revenues from mobile and stationary sources to support program objectives, albeit with constraints on the use of the funds. Grants and cost-sharing revenue contracts from various government agencies, such as CARB, CEC, NREL and other national laboratories, U.S. EPA and the U.S. Departments of Energy and Transportation, also support technology advancement efforts.

The Plan Update is the result of a comprehensive planning and review process. This process included consideration of 2016 AQMP control measures as well as CARB's Mobile Source Strategies including the Truck and Bus Regulation and Advanced Clean Truck Regulation, U.S. EPA's Cleaner Trucks Initiative, San Pedro Bay Ports' Clean Air Action Plan, the Sustainable Freight Action Plan, and the California Fuel Cell Partnership's *Medium & Heavy-Duty Fuel Cell Electric Vehicle Action Plan* and *Road Map for Zero Emission, Fuel Cell Electric Buses in California*. It also incorporates coordination activities involving outside organizations including consideration of federal, state and local activities and proposed integrated solutions that capture the co-benefits of reduced GHG emissions and criteria pollutants. As part of this process, staff

hosted two meetings in September 2019 and February 2020 to solicit input from the SB 98 Clean Fuels Advisory Group, TAAG and other technical experts. During these meetings, the participants reviewed the current Technology Advancement projects and discussed near-term and long-term technologies as potential projects. Staff also attended a variety of conferences and symposiums, such as the ACT Expo in April 2019 and the DOE Annual Merit Reviews (May & June 2019). Additionally, staff attended meetings or workshops with CARB, CEC, the California Fuel Cell Partnership, the California Stationary Fuel Cell Collaborative, California Hydrogen Business Council, Veloz (a nonprofit supporting electric vehicles for all), and other entities to solicit and incorporate technical areas for potential leveraged funding and project coordination.

Based on discussions with the organizations specified in H&SC Section 40448.5.1 and review of their programs, the projects proposed in this Plan Update do not duplicate any past or present projects. As each individual project is recommended to the Board for funding, staff will continue to coordinate with these organizations to ensure that duplication is avoided and ensure optimal expenditure of Clean Fuels Program funds.

Staff presented the Draft 2019 Clean Fuels Program Plan Update to the Technology Committee on October 18, 2019. Figure 2 graphically depicts the potential distribution of Clean Fuels Program funds which represents priority focus for the nine project areas discussed above.

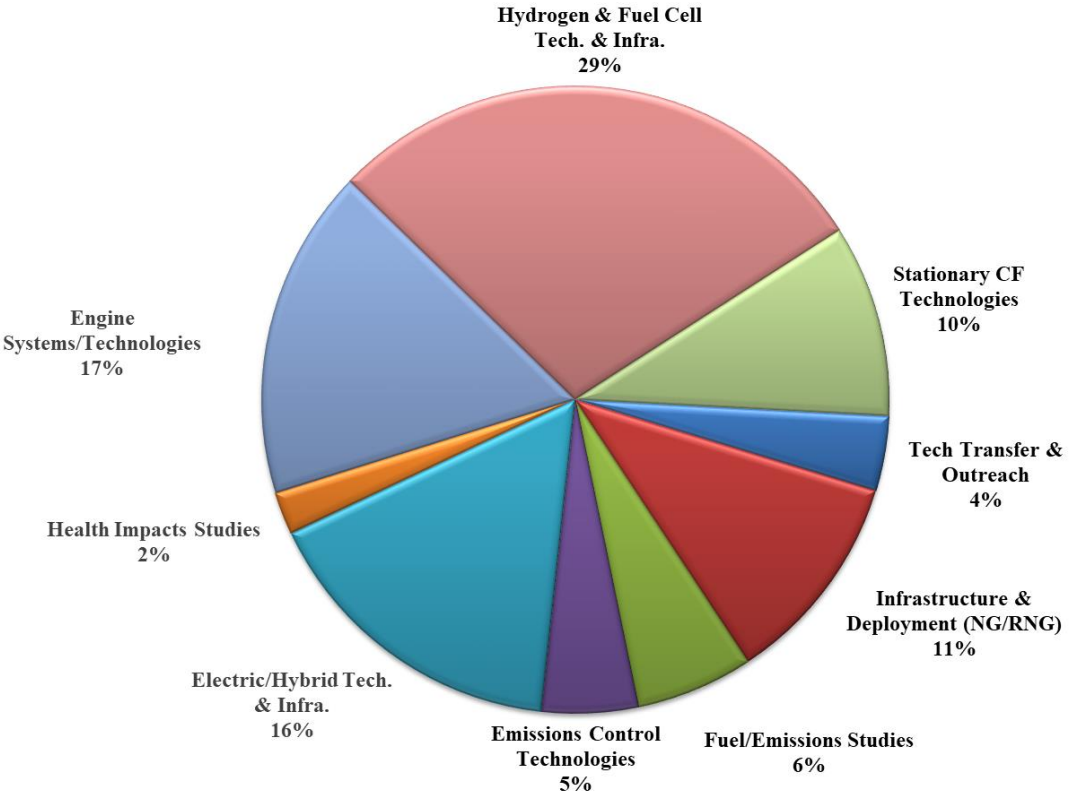


Figure 2: Projected Cost Distribution for Potential Projects in 2020 ($16.1M)

The expected actual program expenditures for 2019 will be much less than the total projected program cost since not all projects will materialize. The target allocations are based on balancing technology priorities, technical challenges and opportunities discussed previously and near-term versus long-term benefits with the constraints on available Clean Fuels funding. Specific contract awards throughout 2019 will be based on this proposed allocation, the quality of proposals received and evaluation of projects against standardized criteria and, ultimately, Board approval. At that time, additional details will be provided about the technology, its application, the specific scope of work, the project team capabilities and the project cost-sharing.

H&SC Section 40448.5.1 requires the Board approve the Clean Fuels Annual Report for 2019 and adopt the Clean Fuels Plan Update for 2020 as well as find that the proposed projects do not duplicate programs of other organizations specified in the H&SC provision. As required, the Annual Report and Plan Update have been reviewed by the SB 98 Clean Fuels Advisory Group.

Attachments

A. Resolution
B. Qualifications and Expertise of Proposed New Advisory Group Members
C. TAO Clean Fuels Program 2019 Annual Report and 2020 Plan Update

Back to Agenda

ATTACHMENT A

RESOLUTION NO. 20-

A Resolution of the Governing Board (the Board) of the South Coast Air Quality Management District (SCAQMD) approving the Technology Advancement Office Clean Fuels Program Annual Report for 2019 and adopting the Clean Fuels Program Plan Update for 2020.

WHEREAS, the Board initiated a Clean Fuels Program in 1988 to expedite the demonstration and commercialization of advanced low emission and zero emission technologies and clean fuels; and,

WHEREAS, Health and Safety Code Sections 40404 and 40448.5 require the SCAQMD to coordinate and manage a Clean Fuels Program to accelerate the utilization of clean-burning fuels within the South Coast Air Basin; and,

WHEREAS, Health and Safety Code Section 40512 and Vehicle Code Section 9250.11 authorize funding for the SCAQMD Clean Fuels Program; and,

WHEREAS, SB 98 (Alarcon), chaptered into state law on June 8, 1999, extended the funding authority for the Clean Fuels Program and added administrative provisions under Health and Safety Code Section 40448.5.1 regarding program planning and reporting, including:

- Providing notice to interested parties and the public at least 30 days prior to the annual public hearing at which the Board or a committee of the Board takes action to approve the clean-burning fuels program.
- Consulting with the SB 98 Clean Fuels Advisory Group regarding approval of the required annual report. The results of that consultation shall be provided to the Board prior to its approval of the report.
- Submitting the Clean Fuels Program annual report to the office of the Legislative Analyst and to the committees of the Legislature responsible for improving air quality on or before March 31 of each year that the clean-burning fuels program is in operation; and

WHEREAS, SB 1646 (Padilla), chaptered into state law on September 30, 2008, reauthorized the funding authority for the Clean Fuels Program, removed the sunset of January 1, 2010, and reinstated the five percent administrative cap; and,

WHEREAS, the Technology Advancement Office Clean Fuels Program Plan Update has been reviewed and commented on by both the Technology Advancement Advisory Group and the SB 98 Clean Fuels Advisory Group; and,

WHEREAS, Health and Safety Code Section 40448.5.1 requires that the SCAQMD coordinate and ensure non-duplication of clean fuels-related projects with specified organizations, including the: CARB, CEC, California air quality management districts or air pollution control districts, a public transit district or authority within the geographic jurisdiction of the SCAQMD, San Diego Transit Corporation, North County Transit District, Sacramento Regional Transit District, Alameda-Contra Costa Transit District, San Francisco Bay Area Rapid Transit District, Santa Barbara Metropolitan Transit District, Los Angeles Department of Water and Power, Sacramento Municipal Utility District, Pacific Gas and Electric Company, Southern California Gas Company, Southern California Edison Company, San Diego Gas and Electric Company, or the Office of Mobile Sources within the U.S. Environmental Protection Agency; and

WHEREAS, based on communications with the organizations specified in Health and Safety Code Section 40448.5.1 and review of their programs, the proposed program and projects included in the Technology Advancement Office Clean Fuels Program Plan Update do not duplicate any other past or present program or project funded by those organizations; and,

WHEREAS, notice has been provided to interested parties and the public at least 30 days prior to the annual public hearing at which the Board is to consider approving the clean-burning fuels program; and,

WHEREAS, the SB 98 Clean Fuels Advisory Group has reviewed the Technology Advancement Office Annual Report.

NOW, THEREFORE, BE IT RESOLVED, that the Board finds the Technology Advancement Office Clean Fuels Program Plan Update does not duplicate any past or present programs or projects funded by the above-specified organizations.

BE IT FURTHER RESOLVED, that the Board approves the Technology Advancement Office Clean Fuels Program Annual Report for 2019.

BE IT FURTHER RESOLVED, that the Board adopts the Technology Advancement Office Clean Fuels Program Plan Update for 2020.

BE IT FURTHER RESOLVED, that the Board hereby directs staff to forward the Technology Advancement Office Clean Fuels Program Annual Report 2019 and Plan Update 2020 to the California Legislature and the Legislative Analyst.

_____ _____

Dated: Faye Thomas, Clerk of the Boards

Back to Agenda

ATTACHMENT B
Qualifications and Expertise of Proposed New Advisory Group Members

SB 98 Clean Fuels Advisory Group*

Stephen Ellis American Honda	Stephen Ellis is Manager of Fuel Cell Vehicle Marketing at American Honda Motor Co., Inc. Steve is responsible for the deployment of the Honda FCX Clarity, Hydrogen Fuel Cell Electric Vehicle to retail consumers. He previously deployed the original FCX to government fleets and the world's first retail sale to a consumer. Steve currently works with State of California, the U.S. Department of Energy, auto OEMs, energy companies, and hydrogen providers to develop a H2 station network. Steve was previously Board Chairman of the Fuel Cell and Hydrogen Energy Association (FCHEA) and is now working to collaborate and introduce H2 USA.
Petros Ioannou, PhD University of Southern California	Dr. Ioannou is a Professor of the Ming Hsieh Department of Electrical Engineering with joint appointments in the Departments of Aerospace and Mechanical Engineering, and Industrial and Systems Engineering. He received his B.Sc. degree with First Class Honors from University College, London, England, and his M.S. and Ph.D. degrees from the University of Illinois at Urbana-Champaign. In 1982, he became a faculty member of USC Electrical Engineering-Systems and currently serves as the Director of the Center of Advanced Transportation Technologies as well as the Associate Director for Research of METRANS. Petros is a Fellow of the IEEE, Fellow of the International Federation of Automatic Control (IFAC), and Fellow of the Institution of Engineering and Technology (IET). He is the author/co-author of 8 books and over 400 research papers in the area of controls, vehicle dynamics and control, and intelligent transportation systems (ITS). He is the Editor in Chief of the IEEE Transactions on ITS. In 1985, he received the Presidential Young Investigator Award for his research in Adaptive Control. In 2009, he received the Intelligent Transportation System's Outstanding Application Award by the IEEE Intelligent Transportation System Society (ITSS) and the 2009 IET Heaviside Medal for Achievement in Control. In 2012, he received the IEEE ITSS Outstanding ITS Research Award, and in 2015, he received the 2016 IEEE Transportation Technologies Field Award for his work on Adaptive Cruise Control Systems. .
Dr. John Wall	Dr. John Wall has more than 35 years of industry experience in internal combustion engine technology, fuels and emissions, and in global engineering organization development. He served as Vice President and Chief Technical Officer of Cummins Inc., the world's largest independent manufacturer of diesel engines and related technologies, retiring in 2015. He is an advisor to the U.S. Department of Energy Joint BioEnergy Institute and Co-Optima Program and the Cyclotron Road energy incubator at Lawrence Berkeley Laboratory. In 2010, he was elected to the U.S. National Academy of Engineering. He is a Fellow of the Society of Automotive Engineers and a recipient of the SAE Horning Memorial Award and Arch T. Colwell Merit Award for research in the area of diesel fuel effects on emissions, the ASME Soichiro Honda Medal

	for significant engineering contributions in the field of personal transportation, the California Air Resources Board Haagen-Smit Clean Air Award, and the U.S. EPA's Thomas W. Zosel Individual Achievement Award for career accomplishments in diesel emissions control. Dr. Wall holds SB, SM, and ScD. degrees in mechanical engineering from the Massachusetts Institute of Technology.

**The charter of the CFAG requires membership changes to be approved by the full SCAQMD Board.*

Technology Advancement Advisory Group**

Michael Kleinman, PhD UCI	Dr. Michael T. Kleinman is a Professor of Occupational and Environmental Medicine in the Department of Medicine at the University of California, Irvine (UCI), where he has been since 1982. He was previously employed by the U.S. Atomic Energy Commission (AEC) as an environmental scientist and he directed the Aerosol Exposure and Analytical Laboratory at Rancho Los Amigos Hospital in Downey, CA. He is a toxicologist and has been studying the health effects of exposures to environmental contaminants 40 years. He holds a M.S. in Chemistry (Biochemistry) from the Polytechnic Institute of Brooklyn and a Ph.D. in Environmental Health Sciences from New York University. He is also the Co-Director of the Air Pollution Health Effects Laboratory in the Department of Medicine at University of California, Irvine. He has published about 110 articles in peer-reviewed journals dealing with environmental contaminants and their effects on cardiopulmonary and immunological systems and on global and regional distribution of environmental contaminants including heavy metals and radioactive contaminants from nuclear weapons testing and manufacture.
George Payba LADWP	George Payba is the Director of Electrification of Transportation Systems and Electronic Vehicle Policy at the Los Angeles Department of Water and Power (LADWP). Prior to joining LADWP, Mr. Payba served as the Executive Director of Los Angele Regional Agency (a.k.a. Los Angeles Integrated Waste Management Authority) which comprises 18 SoCal cities. At LA Sanitation and Environment (LASAN), Mr. Payba served as the Section Head for the Zero Waste Compliance and Sustainability Section from 2014 to 2019. During his tenure at LASAN, Mr. Payba oversaw citywide sustainability and recycling programs such as LARA; AB 939, AB 341 and AB 1826 compliance, and the Recycling Market Development Zone. He also managed the successful City of LA Green Business Certification Programs comprising of Green Business, Green Arts, and Green Lodging, as well as the implementation of the citywide sustainability programs such as LA Green Business Certification Programs, the Environmentally Preferable Purchasing Program/Ordinance, Single-Use Plastic Bag Ban, and the Department of Dept. of Water and Power's Waste Tire and Universal Waste Programs. Mr. Payba received his Bachelor of Arts degree in Chemistry from Long Beach State University.
Vic La Rosa Total Transportation Solutions Inc.	Vic La Rosa's comprehensive professional background spans the industries of transportation and clean tech. These include freight forwarding, warehousing, trucking, LTL, airfreight, logistics, distribution, roll-on / roll-off, 3PL, and international shipping. Mr. La Rosa is recognized as a transportation and trucking subject matter expert. He provides local newspapers and industry publications with expertise and advisory,

	including the Wall Street Journal, American Shipper and the Journal of Commerce. In 1986, Mr. La Rosa co-founded Total Transportation Solutions Inc. (TTSI) with Bill Allen to provide a wide range of cross-nation and international freighting services. Serving as President during the early growth years, he directed the upward trajectory of the company to reach a peak of $100 million prior to the successful sale of the business in 2006.

***The charter of the TAAG requires membership changes to be approved by the Board's Technology Committee.*

Back to Agenda

ATTACHMENT C

TECHNOLOGY ADVANCEMENT OFFICE
CLEAN FUELS PROGRAM
DRAFT 2019 ANNUAL REPORT & 2020 PLAN UPDATE

South Coast Air Quality Management District
March 2020

[This Page Intentionally Left Blank]

South Coast Air Quality Management District

Governing Board

Chairman
William A. Burke, Ed.D.
Assembly Speaker Appointee

County Representatives
Kathryn Barger
Supervisor, Los Angeles County

Lisa Bartlett*
Supervisor, Orange County

V. Manuel Perez
Supervisor, Riverside County

Janice Rutherford
Supervisor, San Bernardino County

State Representatives
Vacant
Governor's Appointee

Vice Chairman
Ben Benoit
Council Member, City of Wildomar
Riverside County Cities

Cities Representatives
Joe Buscaino**
Council Member, City of Los Angeles
City of Los Angeles

Michael Cacciotti
Council Member, City of South Pasadena
Los Angeles County, Eastern Region Cities

Vanessa Delgado
Senator (Ret.)
Senate Rules Committee Appointee

Larry McCallon
Mayor, City of Highland
San Bernardino County Cities

Judith Mitchell*
Council Member, City of Rolling Hills Estates
Los Angeles County, Western Region Cities

Carlos Rodriguez*
Council Member, City of Yorba Linda
Orange County Cities

Executive Officer
Wayne Nastri

*Technology Committee Members (as of 2/14/20) **Technology Committee Chairman

[This Page Intentionally Left Blank]

South Coast Air Quality Management District

Technology Advancement Office

Matt Miyasato, Ph.D., Deputy Executive Officer, Science & Technology Advancement
Naveen Berry, Assistant Deputy Executive Officer, Technology Advancement Office
Joseph Impullitti, Technology Demonstration Manager
Vicki White, Technology Implementation Manager
Lourdes Cordova Martinez, Sr. Public Affairs Manager

Al Baez, Program Supervisor
Phil Barroca, Program Supervisor
Ping Gui, Program Supervisor
Patricia Kwon, Program Supervisor
Tom Lee, Program Supervisor
Joseph Lopat, Program Supervisor
Lisa Mirisola, Program Supervisor
Walter Shen, Program Supervisor
Mei Wang, Program Supervisor
Vasken Yardemian, Program Supervisor

Bahareh Brumand, Sr. Air Quality Engineer

Drue Hargis, Sr. Staff Specialist
Ash Nikravan, Sr. Staff Specialist

Frances Maes, Staff Specialist

Sam Cao, Ph.D., Air Quality Specialist
Darren Ha, Air Quality Specialist
Seungbum Ha, Ph.D., Air Quality Specialist
Alicia Ibarra Martinez, Air Quality Specialist
Krystle Martinez, Air Quality Specialist
Yuh Jiun Tan, Air Quality Specialist
Greg Ushijima, Air Quality Specialist
Adan Velasco, Air Quality Specialist
Fan Xu, Air Quality Specialist
Alyssa Yan, Air Quality Specialist

Kenny Heralal, Air Quality Inspector II

Alan Wang, Air Quality Inspector I

Penny Shaw Cedillo, Sr. Administrative Secretary
Alejandra Vega, Sr. Administrative Secretary

Maria Allen, Secretary
Marjorie Eaton, Secretary
Donna Vernon, Secretary

Christina Kusnandar, Staff Assistant
Michelle White, Staff Assistant

Tribrina Brown, Contracts Assistant
Jessie Conaway, Contracts Assistant
Deanna Doerr, Contracts Assistant
Liliana Garcia, Contracts Assistant
Mariel Maranan, Contracts Assistant
Genette Martinez, Contracts Assistant
Celina Sanchez, Contracts Assistant
Benigna Taylor, Contracts Assistant
Veronica Tejada, Contracts Assistant
Ana Troccoli, Contracts Assistant

Cynthia Snyder, Sr. Office Assistant

Margarita Cabral, Office Assistant
Lauren Henninger, Office Assistant
Kristina Voorhees, Office Assistant

[This Page Intentionally Left Blank]

Table of Contents

[This Page Intentionally Left Blank]

EXECUTIVE SUMMARY

Introduction

The South Coast Air Quality Management District (South Coast AQMD) is the air pollution control agency for all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties. This region, which encompasses the South Coast Air Basin (Basin) as well as small portions of the Mojave Desert and Salton Sea Air Basins, historically experiences the worst air quality in the nation due to the natural geographic and atmospheric conditions of the region, coupled with the high population density and associated mobile and stationary source emissions.

In 1988, SB 2297 (Rosenthal) was signed into law (Chapter 1546). It initially established a "five-year program to increase the use of clean fuels," but subsequent legislation extended and eventually removed the sunset clause for the Program. That legislation also reaffirmed existence of the Technology Advancement Office (TAO) to administer the Clean Fuels Program. The TAO Clean Fuels Program is an integral part of the South Coast AQMD's effort to achieve the significant NOx reductions called for in the 2016 Air Quality Management Plan (AQMP) because it affords the South Coast AQMD the ability to fund research, development, demonstration and accelerated deployment of clean fuels and transformative transportation technologies.

Using funding received through a $1 motor vehicle registration fee, the Clean Fuels Program encourages, fosters and supports clean fuels and transportation technologies, such as hydrogen and fuel cells, advanced natural gas technologies, alternative fuel engines, battery electric vehicles, plug-in hybrid electric vehicles and related fueling infrastructure including renewable fuels. A key strategy of the Program, which allows significant leveraging of the 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 leveraged nearly $340 million into over $1.5 billion in projects.

As technologies move towards commercialization, such as battery electric trucks, the Clean Fuels Program has been able to partner with large original equipment manufacturers (OEMs), such as Daimler and Volvo, in order to eventually deploy these vehicles in 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 standards, large numbers of advanced technology clean-fueled vehicles must be deployed across our region and state.

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

California Health and Safety Code (H&SC) 40448.5(e) calls for the Clean Fuels Program to consider, among other factors, the current and projected economic costs and availability of fuels, 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.

H&SC 40448.5.1 requires the South Coast AQMD to prepare and submit to the Legislative Analyst each year by March 31, a Clean Fuels Annual Report and Plan Update. The Clean Fuels Annual Report looks at what the Program accomplished in the prior calendar year (CY) and the Clean Fuels Plan Update looks ahead at proposed projects for the next CY, essentially re-calibrating the technical emphasis of the Program.

Setting the Stage

The overall strategy of TAO's Clean Fuels Program is based, in large part, on emissions reduction technology needs identified in the Air Quality Management Plan (AQMP) and the South Coast AQMD Board's directives to protect the health of the almost 18 million residents (nearly half the population of California) in the South Coast Air Basin (Basin). The AQMP, which is updated approximately every four years, is the long-term regional "blueprint" that relies on fair-share emission reductions from all jurisdictional levels (e.g., federal, state and local). The 2016 AQMP, which was adopted by the 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).

Ground level ozone (a key component of smog) is created by a chemical reaction between NOx and volatile organic compound (VOC) emissions in sunlight. This is noteworthy because the primary driver for ozone formation in the Basin is NOx emissions, and mobile sources contribute approximately 88 percent of the NOx emissions in this region, as shown in Figure 1. Furthermore, NOx emissions, along with VOC emissions, also lead to the formation of PM2.5 [particulate matter measuring 2.5 microns or less in size, expressed as micrograms per cubic meter ($\mu g/m^3$)], including secondary organic aerosols.

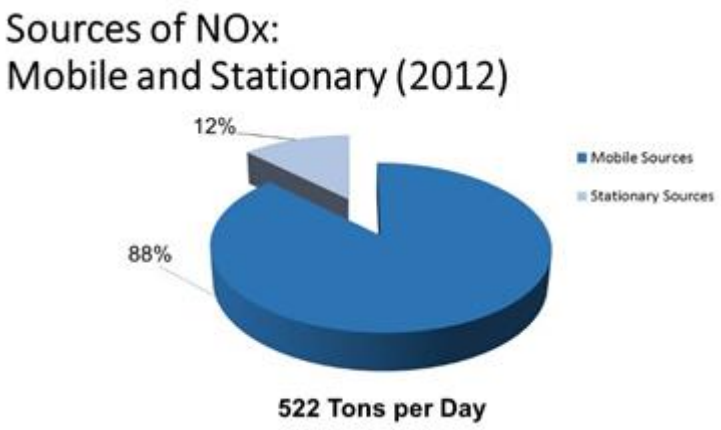
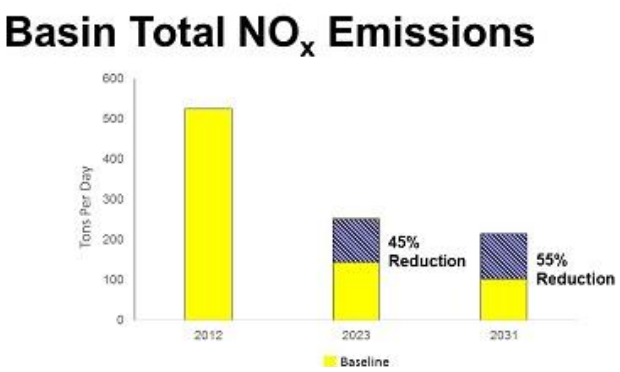


Figure 1: Sources of NOx 2012 Base Year

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 lower-emitting mobile and stationary advanced technologies to achieve health-based air quality standards. The 2016 AQMP identifies a 45 percent reduction in NOx required by 2023 and an additional 55 percent reduction by 2031 to achieve ozone standards of 80 ppb and 75 ppb, respectively. Figure 2 illustrates these needed NOx reductions in the Basin. The majority of these NOx reductions must come from mobile sources, both on-road and off-road. Notably, the South Coast

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



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 federal ambient standards through regulations and incentives for near-zero and zero emission technologies that are commercial or nearing commercialization. This strategy, however, 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 efforts in developing regulations for on- and off-road vehicles and equipment are expected to reduce NOx emissions significantly, but not sufficiently to meet the South Coast AQMD needs, especially in terms of timing.

Clean Fuels Program

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

Figure 3 provides a conceptual design of the wide scope of the Clean Fuels Program and the relationship with incentive programs. Various stages of technology projects are funded not only to provide a portfolio of technology choices but to achieve emissions reduction benefits in the near-term as well as over the longer term. The 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 2019 Clean Fuels Annual Report and Draft 2020 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 serve, among other roles, to 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.

2019 Annual Report

In CY 2019, the South Coast AQMD Clean Fuels Program executed 68 new contracts, projects or studies and modified 4 continuing project adding dollars toward research, development, demonstration and deployment projects as well as technology assessment and transfer of alternative fuel and clean fuel technologies. Table 1 (page 18) shows our major funding partners in CY 2019. Table 2 (page 32) lists the 72 projects or studies, which are further described in this report. The South Coast AQMD Clean Fuels Program contributed nearly $11.9 million in partnership with other governmental organizations, private industry, academia and research institutes, and interested parties, with total project costs of approximately $134 million. The $11.9 million includes $3.12 million recognized into the Clean Fuels Fund as pass-through funds from United States Environmental Protection Agency (U.S. EPA) Airshed Grant funds for a battery-electric shuttle bus replacement project. Table 3 (page 34) provides information on this outside funding received into the Clean Fuels Fund. Additionally, in CY 2019, the Clean Fuels Program continued to leverage other outside funding opportunities, securing new awards totaling $19.9 million from federal, state and local funding opportunities. Table 4 (page 34) provides a comprehensive summary of these federal, state and local revenues awarded to the South Coast AQMD during CY 2019. Like the last couple of years, the significant project scope of a few key contracts executed in 2019 resulted in higher than average leveraging of Clean Fuels dollars. Typical historical leveraging is $4 for every $1 in Clean Fuels funding. In 2019, South Coast AQMD continued this upward trend with more than $14 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 2019 included a diverse mix of advanced technologies. The following core areas of technology advancement for 2019 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 OEMs and container transport technologies with zero emission operations);
2. Health Impacts Studies (including MATES V);
3. Technology Assessment and Transfer/Outreach;
4. Hydrogen and Mobile Fuel Cell Technologies and Infrastructure;
5. Fuel/Emissions Studies; and
6. Engine Systems/Technologies (emphasizing alternative and renewable fuels for truck and rail applications).

The chart on page 30 (Figure 17) shows the distribution by percentage of executed agreements in 2019 across these core technologies.

During CY 2019, the South Coast AQMD supported a variety of projects and technologies, ranging from near- term to long-term research, development, demonstration and deployment activities. This "technology portfolio" strategy provides the South Coast AQMD the ability and flexibility to leverage state and federal funding while also addressing the specific needs of the Basin. Projects included significant electric and hybrid electric technologies and infrastructure to develop and demonstrate medium- and heavy-duty vehicles in support of transitioning to a near-zero and zero emissions goods movement industry; development, demonstration and deployment of large displacement natural gas and

ultra-low emissions engines; and demonstration of emissions control technologies for heavy-duty engines; and natural gas and renewable natural gas deployment and support.

In addition to the 72 executed contracts and projects, 15 research, development, demonstration and deployment projects or studies and 18 technology assessment and transfer contracts were completed in 2019, as listed in Table 6 (page 52). Appendix C includes two-page summaries of the technical projects completed in 2019. As of January 1, 2020, there were 128 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, 2020, after approval by the South Coast AQMD Board.

2020 Plan Update

Staff's re-evaluation of the Clean Fuels Program to develop the annual Plan Update is based on a reassessment of the technology progress and direction for the agency. The Program continually seeks to support the development and deployment of lower-emitting technologies with increased collaboration with OEMs in order to get to 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, emissions reduction potential and cofunding opportunities. For several years, the state has continued to focus a great deal of its attention on climate change and petroleum reduction goals, but the South Coast AQMD has necessarily remained committed to developing, demonstrating and commercializing technologies that reduce criteria pollutants, specifically NOx and toxic air contaminants (TACs). Fortunately, many, if not the majority, of these technologies that address the Basin's need for NOx and TAC reductions also garner reductions in greenhouse gases (GHG) and petroleum use. Due to these "co-benefits," the South Coast AQMD has been successful in partnering with the state, which allows the Clean Fuels Program to leverage its funding extensively.

To identify technology and project opportunities where funding can make a significant difference in deploying progressively cleaner technologies in the Basin, the South Coast AQMD employs several outreach and networking activities. These activities range from close involvement with state and federal collaboratives, partnerships and industrial coalitions, to the issuance of Program Opportunity Notices (PONs) to solicit project ideas and concepts as well as issuance of Requests for Information (RFIs) to determine the state of various technologies and the development and commercialization challenges faced by those technologies. 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 activities are included conceptually within the Draft 2020 Plan Update. On a related side note, because of Assembly Bill (AB) 617[1], which requires reduced exposure to communities most impacted by air pollution. TAO conducted additional outreach to AB 617 communities regarding available zero and near-zero emission technologies as well as the incentives to accelerate those cleaner technologies into their communities.

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

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

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

Table 7 (page 71) lists the potential projects across nine core technologies by funding priority:

1. Hydrogen/Mobile Fuel Cell Technologies and Infrastructure (especially large-scale refueling facilities);
2. Engine Systems/Technologies (emphasizing alternative and renewable fuels for truck and rail applications);
2. Electric/Hybrid Vehicle Technologies and Related Infrastructure (emphasizing electric and hybrid electric trucks and container transport technologies with zero emission operations);
4. Fueling Infrastructure and Deployment (predominantly natural gas and renewable fuels);
5. Stationary Clean Fuel Technologies (including microgrids and renewables);
6. Fuel and Emission Studies;
7. Emission Control Technologies;
8. Health Impact Studies; and
9. Technology Transfer/Assessment and Outreach.

These potential projects for 2020 total $16.1 million, with anticipated leveraging of more than $4 for every $1 of Clean Fuels funding for total project costs of $81.86 million. Some of the proposed projects may also be funded by revenue sources other than the Clean Fuels Program, especially VOC and NOx mitigation and incentive projects.

CLEAN FUELS PROGRAM
Background and Overview

Program Background

The South Coast Air Basin (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 NOx reductions called for in the 2016 AQMP.

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

In 1999, further state legislation was passed which amended the Clean Fuels Program. Specifically, as stated in the H&SC section 40448.5.1(d), the South Coast AQMD must submit to the Legislature, on or before March 31 of each year, an annual report that includes:

1. A description of the core technologies that the South Coast AQMD considers critical to ensure attainment and maintenance of ambient air quality standards and a description of the efforts made to overcome barriers to commercialization of those technologies;
2. An analysis of the impact of the South Coast AQMD's Clean Fuels Program on the private sector and on research, development and commercialization efforts by major automotive and energy firms, as determined by the South Coast AQMD;
3. A description of projects funded by the South Coast AQMD, including a list of recipients, subcontractors, cofunding sources, matching state or federal funds and expected and actual results of each project advancing and implementing clean fuels technology and improving public health;
4. The title and purpose of all projects undertaken pursuant to the Clean Fuels Program, the names of the contractors and subcontractors involved in each project and the amount of money expended for each project;
5. A summary of the progress made toward the goals of the Clean Fuels Program; and

6. Funding priorities identified for the next year and relevant audit information for previous, current and future years covered by the project.

Furthermore, H&SC section 40448.5.1(a)(2) requires the South Coast AQMD to find that the proposed program and projects funded as part of the Clean Fuels Program will not duplicate any other past or present program or project funded by the state board and other government and utility entities. This finding does not prohibit funding for programs or projects jointly funded with another public or private agency where there is no duplication. Concurrent with adoption and approval of the annual report and plan update every year, the Board will consider the efforts TAO has undertaken in the prior year to ensure no such duplication has occurred then make a finding through a Resolution attesting such.

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

Program Review

In 1990, the South Coast AQMD initiated an annual review of its technology advancement program by an external panel of experts. That external review process has evolved, in response to South Coast AQMD policies and legislative mandates, into two external advisory groups. The Technology Advancement Advisory Group (one of six standing Advisory Groups that make up the South Coast AQMD Advisory Council) is made up of stakeholders representing industry, academia, regulatory agencies, the scientific community and environmental impacts. The Technology Advancement Advisory Group serves to:

- Coordinate the South Coast AQMD program with related local, state and national activities;
- Review and assess the overall direction of the program; and
- Identify new project areas and cost-sharing opportunities.

In 1999, the second advisory group was formed as required by SB 98 (Alarcon). Under H&SC Section 40448.5.1(c), this advisory group must comprise 13 members with expertise in clean fuels technology and policy or public health and appointed from the scientific, academic, entrepreneurial, environmental and public health communities. This legislation further specified conflict-of-interest guidelines prohibiting members from advocating expenditures towards projects in which they have professional or economic interests. The objectives of the SB 98 Clean Fuels Advisory Group are to make recommendations regarding projects, plans and reports, including consulting with regarding approval of the required annual report prior for submittal to the South Coast AQMD Governing Board. Also, in 1999, considering the formation of the SB 98 Clean Fuels Advisory Group, the South Coast AQMD also revisited the charter and membership of the Technology Advancement Advisory Group to ensure their functions would complement each other.

On an as-needed basis, changes to the composition of the Clean Fuels Advisory Group are reviewed by the South Coast AQMD Board while changes to the Technology Advancement Advisory Group are reviewed by the South Coast AQMD Board's Technology Committee.

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

As needed, current membership changes to both advisory groups are considered by the South Coast AQMD Board and its Technology Committee, respectively, as part of consideration of each year's Annual Report and Plan Update. The current members of the SB 98 Clean Fuels Advisory Group and Technology Advancement Advisory Group (as of 2/14/20) 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 NOx and volatile organic compound (VOC) emissions in sunlight. This is noteworthy because the primary driver for ozone formation in the Basin is NOx emissions, and mobile sources contribute approximately 88 percent of the NOx emissions in this region, as shown in Figure 1. Furthermore, NOx emissions, along with VOC emissions, also lead to the formation of PM2.5 [particulate matter measuring 2.5 microns or less in size, expressed as micrograms per cubic meter (µg/m3)], including secondary organic aerosols.

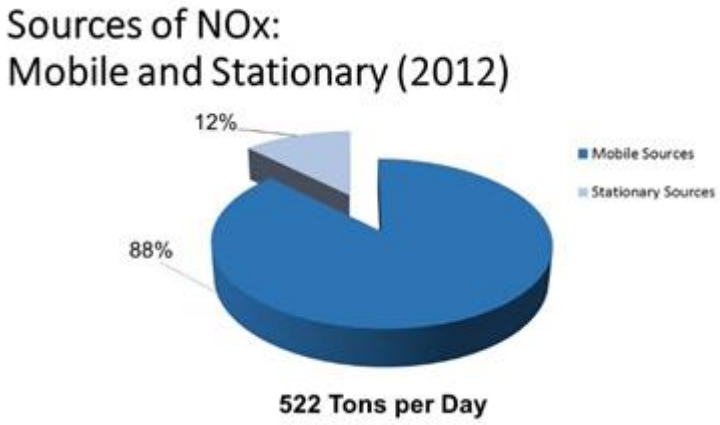


Figure 1: Sources of NOx 2012 Base Year

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. EPA, are projected to require additional long-term control measures for both NOx and VOC.

The need for advanced mobile source technologies and clean fuels is best illustrated by Figure 2 (page 4) which identifies just how far NOx emissions must be reduced to meet federal standards by

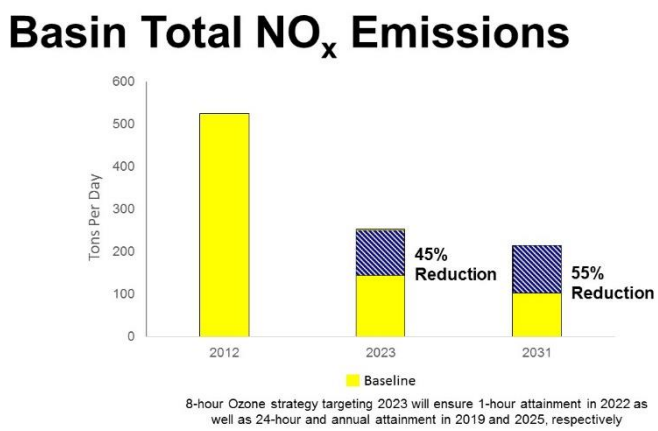


Figure 2: Total NOx Reductions Needed

2023 and 2031. The 2016 AQMP's estimate of needed NOx 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 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 NOx 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 NOx 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 2020.

In summary, advanced, energy efficient and renewable technologies are needed not only for attainment, but also to protect the health of those who reside within the South Coast AQMD's jurisdiction, reduce long-term dependence on petroleum-based fuels, and support a more sustainable energy future. Conventional strategies and traditional supply and consumption need to be retooled to achieve the federal air quality goals. To help meet this need for advanced, clean technologies, the South Coast AQMD Board continues to aggressively carry out the Clean Fuels Program and promote alternative fuels through its Technology Advancement Office (TAO).

As technologies move towards commercialization, such as battery electric trucks, the Clean Fuels Program has been able to partner with large original equipment manufacturers (OEMs), such as Daimler and Volvo, in order to eventually deploy these vehicles in 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 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 ono 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 Program[2]) 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 (RD[3]) projects as well as incentives remains a concern given the magnitude of additional funding identified in the 2016 AQMP to achieve federal ozone air quality standards.

The following sections describe program funding, provide a 2019 overview and describe core technologies of the Clean Fuels Program.

Program Funding

The Clean Fuels Program is established under H&SC Sections 40448.5 and 40512 and Vehicle Code Section 9250.11. This legislation establishes mechanisms to collect revenues from mobile and stationary sources to support the program objectives and identifies the constraints on the use of funds. In 2008, these funding mechanisms were reauthorized under SB 1646 (Padilla), which removed the funding sunset of January 1, 2010, and established the five percent administrative cap instead of the previous cap of two-and-half percent.

Specifically, the Clean Fuels Program is funded through a $1 fee on motor vehicles registered in the South Coast AQMD. Revenues collected from these motor vehicles must be used to support mobile source projects. Stationary source projects are funded by an emission fee surcharge on stationary sources emitting more than 250 tons of pollutants per year within the South Coast AQMD. This revenue is typically about $13.5 million and $350,000, respectively, every year. For CY 2019, the funds available through each of these mechanisms were as follows:

- Mobile sources (DMV revenues) $13,877,184
- Stationary sources (emission fee surcharge) $349,876

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 the California Air Resources Board (CARB), the California Energy Commission (CEC), the U.S. EPA (including but not limited to their Diesel Emissions Reduction Act or DERA, the Clean Air Technology Initiative or CATI, and Airshed programs), the U.S. Department of Energy (DOE) and the U.S. Department of Transportation (DOT). These supplemental revenues depend in large part on the originating agency, its budgetary and planning cycle and the specific project or intended use of the revenues.

Table 3 (page 34) lists the supplemental grants and revenues totaling $3.12 million for contracts executed in CY 2019.

Table 4 (page 34) lists the federal and state revenue totaling nearly $20 million awarded to the South Coast AQMD in 2019 for projects that are part of the overall Clean Fuels Program's RD[3] efforts, even if for financial tracking purposes the revenue is recognized into another special revenue fund other than the Clean Fuels Fund (Fund 31).

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

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 $340 million into more than $1.5 billion in projects. For 2019, the Clean Fuels Program leveraged each $1 to more than $14 of outside funding. Similar to last year, this atypical leverage was the result of a few key contracts with significant project scopes executed in 2019, such as the $91 million project with Volvo, which includes a nearly $45 million award to the South Coast AQMD from CY 2018 (see the Project Summaries by Core Technologies for more information on these key projects, as well as the project highlights in the Strategy and Impact section starting on page 17). 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 2019 are listed in Table 1 (page 18).

2019 Overview

This report summarizes the progress of the South Coast AQMD Clean Fuels Program for CY 2019. 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 2019. During the period between January 1 and December 31, 2019, the South Coast AQMD executed 68 new contracts/agreements, projects or studies and modified 4 continuing project adding dollars during CY 2019 that support clean fuels and advanced zero, near-zero and low emission technologies (see Table 2, page 32). The South Coast AQMD Clean Fuels Program contribution for these projects was nearly $12 million, inclusive of $3 million received into the Clean Fuels Fund as cost-share for one contract executed in this reporting period. Total project costs are nearly $134 million. These projects address a wide range of issues with a diverse technology mix including near-term emissions reductions and long-term planning efforts. The report not only provides information on outside funding received into the Clean Fuels Fund as cost-share for contracts executed in this period (summarized in Table 3, page 34), but also funds awarded to the South Coast AQMD for projects that fall within the scope of the Clean Fuels Program's RD^3 efforts but may have been recognized (received) into another special revenue fund for financial tracking purposes (nearly $20 million in 2019, see Table 4, page 34). For example, in 2018, the South Coast AQMD was awarded nearly $45 million by CARB as project partner with Volvo on their Low Impact Green Heavy Transportation Solutions (LIGHTS) Project, which has an overall project cost of over $100 million and

will advance and hopefully commercialize electric truck technology. In the 2018 Annual Report reflected this $45 million award. In CY 2019, the contract with Volvo was executed so it's reflected in Project Summaries (which begin on page 35); in fact, given its significance, the Volvo LIGHTS Project is included in project highlights in this Annual Report (page 18). 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 2020 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 (especially large-scale refueling facilities);
- Engine Systems/Technologies (emphasizing alternative and renewable fuels for truck and rail applications);
- Electric/Hybrid Vehicle Technologies and Related Infrastructure (emphasizing electric and hybrid electric trucks and container transport technologies with zero emission operation);
- Fueling Infrastructure and Deployment (predominantly natural gas and renewable fuels);
- Stationary Clean Fuels Technologies (including microgrids and renewables);
- Fuel and Emissions Studies;
- Emissions Control Technologies;
- Health Impacts Studies; and
- Technology Assessment and Transfer/Outreach.

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

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

1. Zero, near-zero and low emission technologies needed to achieve clean air standards in the Basin; and
2. Available funding to support technology development within the constraints imposed by that funding.

The South Coast AQMD strives to maintain a flexible program to address dynamically evolving technologies and the latest progress in the state of the technology while balancing the needs in the various technology sectors with technology readiness, emissions reduction potential and cofunding opportunities. Although the South Coast AQMD program is significant, national and international activities affect the direction of technology trends. As a result, the South Coast AQMD program must be flexible to leverage and accommodate these changes in state, national and international priorities. Nonetheless, while the state and federal governments have continued to turn a great deal of their attention to climate change, South Coast AQMD has remained committed to developing, demonstrating and commercializing zero and near-zero emission technologies. Fortunately, many, if not the majority,

of technology sectors that address our need for NOx reductions also garner greenhouse gas (GHG) reductions. Due to these "co-benefits," the South Coast AQMD has been successful in partnering with the state and federal government. Even with the leveraged funds, the challenge for the South Coast AQMD remains the need to identify project or technology opportunities in which its available funding can make a difference in achieving progressively cleaner air in the Basin.

To achieve this, the South Coast AQMD employs various outreach and networking activities as well as evaluates new ways to expand these activities. These activities range from close involvement with state and federal collaboratives, partnerships and industrial coalitions, to the issuance of Program Opportunity Notices (PONs) to solicit project ideas and concepts as well as the issuance of Requests for Information to determine the state of various technologies and the development and commercialization challenges faced by those technologies. Additionally, in the absence of PONs, unsolicited proposals from OEMs and other clean fuel technology developers are accepted and reviewed.

Historically, mobile source projects have targeted low-emission developments in automobiles, transit buses, medium- and heavy-duty trucks and non-road applications. These vehicle-related efforts have focused on advancements in engine design, electric power-trains and energy storage/conversion devices (e.g., fuel cells and batteries); and implementation of clean fuels (e.g., natural gas, propane and hydrogen) including their infrastructure development. Stationary source projects have included a wide array of advanced low NOx technologies and clean energy alternatives such as fuel cells, solar power and other renewable and waste energy systems. The focus 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 NOx emissions in this region. However, while mobile sources include both on- and off-road vehicles as well as aircraft and ships, only the federal government has the authority to regulate emissions from aircraft and ships. The 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 RD^3 projects to include marine and ocean-going vessels. Utilizing mitigation funds, funding from San Pedro Bay ports and industry partners, RD^3 projects to demonstrate emissions reduction technology in the marine sector where NOx emissions are increasing are being pursued.

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

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

Specific projects are selected for cofunding from competitive solicitations, cooperative agency agreements and unsolicited proposals. Criteria considered in project selection include emissions reduction potential, technological innovation, potential to reduce costs and improve cost effectiveness, contractor experience and capabilities, overall environmental impacts or benefits, commercialization and business development potential, cost-sharing and cost-sharing partners, and consistency with

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

Hydrogen/Mobile Fuel Cell Technologies and Infrastructure

Toyota and Hyundai commercialized light-duty fuel cell vehicles in 2015. Honda started delivering their Fuel Cell Clarity in 2016, and others have plans to commercialize their own soon. As automakers continue to collaborate on development efforts (e.g., Honda and GM) and commercialize fuel cell vehicles, in the interim plug-in hybrid technology could help enable fuel cells by using larger capacity batteries until fuel cell components mature. For example, Mercedes-Benz announced limited production of a plug-in fuel cell model GLC for 2018 in Germany, with U.S. availability to follow. However, the greatest challenge for the viability of fuel cell vehicles remains the installation and operations of hydrogen fueling stations. AB 8 requires the CEC to allocate $20 million annually from the Alternative and Renewable Fuel and Vehicle Technology Program until there are at least 100 publicly accessible hydrogen stations in operation in California. Of the 65 stations funded by CEC and CARB by the end of 2019, partially funded by South Coast AQMD for those in our region, there is one legacy and 39 retail operational in California, but most if not all 65 are expected to be operational by the end of 2020 with capacity for more than 10,000 fuel cell vehicles. AB 8 also requires CARB to annually assess current and future fuel cell vehicles (FCVs) and hydrogen stations in the marketplace. *The Joint Agency Staff Report on Assembly Bill 8: 2019 Annual Assessment of Time and Cost Needed to Attain 100 Hydrogen Refueling Stations in California*[3] released in December 2019 covering 2019 findings states that there were 6,826 fuel cell vehicles registered in California by October 2019. However, CARB's 2017 Annual Evaluation projects 13,400 fuel cell electric vehicles (FCEVs) in California by 2020 and 37,400 by the end of 2023. Additionally, the California Fuel Cell Partnership's (CaFCP) *The California Fuel Cell Revolution, A Vision For Advancing Economic, Social, and Environmental Priorities* (Vision 2030) includes the need for up to 1,000 refueling stations statewide as well as the need to expand the market with heavy-duty technologies and their infrastructure.

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

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

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

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 greenhouse gases (GHGs) and criteria emissions. While MATES IV found a dramatic decrease in ambient levels of diesel PM and other air toxics, diesel PM is still the major driver of air toxics health risks. Clearly, significant emission reductions will be required from mobile sources, especially from the heavy-duty sector, to attain the federal clean air standards. Even with the announced rollout of zero emission trucks beginning in 2021 by Volvo and Daimler, it is anticipated that it would take ten years for a large enough deployment of those trucks to have an impact on air quality.

The use of alternative fuels in heavy-duty vehicles can provide significant reductions in NOx and particulate emissions. The current NOx emissions standard for heavy-duty engines is 0.2 g/bhp- hr. The South Coast AQMD, along with various local, state and federal agencies, continues to support the development and demonstration of alternative-fueled low emission heavy-duty engine technologies, using natural gas, renewable natural gas or hydrogen, renewable diesel and potentially other renewable or waste stream fuels, for applications in heavy-duty trucks, transit and school buses, rail operations, and refuse collection and delivery vehicles to meet future federal emission standards. South Coast AQMD is supporting three contracts to convert the model year 2021 new Ford medium-duty gasoline engine to near-zero NOx level by using natural gas and propane.

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

Electric/Hybrid Vehicle Technologies and Infrastructure

There has been an increased level of activity and attention on electric and hybrid vehicles due to a confluence of factors, including the highly successful commercial introductions of hybrid light-duty passenger vehicles and more recently plug-in electric vehicles (PEVs) by almost all major automakers and increased public attention on global warming, as well as several Executive Orders issued by Former Governor Brown, such as his January 26, 2018 order, calling for 5 million ZEVs by 2030.

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

However, technology transfer to the medium- and heavy-duty applications is just beginning, especially in goods movement demonstrations in this region. As with hydrogen and fuel cell technologies, South Coast AQMD is actively pursuing research, development and demonstration projects for medium- and heavy-duty battery electric vehicles and their commercialization. South Coast AQMD is administering the DOE funded ZECT project to develop and demonstrate battery electric and plug-in hybrid drayage trucks: four battery electric trucks from TransPower, two battery electric trucks from US Hybrid, two

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

Lastly, the same electric and hybrid technology transfer is beginning to appear on off-road and marine applications. South Coast AQMD is currently in the process of demonstrating a battery electric excavator and wheel loader with Volvo Construction Equipment as part of a FY 18 U.S. EPA Targeted Airshed Grant award. At the same time, a new electric drive, diesel hybrid tugboat is in the process of construction and demonstration by fleet operator Harley Marine Services with cofunding from Port of Long Beach and CARB. These pilot demonstration projects are key to additional emission reductions from the off-road 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 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. 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 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. Another ongoing demonstration project 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 selective catalytic reduction (SCR) NOx emissions or lower. SCR requires the injection of ammonia or urea that is reacted over a catalyst bed to reduce the NOx 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 NOx 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 NOx and PM2.5 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 South Coast Air Basin. This study, expected to be completed in 2020, is aimed at understanding the activity pattern of different vocations, understanding the real-world emissions emitted from different technologies. Another study launched in 2020 will evaluate the emissions produced using alternative diesel blends in off-road heavy-duty engines.

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) 617[4], 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 CARB's Low Carbon Transportation Heavy-Duty Project Showcase in March, the SoCal Work Truck Show in October, and Riverside and Santa Monica AltCar events in October and November. 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 13 for a description of the technology assessment and transfer contracts executed in CY 2019 as well as a listing of the 23 conferences, workshops and events funded in CY 2019. Throughout the year, staff also participates in various programmatic outreach for the various incentive programs implemented by TAO, including the Carl Moyer Program, Proposition 1B-Goods Movement, Volkswagen Mitigation Program, Replace Your Ride, a U.S. EPA Airshed-funded Commercial Electric Lawn and Garden Incentive and Exchange Program, and residential lawn mower and EV charger rebate programs, to name a few.

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

[This Page Intentionally Left Blank]

CLEAN FUELS PROGRAM
Barriers, Scope and Impact

Overcoming Barriers

Commercialization and implementation of advanced technologies come with a variety of challenges and barriers. A combination of real-world demonstrations, education, outreach and regulatory impetus and incentives is necessary to bring new, clean technologies to market. To reap the maximum emissions benefits from any technology, widespread deployment and user acceptance must occur. The product manufacturers must overcome technical and market barriers to ensure a competitive and sustainable business. Barriers include project-specific issues as well as general technology concerns.

Technology Implementation Barriers

- Viable commercialization path
- Technology price/performance parity with convention technology
- Consumer acceptance
- Fuel availability/convenience issues
- Certification, safety and regulatory barriers
- Quantifying emissions benefits
- Sustainability of market and technology

Project-Specific Issues

- Identifying a committed demonstration site
- Overall project cost and cost-share using public monies
- Securing the fuel
- Identifying and resolving real and perceived safety issues
- Quantifying the actual emissions benefits
- Viability of the technology provider

Other barriers include reduced or shrinking research budgets, infrastructure and energy uncertainties and risks, sensitivity to multi-media environmental impacts and the need to find balance between environmental needs and economic constraints. The South Coast AQMD seeks to address these barriers by establishing relationships through unique public-private partnerships with key stakeholders; e.g., industry, end-users and other government agencies with a stake in developing clean technologies. Partnerships that involve all the key stakeholders have become essential to address these challenges in bringing advanced technologies from development to commercialization.

Each of these stakeholders and partners contributes more than just funding. Industry, for example, can contribute technology production expertise as well as the experience required for compatibility with process operations. Academic and research institutes bring state-of-the- technology knowledge and testing proficiency. Governmental and regulatory agencies can provide guidance in identifying sources with the greatest potential for emissions reduction, assistance in permitting and compliance issues, coordinating of infrastructure needs and facilitation of standards setting and educational outreach. Often, there is considerable synergy in developing technologies that address multiple goals of public and private bodies regarding the environment, energy and transportation.

Scope and Benefits of the Clean Fuels Program

Since the time needed to overcome barriers can be long and the costs high, both manufacturers and end-users tend to be discouraged from considering advanced technologies. The Clean Fuels Program addresses these needs by cofunding research, development, demonstration and deployment projects to share the risk of emerging technologies with their developers and eventual users.

Figure 3 below provides a conceptual design of the wide scope of the Clean Fuels Program. As mentioned in the Core Technologies section, various stages of technology projects are funded not only to provide a portfolio of emissions technology choices but to achieve emission reduction benefits in the nearer as well as over the longer term. The South Coast AQMD Clean Fuels Program funds projects in the Technology Readiness Level ranging between 3-8.

Figure 3: Stages of Clean Fuels Program Projects

Due to the nature of these advanced technology research, development, demonstration and deployment (RD^3) projects, the benefits are difficult to quantify since their full emissions reduction potential may not be realized until sometime in the future, or perhaps not at all if displaced by superior technologies. Nevertheless, a good indication of the impact and benefits of the Clean Fuels Program overall is provided by this selective list of sponsored projects that have resulted in commercialized products or helped to advance the state-of-the-technology.

- Near-zero NOx Engine Development for Heavy-Duty Vehicles
  - Cummins Westport: low-NOx natural gas ISL G 8.9L and 12L engines (0.2 & 0.02 g/bhp-hr);
  - SwRI project to develop a near-zero NOx Heavy-duty diesel engine; and
  - Kenworth CNG Hybrid Electric Drayage Truck project.
- Fuel Cell Development and Demonstrations
  - Kenworth Fuel Cell Range Extended Electric Drayage Truck project;
  - New Flyer Fuel Cell Transit Bus and Air Products Liquid Hydrogen Station at OCTA;
  - Retail light-duty passenger fuel cell vehicles (Toyota Mirai, Hyundai 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; and
  - Fuel cell Class 8 trucks under Zero Emission Cargo Transport (ZECT) II Program.
- Electric and Hybrid Electric Vehicle Development and Demonstrations
  - Daimler Class 6 and 8 battery electric trucks with Penske and NFI;
  - Volvo Class 8 battery electric trucks with TEC Fontana, DHE, and NFI;
  - Hybrid electric delivery trucks with NREL, FedEx and UPS;
  - Plug-in hybrid work truck with Odyne Systems;
  - BYD battery-electric transit bus and trucks (yard hostlers and drayage);
  - LA Metro battery electric buses;
  - Blue Bird Electric School Bus with Vehicle to Grid (V2G) capability;
  - TransPower Electric school buses, including V2G capability;
  - TransPower/US Hybrid battery electric heavy-duty truck and yard hostlers; and
  - Peterbilt battery-electric drayage trucks.

- Aftertreatment Technologies for Heavy-Duty Vehicles
  - Johnson Matthey and Engelhard trap demonstrations on buses and construction equipment;
  - Johnson Matthey SCRT and SCCRT NOx and PM reduction control devices on heavy-duty on-road trucks; and
  - Southwest Research Institute 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 RD^3 process.

Strategy and Impact

In addition to the feedback and input detailed in Program Review (page 2), 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 2019 are provided in the next section of this report. It is noteworthy that most of the projects are cosponsored by various funding organizations and include the active involvement of original equipment manufacturers (OEMs). Such partnerships are essential to address commercialization barriers and to help expedite the implementation of advanced low emission technologies. Table 1 below lists the major funding agency partners and manufacturers actively involved in South Coast AQMD projects for this reporting period. It is important to note that, although not listed, there are many other technology developers, small manufacturers and project participants who make important contributions critical to the success of the South Coast AQMD program. These partners are identified in the more detailed 2019 Project Summaries by Core Technologies (beginning page 35) contained within this report, as well as Table 4 (page 34) which lists

federal, state and local funding awarded to the South Coast AQMD in CY 2019 for RD^3 projects (which will likely result in executed project contracts in 2020).

Table 1: South Coast AQMD Major Funding Partners in CY 2019

Research Funding Organizations	Major Manufacturers/Technology Providers
California Air Resources Board	Cummins Inc.
California Energy Commission	Daimler Trucks North America
Department of Energy	Long Beach Container Terminal
National Renewable Energy Laboratory	Mercedes-Benz USA
U.S. Environmental Protection Agency	Ports of Los Angeles & Long Beach
Local Entities & Utilities	San Pedro Bay Ports
MSRC/AB 2766 Discretionary Program	SSA Marine Terminal
San Joaquin APCD	Volvo Technology of America LLC
Southern California Gas Company	

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 2019. 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 2019 include: (a) Demonstrate Zero Emission Trucks and EV Infrastructure (Volvo LIGHTS Project); (b) Demonstrate Zero Emission Cargo Handling Equipment; (c) Continued Development of Natural Gas Engine Emissions and Efficiency Improvements; and (d) Development of Fuel Cell-Gas Turbine Hybrid Technology.

Demonstrate Zero Emission Trucks and EV Infrastructure

Volvo Trucks North America (Volvo), the second largest manufacturer of heavy-duty trucks, proposed a ground-breaking $91 million project called Volvo Low Impact Green Heavy Transport Solutions (LIGHTS). South Coast AQMD applied for a CARB Low Carbon Transportation grant and was awarded $44.8 million to administer the project, with an additional $4 million cost-share from South Coast AQMD through the Clean Fuels Program. Volvo and its partners provided the remaining $42 million. South Coast AQMD previously worked with Volvo on a DOE-funded project to develop a prototype Class 8 plug-in hybrid electric diesel truck with significantly reduced NOx emissions. Volvo continued to refine the plug-in hybrid electric diesel truck under an earlier CARB-funded GGRF Zero Emission Drayage Truck (ZEDT) project, with Coordinated Intelligent Transportation System (C-ITS) Eco-Drive software and geofencing capabilities to enable the truck to optimize NOx reductions and drive in zero emissions mode while operating in disadvantaged/environmental justice (EJ) communities. The Volvo LIGHTS project is Volvo's first endeavor into pilot and production Class 8 battery electric trucks in North America, with the first of these trucks being demonstrated at freight handling facilities in the Inland Empire.

While the environmental benefits of electric drive vehicles are widely accepted, the cost and durability of the technology as well as installation of charging infrastructure to support these vehicles, needs to be carefully analyzed and considered. There is also a need for regulatory agencies and OEMs to collect and analyze operational data on vehicles and infrastructure to evaluate the extent to which vehicle and infrastructure technologies are meeting the operational needs of fleets.

Under the Volvo LIGHTS project, Volvo will develop 8 pilot and 15 production level Class 8 battery-electric heavy-duty trucks and demonstrate them at Dependable Highway Express (DHE) in Ontario and NFI Industries in Chino. These trucks will be utilized in real-world commercial fleet operations in

Figure 4: Overview of Volvo LIGHTS Project

and around EJ communities and the Ports within the Basin. In addition, the Volvo LIGHTS project will deploy 29 battery electric forklifts, yard tractors and EVs, 59 Level 2 and DC fast chargers, and 1.8 MWh of solar. The Volvo LIGHTS project is expected to result in 3.57 tons/year of weighted emission reductions in NOx, ROG, and PM, and 3,020 tons/year of GHG reductions. Over the ten-year expected lifetime of the vehicles, this equates to 35.7 tons per year of NOx, ROG, and PM emission reductions, and 30,200 tons of GHG reductions. The project partners and main components of the Volvo LIGHTS project are in Figure 4 above.

The University of California Riverside (UCR/CE-CERT) and CALSTART Inc., contracts with which will be executed in 2020, will gather and analyze data from the trucks, forklifts, yard tractors, support electric vehicles, charging infrastructure and solar to evaluate performance under specific duty-cycles. Three configurations of the trucks will be produced including rigid trucks and 60,000 to 80,000-pound tractors. Volvo will utilize data from the pilot vehicles to inform development of the production vehicles. Volvo deployed two rigid trucks and three tractors to California in December 2019 and is extensively testing these vehicles prior to deployment at DHE and NFI in 2020.

The trucks have an all-electric range of 100-150 miles, with two electric drive motors with 370 kW maximum power and a two-speed transmission. The trucks have a 6x4 axle configuration, and the battery system provides 320 kWh of usable power. The Class 8 trucks are capable of utilizing 50 kW and 150 kW DC fast charging with CCS Type 2 connectors, with the production trucks having additional AC on-board charging capability to provide flexible charging options such as overnight charging for fleets. Figure 5 shows the Volvo LIGHTS trucks undergoing testing in Southern California.

Figure 5: Volvo LIGHTS Trucks in California

Facility upgrades will also take place at DHE and NFI fleet locations, as well as the TEC Fontana and La Mirada Volvo dealerships, to fully support the trucks. Two 50 kW DC fast chargers have already been installed at TEC Fontana (see Figure 6 below) and installation for the 150 kW DC fast charger will be completed in February 2020. Volvo is also hosting a technology showcase in February 2020 at TEC Fontana and the Fontana Speedway with a commercial fleet ride-and-drive opportunity for funding agencies, fleets and the media to highlight the technologies on the trucks, charging infrastructure, and service and support of these trucks. Installation of charging infrastructure, solar, and facility upgrades at DHE and NFI will take place later in 2020. In anticipation of charging infrastructure, these fleets have already ordered or received battery electric forklifts, yard tractors and support EVs.

The Volvo LIGHTS project showcases an opportunity for two major fleets in the Inland Empire to utilize an entirely zero emissions freight handling drayage operation throughout the goods movement supply chain, with Class 8 battery electric trucks handling drayage operations to and from the Ports of Los Angeles and Long Beach, to staging by battery electric yard tractors and unpacking by battery electric forklifts. When cargo is repacked, it will be delivered locally or regionally using battery electric trucks. The entire life cycle of zero emissions freight handling operations will be further enhanced

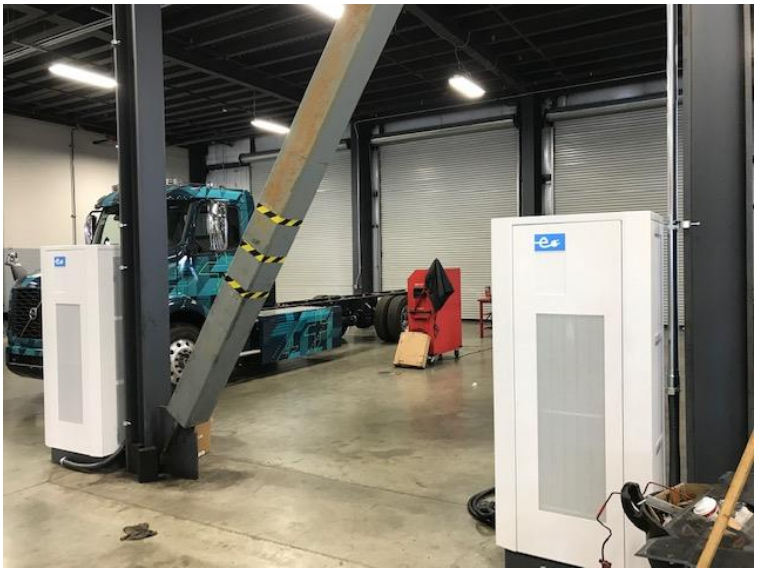


Figure 6: Two 50 kW DC Fast Chargers at TEC Fontana

by facility upgrades, such as electrical infrastructure and energy efficiency to enable charging infrastructure, solar, energy storage, and smart charging and energy management software to minimize grid impacts and costs to fleets. DHE and NFI are full service logistics providers handling drayage, third-party logistics, and warehousing and distribution operations. These fleets will serve as models for other fleets in how to effectively scale up electrification of their operations.

Demonstrate Zero Emission Cargo Handling Equipment

In the last couple of years, the South Coast AQMD has provided cofunding on several zero emission cargo handling demonstration projects at the Ports of Los Angeles (POLA) and Long Beach (POLB) through its Clean Fuels Program. South Coast AQMD provided $1 million in Clean Fuels funding for POLA's Zero Emission Freight Shore-to-Store Project (S2S), which also received $41.1 million in funding from CARB's ZANZEFF Program for a total project cost of $82.5 million. The S2S project includes Toyota, Kenworth and Shell which are developing and demonstrating ten Kenworth zero emission Class 8 fuel cell electric trucks and two heavy-duty hydrogen stations in Wilmington and Ontario. South Coast AQMD also provided $500,000 in cost-share for POLB's Sustainable Terminals Accelerating Regional Transformation (START) Project, which also received $50 million in funding from CARB's ZANZEFF Program for a total project cost of $103 million. The START Project is developing and demonstrating 33 battery electric yard tractors, one battery electric top handler, six battery electric forklifts, 9 battery electric RTG cranes, five Class 8 battery electric yard trucks, and one electric drive tugboat at SSA Marine Terminal and Shippers Transport Express. These projects will be completed mid-2021 and should provide significant viability and performance information on battery electric and fuel cell electric technologies across multiple pieces of cargo handling equipment used by ports.

In 2019, the Clean Fuels Fund provided funding towards the "Commercialization of the Port of Long Beach Off-Road Technology" (C-PORT) Demonstration Project, which also received $5.3 million in CARB GGRF funding for a total project cost of $8.7 million. This is a follow-on to an earlier GGRF-funded project demonstrating battery electric and fuel cell electric cargo handling equipment at the Long Beach Container Terminal (LBCT) during which SSA Marine Terminal helped prove and resolve earlier issues in these technologies. The C-PORT Project will demonstrate three battery electric top handlers, one battery electric yard truck and one fuel cell yard truck to directly compare the performance of battery electric and fuel cell electric trucks in cargo handling operations. SSA Marine Terminals demonstrated two battery electric top handlers, while the LBCT demonstrated one battery electric top handler, one battery electric yard truck and one fuel cell electric yard truck in revenue service.

Figure 7: CPORT Project at LBCT & SSA Marine at POLB

The C-PORT Project is POLB's first demonstration of the Taylor/BYD battery electric top handlers. Taylor and BYD collaborated on design and production of the three top handlers with duty-cycle testing and UL safety certification. The battery electric top handlers have a 931-kWh battery pack and fast charge using 200 kW DC fast chargers, capable of operating for two 8-hour shifts. The top handlers will be demonstrated for a six-month period starting in February 2020. The project also features a Kalmar/TransPower battery electric yard truck with a 154-kWh battery pack, operating time of 6-21 hours, and a recharge time of less than 3 hours. The battery-electric yard truck also utilizes the 200 kW DC fast chargers installed for the battery electric top handlers. The Kalmar/TransPower battery electric yard truck started its demonstration in July 2019 and will continue to collect data for at least six months.

Figure 8: Taylor/BYD Battery Electric Top Handler

Lastly, the C-PORT project will demonstrate a China National Heavy-Duty Truck Group Company (CNHTC)/ Sinotruk fuel cell electric yard truck with a 56-kW fuel cell. The yard truck will be fueled by an Air Products HF-150 mobile hydrogen fueling platform with a capacity of 150 kg. Potential emission reductions for the five pieces of cargo handling equipment in the C-PORT Project are 0.69 tons/year of NOx, 0.159 tons/year of ROG, and 0.021 tons/year of PM10.

Figure 9: Kalmar/TransPower Battery-Electric Yard Truck

The C-PORT Project highlights some of the challenges underlying implementing zero emission technologies at the Ports for cargo handling operations. There is still a lack of standardization for heavy-duty charging infrastructure in terms of non-UL or Nationally Recognized Testing Laboratory (NRTL) approved chargers, connectors and cables. Although the CCS1 connector standard is the prevalent nationally recognized DC fast charging connector standard for North America, there are chargers that are manufactured elsewhere which come with connectors that are standard in other parts of the world, such as the GB/T connector for China or the CCS2 connector used in Europe. The non-standard chargers, connectors and cables for the battery-electric top handlers and yard truck required inspection and field certification by TUV North America to confirm compliance with relevant

Figure 10: CNHTC/LOOP Energy Fuel Cell Yard Truck

Figure 11: Battery-Electric Top Handler in Service

codes and standards and local municipal permitting requirements.

There were also some initial issues with the telematics system and failure of the power steering on the Kalmar/ TransPower battery electric yard truck that were later resolved. Additional coordination is required between Air Products and Sinotruk for the fuel cell yard truck to work with the hydrogen fueling infrastructure. Sinotruk is also arranging for a certified engineering assessment on collision testing for the hydrogen tank with a U.S. company to ensure compatibility of the tank with the fueling infrastructure. Also, there were design modifications required on the fuel cell electric yard truck to ensure the fifth wheel can operate without coming in to contact with the hydrogen fuel tank behind the cab.

Demonstration of the battery-electric yard tractors and the fuel cell yard truck will start in 2020, and the project is scheduled for completion in August 2020. Results from the cargo handling equipment and infrastructure will inform development of these technologies in the S2S and START projects.

Continued Development of Natural Gas Engine Emissions and Efficiency Improvements

The South Coast AQMD has been supporting rapid deployment of near-zero natural gas engines for both medium-duty and heavy-duty vehicles that have been commercialized since 2015 and supporting alternative fuel light-duty passenger vehicles since early 2000s. With nearly two decades of operational experience in the Basin, natural gas technology is well on its way towards full commercialization (achieving a Technology Readiness Level 9; see page Figure 3). However, there are ongoing concerns, such as those highlighted in the 2019 Feasibility Assessment for Drayage Trucks by Gladstein Neandross & Associates5, including the need for higher efficiency, more powerful natural gas engines.

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

[5] https://www.gladstein.org/gna_whitepapers/2018-feasibility-assessment-for-drayage-trucks/

One of those awards was to Cummins Inc., the largest U.S. manufacturer of medium- and heavy-duty natural gas engines. Cummins will address natural gas engine emissions and efficiency improvements by developing a natural gas specific Tumble Charge Motion based combustion design utilizing high tumble charge motion and cooled exhaust gas recirculation. Most heavy-duty natural gas engines, such as the Cummins ISX12N referenced as the baseline in Figure 12 below, were retrofitted from heavy-duty diesel engines rather than natural gas specific designs. The engine will be integrated on a global heavy-duty base engine platform, enabling up to 20 percent reduction in system costs. The technical targets of the project include demonstrating a ten percent improvement in cycle average and peak brake thermal efficiency over the commercially available product and maintaining 0.02 g/bhp-hr NOx capability, as shown in Figure 12 below. This project kicked off in fourth quarter 2019 and is expected to continue over a 40-month period.

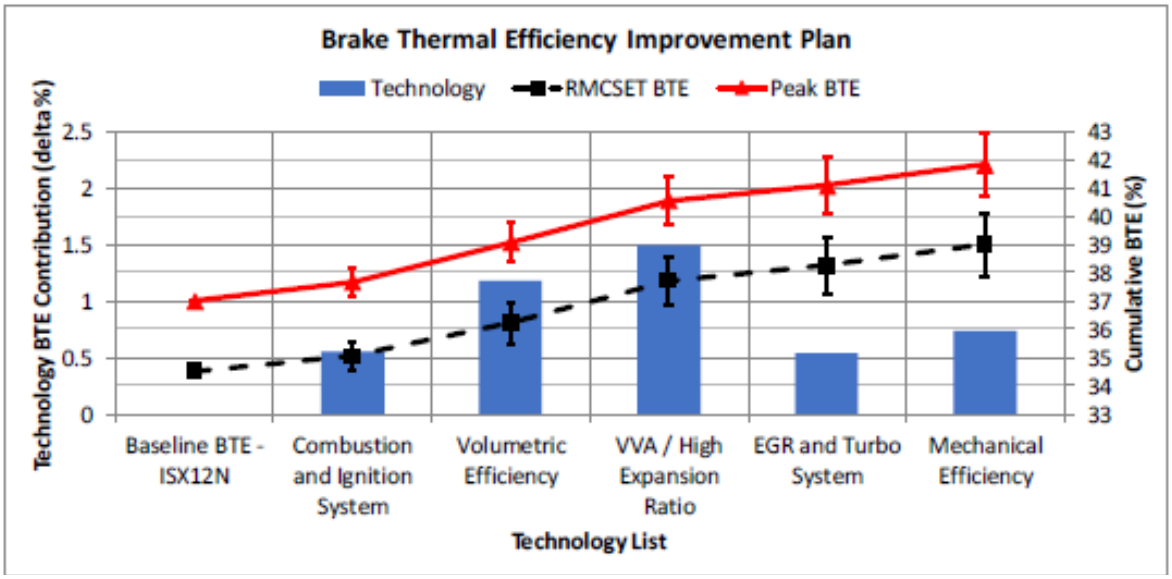


Figure 12: Projected Heavy-Duty Natural Gas Engine Efficiency Improvement Pathways

Two additional projects funded under the same solicitation will kick off in 2020, including development of CNG-electric hybrid systems for both medium- and heavy-duty applications. The future development will seek to increase the efficiency of the natural gas engines while maintaining 0.02 g/bhp-hr NOx capability. If successful, the projects will prove out that there are multiple technology pathways to reducing NOx while concurrently achieving reductions in fuel consumption and GHG emissions.

Development of Fuel Cell-Gas Turbine Hybrid Technology

The University of California Irvine's Advanced Power and Energy Program (UCI's APEP) is conducting a DOE-funded study to develop solid oxide fuel cell-gas turbine (SOFC-GT) hybrid technology. The goal of the project is to dramatically reduce the water requirement for operating on natural gas in two applications - distributed generation (~10 MW) and gasified coal and biomass central power generation (~100MW). A suitable fuel cell for these applications is the SOFC which may be fueled by natural gas, biogas or hydrogen. When the SOFC-GT system is integrated into a Brayton cycle, the hybrid technology achieves a high efficiency generation of electricity.

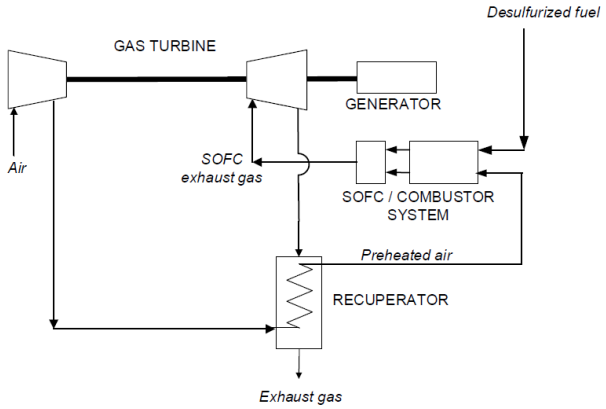


Figure 13: SOFC integrated system with a gas turbine

Operated on natural gas, the SOFC-GT hybrid has the potential for efficiencies approaching 75 percent. Due to the ultra-high efficiency of the SOFC-GT hybrid system, CO2 emissions are reduced significantly. UCI is interested in leveraging the DOE-funded study to expand the scope to include natural gas, biogas, mixtures of natural gas and biogas, and eventually renewable hydrogen applications in the 1-10 MW range for potential uses in off-road vehicles.

This project will develop an integration model to fully realize the potential of hybrid SOFC-GT systems in the 1-10 MW range fueled by natural gas, biogas and renewable hydrogen. The model will quantify thermal and environmental performances and economics of various alternate schemes. The 1-10 MW range is applicable for repowering locomotives with SOFC-GT power blocks, from switchers (~1MW) to long-haul locomotives (~5 MW). Similarly, ocean going vessels (OGVs) also fall into this power range. The potential for powering locomotives and OGVs powered by SOFC-GT technology will be addressed, along with the applications to the distributed generation market.

Smaller scale energy conversion devices, especially those at the distributed-scale, typically do not have the same level of emissions cleanup of equipment as larger sites, e.g., central-scale power plants. To avoid these emissions and their potential impact on air quality within the basin, it is important to understand how such devices need to be configured to take advantage of advanced technologies including fuel cells and renewable fuels. This research will directly contribute towards achieving South Coast AQMD goals, as well as achieving co-benefits to help meet GHG reduction targets in 2030 and 2050 by providing insight for the development/implementation of highly efficient and environmentally sensitive SOFC-GT energy conversion systems that complement intermittent renewable generation resources.

Figure 14: SOFC-GT system application--Locomotives & OGVs

Technology Deployment and Commercialization

One function of the Clean Fuels Program is to help expedite the deployment and commercialization of zero, near-zero and low emission technologies and fuels needed to meet the requirements of the AQMP control measures. In many cases, new technologies, although considered "commercially available," require assistance to fully demonstrate the technical viability to end-users and decision-makers.

It is important to note here that South Coast AQMD's Technology Advancement Office (TAO) administers not only the Clean Fuels Program but also the Carl Moyer Program (and other significant incentive programs, such as Proposition 1B-Goods Movement and the Community Air Protection Program). These two programs produce a unique synergy, with the Carl Moyer Program providing the necessary incentives to push market penetration and commercialization of zero and near-zero emission technologies developed and demonstrated by the Clean Fuels Program. This synergy enables the South

Coast AQMD to act as a leader in both technology development and commercialization efforts targeting reduction of criteria pollutants and GHG reduction co-benefits.

This report, however, is required to detail the accomplishments and achievements of the Clean Fuels Program. Two examples of such projects launched during CY 2019 include: (1) Battery-Electric Shuttle Bus Replacement Project; and (2) Expansion of Hydrogen Fueling Station for Cars and Buses. In January 2018, U.S. EPA notified the South Coast AQMD that two awards had been approved under a FY 17 Targeted Airshed Grant solicitation in the amount of $3,184,875 to replace diesel and gasoline airport shuttle buses with zero emission battery-electric buses.

Battery-Electric Shuttle Bus Replacement Project

Due to projected increases in airline passenger transportation and expansion of operations at various commercial airports, significant increases in emissions of ozone precursors, toxic air contaminants and GHGs were anticipated, particularly in EJ communities adjacent to the airports. In addition to aircraft emissions, indirect airport activities, such as passenger transportation to and from the airport, are one of the major emission sources with adverse impact on air quality and public health. Airport shuttle buses include buses that transport passengers to and from car parking lots and airport terminals as well as those that transport passengers to airport car rental facilities. The emissions in this source category are expected to increase significantly with the projected increase in passenger aviation activities.

The South Coast AQMD Board has directed staff to develop proposed voluntary and regulatory measures to reduce emissions from the ports, warehouses, airports, rail yards and new development. For the region's five major commercial airports, staff will develop voluntary agreements with each airport to develop its own Clean Air Action Plan (CAAP). The CAAPs will aim to reduce emissions from non-aircraft sources such as vehicles and ground service equipment.

The electrification of these airport shuttles will provide significant benefits in emission reductions and public health for the EJ communities around the airports. Also, successful demonstration of these shuttles will prove its performance and reliability and will lead to larger-scale deployment of the technology at the airports and beyond.

Figure 15: Phoenix Motorcars ZEUS 400 Shuttle Bus

This project is to replace 29 diesel and gasoline airport shuttle buses with new battery-electric shuttle buses manufactured by Phoenix Motorcars, an electric vehicle manufacturer. The new electric buses are equipped with state-of-the-art electric drivetrain technology that delivers up to 100 miles range on a single charge. Combined with dual charging capability, the buses are well suited to meet the requirements of most fleets operating on a fixed route within proximity of the airport. Phoenix Motorcars is committed to providing significant cost-share and securing additional funds from CARB's Hybrid and Zero Emission Truck and Bus Voucher Incentive Project (HVIP) to cofund the shuttle bus replacement project.

The shuttle bus fleet operators, including offsite airport parking companies, airport employee shuttle service providers, hotels and rental car companies, are operating substantial numbers of buses continuously during their 24-hour operations. Electrifying these shuttle buses is an ideal starting point to the adoption of emerging technologies, as their operations are predictable over fixed routes, with

limited daily mileage eliminating range anxiety. Airport shuttle buses operate in highly congested environments and idle frequently, leading to very high fuel usage and emissions. On average, an equivalent conventional-fueled shuttle bus returns a fuel efficiency of six miles per gallon. Completely removing the emissions from the operations and by using no fuel, fleet operators can significantly improve the energy efficiency of their operations. Fleet operators will also benefit from significantly lower operational costs due to lower maintenance and fuel costs. Drivers and employees of fleet operators also directly benefit from zero emissions work environments.

The electrification of airport shuttle buses will serve as a catalyst to the adoption of zero emission electric drivetrain technologies amongst medium and heavy-duty fleets. Furthermore, the project will serve as a demonstration of the capabilities and readiness of electric shuttle buses as a commercially viable and economically beneficial alternative. In the medium to long term, the successful deployment of electric shuttle buses through this project will also serve as a model for other large airports in the U.S. to follow and significantly low exposure for disadvantaged communities typically located adjacent to airports.

Expansion of Hydrogen Fueling Station for Cars and Buses

The University of California Irvine (UCI) station has been in operation since January 2003, supporting research and fuel cell vehicle development. In 2007, it became the first dual-pressure station operating in the U.S. with public access for fuel cell vehicle fueling. The station has been upgraded over the years, opening as a retail station for fueling passenger cars in November 2015 and refueling buses at night, including fleet buses for the Orange County Transit Authority (OCTA). Customer demand continues to increase beyond its design throughput capacity, resulting in an urgent need for expansion of capacity and fueling positions. Shifting to liquid hydrogen deliveries will strengthen supply chains, potentially reducing the price of dispensed hydrogen.

The UCI hydrogen station expansion project provides a unique public-private partnership opportunity to enable ongoing research on a larger capacity retail hydrogen station serving retail and transit customers. UCI will expand their hydrogen fueling station from the current capacity of 180 kilograms per day (kg/day) of delivered gaseous hydrogen to more than 800 kg/day of delivered liquid hydrogen and from one to four fueling positions, with both 350 bar and 700 bar hydrogen. On-site storage will also increase, further strengthening the hydrogen supply chain, and limiting impacts to the consumers. Delivered hydrogen is expected to be at least 33 percent renewable, in compliance with SB 1505 requirements.

In addition to serving more light-duty vehicles, buses will continue to be scheduled for fueling at night to minimize impact on light-duty customers. Expansion of the station will enable UCI to increase the number of fuel cell buses serving the campus, as well as provide support, if needed, for the increased number of fuel cell buses planned for deployment by OCTA, leading to a more robust hydrogen fueling network. This station will provide an excellent example for larger station designs needed to reduce costs while expanding throughput to reach California's goals of 200 stations by 2025, and the CaFCP Vision 2030 for 1,000 stations in California to support one million vehicles.

As stations grow, continued public research is needed to evaluate multiple aspects. Fueling protocols, dispenser design and station throughput and reliability are just some examples that can be evaluated by UCI. UCI intends to report at least three years of operating data through the National Renewable Energy Laboratory.

UCI has been and continues to be instrumental in hydrogen related research for more than two decades. The National Fuel Cell Research Center (NFCRC), located at UCI, was dedicated in 1998 by DOE and CEC to: 1) accelerate the development and deployment of fuel cell technology; 2) enable the stationary and mobile fuel cell market; 3) address market hurdles; 4) convene government agencies, businesses and academia to develop effective public-private alliances, and 5) provide leadership in the preparation of educational materials and programs to help develop the national work force in fuel cell technology. The NFCRC focuses on both mobile and stationary fuel cells, the development of a hydrogen fueling infrastructure, and the interface between stationary fuel cell technology, transportation and the emerging hydrogen economy. In fact, in November 2019, to assist the NFCRC at UCI in continuing these efforts, the South Coast AQMD established an $625,000 endowment for the NFCRC to support graduate students studying emerging issues and the latest research related to air quality and climate change using funds in a special settlement fund.

Figure 16: Existing Dispenser Installed November 2015

UCI's station upgrade continues to push technology, design and cooperation to deploy increasing numbers of fuel cell cars and buses and further study issues related to co-locating hydrogen fueling for light-, medium- and heavy-duty vehicles and larger volume stations supported by increasing liquid hydrogen storage. This expansion also provides continued opportunity for students to experience the deployment of advanced technology.

CLEAN FUELS PROGRAM
2019 Funding & Financial Summary

The South Coast AQMD Clean Fuels Program supports clean fuels and technologies that appear to offer the most promise in reducing emissions, promoting energy diversity, and in the long-term, providing cost-effective alternatives to current technologies. In order to address the wide variety of pollution sources in the Basin and the need for reductions now and in the future, using revenue from a $1 motor vehicle registration fee (see Program Funding on page 5), the South Coast AQMD seeks to fund a wide variety of projects to establish a diversified technology portfolio to proliferate choices with the potential for different commercial maturity timing. Given the evolving nature of technology and changing market conditions, such a representation is only a "snapshot-in-time," as reflected by the projects approved by the South Coast AQMD Board.

As projects are approved by the South Coast AQMD Governing Board and executed into contracts throughout the year, the finances may change to reflect updated information provided during the contract negotiation process. As such, the following represents the status of the Clean Fuels Fund as of December 31, 2019.

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, 2019, a total of 72 contracts/agreements, projects or studies that support clean fuels were executed or amended (adding dollars), as shown in Table 2 (page 32). 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 17 (page 30). 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 2019 reporting period are shown below with the total projected project costs:

- South Coast AQMD Clean Fuels Fund Contribution $11,870,196
- Total Cost of Clean Fuels Projects $133,738,963

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 2019-20 Budget on May 3, 2019, it included $1 million from Clean Fuels recognized in TAO's budget for technical assistance, workshops, conferences, cosponsorships and outreach activities, as well as postage, supplies and miscellaneous costs; another $285,000 is transferred from the Clean Fuels Fund to Capital Outlays for alternative fuel vehicle purchases for TAO's Alternative Fuel Demonstration Program as well as supporting vehicle and energy infrastructure. Only the funds committed by December 31, 2019, are included within this report. Any portion of the Clean Fuels Funds not spent by the end of Fiscal Year 2019-20 ending June 30, 2020, 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 2019 totaling $3,122,426 is listed within Table 3 (page 34). This $3.12 million was provided from a U.S. EPA Targeted Airshed Grant for battery-electric shuttle bus replacements.

For Clean Fuels executed and amended contracts, projects and studies in 2019, the average South Coast AQMD contribution is approximately 7 percent of the total cost of the projects, identifying that each dollar from the South Coast AQMD was leveraged with more than $14 of outside investment. The typical historical leverage amount is $4 for every $1 of South Coast AQMD Clean Fuels funds, but from 2016 to 2019 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 2019, the distribution of funds for South Coast AQMD executed contracts, purchases and contract amendments with additional funding for the Clean Fuels Program totaling approximately $11.9 million are shown in the figure below.

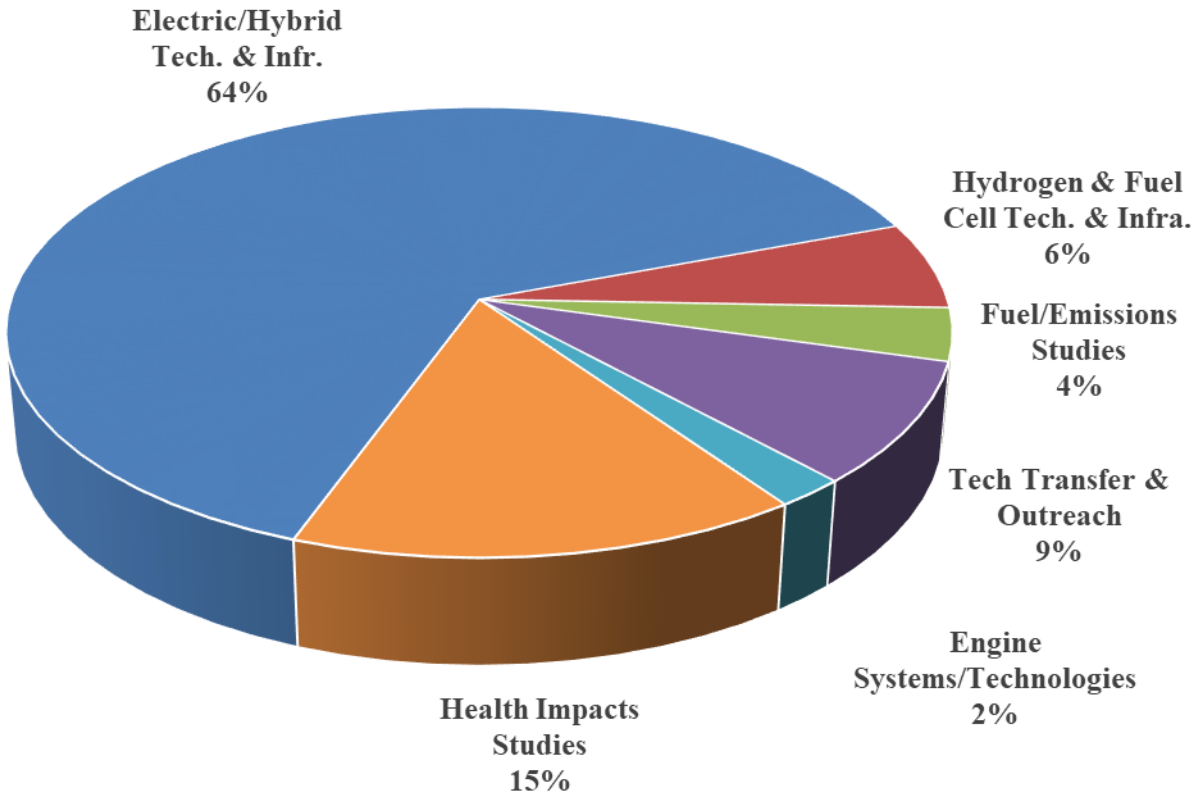


Figure 17: Distribution of Funds for Executed Clean Fuels Projects CY 2019 ($11.9M)

Additionally, the South Coast AQMD continued to seek funding opportunities in the 2018-2019 timeframe and was awarded an additional $19.9 million in CY 2019 for RD[3] projects. Table 4 (page 34).

As of January 1, 2020, there were 128 open Clean Fuels Fund contracts. Appendix B lists these contracts by core technology.

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, 2019, 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 72 new and continuing contracts/agreements, projects and studies that received South Coast AQMD funding in CY 2019 are summarized in Table 2 (beginning on the next page), together with the funding authorized by the South Coast AQMD and by the collaborating project partners.

Table 2: Contracts Executed or Amended (w/$) between Jan. 1 & Dec. 31, 2019

Contract	Contractor	Project Title	Start Term	End Term	SCAQMD $	Project Total $
Hydrogen/Mobile Fuel Cell Technologies and Infrastructure						
19191	University of California Irvine	Develop Solid Oxide Fuel Cell and Gas Turbine Hybrid Technology	06/21/19	06/20/20	200,000	900,000
19248	Tustin Hyundai	Lease One 2019 Fuel Cell Hyundai Nexo for Three Years	03/07/19	03/06/22	25,193	25,193
20038	University of California Irvine	Expand Hydrogen Fueling Station for Cars and Buses	10/18/19	02/17/27	400,000	1,800,000
20088	Frontier Energy, Inc.	Participate in California Fuel Cell Partnership for Calendar Year 2019 and Provide Support for Regional Coordinator	01/01/19	12/31/19	120,000	1,300,000
Engine Systems/Technologies						
19439	Cummins Inc.	High Efficiency Natural Gas Medium- and Heavy-Duty Engine Development and Research	08/30/19	08/29/23	250,000	10,996,626
Electric/Hybrid Technologies and Infrastructure						
18397	Port of Long Beach	Demonstrate Zero Emission Cargo Handling Vehicles at Port of Long Beach	01/04/19	05/31/20	350,000	8,688,410
19166	Phoenix Cars LLC dba Phoenix Motorcars	Battery Electric Shuttle Bus Replacement Project	01/31/19	01/30/22	3,122,426	7,311,456
19278	Volvo Trucks North America	Demonstrate Zero Emission Trucks and EV Infrastructure through Volvo Low Impact Green Heavy Transport Solutions Project	04/24/19	04/23/22	4,000,000	91,246,900
19438	Puente Hills Hyundai	Lease Two 2019 Hyundai Kona Evs for Three Years	06/06/19	06/05/22	61,156	61,156
20054	Puente Hilly Hyundai	Lease One 2019 Hyundai Kona EV for Three Years	08/23/19	08/22/22	29,640	29,640
Various	Various	Disburse Donated Mercedes-Benz USA Electric Vehicle Chargers	01/10/19	04/19/22	0	0
Direct Pay	Clean Fuel Connection, Inc.	Installation of EV Charging Signage and One Station	02/01/19	08/31/19	4,440	4,440
Fuel/Emissions Studies						
19208	University of California Riverside/CE-CERT	Conduct Emissions Study on Use of Alternative Diesel Blends in Off-Road Heavy-Duty Engines	06/21/19	04/30/20	261,000	1,353,499

Table 2: Contracts Executed or Amended (w/$) between Jan. 1 & Dec. 31, 2019 (cont'd)

Contract	Contractor	Project Title	Start Term	End Term	SCAQMD $	Project Total $
Fuel/Emissions Studies (cont'd)						
19208	University of California Riverside/CE-CERT	Conduct Emissions Study on Use of Alternative Diesel Blends in Off-Road Heavy-Duty Engines	06/21/19	04/30/20	261,000	1,353,499
20058	University of California Riverside	Evaluate Meteorological Factors and Trends Contributing to Recent Poor Air Quality in Basin	08/23/19	08/23/20	188,798	188,798
Health Impacts Studies						
Fund Transfer	Various	Conduct Fifth Multiple Air Toxics Exposure Study (MATES V)	01/01/18	06/30/20	1,815,800	5,486,810
Technology Assessment and Transfer/Outreach						
12376	University of California Riverside/CE-CERT	Technical Assistance with Alternative Fuels, Biofuels, Emissions Testing and Zero-Emissions Transportation Technology	06/13/14	05/31/22	150,000	150,000
12453	TechCompass	Technical Assistance with Alternative Fuels, Fuel Cells, Emissions Analysis and Aftertreatment Technologies	06/21/12	05/31/20	10,000	10,000
17358	AEE Solutions, LLC	Technical Assistance with Heavy-Duty Vehicle Emissions Testing, Analysis and Engine Development	06/09/17	05/31/21	100,000	100,000
19078	Clean Fuel Connection, Inc.	Technical Assistance with Alternative Fuels, EVs, Charging and Infrastructure, and Renewable Energy	09/07/18	09/30/21	50,000	50,000
19227	Gladstein, Neandross & Associates LLC	Technical Assistance with Alternative Fuels & Fueling Infrastructure, Emissions Analysis and On-Road Sources	02/01/19	01/31/21	200,000	200,000
19302	Hydrogen Ventures	Technical Assistance with Hydrogen Infrastructure and Related Projects	04/24/19	04/23/21	50,000	50,000
20085	CALSTART Inc.	Technical Assistance for Development and Demonstration of Infrastructure and Mobile Source Applications	11/08/19	11/07/21	150,000	150,000
Direct Pay	Prizm Imaging	Procure Outreach Equipment and Materials	08/01/18	09/24/19	1,554	1,554
Direct Pay	Various	Alternative Fuel Demonstration Vehicle Program Related Expenses	02/01/19	09/30/19	3,579	3,579
Direct Pay	Various	Cosponsor 23 Conferences, Workshops & Events plus 2 Memberships	01/01/19	12/31/19	326,610	3,650,902
						$11,870,196

Table 3: Supplemental Grants/Revenue Received into the Clean Fuels Fund (31) in CY 2019

Revenue Agreement #	Revenue Source	Project Title	Contractor	SCAQMD Contract #	Award Total $
#19165	U.S. EPA Airshed Grant	Battery Electric Shuttle Bus Replacement Project	Phoenix Motorcars	#19166	$3,184,875
Table 3 lists revenue awarded to South Coast AQMD and received into the Clean Fuels Fund (31) only if the South Coast AQMD pass-through contract was executed during the reporting CY (2019).					**$3,184,875**

Table 4: Summary of Federal, State and Local Funding Awarded or Recognized in CY 2019

Awarding Entity or Program	Award (*) or Board Date	Purpose	Contractors	Award Total/ Fund
Veolia ES Technical Solutions, LLC	03/01/19	Install Air Filtration Systems at Schools (U.S. EPA Supplemental Environmental Project)	IQ Air North America	$161,352 Fund 75
Aliso Fund	05/03/19	Install Air Filtration Systems at Schools (Aliso Supplemental Environmental Project)	IQ Air North America	7,100,000 Fund 75
U.S. EPA Airshed Grant	07/12/19	Develop and Demonstrate Battery-Electric Excavator and Wheel Loader	Volvo Technology of America, LLC	2,100,000 Fund 31
U.S. EPA Airshed Grant	07/12/19	Deploy Zero Emission Electric Delivery Trucks	Daimler Trucks North America	4,177,083 Fund 31
U.S. EPA Section 105 CATI Grant	07/12/19	Daimler Zero Emission Trucks and EV Infrastructure Project	Daimler Trucks North America	500,000 Fund 31
World Oil Corporation	09/06/19	Install Air Filtration Systems at Schools (U.S. EPA Supplemental Environmental Project)	IQ Air North America	167,967 Fund 75
U.S. EPA DERA Grant	09/23/19*	Market Acceleration Program: Near-Zero Natural Gas Heavy-Duty Trucks including Trade-Down	Various Fleets/Truck Owners	2,289,581 Fund 31
SoCalGas	10/4/19	Development, Demonstration and Commercialization of Near-Zero Emissions Natural Gas Conversion Systems	A-1 Alternative Fuel Systems; Landi Renzo USD; and Agility Fuel Solutions	900,000 Fund 61
San Pedro Bay Ports	11/1/19	Clean Shipping Technology Demonstration	MAN Energy Solutions USA	1,000,000 Fund 83
Pacific Resource Recovery Services, Dean Foods Company and Tesoro Refining & Marketing Company	12/09/19	Install Air Filtration Systems at Schools (U.S. EPA & CARB Supplemental Environmental Projects)	IQ Air North America	316,000 Fund 75
Navistar, CNS, J&P Cycles	12/19/19*	Install Air Filtration Systems at Schools (Navistar) and Residences (CNS, J&P) (CARB Supplemental Environmental Projects)	IQ Air North America	1,205,300 Fund 75
Table 4 provides a comprehensive summary of revenue awarded to South Coast AQMD during the reporting CY (2019) 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.				**$19,917,283**

Project Summaries by Core Technologies

The following summaries describe the contracts, projects and studies executed, or amended with additional dollars, in CY 2019. They are listed in the order found in Table 2 by category and contract number. As required by H&SC Section 40448.5.1(d), the following project summaries provide the project title; contractors and, if known at the time of writing, key subcontractors or project partners; South Coast AQMD cost-share, cosponsors and their respective contributions; contract term; and a description of the project.

Hydrogen/Mobile Fuel Cell Technologies and Infrastructure

19191: Develop Solid Oxide Fuel Cell and Gas Turbine Hybrid Technology

Contractor: University of California Irvine	South Coast AQMD Cost-Share	$ 200,000
	Cosponsor	
	U.S. Dept. of Energy	700,000
Term: 06/21/19 – 06/20/20	Total Cost:	$ 900,000

The University of California Irvine (UCI) through its Advanced Power and Energy Program is working on developing solid oxide fuel cell-gas turbine (SOFC-GT) hybrid technology. This project will develop an integration model to fully realize the potential of hybrid SOFC-GT systems in the 1-10 MW range fueled by natural gas, biogas and renewable hydrogen. The model will quantify thermal and environmental performances and economics of various alternate schemes. The 1-10 MW range is applicable for repowering locomotives with SOFC-GT power blocks, from switchers (~1MW) to long-haul locomotives (~5 MW). Similarly, ocean going vessel (OGV) power also falls into this power range. The potential for powering locomotives and OGVs with SOFC-GT technology will be addressed, along with the applications to the distributed generation market.

19248: Lease One 2019 Fuel Cell Hyundai Nexo for Three Years

Contractor: Tustin Hyundai	South Coast AQMD Cost-Share	$ 25,193
Term: 03/07/2019 – 03/06/2022	Total Cost:	$ 25,193

The South Coast AQMD operates several alternative fuel vehicles, including electric vehicles, fuel cell vehicles and plug-in hybrid-electric vehicles. The primary objective of having these vehicles as part of the South Coast AQMD demonstration fleet is to continue to support the use of zero emissions vehicles. The fuel cell Hyundai Nexo is the first dedicated hydrogen-powered SUV and provides the highest range of any fuel cell or electric vehicle with an EPA-estimated range of 380 miles.

20038: Expand Hydrogen Fueling Station for Cars and Buses

Contractor: University of California Irvine	South Coast AQMD Cost-Share	$ 400,000
	Cosponsors	
	California Energy Commission	400,000
	MSRC/AB 2766 Discretionary Fund	1,000,000
Term: 10/18/19 – 02/17/27	Total Cost:	$ 1,800,000

The University of California Irvine (UCI) will expand their hydrogen fueling station from the current capacity of 180 kilograms per day (kg/day) of delivered gaseous hydrogen to in excess of 800 kg/day of delivered liquid hydrogen and from one to four fueling positions, with both 350 bar and 700 bar hydrogen. Delivered hydrogen is expected to be at least 33 percent renewable, in compliance with SB 1505 requirements. In addition to serving more light-duty vehicles, buses will continue to be scheduled for fueling at night to minimize impact on light-duty customers. Expansion of the station will enable UCI to increase the number of fuel cell buses serving the campus, as well as provide support, if needed, for the increased number of fuel cell buses planned for deployment by the Orange County Transportation Authority, leading to a more robust hydrogen fueling network. Fueling protocols, dispenser design and station throughput and reliability are just some examples that can be evaluated by UCI. This expansion also provides continued opportunity for students to experience the deployment of advanced technology.

20088: Participate in California Fuel Cell Partnership for Calendar Year 2019 and Provide Support for Regional Coordinator

Contractor: Frontier Energy, Inc.	South Coast AQMD Cost-Share	$ 120,000
	Cosponsors	
	7 automakers, 3 public agencies, 4 industry stakeholders, 32 Full & Associate Members	1,180,000
Term: 01/01/19 – 12/31/19	Total Cost:	1,300,000

In April 1999, the California Fuel Cell Partnership (CaFCP) was formed with eight members; South Coast AQMD joined and has participated since early 2000. The CaFCP and its members are demonstrating and deploying fuel cell passenger cars, transit buses, and heavy-duty trucks with associated hydrogen fueling infrastructure in California. Since the CaFCP is a voluntary collaboration, each participant contracts with Frontier Energy Inc. (previously Bevilacqua-Knight, Inc. or BKi) for their portion of the CaFCP's administration. In 2019, South Coast AQMD contributed $70,000 for Executive membership and $50,000 to continue support for a Regional Coordinator.

Engine Systems/Technologies

19439: High Efficiency Natural Gas Medium- and Heavy-Duty Engine Development and Research

Contractor: Cummins Inc.	South Coast AQMD Cost-Share	$ 250,000
	Cosponsors	
	U.S. Dept. of Energy	3,183,773
	California Energy Commission	566,227
	Cummins Inc.	6,996,626
Term: 08/30/19 – 08/29/23	Total Cost:	$ 10,996,626

The DOE, National Renewable Energy Laboratory (NREL), CEC and South Coast AQMD partnered to launch a research effort to increase efficiency of natural gas engines for medium- and heavy-duty engines and vehicles as part of a $37 million solicitation. This project is one of four projects that aligned well with South Coast AQMD priorities. Cummins Inc. will address natural gas engine emissions and efficiency improvements by developing a new natural gas specific combustion design utilizing high tumble charge motion and cooled exhaust gas recirculation (EGR). The engine will be integrated on a

global heavy-duty base engine platform in the 12- to 15-liter displacement range, enabling up to 20 percent reduction in system costs. The technical targets of the project include demonstrating a 10 percent improvement in cycle average and peak brake thermal efficiency over the commercially available product and maintaining 0.02 g/bhp-hr NOx capability with reduced aftertreatment cost. This project was kicked off in fourth quarter 2019 and expected to continue over a 40-month period.

Electric/Hybrid Technologies and Infrastructure

18397: Demonstrate Zero Emission Cargo Handling Vehicles at Port of Long Beach

Contractor: Port of Long Beach	South Coast AQMD Cost-Share	$ 350,000
	Cosponsors	
	California Air Resources Board	6,066,000
	Port of Long Beach	1,184,530
	Long Beach Container Terminal	642,321
	SSA Marine Terminal	445,559
Term: 01/04/19 – 5/31/20	Total Cost:	$ 8,688,410

The Commercialization of the Port of Long Beach Off-Road Technology (C-PORT) Demonstration Project is an early recipient of a CARB Greenhouse Gas Reduction Fund (GGRF) project that demonstrates battery-electric and fuel cell electric cargo handling equipment. This includes a six-month demonstration of two Taylor/BYD battery-electric yard tractors at SSA Marine Terminal, one Taylor/BYD battery-electric yard tractor, one Kalmar/TransPower battery-electric yard truck and one China National Heavy-Duty Truck Group Company (CNHTC)/Sinotruk fuel cell electric yard truck at Long Beach Container Terminal. Demonstration of the battery electric yard truck started in July 2019 and demonstration of the battery electric top handlers and fuel cell electric yard truck will start in February 2020, with the project scheduled for completion in August 2020. Results from the cargo handling equipment and infrastructure will inform future development of these technologies at the San Pedro Bay Ports.

19166: Battery Electric Shuttle Bus Replacement Project

Contractor: Phoenix Cars LLC dba Phoenix Motorcars	South Coast AQMD Cost-Share *(received as pass-through funds)*	$ 3,122,426
	Cosponsors	
	Phoenix Motorcars/CARB HVIP	4,189,030
Term: 01/31/19 – 01/30/22	Total Cost:	$ 7,311,456

In January 2018, U.S. EPA notified the South Coast AQMD that two awards had been approved under a FY 2017 Targeted Airshed Grant solicitation to replace diesel and gasoline airport shuttle buses with zero emissions battery electric buses. This project is to replace 29 diesel and gasoline airport shuttle buses with new battery electric buses manufactured by Phoenix Motorcars. The new electric buses are equipped with state-of-the-art electric drivetrain technology that delivers up to 100 miles range on a single charge. Combined with dual charging capability, the buses are well suited to meet the requirements of most fleets operating on a fixed route within proximity of the airport. Phoenix Motorcars, an electric vehicle manufacturer, is committing significant cost-share and securing additional funds from CARB's Hybrid and Zero Emission Truck and Bus Voucher Incentive Project (HVIP) to cofund the shuttle bus replacement project. This contract includes pass-through funds

totaling $3,122,426 in FY 2017 U.S. EPA Airshed Grant revenues. Administrative funds totaling $62,449 to implement the project were also included in the Airshed Grant for a total award of $3,184,875 (see Table 3).

19278: Demonstrate Zero Emission Trucks and EV Infrastructure through Volvo Low Impact Green Heavy Transport Solutions Project

Contractor: Volvo Trucks North America	South Coast AQMD Cost-Share	$ 4,000,000
	Cosponsors	
	California Air Resources Board	41,591,592
	Volvo Trucks North America	45,655,308
Term: 04/24/19 – 04/23/22	Total Cost:	$ 91,246,900

Volvo Trucks North America and South Coast AQMD secured a CARB Zero and Near-Zero Emission Freight Facilities (ZANZEFF) grant for the Volvo Low Impact Green Heavy Transport Solutions (LIGHTS) project to demonstrate 8 pilot and 15 production Class 8 battery-electric trucks at Dependable Highway Express (DHE) in Ontario and NFI Industries in Chino, two freight handling facilities in San Bernardino County. The Volvo LIGHTS project also includes the demonstration of 29 battery electric forklifts, yard tractors and support EVs; 59 Level 2 and DC fast chargers; and production of 1.8 million MWh annually of solar. Five pilot vehicles were delivered to California in 2019 and will be driven 10,000 miles on local roads prior to being deployed at DHE and NFI in spring 2020. Volvo will be deploying their production vehicles later in 2020 and is applying for the Zero Emission Powertrain certification to allow these vehicles to become commercially available in California. For this project, pass-through funding from CARB totaling $41,591,592 was received into a special revenue fund, the GHG Reduction Projects Special Revenue Fund (67), while the South Coast AQMD provided $4,000,000 in cost-share from the Clean Fuels Fund (31).

19438: Lease Two 2019 Hyundai Kona EVs for Three Years

Contractor: Puente Hills Hyundai	South Coast AQMD Cost-Share	$ 61,156
Term: 06/06/2019 – 06/05/2022	Total Cost:	$ 61,156

The South Coast AQMD operates several alternative fuel vehicles, including electric vehicles, fuel cell vehicles and plug-in hybrid-electric vehicles. The primary objective of having these vehicles as part of the South Coast AQMD demonstration fleet is to continue to support the use of zero emissions vehicles. The Hyundai Kona EV is the first all-electric subcompact SUV with EPA-estimated range of 258 miles.

20054: Lease One 2019 Hyundai Kona EV for Three Years

Contractor: Puente Hills Hyundai	South Coast AQMD Cost-Share	$ 29,640
Term: 08/23/2019 – 08/22/2022	Total Cost:	$ 29,640

The South Coast AQMD operates several alternative fuel vehicles, including electric vehicles, fuel cell vehicles and plug-in hybrid-electric vehicles. The primary objective of having these vehicles as part of the South Coast AQMD demonstration fleet is to continue to support the use of zero emissions vehicles. The Hyundai Kona EV is the first all-electric subcompact SUV with U.S. EPA-estimated range of 258 miles.

Various: Disburse Donated Mercedes-Benz USA Electric Vehicle Chargers

Contractor: Various	South Coast AQMD Cost-Share	$ 0
	Cosponsor	
	Mercedes-Benz USA, LLC	0
Term: 01/10/19 – 04/19/22	Total Cost:	$ 0

In October 2018, the South Coast AQMD accepted a donation of 977 Level 2 EV chargers offered by Mercedes-Benz USA LLC. South Coast AQMD identified residents and sites in disadvantaged communities to receive the chargers. This included rebate recipients from South Coast AQMD's Replace Your Ride Program (a scrap and trade program for low-income residents) who opted to purchase battery electric or plug-in electric vehicles to replace their older vehicle. Staff also worked with multiple utilities and local governments, including Los Angeles County and the Southern California Public Power Authority (SCPPA), to identify recipients of the donated EV chargers. In CY 2019, the South Coast AQMD executed agreements with Mercedes-Benz USA to accept the donated EV chargers, with both Los Angeles County and SCPPA to facilitate the donations, and with 21 individual residents in the Basin who were awarded one of the donated EV chargers. All of these were no-cost agreements.

Direct Pay: Installation of EV Charging Signage and One Station

Contractor: Clean Fuel Connection, Inc.	South Coast AQMD Cost-Share	$ 4,440
Term: 02/01/19 – 08/31/19	Total Cost:	$ 4,440

Beginning in late 2015, the South Coast AQMD undertook an expansion and upgrade of the EV charging infrastructure at its headquarters in Diamond Bar. The Diamond Bar facility had 28 Level 2 chargers and 1 DC fast charger. After the expansion, the facility had 92 Level 2 charges and 1 DC fast charger for use by staff, visitors and the public as well as equipment for cost recovery and demand response capabilities. In CY 2019, staff secured Clean Fuel Connection, Inc., to install 47 directional and wayfinding EV charging signs and 10 towing signs for South Coast AQMD headquarters' EV charging network. These signs will assist EV drivers in locating the chargers, and towing signs will enable these chargers to be available to EV drivers in need of charging on a timely basis. In addition, one EV charging station was installed at Board Member Delgado's residence to support the EV assigned to her for demonstration of early commercial, long range battery electric vehicles.

Fuel/Emissions Studies

19208: Conduct Emissions Study on Use of Alternative Diesel Blends in Off-Road Heavy-Duty Engines

Contractor: University of California Riverside/CE-CERT	South Coast AQMD Cost-Share	$ 261,000
	Cosponsors	
	California Air Resources Board	932,499
	U.S. Environmental Protection Agency	150,000
	San Joaquin Valley APCD	10,000
Term: 06/21/19 – 04/30/20	Total Cost:	$ 1,353,499

The South Coast AQMD regularly participates in emissions research projects with CARB. The emergence of renewable diesel and biofuels has raised the need to better understand emissions and performance effects relative to current ultra-low sulfur diesel. This study, a collaboration with CARB and the U.S. EPA, will conduct detailed emissions testing on various renewable diesel blends and biodiesel blends on heavy-duty off-road engines. The results of this study will help promote fuel standards for various blended fuels.

20058: Evaluate Meteorological Factors and Trends Contributing to Recent Poor Air Quality in Basin

Contractor: University of California Riverside	South Coast AQMD Cost-Share	$ 188,798
Term: 08/23/19 – 08/23/2020	Total Cost:	$ 188,798

The South Coast Air Basin (Basin) has achieved tremendous emission reductions in ozone and particulate matter (PM), particularly for fine PM or PM2.5, over the last five decades, but the region has recently experienced a leveling from the reductions and even an uptick in ozone in 2016 and 2017. The immediate question is why? Related to this is how much is related to meteorological trends versus a response to emission changes from mobile and stationary sources. The study will employ long-term records of air quality information, emissions information and detailed meteorological information (from observations and models) to separate the contribution of meteorology and climate from the effects of emission changes due to cleaner technologies and emission regulations. The study will also use satellite-derived data on trace species loadings (e.g., NO2, formaldehyde and ozone) 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. While there are uncertainties in the use of any one of these techniques to answering why ozone may have increased in the past couple of years, together, they should provide a much more robust understanding of the likely causes.

Health Impacts Studies

Fund Transfer: Conduct Fifth Multiple Air Toxics Exposure Study (MATES V)

Contractor: Various	South Coast AQMD Cost-Share	$ 1,815,800
	Cosponsor	
	Rule 1118 Mitigation Fund (54)	3,671,010
Term: 01/01/18 – 06/30/20	Total Cost:	$ 5,486,810

Since 1987, the South Coast AQMD has conducted four Multiple Air Toxics Exposure Studies (MATES) to evaluate air toxics health risks in the Basin. MATES V launched January 2018 to monitor air toxics for a one-year period, conduct air toxics modeling and quantify the health impacts. MATES V will include local-scale studies in areas near oil refineries to assess the air toxics exposures and associated health risks in these communities. The MATES V effort included a suite of advanced air monitoring techniques, including aerial and mobile measurements of air toxics. These efforts will generate detailed air toxics maps, near real-time data on emissions and better assessment of community air toxics exposure, especially in environmental justice communities. Mitigation fees collected for exceeding rule limitations of flaring operations at refineries are deposited into the 1118 Mitigation Fund (54), and those mitigation fees are used to develop air quality improvement projects. The Clean Fuels and Rule 1118 monies are being used for staffing, technical support and equipment purchases to carry out MATES V.

Technology Assessment and Transfer/Outreach

12376: Technical Assistance with Alternative Fuels, Biofuels, Emissions Testing and Zero Emission Transportation Technologies

Contractor: University of California Riverside/CE-CERT	South Coast AQMD Cost-Share	$ 150,000
Term: 06/13/14 – 05/31/22	Total Cost:	$ 150,000

South Coast AQMD seeks to implement aggressive programs to develop and demonstrate pre-commercial technologies for zero and near-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 University of California Riverside's (UCR) College of Engineering/Center for Environmental Research and Technology (CE-CERT) is a research center at UCR 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.

12453: Technical Assistance with Alternative Fuels, Fuel Cells, Emissions Analysis and Aftertreatment Technologies

Contractor: TechCompass	South Coast AQMD Cost-Share	$ 10,000
Term: 06/21/12 – 05/31/20	Total Cost:	$ 10,000

The AQMP for the Basin identifies the application of clean burning alternative fuels (e.g., natural gas, ethanol, and hydrogen), advanced vehicle technologies (e.g., fuel cells, hybrid electric and plug-in hybrid electric vehicles) and advanced stationary source pollution control technologies to meet the national ambient air quality standards. These air quality gains, however, may only be realized if programs are in place to develop, commercialize, and implement these technologies. As a result, South Coast AQMD seeks to implement aggressive programs to develop and demonstrate pre-commercial technologies. This contract is being used to leverage staff resources with specialized outside expertise. TechCompass has over 30 years of professional experience in bringing environmental, energy and alternative propulsion technologies from the laboratory to the market. This contract was originally executed in 2012 in the amount of $75,000 and was amended in 2019 to add $10,000 to continue utilizing Tech Compass' services.

17358: Technical Assistance with Heavy-Duty Vehicle Emissions Testing, Analysis and Engine Development

Contractor: AEE Solutions, LLC	South Coast AQMD Cost-Share	$ 100,000
Term: 06/09/17 – 05/31/21	Total Cost:	$ 100,000

Under this contract, AEE Solutions, LLC, provides technical assistance for an in-use emissions study being conducted by West Virginia University and the University of California Riverside using Clean Fuels funds. Specifically, AEE Solutions assists in the: 1) development of test vehicle selection, activity and emissions protocols, 2) recruitment of 200 heavy-duty test vehicles, 3) preparation of a technology assessment plan to identify the impact of current and near-future technology on engine performance, emissions and fuel usage, 4) identification of engine and aftertreatment issues and how to mitigate them, and 5) matching of vehicle technologies to vocations for which technology benefits can be

maximized. This level-of-effort contract was initially executed in June 2017, then amended in late 2017 for a total contract value of $100,000. Given the volume of work needed, an amendment was executed in CY 2019 adding an additional $100,000.

19078: Technical Assistance with Alternative Fuels, EVs, Charging and Infrastructure, and Renewable Energy

Contractor: Clean Fuel Connection, Inc.	South Coast AQMD Cost-Share	$ 50,000
Term: 09/07/18 – 09/30/21	Total Cost:	$ 50,000

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. Clean Fuel Connection, Inc., (CFCI) is providing technical assistance with alternative fuels, renewable energy and electric vehicles as well as outreach activities to promote, assess, expedite and deploy the development and demonstration of advanced, low and zero emissions mobile and stationary technologies. This contract is for technical and administrative support to enable the range of activities involved in implementing the Clean Fuels Program and associated complementary programs, as needed. In CY 2019, additional funds for this contract were allocated to fund administrative support of various incentive and rebate programs including the Lawn Mower Rebate Program, the Commercial Electric Lawn and Garden Incentive and Rebate Program, and the Replace Your Ride Program to assist potential applicants in submitting applications.

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

Contractor: Gladstein, Neandross & Associates LLC	South Coast AQMD Cost-Share	$ 200,000
Term: 02/01/19 – 01/31/21	Total Cost:	$ 200,000

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.

19302: Technical Assistance with Hydrogen Infrastructure and Related Projects

Contractor: Hydrogen Ventures	South Coast AQMD Cost-Share	$ 50,000
Term: 04/24/19 – 4/23/21	Total Cost:	$ 50,000

To promote, assess, expedite and deploy the development and demonstration of advanced, zero and near-zero emissions mobile and stationary technologies, South Coast AQMD relies on expert input and consultation. Hydrogen Ventures provides nearly 35 years of experience in the fields of combustion generated pollutants and their control, advanced energy technologies (including hydrogen and fuel cells) and alternative fuels, combustion modifications, secondary combustion processes and backend control focused on boilers, thermal treatment units and stationary engines. Hydrogen Venture has established relationships with numerous equipment manufacturers in the fuel cell and fuel processing industries and has worked with South Coast AQMD, CARB, CEC, DOE and U.S. EPA. Under this

contract, Hydrogen Ventures provides technical assistance and expert consultation for alternative fuels, emissions analysis and combustion technologies.

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

Contractor: CALSTART Inc.	South Coast AQMD Cost-Share	$ 150,000
Term: 11/08/19 – 11/07/21	Total Cost:	$ 150,000

The AQMP for the Basin identifies the application of clean burning alternative fuels (e.g., natural gas, ethanol and hydrogen), advanced vehicle technologies (e.g., fuel cells, hybrid electric and plug-in hybrid electric vehicles) and advanced stationary source pollution control technologies to meet the national ambient air quality standards. These air quality gains, however, may only be realized if programs are in place to develop, commercialize and implement these technologies. As a result, South Coast AQMD seeks to implement aggressive programs to develop and demonstrate pre-commercial technologies. This contract is being used to leverage staff resources with specialized outside expertise. CALSTART Inc.is the nation's leading clean transportation industry nonprofit that successfully spurs the commercialization of advanced transportation technologies, fuels, systems and the companies that make them. CALSTART Inc. manages a wide range of national clean transportation and grant programs in close partnership with several federal, state and regional agencies that address national and international issues related to creating the next generation of jobs and reducing emissions from transportation. The Federal Transit Administration, Caltrans and CEC were CALSTART's first partners funding consortia projects over 25 years ago, which were focused on developing and demonstrating advanced transit, infrastructure and electric drive technologies that today are entering the mainstream. CALSTART has been working as an effective catalyst for the global advanced transportation technology industry for over a decade and continues to gain momentum as a unique and increasingly important "meeting point" between key public and private sector stakeholders in the industry.

Direct Pay: Procure Outreach Equipment and Materials

Contractor: Prizm Imaging	South Coast AQMD Cost-Share	$ 1,554
Term: 08/01/18 – 09/24/19	Total Cost:	$ 1,554

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. Throughout the year, the South Coast AQMD participates in dozens of conferences, symposiums, workshops and events ranging in topic from technology-focused subjects to general clean air or environmental issues. Large backdrops and smaller retractable pullups are helpful in conveying information in quick bites and drawing the attention of attendees. In 2018 and 2019, the Technology Advancement Office designed images promoting various technology programs and procured one ten-foot fabric popup display and three 6-foot pullups to display these images at various events.

Direct Pay: Alternative Fuel Demonstration Vehicle Program Related Expenses

Contractor: Various	South Coast AQMD Cost-Share	$ 3,579
Term: 02/01/19 – 09/30/19	Total Cost:	$ 3,579

The South Coast AQMD alternative fuel vehicle demonstration program showcases new clean-fuel vehicles to public and private organizations so that potential purchasers may familiarize themselves with available low-emission technologies and to push the development of even cleaner vehicle technologies. This direct pay covers cost of service for two PHEV Via Vans and the disposition cost of one Toyota Mirai FCV vehicle.

Various: Cosponsor 23 Conferences, Workshops and Events plus 2 Memberships

Contractor: Various	South Coast AQMD Cost-Share	$ 326,610
	Cosponsors	
	Various	3,324,292
Term: 01/01/19 – 12/31/19	Total Cost:	$ 3,650,902

The South Coast AQMD regularly participates in and hosts or cosponsors conferences, workshops and miscellaneous events. In CY 2019, South Coast AQMD provided funding for 23 conferences, workshops and events and 2 memberships in key stakeholder organizations, as follows: Clean Fuels Advisory Group Retreat in January 2019; Rethink Methane in February 2019; PEMS Conference and Workshop in March 2019; ICEPAG-Microgrid Global Summit in March 2019; ACT Expo in April 2019; Asilomar Conference on Transportation & Energy in July 2019; the 29th Real World Emissions Workshop in March 2019; Clean Transportation Summit, California: 2030 in March 2019; Hydrogen and Fuel Cells for Freight Workshop in April 2019; Women in Green Forum in August 2019; Advanced Transportation Symposium & Expo-Driving Mobility 6 in June 2019; California Fuel Cell Partnership 20th Anniversary Event in October 2019; RadLaunch Program for 2019-2020; SoCal Work Truck Show in October 2019; Los Angeles National Drive Electric Week 2019 "Charge Up LA" Event in September 2019; AltCar Expo & Conference in October 2019 in Riverside and November 2019 n Santa Monica; the 30th Real World Emissions Workshop in March 2020; CalETC Los Angeles Auto Show Events in November 2019; Renewable Gas 360 Symposium in January 2020; Special Awards at the California Science Fair in April 2019; Ports Workshop @ POLA in October 2018; Hydrogen and Fuel Cell Summit in December 2018; and California Dairy Sustainability Summit in November 2018. Additionally, for 2019, two memberships were renewed for participation in the California Hydrogen Business Council, a member-based association representing a wide array of organizations that acts as a leading advocate for the hydrogen and fuel cell industry, 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.

.

CLEAN FUELS PROGRAM
Progress and Results in 2019

Key Projects Completed

Given the large number and diversity of emission sources contributing to the air quality problems in the Basin, there is no single technology or "silver bullet" that can solve all the region's problems. Only a portfolio of different technologies can successfully achieve the required emission reductions needed to meet the upcoming 2023 and 2032 air quality standards as well as the state's 2050 climate goals. Therefore, the South Coast AQMD continues to support a wide range of advanced technologies, addressing not only the diversity of emission sources, but also the time frame to commercialization of these technologies. Projects cofunded by the South Coast AQMD's Clean Fuels Program include emission reduction demonstrations for both mobile and stationary sources, although legislative requirements limit the use of available Clean Fuels funds primarily to on-road mobile sources. The projects funded not only expedite the development, demonstration and commercialization of zero and near-zero emission technologies and fuels, but also demonstrate the technical viability to technology providers, end-users and policymakers.

In the early years, the mobile source projects funded by the Clean Fuels Program targeted low emissions technology developments in automobiles, transit buses, medium- and heavy-duty trucks and off-road applications. Over the last several years, the focus has shifted to near-zero and zero emission technologies for medium- and heavy-duty trucks, especially those in the goods movement and freight handling industry.

Table 6 (page 52) provides a list of 32 projects and contracts completed in 2019. Summaries of the completed technical projects are included in Appendix C. Selected projects completed in 2019 which represent a range of key technologies from near-term to long-term are highlighted below: (a) Develop and Demonstrate Vehicle-to-Grid Technology on School Buses; (b) Develop and Evaluate Low NOx Diesel Engine Aftertreatment Technologies for Heavy-Duty Diesel Engines; (c) Developing and Demonstrating Renewable Fuels; and (d) Study of Real-World Electrification Options for Environmental Justice Communities.

Develop and Demonstrate Vehicle-to-Grid Technology on School Buses

This project was the first to demonstrate vehicle-to-grid (V2G) functionality in electric school buses. It was a follow-on to a project the South Coast AQMD had previously funded to convert diesel school buses to electric. In 2014, the South Coast AQMD and CEC awarded funding to National Strategies, LLC, a technology developer. National Strategies also provided significant matching funds toward this $3.4 million project. The V2G school bus project also included vehicle-to-building (V2B) components. The project was to retrofit and demonstrate six diesel-powered Type C school buses with electric drive and power export systems.

The V2G school bus technology is a battery-electric drive system that uses low-cost yet powerful electric motors and lithium iron phosphate batteries, along with advanced controls. The V2G school bus platform is a variant of drive system originally developed by Transportation Power Inc. (TransPower) for yard tractors that haul heavy containers at low speeds, with a gross combined vehicle weight rating exceeding 80,000 pounds. The TransPower "ElecTruck™" drive system was adapted for medium-duty Type C school buses in a retrofit conversion. Two buses were deployed at the Torrance Unified School District (TUSD) and four at the Napa Valley Unified School District (NVUSD). The South Coast AQMD's funding was specifically directed to the deployment and demonstration of the two school buses at TUSD.

The V2G school bus technology is based substantially on (1) low-cost components; (2) advanced battery management technology to maximize battery safety and operating life; (3) onboard chargers that minimize external infrastructure requirements and expenses; (4) automated-manual transmission technology which improves operating efficiency, thereby increasing range and reducing operating cost per mile; and (5) models-based controls that can be easily adapted to new components as they emerge or to other vehicles.

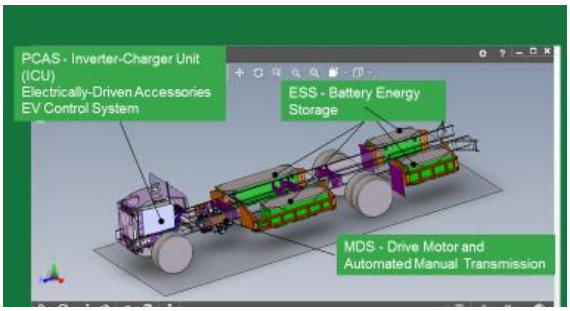


Figure 18: Chassis Layout of EV Components

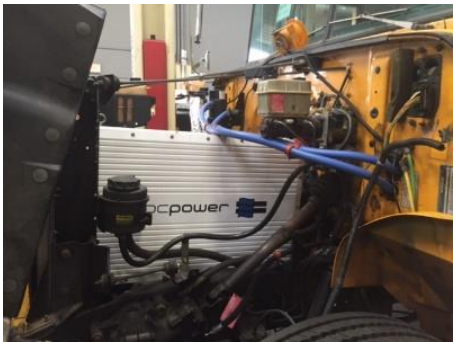


Figure 19: Power Control & Accessory Subsystem after Installation into Bus

The project was very successful. First, the technology met the national average range requirements of the student transportation industry, which is approximately 80 miles per day. Second, the project was able to pass all CHP requirements for school bus safety. Third, a charging infrastructure was installed which allows V2G operations and a successful interconnection agreement with the local utility was completed. Finally, and most importantly, the project delineated a clear path for EV school buses to achieve zero emission student transportation.

The V2G element of the project demonstrated that the school buses could serve as energy storage and supply peak time energy "behind the meter" of school districts and generate revenues during the long stretches of bus downtime. The energy revenue stream brings the economics of EV bus ownership within reach of school districts at a time when EV bus production costs are relatively high. The V2G electric school bus also provides frequency regulation to the grid and maintains the correct frequency throughout the grid to ensure there are no power surges and restrains the grid frequency from getting too high or too low and helps maintain it at 60HZ.

There were a few difficulties in the project, including the decision to retrofit existing 20-year-old school buses and the reluctance of the original equipment manufacturer (OEM) to provide robust support to the effort. While the age of the buses and the process of retrofitting the buses were not the only challenges, they did create significant delays and intensify reliability issues. In addition, there were significant delays on the interconnection agreement with SCE simply because this was the first project of its kind. This further delayed the project due to California Public Utility Commission rule interpretations. Ultimately, the team and SCE worked together to eventually achieve an interconnection agreement that did result in energy savings for TUSD. In conclusion, however, while the retrofit model cannot be recommended based on this project, it still resulted in value lessons learned toward technical feasibility.

From a commercialization and application perspective, this project was very successful. Prior to this project, there was not a single EV school bus in operation within California. Further, there were no school bus OEMs providing EV school buses in the market. As this project moved forward and early results were positive, the EV school bus market changed. In 2017, Blue Bird Corporation was awarded $1.9 million from the South Coast AQMD and $4.9 million from U.S. DOE to further develop components and systems for the commercialization and deployment of electric school buses. In fact, all three major school bus OEMs and a few smaller ones as well announced plans to produce EV school buses, most with some form of V2G technology. By the project conclusion, there were approximately 75 EV school buses operating in the state with a significant number on order with OEMs.

Finally, this project led to the realization that V2G technology is not a theory but a reality and resulted in the first commercially available U.S.-manufactured V2G electric school bus in all 50 states.

Develop and Evaluate Low NOx Diesel Engine Aftertreatment Technologies for Heavy-Duty Diesel Engines

A key measure in CARB's Mobile Source Strategy is the establishment of low NOx engine emission standards that result in a 90 percent reduction in NOx emissions compared to the emissions of today's diesel engines. This measure is critical for attaining federal health-based air quality standards for ozone in 2031 in the South Coast and San Joaquin Valley air basins, and fine PM2.5 standards in the next decade.[6]

CARB, in conjunction with Southwest Research Institute (SwRI), developed a three-stage project exploring the feasibility of technologies to achieve target tailpipe NOx levels of 0.02 g/bhp-hr from larger displacement diesel engines suitable for long-haul operations. Stage one was development and evaluation of the aftertreatment systems. The first step involved modeling and selecting the aftertreatment system. The down selected system was subsequently aged in an accelerated fashion to simulate full useful life degradation. This process simulated performance of the system at the end of useful life. However, during the aging process, an unexpected failure occurred which disturbed the experiment, resulting in the exposure of the aftertreatment system to unrepresentative conditions. CARB requested the South Coast AQMD's assistance in a joint effort to restart stage1.

SwRI, with cofunding from the South Coast AQMD and U.S. EPA's Section 105 Clean Air Technology Initiative Program, restarted Stage 1. The objective of this follow-on project was to duplicate the original CARB-funded Stage 1 effort with the goal of developing a robust aftertreatment system for the next phases of the project. SwRI developed, aged and tested a second set of catalysts to represent real-world low load and low temperature test cycles. The parts were aged for 1,000 hours and emissions testing was performed at set intervals along the Federal Test Procedure (FTP) transient cycle. The diesel demonstration platform was a 2014 Volvo MD13TC EU6 engine. The final configuration of the low NOx aftertreatment system is shown below in Figure 20 below.

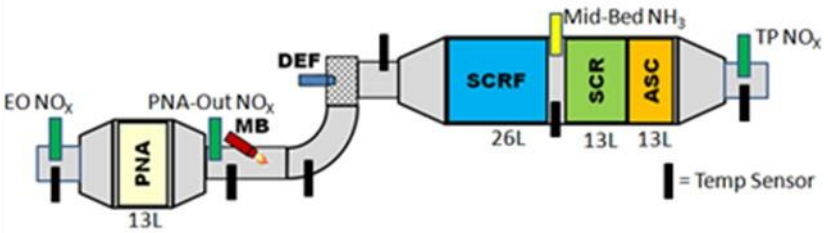


Figure 20: Final Stage 1 Low NOX Aftertreatment System Configuration Results

The Test Plan involved a 1,000-hour accelerated aging experiment. To gain better insight into system degradation over time, the parts were tested at two intermediate points during aging, in addition to before and after the completion of the full aging duration. Tests were conducted at the 0-hour point (following de-greening), and at 33%, 67% and 100% of the FUL aging duration of 1,000 hours. The aging was conducted using the SwRI-developed DAAAC (Diesel Accelerated Aftertreatment Aging Cycles) methodology, which accounts for both thermal and chemical aging components. However, at the end of aging, the selective catalytic reduction on filter (SCRF) contained a near maximum life duration of ash loading, prior to ash cleaning. To assess the impact of ash cleaning on the SCRF, an

[6] https://ww2.arb.ca.gov/our-work/programs/heavy-duty-low-nox/about

additional ash cleaning experiment and test were added to the Test Plan, supported with cofunding from the Manufacturers of Emission Controls Association.

The objectives of this project were proven successful. Hot-start STP performance was considerably better than what was shown in the previous Stage 1. The system maintained 99.6% NOx conversion, as compared to only 99.3% previously. This was primarily driven by the behavior of the SCRF, and it indicates that the SCRF was significantly disturbed by the upstream canning failure in the previous Stage 1. Another result from this project showed composite FTP NOx levels were 0.023 g/hp-hr after ash cleaning, as opposed to 0.034 g/hp-hr in the original Stage 1.

Developing and Demonstrating Renewable Fuels

Renewable natural gas (RNG) is not a fossil fuel. RNG (biogas or biomethane) is an ultra-clean and ultra-low carbon natural gas alternative. It is produced by harnessing the methane emitted when organic waste breaks down (e.g., livestock manure, forestry, food waste), allowing California to sustainably manage its vast volumes of waste products and mitigate short-lived climate pollutants.7 Nearly 16 tons of waste decomposing in California landfills could be utilized to produce energy. Methane emissions entering the atmosphere from waste is 30 times more potent than CO2 as a heat trapping gas. The conversion of waste to gas which is fully interchangeable with fossil natural gas also helps to reduce dependency on fossil fuels. Additionally, because of RNG's low carbon intensity, it qualifies for incentive funds and Low Carbon Fuel Standard credits. South Coast AQMD sees a co-benefit of lowering GHG's by converting waste to RNG and reducing air pollution when RNG is used as a fuel in low emitting engines reducing NOx emissions.

In 2017, the University of California Riverside (UCR) established a Center for Renewable Natural Gas at their College of Engineering-Center for Environmental Research (CE-CERT). This RNG Center is dedicated to researching key RNG production technologies in demonstration-scale testbeds to better address technical and other challenges, as well as systems optimization and integration needs, to lead toward commercial RNG production in California and elsewhere. The South Coast AQMD, the Southern California Gas Company and the Department of Transportation's National Center for Sustainable Transportation joined together to cost-share Phase 1 of the RNG Center effort, focusing on evaluating the RNG production potential in California and conducting a survey of thermochemical conversion technologies available for RNG production.

Anaerobic digestion (AD) is typically used to convert high moisture content biomass to RNG and thermochemical processes such as gasification and pyrolysis are typically the conversion technologies for low moisture content biomass. RNG is a low to ultra-low carbon intensity transportation fuel that can power near-zero emission heavy-duty natural gas vehicles certified to CARB's optional low-NOx emissions standard, which is 90% cleaner than current standards, and current heavy-duty diesel engines equipped with SCR systems. RNG is also a viable feedstock for renewable hydrogen (RH2) for fuel cell electric vehicles that generate zero tailpipe emissions. Its low carbon intensity comes from capturing methane, a potent short-lived climate pollutant, that would otherwise be released into the atmosphere from biomass decomposition and from displacing methane emissions and new CO2 contributions associated with fossil-based methane production and use. The following illustrates the process from RNG sources to methane conversion.

[7] https://cngvp.org/why-natural-gas/low-carbon-renewable-fuel/

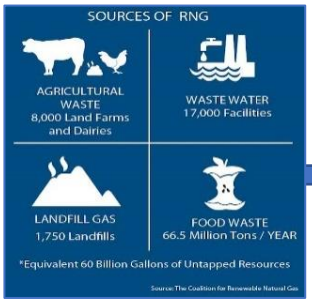


Figure 21: RNG Sources

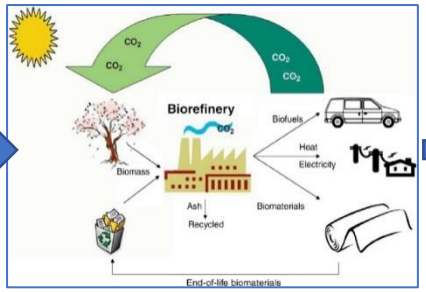


Figure 22: RNG

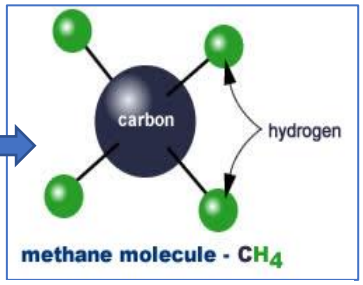


Figure 23: RH2

The South Coast AQMD has a long history of advancing clean fuels that are integral to the deployment of to zero, near-zero and low emission vehicles. Current funding examples include: 1) CR&R's state-of-the-art AD facility in Perris that uses the RNG it produces from the municipal solid waste it collects to power its near-zero emission heavy-duty vehicles and to inject the RNG into the SoCalGas pipeline; 2) demonstrating less commercially developed pyrolysis technology with Kore to show the viability of producing RNG and renewable hydrogen; and 3) Rialto Bioenergy Facility's commercial AD and pyrolysis project in Rialto that expects to produce significant quantities of RNG for pipeline injection and use by anchored fleets in the South Coast Air Basin.

Figure 24: CR&R Anaerobic Digestion of MSW to RNG

UCR's RNG Center project supported developing and demonstrating the potential for RNG production in California and particularly focused on the less commercially developed thermochemical conversion technologies to address the significant amount of available and potential low moisture-content biomass. The project also reviewed the state's clean power generation and curtailment data and the potential of power-to-gas technology to convert zero emission energy from wind and solar into a more storable form such as RNG or RH2 gas. UCR intends to continue their RNG viability efforts through the design, construction and operation of two demonstration scale plants that will form the design basis for a commercial plant along with a business plan. The final phase of the project will include a detailed engineering design of the commercial scale facility along with the permitting steps, financing details, facility construction, shakedown and operation with further technology refinement.

Figure 25: Rialto Bioenergy Anaerobic Digestion & Pyrolysis of MWS and Biosolids to RNG

Figure 26: CR&R Fleet of HDVs Operating on RNG

Figure 27: Kore Infrastructure Pyrolysis of Biomass to RNG and RH2

Study of Real-World Electrification Options for Environmental Justice Communities

Incentivizing solar technologies, electric appliances and vehicles can be an effective means to augment South Coast AQMD's existing regulations and programs to achieve further NOx and GHG reductions. Charging electric vehicles and equipment using solar panels can reduce the need for traditional fossil-based power generation for the transportation sector. But is there feasibility in promoting the greater use of solar technologies, electric appliances and vehicles for residents in environmental justice (EJ) communities, who are the most impacted by poor air quality? To answer this question, the South Coast AQMD and CEC funded a study to be conducted by the Electric Power Research Institute (EPRI) on real-world electrification options for energy services in EJ communities. EPRI also provided significant cost-share. The study considered air quality and health benefits from using solar, electric appliances and electric vehicles.

EPRI performed a statewide analysis of the economic and environmental impacts of electrification. The analysis focused on the costs and benefits of electrification technologies on residents in EJ communities. Air quality models analyzed the effects of existing electrification technologies deployed at a larger scale. Assumptions for the potential for electrification are primarily from a CEC study, "Long Term Energy Scenarios in California" (EPC 14-069, Mahone et al, 2018[8]). The Mahone study investigated potential pathways to achieve California's GHG goals. The "in-state biomass" scenario was used since it emphasized various electrification strategies. Additional assumptions were necessary since many emission sources affecting air quality are not included in GHG models. Electrification is a broad array of technologies for transitioning direct fossil fuel use to electricity. Examples of electrification technologies include batteries and motors for electrification of transportation, heat pumps for electrification of space and water heating, and technologies for industrial electrification. Air quality modeling and a health effects analysis was performed based on levels of electrification from different sources. Air quality modeling extended the current emissions inventories to the year 2050 and looked specifically at the effects of electrification on pollutant levels in future years, and health effects stemming from pollutant levels in future model years.

Precise costs for electrification are difficult to estimate due to the variety of factors that affect lifetime costs but estimates show that the costs are recovered in a few short years through air quality benefits. Monetized health benefits from reduced ozone and PM2.5 were estimated at $108 billion for the state of California in 2050, including $56 billion in benefits for this Basin. Improvements in air quality were fed into a health impacts model to calculate the monetized benefits shown in Table 5 below. Figure 28 below further illustrates this by census tract.

Table 5: Health Benefits of Electrification in South Coast Air Basin

Pollutant	Avoided Deaths	Valuation (in billions)
PM2.5	6,242	$54.3
Ozone	179	$1.6
Total	**6,421**	**$55.9**

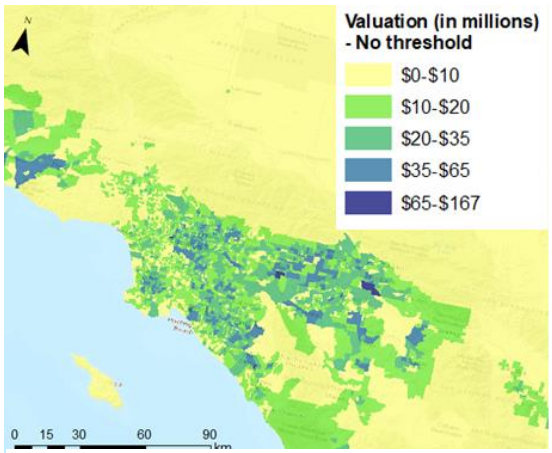


Figure 28: Monetized Health Benefits of Electrification within the Basin by Census Tract

For 2050, the study projects summer average maximum daily 8-hour ozone below 65 ppb in the Basin, with ozone reductions exceeding 5 ppb in most of the Basin and as much as 10 ppb. By 2050, PM2.5 is projected to be

[8] Mahone, A., Subin, Z., Kahn-Lang, J., Allen, D., Li, V. De Moor, G., Ryan, N., Price, S. Deep Decarbonization in a High Renewables Future: Updated Results from the California Pathways Model. CEC Publication Number CEC-500-2018-012.

reduced by 2 µg/m^3 and up to 14 2 µg/m^3 due to electrification. In addition, the study's modeling projects that electrification would significantly reduce mortality rates in EJ communities.

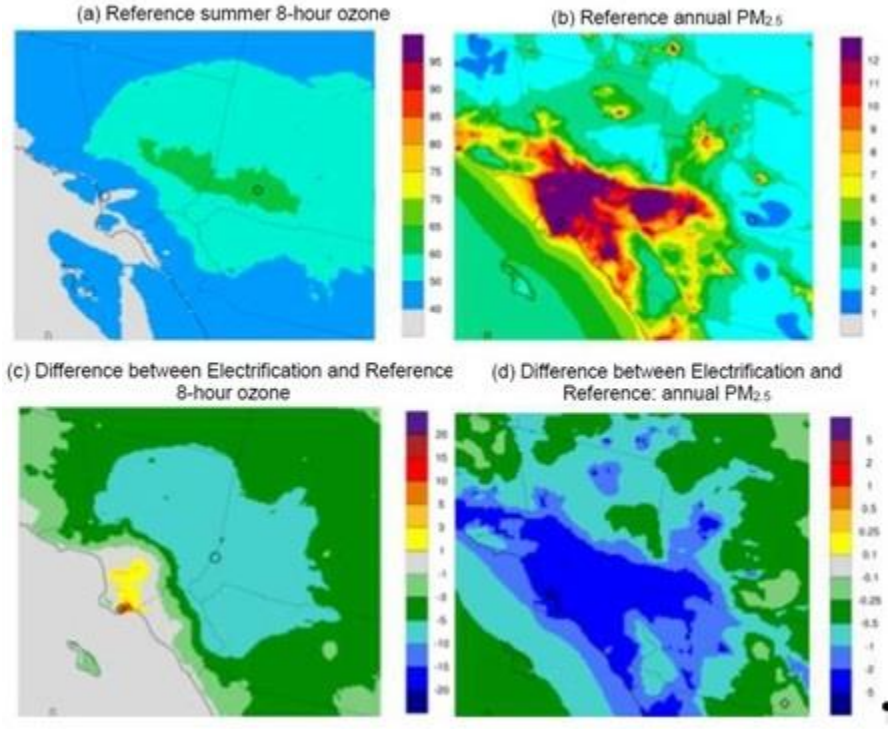


Figure 29: Electrification Effects for Summer Max Daily Average 8-Hour Ozone and Max Annual PM2.5

In conclusion, the study recommended that strategies be identified to provide funding for electrical infrastructure upgrades in low-income residences within EJ communities, given the high cost of retrofitting existing homes. Electrification technologies such as electric vehicles, appliances, heat pumps, and solar are commercially available but are generally more expensive than conventional options. Incentivizing these technologies for low-income residences will be necessary to cover the differential cost and enable residents in EJ communities to experience the benefits of electrification technologies.

Studies looking at the benefits of electrification such as the EPRI study support other research showing air quality and health benefits from electrification. These support policies in California, such as SB 100, requiring 60 percent renewable energy by 2030 and 100 percent renewable energy by 2045, and CEC's new Building Energy Efficiency Standards requiring solar PV systems for new home construction starting in January 1, 2020, and Net Energy Metering allowing consumers with solar to receive credit for electricity produced and fed into the grid.

In response to these developments, in 2019 the South Coast AQMD prepared a white paper on solar technologies, which recommends a shift towards electrification of residential appliances to achieve additional NOx and GHG reductions. The solar white paper proposed several measures and technologies to be undertaken as part of a new Solar Initiative being proposed for deployment of solar technologies in EJ communities. The South Coast AQMD has also developed a Net Emissions Analysis Tool (NEAT), which evaluates what the costs and NOx and GHG emission benefits will be to switch to all electric residential appliances (i.e., water and space heaters, clothes dryers, and cooktops and ovens). The new Solar Initiative will be considered by the Board in 2020.

Table 6: Projects Completed between January 1 & December 31, 2019

Contract	Contractor	Project Title	Date
Hydrogen/Mobile Fuel Cell Technologies and Infrastructure			
19213	Frontier Energy Inc.	Participate in California Fuel Cell Partnership for CY 2018 & Provide Support for Regional Coordinator	Jul-2019
20088	Frontier Energy Inc.	Participate in California Fuel Cell Partnership for CY 2019 & Provide Support for Regional Coordinator	Dec-2019
Electric/Hybrid Technologies and Infrastructure			
08063	Quantum Fuel Systems LLC	Develop & Demonstrate 20 Plug-In Hybrid Electric Vehicles	Jan-2019
13058	Capstone Turbine Corporation	Develop Microturbine Series Hybrid System for Class 7 Heavy-Duty Vehicle Applications	Dec-2019
14222	Odyne Systems, LLC	Develop & Demonstrate Plug-In Hybrid Electric Retrofit System for Class 6 to 8 Trucks	Aug-2019
14256	National Strategies LLC	Develop & Demonstrate Vehicle-to-Grid Technology	Jan-2019
16227†	Selman Chevrolet Company	Lease One 2016 Chevrolet Volt Extended-Range Electric Vehicle for Three Years	Jan-2019
18072	Electric Power Research Institute	Study Electrification Options of Energy Services for EJ Communities and Non-Attainment Areas	Jun-2019
Fueling Infrastructure and Deployment (NG/RNG)			
14219	City of West Covina	Upgrade CNG Station at City Yard	Aug-2019
16076	Coachella Valley Association of Governments	Purchase & Deploy One Heavy-Duty CNG Paratransit Vehicle	Nov-2019
16333	Ontario CNG Station, Inc	Implement Alternative Fuel Station Expansion	Nov-2019
17349	University of California Riverside/CE-CERT	Establish Renewable Natural Gas Center	Feb-2019
Fuel/Emissions Studies			
15607	University of California Riverside/CE-CERT	Innovative Transportation System Solutions for NOx Reductions in Heavy-Duty Fleets	Jan-2019
15636	University of California Riverside/CE-CERT	Evaluate PEV Utilization through Advanced Charging Strategies in a Smart Grid System	Dec-2019
17331	University of California Riverside/CE-CERT	Conduct In-Use PM Emissions Study for Gasoline Direct Injection Vehicles	Jul-2019
Emissions Control Technologies			
17367	Southwest Research Institute	Develop & Evaluate Aftertreatment Systems for Large Displacement Diesel Engines	Jun-2019

Table 6: Projects Completed between January 1 & December 31, 2019 (cont'd)

Contract	Contractor	Project Title	Date
Technology Assessment and Transfer/Outreach			
18019†	Ricardo Inc.	Technical Assistance with Heavy-Duty Vehicle Emissions Testing, Analysis and Engine Development and Applications	Aug-2019
19160†	Coordinating Research Council, Inc.	Copsonsor 2019 Mobile Source Air Toxics Workshop on 2/4-6/19	Feb-2019
19232†	Gladstein, Neandross & Associates	Cosponsor Rethink Methane 2019 on 2/26-27/2019	Feb-2019
19233†	University of California Riverside	Cosponsor the 2019 Portable Emissions Measurements Systems Conference & Workshop	Apr-2019
19234†	University of California Irvine	Cosponsor ICEPAG 2019	Sep-2019
19249†	Gladstein, Neandross & Associates	Cosponsor ACT Expo 2019	May-2019
19264†	University of California Davis-Institute of Transportation Studies	Cosponsor the Asilomar 2019 Conference on Transportation & Energy	Aug-2019
19271†	Coordinating Research Council, Inc.	Cosponsor the 29th Real World Emissions Workshop	Apr-2019
19293†	CALSTART Inc.	Cosponsor 2019 Clean Transportation Summit, California: 2030	Apr-2019
19348†	California Hydrogen Business Council	Cosponsor Hydrogen and Fuel Cells for Freight Workshop on 4/23/19	May-2019
19377†	Three Squares Inc.	Cosponsor the 2019 Women in Green Forum	Nov-2019
19431†	Sustain SoCal	Cosponsor the 2019 Advanced Transportation Symposium & Expo – Driving Mobility 6	Jul-2019
20036†	Frontier Energy, Inc.	Cosponsor the California Fuel Cell Partnership 20th Anniversary Event	Nov-2019
20053†	Motor Trend Group, LLC	Cosponsor the 2019 SoCal Work Truck Show	Nov-2019
20055†	Plug In America	Cosponsor the Los Angeles National Drive Electric Week 2019 Event "ChargeUp LA"	Sep-2019
20069†	Platia Productions	Cosponsor AltCar 10/16/19 in Riverside & 11/2/19 in Santa Monica	Nov-2019
20099†	California Electric Transportation Coalition	Cosponsor the CalETC 2019 Los Angeles Auto Show Events	Dec-2019

†Two-page summary reports (as provided in Appendix C) are not required for level-of-effort technical assistance contracts, leases or cosponsorships; or it was unavailable at time of printing this report.

CLEAN FUELS PROGRAM
2020 Plan Update

In 1988, SB 2297 (Rosenthal) was signed into law (Chapter 1546) establishing the South Coast AQMD's Clean Fuels Program and reaffirming the existence of the Technology Advancement Program (TAO) to administer the Clean Fuels Program. The funding source for the Clean Fuels Program is a $1 motor vehicle registration surcharge that was originally approved for a limited five-year period, but legislation eventually extended both the Program and surcharge indefinitely. The Clean Fuels Program has evolved over the years but continues to fund a broad array of technology applications spanning near- and long-term implementation. Similarly, planning will remain an ongoing activity for the Clean Fuels Program, which must remain flexible to address evolving technologies as well capitalize on the latest progress in state-of-the-art technologies, new research areas and data.

Every year, the South Coast AQMD re-evaluates the Clean Fuels Program to develop a Plan Update based on a reassessment of the technology progress and direction of the South Coast AQMD's Board. This Plan Update for CY 2020 targets several projects to help achieve near-term emission reductions needed for the South Coast to meet health-based federal air quality standards.

Overall Strategy

The overall strategy of the TAO's Clean Fuels Program is based, in large part, on emissions reduction technology needs identified through the AQMP process and the South Coast AQMD Board's directives to protect the health of the approximately 18 million residents (nearly half the population of California) in the South Coast Air Basin (Basin). The AQMP, which is updated approximately every four years, is the long-term regional "blueprint" that relies on fair-share emission reductions from all jurisdictional levels (e.g., federal, state and local). The 2016 AQMP is composed of stationary and mobile source emission reductions from traditional regulatory control measures, incentive-based programs, projected co-benefits from climate change programs, mobile source strategies and reductions from federally regulated sources (e.g., aircraft, locomotives and ocean-going vessels).

The emission reductions and control measures in the 2016 AQMP rely on commercial adoption of a mix of currently available technologies as well as the expedited development and commercialization of lower-emitting mobile and stationary advanced technologies in the Basin to achieve air quality standards. The 2016 AQMP identifies a 45 percent reduction in NOx required by 2023 and an additional 55 percent reduction by 203 to achieve ozone standards of 80 ppb and 75 ppb, respectively. The majority of these NOx reductions must come from mobile sources, both on- and off-road. Notably, the South Coast AQMD is currently only one of two regions in the nation designated as an extreme nonattainment area (the other region is San Joaquin Valley). Furthermore, in April 2019, the South Coast AQMD requested a voluntary re-classification from U.S. EPA of the 1997 8-hour federal standard ozone for Coachella Valley to "extreme" status. Hotter summer months and the threat of climate change in the region have presented challenges that require additional time to reach attainment.

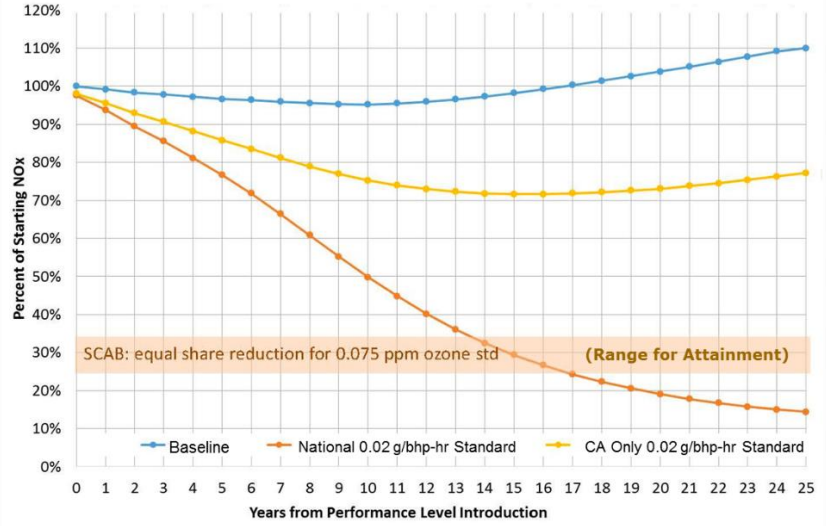
While current state efforts in developing regulations for on- and off-road vehicles and equipment are expected to reduce NOx emissions significantly, they will not be sufficient to meet the South Coast AQMD needs, especially in terms of timing. Nonetheless, for the first time, the 2016 AQMP identified a means to achieving the federal ambient standards through regulations and incentives for near-zero and zero emission technologies that are commercial or nearing commercialization. This strategy, however, requires a significantly lower state and national heavy-duty truck engine emissions standard with the earliest feasible implementation date, significant additional financial resources, and accelerated fleet turnover on a massive scale.

On June 3, 2016, in light of the need for a more stringent national heavy-duty truck engine emissions standard to achieve mobile source emission reductions, the South Coast AQMD petitioned the U.S. EPA to initiate rulemaking for a lower NOx national standard for heavy-duty engines. A national 50 state standard (as opposed to a California standard) for on-road heavy-duty vehicles is estimated to result in NOx emission reductions from this source category from 70 to 90 percent in 14 to 25 years, respectively. While CARB has adopted more stringent in-use fleet rules which require older trucks and buses to upgrade to newer, cleaner engines meeting the 2010 standard of 0.2 g/bhp-hr by 2023, CARB estimates that 60 percent of total heavy-duty vehicle miles traveled in the South Coast Air Basin are from vehicles purchased outside of California. This points to the need for a more stringent federal as well as state standard for on-road heavy-duty vehicles.

Given that the Basin must attain the 75-ppb ozone NAAQS by 2031, a new on-road heavy-duty engine NOx emission standard is critical given the time needed for OEMs to develop and produce compliant vehicles, and for national fleet turnover to occur.

Figure 30 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.

The U.S. EPA has since acknowledged a need for additional NOx reductions through a harmonized and comprehensive national NOx reduction program for heavy-duty on-highway engines and vehicles. On November 13, 2018, U.S. EPA announced the Cleaner Truck Initiative, and on January 6, 2020, they issued an Advance Notice of Proposed Rule to reduce NOx emissions from on-road heavy-duty trucks starting as early as model year 2026. However, CARB forged ahead, announcing its own Low NOx Omnibus rule, which 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.



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

The findings from the MATES IV[9] study (May 2015), which included local scale studies near large sources such as ports and freeways, reinforced the importance of the need for transformative transportation technologies, especially near the goods movement corridor to reduce NOx emissions. In

[9] http://www.aqmd.gov/docs/default-source/air-quality/air-toxic-studies/mates-iv/mates-iv-final-draft-report-4-1-15.pdf?sfvrsn=7

mid-2017, South Coast AQMD initiated MATES V to update the emissions inventory of toxic air contaminants, as well as modeling to characterize risks, including measurements and analysis of ultrafine particle concentrations typically emitted or subsequently formed from vehicle exhaust. The MATES V report is expected to be finalized by the end of 2020. 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 vehicles such as yard tractors, top handlers, and rubber tire gantry cranes, is being replaced by category specific methods and inventory models being developed for specific regulatory support projects.

A key strategy of the Clean Fuels Program, which allows significant leveraging of the Clean Fuels funding (historically $4 to every $1 of Clean Fuels funds), is its public-private partnerships with private industry, technology developers, academic institutions, research institutions and government agencies. Since 1988, the Clean Fuels Program provided more than $340 million toward projects exceeding $1.5 billion. In 1998, the 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 the technologies developed and demonstrated by the Clean Fuels Program. This synergy enables the South Coast AQMD to act as a leader in both technology development and commercialization efforts targeting reduction of criteria pollutants. Since the Carl Moyer Program began more than 20 years, the South Coast AQMD has implemented other incentive programs (i.e., Proposition 1B-Goods Movement, Community Air Protection Program and Voucher Incentive Program, to name a few), currently with cumulative funding of $250 million annually. With the success of this process, the 2016 AQMP also included control measures to develop indirect source regulations and strengthen the fleet rules that can take advantage of incentives provided, as a method of compliance to further accelerate emission reductions.

Despite several current California incentive programs to help implement cleaner technologies, however, even with some additional financial resources recently identified to offset the higher procurement costs of emerging clean technologies (i.e., Volkswagen Environmental Mitigation Trust which allocated $423 million to California), significant additional resources are still needed for the scale necessary to achieve the national ambient air quality standards for this region.

As technologies move towards commercialization, such as battery electric trucks, the Clean Fuels Program has been able to partner with large original equipment manufacturers (OEMs), such as Daimler and Volvo, in order to eventually deploy these vehicles in 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 standards, large numbers of advanced technology clean-fueled vehicles must be deployed across our region and state.

Figure 31 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 emission reduction benefits in the near term as well as over long term.

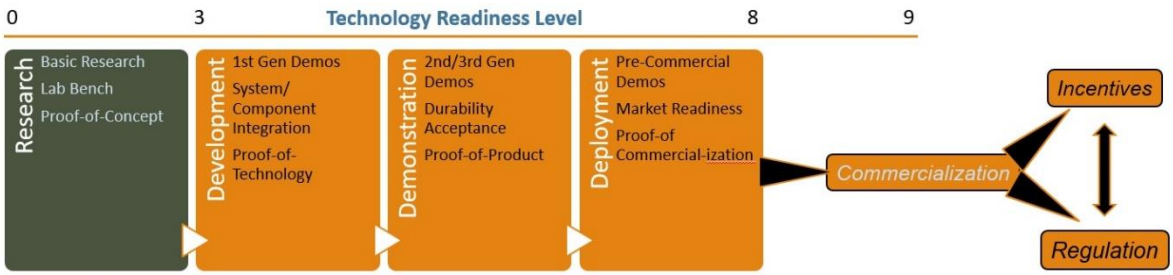


Figure 31: Technology Readiness Level Stages

While the state continues to focus their attention on climate change (GHG reductions), the South Coast AQMD remains committed to achieving NOx reductions. Fortunately, many of the technologies that address the Basin's needed NOx reductions align with the state's GHG reduction efforts. In fact, the U.S. EPA noted that in 2016 the transportation sector contributed 28 percent of overall GHG emissions. Given this, and other recent state and federal announcements, the South Coast AQMD is confident it can successfully partner on state and federally funded projects that promise NOx and GHG co-benefits.

Program and Funding Scope

This 2020 Plan Update includes projects to research, develop, demonstrate and advance deployment (RD^3) 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 getting ready for 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 2020 Plan Update needs to remain sufficiently flexible to address new challenges and measures that are identified in the 2016 AQMP, consider dynamically evolving technologies, and consider new research and data. The latter might include findings from MATES V and revised emission inventories in EMFAC 2017.

Within the core technology areas defined later in this section, project objectives range from near term to long term. The South Coast AQMD Clean Fuels Program concentrates on supporting development, demonstration and technology commercialization and deployment efforts rather than fundamental research. The nature and typical time-to-product for the Clean Fuels Program's projects is described below, from near term to long term.

- *Deployment* or technology *commercialization* efforts focus on increasing the 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 behaviors, even if such the technologies or fuels offer significant benefits. As a result, in addition to government's role to reduce risk by funding technology development and testing, it is also necessary to support and offset incremental costs through incentives to accelerate the transition and use of cleaner technologies. The increased use and

proliferation of these cleaner technologies often depends on initial support and funding as well as efforts to increase stakeholder confidence that these technologies are real, cost-effective in the long term and viable.

- Technologies ready to begin field *demonstration* in 2020 are expected to result in commercially available products in the 2023-2025 timeframe, and technologies being demonstrated generally are in the process of being certified by CARB and U.S. EPA. Field demonstrations provide a controlled environment for manufacturers to gain real-world experience and address end-user issues that arise prior to the commercial introduction of the technologies. Field demonstrations provide real-world evidence of performance to allay any concerns by early adopters.
- Finally, successful technology *development* projects are expected to begin during 2020 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. Thus, development projects identified in this plan may result in technologies ready for commercial introduction as soon as 2021-2025. Projects may involve the development of emerging technologies that are considered longer term and higher risk, but with significant emission reductions potential. Commercial introduction of such long-term technologies would not be expected until 2026 or later.

Core Technologies

The following technologies have been identified as having the greatest potential to enable the emission reductions needed to achieve NAAQS and thus form the core of the Clean Fuels Program.

The goal is to fund viable projects in all categories. However, not all project categories will be funded in 2020 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 agencies to expedite the demonstration and eventual implementation of cleaner alternative technologies in the Basin. A concerted effort is continually made to form public private partnerships to leverage Clean Fuels funds.

Several of the core technologies discussed below are synergistic. For example, a heavy-duty vehicle such as a transit bus or drayage truck, may utilize a hybrid electric drive train with a fuel cell operating on hydrogen fuel or an internal combustion engine operating on an alternative fuel as a range extender. Elements of the core hybrid electric system may overlap.

Priorities may shift during the year in keeping with the diverse and flexible "technology portfolio" approach or to leverage opportunities such as cost-sharing by the state or federal government or other entities. Priorities may also shift to address specific technology issues which affect residents within the South Coast AQMD's jurisdiction. For example, AB 617, signed by the Governor in mid-2017, will implement actions designated in Community Emission Reduction Plans (CERPs) by five AB 617 communities within the South Coast region, and additional flexibility will be needed to develop new strategies and technologies for those disproportionately affected communities.

The following nine core technology areas are listed by current South Coast AQMD priorities based on the goals for 2020.

Hydrogen/Mobile Fuel Cell Technologies and Infrastructure

The South Coast AQMD supports hydrogen infrastructure and fuel cell technologies as one option in the technology portfolio. It is dedicated to assisting federal and state government programs to deploy light-, medium-, and heavy-duty fuel cell vehicles by supporting the required hydrogen fueling infrastructure.

Calendar Years 2015-2019 were a critical timeframe for the introduction of hydrogen fueling infrastructure. In 2014, Hyundai introduced the Tucson FCV for lease. In 2015, Toyota commercialized the Mirai, the first FCV available to consumers for purchase. In December 2016, Honda started delivering its 2017 Honda Clarity FCV. Other commercially available FCVs include the Audi H-Tron Quattro, Chevrolet Colorado ZH2, Hyundai Nexo, Mercedes-Benz GLC F-Cell and Nissan X-Trail. With lead times on retail level hydrogen fueling stations requiring 18-36 months for permitting, construction and commissioning, plans for future stations need to be implemented. While coordination with the California Division of Measurement Standards (DMS) to establish standardized measurements for hydrogen fueling started in 2014, additional efforts to offer hydrogen for sale in higher volumes for light-duty vehicles are still needed. Changes to CARB's Low Carbon Fuel Standard (LCFS) regulation to provide credit for low carbon fuel capacity in addition to throughput should enable station operators to remain solvent during the early years until vehicle numbers ramp up. Lastly, a deliberate and coordinated effort is necessary to ensure that light-duty retail hydrogen stations are developed with design flexibility to address specific location limitations, robust hydrogen supply, and refueling reliability matching those of existing gasoline and diesel fueling stations. The current network of hydrogen fueling stations to support the current number of light-duty FCVs on the road is insufficient, and supply of hydrogen and additional hydrogen production continue to be challenges that need to be addressed.

In 2018, Former Governor Brown issued Executive Order (EO) B-48-18. Among other provisions, the order sets an additional hydrogen station network development target of 200 stations by 2025. Meeting this new ambitious target clearly requires accelerated effort on the part of the State to ensure its achievement. The EO additionally sets a target for 5 million ZEVs by 2030; FCVs are expected to comprise a significant portion of this future ZEV fleet. In September 2019, Governor Newsom issued EO N-19-19 on Climate Change, which directs CARB to push OEMs to produce even more clean vehicles, and to find ways for more Californians, including residents in disadvantaged communities, to purchase these vehicles on the new and used markets. CARB is tasked with developing new grant criteria for clean vehicle programs to encourage OEMs to produce clean, affordable cars and propose new strategies to increase demand in the primary and secondary markets for ZEVs. Finally, CARB is taking steps to strengthen existing or adopt new regulations to achieve GHG reductions within the transportation sector.

Fuel cells can play a role in medium- and heavy-duty applications where battery recharge time is insufficient to meet fleet operational requirements. The CaFCP's 2030 Vision[10] released in July 2018 provides a broader framework for the earlier Medium- and Heavy-Duty Fuel Cell Electric Truck Action Plan completed in October 2016, which focused on Class 4 parcel delivery trucks and Class 8 drayage trucks with infrastructure development and established metrics for measuring progress.

As part of the $83 million Shore-to-Store project, for which the Clean Fuels Program committed $1 million, Toyota and Kenworth will deploy 10 Class 8 fuel cell trucks and Equilon (Shell) will build two large capacity hydrogen fueling stations in Wilmington and Ontario. Kenworth will leverage the development on the fuel cell truck demonstrated in South Coast AQMD's ZECT 2 project and integrate Toyota's fuel cells into the Kenworth trucks. These fuel cell trucks will be deployed at fleets including

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

UPS, Total Transportation Services, Southern Counties Express, and Toyota Logistics Services at the Ports of Los Angeles and Port Hueneme, as well as other fleets in Riverside County. In 2019, Toyota displayed a second prototype Class 8 fuel cell truck at the Port of Long Beach, including plans for a new 1,000 kg/day heavy-duty hydrogen fueling station using hydrogen produced by a new tri-generation fuel cell.

The CaFCP *Fuel Cell Electric Bus Road* Map released in September 2019 supports implementation of CARB's Innovative Clean Transit and Zero Emission Airport Shuttle regulations. As part of the $46 million Fuel Cell Electric Bus Commercialization Consortium project, for which the Clean Fuels fund contributed $1 million, the Center for Transportation and Environment (CTE) partnered with New Flyer, Trillium, and Orange County Transportation Authority (OCTA) to deploy 10 40-foot New Flyer XHE40 fuel cell transit buses and install a liquid storage hydrogen station capable of fueling up to 50 fuel cell transit buses at OCTA. This project also deployed 10 fuel cell transit buses and a hydrogen station upgrade at Alameda-Contra Costa Transit District (AC Transit). The transit buses were delivered in December 2019 and liquid hydrogen station was completed in January 2020.

The 2020 Plan Update identifies key opportunities while clearly leading the way for pre-commercial demonstrations of OEM vehicles. Future projects may include the following:

- continued development and demonstration of distributed hydrogen production and fueling stations, including energy stations with electricity and hydrogen co-production and higher pressure (10,000 psi) hydrogen dispensing and scalable/higher throughput;
- development of additional sources of hydrogen production and local generation of hydrogen for fueling stations far from local production sources to better meet demand of FCVs;
- development and demonstration of cross-cutting fuel cell applications (e.g. plug-in hybrid fuel cell vehicles);
- development and demonstration of fuel cells in off-road, locomotive and commercial harbor craft applications such as port cargo handling equipment, switcher locomotives and tugs;
- demonstration of fuel cell vehicles in controlled fleet applications in the Basin;
- development and implementation of strategies with government and industry to build increasing scale and renewable content in the hydrogen market including certification and testing of hydrogen as a commercial fuel to create a business case for investing as well as critical assessments of market risks to guide and protect this investment;
- coordination with fuel cell vehicle OEMs to develop an understanding of their progress in overcoming barriers to economically competitive fuel cell vehicles and develop realistic scenarios for large scale introduction; and
- repurpose of fuel cells and hydrogen tanks for other, secondary energy production and storage uses, as well as reusing fuel cells and hydrogen tanks, and approaches to recycle catalysts and other metals.

Engine Systems/Technologies

To achieve the emissions reductions required for the Basin, internal combustion engines (ICEs) used in the heavy-duty sector will require emissions that are 90 percent lower than the 2010 standards as outlined in CARB's proposed Heavy-Duty On-Road "Omnibus" Low NOx regulation and EPA's Advance Notice of Proposed Rule. In 2016, commercialization of the Cummins 8.9 liter (8.9L) natural gas engine achieving 90 percent below the existing federal standard was a game changer. The 8.9L engine works well in refuse and other vocational trucks as well as transit and school buses. In 2017, Cummins Westport Inc., with South Coast AQMD and other project partners, also achieved certification of the 12L natural gas engine. The 12L engine in Class 8 drayage trucks and 60-foot articulated transit buses is a further game changer. CARB and U.S. EPA certified both engines at 0.02 g/bhp-hr for NOx. For smaller and long-haul trucks that cannot utilize the 8.9L and 12L near-zero emission engines, the 2020 Plan Update includes potential projects to develop, demonstrate and certify

natural gas engines in the 6-8L and larger 13-15L displacement range. Although no near-zero emission diesel technology is commercially available today, South Coast AQMD has been working closely with CARB and others on defining technology pathways via several projects, including the Ultra-Low Emissions Diesel Engine Program at Southwest Research Institute (SwRI), opposed piston engine development with Achates Power Inc., and Thermal Management using Cycle Deactivation Project with West Virginia University. These demonstration projects, although not yet complete, show that near-zero emission diesel technologies are feasible via advanced engine and aftertreatment or optimized engine design and calibration. The Plan Update continues to incorporate pursuit of cleaner engines for the heavy-duty sector. Future projects will support the development, demonstration and certification of engines that can achieve these massive emission reductions using an optimized systems approach. 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.

Heavy-duty hybrid vehicles have historically been optimized for fuel economy, new generation hybrid powertrains could be co-optimized for both criteria emissions and fuel economy that could better meet the air quality goals of the Basin. CARB announced their new proposal to allow medium-duty and heavy-duty hybrid powertrain certification procedures in CARB's proposed Heavy-Duty On-Road "Omnibus" Low NOx regulation. The new hybrid powertrain test procedures will properly credit for the fuel and emission benefits of hybrid vehicles and allow the entire hybrid system to certify to potentially lower engine standard on traditional engine dynamometers. South Coast AQMD have made initial contact with several OEMs to develop next generation heavy-duty hybrid powertrains to a lower NOx standard. These next generation hybrid powertrains provide another potential pathway for reducing NOx emissions in the near term.

The 2020 Plan includes potential projects that the South Coast AQMD might participate in with federal and state agencies towards these efforts. Specifically, these projects are expected to target the following:

- development of ultra-low emissions and improved higher efficiency natural gas engines for heavy-duty vehicles and high horsepower applications projects that move these technologies to a higher technology readiness level and eventual commercialization;
- continued development and demonstration of gaseous- and liquid-fueled, advanced fuels or alternative fuel medium-duty and heavy-duty engines and vehicles;
- development and demonstration of CNG hybrid vehicle technology;
- development and demonstration of diesel hybrid vehicle technology;
- development and demonstration of alternative fuel engines for off-road applications;
- evaluation of alternative engine systems such as hydraulic plug-in hybrid vehicles;
- development and demonstration of engine systems that employ advanced engine design features, cylinder deactivation, improved exhaust or recirculation systems, and aftertreatment devices; and
- development of low load and cold start technologies for hybrids and diesels where high-level emissions occur.

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

Electric/Hybrid Technologies and Infrastructure

In an effort to meet federal standards for PM2.5 and ozone, a primary focus must be on zero and near-zero emission technologies. A key strategy to achieve these goals is the wide-scale electrification of transportation technologies. With that in mind, the South Coast AQMD supports projects to address the concerns regarding cost, battery lifetime, travel range, charging infrastructure and OEM commitment.

Integrated transportation systems can encourage further emission reduction by matching EVs (zero emission, zero start-up emission, all electric range) to typical consumer demands for mobility and by linking them to transit. Additionally, the impact of fast charging on battery life and infrastructure costs needs to be better understood. This is especially important when every month roughly 36,000[11] new plug-in vehicles are sold or leased in the U.S. This number will increase significantly with the introduction of vehicles with 200-plus mile range, such as the Chevy Bolt, launched in December 2016, the Tesla Model 3 which came out in mid-2017, and Hyundai Kona, Nissan Leaf and more to come in 2020.

The development and deployment of zero emission goods movement technologies remains one of the top priorities for the South Coast AQMD to support a balanced and sustainable growth in the port complex. The South Coast AQMD continues to work with our regional partners, in particular the Ports of Los Angeles and Long Beach, the Southern California Association of Governments (SCAG) and Los Angeles County Metropolitan Transportation Authority (Metro) to identify technologies that could be beneficial to all stakeholders. Specific technologies include zero emission trucks (battery and/or fuel cell), or plug-in hybrid powertrains, near-zero emission locomotives (e.g., 90% below Tier 4), electric locomotives using battery electric tender cars and catenary systems, and linear synchronous motors for locomotives and trucks. Additionally, the California Sustainable Freight Action Plan outlines a blueprint to transition the state's freight system to an environmentally cleaner, more efficient and economical system, including a call for a zero and near-zero emission vehicle pilot project in Southern California. The Port of Los Angeles's Sustainable City Plan corroborates this effort, setting a goal of 15 percent of zero emission goods movement trips by 2025 and 35 percent by 2035. More recently, the Clean Air Action Plan 2017 Update adopted by Ports of Los Angeles and Long Beach calls for zero emissions cargo handling equipment by 2030 and zero emissions drayage trucks by 2035, respectively.

An example of a project in this core technology is one the South Coast AQMD is providing $500,000 from the Clean Fuels Fund to cost-share with the Port of Long Beach. The Sustainable Terminals Accelerating Regional Transformation (START) Project will develop and demonstrate 102 near-zero and zero emission vehicles, vessels, cargo handling equipment, and charging infrastructure, across an intermodal freight network at the Ports of Long Beach, Oakland and Stockton, in partnership with three California air districts. A total of 33 battery electric yard tractors, one battery electric top handler, 9 battery electric RTG cranes, five Class 8 battery electric trucks, and one electric drive tugboat will be demonstrated at the Port of Long Beach.

Continued technology advancements in light-duty infrastructure have facilitated the development of corresponding codes and standards for medium- and heavy-duty infrastructure. Additional traction may be gained in this area with the City of Los Angeles' Zero Emissions 2028 Roadmap in preparation for the 2028 summer Olympics in Los Angeles, which sets a goal of an additional 25 percent reduction in GHGs and air pollution beyond current commitments through accelerating transportation electrification. Additionally, SCE's Charge Ready Transport Program includes funding for medium- and heavy-duty vehicles and infrastructure.

Opportunities to develop and demonstrate technologies that could enable expedited widespread use of 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;

[11] https://insideevs.com/december-2018-u-s-ev-sales-recap/?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+InsideEvs+%28InsideEVs%29

- 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 electric off-road vehicles; e.g. battery electric off-road construction equipment;
- 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 vehicles;
- 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 understanding of the capability to accept fast-charging and the resultant life cycle and demonstration of the effects of fast-charging on battery life and vehicle performance; and
- deployment of infrastructure corresponding to codes and standards specific to light-, medium- and heavy-duty vehicles, including standardized connectors, fuel quality, communication protocols, and open standards and demand response protocols for EV chargers to communicate across charging networks.

Fueling Infrastructure and Deployment (Natural Gas/Renewable Fuels)

Significant demonstration and commercialization efforts funded by the Clean Fuels Program as well as other local, state and federal agencies are underway to: 1) support the upgrade and buildup of public and private infrastructure projects, 2) expand the network of public-access and fleet fueling stations based on the population of existing and anticipated vehicles, and 3) put in place infrastructure that will ultimately be needed to accommodate transportation fuels with very low gaseous emissions.

Compressed and liquefied natural gas (CNG and LNG) refueling stations are being positioned to support both public and private fleet applications. Upgrades and expansions are also needed to refurbish or increase capacity for some of the stations installed five or more years ago as well as standardize fueling station design, especially to ensure growth of alternative fuels throughout the Basin and beyond. There is also growing interest for partial or complete transition to renewable natural gas delivered through existing natural gas pipelines. Funding has been provided at key refueling points for light-, medium- and heavy-duty natural gas vehicle users traveling from the local ports, along I-15 and The

Greater Interstate Clean Transportation Corridor (ICTC) Network. SB 350 (De León) further established a target to double the energy efficiency in electricity and natural gas end uses by 2030.

Some of the projects expected to be developed and cofunded for infrastructure development are:

- development and demonstration of renewable natural gas as a vehicle fuel from renewable feedstocks and biowaste;
- development and demonstration of advanced, cost effective methods for manufacturing synthesis gas for conversion to renewable natural gas;
- enhancement of safety and emissions reductions from natural gas refueling equipment;
- expansion of fuel infrastructure, fueling stations, and equipment; and
- expansion of infrastructure connected with existing fleets, public transit, and transportation corridors, including demonstration and deployment of closed loop systems for dispensing and storage.

Stationary Clean Fuel Technologies

Although stationary source 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 formed during the combustion process. Challenges arise if ammonia distribution within the flue gas or operating temperature is not optimal resulting in ammonia emissions leaving the SCR in a process referred to as "ammonia slip". The ammonia slip may also lead to the formation of particulate matter in the form of ammonium sulfates. An ongoing demonstration project funded in part by the South Coast AQMD consists of retrofitting a Low 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.

Additionally, alternative energy storage could be achieved through vehicle-to-grid or vehicle-to-building technologies, as well as power-to-gas that could allow potentially stranded renewable electricity stored as hydrogen fuel. UCR's Sustainable Integrated Grid Initiative and UCI's Advanced Energy and Power Program, funded in part by the South Coast AQMD, for example, could assist in the evaluation of these technologies.

Projects conducted under this category may include:

- development and demonstration of reliable, low emission stationary technologies (e.g., new innovative low 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; and
- vehicle-to-grid or vehicle-to-building, or other stationary energy demonstration projects to develop sustainable, low emission energy storage alternatives.

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 NOx and VOCs from traditional combustion sources by replacement or retrofits with zero and near-zero emission technologies.

Health Impacts, Fuel and Emissions Studies

The monitoring of pollutants in the Basin is extremely important, especially when linked to (1) a particular sector of the emissions inventory (to identify the responsible source or technology) and/or (2) exposure to pollution (to assess potential health risks). In fact, studies indicate that ultrafine particulate matter (PM) can produce irreversible damage to children's lungs. This information highlights the need for further emission and health studies to identify emissions from high polluting sectors as well as the health effects resulting from these technologies.

Over the past few years, the South Coast AQMD has funded emission studies to evaluate the impact of tailpipe emissions of biodiesel and ethanol fueled vehicles mainly focusing on criteria pollutants and GHG emissions. These studies showed that biofuels, especially biodiesel in some applications and duty cycles, can contribute to higher NOx emissions while reducing other criteria pollutant emissions. Furthermore, despite recent advancements in toxicological research related to air pollution, the relationship between particle chemical composition and health effects is still not completely understood, especially for biofuels. In 2015, South Coast AQMD funded studies to further investigate the toxicological potential of emissions, such as ultrafine particles and vapor phase substances, and to determine whether substances such as volatile or semi-volatile organic compounds are being emitted in lower mass emissions that could pose harmful health effects. In addition, as the market share for gasoline direct injection (GDI) vehicles has rapidly increased from 4 percent of all vehicle sales in the U.S. to an estimated 60 percent between 2009 and 2016, it is important to understand the air quality impacts from these vehicles. South Coast AQMD has funded studies to investigate both physical and chemical composition of tailpipe emissions, focusing on PM from GDI vehicles as well as secondary organic aerosol formation formed by the reaction of gaseous and particulate emissions from natural gas and diesel heavy-duty vehicles. In 2017, South Coast AQMD initiated a basin wide in-use real-world emissions study, including fuel usage profile characterization and an assessment of the impacts of current technology and alternative fuels. Preliminary results suggest real-world emissions vary greatly between applications and fuel types. In 2019, CARB announced their latest proposal to the next lower level NOx standard, particularly highlighting the need to address the gap between certification values and in-use emissions. The new regulation included a new low-load cycle, new in-use emissions testing metric, and new concept to assess compliance across the entire vehicle population via onboard emission sensors. The real-world emissions study could help stakeholders better understand the impacts of emissions in real time to a specific geographic area.

In recent years, there has also been an increased interest at the state and federal level on the use of alternative fuels to reduce petroleum oil dependency, GHG emissions and air pollution. In order to sustain and increase biofuel utilization, it is essential to identify feedstocks that can be processed in a more efficient, cost-effective and sustainable manner. More recently, the power-to-gas concept has renewed interest in hydrogen-fossil fuel blends where the emissions impact on latest ICE technologies needs to be reassessed. 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 being 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 the health risks associated with ultrafine and ambient particulate matter including their composition to characterize their toxicity and determine specific combustion sources;
- in-use emission studies using biofuels, including renewable diesel, to evaluate in-use emission composition;
- in-use emission studies to determine the impact of new technologies, in particular EVs on local air quality as well as the 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 the 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 mp0ethods are also needed to address currently installed on-road and off-road technologies. Existing diesel emissions can be greatly reduced with introduction of natural gas into the engine or via aftertreatment controls such as PM traps and catalysts, as well as lowering the sulfur content or using additives with diesel fuel. Gas-to-Liquid (GTL) fuels, formed from natural gas or other hydrocarbons rather than petroleum feedstock and emulsified diesel, provide low emission fuels for use in diesel engines. As emissions from engines become lower and lower, the lubricant contributions to VOC and PM emissions become increasingly important. 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, 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 as needed, efforts to expedite the implementation of low emission and clean fuel technologies, coordination of these activities with other organizations and information dissemination to educate end users of these technologies. Technology transfer efforts include supporting various clean

fuel vehicle incentive programs, cosponsoring technology-related conferences, workshops and other events, and disseminating information on advanced technologies to various audiences (i.e., residents in disadvantaged communities, local governments, funding agencies, technical audiences).

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 $16.1 million for all potential projects. The expected actual project expenditures for 2020 will be less than the total South Coast AQMD projected program cost since not all projects will materialize. The target allocations are based on balancing technology priorities, technical challenges and opportunities discussed previously and near term versus long term benefits with the constraints on available South Coast AQMD funding. Specific contract awards throughout 2020 will be based on this proposed allocation, the quality of proposals received and evaluation of projects against standardized criteria and ultimately South Coast AQMD Board approval.

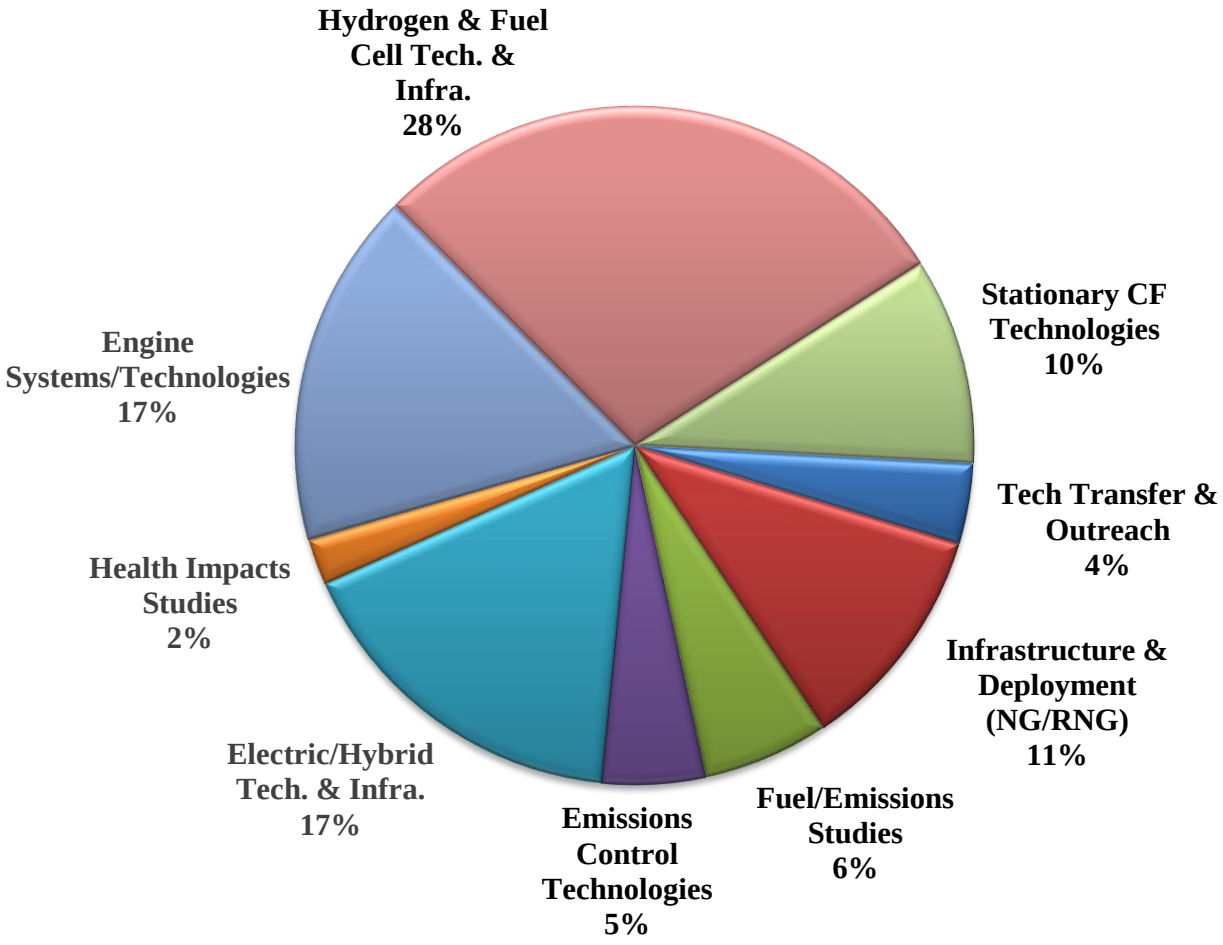


Figure 32: Projected Cost Distribution for Potential South Coast AQMD Projects in 2020 ($16.1M)

CLEAN FUELS PROGRAM
Program Plan Update for 2020

This section presents the Clean Fuels Program Plan Update for 2020. 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 be funded by revenue sources other than the Clean Fuels Program, specifically related to VOC and incentive projects.

Table 7 (page 71) summarizes potential projects for 2020 as well as the distribution of South Coast AQMD costs in some areas as compared to 2019. The funding allocation continues the focus on development and demonstration of zero and near-zero emission technologies including infrastructure to support these vehicles. For the 2020 Draft Plan, the same four funding categories remain at the top but with reduced funding for electric/hybrid technologies in light of large electric/hybrid projects recently funded and with additional funding to Stationary Clean Fuel Technologies and Emissions Control Technologies for planned projects in 2020, including:

- Heavy-duty zero emission fuel cell trucks and infrastructure;
- Onboard sensor development for emissions monitoring and improved efficiency;
- Microgrid demonstrations to support zero emission infrastructure;
- Electric school bus and fleet charging demonstrations;
- 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 2019-20 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 perform 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 and their applications, proposed scope of work of the project 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 7 (page 71).

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 7: Summary of Potential Projects for 2020

Proposed Project	Expected SCAQMD Cost $	Expected Total Cost $
Hydrogen/Mobile Fuel Cell Technologies and Infrastructure		
Develop and Demonstrate Hydrogen Research to Support Innovative Technology Solutions for Fueling Fuel Cell Vehicles	88,150	760,000
Develop and Demonstrate Hydrogen Production and Fueling Stations	1,763,000	6,000,000
Develop and Demonstrate Medium- and Heavy-Duty Fuel Cell Vehicles	2,644,500	12,000,000
Demonstrate Light-Duty Fuel Cell Vehicles	88,150	100,000
Subtotal	$4,583,800	$18,860,000
Engine Systems/Technologies		
Develop and Demonstrate Advanced Gaseous- and Liquid-Fueled Medium- and Heavy-Duty Engines & Vehicle Technologies to Achieve Ultra-Low Emissions	2,203,750	12,500,000
Develop and Demonstrate Alternative Fuel and Clean Conventional Fueled Light-Duty Vehicles	176,300	1,000,000
Develop and Demonstrate Low Load and Cold-Start Technologies	176,300	1,000,000
Develop and Demonstrate Low Emissions Locomotive Technologies	176,300	1,000,000
Subtotal	$2,732,650	$15,500,000
Electric/Hybrid Technologies and Infrastructure		
Develop and Demonstrate Medium- and Heavy-Duty On-Road and Off-Road Battery Electric and Hybrid Technologies	2,203,750	12,500,000
Develop and Demonstrate Electric Charging Infrastructure	220,375	1,250,000
Demonstrate Alternative Energy Storage	176,300	1,500,000
Demonstrate Light-Duty Battery Electric and Plug-In Hybrid Vehicles	100,000	100,000
Subtotal	$2,700,425	$15,350,000
Fueling Infrastructure and Deployment (Natural Gas/Renewable Fuels)		
Demonstrate Near-Zero Emission Natural Gas Vehicles in Various Applications	440,750	2,000,000
Develop, Maintain and Expand Natural Gas Infrastructure	440,750	2,000,000
Demonstrate Renewable Transportation Fuel Manufacturing and Distribution Technologies	881,500	10,000,000
Subtotal	$1,763,000	$14,000,000
Stationary Clean Fuel Technologies		
Develop and Demonstrate Microgrids with Photovoltaic/Fuel Cell/Battery Storage/EV Chargers and Energy Management	1,322,250	6,000,000
Develop and Demonstrate Renewables-Based Energy Generation Alternatives	264,450	1,000,000
Subtotal	$1,586,700	$7,000,000

Table 7: Summary of Potential Projects for 2020 (cont'd)

Proposed Project	Expected SCAQMD Cost $	Expected Total Cost $
Fuel/Emissions Studies		
Conduct In-Use Emissions Studies for Advanced Technology Vehicle Demonstrations	308,525	850,000
Conduct Emissions Studies on Biofuels, Alternative Fuels and Other Related Environmental Impacts	440,750	1,500,000
Identify and Demonstrate In-Use Fleet Emissions Reduction Technologies and Opportunities	220,375	1,000,000
Subtotal	$969,650	$3,350,000
Emissions Control Technologies		
Develop and Demonstrate Advanced Aftertreatment Technologies	176,300	2,000,000
Develop and Demonstrate Advanced Aftertreatment Catalyst Heating Technologies	220,375	1,000,000
Develop Methodology and Evaluate and Demonstrate Onboard Sensors for On-Road Heavy-Duty Vehicles	220,375	1,100,000
Demonstrate On-Road Technologies in Off-Road and Retrofit Applications	176,300	800,000
Subtotal	$793,350	$4,900,000
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	352,600	800,000
Support Implementation of Various Clean Fuels Vehicle Incentive Programs	264,450	400,000
Subtotal	$617,050	$1,200,000
TOTALS FOR POTENTIAL PROJECTS	**$16,099,225**	**$81,960,000**

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: $88,150

Expected Total Cost: $760,000

Description of Technology and Application:

California regulations require automakers to place increasing numbers of ZEVs into service every year. By 2050, CARB projects that 87% of light-duty vehicles on the road will be zero emission battery and FCVs.

Many stakeholders are working on hydrogen and fuel cell products, markets, requirements, mandates and policies. California has been leading the way for hydrogen infrastructure and FCV deployment. This leadership has advanced a hydrogen network that is not duplicated anywhere in the U.S. and is unique in the world for its focus on providing a retail fueling experience. In addition, the advancements have identified many lessons learned for hydrogen infrastructure development, deployment and operation. Other interested states and countries are using California's experience as a model case, making success in California paramount to enabling market acceleration and uptake in the U.S. U.S. leadership for hydrogen technologies is rooted in California, a location for implementing many DOE H2@Scale pathways, such as reducing curtailment and stranded resources, reducing petroleum use and emissions, and developing and creating jobs. The technical research capability of the national laboratories can be used to assist California in decisions and evaluations, as well as to verify solutions to problems impacting the industry. Because these challenges cannot be addressed by one agency or one laboratory, in 2018, a hydrogen research consortium was organized to combine and collaborate.

The California Hydrogen Infrastructure Research Consortium focuses on top research needs and priorities to address near-term problems in order to support California's continued leadership in innovative hydrogen technology solutions needed for fueling FCVs. These tasks also provide significant contributions to the DOE H2@Scale Initiative. For instance, advances in fueling methods and components can support the development of supply chains and deployments. Currently, funded tasks include data collection from operational stations, component failure fix verification (i.e., nozzle freeze lock), analysis of data to optimize new fueling methods for medium- and heavy-duty applications and ensuring hydrogen quality is maintained. The tasks are supported by leading researchers at NREL and coordinating national labs and managed in detail (e.g., schedule, budget, roles, milestones, tasks, reporting requirements) in a hydrogen research consortium project management plan.

These efforts are complemented by projects undertaken and supported by the Ca FCP over the last few years including their Medium- and Heavy-Duty Fuel Cell Electric Truck Action Plan released in October 2016 focusing on Class 4 parcel delivery trucks and Class 8 drayage trucks with infrastructure development and establishing metrics for measuring progress, and their Vision 2030 document released in July 2018 establishing a roadmap for future FCV and hydrogen refueling stations, including barriers that need to be overcome.

This project area would enable cofunding support for additional or follow on mutually agreed technical tasks with the California Hydrogen Infrastructure Research Consortium, the CaFCP as well as other collaborative efforts that may be undertaken to advance hydrogen infrastructure technologies.

Potential Air Quality Benefits:

The 2016 AQMP identifies the use of alternative fuels and zero emission transportation technologies as necessary to lower NOx and VOC emissions, in an effort to meet federal air quality standards. One of the major advantages of FCVs is the fact that they use hydrogen, a fuel that can be domestically produced from a variety of resources such as natural gas (including biogas), electricity (stationary turbine technology, solar or wind) and biomass. The technology and means to produce hydrogen fuel to support FCVs are available but require optimization to achieve broad market scale. The deployment of large numbers of FCVs, which is one strategy to attain air quality goals, requires a well-planned and robust hydrogen fueling infrastructure network. This South Coast AQMD project, with significant additional funding from other governmental and private entities, will work towards providing the necessary hydrogen fueling infrastructure network.

Proposed Project: Develop and Demonstrate Hydrogen Production and Fueling Stations

Expected South Coast AQMD Cost: $1,763,000

Expected Total Cost: $6,000,000

Description of Technology and Application:

Alternative fuels, such as hydrogen and the use of advanced technologies, such as 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 and dispensing pressure of up to 10,000 psi and compatibility with existing CNG stations may be considered.

Energy Stations: Multiple-use energy stations that can produce hydrogen for FCVs or for stationary power generation are considered an enabling technology with the potential for costs competitive with large-scale reforming. System efficiency, emissions, hydrogen throughput, hydrogen purity and system economics will be monitored to determine the viability of this strategy for hydrogen fueling infrastructure deployment and as a means to produce power and hydrogen from renewable feedstocks (e.g., biomass, digester gas).

Innovative Refueling Appliances: Home or small scale refueling/recharging is an attractive advancement for alternative clean fuels due to the limited conventional refueling infrastructure. This project would evaluate a hydrogen innovative refueler for cost, compactness, performance, durability, emission characteristics, ease of assembly and disassembly, maintenance and operations. Other issues such as setbacks, building permits, building code compliance and UL ratings for safety would also be evaluated.

Projections for on-the-road FCVs counts now exceed 23,000 in 2021 and 47,000 in 2024 in California and the majority of these do not include medium- and heavy-duty vehicles that may be deployed in the Basin. To provide fuel for these vehicles, the hydrogen fueling infrastructure needs to be significantly increased and become more reliable in terms of availability. South Coast AQMD will seek additional funding from CEC and CARB to construct and operate hydrogen fueling stations and take advantage of funding opportunities that may be realized by any momentum created by the Governor's 2018 Executive Order to establish 200 stations by 2025.

Potential Air Quality Benefits:

The 2016 AQMP identifies the use of alternative clean fuels in mobile sources as a key attainment strategy. Pursuant to AQMP goals, the South Coast AQMD has in effect several fleet rules that require public and certain private fleets to purchase clean-burning alternative-fueled vehicles when adding or replacing vehicles to their vehicle fleets. FCVs constitute some of the cleanest alternative-fuel vehicles today. Since hydrogen is a key fuel for FCVs, this project would address some of the barriers faced by hydrogen as a fuel and thus assist in accelerating its acceptance and ultimate commercialization. In addition to supporting the immediate deployment of the demonstration fleet, expanding the hydrogen fuel infrastructure should contribute to the market acceptance of fuel cell technologies in the long run, leading to substantial reductions in NOx, VOC, CO, PM and toxic compound emissions from vehicles.

Proposed Project: Develop and Demonstrate Medium- and Heavy-Duty Fuel Cell Vehicles

Expected South Coast AQMD Cost: $2,644,500

Expected Total Cost: $12,000,000

Description of Technology and Application:

This proposed project would support evaluation including demonstration of promising fuel cell technologies for applications using direct hydrogen with proton exchange membrane (PEM) fuel cell technology. Battery dominant fuel cell hybrids are another potential technology as a way of reducing costs and potentially enhancing performance of FCVs.

The California ZEV Action Plan specifies actions to help deploy an increasing number of ZEVs, including medium- and heavy-duty ZEVs. CARB recently adopted Innovative Clean Transit Bus Regulation as another driver. Fleets are useful demonstration sites because economies of scale exist in central refueling, in training skilled personnel to operate and maintain the vehicles, in the ability to monitor and collect data on vehicle performance and for manufacturer technical and customer support. In some cases, medium- and heavy-duty FCVs could leverage the growing network of hydrogen stations, providing an early base load of fuel consumption until the number of passenger vehicles grows. These vehicles could include hybrid-electric vehicles powered by fuel cells and equipped with batteries capable of being charged from the grid and even supplying power to the grid.

In 2012, the DOE awarded South Coast AQMD funds to demonstrate Zero Emission Container Transport (ZECT) technologies. In 2015, the DOE awarded South Coast AQMD additional funds to develop and demonstrate additional fuel cell truck platforms and vehicles under ZECT II. More recently, the Clean Fuels Program cost-shared the development of transit buses at OCTA and will cost-share the demonstration of trucks and hydrogen stations to support the Port of Los Angeles project. More projects like these are anticipated as the OEMs come on board.

This category may include projects in the following applications:

On-Road:	**Off-Road:**
• Transit Buses • Shuttle Buses • Medium- & Heavy-Duty Trucks	• Vehicle Auxiliary Power Units • Construction Equipment • Lawn and Garden Equipment • Cargo Handling Equipment

Potential Air Quality Benefits:

The 2016 AQMP identifies the need to implement ZEVs. South Coast AQMD adopted fleet regulations require public and some private fleets within the Basin to acquire alternatively fueled vehicles when making new purchases. In the future, such vehicles could be powered by zero emission fuel cells operating on hydrogen fuel. The proposed projects have the potential to accelerate the commercial viability of FCVs. Expected immediate benefits include the establishment of zero and near-zero emission proof-of-concept vehicles in numerous applications. Over the longer term, the proposed projects could help foster wide-scale implementation of FCVs in the Basin. The proposed projects could also lead to significant fuel economy improvements, manufacturing innovations and the creation of high-tech jobs in Southern California, besides realizing the air quality benefits projected in the AQMP as well as GHG emission reductions.

Proposed Project: Demonstrate Light-Duty Fuel Cell Vehicles

Expected South Coast AQMD Cost: $88,150

Expected Total Cost: $100,000

Description of Technology and Application:

This proposed project would support the demonstration of limited production and early commercial light-duty FCVs using gaseous hydrogen with proton exchange membrane (PEM) fuel cell technology, mainly through showcasing this technology. Recent designs of light-duty FCVs include hybrid batteries to recapture regenerative braking and improve overall system efficiency.

With the implementation of the California ZEV Action Plan, supplemented by the existing and planned hydrogen refueling stations in the Southern California area, light-duty limited-production FCVs are planned for retail deployment in early commercial markets near hydrogen stations by several OEMs. Fleets are useful demonstration sites because economies of scale exist in central refueling, in training skilled personnel to operate and maintain the vehicles, in the ability to monitor and collect data on vehicle performance and for OEM technical and customer support. South Coast AQMD has included FCVs as part of its demonstration fleet since it started the Five Cities Program in 2005 with the Cities of Burbank, Ontario, Riverside, Santa Ana, and Santa Monica to deploy 30 hydrogen ICE vehicles and five hydrogen stations. As part of this effort, South Coast AQMD has provided support, education, and outreach regarding FCV technology on an ongoing basis. In addition, demonstration vehicles could include hybrid-electric vehicles powered by fuel cells and equipped with larger batteries capable of being charged from the grid and even supplying power to the grid.

Hyundai, Toyota and Honda have commercialized FCVs in California, but the first commercial FCV leases are ending, and solo carpool lane access extends only for MY 2017 and later, encouraging new replacements. Innovative strategies and demonstration of dual fuel, ZEVs could expand the acceptance of BEVs and accelerate the introduction of fuel cells in vehicle propulsion.

Potential Air Quality Benefits:

The 2016 AQMP identifies the need to implement ZEVs. South Coast AQMD adopted fleet regulations require public and some private fleets within the Basin to acquire alternatively fueled vehicles when making new purchases. In the future, such vehicles could be powered by zero emission fuel cells operating on hydrogen fuel. The proposed projects have the potential to accelerate the commercial viability of FCVs. Expected immediate benefits include the deployment of zero emission vehicles in South Coast AQMD's demonstration fleet. Over the longer term, the proposed projects could help foster wide-scale implementation of ZEVs in the Basin. The proposed projects could also lead to significant fuel economy improvements, manufacturing innovations and the creation of high-tech jobs in Southern California, besides realizing the air quality benefits projected in the AQMP.

Engine Systems/Technologies

Proposed Project: Develop and Demonstrate Advanced Gaseous- and Liquid-Fueled Medium- and Heavy-Duty Engines and Vehicles Technologies to Achieve Ultra-Low Emissions

Expected South Coast AQMD Cost: $2,203,750

Expected Total Cost: $12,500,000

Description of Technology and Application:

The objective of this proposed project would be to support development and certification of near-commercial prototype low emission medium- and heavy-duty gaseous- and liquid-fueled engine technologies, as well as integration and demonstration of these technologies in on-road vehicles. The NOx emissions target for this project area is 0.02 g/bhp-hr or lower and the PM emissions target is below 0.01 g/bhp-hr. To achieve these targets, an effective emissions control strategy must employ advanced fuel system and engine design features, cylinder deactivation, aggressive engine calibration and improved thermal management, improved exhaust gas recirculation systems, and aftertreatment devices that are optimized using a system approach. This effort is expected to result in several projects, including:

- development and demonstration of advanced engines in medium- and heavy-duty vehicles and high horsepower (HP) applications;
- development of durable and reliable retrofit technologies to partially or fully convert engines and vehicles from petroleum fuels to alternative fuels; and
- field demonstrations of advanced technologies in various fleets operating with different classes of vehicles.

Anticipated fuels for these projects include but are not limited to alternative fuels (fossil fuel-based and renewable natural gas, propane, hydrogen blends, electric and hybrid), conventional and alternative diesel fuels, ultra-low sulfur diesel, renewable diesel, dimethyl ether and gas-to-liquid fuels.

The use of alternative fuel in heavy-duty trucking applications has been demonstrated in certain local fleets within the Basin. These vehicles typically require 200-400 HP engines. Higher HP alternative fuel engines are beginning to be introduced. However, vehicle range, lack or limited accessible public infrastructure, lack of experience with alternative fuel engine technologies and limited selection of appropriate alternative fuel engine products have made it difficult for more firms to consider significant use of alternative fuel vehicles. For example, in recent years, several large trucking fleets have expressed interest in using alternative fuels. However, at this time the choice of engines over 400 HP or more is limited. Continued development of cleaner dedicated alternative gaseous- or diesel-fueled engines over 400 HP with lower NOx emissions, would increase availability to end-users and provide additional emission reductions.

Potential Air Quality Benefits:

This project is intended to expedite the commercialization of near-zero emission gaseous- and liquid-fueled medium- and heavy-duty engine technology both in the Basin and in intrastate operation. The emissions reduction benefits of replacing one 4.0 g/bhp-hr heavy-duty engine with a 0.2 g/bhp-hr engine in a vehicle that consumes 10,000 gallons of fuel per year is about 1,400 lb/yr of NOx. A heavy-duty 8.9L and 11.9L engines using natural gas achieving NOx emissions of 0.02 g/bhp-hr have been certified and commercialized, with larger displacement and advanced technology (e.g., opposed piston) engines undergoing development. Further, neat or blended alternative fuels can also reduce heavy-duty engine particulate emissions by over 90 percent compared to current diesel technology. 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.

Proposed Project: Develop and Demonstrate Alternative Fuel and Clean Conventional Fueled Light-Duty Vehicles

Expected South Coast AQMD Cost: $176,300

Expected Total Cost: $1,000,000

Description of Technology and Application:

Although new conventionally fueled vehicles are much cleaner than their predecessors, not all match the lowest emissions standards often achieved by alternative fuel vehicles. This project would assist in the development, demonstration and certification of both alternative-fueled and conventional-fueled vehicles to meet the strictest emissions requirements by the state, e.g., SULEV for light-duty vehicles. The candidate fuels include CNG, LPG, ethanol, GTL, clean diesel, modified bio-diesel and ultra-low sulfur diesel, and other novel technologies. The potential vehicle projects may include:

- certification of CNG light-duty sedans and pickup trucks used in fleet services;
- assessment of "clean diesel" vehicles, including hybrids and their ability to attain SULEV standards; and
- assessment of other clean technologies.

Other fuel and technology combinations may also be considered under this category.

Potential Air Quality Benefits:

The 2016 AQMP identifies the use of alternative clean fuels in mobile sources as a key attainment strategy. Pursuant to AQMP goals, the South Coast AQMD has in effect several fleet rules that require public and certain private fleets to purchase clean-burning alternative-fueled vehicles when adding or replacing vehicles to their vehicle fleets. This project is expected to lead to increased availability of low emission alternative-and conventional-fueled vehicles for fleets as well as consumer purchase.

Proposed Project: Develop and Demonstrate Low Load and Cold-Start Technologies

Expected South Coast AQMD Cost: $176,300

Expected Total Cost: $1,000,000

Description of Technology and Application:

Cold starts and low loads of internal combustion engines have a negative impact on the environment. The thermal efficiency of the internal combustion engine is significantly lower at cold-starts and lower loads. Exhaust aftertreatment systems require a temperature of 250 degrees Celsius or higher to operate at the highest level of emissions reduction efficiency. Diesel engines at cold start increase emissions as much as 10% compared to spark-ignited CNG engines. At low loads, an aftertreatment system often may operate at 150 degrees Celsius. It is also now known that the smaller hybrid engines are experiencing similar warm-up issues due to the on-off drive cycles. The need for thermal efficiency at start- up has led to a variety of suggestions and trials. The primary goal is to reduce energy losses so that systems and components such as the catalytic converter system reach and maintain their intended operating temperature range as soon as possible after engine start. In most cases, adaptation of algorithms associated with fuel injection timing, cylinder deactivation, EGR fraction, turbo control, heated dosing, SCR pre-heaters and close coupled catalysts can be used to keep the catalyst at the correct operating temperature. This project is to investigate technology to improve catalyst temperature at start-up and low loads with minimal economic impact and time. This technology could be applied to a range of vehicles from hybrid-electric light-duty vehicles to heavy-duty trucks. Emphasis should be on steady temperature control at optimal degrees already proven and established through significant research. The following items are the most recently developed best practices with respect to cost and functionality.

- design and prove cylinder activation technology; and
- develop control algorithms to ensure the catalyst maintains temperature throughout the duty cycle.

The project would be implemented, and fleet tested, and recorded over a minimum 12-month period. Further projects can develop from this technology and should be tested in regard to other liquid fuel burning engines.

Potential Air Quality Benefits:

The technology to reduce emissions at cold starts and low loads is beneficial to a broad spectrum of vehicles from hybrid electric, light-duty and heavy-duty engines in drayage long haul trucks. The advancement in this technology will directly contribute toward low NOx required as a result of U.S. EPA's heavy-duty engine standard and the current attainment policies in effect. Eliminating cold starting engine issues also directly creates a co- benefit of reducing fuel consumption.

Proposed Project: Develop and Demonstrate Low Emissions Locomotive Technologies

Expected South Coast AQMD Cost: $176,300

Expected Total Cost: $1,000,000

Description of Technology and Application:

The objective of this project is to support the development and demonstration of gaseous and liquid fueled locomotive engines. The requirements of locomotive engines as primary generators of electricity to power the locomotive poses serious challenges. Locomotives operate at a specific duty cycle different than conventional on-road engines. The engines often run at low speed and have extended periods of idle time. The durability requirements also surpass other forms of transportation.

Large displacement gaseous fueled engines do not currently exist to power locomotives. The early stages of development of engines and systems to fill this need is currently on-going. Engines are expected to be below the current 0.2g/bhp-hr low NOx standard. The adaptation of alternative fueled locomotives in coordination with required infrastructure improvement by leading manufacturers in the industry shows great potential for further research and cost savings with less maintenance costs and better reliability.

Potential Air Quality Benefits:

This project is expected to reduce emissions around 97 tons per year of NOx for each locomotive. The reduction of PM and CO2 also shows great potential mitigation in environmental justice communities.

Electric/Hybrid Technologies and Infrastructure

Proposed Project: Develop and Demonstrate Medium- and Heavy-Duty On-Road and Off-Road Electric and Hybrid Vehicles

Expected South Coast AQMD Cost: $2,203,750

Expected Total Cost: $12,500,000

Description of Technology and Application:

The significance of transportation in overall carbon emissions is increasing as energy utilities move toward cleaner and more sustainable ways to generate electricity. The U.S. EPA estimated that in 2016, transportation was responsible for about 28 percent of the nation's carbon emissions, while the electricity sector emissions declined from 31 to 28 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 current and planned market offerings in this category, priorities have shifted. Nevertheless, the South Coast AQMD will continue to evaluate market offerings and proposed technologies in light-duty vehicles to determine if any future support is required.

Meanwhile, medium- and heavy-duty vehicles make up 4.3 percent of vehicles in the U.S. and drive 9.3 percent of all vehicle miles traveled each year yet are responsible for more than 25 percent of all the fuel burned annually. Moreover, the AQMP identified medium- and heavy-duty vehicles as the largest source of NOx emissions in the South Coast Air Basin. Electric and hybrid technologies have gained momentum in the light-duty sector with commercial offerings by most of the automobile manufacturers. Unfortunately, the medium- and heavy-duty platforms require the greatest emission reductions, especially for the fleets due to low turnover.

The South Coast AQMD has investigated the use of electric and hybrid technologies to achieve similar performance as the conventional-fueled counterparts while achieving both reduced emissions and improved fuel economy. Development and validation of emissions test procedures is needed but is complicated due to the low volume and variety of medium- and heavy-duty vehicles. In 2019, CARB announced the next stages of lower NOx standards and introduced the new hybrid powertrain certification test procedures. The new test procedures will account for the fuel and emission benefits of hybrid vehicles and allow them to certify to a potentially lower engine standard. South Coast AQMD have made initial contact with several OEMs to develop next generation lower NOx heavy-duty diesel and natural gas hybrid powertrains. Hybrid technologies offers a potentially faster commercialization pathway for reducing both NOx and greenhouse gas emissions in the near term by strategically utilizing the existing internal combustion engines and electric components. These new hybrid powertrains could be used as a bridge to the zero emission technologies. Due to limited time to attainment, continued development and demonstration efforts are much needed in the medium- and heavy-duty sector in order to accelerate the commercialization of next generation hybrid technologies to market.

Platforms to be considered include utility trucks, delivery vans, shuttle buses, transit buses, waste haulers, construction equipment, cranes and other off-road vehicles. Innovations that may be considered for demonstration include: advancements in the auxiliary power unit, either ICE or other heat engine; and battery-dominant hybrid systems utilizing off-peak re-charging, with advanced battery technologies. Alternative fuels are preferred in these projects, e.g., natural gas, especially from renewable sources, LPG, hydrogen, GTL and hydrogen-natural gas blends, but conventional fuels such as gasoline, renewable diesel, or even modified biodiesel may be considered if the 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.

As on-road mobile sources are increasingly getting cleaner, the off-road sector has been gaining attention. These sources include cargo handling equipment and off-road construction equipment. Several manufacturers have released electric and hybrid equipment, and more are underway. Since the applications are more diverse in this sector, continued development and incentives are needed to accelerate the progress in this sector.

This project category will develop and demonstrate:

- various EV architectures;
- anticipated costs for such architectures;
- customer interest and preferences for each alternative;
- integration of the technologies into prototype vehicles and fleets;
- electric and hybrid-electric medium- and heavy-duty vehicles (e.g., utility trucks, delivery vans, shuttle buses, transit buses, waste haulers, construction equipment, cranes and other off-road vehicles);
- development and demonstration of electric off-road vehicles, e.g., battery electric off-road construction equipment;
- development and demonstration of CNG hybrid vehicle technology; and
- development and demonstration of diesel hybrid vehicle technology.

Potential Air Quality Benefits:

The 2016 AQMP identifies zero or near-zero emission vehicles as a key attainment strategy. Plug-in hybrid electric technologies have the potential to achieve near-zero emission while retaining the range capabilities of a conventionally gasoline-fueled combustion engine vehicle, a key factor expected to enhance broad consumer acceptance. Given the variety of EV systems under development, it is critical to determine the true emissions and performance utility compared to conventional vehicles. Successful demonstration of optimized prototypes would promise to enhance the deployment of 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 AQMP.

Proposed Project: Develop and Demonstrate Electric Charging Infrastructure

Expected South Coast AQMD Cost: $220,375

Expected Total Cost: $1,250,000

Description of Technology and Application:

There is a critical need to address gaps in EV charging infrastructure availability. Almost half (48 percent) of the 1,293,728 EVs sold in the U.S. since 2011 were in California, and of those sales in California, it is estimated that almost half (43 percent) of CVRP rebates issued to date were issued in 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.

The revised recommended practice SAE J1772 enables passenger vehicles to charge from 240V AC (Level 2) and 480V DC charging using a common conductive connector in 30 minutes for 90 miles of range (50 kW fast charger) or 40 minutes for 200 miles of range (135 kW Tesla fast charger). Together with the growing adoption of long range EVs above 200-mile electric range, the technology and infrastructure of three fast charging systems (CCS1 in North America and CCS2 elsewhere in the world, CHAdeMO and Tesla) are developing as well, although China adopted a GB/T standard based on CHAdeMO. Technological developments improving the driving range of EVs, as well as increasing availability and speed of charging infrastructure, could change the need for charging infrastructure in the future. However, a study of fast charging impact on battery life and degradation is very limited. The research and demonstration to increase understanding of the degradation effects of fast charging will have implications on what types of charging EV owners will leverage and what EVSE stakeholders will bring to market. South Coast AQMD is committed to continuing to support the successful deployment of EV charging infrastructure as well as demonstration of fast charging effect on battery life, leveraging funds from the state, local utility funds like SCE's Charge Ready and the Volkswagen settlement.

The South Coast AQMD is actively pursuing development of intelligent transportation systems, such as Volvo's EcoDrive software platform being utilized for the ZEDT and Volvo LIGHTS projects, to improve traffic efficiency of battery electric and fuel cell electric cargo container 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 is also using geofencing capabilities to operate in zero emissions mode while traveling through disadvantaged communities. A truck eco-routing system can provide the most eco-friendly travel route based on truck engine/emission control characteristics, loaded weight, road grade and real-time traffic conditions. Integrated programs can interconnect fleets of electric drive vehicles with mass transit via web-based reservation systems that allow multiple users. These integrated programs can match the features of EVs (zero emissions, zero start-up emissions, short range) to typical consumer demands for mobility in a way that significantly reduces emissions of pollutants and greenhouse gases.

This project category is one of South Coast AQMD's continued efforts to:

- deploy a network of DC fast charging infrastructure (350kW or more) and rapidly expand the existing network of public EV charging stations including energy storage systems;
- charging infrastructure and innovative systems to support advanced vehicle development projects;
- support investigation of fast charging impact on battery life;
- develop intelligent transportation system strategies for cargo containers; and
- develop freight load-balancing strategies as well as to conduct market analysis for zero emission heavy-duty trucks in goods movement.

Potential Air Quality Benefits:

The 2016 AQMP identifies zero emission vehicles as a key attainment strategy. This proposed project category will reduce PM pollution along major roadways through the expansion of the public EV charging infrastructure network by allowing drivers to shift away from petroleum-fueled vehicles to battery and FCVs. In addition, this project will assist in achieving improved fuel economy and lower tailpipe emissions, further helping the region to achieve federal ambient air quality standards and protect public health. Expected benefits include the establishment of criteria for 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 South Coast Basin, which is a high priority of the AQMP.

Proposed Project: Demonstrate Alternative Energy Storage

Expected South Coast AQMD Cost: $176,300

Expected Total Cost: $1,500,000

Description of Technology and Application:

The South Coast AQMD has been involved in the development and demonstration of energy storage systems for electric and hybrid-electric vehicles, mainly lithium ion chemistry battery packs. Over the past few years, new technologies, especially lithium-ion batteries have shown robust performance. Other technology manufacturers have also developed energy storage devices including beyond lithium-ion batteries, flywheels, hydraulic systems and ultracapacitors. Energy storage systems optimized to combine the advantages of ultracapacitors and high-energy but low-power advanced batteries could yield benefits. Beyond lithium-ion batteries (e.g., lithium-sulfur, lithium-oxygen, sodium-ion, flow, and solid-state batteries) also have opportunities to achieve higher energy density, longer cycle life, and lower cost.

This project category is to apply these advanced storage technologies in vehicle platforms to identify best fit applications, demonstrate their viability (reliability, maintainability and durability), gauge market preparedness, evaluate costs relative to current lithium-ion batteries and provide a pathway to commercialization.

The long-term objective of this project is to decrease fuel consumption and resulting emissions without any changes in performance compared to conventional vehicles. This effort will support several projects for development and demonstration of different types of low emission hybrid vehicles using advanced energy storage strategies and conventional or alternative fuels. The overall net emissions and fuel consumption of these types of vehicles are expected to be much lower than traditional engine systems. Both new and retrofit technologies will be considered.

Additionally, this project will also assess potential for repurposing of electric vehicle batteries for storage as well as the longer term more cost-effective recycling approaches currently in a nascent "pilot" stage, especially for metals such as lithium and cobalt.

Potential Air Quality Benefits:

Certification of low emission vehicles and engines and their integration into the Basin's transportation sector is a high priority under the 2016 AQMP. This project is expected to further efforts to develop alternative energy storage technologies that could be implemented in medium- and heavy-duty trucks, buses and other applications. Benefits will include proof of concept for the new technologies, diversification of transportation fuels and lower emissions of criteria, toxic pollutants and greenhouse gases.

Proposed Project: Demonstrate Light-Duty Battery Electric and Plug-In Hybrid Vehicles

Expected South Coast AQMD Cost: $100,000

Expected Total Cost: $100,000

Description of Technology and Application:

This proposed project would support the demonstration of limited production and early commercial light-duty BEVs and PHEVs using advanced technology, mainly through showcasing this technology. Recent designs of light-duty BEVs and PHEVs provide increased range before recharging, improved efficiency and recharging 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 on an ongoing basis.

Light-duty BEVs and PHEVs are available from most established OEMs and several new OEMs. Since solo carpool lane access extends only for three years through MY 2025 according to current legislation, demonstration vehicle replacement is encouraged.

Potential Air Quality Benefits:

The 2016 AQMP identifies the need to implement ZEVs. South Coast AQMD adopted fleet regulations require public and some private fleets within the Basin to acquire alternatively fueled vehicles when making new purchases. In the future, such vehicles could be powered by BEVs. The proposed projects have the potential to accelerate the 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 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.

Fueling Infrastructure and Deployment (Natural Gas/Renewable Fuels)

Proposed Project: Demonstrate Near-Zero emission Natural Gas Vehicles in Various Applications

Expected South Coast AQMD Cost: **$**440,750

Expected Total Cost: $2,000,000

Description of Technology and Application:

Natural gas vehicles (NGVs) have been very successful in reducing emissions in the Basin due to the deployment by fleets and owners and operators of heavy-duty vehicles utilizing this clean fuel. Currently, on-road heavy-duty natural gas engines are increasingly being certified to CARB's optional low-NOx standards which are significantly lower in NOx than the current on-road heavy-duty standard. This technology category seeks to support the expansion of OEMs producing engines or systems certified to the lowest optional NOx standard or near-zero emissions and useable in a wide variety of medium- and heavy-duty applications, such as Class 6 vehicles used in school buses and in passenger and goods delivery vans, Class 7 vehicles such as transit buses, waste haulers, street sweepers, sewer-vector trucks, dump trucks, concrete mixers, commercial box trucks, and Class 8 tractors used in goods movement and drayage operations and off-road equipment such as construction vehicles and yard hostlers. This category can also include advancing engine technologies to improve engine efficiencies that will help attract heavy-duty vehicle consumers to NGVs.

Potential Air Quality Benefits:

Natural gas-powered vehicles have inherently lower engine criteria pollutant emissions relative to conventionally-fueled vehicles, especially older diesel-powered vehicles. Recently, on-road heavy-duty engines have been certified to near-zero emission levels that are 90% lower in NOx than the current on-road HDV standard. California's On-Road Truck and Bus Regulation requires all on-road HDVs to meet the current standard by January 1, 2023. The deployment of near-zero emission vehicles would significantly further emission reductions relative to the state's current regulatory requirements. Incentivizing the development and demonstration of near-zero emission NGVs in private and public fleets, goods movement applications, transit buses will help reduce local emissions and emissions exposure to nearby residents. Natural gas vehicles can also have lower greenhouse gas emissions and can increase energy diversity, help address national energy security objectives, and can reduce biomass waste when produced from such feedstocks. Deployment of additional NGVs is consistent with South Coast AQMD's AQMP to reduce criteria pollutants, and when fueled by RNG supports California's objectives of reducing GHGs and the carbon intensity of the state's transportation fuel supply, as well as the federal government's objective of increasing domestically produced alternative transportation fuels.

Proposed Project: Develop, Maintain & Expand Natural Gas Infrastructure

Expected South Coast AQMD Cost: $440,750

Expected Total Cost: $2,000,000

Description of Technology and Application:

This project supports the development, maintenance and expansion of natural gas fueling stations in strategic locations throughout the Basin, including the Ports, and advancing technologies and station design to improve fueling and refueling efficiencies of heavy-duty NGVs. This category supports the broader deployment of near-zero emission heavy-duty vehicles and the implementation of South Coast AQMD's fleet rules. In addition, as natural gas fueling equipment begins to age or has been placed in demanding usage, components will deteriorate. This project offers facilities to replace worn-out equipment or to upgrade existing fueling and/or garage and maintenance equipment to offer increased fueling capacity to public agencies, private fleets and school districts.

Potential Air Quality Benefits:

The AQMP identifies the use of alternative clean fuels in mobile sources as a key attainment strategy. Heavy-duty NGVs have significantly lower emissions than their diesel counterparts and represent the cleanest internal combustion engine-powered vehicles available today. The project has the potential to significantly reduce the installation and operating costs of NGV refueling stations, and improving vehicle refueling times through improved refueling systems designs and high-flow nozzles. While new or improved NGV stations have an indirect emissions reduction benefit, they help facilitate the introduction of near-zero emission NGVs in private and public fleets in the area, which have a direct emissions reduction benefit. It is expected that natural gas' lower fuel cost relative to diesel and the added financial incentives of renewable natural gas (RNG) under the state's Low Carbon Fuel Standard program and the federal Renewable Fuel Standard program will significantly reduce operating costs of high fuel volume heavy-duty NGVs and attract consumers to this technology. The increased exposure and fleet and consumer acceptance of NGVs would lead to significant and direct reductions in NOx, VOC, CO, PM and toxic compound emissions from mobile sources. Such increased penetration of NGVs will provide direct emissions reductions of NOx, VOC, CO, PM and air toxic compounds throughout the Basin.

Proposed Project: Demonstrate Renewable Transportation Fuel Manufacturing and Distribution Technologies

Expected South Coast AQMD Cost: $881,500

Expected Total Cost: $10,000,000

Description of Technology and Application:

The transportation sector represents a significant source of criteria pollution in the Basin. Clean, alternative fuel-powered transportation is a necessary component for this region to meet federal clean air standards. Alternative fuels produced from renewable sources such as waste biomass help to further efforts associated with landfill and waste diversion, greenhouse gas reduction, energy diversity and petroleum dependency. Locally produced renewable fuels further reduces concerns associated with out-of-state production and transmission of fuel as well as helps support the local economy. Renewable fuels recognized as a transportation fuel under the state's Low Carbon Fuel Standard program and the federal government's Renewable Fuel Standard program can provide financial incentives that can significantly reduce the price of fuel and hence the cost of operation of clean, alternative fuel vehicles and providing additional incentive for consumers to purchase and deploy clean, alternative renewable fueled powered vehicles.

The project category will consider the development and demonstration of technologies for the production and use of renewable transportation fuels such as renewable natural gas (RNG), renewable diesel (RD), and renewable hydrogen (RH) from various waste biomass feed stocks including municipal solid wastes, green waste, and biosolids from waste water treatment facilities, from technologies such as anaerobic digestion, gasification, and pyrolysis.

The main objectives of this project are to investigate, develop and demonstrate:

- commercially viable methods for converting renewable feed stocks into CNG, LNG, Hydrogen or diesel (e.g., production from biomass);
- economic small-scale natural gas liquefaction technologies;
- utilization of various gaseous feed stocks locally available;
- commercialize incentives for fleets to site, install and use RNG refueling facilities; and
- pipeline interconnection in the local gas grid to provide supply to users.

Potential Air Quality Benefits:

The South Coast AQMD relies on a significant increase in the penetration of zero and near-zero emission vehicles in the South Coast Basin to attain federal clean air standards by 2023 and 2032. This project would help develop a number of renewable transportation fuel production and distribution facilities to improve local production and use of renewable fuels to help reduce transportation costs and losses that can reduce total operating costs of zero and near-zero emission vehicles to be competitive with comparable diesel fueled vehicles. Such advances in production and use are expected to lead to greater infrastructure development. Additionally, this project could support the state's goal of redirecting biomass waste for local fuel production and reduce greenhouse gases associated with these waste biomass feedstocks.

Stationary Clean Fuel Technologies

Proposed Project: Develop and Demonstrate Microgrids with Photovoltaic/Fuel Cell/Battery Storage/EV Chargers and Energy Management

Expected South Coast AQMD Cost: $1,322,250

Expected Total Cost: $6,000,000

Description of Technology and Application:

Currently, the inability of air/fuel ratio control (AFRC) systems to keep rich-burn engines in compliance contributes significantly to air pollution in the basin. Reliable, low-cost emission monitoring systems are needed for small-to-intermediate size combustion devices, including stationary engines, boilers, heaters, furnaces and ovens that are not large enough to justify a continuous emission monitoring system (CEMS). This class of combustion device is often permitted on the basis of a single demonstration or periodic demonstrations of NOx and CO emissions meeting South Coast AQMD rule requirements or a RECLAIM concentration limit. However, South Coast AQMD-unannounced tests on engines and boilers have found that in many cases NOx and/or CO levels have increased significantly above levels that have been initially or periodically demonstrated due to equipment malfunction and/or inadequate operator attention. It is suspected that the same may be true of heaters, furnaces and ovens.

A demonstration project funded in part by the South Coast AQMD consisted of retrofitting a biogas engine with a digester gas clean up system and catalytic oxidizer at the exhaust followed by SCR which resulted in significant reductions of NO_x, VOC and CO. Based on the successful deployment of this project, further emission reductions may be achieved by other biogas combustion sources such as gas turbines and boilers by the continued development of specialized low cost biogas clean up systems that will allow for the use of catalytic after control systems.

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 formed during the combustion process. Challenges arise if ammonia distribution within the flue gas or operating temperature is not optimal resulting in ammonia emissions leaving the SCR in a process referred to as "ammonia slip". The ammonia slip may also lead to the formation of particulate matter in the form of ammonium sulfates.

An ongoing demonstration project funded in part by the South Coast AQMD consists of retrofitting a Low 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.[AB1]

Demonstrations of newer technologies in recent years could result in a commercially viable alternative to CEMS that is both reliable and feasible in terms of lower costs. For example, manufacturers of flue gas analyzers have, in recent years, developed low-cost multi-gas analyzers suitable for portable or stack-mounted use. Some preliminary testing of a new type of AFRC, which uses a different type of O2 sensor known as a wide-band O2 sensor, is another alternative that can be analyzed. Another technical approach might be to deploy technology utilizing the O2 signature of a post-catalyst O2 sensor and additional control concepts being developed by manufacturers. Since an underlying problem has been that engine, catalyst and AFRC manufacturers have developed systems independently, a system being co-developed to perform continuous diagnostics to assist operators in keeping rich-burn engines in compliance is possibly another alternative for demonstration.

Potential Air Quality Benefits:

Stationary engines, boilers, heaters, furnaces and ovens account for approximately 11 percent of total NO_x emissions and about 6 percent of total CO emissions. There has been a long-standing compliance problem with rich-burn IC engines in the basin and evidence indicates that many of these devices are operating with NOx and/or CO emissions above levels required in their permits. Projects could potentially reduce a significant class of NOx and CO emissions that are in excess of the assumptions in the AQMP and further enhance South Coast AQMD's ability to enforce full-time compliance.

Proposed Project: Develop and Demonstrate Renewables-Based Energy Generation Alternatives

Expected South Coast AQMD Cost: $264,450

Expected Total Cost: $1,000,000

Description of Technology and Application:

The objective of this proposed project is to support the development and demonstration of clean energy, renewable alternatives in stationary applications. The technologies to be considered include thermal, photovoltaic and other solar energy technologies; wind energy systems; energy storage potentially including vehicle to grid or vehicle to building functionalities for alternative energy storage; biomass conversion; and other renewable energy and recycling technologies. Innovative solar technologies, such as solar thermal air conditioning and photovoltaic-integrated roof shingles, are of particular interest. Also, in the agricultural sections of the Basin, wind technologies could potentially be applied to drive large electric motor-driven pumps to replace highly polluting diesel-fired pumps. Besides renewable technologies, electrolyzer technology could be used to generate hydrogen, a clean fuel. Hydrogen, when used in regular engines, can potentially reduce tail-pipe emissions, while in fuel cells the emissions are reduced to zero.

The project is expected to result in pilot-scale production demonstrations, scale-up process design and cost analysis, overall environmental impact analysis and projections for ultimate clean fuel costs and availability. This project is expected to result in several projects addressing technological advancements in these technologies that may improve performance and efficiency, potentially reduce capital and operating costs, enhance the quality of natural gas generated from renewable sources for injection into natural gas pipelines, improve reliability and user friendliness and identify markets that could expedite the implementation of successful technologies.

Potential Air Quality Benefits:

The 2016 AQMP identifies the development and ultimately the implementation of non-polluting power generation. To gain the maximum air quality benefit, polluting fossil fuel-fired electric power generation needs to be replaced with clean renewable energy resources or other advanced zero emission technologies, such as hydrogen fuel cells, particularly in a distributed generation context.

The proposed project is expected to accelerate the implementation of advanced zero emission energy sources. Expected benefits include directly reducing the emissions by the displacement of fossil generation; proof-of-concept and potential viability for such zero emission power generation systems; increased exposure and user acceptance of the new technology; reduced fossil fuel usage; and the potential for increased use, once successfully demonstrated, with resulting emission benefits, through expedited implementation. These technologies would also have a substantial influence in reducing global warming emissions.

Fuel/Emissions Studies

Proposed Project: Conduct In-Use Emissions Studies for Advanced Technology Vehicle Demonstrations

Expected South Coast AQMD Cost: $308,525

Expected Total Cost: $850,000

Description of Technology and Application:

Hybrid electric, hybrid hydraulic, plug-in electric hybrid and pure EVs will all play role in the future of transportation. Each of these transportation technologies has attributes that could provide unique benefits to different transportation sectors. Identifying the optimal placement of each transportation technology will provide the co-benefits of maximizing the environmental benefit and return on investment for the operator.

In addition, South Coast AQMD has been supporting rapid deployment of near-zero emission natural gas technologies ever since the first heavy-duty engine is commercially available in 2015. As more near-zero emission natural gas technology penetrate the different segments, in-use assessment of real-world benefit is needed.

The environmental benefit for each technology class is duty-cycle and application specific. Identifying the attributes of a specific application or drive cycle that would take best advantage of a specific transportation technology would speed the adoption and make optimal use of financial resources in the demonstration and deployment of a technology. The adoption rates would be accelerated since the intelligent deployment of a certain technology would ensure that a high percentage of the demonstration vehicles showed positive results, which would spur the adoption of this technology in similar applications, as opposed to negative results derailing the further development or deployment of a certain technology.

The proposed project would review and potentially coordinate application specific drive cycles to for specific applications. The potential emissions reductions and fossil fuel displacement for each technology in a specific application would be quantified on a full-cycle basis. This information could be used to develop a theoretical database of potential environmental benefits of different transportation technologies when deployed in specific applications.

Another proposed project would be the characterization of intermediate volatility organic compound (IVOC) emissions which is critical in assessing ozone and SOA precursor production rates. Diesel vehicle exhaust and unburned diesel fuel are major sources of and contribute to the formation of urban ozone and secondary organic aerosol (SOA), which is an important component of PM2.5.

Finally, while early developments in autonomous and vehicle-to-vehicle controls are focused on light-duty passenger vehicles, the early application of this technology to heavy-duty, drayage and container transport technologies is more likely. The impact on efficiency and emissions could be substantial. A project to examine this technology to assess its effect on goods movement and emissions associated with goods movement could be beneficial at this time.

Potential Air Quality Benefits:

The development of an emissions reduction database, for various application specific transportation technologies, would assist in the targeted deployment of new transportation technologies. This database coupled with application specific vehicle miles traveled and population data would assist in intelligently deploying advanced technology vehicles to attain the maximum environmental benefit. These two data streams would allow vehicle technologies to be matched to an application that is best suited to the specific technology, as well as selecting applications that are substantial enough to provide a significant environmental benefit. The demonstration of a quantifiable reduction in operating cost through the

intelligent deployment of vehicles will also accelerate the commercial adoption of the various technologies. The accelerated adoption of lower emitting vehicles will further assist in attaining South Coast AQMD's air quality goals.

Proposed Project: Conduct Emissions Studies on Biofuels, Alternative Fuels and Other Environmental Impacts

Expected South Coast AQMD Cost: $440,750

Expected Total Cost: $1,500,000

Description of Technology and Application:

The use of biofuels can be an important strategy to reduce petroleum dependency, air pollution and greenhouse gas emissions. Biofuels are in fact receiving increased attention due to national support and state activities resulting from SB 32, AB 1007 and the Low-Carbon Fuel Standard. With an anticipated increase in biofuel use, it is the objective of this project to further analyze these fuels to better understand their benefits and impacts not only on greenhouse gases but also air pollution and associated health effects.

In various diesel engine studies, replacement of petroleum diesel fuel with biodiesel fuel has demonstrated reduced PM, CO and air toxics emissions. Biodiesel also has the potential to reduce greenhouse gas emissions because it can be made from renewable feedstocks, such as soy and canola. However, certain blends of biodiesel have a tendency to increase NOx emissions for certain engines and duty cycles, which exacerbates the ozone and PM2.5 challenges faced in the Basin. In addition, despite recent advancements in toxicological research in the air pollution field, the relationship between biodiesel particle composition and associated health effects is still not completely understood.

Ethanol is another biofuel that is gaining increased national media and state regulatory attention. CARB's reformulated gasoline regulation to further increase the ethanol content to 10% as a means to increase the amount of renewable fuels in the state. It is projected that the state's ethanol use will increase from 900 million gallons in 2007 to 1.5 billion gallons by 2012 as a result. As in the case of biodiesel, ethanol has demonstrated in various emission studies to reduce PM, CO and toxic emissions; however, the relationship between particle composition and associated health effects from the combustion of ethanol is not well understood either.

CARB recently proposed a regulation on the commercialization of alternative diesel fuels, including biodiesel and renewable diesel, while noting that biodiesel in older heavy-duty vehicles can increase NOx and the need for emerging alternative diesel fuels to have clear ground rules for commercialization. The impact of natural gas fuel composition on emissions from heavy-duty trucks and transit buses is also being studied. Researchers has proposed to evaluate the emissions impact of renewable natural gas and other natural gas blends such as renewable hydrogen.

In order to address these concerns on potential health effects associated with biofuels, namely biodiesel and ethanol blends, this project will investigate the physical and chemical composition and associated health effects of tailpipe PM emissions from light- to heavy-duty vehicles burning biofuels in order to ensure public health is not adversely impacted by broader use of these fuels. This project also supports future studies to identify mitigation measures to reduce NOx emissions for biofuels. Additionally, a study of emissions from well-to-wheel for the extraction and use of shale gas might be considered.

More recently, the Power-to-Gas concept has renewed interest in hydrogen-fossil fuel blends which the emissions impact on latest ICE technologies needs to be reassessed. Hydrogen fueled ICE was studied heavily in the early 2000's and results has shown significant criteria emissions reduction possible with optimized engine calibration. Since then, ICE technologies have been fitted with advanced aftertreatment to allow the engines to be certified to today's NOx and low NOx standards. Therefore, emissions impact assessment is much needed on the latest engines.

Lastly, in an effort to evaluate the contribution of meteorological factors to high ozone and PM2.5 episodes occurring in the Basin, mainly as a result of higher summer time temperatures and increased air stagnation following the drought years, a comprehensive study is necessary to evaluate the trends

of meteorological factors that may adversely impact air quality in the Basin. The study will assist staff to better understand the potential impact of recent weather trends on criteria pollutant emissions and potentially develop more effective strategies for improving air quality in the future.

Potential Air Quality Benefits:
If renewable diesel, biodiesel and biodiesel blends can be demonstrated to reduce air pollutant emissions with the ability to mitigate any NOx impact, this technology will become a viable strategy to assist in meeting air pollutant standards as well as the goals of SB 32 and the Low-Carbon Fuel Standard. The use of biodiesel is an important effort for a sustainable energy future. Emission studies are critical to understanding the emission benefits and any tradeoffs (NOx impact) that may result from using this alternative fuel. With reliable information on the emissions from using biodiesel and biodiesel blends, the South Coast AQMD can take actions to ensure the use of biodiesel will obtain air pollutant reductions without creating additional NOx emissions that may exacerbate the Basin's ozone problem. Additionally, understanding meteorological factors on criteria pollutant emissions may help identify ways to mitigate them, possibly through targeted advanced transportation deployment.

Proposed Project: Identify and Demonstrate In-Use Fleet Emissions Reduction Technologies and Opportunities

Expected South Coast AQMD Cost: $220,375

Expected Total Cost: $1,000,000

Description of Technology and Application:

New technologies, such as alternative fueled heavy-duty engines, are extremely effective at reducing emissions because they are designed to meet the most stringent emissions standards while maintaining vehicle performance. In addition, many new vehicles are now equipped with telematics enabling motorists to obtain transportation information such as road conditions to avoid excessive idling and track information about the vehicle maintenance needs, repair history, tire pressure and fuel economy. Telematics have been shown to reduce emissions from new vehicles. Unfortunately, the in-use fleet lacks telematic systems--particularly heavy-duty engines in trucks, buses, construction equipment, locomotives, commercial harbor craft and cargo handling equipment--have fairly long working lifetimes (up to 20 years due to remanufacturing in some cases). Even light-duty vehicles routinely have lifetimes exceeding 200,000 miles and 10 years. And it is the in-use fleet, especially the oldest vehicles, which are responsible for the majority of emissions.

This project category is to investigate near-term emissions control technologies that can be cost-effectively applied to reduce emissions from the in-use fleet. The first part of the project is to identify and conduct proof-of-concept demonstrations of feasible candidate technologies, such as:

- remote sensing for heavy-duty vehicles;
- annual testing for high mileage vehicles (>100,000 miles);
- replace or upgrade emissions control systems at 100,000-mile intervals;
- on-board emission diagnostics with remote notification;
- low-cost test equipment for monitoring and identifying high emitters;
- test cycle development for different class vehicles (e.g. four-wheel drive SUVs);
- electrical auxiliary power unit replacements;
- development, deployment and demonstration of smart vehicle telematic systems; and
- low NOx sensor development

Potential Air Quality Benefits:

Many of the technologies identified can be applied to light- and heavy-duty vehicles to identify and subsequently remedy high-emitting vehicles in the current fleet inventory. Estimates suggest that 5 percent of existing fleets account for up to 80 percent of the emissions. Identification of higher emitting vehicles would assist with demand-side strategies, where higher emitting vehicles have correspondingly higher registration charges. The identification and replacement of high-emitting vehicles has been identified in CERPs from the Year 1 AB 617 communities as a high priority for residents living in these communities, particularly as heavy-duty trucks frequently travel on residential streets to bypass traffic on freeways surrounding these disadvantaged communities.

Emissions Control Technologies

Proposed Project: Develop and Demonstrate Advanced Aftertreatment Technologies

Expected South Coast AQMD Cost: $176,300

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 available to keep desired catalyst temperatures such as heated dosing and heated catalysts are also part of the complete aftertreatment system design for near-zero emission NOx. This project category is to develop and demonstrate these aftertreatment technologies alone or in tandem with an alternative fuel to produce the lowest possible PM, ultrafine particles, nanoparticles, NOx, CO, carbonyl and hydrocarbon emissions in retrofit and new applications. With the increasing focus on zero and near-zero emissions goods movement technologies, this category should examine idle reduction concepts and technologies that can be employed at ports and airports.

Possible projects include advancing the technologies for on-road retrofit applications, such as heavy-duty line-haul and other large displacement diesel engines, street sweepers, waste haulers and transit buses. Applications for non-road may include construction equipment, yard hostlers, gantry cranes, locomotives, commercial harbor craft, ground support equipment and other similar industrial applications. Potential fuels to be considered in tandem are low-sulfur diesel, emulsified diesel, biodiesel, gas-to-liquids, hydrogen and natural gas. This project category will also explore the performance, economic feasibility, viability (reliability, maintainability and durability) and ease-of-use to ensure a pathway to commercialization.

Potential Air Quality Benefits:

The transfer of mature emission control technologies, such as DPFs and oxidation catalysts, to the off-road sector is a potentially low-risk endeavor that can have immediate emissions reductions. Further development and demonstration of other technologies, such early light –off SCR and heated dosing, could also have NOx reductions of up to 90%.

Proposed Project: Develop and Demonstrate Advanced Aftertreatment Catalyst Heating Technologies

Expected South Coast AQMD Cost: $220,375

Expected Total Cost: $1,000,000

Description of Technology and Application:

The objective of this project is to support the demonstration and integration of aftertreatment systems incorporating technologies such as heated dosing and electrically heated catalysts used for on-road heavy duty vehicles. Current aftertreatment systems are required to maintain an operating temperature of 200°C or higher for optimal performance. Diesel engines for heavy duty commercial vehicles have been discovered to operate at temperatures below 200°C during specific parts of the driving cycle, such as low loads and cold starts. Emissions during the low-load and cold starts have been shown to increase up to 30% and PM up to 20%. Previous technologies, such as the mini-burner, were successful mitigating the cold catalyst issue. There were draw backs in this technology due to increased CO2 emissions. The mini burner was not favorable as a successful approach because it increased fuel consumption. New aftertreatment technologies, coupled with advanced engine technologies, have shown potential to reduce emissions up to 99% without a fuel penalty. Technologies such as:

- Close-coupled catalysts
- Dual-heated diesel-exhaust fluid dosing
- Heated catalysts

Current aftertreatment design incorporates a close-coupled catalyst, selective catalyst reduction filter, dual SCR, and an ammonia–slip catalyst. Included in this design is a required heat source at low loads, cold starts and motoring conditions. The use of an electric heat source has become feasible due to advancements in electrical-powered applications and integration with the vehicle.

Potential Air Quality Benefits:

This project is expected to contribute to the total emission reductions in heavy-duty on road engines. Emission reductions of 80-90% in heavy-duty diesel long-haul trucks has already been proven when an advanced aftertrearment system, incorporating an additional heat source, along with advanced engine technology such as cylinder deactivation is used. The fuel savings benefit is especially attractive to long-haul fleet operations. In order to meet the ultra-low NOx air quality standards and promote a national low NOx standard for heavy-duty diesel engines, an advanced aftertreatment system incorporating heated catalyst technology is required.

Proposed Project: Develop Methodology and Evaluate Onboard Emission Sensors for On-Road Heavy-Duty Vehicles

Expected South Coast AQMD Cost: $220,375

Expected Total Cost: $1,100,000

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. In order 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 proposed Heavy-Duty On-Road "Omnibus" Low NOx regulation, multiple lower NOx standards will be phased in starting in 2022. In addition to the lower certification values, a low load test cycle, revisions to the not-to-exceed compliance test and NOx sensor data reporting are also proposed to ensure real-world emission reductions are realized over various duty cycles, especially those low power duty cycles in urban areas. An alternative proposed new methodology is to continuously measure real-time emissions from trucks with onboard sensors. Both industry, government and regulators are looking to use the sensors to better monitor emissions compliance and leverage the real-time data from sensors to enable advances concepts such as geofencing.

This project category is to investigate near term and long-term benefits from onboard sensors to understand in-use emissions better and reduce emissions from the advanced management concept. The first part of the project is to identify and conduct proof-of-concept demonstrations of feasible candidate technologies, such as:

- laboratory evaluation of existing sensors;
- development and evaluation of next generation sensors;
- development of algorithms to extract sensor information into mass-based metric;
- demonstrate feasibility to monitor emissions compliance using sensors;
- identify low cost option for cost and benefit analysis;
- demonstrate sensors on natural gas and other mobile sources such as light-duty, off-highway and commercial harbor craft; and
- development, deployment and demonstration of smart energy/emissions management systems

Potential Air Quality Benefits:

The proposed research projects will assist the trucking industry to monitor emissions, using sensors as one of the design platform options. Reduction of NOx and PM emissions from mobile sources is imperative for the Basin to achieve federal ambient air quality standards 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 NOx in 2004 to 0.2 g/bhp-hr NOx in 2010, which is an order of magnitude decrease in just six years. Off-road engines, however, have considerably higher emissions limits depending on the engine size. For example, Tier 3 standards for heavy-duty engines require only 3 g/bhp-hr NOx. There are apparent opportunities to implement cleaner on-road technologies in off-road applications. There is also an opportunity to replace existing engines in both on-road and off-road applications with the cleanest available technology. Current regulations require a repower (engine exchange) to only meet the same emissions standards as the engine being retired. Unfortunately, this does not take advantage of recently developed clean technologies.

Exhaust gas cleanup strategies, such as SCR, electrostatic precipitators, baghouses and scrubbers, have been used successfully for many years on stationary sources. The exhaust from the combustion source is routed to the cleaning technology, which typically requires a large footprint for implementation. This large footprint has made installation of such technologies on some mobile sources prohibitive. However, in cases where the mobile source is required to idle for long periods of time, it may be more effective to route the emissions from the mobile source to a stationary device to clean the exhaust stream.

Projects in this category will include utilizing proven clean technologies in novel applications, such as:

- demonstrating certified LNG and CNG on-road engines in off-road applications including yard hostlers, switcher locomotives, gantry cranes, waste haulers and construction equipment;
- implementing lower emission engines in repower applications for both on-road and off-road applications; and
- applying stationary best available control technologies, such as SCR, scrubbers, baghouses and electrostatic precipitators, to appropriate on- and off-road applications, such as idling locomotives, 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 contaminant emitted from diesel exhaust. Additionally, health studies indicate that the ultrafine portion of particulate matter may be more toxic on a per-mass basis than other fractions. Several technologies have been introduced and others are under development to reduce diesel emissions. These include among others low-sulfur diesel fuel, particulate matter traps and heavy-duty engines operating on alternative fuel such as CNG and LNG. Recent studies have shown that control technologies applied to mobile sources have been effective in reducing the mass of particulates emitted. However, there is also evidence that the number of ultrafine particles on and near roadways has increased, even while the mass of particulates has decreased. To have a better understanding of changes in ultrafine particulate emissions from the application of the new technologies and the health effects of these emissions, an evaluation and comparison of ultrafine particulate matter and the potential impacts on community exposures are necessary.

In this project, measurements and chemical composition of ultrafine particulates will be done, as well as studies conducted to characterize their toxicity. The composition of the particulates can further be used to determine the contribution from specific combustion sources. Additionally, engine or chassis dynamometer testing may be conducted on heavy-duty vehicles to measure, evaluate and compare ultrafine particulate matter, PAH and other relevant toxic emissions from different types of fuels such as CNG, low-sulfur diesel, biofuels and others. This project needs to be closely coordinated with the development of technologies for alternative fuels, aftertreatment and new engines in order to determine the health benefits of such technologies.

Furthermore, gasoline direct injection (GDI) vehicles are known for higher efficiency and power output but the PM emissions profile is not well understood especially on secondary organic aerosol (SOA) formation potential. As manufacturers introduce more GDI models in the market to meet new fuel economy standards, it is important to understand the SOA potential from these vehicles as it could lead to further impact on the ambient PM concentration in our region. Consequently, in 2015 a project was initiated with UCR/CE-CERT to investigate the physical and chemical composition of aerosols from GDI vehicles using a mobile environmental chamber that has been designed and constructed to characterize secondary emissions. Based on initial results indicating an increase in particle numbers, follow-up in-use studies to assess PM emissions including with and without particle filters will be beneficial.

Potential Air Quality Benefits:

The AQMP for the South Coast Basin relies on significant penetration of low emission vehicles to attain federal clean air standards. Reduction of particulate emissions from the combustion of diesel and other fuels is a major priority in achieving these standards. This project would help to better understand the nature and number of ultrafine particulates generated by different types of fuels and advanced control technologies as well as provide information on potential health effects of ultrafine particles. Such an understanding is important to assess the emission reduction potentials and health benefits of these technologies. In turn, this will have a direct effect on the policy and regulatory actions for commercial implementation of alternative fuel vehicles in the Basin.

Proposed Project: Conduct Monitoring to Assess Environmental Impacts

Expected 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, distribution centers and freeways is important to identify the emissions exposure to the surrounding communities and provide the data to then conduct the health impacts due to these sources. This project category would identify areas of interest and conduct ambient air monitoring, conduct emissions monitoring, analyze the data and assess the potential health impacts from mobile sources. The projects would need to be at least one year in duration in order to properly assess the air quality impacts in the area.

Potential Air Quality Benefits:

The proposed project will assist in the evaluation of adverse public health impacts associated with mobile sources. The information will be useful in (a) determining whether indirect sources have a relatively higher impact on residents living in close proximity; and (b) providing guidance to develop some area-specific control strategies in the future should it be necessary.

Proposed Project: Assess Sources and Health Impacts of Toxic Air Contaminants

Expected South Coast AQMD Cost: $132,225

Expected Total Cost: $300,000

Description of Technology and Application:

Previous studies of ambient levels of toxic air contaminants, such as the MATES series of studies, have found that diesel exhaust is the major contributor to health risk from air toxics. Analyses of diesel particulate matter in ambient samples have been based on measurements of elemental carbon. While the bulk of particulate elemental carbon in the 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 diesel particulate matter as well as estimate levels of particulate matter from other major sources. Other major sources that were taken into consideration include automobile exhaust, meat charbroiling, road dust, wood smoke and fuel oil combustion. Analyzing for organic compounds and metals in conjunction with elemental carbon upon collected particulate samples was used to determine contributing sources.

MATES IV, completed in 2015, included an air monitoring program, an updated emissions inventory of toxic air contaminants and a to air toxics, MATES IV also measured ultrafine particle concentrations and black carbon at the monitoring sites as well as near sources such as airports, freeways, rail yards, busy intersections and warehouse operations.

MATES V was launched in 2017 to update the emissions inventory of toxic air contaminants and modeling to characterize risks, including measurements and analysis of ultrafine particle concentrations typically emitted or converted from vehicle exhaust. Based on preliminary results of MATES V, further assessment may need to be performed to assess secondary organic aerosols; including installation of sensors and additional monitoring activities.

This project category would include other related factors, such as toxicity assessment based on age, source (heavy-duty, light-duty engines) and composition (semi-volatile or non-volatile fractions) to better understand the health effects and potential community exposures. Additionally, early identification of new health issues could be of considerable value and could be undertaken in this project category.

Potential Air Quality Benefits:

Results of this work will provide a more robust, scientifically sound estimate of ambient levels of diesel particulate matter as well as levels of particulate matter from other significant combustion sources, including gasoline and diesel generated VOCs. This will allow a better estimation of potential exposures to and health effects from toxic air contaminants from diesel exhaust in the Basin. This information in turn can be used to determine the health benefits of promoting clean fuel technologies.

Technology Assessment/Transfer and Outreach

Proposed Project: Assess and Support Advanced Technologies and Disseminate Information

Expected South Coast AQMD Cost: $352,600

Expected Total Cost: $800,000

Description of Project:

This project supports the assessment of clean fuels and advanced technologies, their progress towards commercialization and the dissemination of information on demonstrated technologies. The objective of this project is to expedite the transfer of technology developed as a result of Technology Advancement Office projects to the public domain, industry, regulatory agencies and the scientific community. This project is a fundamental element in the South Coast AQMD's outreach efforts to expedite the implementation of low emission and clean fuels technologies and to coordinate these activities with other organizations.

This project may include the following:

- technical review and assessment of technologies, projects and proposals;
- support for alternative fuel refueling and infrastructure;
- advanced technology curriculum development, mentoring and outreach to local schools;
- emissions studies and assessments of zero emission alternatives;
- preparation of reports, presentations at conferences, improved public relations and public communications of successful demonstrations of clean technologies;
- participation in and coordination of workshops and various meetings;
- support for training programs related to fleet operation, maintenance and refueling of alternative fuel vehicles;
- publication of technical papers as well as reports and bulletins; and
- production and dissemination of information, including websites.

These objectives will be achieved by consulting with industry, scientific, health, medical and regulatory experts and co-sponsoring related conferences and organizations, resulting in multiple contracts. In addition, an ongoing outreach campaign will be conducted to encourage decision-makers to voluntarily switch to alternatively fueled vehicles and train operators to purchase, operate and maintain these vehicles and associated infrastructure.

Potential Air Quality Benefits:

South Coast AQMD adopted fleet regulations requiring public and private fleets within the Basin to acquire alternatively fueled vehicles when making new purchases. Expected benefits of highlighting success stories in the use of advanced alternatively fueled vehicles could potentially expedite the acceptance and commercialization of advanced technologies by operators seeking to comply with the provisions of the recently adopted South Coast AQMD fleet rules. The resulting future emissions benefits will contribute to the goals of the AQMP.

Proposed Project: Support Implementation of Various Clean Fuels Vehicle Incentive Programs

Expected South Coast AQMD Cost: $264,450

Expected Total Cost: $400,000

Description of Project:

This project supports the implementation of ZEV incentive programs, the Carl Moyer incentives program, school bus incentive program, and the South Coast AQMD residential EV charger rebate program. Implementation support includes application review and approval, grant allocation, documentation to the CARB, verification of vehicle operation and other support as needed. Information dissemination is critical to successful implementation of a coordinated and comprehensive package of incentives. Outreach will be directed to vehicle dealers, individuals and fleets. To date, the South Coast AQMD residential EV charger rebate program, which is jointly supported by the South Coast AQMD Clean Fuels Fund ($500,000) and the Mobile Source Air Pollution Reduction Review Committee (MSRC) for $500,000, has provided over 1,300 rebates and $360,000 in funding to residents in the South Coast AQMD jurisdiction.

Potential Air Quality Benefits:

As described earlier, the South Coast AQMD will provide matching funds to implement several key incentives programs to reduce diesel emissions in the Basin. Furthermore, the South Coast AQMD recently adopted fleet regulations requiring public and private fleets within the Basin to acquire alternatively fueled vehicles when making new purchases. Expected benefits of highlighting zero emission vehicle incentives could potentially expedite the acceptance and commercialization of advanced technologies by operators seeking to comply with the provisions of the recently adopted South Coast AQMD fleet rules. The resulting future emissions benefits will contribute to the goals of the AQMP. The school bus program and the Carl Moyer incentives program will also reduce large amounts of NOx and PM emissions in the basin in addition to reducing toxic air contaminants.

South Coast AQMD

South Coast
Air Quality
Management District

Back to Agenda

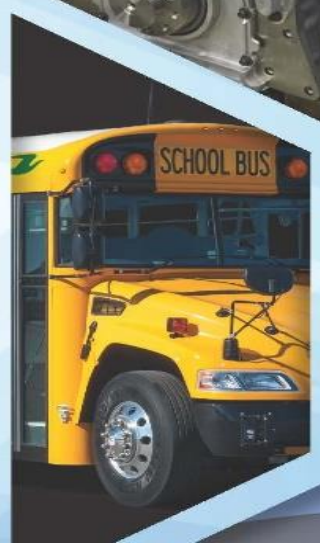
March 2020

Clean Fuels Program

2020 Draft Plan Update

Technology Advancement Office

Leading the way to zero and near-zero emission technologies



Background

2019 Annual Report and 2020 Plan Update

- Annual Report on Clean Fuels Program (HSC 40448.5.1)
- Technology Advancement Plan (Update) (HSC 40448.5)
- 2020 Plan Update (draft) submitted to Technology Committee October 18, 2019
- Annual public hearing to approve Annual Report and adopt (final) Plan Update
- Submit to Legislature by March 31 every year

Input and Feedback

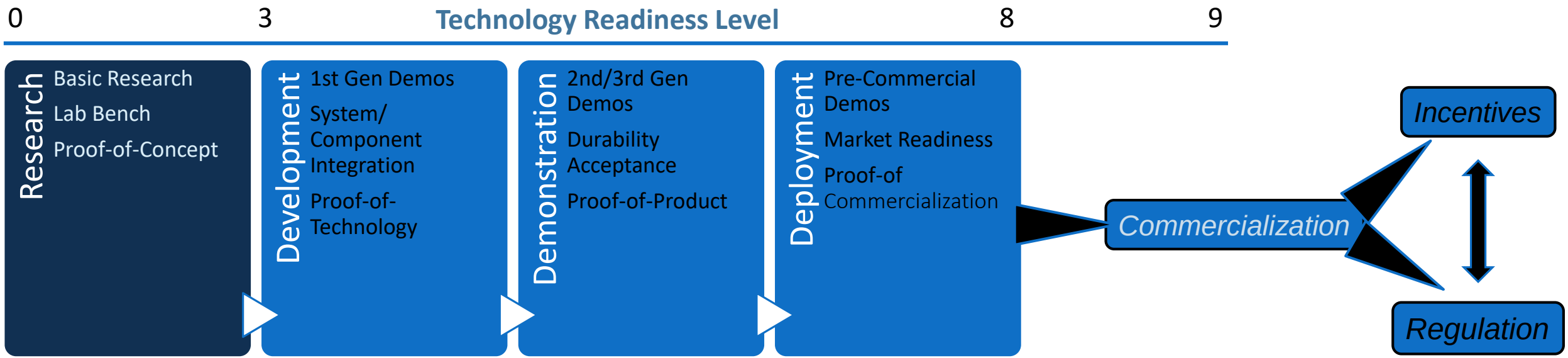
- Advisory group meetings
  - September 2019 and February 2020
  - Technology Advancement/Clean Fuels
  - Invited technical experts
- Meetings - agencies, industry groups, technology providers and other stakeholders
- Symposiums and conferences
  - ACT Expo (April 2019)
  - DOE Annual Merit Reviews (May & June 2019)
- Clean tech partnerships
  - VELOZ
  - California Fuel Cell Partnership
  - California Hydrogen Business Council

VELOZ

California FUEL CELL PARTNERSHIP
DRIVING FOR THE FUTURE

CALIFORNIA HYDROGEN BUSINESS COUNCIL
Hydrogen Means Business in California!

Clean Fuels Program - Overview



Clean Fuels Program-Core Technologies

- Hydrogen/Fuel Cell Technologies and Infrastructure
- Engine Systems/Technologies (ultra-low emission NG HDVs)
- Electric/Hybrid Technologies and Infrastructure
- Fueling Infrastructure and Deployment (NG/RNG)
- Stationary Clean Fuel Technologies
- Fuels/Emissions Studies
- Emission Control Technologies
- Health Impacts Studies
- Technology Assessment/Transfer and Outreach

2019 – Key Funding Partners

Total = $19.9M

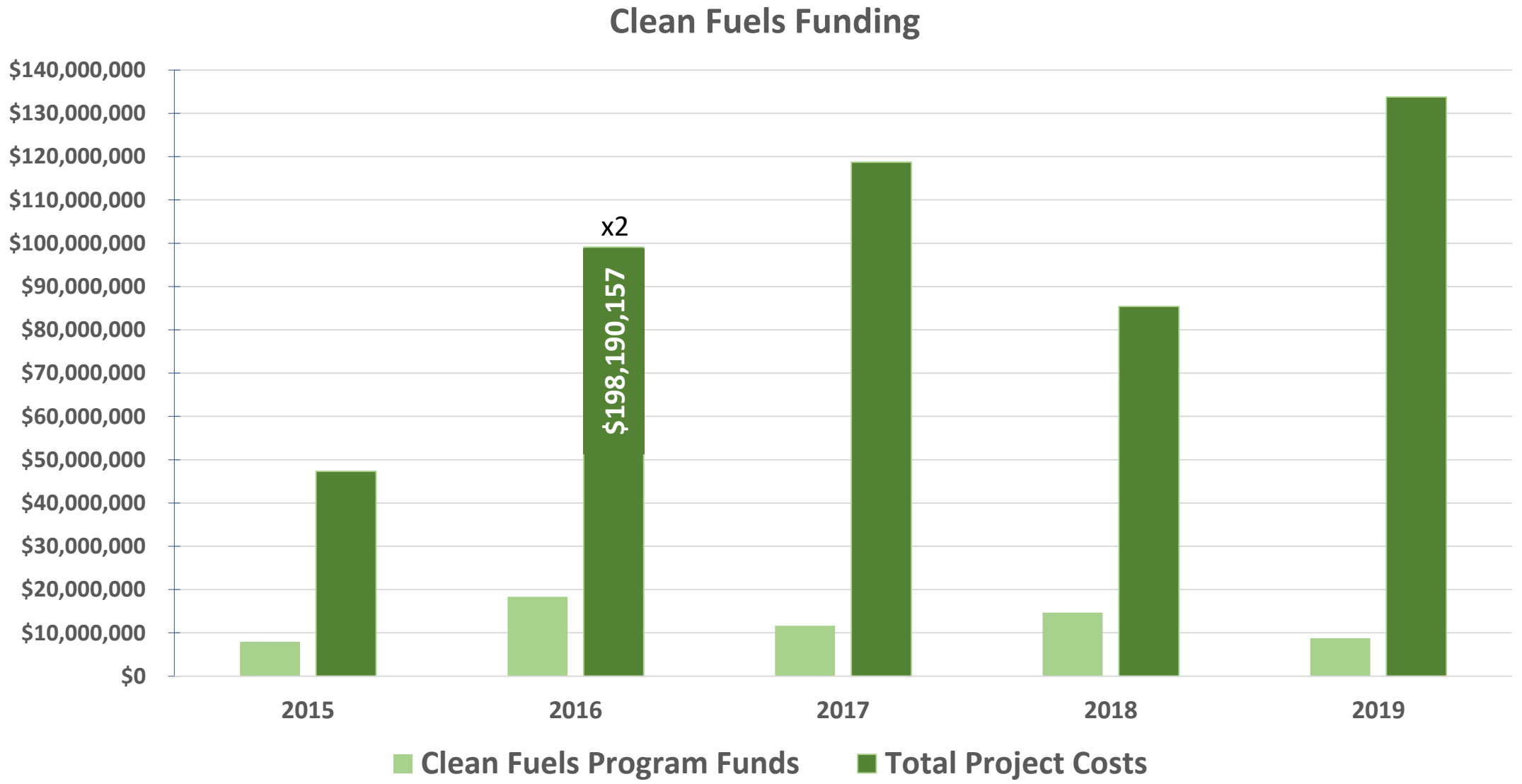
Targeted Airshed – CATI - DERA

THE PORT OF LOS ANGELES

Port of LONG BEACH
The Green Port

SoCalGas
A Sempra Energy utility

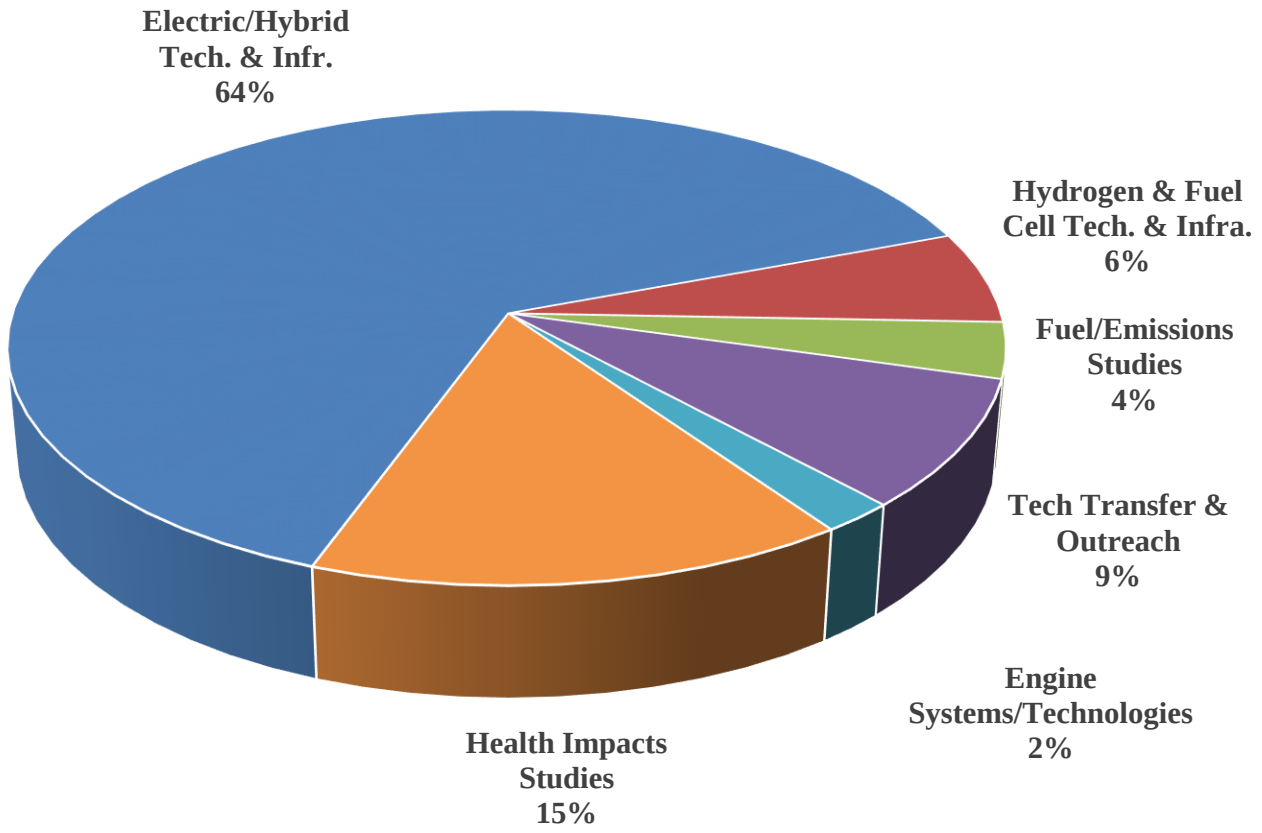
Five-Year Snapshot of Clean Fuels Program Funding



CY 2019 Accomplishments

- 72 contracts executed or modified adding dollars
  - $11.9M – total contract value
  - $3.1 revenue recognized
  - $134M – total project costs
  - $1:$14+ leveraging*
- 33 completed projects
  - 15 research, development, demonstration and deployment projects
  - 18 technology assessment and transfer/outreach projects

Distribution of Executed Contracts



*Historical cost leveraging is $4 per every Clean Fuels $1

2019 Key Contracts Executed

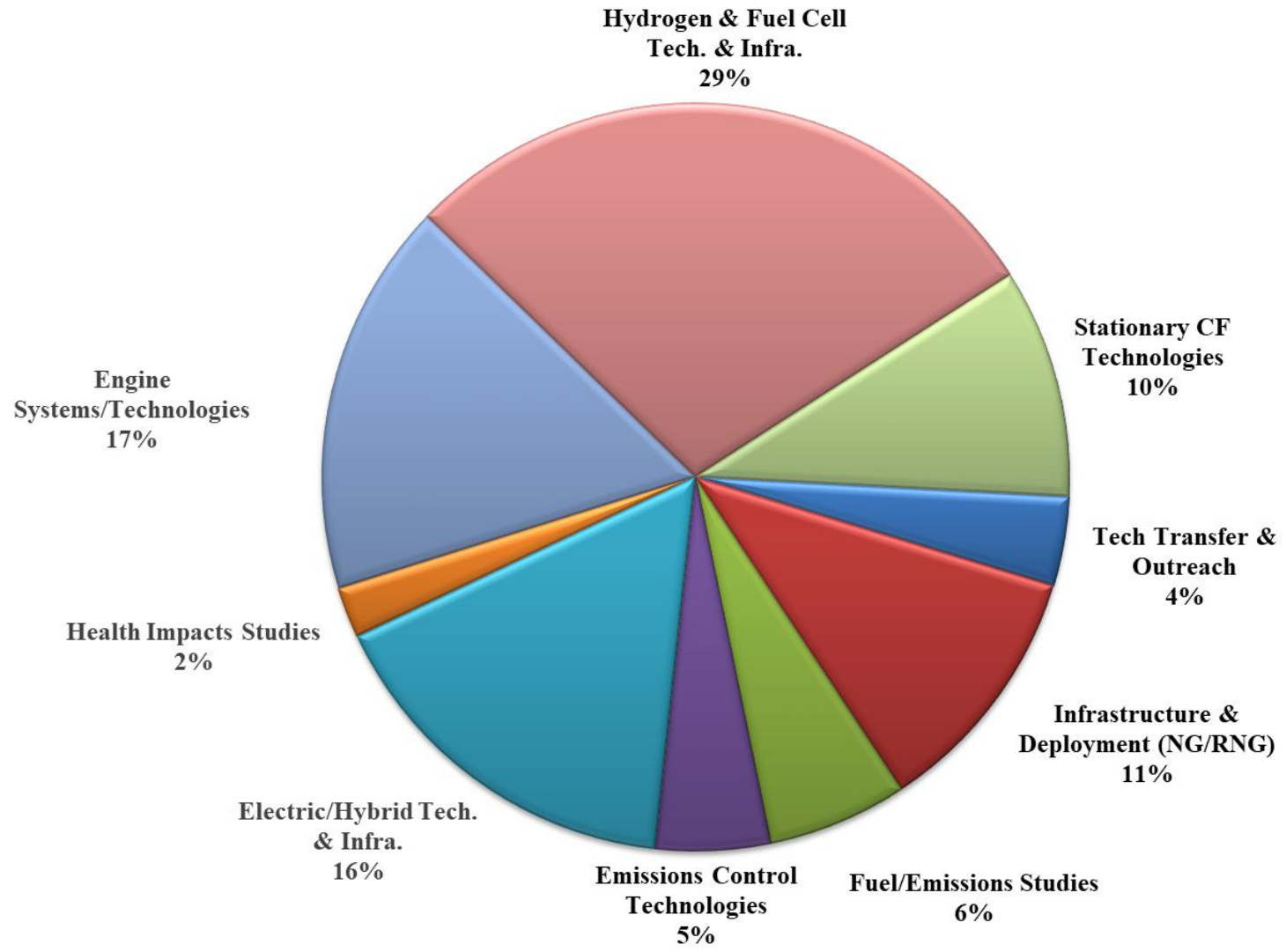
- Volvo LIGHTS
- Zero emission cargo handling vehicle demonstration

- Battery electric shuttle bus transportation
- Natural gas engine emissions and efficiency improvements
- Solid oxide fuel cell and gas turbine hybrid technology
- UCI hydrogen fueling station expansion
- UCR emission studies

2019 Key Projects Completed

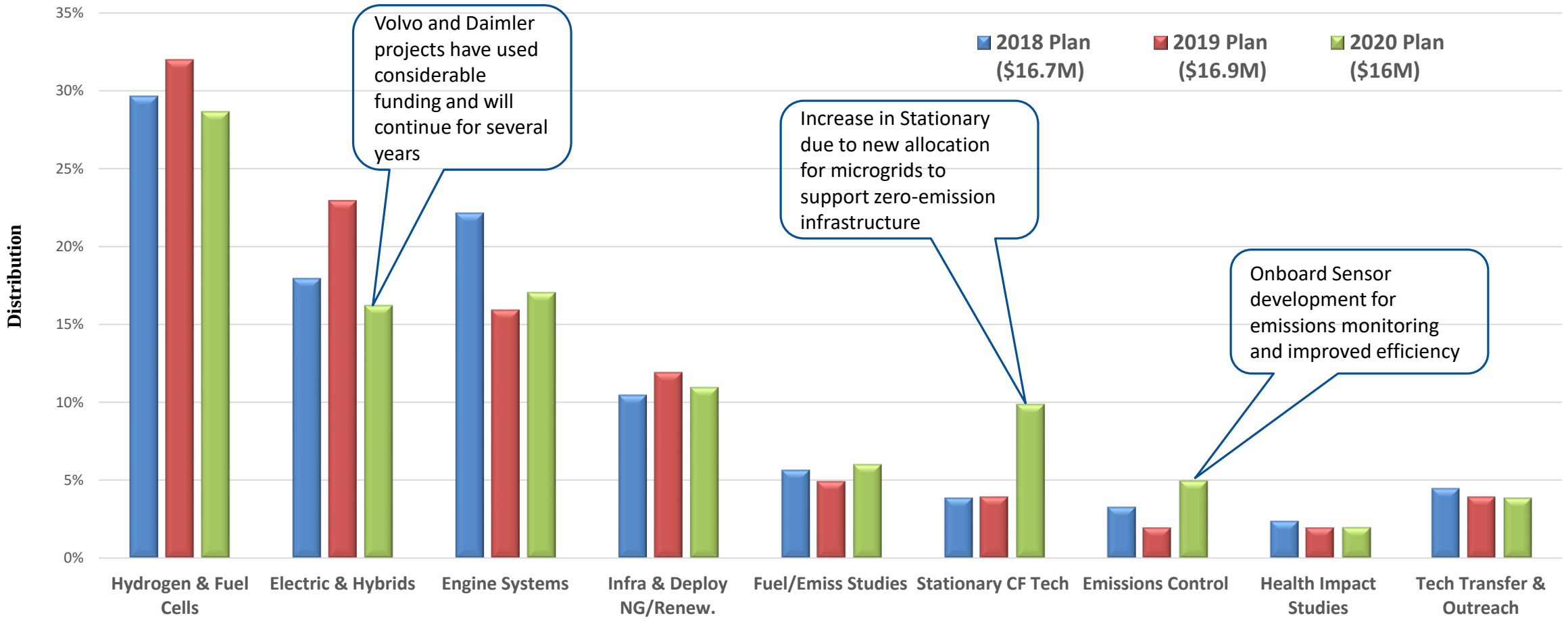
- Electric/hybrid technologies
  - Vehicle-to-grid technology development for school buses
  - Plug-in hybrid electric retrofit system Class 6-8 trucks
  - Electrification study for EJ communities
- Infrastructure & Deployment
  - Upgrade/expand NG stations including renewable natural gas
  - Support Renewable Natural Gas Center
- Emissions control technologies – develop aftertreatment systems for large diesel engines

Proposed 2020 Plan Distribution



$16.1M

Plan Update Comparison



Development Schedule

➢Technology Committee	October 18, 2019 (Draft 2020 Plan Update)
➢Advisory Group Review	September 19, 2019 February 6, 2020
➢Technology Committee	February 21, 2020
➢Board Approval	March 6, 2020
➢Due to State Legislature	March 31, 2020

New Advisory Group Members

Clean Fuels Advisory Group:

- USC: Prof. Petros Ioannou, Ph.D.
- Honda Motors: Steve Ellis
- Independent Consultant in Combustion Technology: Dr. John Wall

Technology Advancement Advisory Group:

- UCI: Michael Kleinman
- TTSI: Vic La Rosa
- LADWP: George Payba

Recommended Actions

Approve	Approve Clean Fuels Program 2019 Annual Report
Adopt	Adopt Clean Fuels Program Plan Update for 2020
Adopt	Adopt Resolution finding no duplicate projects or programs funded by other state/local agencies
Approve and Adopt	Approve and adopt Clean Fuels Advisory Group membership changes
Receive and file	Receive and file Technology Advancement Advisory Group membership changes
Staff	Direct staff to forward documents to State Legislative Analyst by March 31, 2020

Back to Agenda

Go to SLIDES

DRAFT

Technology Committee Agenda #5

BOARD MEETING DATE: March 6, 2020 AGENDA NO.

PROPOSAL: Recognize Revenue, Amend Contract for Heavy-Duty Truck Replacements and Reimburse General Fund for Administrative Costs

SYNOPSIS: In November 2019, South Coast AQMD received approval of a revised project scope for a FY 18 U.S. EPA Diesel Emissions Reductions Act (DERA) grant previously awarded. The approved project scope will allow for replacement of older on-road heavy-duty diesel trucks with new near-zero emissions natural gas-powered trucks in non-drayage applications. Since Proposition 1B eligible projects qualify for these DERA funds, staff proposes to award the funds to a previously approved Proposition 1B project. These actions are to recognize $1,601,523 in revenue from U.S. EPA DERA into the Advanced Technology Outreach and Education Fund (17), amend a contract for heavy-duty truck replacements adding DERA funds to reduce Proposition 1B-Goods Movement funding, and reimburse the General Fund for administrative costs up to $99,444 to implement the project.

COMMITTEE: Technology, February 21, 2020; Recommended for Approval

RECOMMENDED ACTIONS:

1. Recognize revenue, upon receipt, up to $1,601,523 from a U.S. EPA FY 18 DERA grant into the Advanced Technology, Outreach and Education Fund (17) to replace on-road heavy-duty diesel trucks with near-zero emissions natural gas heavy-duty trucks;
2. Amend a contract with Ecology Auto Parts, Inc., adding up to $1,502,079 from the Advanced Technology, Outreach and Education Fund (17) to utilize DERA funds, thereby reducing the Proposition 1B funding for the Ecology vehicle replacement project; and

3. Reimburse the General Fund up to $99,444 from the Advanced Technology, Outreach and Education Fund (17) to implement the DERA award.

Wayne Nastri
Executive Officer

MMM:NB:JI:PMB

Background

In September 2018, the South Coast AQMD was awarded $1,601,523 in FY 2018 U.S. EPA Diesel Emissions Reduction Act (DERA) funds for a heavy-duty diesel truck replacement project, replacing older diesel drayage trucks with new natural gas trucks. Subsequently, in November 2019, the South Coast AQMD and U.S. EPA agreed to a project scope change allowing replacement of non-drayage trucks instead, without a change in the award amount. The new project scope will replace older (Model Years 2000-2003) non-drayage on-road heavy-duty diesel tractor-trailer trucks (HDDTs) with new near-zero-emissions (NZE) natural gas-powered tractor-trailer trucks in non-drayage applications. Since Proposition 1B eligible projects qualify for these DERA funds, staff proposes to award the funds to a previously approved competitively awarded Proposition 1B project. In 2018, following Board approval, a Proposition 1B contract with Ecology Auto Parts, Inc., (Ecology) was executed for the replacement of 47 older HDDTs with 47 new NZE natural gas-powered heavy-duty trucks for a total award of $4,700,000 or $100,000 per vehicle replacement. . In October 2019, the Board also issued another Proposition 1B-Goods Movement Program Announcement to solicit additional projects to utilize turnback funds until all funds are exhausted.

Proposal

The actions are to recognize up to $1,601,523 in FY 18 U.S. EPA DERA funds into the Advanced Technology, Outreach and Education Fund (17) and amend a contract with Ecology to add $1,502,079 in DERA project funds and reduce $1,502,079 in Proposition 1B funds, thereby maintaining the original $100,000 per vehicle award under Proposition 1B. The proposed cost-share methodology is as follows: DERA Grant to fund up to 35 percent of the cost of the new NZE truck; Proposition 1B to fund the remaining balance of the $100,000 award; and Ecology to fund the remaining cost of the vehicle. This cost-share methodology will be applied to as many of the 47 Proposition 1B qualifying vehicles that also meet DERA funding requirements.

The DERA Grant will supplement the Proposition 1B program and will enable the Proposition 1B funds to be reallocated to other eligible applications that have been received under the October 2019 Program Announcement, thereby reducing additional mobile source emissions and possibly leveraging other funds.

This action is to also reimburse the General Fund up to $99,444 from the Advanced Technology, Outreach and Education Fund (17) to implement the DERA project.

Benefits to South Coast AQMD
Successful implementation of these vehicle replacements will permanently remove higher emitting on-road heavy-duty diesel trucks and deploy new ultra-low NOx emissions natural gas trucks certified to CARB's optional NOx standard of 0.02g-NOx/bhp-hr, which is 90% lower than the current standard. The accelerated replacement of diesel trucks with near-zero emissions natural gas trucks will help realize immediate emission reductions in the Basin.

Resource Impacts
The FY 18 DERA funds totaling $1,601,523 will be recognized into the Advanced Technology, Outreach and Education Fund (17). Of the $1,601,523 award, $1,502,079 is for project costs and $99,444 is for administrative costs. The DERA funding in the contract with Ecology will not exceed $1,502,079.

With U.S. EPA's concurrence, the $1,601,523 in FY 18 DERA funds will be used to supplement the Proposition 1B funds for this project, enabling the Proposition 1B funds to be reallocated to other projects, further reducing mobile source emissions and possibly leveraging other funds. The total project cost depends on the number of trucks replaced and the price per each truck. Funding for the project comes from the FY 18 DERA Grant, Proposition 1B and Ecology.

Back to Agenda

Agenda Item #5

Phil Barroca

Recognize Revenue, Amend Contract for Heavy-Duty Truck Replacements and Reimburse Administrative Costs

Background

- In July 2018, the South Coast AQMD was awarded $1,601,523 in FY 2018 U.S. EPA DERA grant funds for heavy-duty diesel truck replacements
- In November 2019, U.S. EPA agreed to project scope change, allowing replacement of non-drayage trucks with near-zero emissions (NZE) natural gas heavy-duty trucks (no $ award change)

New NZE Natural Gas Class 8
0.02g-NOx/bhp/hr

MY 1996-2006 Diesel Class 8
0.5 - 2g-NOx/bhp-hr

SCRAP

Min. 90% NOx reductions

Background (cont'd)

- Proposition 1B eligible projects qualify for these U.S. EPA DERA funds
- In 2018, a Board-approved Proposition 1B contract with Ecology Auto Parts was executed for 47 heavy-duty diesel truck replacements in the amount of $4.7M
- In October 2019, the Board re-issued the Proposition 1B solicitation to utilize turnback funds until all funds are exhausted

Proposal

- Recognize $1.6M in FY 2018 DERA revenue
- Amend Ecology contract, adding DERA funds and reducing Proposition 1B funds
- Ecology would still receive $100,000 per new NZE natural gas heavy-duty truck and scrap an older heavy-duty diesel truck
- DERA funds will provide up to 35% of the cost of the NZE truck
- Proposition 1B funds to make up the balance of the $100,000 per NZE truck
- Proposition 1B funds not used will be applied to fund other eligible projects received through the Proposition 1B solicitation

Recommended Actions

- Recognize revenue up $1,601,523 from U.S. EPA DERA into Advanced Technology, Outreach and Education Fund (17)
- Amend contract with Ecology Auto Parts, adding $1,502,079 from DERA funds, reducing Proposition 1B funding
- Reimburse the General fund up to $99,444 from Fund 17 to implement the DERA award

Back to Agenda

Go to SLIDES

DRAFT

Technology Committee Agenda #6

BOARD MEETING DATE: March 6, 2020 AGENDA NO.

PROPOSAL: Execute Contract to Conduct Airborne Measurements of NOx Emissions in the South Coast Air Basin

SYNOPSIS: Emission inventories are a critical component of South Coast AQMD's air quality modeling and control strategy development. The University of California, Berkeley (UC Berkeley) has proposed to conduct airborne flux measurements by aircraft, offering a robust method to evaluate NOx emission inventories. CARB has committed $700,000 for the parallel measurement of VOC fluxes during this field effort. This action is to execute a contract with the UC Berkeley to conduct airborne measurements of NOx emissions in the South Coast Air Basin at a cost not to exceed $300,000 from the Clean Fuels Program Fund (31).

COMMITTEE: Technology, February 21, 2020; Recommended for Approval

RECOMMENDED ACTION:
Authorize the Chairman to execute a contract with The Regents of the University of California, on behalf of its Berkeley Campus, to conduct airborne measurements of NOx emissions in the South Coast Air Basin in an amount not to exceed $300,000 from the Clean Fuels Program Fund (31).

Wayne Nastri
Executive Officer

PF:SR:ZP:SML

Background

Emission inventories are critical components of South Coast AQMD's air quality modeling and control strategy development to improve air quality in the South Coast Air Basin (Basin). Volatile organic compounds (VOCs), nitrogen oxides (NOx) and diesel particulate matter (PM) from various sources such as area/consumer products, mobile sources, diesel combustion sources and vegetation contribute to ozone and PM pollution. During development of the 2016 AQMP, uncertainties in emissions inventory and air

quality modeling were one of the main comments raised by stakeholders. While the emissions inventory and regional modeling employed in the 2016 AQMP were state-of-the science, emissions inventories require constant improvement and updates. The University of California, Berkeley (UC Berkeley) has proposed to conduct airborne measurements by aircraft, offering a robust method to evaluate these inventories. CARB has committed $700,000 for the parallel measurement of VOC emissions during this field effort.

Proposal

UC Berkeley will conduct airborne NOx and VOC emissions measurements over the Basin in the summer of 2021 to evaluate NOx emissions and over 100 VOC species during approximately 40 flight hours. The instrumentation on-board the Naval Postgraduate School's Twin Otter aircraft represents a substantial improvement compared to previous airborne emission measurements conducted over California.. UC Berkeley will plan the flights, perform the measurements, analyze the data and prepare a final report. UC Berkeley will work in close collaboration with CARB and South Coast AQMD staff during the entire process to ensure the data collected is suitable for the evaluation of emission inventories.

Sole Source Justification

Section VIII.B.2 of the Procurement Policy and Procedure identifies four major provisions under which a sole source award may be justified. This request for a sole source award is made under provisions B.2.c. and B.2.d. Specifically, provision B.2.c.(1): The desired services are available from only the sole-source based upon the unique experience and capabilities of the proposed contractor or contractor team. And provision B.2.d.(8): Other circumstances exist which in the determination of the Executive Officer requirement such waiver in the best interests of the AQMD, including research and development efforts with educational institutions and nonprofit organizations. Dr. Cohen and his team at UC Berkeley possess the unique knowledge and instrumental capabilities needed for this project. Dr. Cohen's group has published extensively in the field of NOx observations and associated air quality impacts and has experience conducting similar airborne measurements elsewhere.

Benefits to South Coast AQMD

This proposed project will provide a unique set of NOx and VOC data that can improve the emissions inventories to be used in the upcoming 2022 AQMP. The data will assist in understanding of the full photochemical spectrum involved in ozone production in the Basin. Additionally, the knowledge to be acquired through this project will assist in identifying pathways in the formation of VOC and NOx and the benefits of using clean fuels to lower these emissions. Emissions studies are included in the *Technology Advancement Office Clean Fuels Program 2019 Plan Update* under the category of "Fuel/Emissions Studies."

Resource Impacts
The contract with UC Berkeley will not exceed $300,000 from the Clean Fuels Program Fund (31).

Sufficient funds are available in the Clean Fuels Program Fund (31), which was established as a special revenue fund resulting from the state-mandated Clean Fuels Program. The Clean Fuels Program, under Health and Safety Code Sections 40448.5 and 40512 and Vehicle Code Section 9250.11, establishes mechanisms to collect revenues from mobile sources to support projects to increase the utilization of clean fuels, including the development of the necessary advanced enabling technologies. Funds collected from motor vehicles are restricted, by statute, to be used for projects and program activities related to mobile sources that support the objectives of the Clean Fuels Program.

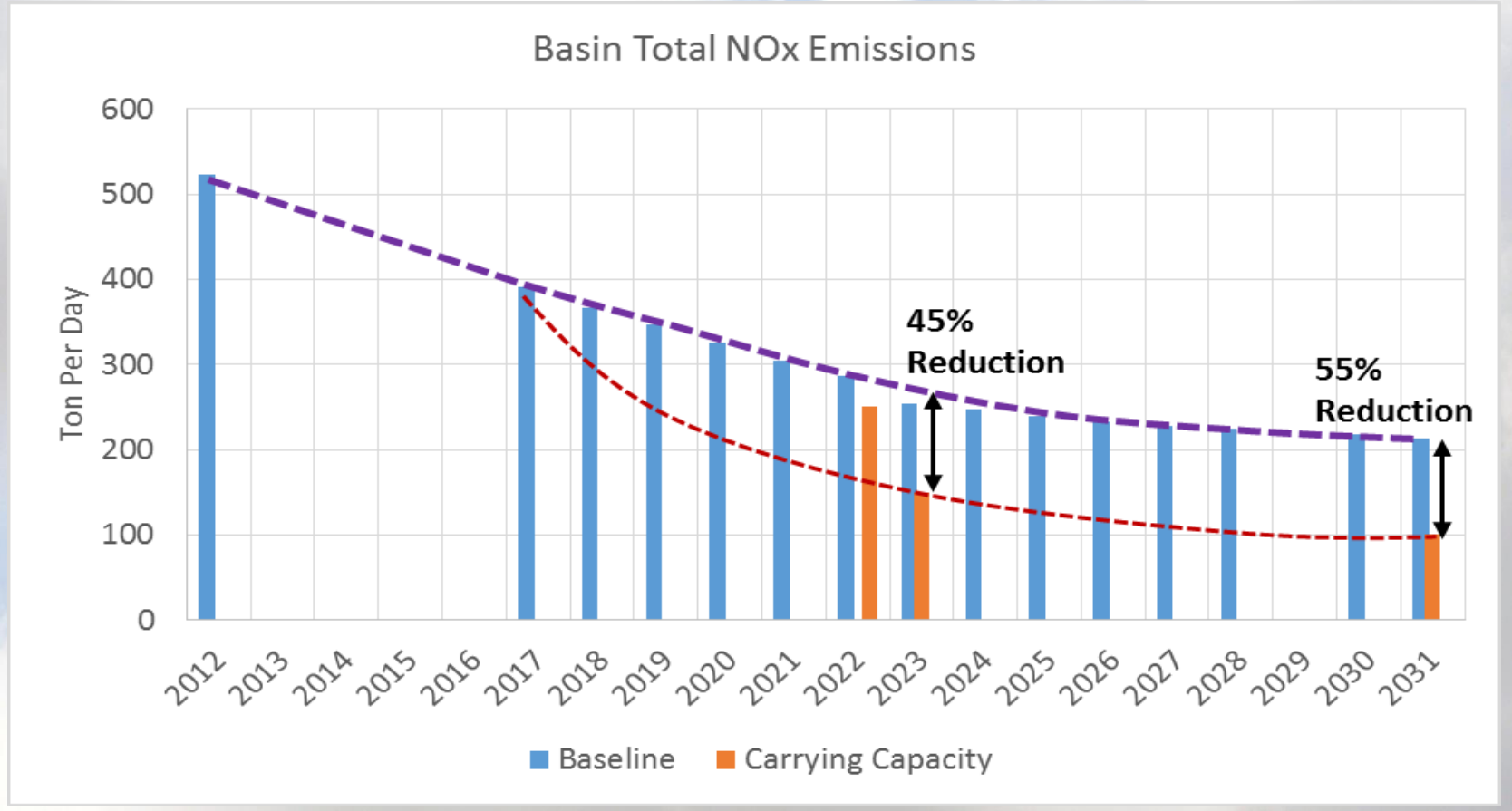
Back to Agenda

Agenda Item #6

Sang-Mi Lee

Execute Contract to Conduct
Airborne Measurements of NOx Emissions
in South Coast Air Basin

Background - Attainment

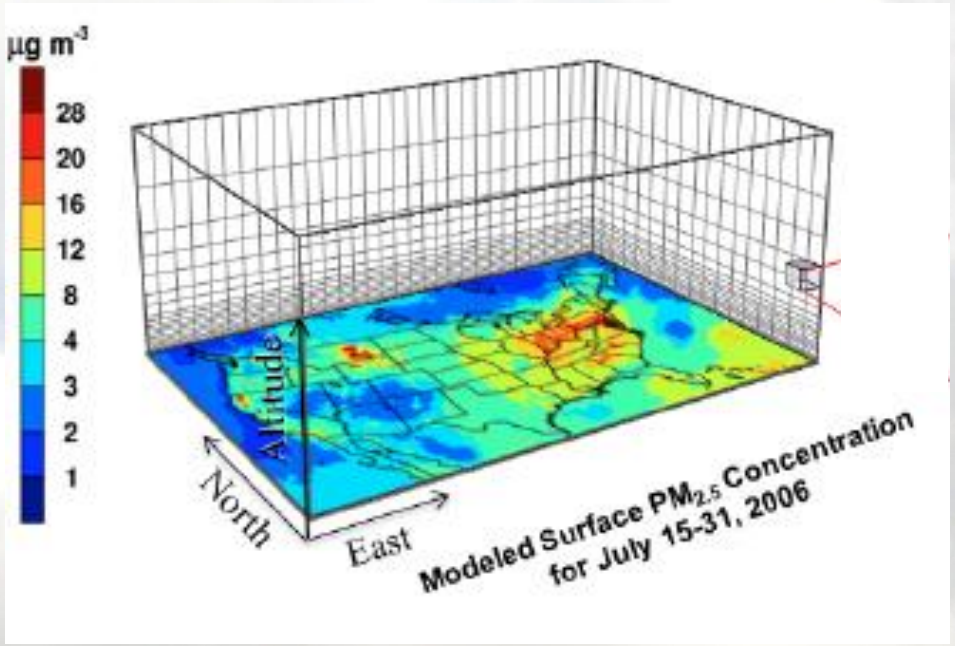


Background – Chemical Transport Modeling

Meteorology

Emissions

Chemical Transport Model



Ozone

PM2.5

Background - Emissions Inventory

- Uncertainties in emissions inventory and air quality modeling
- Diesel exhaust from mobile sources contributes to direct PM
- NOx emissions from mobile sources and VOC emissions from area/consumer products contribute to secondary PM formation such as secondary organic aerosols
- Less-understood categories such as volatile chemical products and urban vegetation may also be important

Proposal

Award contract to University of California Berkeley for airborne measurements of VOCs and NOx emissions

- NOx emissions using Laser Induced Fluorescence (LIF) technology
- Over 100 VOC species using a Vocus Proton Transfer Reaction (PTR) and Time of Flight (ToF) Mass Spectrometry analyzer
- Field measurements in summer 2021
- 8 flights, 40 airborne hours
- Instruments onboard Naval Postgraduate School's Twin Otter aircraft
- Measurements will provide unique data for emissions inventory to be included in the 2022 AQMP

Proposed Funding

Tasks	Funding Agency	Cost
VOC Measurements	CARB	$700,000
NOx Measurements	South Coast AQMD *(requested)*	$300,000
	Total Project Cost	**$1,000,000**

Recommended Action

Execute a contract with The Regents of the University of California, on behalf of its Berkeley Campus, in the amount of $300,000 from the Clean Fuels Program Fund (31)