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

TECHNOLOGY COMMITTEE MEETING

Committee Members
Council Member Joe Buscaino, Chair
Supervisor Sheila Kuehl, Vice Chair
Mayor Pro Tem Larry McCallon
Council Member Judith Mitchell
Council Member Dwight Robinson
Supervisor Janice Rutherford

October 20, 2017 ♦ 12:00 p.m. ♦ Conference Room CC8
21865 Copley Dr., Diamond Bar, CA 91765

(The public may participate at location listed above.)

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AGENDA

CALL TO ORDER

ACTION ITEMS – Items 1 through 5

NOVEMBER BOARD AGENDA ITEMS

1. Execute Contracts for FY 2016-17 "Year 19" Carl Moyer Program, SOON Provision and AB 134 Carl Moyer Funding, and Transfer Funds for Carl Moyer Program and Voucher Incentive Program *(Motion Requested)*

Vicki White
Technology Implementation Manager

In July 2017, Program Announcements for the "Year 19" Carl Moyer Program and SOON Provision closed. These actions are to execute contracts for the "Year 19" Carl Moyer Program and SOON Provision in an amount not to exceed $27,379,771, comprised of $23,937,451 from SB 1107 Fund (32), $3,251,080

from AB 923 Fund (80) and $191,240 in accrued interest from Carl Moyer Program Fund (32). These actions are to also execute contracts for the Carl Moyer Program and SOON Provision in an amount not to exceed $51,573,116 with funds to be allocated as approved under Assembly Bill 134 and transfer up to $51,573,116 as a temporary loan from AB 923 Fund (80) into Carl Moyer Program Fund (32) until receipt of CARB revenues. The Carl Moyer and SOON Provision funds will be used for on- and off-road and marine projects. Finally, this action is to transfer $2 million from Carl Moyer Program AB 923 Fund (80) to Voucher Incentive Program Fund (59) to continue funding truck replacement projects on a first-come, first-served basis.

2. Amend Contract for Tier 4 Passenger Locomotives *(Motion Requested)*

Mei Wang
Program Supervisor

Under the "Year 16" Carl Moyer Program Announcement released on March 7, 2014, the Southern California Regional Rail Authority (SCRRA) submitted a proposal requesting $58.85 million to cofund the replacement of 17 and the purchase of 3 new Tier 4 locomotives. On September 4, 2015, the Board awarded $22.85 million to SCRRA from the Carl Moyer Program AB 923 Fund (80), with a commitment to consider the remaining $36 million over four phases. The first addition of $9 million was approved by the Board on December 2, 2016. The SCAQMD's cost-share of this $129 million project is only for the replacement component of the project. This action is to amend SCRRA's contract, adding an additional $9 million for a revised total of $40.85 million from the Carl Moyer Program AB 923 Fund (80). The remaining $18 million requested by SCRRA will be considered over two phases in future Board requests.

3. Amend Contract for Replacement of Diesel School Buses with Electric Buses *(Motion Requested)*

Adewale Oshinuga
Program Supervisor

The Board previously awarded contracts to replace three diesel school buses with electric buses in the amount of $825,000, consisting of $156,000 using U.S. EPA Diesel Emissions Reduction Act (DERA) funds recognized in the Lower-Emission School Bus Replacement & Retrofit Program Fund (33) and $669,000 from the Lower-Emission School Bus Program. The Colton Joint Unified School District (CJUSD) has successfully completed replacement of two buses and expressed interest in cofunding one additional bus replacement. In June 2017, the Los Angeles Unified School District (LAUSD) informed staff they would be unable to cost-share their replacement bus using FY 2017-18 budget funds, but they are still committed to electric school bus replacements. To meet the U.S. EPA deadline, staff is proposing to reallocate the funds originally awarded to LAUSD to CJUSD. This action is to amend a contract with CJUSD to replace a total of three diesel school buses with electric buses, adding $275,000 to the previous

$550,000 award for a total of $825,000 from the Lower-Emission School Bus Replacement & Retrofit Program Fund (33).

4. Recognize Revenue, Issue Program Announcement for Heavy-Duty Diesel Truck Replacement Projects, Execute Agreement and Reimburse General Fund for Administrative Costs *(Motion Requested)* — Adewale Oshinuga

In August 2017, U.S. EPA notified SCAQMD that an award had been approved under a Fiscal Year 2017 Diesel Emissions Reduction Act (DERA) solicitation in the amount of $1,050,000 for the replacement of heavy-duty diesel trucks with CNG trucks as well as the transfer of the replaced diesel trucks to Washington State to replace older dirtier diesel trucks, which would then be scrapped. These actions are to recognize revenue up to $1,050,000 from the U.S. EPA DERA award into the Advanced Technology, Outreach and Education Fund (17), issue a Program Announcement to solicit proposals for on-road heavy-duty diesel drayage truck replacement projects at a cost not to exceed $1,000,000, and execute an agreement with the Puget Sound Clean Air Agency to implement the replacement projects in Washington State at a total cost not to exceed $25,000 from the Advanced Technology, Outreach and Education Fund (17). This action is to also reimburse the General Fund for administrative costs up to $25,000 from the Advanced Technology, Outreach and Education Fund (17).

5. Amend Contract to Develop and Demonstrate Catenary Zero Emissions Goods Movement System *(Motion Requested)* — Joseph Impullitti, Program Supervisor

In April 2013 the Board awarded a contract to Siemens Industry Inc. to develop and demonstrate a zero emission goods movement system using overhead catenary technology. Unexpected subsurface obstructions on Alameda Street in Carson caused delays and added cost for Siemens to redesign the system, including adding previously unbudgeted safety barriers required by the City of Carson around above-ground foundations. This action is to amend the contract with Siemens to cofund safety barriers, adding additional funds not to exceed $430,000 from the Clean Fuels Fund (31).

WRITTEN REPORT

6. Clean Fuels Program Draft 2018 Plan Update I *(No Motion Required)* — Naveen Berry, Technology Demonstration Manager

Every fall, staff has brought the Clean Fuels Program Draft Plan Update before the Board Technology Committee to solicit input on the proposed distribution of potential project funds for the upcoming year before requesting final approval for the Plan Update each year in early spring. Staff proposes continued support for a wide portfolio of technologies, but with particular emphasis on heavy-duty truck technologies with zero and near-zero emissions for goods movement applications to create a pathway towards achieving 2023 attainment as well as a continued focus on preparing for hydrogen vehicle deployments.

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**
Members of the public may address this body concerning any agenda item before or during consideration of that item (Gov't. Code Section 54954.3(a)). All agendas for regular meetings are posted at District Headquarters, 21865 Copley Drive, Diamond Bar, California, at least 72 hours in advance of a regular meeting. At the end of the regular meeting agenda, an opportunity is also provided for the public to speak on any subject within the Committee's authority. Speakers may be limited to three (3) minutes each.

9. **Next Meeting Date –** Friday, November 17, 2017 at 12:00 pm

ADJOURNMENT

Americans with Disabilities Act
The agenda and documents in the agenda packet will be made available, upon request, in appropriate alternative formats to assist persons with a disability (Gov't. Code Section 54954.2(a)). Disability-related accommodations will also be made available to allow participation in the Stationary Source Committee meeting. Any accommodations must be requested as soon as practicable. Requests will be accommodated to the extent feasible. Please contact Pat Krayser at 909.396.3248 from 7:30 a.m. to 6:00 p.m., Tuesday through Friday, or send the request to pkrayser@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.

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DRAFT
Technology Committee Agenda #1

BOARD MEETING DATE: November 3, 2017 AGENDA NO.

PROPOSAL: Execute Contracts for FY 2016-17 "Year 19" Carl Moyer Program, SOON Provision and AB 134 Carl Moyer Funding, and Transfer Funds for Carl Moyer Program and Voucher Incentive Program

SYNOPSIS: In July 2017, Program Announcements for the "Year 19" Carl Moyer Program and SOON Provision closed. These actions are to execute contracts for the "Year 19" Carl Moyer Program and SOON Provision in an amount not to exceed $27,379,771, comprised of $23,937,451 from SB 1107 Fund (32), $3,251,080 from AB 923 Fund (80) and $191,240 in accrued interest from Carl Moyer Program Fund (32). These actions are to also execute contracts for the Carl Moyer Program and SOON Provision in an amount not to exceed $51,573,116 with funds to be allocated as approved under Assembly Bill 134 and transfer up to $51,573,116 as a temporary loan from AB 923 Fund (80) into Carl Moyer Program Fund (32) until receipt of CARB revenues. The Carl Moyer and SOON Provision funds will be used for on- and off-road and marine projects. Finally, this action is to transfer $2 million from Carl Moyer Program AB 923 Fund (80) to Voucher Incentive Program Fund (59) to continue funding truck replacement projects on a first-come, first-served basis.

COMMITTEE: Technology, October 20, 2017; Recommended for Approval

RECOMMENDED ACTIONS:

1. Authorize the Chairman to execute the Carl Moyer Program contracts as listed in Table 2, in an amount not to exceed $23,597,250, comprised of $20,154,930 from the Carl Moyer Program SB 1107 Fund (32), $191,240 from interest funds accrued in the Carl Moyer Program Fund (32), and $3,251,080 from the Carl Moyer Program AB 923 Fund (80).

2. Authorize the Chairman to execute the SOON Provision contracts as listed in Table 3, in an amount not to exceed $3,782,521 from the Carl Moyer Program SB 1107 Fund (32).

3. Transfer up to $51,573,116 as a temporary loan from the Carl Moyer Program AB 923 Fund (80) into the Carl Moyer Program Fund (32) until the receipt of revenues from CARB for the Carl Moyer Program as approved under AB 134 signed by the Governor on September 16, 2017.

4. Authorize the Chairman to execute the following contracts in an amount not to exceed $51,573,116 from the Carl Moyer Program Fund (32):
   a. Carl Moyer Program contracts as listed in Table 5, in amount not to exceed $32,715,018; and
   b. SOON Provision contracts as listed in Table 6, in an amount not to exceed $18,858,098.

5. Authorize the Executive Officer to redistribute the source of funds between the Carl Moyer Program SB 1107 (32), AB 923 (80), and the funds to be allocated under AB 134 into the Carl Moyer Program Fund (32) in order to expeditiously meet the program encumbrance and expenditure targets.

6. Approve the transfer of $2 million from the Carl Moyer Program AB 923 Fund (80) to the Voucher Incentive Program (VIP) Fund (59) to continue funding truck replacement projects on a first-come, first-served basis under the Carl Moyer VIP.

Wayne Nastri
Executive Officer

MMM:FM:VAW

Background

This is the 19th year of the original Carl Moyer Program and the 13th year of the Carl Moyer Program with a long-term source of funding generated under SB 1107 and AB 923. For FY 2016-17, CARB has allocated $25,436,695 in SB 1107 funds to the SCAQMD, comprised of $23,846,902 in project funds and $1,589,793 in administrative funds. In addition, $3,815,504 is required from the SCAQMD as its local match. Table 1 shows a summary of the total available funds including accumulated interest and returned funds.

On July 11, 2017, proposals were received in response to the Program Announcements issued for the "Year 19" Carl Moyer Program and the SOON Provision. A total of 164 proposals were received requesting over $118 million in funding.

Furthermore, on September 16, 2017, the Governor signed Assembly Bill (AB) 134 making $250 million available statewide for the Carl Moyer Program, of which 43% will be allocated to the SCAQMD. As stated in AB 134, these funds must be

encumbered by June 30, 2019, and liquidated by June 30, 2021. It is imperative to award the funds expeditiously in order to meet the liquidation deadline.

Outreach
In accordance with SCAQMD's Procurement Policy and Procedure, a public notice advertising the PAs and inviting bids was 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 have been notified utilizing SCAQMD's own electronic listing of certified minority vendors. Notice of the PAs was emailed to the Black and Latino Legislative Caucuses and various minority chambers of commerce and business associations, and placed on the Internet at SCAQMD's website (http://www.aqmd.gov).

Proposal
These actions are to approve the recommended awards as outlined in Tables 2 and 3, under the "Year 19" Carl Moyer Program and the SOON Provision for on- and off-road and marine projects in an amount not to exceed $27,379,771 comprised of $23,937,451 from the SB 1107 Fund (32), $3,251,080 from the AB 923 Fund (80) and $191,240 in accrued interest from the Carl Moyer Program Fund (32).

In order to meet the stringent funding encumbrance and liquidation deadlines of AB 134, it is also recommended to fund all the remaining oversubscribed projects with funds to be allocated by CARB to the SCAQMD under AB 134. This action is to transfer up to $51,573,116 as a temporary loan from the Carl Moyer Program AB 923 Fund (80) into the Carl Moyer Program Fund (32) until the receipt of revenues from CARB as approved under AB 134. These actions are to also approve all the remaining awards as outlined in Tables 5 and 6, under the Carl Moyer Program and SOON Provision in an amount not to exceed $51,573,116 from the Carl Moyer Program Fund (32).

All the applications have been evaluated and recommended for funding according to CARB's Carl Moyer Program Guidelines approved in April 2017. Since this is the first funding cycle that on-road heavy-duty vehicles qualify for reasonable funding amounts as a result of the adoption of AB 513 and the subsequent approval of the new program guidelines by CARB, all the eligible on-road projects are recommended for awards to encourage continued and increased funding requests for this category in subsequent years. Projects from all eligible categories are recommended to first meet the AB 1390 goals with at least fifty percent of the projects being located in disproportionately impacted areas and then based on their cost-effectiveness as allowed in the program guidelines. As outlined in Table 4, 56.4 percent of the projects under Year 19 combined

are located in disproportionately impacted areas and communities. All the projects recommended under both Year 19 and AB 134 result in a total of 44 percent of the projects located in disproportionately impacted areas and communities. Well over 50 percent of disproportionately impacted areas and communities will benefit from the projects since the actual operation areas of these mobile sources occur regionally and in these communities.

Finally, this action is to transfer $2 million from the Carl Moyer Program AB 923 Fund (80) to the VIP Fund (59) to continue funding truck replacement projects on a first-come, first-served basis under the Carl Moyer VIP.

Funding Distribution
Funding for projects has been recommended based on the priorities of the "Carl Moyer Program Guideline under SB 1107 & AB 923" adopted by the Board on July 8, 2005. The priorities of the Guideline are:

- Goods Movement (no less than 40%)
- Environmental Justice (no less than 50%)
- Cost-Effectiveness
- Low-Emission Engine/Vehicle Preference
- Early Commercialization of Advanced Technologies/Fuels
- Fleet Rules
- School Buses

Disproportionate Impact Point Ranking
The requirements of AB 1390 are implemented according to the following criteria:

1) All projects must qualify for the Carl Moyer Program by meeting the cost effectiveness limits established in the Program Announcement.
2) All projects will be evaluated according to the following criteria to qualify for funding as a disproportionately impacted area:
    a. Poverty Level: Detailed socioeconomic information is not included in the 2010 Census. Such data is collected annually from a small percentage of the population on a rotating basis by the American Community Survey (ACS). All projects in areas where at least 10 percent of the population falls below the Federal poverty level based on the 2008-2012 ACS data are eligible to be included in this category, and
    b. PM2.5 Exposure: All projects in areas with the highest 15 percent of PM2.5 concentration measured within a 2 km grid will be eligible to be ranked in this category. The highest 15 percent of PM2.5 concentration is 11.10 micrograms per cubic meter and above, on an annual average, or

c. Air Toxics Exposure: All projects in areas with a cancer risk of 894 in a million and above (based on MATES IV estimates) will be eligible to be ranked in this category.

The maximum score is comprised of 40 percent for poverty level and 30 percent each for PM and toxic exposures.

Benefits to SCAQMD

The successful implementation of the Carl Moyer Program and SOON Provision will provide direct emissions reductions for both NOx and PM as required by the programs. Total annual NOx and PM emissions reductions for the Carl Moyer Program projects from both the Year 19 funding cycle and the additional funding from AB 134 funds are approximately 419 tons and 23.6 tons, respectively. Total annual NOx emission reductions from the recommended SOON Provision projects are approximately 145 tons. Since the vehicles and equipment funded under these programs will operate for the life of the contract and beyond, the emissions reductions will provide long-term benefits.

Resource Impacts

Funding for the "Year 19" Carl Moyer Program and the SOON Provision projects shall not exceed $27,379,771, comprised of $23,937,451 from the SB 1107 Fund (32), $3,251,080 from the AB 923 Fund (80) and $191,240 in accrued interest from the Carl Moyer Program Fund (32). Under AB 134, funding for the Carl Moyer Program and the SOON Provision projects shall not exceed $51,573,116, with funds to be allocated by CARB to be recognized into the Carl Moyer Program Fund (32). Until then, up to $51,573,116 from the Carl Moyer Program AB 923 Fund (80) will be used as temporary loan. The transfer from the Carl Moyer Program AB 923 Fund (80) to the VIP Fund (59) will not exceed $2 million.

Attachments

Table 1 – Carl Moyer Program Available Funds
Table 2 – Recommended Carl Moyer Program Awards
Table 3 – Recommended SOON Provision Awards
Table 4 – Carl Moyer & SOON Funding Distribution in EJ Areas for the "Year 19" Funding Cycle
Table 5 – Recommended Carl Moyer Program Awards under AB 134
Table 6 – Recommended SOON Provision Awards under AB 134

Table 1: Carl Moyer Program Available Funds

Funding Source	Funds Required to be Encumbered	Comment
SB 1107	$23,937,451	From $25,436,695 "Year 19" funds allocated by CARB: less $1,589,793 in administration funds; plus $90,549 in returned projects.
Carl Moyer Fund Interest	$191,331	Total unobligated interest funds in Fund 32 as of 6/30/17.
Match Funds	$3,243,178	This is the required match amount for "Year 19", less 15% as SCAQMD's in-kind contribution allowed under the Program. The SCAQMD has already met its local match. However, in case of increased demand, projects can be funded with AB 923 funds that can be used either towards future match requirements or as backup for canceled or partially completed projects.
Total	**$27,371,960**	

Table 2: Recommended Carl Moyer Program Awards

SB 1107 Funds				
Applicant	**Category**	**Project Type**	**No. of Engines**	**Recommended Award Amount**
Anaheim Transportation Network	On-Road	Replacement	2	$39,383
Arakelian Enterprises, Inc.	On-Road	Replacement	68	$1,925,246
CR&R Inc.	On-Road	Replacement	61	$2,017,772
EDCO Disposal Corporation	On-Road	Diesel to CNG Replacement	10	$260,171
Green Fleet Systems, LLC	On-Road	LNG/Diesel to RNG Replacement	22	$1,183,316
Sysco Los Angeles	On-Road	LNG to LNG Repower	21	$525,000
Sysco Riverside	On-Road	LNG to LNG Repower	7	$175,000
USA Waste of California, Inc.	On-Road	Replacement	29	$1,158,830
Waste Management Collection & Recycling, Inc.	On-Road	Replacement	10	$390,757
Have A Plan, LLC	Marine	Repower	2	$269,600
Steven Raby	Marine	Repower	1	$114,400
Harbor Breeze Corp.	Marine	Repower	4	$441,600
Trojan Inc.	Marine	Repower	2	$264,000
Robert N. Austin	Marine	Repower	3	$213,600
Steve Mardesich	Marine	Repower	2	$143,200
Exodus Charters, Inc.	Marine	Repower	2	$234,400
Clinton Nguyen	Marine	Repower	2	$125,600
Cal Crystal Sea, LLC	Marine	Repower	2	$225,600
Salvatore Russo	Marine	Repower	1	$124,800
Joshua Fisher	Marine	Repower	1	$143,200
Daniel Hernandez Fishing Adventures	Marine	Repower	2	$188,800
Toronado Sportfishing, Inc.	Marine	Repower	2	$246,400
Long Beach Anglers, Inc.	Marine	Repower	1	$123,200
Earnest D. Beard II	Marine	Repower	2	$238,400
Seal Beach Anglers, Inc.	Marine	Repower	1	$123,200
J Deluca Fish Company	Marine	Repower	1	$112,800
JMJ Sportfishing, Inc.	Marine	Repower	2	$340,000
Toan D. Nguyen	Marine	Repower	2	$154,400
Harbor Breeze Corp	Marine	Repower	2	$1,108,000
Amazing Coachella, Inc.	Off-Road - Ag	Replacement	1	$59,189
Belk Farms LLC	Off-Road - Ag	Replacement	14	$853,478
Buffalo Meadows Ranch Inc.	Off-Road - Ag	Replacement	1	$81,459

Cleveland Farms Inc.	Off-Road - Ag	Replacement	2	$211,464
Desert Custom Farming Inc	Off-Road - Ag	Replacement	3	$308,260
GH Dairy	Off-Road - Ag	Replacement	13	$636,831
Golden Farm	Off-Road - Ag	Replacement	2	$192,372
Gordon Hay, Inc.	Off-Road - Ag	Replacement	1	$128,648
Hacienda De Trampas	Off-Road - Ag	Replacement	1	$12,563
Hollandia Farms North Inc.	Off-Road - Ag	Replacement	3	$252,432
Junior Enterprises, LLC	Off-Road - Ag	Replacement	2	$118,475
Long Life Farms Inc.	Off-Road - Ag	Replacement	12	$619,710
Marvo Holsteins Dairy	Off-Road - Ag	Replacement	1	$80,561
Mr. Arave	Off-Road - Ag	Replacement	2	$102,885
Organic Depot, LLC	Off-Road - Ag	Replacement	1	$700,408
Pastime Lakes Holdings, LLC	Off-Road - Ag	Replacement	9	$559,188
Prado Recreation Inc.	Off-Road - Ag	Replacement	1	$12,209*
Sun and Sands Enterprises, LLC, dba Prime Time International	Off-Road - Ag	Replacement	10	$872,345
Pro-Organic Farms LLC	Off-Road - Ag	Replacement	3	$424,374
Russ Ramsey/Wally Hall	Off-Road - Ag	Replacement	1	$59,662
Scott Bros. Dairy Farms, L.P.	Off-Road - Ag	Replacement	3	$531,975
Varge Richard	Off-Road - Ag	Replacement	1	$55,008
Wally Hall/Russ Ramsey	Off-Road - Ag	Replacement	2	$72,074
Washburn Grove Management, Inc.	Off-Road - Ag	Replacement	1	$205,591
West Coast Turf	Off-Road - Ag	Replacement	6	$282,587
Wilson Creek Winery and Vineyards, Inc	Off-Road - Ag	Replacement	2	$110,507
Subtotal SB1107 Funds			**365**	**$20,154,930**
Interest Funds				
Joseph Prieto	Marine	Repower	2	$142,400
McMillan Farm Management	Off-Road – Ag	Replacement	3	$48,840
Subtotal Interest Funds			**5**	**$191,240**
AB 923 Funds				
Harley Marine Services, Inc.	Marine	Repower	3	$1,734,228
Ramona Dairy	Off-Road – Ag	Replacement	11	$1,372,951
Prado Recreation Inc.	Off-Road – Ag	Replacement	See above	$143,901*
Subtotal AB 923 Funds			**14**	**$3,251,080**
Grand Total Carl Moyer Program Awards			**384**	**$23,597,250**

*This project will be funded with $12,209 in SB 1107 funds and $143,901 in AB 923 funds for a total amount not to exceed $156,110.

Table 3: Recommended SOON Provision Awards

Applicant	Category	Project Type	No. of Engines	Recommended Award Amount
Bali Construction	SOON	Replacement	4	$162,940
Griffith Company	SOON	Replacement	10	$668,460
Power Move Inc.	SOON	Repower	2	$237,646
Sukut	SOON	Replacement	2	$802,217
Peed Equipment	SOON	Repower	8	$1,425,018
Coburn Equipment Rentals	SOON	Replacement	3	$486,240
Total			**29**	**$3,782,521**

Table 4: Carl Moyer & SOON Funding Distribution in EJ Areas for the "Year 19" Funding Cycle

Category	Recommended Carl Moyer Program Funding	EJ Funding Total
SOON Provision	$3,782,521	$1,871,263
On-Road	$7,675,475	$4,191,174
Marine	$6,811,828	$6,811,828
Off-Road – Ag	$9,109,947	$2,578,205
Totals	**$27,379,771**	**$15,452,470**
Percent of Total Funding in EJ Areas		**56.4%**

Table 5: Recommended Carl Moyer Program Awards under AB 134

Applicant	Category	Project Type	No. of Engines	Recommended Award Amount
Arthur Smith	Marine	Repower	2	$305,868
Balboa Boat Yard of California	Marine	Repower	1	$77,526
Bryan Keith Bishop	Marine	Repower	2	$130,400
Canyon Beach Offshore, Inc.	Marine	Repower	1	$166,678
Carnage Fish Company, Inc.	Marine	Repower	2	$210,101
Current Sportfishing	Marine	Repower	2	$343,528
Freelance Sportfishing, Inc.	Marine	Repower	1	$122,009
Harbor Breeze Corp	Marine	Repower	1	$17,179
Hot-Spot-Charters	Marine	Repower	2	$236,061
J Deluca Fish Company	Marine	Repower	1	$231,200

Applicant	Category	Project Type	No. of Engines	Recommended Award Amount
Joseph Caruso	Marine	Repower	1	$125,600
Joseph P Clark	Marine	Repower	3	$595,200
Long Beach Police Department	Marine	Repower	2	$182,400
Los Angeles County Sheriff	Marine	Repower	1	$163,200
Monte Carlo Sportfishing	Marine	Repower	2	$265,600
Nguyen Dung Van	Marine	Repower	2	$147,200
San Clemente Sportfishing, Inc.	Marine	Repower	3	$247,021
San Pedro Pride, Inc.	Marine	Repower	1	$112,000
Seamus Callahan	Marine	Repower	1	$80,417
Terry Allen Roland	Marine	Repower	1	$128,000
Tradition Sportfishing Charters, LLC	Marine	Repower	2	$216,000
White Shark Yacht Charters	Marine	Repower	4	$641,365
William Sutton	Marine	Repower	2	$190,157
ACE Rental & Repair Inc.	Off-Road	Replacement	1	$953,119
Amazing Coachella, Inc.	Off-Road – Ag	Replacement	12	$1,680,696
Bali Construction	Off-Road	Replacement	2	$58,347
Blackmore Co. LLC	Off-Road	Replacement	1	$671,953
Bogh Engineering	Off-Road	Repower	1	$103,774
Caplinger Construction	Off-Road	Replacement	1	$362,164
City of Whittier	Off-Road	Replacement	1	$148,689
Cleveland Farms Inc.	Off-Road – Ag	Replacement	2	$127,964
Cold Creek Estates, LLC	Off-Road – Ag	Replacement	1	$83,913
County of Los Angeles, Dept. of Public Works	Off-Road	Replacement	2	$20,462
Desert Custom Farming Inc.	Off-Road – Ag	Replacement	2	$557,326
Domenigoni Bros Ranch, LP	Off-Road – Ag	Replacement	1	$159,473
Don Bean Ranch	Off-Road – Ag	Replacement	1	$163,567
Double D Pipeline	Off-Road	Replacement	8	$972,497
Earth & Ag, Inc.	Off-Road – Ag	Replacement	1	$941,816
Evergreen Recycling, Inc.	Off-Road	Replacement	1	$179,617
Full Season Ag Inc.	Off-Road – Ag	Replacement	8	$568,284
Gary Kantor Equipment Rental	Off-Road	Replacement	1	$77,750
Gateway Concrete Inc.	Off-Road	Replacement	2	$117,670

Applicant	Category	Project Type	No. of Engines	Recommended Award Amount
Gene Rheingans	Off-Road – Ag	Replacement	1	$706,297
GH Dairy	Off-Road – Ag	Replacement	17	$2,629,716
Golden Farm	Off-Road – Ag	Replacement	5	$451,664
Gordon Hay, Inc.	Off-Road – Ag	Replacement	7	$723,197
Hollandia Farms North Inc.	Off-Road – Ag	Replacement	1	$147,363
Indacochea Sheep Ranch	Off-Road – Ag	Replacement	2	$415,837
JC Farming, Inc.	Off-Road – Ag	Replacement	1	$700,067
JCE Equipment, Inc.	Off-Road	Repower/Retrofit	2	$283,876
Jim Bootsma Jr.	Off-Road – Ag	Replacement	3	$285,434
Jorge Mathieu	Off-Road – Ag	Replacement	1	$129,981
Junior Enterprises, LLC	Off-Road – Ag	Replacement	3	$233,363
Kuno's Grading, Inc.	Off-Road	Replacement	1	$126,357
La Quinta Date Growers, LP	Off-Road – Ag	Replacement	1	$105,504
Latin Lady Ranch, LLC	Off-Road – Ag	Replacement	1	$88,718
Long Life Farms Inc.	Off-Road – Ag	Replacement	14	$1,212,954
Mali Basta Ranches LLC	Off-Road – Ag	Replacement	11	$750,486
Marvo Holsteins Dairy	Off-Road – Ag	Replacement	3	$631,239
McKinney Construction Co Inc.	Off-Road	Replacement	2	$113,608
Northhills Recycling, Inc.	Off-Road	Replacement	2	$487,827
O&S Holstein, LP	Off-Road – Ag	Replacement	1	$151,070
Oostadam Dairy	Off-Road – Ag	Replacement	1	$87,547
Pacific Hydrotech	Off-Road	Replacement	3	$161,048
Pastime Lakes Holdings, LLC	Off-Road – Ag	Replacement	2	$170,731
Perazzolo Transportations Inc.	Off-Road	Replacement	1	$152,302
Post Company Grading Inc.	Off-Road	Repower	4	$505,818
Prado Recreation Inc.	Off-Road – Ag	Replacement	4	$901,625

Applicant	Category	Project Type	No. of Engines	Recommended Award Amount
Prime Time International	Off-Road – Ag	Replacement	6	$930,033
R&J Haringa Dairy	Off-Road – Ag	Replacement	1	$176,485
Ramona Dairy	Off-Road – Ag	Replacement	3	$569,489
REC Equipment Corp.	Off-Road	Replacement	1	$100,119
Recycled Wood Products	Off-Road	Replacement	7	$1,172,515
Richard Bagdasarian, Inc.	Off-Road – Ag	Replacement	1	$58,061
Russ Bell Equipment	Off-Road	Repower/Retrofit	5	$683,205
Sage Green	Off-Road – Ag	Replacement	1	$806,278
San-Mar Construction, Inc.	Off-Road	Replacement	1	$39,874
Skip Edmunson, Inc.	Off-Road	Replacement	2	$1,126,520
Southern California Landscape Supply	Off-Road	Replacement	1	$165,073
The Johnson Equipment Company, Inc.	Off-Road	Replacement	2	$159,913
Van Dam Dairy Farm	Off-Road – Ag	Replacement	4	$649,254
Washburn Grove Management, Inc.	Off-Road – Ag	Replacement	1	$65,122
Wayne Allison	Off-Road – Ag	Replacement	1	$38,556
West Coast Turf	Off-Road – Ag	Replacement	3	$205,775
Whittier Fertilizer Co.	Off-Road	Replacement	1	$230,663
William Koot Dairy	Off-Road – Ag	Replacement	2	$244,832
Wilson Creek Winery and Vineyards, Inc.	Off-Road – Ag	Replacement	1	$55,831
Total Carl Moyer Program			**227**	**$32,715,018**

Table 6: Recommended SOON Provision Awards under AB 134

Applicant	Category	Project Type	No. of Engines	Recommended Award Amount
Azusa Land Reclamation	SOON	Replacement	1	$47,477
Bali Construction	SOON	Replacement	2	$80,116
C5 Equipment Rental	SOON	Replacement	5	$496,394
Coburn Equipment Rentals	SOON	Replacement and Repower	19	$3,985,585
Downtown Diversion	SOON	Replacement	3	$239,622
Griffith Company	SOON	Replacement	1	$39,666
Mountain Top Quarries, LLC	SOON	Replacement	1	$548,020
Peed Equipment	SOON	Replacement	2	$396,923
Sukut	SOON	Replacement	13	$7,247,478
TGI Equipment Corporation	SOON	Repower	38	$5,264,830
USA Waste of California	SOON	Replacement	1	$98,970
Waste Management Collection and Recycling, Inc. (Irvine & Orange)	SOON	Replacement	8	$413,017
Total SOON Provision			**94**	**$18,858,098**

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Agenda Item #1

Vicki White

Execute Contracts for FY 2016-17 "Year 19" Carl Moyer Program, SOON Provision and AB 134 Carl Moyer Funding, and Transfer Funds for Carl Moyer Program and Voucher Incentive Program

Background

- This is the 19th year of the Carl Moyer Program
- In April 2017, CARB granted $25,436,695 in SB 1107 funds to SCAQMD
- SCAQMD's required local match is $3,815,504, including 15% in-kind contribution
- In April 2017, SCAQMD released Program Announcements for the Carl Moyer and SOON Programs
- 164 applications were received requesting over $118 million

“Year 19” Project Funds Available

Funding Source	Funds to be Encumbered
SB 1107 Project Funds	$23,937,451
Carl Moyer Fund Interest	$191,331
Match Funds	$3,243,178
Total	**$27,371,960**

“Year 19” Funding Cycle
Project Selection Methodology

- Select projects located in disproportionately impacted areas (AB 1390, at least 50%)
- On-road vehicles using zero and near-zero emission technologies
  - Promote advanced technologies, accelerate commercialization, encourage more fleets to come forward
- Cost effectiveness ($/ton) – selection in order of cost effectiveness

“Year 19” Funding Cycle – Proposed Awards

Funding Category	No. of Engines	Total Awards
On-Road	230	$7,675,475
Marine	42	$6,811,828
Off-Road – Ag	112	$9,109,947
Subtotal (Moyer)	384	$23,597,250
SOON Program	29	$3,782,521
Total	**413**	**$27,379,771**

“Year 19” EJ Results

√ AB 1390 goal met: 56.4% of “Year 19 Funds” (Carl Moyer and SOON) will be spent on projects located in EJ areas with:

- At least 10% of population below poverty level, and
- Areas with the highest 15% of PM2.5 concentration, or
- Areas with cancer risk of 894 in a million and above

Additional New Funding

- AB 134, signed by the Governor on September 16, 2017, will provide $250 million statewide for the Carl Moyer Program
- Of these funds, 43% will be allocated to the SCAQMD (est. $107.5 million)
- Funds must be encumbered by June 30, 2019, and liquidated by June 30, 2021

AB 134 Funding

- Due to early encumbrance deadline, staff recommends funding all remaining projects that have been evaluated and deemed eligible:

– Carl Moyer Program		$32,715,018
– SOON		$18,858,098
	Total:	**$51,573,116**

Project Distributions & Benefits

With implementation of “Year 19” and AB 134 funding, the following program benefits will be achieved:

Carl Moyer Program:

NOx = 419 tons/yr

PM = 23.6 tons/yr

SOON Program:

NOx = 145 tons/yr

Funding Summary of Proposed Awards

Total funding amount and source of funds for proposed Carl Moyer and SOON awards:

Funds	Amount
SB 1107	$23,937,451
AB 923	$3,251,080
Interest	$191,240
AB 134	$51,573,116
Total	$78,952,887

Fund Transfers

- To ensure contracts executed by the AB 134 encumbrance deadline, staff proposes to transfer up to $51,573,116 as a temporary loan from the Carl Moyer Program AB 923 Fund (80) to the Carl Moyer Program Fund (32) until receipt of revenues from CARB under AB 134
- Transfer $2 million from the Carl Moyer Program AB 923 Fund (80) to the Voucher Incentive Program (VIP) Fund (59)

Recommended Actions

- Execute contracts for Carl Moyer projects totaling $23,597,250 comprised of:

$20,154,930	SB 1107 Fund (32)
$3,251,080	AB 923 Fund (80)
$191,240	Carl Moyer Interest Fund (32)

- Execute contracts for SOON projects totaling $3,782,521 from the SB 1107 Fund (32)
- Transfer up to $51,573,116 as a temporary loan from the Carl Moyer Program AB 923 Fund (80) to the Carl Moyer Program Fund (32) until receipt of AB 134 revenues from CARB

Recommended Actions (cont'd)

- Execute contracts for Carl Moyer and SOON projects totaling $51,573,116 from the Carl Moyer Program Fund (32) as follows:
  - Carl Moyer contracts for $32,715,018
  - SOON contracts for $18,858,098
- Authorize the Executive Officer to redistribute the source of funds between the Carl Moyer Program SB 1107 Fund (32), AB 923 (80), and the funds to be allocated under AB 134 into the Carl Moyer Program Fund (32), as necessary, in order to expeditiously meet the program encumbrance and expenditure targets
- Transfer $2 million from the Carl Moyer Program AB 923 Fund (80) to the Voucher Incentive Program (VIP) Fund (59) to continue funding truck replacements projects

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DRAFT
Technology Committee Agenda #2

BOARD MEETING DATE: November 3, 2017 AGENDA NO.

PROPOSAL: Amend Contract for Tier 4 Passenger Locomotives

SYNOPSIS: Under the "Year 16" Carl Moyer Program Announcement released on March 7, 2014, the Southern California Regional Rail Authority (SCRRA) submitted a proposal requesting $58.85 million to cofund the replacement of 17 and the purchase of 3 new Tier 4 locomotives. On September 4, 2015, the Board awarded $22.85 million to SCRRA from the Carl Moyer Program AB 923 Fund (80), with a commitment to consider the remaining $36 million over four phases. The first addition of $9 million was approved by the Board on December 2, 2016. The SCAQMD's cost-share of this $129 million project is only for the replacement component of the project. This action is to amend SCRRA's contract, adding an additional $9 million for a revised total of $40.85 million from the Carl Moyer Program AB 923 Fund (80). The remaining $18 million requested by SCRRA will be considered over two phases in future Board requests.

COMMITTEE: Technology, October 20, 2017; Recommended for Approval

RECOMMENDED ACTION:
Authorize the Chairman to amend a contract with SCRRA, adding an additional $9 million to the previous $31.85 million award for a total of $40.85 million from the Carl Moyer Program AB 923 Fund (80), while noting the remaining $18 million of the requested funds, as set aside by the Board, will be considered over two phases in future Board requests.

Wayne Nastri
Executive Officer

MMM:FM:VAW:MW

Background
At the February 1, 2013 and February 7, 2014 Board meetings, the Board approved awards to SCRRA in the amount of $52 million for the replacement of 20 passenger

locomotives with Tier 4 locomotives over a four-year period. Subsequently, under the "Year 16" Carl Moyer Program solicitation, SCRRA submitted a new proposal requesting $58.85 million for the replacement of an additional 17 and the purchase of 3 new Tier 4 passenger locomotives. For that proposal, on September 4, 2015, the Board approved $22.85 million to SCRRA from the Carl Moyer Program AB 923 Fund (80), with a commitment to consider the remaining $36 million over four phases. The first addition of $9 million was approved by the Board on December 2, 2016.

Proposal

This action is to amend a contract with SCRRA, adding an additional $9 million to the previous $31.85 million award for a total of $40.85 million from the Carl Moyer Program AB 923 Fund (80). The remaining $18 million of the requested funds, as set aside by the Board, will be considered over two phases in future Board requests.

The total project cost of $129 million is cost-shared by Caltrans and Metrolink member agencies with 31.9 percent and 22.5 percent, respectively. In compliance with the Carl Moyer Program requirements, the SCAQMD funds will be used only to fund 11 replacement locomotives because they cannot be comingled with Caltrans funds. However, SCAQMD's participation will be contingent upon implementation of all 20 locomotives.

The SCRRA application was evaluated according to CARB's Carl Moyer Program Guidelines, and the requested funding amount is within the cost-effectiveness limit of the Program. In addition, based on the location of the rail tracks, 53 percent of the locomotive operations will be in disproportionately impacted areas, as defined under SCAQMD's Carl Moyer Program criteria.

Benefits to SCAQMD

The replacement of older diesel locomotives with new Tier 4 locomotives will help the South Coast Air Basin meet federal air quality standards. The procurement of Tier 4 locomotives has been identified in the recent U.S. EPA-approved 2007 8-hour Ozone SIP for the South Coast Air Basin. In addition, since SCRRA locomotives travel throughout the South Coast Air Basin, the cleaner Tier 4 locomotives will result in reduced exposure to diesel particulate emissions. Emissions reductions from NOx, PM and ROG from each locomotive will be approximately 12.3 tons per year, 0.33 ton per year and 1.0 ton per year, respectively.

Resource Impacts

The additional funding award for SCRRA's locomotive project shall not exceed $9 million for a total of $40.85 million from the Carl Moyer Program AB 923 Fund (80). The remaining $18 million of the SCRRA-requested funding will be considered over two phases in future Board requests.

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Agenda Item #2

Mei Wang

Amend Contract for Tier 4
Passenger Locomotives

Background

- Two executed contracts with SCRRA
- First project:

  In 2014, SCRRA was awarded $52M from Carl Moyer AB 923 Fund (80) for the replacement of 20 passenger locomotives to Tier 4 locomotives

- Project is on schedule, with 13 locomotives delivered

Project Description

- Second project:

  Under “Year 16” Carl Moyer PA, SCRRA applied for the replacement of 17 and purchase of 3 new Tier 4 locomotives

- Total project cost: $129M
- Requested funding from SCAQMD: $58.85M

Project Description

- In 2015, the Board approved $22.85M of the requested $58.85M from the Carl Moyer Program AB 923 Fund (80), with a commitment to consider the remaining $36M over four phases
- On December 2, 2016, the Board approved the 1st addition of $9M
- Current award of $31.85M

Summary Table

SCAQMD Project	Total No. of Locomotives	Total Project Funding	Requested Funding from SCAQMD	Approved Funding Amount	Board Approval Date
1	20	$126M	$52M	$34.66M	February 1, 2013
				$17.34M	February 7, 2014
2	20	$129M	$58.85M	$22.85M	September 4, 2015
				$9M	December 2, 2016

Project Benefits

- Cost-effectiveness of the locomotives funded by SCAQMD: $15,082/ton
- Emissions reductions per locomotive:

  NOx = 12.30 tons/yr

  PM = 0.33 ton/yr

  ROG = 1.0 ton/yr
- 53% of the locomotive operations will be in EJ areas

Recommended Action

Amend contract with SCRRA adding $9M to the $31.85M previously approved in 2015 and 2016 for a total of $40.85M from the Carl Moyer Program AB 923 Fund (80)

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DRAFT
Technology Committee Agenda #3

BOARD MEETING DATE: November 3, 2017 AGENDA NO.

PROPOSAL: Amend Contract for Replacement of Diesel School Buses with Electric Buses

SYNOPSIS: The Board previously awarded contracts to replace three diesel school buses with electric buses in the amount of $825,000, consisting of $156,000 using U.S. EPA Diesel Emissions Reduction Act (DERA) funds recognized in the Lower-Emission School Bus Replacement & Retrofit Program Fund (33) and $669,000 from the Lower-Emission School Bus Program. The Colton Joint Unified School District (CJUSD) has successfully completed replacement of two buses and expressed interest in cofunding one additional bus replacement. In June 2017, the Los Angeles Unified School District (LAUSD) informed staff they would be unable to cost-share their replacement bus using FY 2017-18 budget funds, but they are still committed to electric school bus replacements. To meet the U.S. EPA deadline, staff is proposing to reallocate the funds originally awarded to LAUSD to CJUSD. This action is to amend a contract with CJUSD to replace a total of three diesel school buses with electric buses, adding $275,000 to the previous $550,000 award for a total of $825,000 from the Lower-Emission School Bus Replacement & Retrofit Program Fund (33).

COMMITTEE: Technology, October 20, 2017; Recommended for Approval

RECOMMENDED ACTION:
Authorize the Executive Officer to amend a contract with Colton Joint Unified School District to add one additional bus to replace a total of three diesel school buses with electric buses, adding $275,000 (up to $52,000 of this funding will be from the U.S. EPA DERA grant) to the previous $550,000 award for a total of $825,000 from the Lower-Emission School Bus Replacement & Retrofit Program Fund (33)

Wayne Nastri
Executive Officer

MMM:FM:NB:AAO

Background
On February 6, 2015, the Board awarded contracts to replace three diesel school buses with electric buses in the amount of $825,000, consisting of $156,000 using U.S. EPA Diesel Emissions Reduction Act (DERA) funds recognized in the Lower-Emission School Bus Replacement & Retrofit Program Fund (33) and $669,000 from the Lower-Emission School Bus Program. The Colton Joint Unified School District (CJUSD) has successfully completed replacement of two buses and expressed interest in cofunding one additional bus replacement. In June 2017, the Los Angeles Unified School District (LAUSD) informed staff they would be unable to cost-share their replacement bus using FY 2017-18 budget funds, but they are still committed to electric school bus replacements. To meet the U.S. EPA deadline, staff is proposing to reallocate the funds originally awarded to LAUSD to CJUSD.

Proposal
This action is to amend a contract with the CJUSD to replace three diesel school buses with electric buses, adding $275,000 to the previous $550,000 award for a total of $825,000.

Benefits to SCAQMD
The successful implementation of this project will provide NOx, PM and GHG emission reductions through the replacement of diesel school buses with electric buses. Since the buses will operate for many years, the emissions reductions will provide long-term benefits.

Resource Impacts
The $275,000 to be reallocated to CJUSD includes $52,000 in DERA funds previously recognized from U.S. EPA into the Lower-Emission School Bus Replacement & Retrofit Program Fund (33) and funds available in Fund 33.

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Agenda Item #3

Adewale Oshinuga

Amend Contract for Replacement of
Diesel School Buses with Electric Buses

Background

- Board awarded contracts for three electric school bus replacement projects under EPA and CARB grants
- Colton Joint Unified School District
  - Successfully replaced two diesel buses
  - Interest in one additional bus replacement
- Los Angeles Unified School District
  - Unable to provide cost-share at this time
  - Committed to electric school bus program
- Reallocation of funds is necessary to meet EPA's deadline

Proposal

- Reallocate funds originally awarded to Los Angeles Unified School District
- Amend existing contract with Colton Joint Unified School District to:
  - Add one additional school bus for replacement of three diesel buses with electric buses
  - Increase previous $550,000 award by $275,000 for a total of $825,000

Recommended Action

Amend a contract with Colton Joint Unified School District to add one additional bus and increase previous $550,000 award by $275,000 for a total of $823,000 from Fund (33)

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DRAFT
Technology Committee Agenda #4

BOARD MEETING DATE: November 3, 2017 AGENDA NO.

PROPOSAL: Recognize Revenue, Issue Program Announcement for Heavy-Duty Diesel Truck Replacement Projects, Execute Agreement and Reimburse General Fund for Administrative Costs

SYNOPSIS: In August 2017, U.S. EPA notified SCAQMD that an award had been approved under a Fiscal Year 2017 Diesel Emissions Reduction Act (DERA) solicitation in the amount of $1,050,000 for the replacement of heavy-duty diesel trucks with CNG trucks as well as the transfer of the replaced diesel trucks to Washington State to replace older dirtier diesel trucks, which would then be scrapped. These actions are to recognize revenue up to $1,050,000 from the U.S. EPA DERA award into the Advanced Technology, Outreach and Education Fund (17), issue a Program Announcement to solicit proposals for on-road heavy-duty diesel drayage truck replacement projects at a cost not to exceed $1,000,000, and execute an agreement with the Puget Sound Clean Air Agency to implement the replacement projects in Washington State at a total cost not to exceed $25,000 from the Advanced Technology, Outreach and Education Fund (17). This action is to also reimburse the General Fund for administrative costs up to $25,000 from the Advanced Technology, Outreach and Education Fund (17).

COMMITTEE: Technology, October 20, 2017; Recommended for Approval

RECOMMENDED ACTIONS:

1. Recognize revenue, upon receipt, up to $1,050,000 in Fiscal Year (FY) 2017 DERA funds from U.S. EPA into the Advanced Technology, Outreach and Education Fund (17) for on-road heavy-duty diesel drayage truck replacement projects;
2. Issue Program Announcement #PA2018-04 to solicit proposals for on-road heavy-duty diesel drayage truck replacement projects at a cost not to exceed $1,000,000;
3. Authorize the Executive Officer to execute an agreement with the Puget Sound Clean Air Agency to implement the on-road heavy-duty diesel drayage truck replacement projects in Washington State at a total cost not to exceed $25,000 from the Advanced Technology, Outreach and Education Program Fund (17); and

4. Reimburse the General Fund up to $25,000 from the Advanced Technology, Outreach and Education Fund (17) for administrative costs necessary to implement the U.S. EPA DERA grant.

Wayne Nastri
Executive Officer

MMM:FM:NB:AAO

Background

The SCAQMD's goal to accelerate mass introduction of near-zero emission vehicle technologies into the South Coast Air Basin (Basin) and Puget Sound Clean Air Agency's (PSCAA) goal to reduce health risks associated with diesel PM emissions necessitate creation of a working group to discuss strategies to achieve these goals. The working group consists of staff from the SCAQMD, PSCAA, Oregon Department of Environmental Quality, CARB, U.S. EPA, Clean Cities Coalition and other stakeholders. Between April and June of 2017, the group held one meeting in Portland as well as two conference calls and agreed to implement a heavy-duty diesel drayage truck (HDDT) replacement program. The Program would include replacement of 2012 or newer HDDTs in the Basin with new near-zero NOx emission CNG heavy-duty trucks and then transfer of the replaced 2012 or newer HDDTs to Washington State to displace MY 1995-2006 HDDTs, which will then be scrapped.

On June 20, 2017, staff applied for funding under the FY 2017 U.S. EPA Diesel Emissions Reduction Act (DERA) Program for an on-road short-haul HDDT replacement projects. In August 2017, the U.S. EPA informed SCAQMD that its proposal was approved for an award of $1,050,000 under the FY 2017 DERA Program.

Proposal

This project is a two-step HDDT replacement project involving two public agencies, the SCAQMD and PSCAA, and fleets in the agencies' respective geographic boundaries. The first step involves replacement of 2012 or newer HDDTs operating in the Basin with 2017 or newer near-zero NOx emission CNG trucks. In the final step, the replaced 2012 or newer HDDTs will be transferred and sold to fleets in Washington State to replace 1995–2006 HDDTs, which will then be scrapped. The Basin and Washington fleets will execute an agreement with each other delineating, at a minimum, terms of bill of sale and purchase price, transfer of ownership, truck conditions, maintenance records and insurance as well as a signed statement that the replaced 2012 HDDTs will never re-enter the SCAQMD's jurisdiction. The Basin fleets are expected to be large fleets that have participated in incentive programs, and the Washington fleets are expected to be small captive fleets that normally purchase used trucks.

A Program Announcement #PA2018-04 will be released to solicit proposals for the replacement projects. As part of a condition of sale and as an incentive for Washington fleets' participation, the purchase price of each replaced 2012 or newer HDDT cannot exceed $30,000. SCAQMD will reimburse Basin fleets a total of $100,000 per each near-zero NOx emission CNG truck as each new near-zero emission CNG truck is purchased and placed in service as well as a confirmation by PSCAA that the replaced 2012 or newer HDDT has been received by Washington fleet and each replaced 1995–2006 HDDT with its engine has been destroyed or rendered useless. Additionally, Washington fleets will pay Basin fleets up to $30,000 for the sale of the 2012 or newer HDDT.

These actions are to: 1) recognize $1,050,000 in FY 2017 DERA funds from the U.S. EPA for HDDT replacement projects; 2) issue the attached Program Announcement #PA2018-04 to solicit proposals for on-road heavy-duty diesel drayage truck replacement projects at a cost not to exceed $1,000,000; 3) authorize the Executive Officer to execute an agreement with the PSCAA to implement the on-road heavy-duty diesel drayage truck replacement projects in Washington State at a total cost not to exceed $25,000; and 4) reimburse the General Fund up to $25,000 for administrative costs necessary to implement the U.S. EPA DERA grant.

Sole Source Justification for Agreement with PSCAA
Section VIII. B. 3 of the Procurement Policy and Procedure identifies four major provisions under which, for contracts funded in whole or in part with federal funds, a sole source award may be justified. This request for sole source award is made under provision B.3.c., which states the awarding federal agency authorizes noncompetitive proposals.
for Program Annoucement #PA2018-04
In accordance with SCAQMD's Procurement Policy and Procedure, a public notice advertising the PA and inviting bids will be published in the Los Angeles Times, the Orange County Register, the San Bernardino Sun, and Riverside County's Press Enterprises newspapers to leverage the most cost-effective method of outreach to the South Coast Basin.

Additionally, potential bidders may be notified utilizing SCAQMD's own electronic listing of certified minority vendors. Notice of the PA 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 SCAQMD's website (http://www.aqmd.gov) where it can be viewed by making the selection "Grants & Bids".

Benefits to SCAQMD
Successful implementation of the HDDT replacement project will provide reductions of NOx, PM and GHG emissions. The HDDTs funded under this program are expected to operate for many years providing long-term emission reduction benefits.

The proposed project is included in the *Technology Advancement Office Clean Fuels Program 2017 Plan Update* under the category "Fueling Infrastructure and Deployment (NG/RNG)".

Resource Impacts
The U.S. EPA FY 2017 DERA award of $1,050,000 (comprised of $1,000,000 for projects and $50,000 for administrative costs) will be placed into Advanced Technology, Outreach and Education Fund (17) for on-road heavy-duty diesel truck replacement projects. The $50,000 will be shared equally between SCAQMD and PSCAA to implement the U.S. EPA FY 2017 DERA grant in their respective jurisdictions.

Attachment
Program Announcement #PA2018-04 - Interstate Heavy Duty Diesel Drayage Truck Replacement Project

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

HEAVY-DUTY DIESEL DRAYAGE TRUCK REPLACEMENT PROJECTS

SCAQMD PROGRAM ANNOUCEMENT
PA2018-04

The South Coast Air Quality Management District (SCAQMD) requests proposals for the following purpose according to terms and conditions attached. In this Program Announcement (PA) the words "Proposer," "Contractor," "Applicant," "Consultant," and "Proponent", are used interchangeably.

SECTION I OVERVIEW

PURPOSE

The SCAQMD is seeking proposals for on-road short-haul heavy-duty diesel drayage truck (HDDT) replacement projects. The purpose of this PA is to assist fleets in the:

1. South Coast Air Basin (Basin) replace their older Class 8 on-road short-haul drayage HDDTs with newer near-zero emission trucks; and, ultimately
2. Central Puget Sound Region (CPSR) in Washington State replace their older Class 8 on-road short-haul drayage HDDTs with newer Class 8 2010-compliant HDDTs.

INTRODUCTION/BACKGROUND

On-road HDDTs are a major contributor to air pollution problems in both the Basin and the CPSR. Despite the last two decades of aggressive efforts to reduce air pollution, the Basin continues to have the worst air quality in the U.S. based on the number of days the National Ambient Air Quality Standards for ozone are exceeded. Consequently, SCAQMD needs a mass introduction of near-zero and zero-emission truck technologies into the Basin to achieve significant progress toward the Basin's air quality goals. Puget Sound Clean Air Agency (PSCAA) also needs to continue to aggressively reduce diesel particulate emissions from HDDTs operating in its region.

SCAQMD and PSCAA have placed significant importance on accelerating truck turnover by providing incentives and encouraging fleets to replace their older and dirtier HDDTs with newer and cleaner trucks. This PA targets captive fleets of single-unit and combination on-road short-haul drayage HDDTs in Basin and CPSR that are typically used to load, unload, move or transport cargo, such as containerized bulk or break-bulk goods within the ports and intermodal distribution facilities. The Basin fleets are expected to be large fleets that have participated in incentive programs, and CPSR fleets are expected to be small captive fleets that normally purchase used trucks.

This project is a two-step HDDT replacement project involving two public agencies, the SCAQMD and PSCAA, and fleets in the agencies' respective geographic boundaries. The first step involves replacement of 2012 or newer HDDTs operating in the Basin with 2017 or newer near-zero NOx emission CNG trucks. In the final step, the replaced 2012 or newer HDDTs will be transferred and sold to CPSR fleets to replace 1995–2006 HDDTs, which will then be scrapped. The Basin and Washington fleets will execute an agreement with each other delineating, at a minimum, terms of bill of sale and purchase price, transfer of ownership, truck conditions, maintenance records and insurance as well as a signed

statement that the replaced 2012 HDDTs will never re-enter the SCAQMD's jurisdiction. The Basin fleets are expected to be large fleets that have participated in incentive programs, and the CPSR fleets are expected to be small captive fleets that normally purchase used trucks.

As part of a condition of sale and as an incentive for CPSR fleets' participation, the purchase price of each replaced 2012 or newer HDDT cannot exceed $30,000. SCAQMD will reimburse Basin fleets a total of $100,000 per each near-zero NOx emission CNG truck as each new near-zero emission CNG truck is purchased and placed in service as well as a confirmation by PSCAA that the replaced 2012 or newer HDDT has been received by Washington fleet and each replaced 1995 – 2006 HDDT with its engine has been destroyed or rendered useless. Additionally, Washington fleets will pay Basin fleets up to $30,000 for the sale of the 2012 or newer HDDT.

FUNDING/AWARDS

The total estimated funding for this PA is $1,000,000 for on-road short-haul drayage HDDT replacement projects. Cofunding is expected from prospective applicants. Awards will be made on a competitive basis, and SCAQMD anticipates awarding $100,000 for each near-zero emission replacement truck. Additionally, prospective applicants in the Basin will be required to transfer and sell the replaced truck(s) to participating CPSR fleets for no more than $30,000. SCAQMD retains discretion to make full awards, partial awards, or no awards at all under this PA. Prospective applicants will be expected to enter into a "Fixed Price" contract with SCAQMD for specific tasks. Payments will be based upon task deliverables.

DEFINITIONS

1. 2010-compliant HDDTs
   HDDTs powered by diesel engines certified by the U.S. EPA and CARB to meet 2010 emissions standards.

2. Class 8
   Any HDDT of Gross Vehicle Weight Rating (GVWR) greater than 33,000 pounds (lb).

3. Drayage HDDT
   Any single-unit or combination Class 8 on-road short-haul heavy-duty diesel truck operating on or through port or intermodal rail yard property for the purpose of loading, unloading or transporting cargo, such as containerized, bulk or break-bulk goods.

4. Near-zero emission trucks
   Class 8 heavy-duty trucks powered by compressed natural gas engines certified to meet the California Air Resources Board's (CARB) Optional Low-NOx emission standard of 0.02 gram per brake horsepower-hour (g/bhp-hr).

ELIGIBLE PROJECTS

Eligible projects are HDDT replacement projects, which:

1. Replace Model Year (MY) 2012 or newer Class 8 on-road short-haul drayage 2010-compliant HDDTs in Basin with MY 2017 or newer Class 8 on-road short-haul heavy-duty drayage near-zero emission trucks; and

2. Transfer and sell the replaced MY 2012 or newer Class 8 on-road short-haul drayage 2010-compliant HDDTs to CPSR fleets to replace MY 1995 – 2006 Class 8 on-road short-haul drayage HDDTs.

ELIGIBLE ENTITY

Eligible entity is a fleet, company, firm, or corporation under the same ownership, wholly or partially, proposing eligible projects as defined in this PA.

FUNDING RESTRICTIONS

- No funds awarded under this PA shall be used for matching funds for other federal grants, lobbying, or intervention in federal regulatory or adjudicatory proceedings, and cannot be used to sue the Federal Government or any other government entity.

- No funds awarded under this PA shall be used for the purchase of trucks to expand a fleet.

IMPORTANT PROGRAM INFORMATION

- Up to $130,000 for each near-zero emission replacement truck, of which $100,000 from SCAQMD and up to $30,000 from the sale of a MY 2012 or newer Class 8 on-road short-haul drayage 2010-compliant HDDT to a participating CPSR fleet.
- To encourage CPSR fleets' participation in the replacement program, the sale price of a replaced MY 2012 or newer Class 8 on-road short-haul drayage 2010-compliant HDDT shall not exceed $30,000.
- All eligible projects will be evaluated and competitively ranked based on the following criteria:
    - The specification of the replaced MY 2012 or newer Class 8 on-road short-haul drayage 2010-compliant HDDTs, including, but not be limited to: engine model year, vehicle miles traveled per year (VMT), fuel usage and the requested funding amount; and
    - Cost effectiveness.
- Applicants applying for grant funding must be the legal owner of the old HDDT at the time the eligible project application is submitted to the SCAQMD.
- Applicants must provide a price quote for each near-zero emission replacement truck.
- Applicants must provide a copy of the CARB Executive Order before the issuance of a purchase order as a documentation that each:
    - MY 2017 or newer Class 8 on-road short-haul heavy-duty drayage replacement truck is a near-zero emission truck as defined in this PA.
    - MY 2012 or newer Class 8 on-road short-haul drayage HDDT is a 2010-compliant truck as defined in this PA.
- Applicants must provide the old HDDT VIN as part of the application.
- Unsigned applications will be deemed ineligible and will NOT be considered for funding.
- No third party contracts will be executed.
- Any tax obligation associated with the award is the responsibility of the grantee. Individuals or companies receiving grant funding will be issued a 1099-G form by SCAQMD for the full award amount.
- A pre-inspection of each MY 2012 or newer Class 8 on-road short-haul drayage HDDT and post-inspection of each near-zero emission replacement truck will be required to verify eligibility of the vehicle prior to disbursement of any incentive funding under this program. The near-zero emission replacement truck shall not be ordered or purchased until:
    - Each MY 2012 or newer Class 8 on-road short-haul drayage HDDT passes a pre-inspection by SCAQMD or its designee and the contract is fully executed;

- There is a fully-executed agreement between Basin and CPSR fleets, delineating, at a minimum, terms of bill of sale and purchase price, transfer of ownerships, truck conditions, maintenance records, and insurance as well as a signed statement that the replaced MY 2012 HDDT will never reenter the Basin.

- **Destruction of each MY 1995 – 2006 Class 8 on-road short-haul drayage HDDT being replaced is required.**
- There are two payment options that will be available: 1) direct payment to the vendor and 2) reimbursement to contractor with proof of payment by contractor. Payment of grant funds shall only be made upon receipt of sufficient invoice that includes:
  - Satisfactory completion of a post-inspection of the near-zero emission replacement truck;
  - Actual replacement cost of each near-zero emission replacement;
  - Confirmation from PSCAA that the replaced MY 2012 or newer Class 8 on-road short-haul drayage HDDT has been received by CPSR fleet and the replaced MY 1995 – 2006 Class 8 on-road short-haul drayage HDDT and its engine have been destroyed or rendered useless; and
  - Total selling price of the MY 2012 or newer Class 8 on-road short-haul drayage HDDT with documentation is no more than $30,000.
- Compliance with existing air quality regulations is a prerequisite for Program funding. Applicants are responsible for ensuring that they are in full compliance with all applicable regulations
- Non-performance with any provision of the SCAQMD contract may result in the recovery of all or a portion of the grant funds or penalties to the equipment owner.

SCHEDULE OF EVENTS

Release of PA2018-04	November 3, 2017
All Applications Due by 5:00 pm	February 28, 2018
Anticipated Board Consideration of Award	April 6, 2018

ALL APPLICATIONS MUST BE RECEIVED AT THE SCAQMD HEADQUARTERS BY NO LATER THAN 5:00 P.M. ON WEDNESDAY, FEBRUARY 28, 2018

SCAQMD may issue subsequent solicitations if insufficient applications are received in this 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 SCAQMD contracts.

CONTACT FOR ADDITIONAL INFORMATION

Questions regarding the content or intent of this PA, procedural matters, or sample contract can be found at the website (www.aqmd.gov/rfp), or can be addressed to:

Adewale Oshinuga
Science and Technology Advancement
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765
Phone: (909) 396-2599 Fax: (909) 396-3324

SECTION II: PROPOSAL SUBMITTAL REQUIREMENTS

Submitted proposals must follow the format outlined below and all requested information must be supplied. Failure to submit proposals in the required format will result in elimination from proposal evaluation. It is the responsibility of the applicant to ensure that all information submitted is accurate and complete. Each proposal must include the following:

1. Fully Completed Application Forms

Application forms are contained in Attachment A of this PA. These forms must be completed and submitted with other required documents (i.e., Certifications and Representations and vendor quotations) discussed in the application and below.

2. Certifications and Representations

Contained in Attachment B of this PA are five forms which must also be completed and submitted with the application forms in Attachment A.

3. Project Cost

Applicants must provide cost information in their applications, as follows:

- The total project cost
- Program dollar requested
- Source and amount of other funding (private, local, and/or state, federal)
- Request for a direct payment to vendor (if applicable)
- Documentation of match funding availability.

Note that any orders placed or payments made in advance of an executed contract with the SCAQMD are done at the risk of the applicant. The SCAQMD has no obligation to fund the project until a contract is fully executed by both SCAQMD and the applicant, and the applicant has satisfactorily met all the requirements of this PA.

SECTION III PROPOSAL SUBMISSION

All proposals must be submitted according to specifications set forth herein.

Due Date

The applicant shall submit **four (4) complete copies of the application** 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 2018-04"**. All proposals/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. All proposals must

be received no sooner than **5:00 p.m., on Wednesday, February 28, 2018**. 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 applicant will not extend the submittal due date.

Grounds for Rejection

A proposal may be immediately rejected if:

1. It is not for an eligible project as defined in Section I of this PA
2. It is not prepared in the format described.
3. It is not signed by the HDDT owner (or duly authorized individual representing the firm).
4. It does not include DMV registration information, mileage supporting documents, Contractor Statement Forms and other forms required in this PA.
5. It does not include current cost quotes and fully and properly completed forms required in this PA.

Missing Information

SCAQMD is not required to contact the applicant to obtain missing application information. It is the responsibility of the applicant to ensure all required application information is submitted to SCAQMD by the application deadline.

Disposition of Proposals

The SCAQMD reserves the right to reject any or all proposals. All responses become the property of the SCAQMD. One copy of the proposal shall be retained for SCAQMD 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 SCAQMD. All proposals shall constitute firm offers and may not be withdrawn for a period of ninety (90) days following the last day to accept proposals.

SECTION IV: PROPOSAL EVALUATION SELECTION CRITERIA

SCAQMD staff will evaluate all submitted proposals. The proposals will be evaluated on a competitive basis and will be ranked as follows:

1. On the basis of how close the specification of the replaced MY 2012 or newer Class 8 on-road short-haul drayage 2010-compliant HDDTs matched the needs of CPSR fleets. These specifications include, but not be limited to: engine model year, vehicle miles traveled per year (VMT), odometer record, and fuel usage.

2. If there is a tie in (1), then the proposal will be further ranked on the basis of the cost effectiveness (rounded up to the nearest dollar) of each near-zero emission truck replacement project as defined in this PA.

3. Any remaining ties will be further ranked according to earliest time the proposal is received.

SECTION V: WORK STATEMENT/SCHEDULE OF DELIVERABLES

All applicants that are selected for funding awards will be required to execute a contract with SCAQMD that will include, at a minimum, the following Work Statement and Schedule of Deliverables.

WORK STATEMENT

As part of the contract execution, a statement of work will be provided to all grantees that include tasks and deliverables demonstrating compliance with the requirements of the Program as administered by SCAQMD. Detailed requirements will be provided in the contract to be executed but below are the minimum criteria for replacement projects:

1. Commit to register the new near-zero emission replacement truck in California and operate the truck in Basin for the duration of the contract term. Dual plates, IRP, and any other out-of-state registrations are prohibited.
2. Agree to accept an on-board electronic monitoring unit at any time during the contract term.
3. Agree to truck inspections and contract milestone deadlines for project implementation.
4. Comply with provision for payment of grant fund.
5. Agree to execute a legally binding agreement with CPSR fleet establishing, at a minimum, terms of:
   - 5.1 Bill of sale and purchase price;
   - 5.2 Transfer of ownerships;
   - 5.3 Truck conditions and maintenance; and
   - 5.4 Insurance as well as statements that the:
     - 5.4.1 Existing MY 1995 – 2006 Class 8 on-road short-haul drayage HDDT and its engine without shall be scrapped without cannibalizing any parts from the old engine; and
     - 5.4.2 Replaced and transferred MY 2012 HDDT to CPSR will never reenter the Basin.
6. Sign a legally binding contract with SCAQMD including project milestone dates and completion deadlines.
7. Retain, at minimum, all documents, invoices, and correspondence associated with the application, award, contract, monitoring, enforcement, and reporting requirements for at least two years after final payment. Records shall be readily available and accessible to SCAQMD or its designee upon request for the purposes of ongoing evaluations or auditing.
8. Properly maintain the new near-zero emission replacement truck in good operating condition and according to the manufacturer's recommendations.

9. Demonstrate proof of truck warranty and collision/comprehensive insurance on the near-zero emission replacement truck. SCAQMD shall be named as additional insured on the policy.
10. Agree to the following remedies for non-performance with the SCAQMD contract:

    11.1 Recovery of all or a portion of Program funds.
    11.2 Other fiscal penalties on prospective applicant based on the severity of the nonperformance.
    11.3 Cancellation of the contract.

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 SCAQMD expects to receive the following reports:

1. Quarterly status reports until the proposed eligible project has been completed and is operational. These reports shall include a discussion of any problems encountered and how they were resolved, any changes in the schedule, and anticipated completion date.
2. A final report, which shall be submitted no later than 60 days after the completion of the proposed eligible project. The report shall, at a minimum, include:
    a. Name, address, and phone number of grantee.
    b. Annual vehicle miles travelled (including mileage/activity log for documentation)
    c. Annual fuel usage
    d. Project cost
    e. Any problems encountered and how they were resolved.

SECTION VI – PAYMENT TERMS

For all projects, full payment will be made upon the successful completion of all the following:

- Pre-inspection of existing MY 2012 or newer Class 8 on-road short-haul drayage HDDT.
- Post-inspection of the near-zero emission replacement truck.
- Receipt of sufficient invoice that includes:
    - An actual replacement cost of each near-zero emission replacement;
    - A confirmation from PSCAA that the replaced MY 2012 or newer Class 8 on-road short-haul drayage HDDT has been received by CPSR fleet and the replaced MY 1995 – 2006 Class 8 on-road short-haul drayage HDDT and its engine have been destroyed or rendered useless; and
    - The total selling price of the MY 2012 or newer Class 8 on-road short-haul drayage HDDT with documentation is no more than $30,000.

ATTACHMENT A

Application Preparation Forms

APPENDIX A – APPLICATION FOR

HEAVY-DUTY DIESEL DRAYAGE TRUCK REPLACEMENT PROJECTS
SCAQMD PROGRAM ANNOUNCEMENT
PA2018-04

Instructions:

- ✓ Read the SCAQMD Program Announcement **PA2018-04** for instructions and additional important information.
- ✓ Fill in all applicable sections with ink. Please print legibly (Be sure to complete Appendix C – Application Statement and Appendix D – Certifications and Representations).
- ✓ **Return three (3) hard copies to:**

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

DEADLINE: Received at SCAQMD by Wednesday, February 28, 2018 at 5:00PM (no exceptions)

SECTION 1 – GENERAL INFORMATION (PLEASES PRINT OR TYPE)

ORGANIZATION INFORMATION		
1. Applicant Name, Business, or Company (as it appears on Form W-9):		
2. Address:		
3. City:	4. State:	5. Zip Code:
6. Mailing Address (if different from above):		
7. City:	8. State:	9. Zip Code:
10. Number of Vehicles to be replaced:		
11. Have you applied for any other grant programs? ☐ Yes ☐ No If yes, please explain and provide name(s) of the agency:		
BUSINESS INFORMATION		
12. Fleet Size (Include Trucks > 14,000 lbs. GVWR **only**):	13. Number of Employees:	
PRIMARY CONTRACT INFORMATION		
14. First and Last Name:	15. Contact Title:	
16. Phone Number:	17. Fax Number:	
18. Alternate Contact Number:	19. Email:	
20. Vehicle Registered Owner :		
21. Person with Equipment Signing Authority:		

(THE INFORMATION BELOW IS REQUIRED FOR EACH PIECE OF EQUIPMENT.
FOR MULTIPLE UNITS YOU MAY PROVIDE AN EXCEL SPREADSHEET CONTAINING THE REQUIRED INFORMATION)

SECTION 2 – CURRENT HDDT ACTIVITY INFORMATION

CURRENT VEHICLE		
1. Vehicle Number:	2. Vehicle Make:	3. Vehicle Model:
4. Vehicle Model Year:	5. Vehicle GVWR:	
6. Vehicle Identification Number (VIN):	7. License Plate Number:	
8. Vehicle Axle Configuration: □ 2 Axle □ 3 Axle	9. Odometer Reading:	

CURRENT VEHICLE ENGINE	
10. Engine Make:	11. Engine Model:
12. Engine Model Year:	13. Horsepower Rating:
14. Engine Serial Number:	15. Fuel Type:
16. Engine Family Number (if applicable):	

17. Is the Vehicle Used Seasonally? __No. __Yes	18. Miles Traveled during the past 24 Months: _____ miles _____% Operation in the cities of San Bernardino, Long Beach, and LA, and the Boyle Heights neighborhood of LA City	19. Fuel usage during the past 24 Months: _____ gallons
20. Vehicle Vocation(s):		

21. Does the existing HDDV have a diesel particulate filter installed? ☐ Yes ☐ No
If yes, list the CARB verified Level of PM emission control (Level 1, 2, or 3):_____
Diesel filter installation date: _____ Any grant funds received for the installation: ☐ Yes ☐ No

THE FOLLOWING DOCUMENTS ARE REQUIRED TO BE SUBMITTED WITH THE APPLICATION:

- Copy of DMV Registration information, including:
  - Current registration.
  - Past 2-year registration - Provide copies of DMV registration for last 24 months (California Base-plated or International Registration Plan (IRP) are acceptable.)
  - If 2-year registration records are not available, then the applicant must provide a DMV printout showing the registration history or a minimum of 8 months registration supplemented by alternative documentation (e.g., proof of insurance, shipment records, or fuel consumption records) that establishes a pattern of California operation over the last 2 years.
- Copy of Title to show proof of ownership (if available)
- Vocation Letter (specifying the types of goods that you haul and where you haul these goods.)
- Provide documentation of annual miles traveled over past 2 years (e.g., maintenance or inspection records with odometer readings, shipment logs, fuel receipts with vehicle identification, etc)
- CARB Executive Order documenting the certified emissions level of the replacement truck engine, equipment, repower engine, or retrofit device (if available).
- Price quote for the replacement truck.

(THE INFORMATION BELOW IS REQUIRED FOR EACH PIECE OF EQUIPMENT.
FOR MULTIPLE UNITS YOU MAY PROVIDE AN EXCEL SPREADSHEET CONTAINING THE REQUIRED INFORMATION)

SECTION 3 – REPLACEMENT VEHICLE INFORMATION

REPLACEMENT VEHICLE	
1. Vehicle Make (if known):	2. Vehicle Model (if known):
3. Vehicle Model Year:	4. Vehicle GVWR *:

REPLACEMENT VEHICLE ENGINE	
5. Engine Make (if known):	6. Engine Model (if known):
7. Engine Model Year:	8. Horsepower Rating (if known):
9. Fuel Type: □ LNG □ CNG	
10. Engine Family Number (if known):	

REPLACEMENT VEHICLE ACTIVITIES
11. Is the existing MY 2012 or newer Class 8 on-road short-haul HDDT a drayage HDDT as defined in this PA?
12. Will the new near-zero emission replacement truck be operated in the Basin and as a drayage truck?

REPLACEMENT VEHICLE DEALER INFORMATION		
1. Vehicle Dealer Name:		
2. Address:		
3. City:	4. State:	5. Zip Code:
6. Contact Name:	7. Contact Title	
8. Phone Number:	9. Fax Number:	10. Email:

PROJECT FUNDING	
1. Program Funding Requested: $_____	
2. Source(s) and amount of other funding (private, local, other State, Federal)	
3. Purchasing Vehicle with a Lease to Own Program*: □ No □ Yes	4. Indicate if you are requesting: □ Direct payment to vendor □ Reimbursement
5. Total project cost including Program and non-Program dollars:	

APPLICATION PACKET CHECKLIST

- Completed Application form.
- ARB Executive Order (EO) for the replacement engines' verified emissions (if available).
- Copy of Vehicle Title(s) (if available).
- Copy of current DMV registration.
- Copy of DMV registration for past 2 years. If 2-year registration records are not available, then the applicant must provide a DMV Printout showing the registration history or a minimum of 8 months of registration supplemented by alternative documentation (proof of insurance, shipment records, or fuel consumption records) that establishes a pattern of California operation over the last 2 years.
- Dealer price quote for near-zero emission replacement truck.
- Vocation letter (provide a description of type of goods you haul and where you haul these goods.
- Documentation of annual miles traveled and fuel usage for the past two years. Examples of documentation include: maintenance or inspection records with odometer reading, shipment logs, fuel receipts with vehicle identification, etc.
- Verification of GVWR rating for vehicles by providing pictures of the engine tag or manufacturer's specification plate with truck VIN listed.

For additional assistance please contact:
Adewale Oshinuga, Program Supervisor
Technology Advancement Office
South Coast Air Quality Management District
(909) 396-2599

ATTACHMENT B

CERTIFICATIONS AND REPRESENTATIONS

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

Business Information Request

Dear SCAQMD Contractor/Supplier:

South Coast Air Quality Management District (SCAQMD) 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,

Michael B. O'Kelly
Chief Administrative 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

REV 2/17

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 SCAQMD,_____(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 SCAQMD 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 SCAQMD at the time of bid application.
- performs 90 percent of the work within SCAQMD'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 SCAQMD 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. December 2014)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

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

Print or type
See **Specific Instructions** on page 2.

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; 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. For a single-member LLC that is disregarded, do not check LLC; check the appropriate box in the line above for the tax classification of the single-member 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.)

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 Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the instructions for line 1 and the chart on page 4 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 on page 3.

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

General Instructions

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

Future developments. Information about developments affecting Form W-9 (such as legislation enacted after we release it) is at *www.irs.gov/fw9*.

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?* on page 2.

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?* on page 2 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 Publication 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 28% 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 Part II instructions on page 3 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* on page 3 and the separate Instructions for the Requester of Form W-9 for more information.

Also see *Special rules for partnerships* above.

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* on page 3 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, list first, and then circle, the name of the person or entity whose number you entered in Part I of 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 in line 3 for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box in line 3.

Limited Liability Company (LLC). If the name on line 1 is an LLC treated as a partnership for U.S. federal tax purposes, check the "Limited Liability Company" box and enter "P" in the space provided. If the LLC has filed Form 8832 or 2553 to be taxed as a corporation, check the "Limited Liability Company" box and in the space provided enter "C" for C corporation or "S" for S corporation. If it is a single-member LLC that is a disregarded entity, do not check the "Limited Liability Company" box; instead check the first box in line 3 "Individual/sole proprietor or single-member LLC."

Line 4, Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space in 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.

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. However, the IRS prefers that you use your SSN.

If you are a single-member LLC that is disregarded as an entity separate from its owner (see *Limited Liability Company (LLC)* on this page), 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 the chart on page 4 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. You can get Forms W-7 and SS-4 from the IRS by visiting IRS.gov or by calling 1-800-TAX-FORM (1-800-829-3676).

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 items 1, 4, or 5 below indicate 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), 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)	The actual owner of the account or, if combined funds, the first individual on the account[1]
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor[2]
4. 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]
5. Sole proprietorship or disregarded entity owned by an individual	The owner[3]
6. 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:**
7. Disregarded entity not owned by an individual	The owner
8. A valid trust, estate, or pension trust	Legal entity[4]
9. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
10. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
11. Partnership or multi-member LLC	The partnership
12. A broker or registered nominee	The broker or nominee
13. 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
14. 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* on page 2.

*Note. 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 Publication 4535, Identity Theft Prevention and Victim Assistance.

Victims of identity theft who are experiencing economic harm or a system 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 contact them at *www.ftc.gov/idtheft* or 1-877-IDTHEFT (1-877-438-4338).

Visit IRS.gov 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

2017 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** and search for **privacy notice**. 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 _____

7061173

Form 590 C2 2016

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: 916.845.9612

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 (SCAQMD) 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 SCAQMD 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 SCAQMD; 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, SCAQMD 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 SCAQMD Governing Board Members can be found at SCAQMD 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 (SCAQMD) 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 SCAQMD 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 SCAQMD for distribution. This will delay my payment.
2. This authorization remains in effect until SCAQMD receives written notification of changes or cancellation from you.
3. I hereby release and hold harmless SCAQMD 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 SCAQMD Use Only

Input By _____ Date _____

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Agenda Item #4

Adewale Oshinuga

Recognize Revenue, Issue Program Announcement for Heavy-Duty Diesel Truck Replacement Projects, Execute Agreement and Reimburse General Fund for Administrative Costs

Background

SCAQMD and Puget Sound Clean Air Agency (PSCAA) collaboration

- SCAQMD needs accelerated turnover of diesel trucks with near-zero emission trucks
- SCAQMD fleets reluctance to scrap compliant diesel trucks without adequate incentives
- PSCAA needs to replace older dirtier diesel trucks with newer compliant diesel trucks
- Washington fleets will scrap older diesel trucks for newer compliant diesel trucks









Background

- A working group was formed to discuss strategies to achieve SCAQMD and PSCAA project goals in Regions 9 and 10
  - Public agencies and fleets in SCAQMD and PSCAA jurisdictions
- The working group recommended a diesel truck replacement program
  - Replace 2010-compliant diesel trucks with near-zero emission CNG trucks
  - Transfer the replaced 2010-compliant diesel trucks to Washington state to displace 1995-2006 diesel trucks
- Staff applied and received $1,050,000 funds from EPA to implement the program

Proposal

- Recognize FY 2017 EPA DERA funds

- Issue a Program Announcement #PA2018-04:
  - Solicit heavy-duty diesel truck replacement projects
  - Replace 2012 or newer diesel trucks in SCAB with near-zero emission CNG trucks
  - Transfer and sell replaced 2012 or newer trucks to Washington State fleets to displace 1995-2006 diesel trucks
  - Provide $100,000 per truck incentive funds to SCAB
  - Limit sale price of each 2012 and newer truck to $30,000
  - Scrap displaced 1995-2006 diesel trucks
  - Require legally binding agreement between fleets

Program Announcement Schedule

- Release Date: November 3, 2017
- Application Due Date: February 28, 2018
- Anticipated Board Award Date: April 6, 2018

Recommended Actions

- Recognize revenue, upon receipt, up to $1,050,000 from EPA into Fund 17 for heavy-duty diesel truck replacement projects
- Issue Program Announcement #PA2018-04 to solicit proposals for heavy-duty diesel replacement projects in an amount not to exceed $1,000,000
- Authorize the Execute Officer to execute an agreement with PSCAA to implement the heavy-duty diesel truck replacement projects in Washington State at a cost not to exceed $25,000 from Fund 17
- Reimburse the General Fund up to $25,000 from Fund 17 to administer the EPA DERA grant

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DRAFT
Technology Committee Agenda #5

BOARD MEETING DATE: November 3, 2017 AGENDA NO.

PROPOSAL: Amend Contract to Develop and Demonstrate Catenary Zero Emissions Goods Movement System

SYNOPSIS: In April 2013 the Board awarded a contract to Siemens Industry Inc. to develop and demonstrate a zero emission goods movement system using overhead catenary technology. Unexpected subsurface obstructions on Alameda Street in Carson caused delays and added cost for Siemens to redesign the system, including adding previously unbudgeted safety barriers required by the City of Carson around above-ground foundations. This action is to amend the contract with Siemens to cofund safety barriers, adding additional funds not to exceed $430,000 from the Clean Fuels Fund (31).

COMMITTEE: Technology, October 20, 2017; Recommended for Approval

RECOMMENDED ACTION:
Authorize the Executive Officer to amend the contract with Siemens Industry Inc., adding additional funds not to exceed $430,000 from the Clean Fuels Fund (31), to cofund safety barriers as part of the development and demonstration of the catenary zero emissions goods movement system.

Wayne Nastri
Executive Officer

MMM:FM:NB:JI

Background
The SCAQMD has identified the development and deployment of zero emissions goods movement transportation systems as one of the agency's top priorities in order to attain federal air quality standards. On April 5, 2013, the Board awarded a contract to Siemens Industry Inc. to construct a one-mile catenary system and develop and demonstrate a catenary hybrid electric class 8 truck. During construction, an unidentified pipeline was discovered under the roadway preventing Siemens from using their design for a below-grade foundation for the poles that support the catenary lines

along Alameda Street in the City of Carson. Siemens proposed a redesign of the foundations for the poles to be entirely above ground. The City of Carson approved the new design and required Siemens to employ safety barriers around the above-ground foundations to prevent serious damage or injury to vehicles and occupants that may come into contact with the foundations. The redesign and the safety barriers resulted in added cost and delays for Siemens, including eliminating installation of a pantograph and testing of a fourth truck due to commensurate scheduling conflicts.

Proposal

The addition of crash barriers and other safety features has resulted in an increase in project costs of $892,869. The necessary permits for the redesign of the catenary pole foundations and safety barriers were approved by the City of Carson and Siemens completed the construction of the system. The demonstration of the trucks on the catenary began July 1, 2017, and will continue through the end of December 2017.

This action is to amend the contract with Siemens, adding an amount not to exceed $430,000, to cover a portion of the costs of required safety features. The elimination of the fourth truck resulted in an additional $200,000 in funding becoming available from the Los Angeles County Metropolitan Transportation Authority (Metro), and Metro has agreed to allow the funds to be used towards the safety barriers.

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 when project funding does not come from federal monies. For the Siemens contract, a sole source recommendation is made under provision B.2.d.: Other circumstances exist which in the determination of the Executive Officer require such waiver in the best interest of the SCAQMD. Specifically, these circumstances are: B.2.d.(1) Project involving cost-sharing by multiple sponsors. The safety barriers will also be cost-shared by Siemens and Metro. Additional circumstances are B.2.c.(1) the unique experience and capabilities of the proposed contractor or contractor team; and B.2.c.(2) the project involves the use of proprietary technology.

Benefits to SCAQMD

SCAQMD's Clean Fuels Program has been active in funding the development and demonstration of zero emission and near-zero emission electric transportation and goods movement technologies. The proposed project is included in the *Technology Advancement Office Clean Fuels Program 2017 Plan Update* under the category "Electric/Hybrid Technologies & Infrastructure". The Siemens eHighway technology infrastructure supports a variety of architectures including electric and hybrid electric trucks.

Resource Impacts
The total project cost for the safety barriers is estimated at $892,869, of which SCAQMD's cost-share shall not exceed $430,000 from the Clean Fuels Fund (31), in addition to in-kind cofunding of $262,869 from Siemens Industry Inc. and $200,000 in cofunding from Metro redirected from another task no longer being performed.

Sufficient funds are available from the Clean Fuels Fund (31), established as a special revenue fund resulting from the state-mandated Cleans 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.

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Agenda Item #5

Joseph Impullitti

Amend Contract to Develop and Demonstrate Catenary Zero Emissions Goods Movement System

Background

- On April 5, 2013, the Board awarded a contract to Siemens Industry Inc. to develop a catenary truck system
- During construction, an unidentified pipeline was discovered under the roadway preventing Siemens from using their design for a below-grade foundation
- Siemens proposed a redesign of the foundations for the poles to be entirely above ground

Background

The City of Carson approved the new design and required Siemens to employ safety barriers around the above-ground foundations to prevent serious damage or injury to vehicles and occupants that may come into contact with the foundations

Proposal

- Permits for the redesign of the pole foundations and safety barriers were approved and Siemens completed the construction of the system
- The demonstration of the trucks began July 1, 2017, and will continue through the end of December 2017

Proposal

Amend the contract with Siemens, adding an amount not to exceed $430,000, to cover a portion of the costs of required safety features

Recommended Action

Authorize the Executive Officer to amend the contract with Siemens Industry Inc., adding additional funds not to exceed $430,000 from the Clean Fuels Fund (31), to cofund safety barriers as part of the development and demonstration of the catenary zero emissions goods movement system

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DRAFT
Technology Committee Agenda #6

PROPOSAL: Clean Fuels Program Draft 2018 Plan Update
[Written Report Only]

SYNOPSIS: Every fall, staff has brought the Clean Fuels Program Draft Plan Update before the Board Technology Committee to solicit input on the proposed distribution of potential project funds for the upcoming year before requesting final approval for the Plan Update each year in early spring. Staff proposes continued support for a wide portfolio of technologies, but with particular emphasis on heavy-duty truck technologies with zero and near-zero emissions for goods movement applications to create a pathway towards achieving 2023 attainment as well as a continued focus on preparing for hydrogen vehicle deployments. This item was presented at the October 20, 2017 Technology Committee as a written report.

Background
Each calendar year, as required by legislation, the Clean Fuels Program Plan Update is revised to reflect technical priorities and proposed project areas for the upcoming year. As part of this process, every fall staff has brought the Clean Fuels Program Draft Plan Update before the Board as a separate item to solicit input on the proposed allocation of potential project funds before requesting final approval each year in early spring. This has provided an opportunity for the Board to provide initial input, incorporate Board feedback as well as input from advisory groups, technical experts and other stakeholders before Board approval of the final Plan Update (concurrent with approval of the Clean Fuels Annual Report).

For Calendar Year 2018, staff has prepared a Clean Fuels Program Draft 2018 Plan Update which proposes continued support for a wide portfolio of technologies. This Draft Update continues to have particular emphasis on heavy-duty truck technologies with zero and near-zero emissions for goods movement applications to create a pathway towards achieving 2023 attainment, as well as a continued focus on preparing for hydrogen vehicle deployments. This emphasis not only aligns well with the SCAQMD's FY 2017-18 Goals and Priority Objectives, which includes continued development and demonstration of zero-emission goods movement technologies, but also begins to lay a pathway towards implementing the 2016 Air Quality Management Plan (AQMP) calling for a significant reduction in NOx emissions by 2031, while

leveraging funds from other state programs such as the Greenhouse Gas Reduction Fund Program and Volkswagen Settlement Fund.

Proposal

The attached Clean Fuels Program Draft Plan Update identifies potential projects to be considered for funding during 2018. The proposed projects reflect promising low, near-zero and zero emission technologies and applications that are emerging in different source categories. This update includes a number of proposed projects, not all of which are expected to be funded in the current fiscal year given the available budget. Some of the proposed projects for 2018 include but are not limited to: 1) near-zero emission liquid fueled heavy-duty engine systems; 2) medium- and heavy-duty fuel cell vehicles and large-scale hydrogen refueling stations; 3) charging infrastructure for medium- and heavy-duty EVs regionwide; 4) increased biogas production and demonstration of near-zero natural gas engines; and 5) increased availability of light-duty plug-ins, battery electric, and fuel cell vehicles. Projects not funded in 2018 may be considered for funding in subsequent years.

In addition to identifying proposed projects to be considered for funding, this Draft Plan Update confirms nine key technical areas of highest priority to the SCAQMD. These high priority areas are listed below based on the proposed funding distribution shown in Figure 1:

- Hydrogen and Fuel Cell Technologies and Infrastructure
- Engine Systems (particularly in the heavy-duty vehicle sector)
- Electric and Hybrid Vehicle Technologies (including charging infrastructure)
- Infrastructure and Deployment (compressed and liquid natural gas)
- Fuels and Emission Studies
- Stationary Clean Fuels Technologies (including renewables)
- Emission Control Technologies
- Health Impacts Studies
- Technology Transfer and Outreach

It should be noted that these priorities represent the areas where SCAQMD funding is thought to have the greatest impact. In keeping with the diverse and flexible "technology portfolio" approach, 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, or (2) address specific technology issues which affect residents within the SCAQMD's jurisdiction.

Figure 1 graphically depicts the potential distribution of SCAQMD Clean Fuels funds, based on projected program costs of $16.7 million for the nine project areas discussed previously. The expected actual project expenditures for 2018 will be 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 SCAQMD funding. Specific contract awards throughout 2018 will be based on this proposed allocation, the quality of proposals received and evaluation of projects against standardized criteria, and ultimately, the Board's 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.

These technical priorities will necessarily be balanced by funding availability and the availability of qualified projects. Revenues from several sources support the SCAQMD's Technology Advancement program. The principal revenue source is the Clean Fuels Program, which under H&SC Section 40448.5 and Vehicle Code Section 9250.11 establishes mechanisms to collect revenues from mobile and stationary sources to support the program's 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, U.S. EPA and DOE, also support technology advancement efforts and may be approached for cost-sharing.

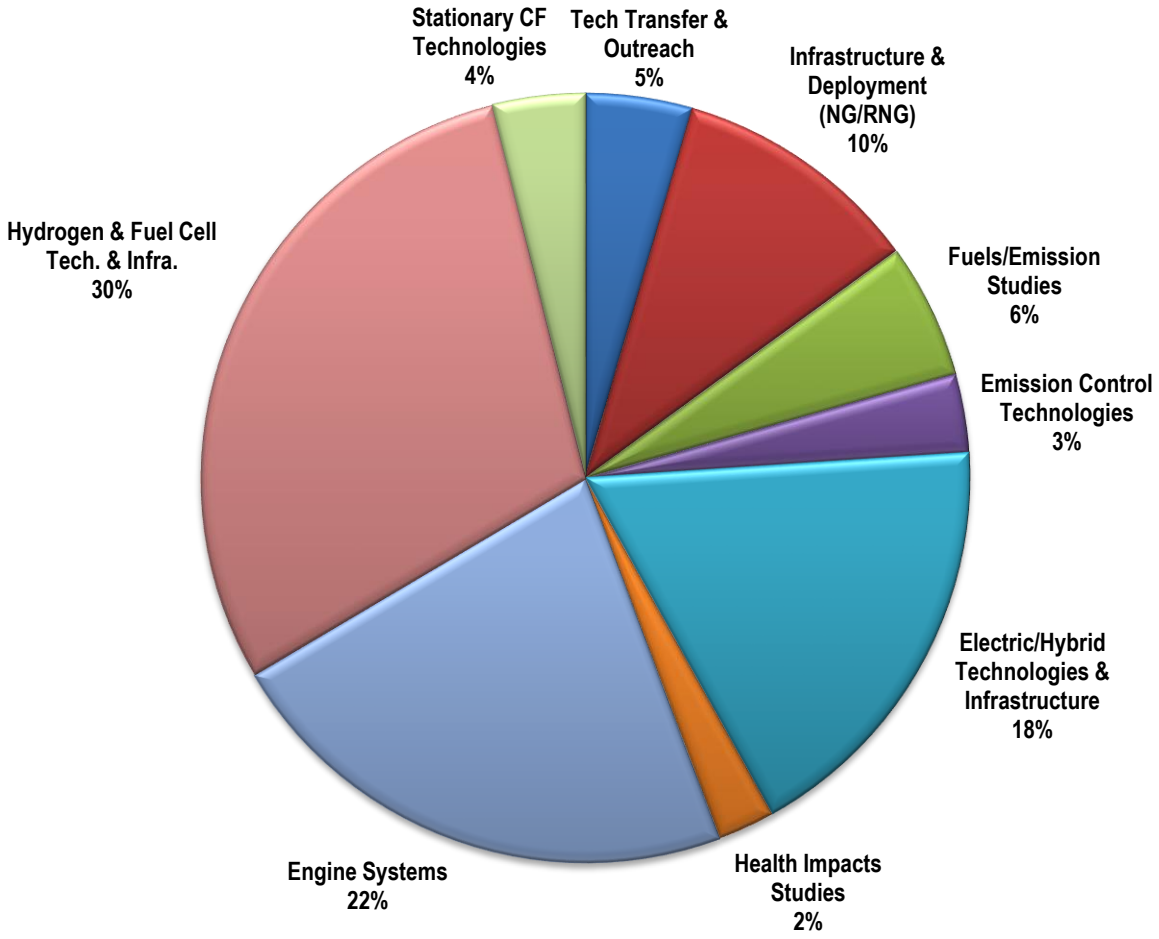


Figure 1: Projected Funding Distribution for Potential Projects in 2018 ($16.7M)

The proposed update is the result of a historical as well as current comprehensive planning and review process, which will continue over the next few months as the Draft Update is further refined before the Board considers adoption in early spring. This process includes consideration of the 2016 AQMP, Draft Clean Air Action Plan, California Sustainable Freight Strategy, and CARB's 2017-2018 Funding Plan. The proposed update also incorporates coordination activities involving outside organizations including consideration of federal, state and local activities and proposed integrated solutions ranging from the Governor's Executive Orders and goals for medium- and heavy-duty vehicles for 2018 and beyond to CARB's climate strategies. As part of this process, staff hosted two advisory group meetings in January 2017 and September 2017 to solicit input from the Clean Fuels Advisory Group, the Technology Advancement Advisory Group and other technical experts. During these advisory meetings, the participants reviewed current and proposed Technology Advancement projects as well as the proposed funding distribution for the Draft 2018 Plan Update and discussed near-term and long-term technologies as potential projects.

Discussions from the review process and advisory meetings, where appropriate, have been and will continue to be fashioned into project areas and included in this year's Plan Update as it is finalized. Additionally, staff regularly interacts with CARB, CEC, DOE, the California Fuel Cell Partnership, and other entities to solicit and incorporate technical areas for potential leveraged funding. Overall, the Draft Plan attempts to maintain flexibility to address dynamically evolving technologies and incorporate new research and data.

The major areas of focus are proposed in the following areas:

- Hydrogen and fuel cell technology and infrastructure
- Near-zero emission engine systems
- Electric and hybrid technologies and infrastructure
- Infrastructure and deployment

The relative changes in funding allocation are a result of recent and anticipated opportunities to partner with other agencies on projects and studies. For example, the 2016 Plan Update included match funding for the $23.5 million Greenhouse Gas Reduction Fund grant the SCAQMD and its partners were awarded in January 2016 for heavy-duty truck projects. The Draft 2018 Plan Update has a particular focus on hydrogen and fuel cell vehicles and infrastructure to meet the current and projected auto manufacturer roll out of fuel cell vehicles, and especially the need for large-scale refueling stations necessary to support medium- and heavy-duty fuel cell vehicles anticipated to be in demonstration service over the next few years. There remains an urgent need in light of 2023 ambient air quality standards for ozone, to develop and demonstrate near-zero and zero emission heavy-duty technologies, especially for goods movement applications, including the infrastructure for such technologies. While this Draft Update reflects a modest decrease in anticipated funding for hydrogen and fuel cells and for electric/hybrid technologies in 2018, the emphasis on heavy-duty truck technologies with zero and near-zero emissions for goods movement applications continues to lay a pathway towards achieving 2023 and 2031 attainment goals. Additional emphasis will be added on near-zero larger displacement engine system development and demonstration, with continued support for natural gas infrastructure and deployment with particular emphasis on renewables to ensure a broad portfolio of technologies and leverage state and federal efforts.

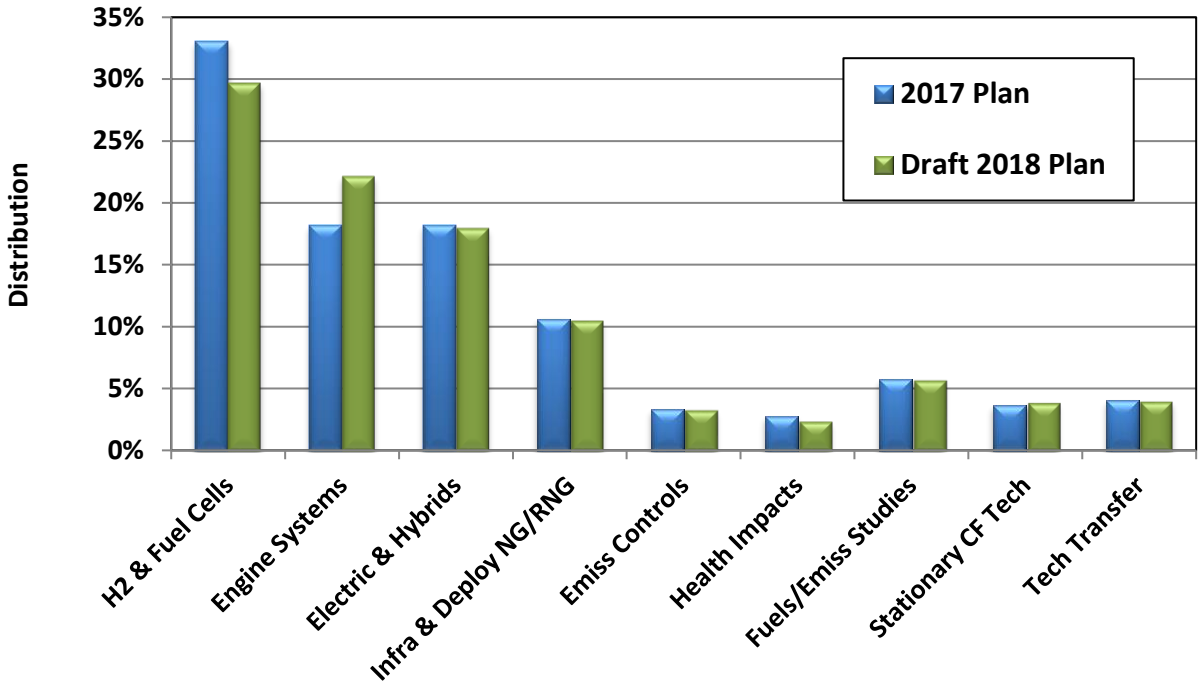


Figure 2: Plan Update Comparison

Based on communications with the organizations specified in H&SC Section 40448.5.1 and review of their programs, the projects proposed in this update do not appear to 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.

Attachment

Clean Fuels Program Draft 2018 Plan Update

Back to Agenda

Go to SLIDES

TECHNOLOGY ADVANCEMENT OFFICE
CLEAN FUELS PROGRAM
DRAFT 2018 PLAN UPDATE

South Coast Air Quality Management District
October 2017

EXECUTIVE SUMMARY

Introduction

The South Coast Air Quality Management District (SCAQMD) is the air pollution control agency for all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties. This region, which encompasses all of the South Coast Air Basin plus small portions of the Mojave Desert and Salton Sea Air Basins, historically experiences the worst air quality in the nation due to the natural geographic and atmospheric conditions of the region, coupled with the high population density and associated mobile and stationary source emissions. Recognizing this challenge, in 1988 the state established the SCAQMD's Clean Fuels Program (Program), along with the SCAQMD's Technology Advancement Office (TAO). The Clean Fuels Program affords the SCAQMD the ability to fund development, demonstration and accelerated deployment of clean fuels and transportation technologies.

For nearly 30 years, using funding received through a $1 motor vehicle registration fee, the Clean Fuels Program has encouraged, fostered and supported clean fuels and transportation technologies, such as hydrogen and fuel cells, natural gas engines and infrastructure, battery electric vehicles, plug-in hybrid electric vehicles and related fueling infrastructure. A key strategy of the Program, which allows significant leveraging of the Clean Fuels funding (typically $3-$4 to every $1 of Clean Fuels funds), is its public-private partnership with private industry, technology developers, academic institutions, research institutions and government agencies. Further, while the TAO aggressively seeks to leverage funds to accomplish more with every dollar, it also strives to be a leader in technology development and commercialization to accelerate the reduction of criteria pollutants. As a result, the TAO Clean Fuels Program has traditionally supported a portfolio of technologies, in different stages of maturity, to provide a continuum of emission reductions and health benefits over time. This approach provides the greatest flexibility and optimizes the region's ability to achieve National Ambient Air Quality Standards (NAAQS).

Health & Safety Code (H&SC) 40448.5.1 requires the SCAQMD to prepare, and submit to the Legislative Analyst each year, a Clean Fuels Annual Report and Plan Update. The Clean Fuels Annual Report looks at what the Program accomplished in the prior calendar year (CY) and the Clean Fuels Plan Update looks ahead at proposed expenditures for the next CY, essentially re-calibrating the technical emphasis of the Program. Preliminary review and comment by SCAQMD's Governing Board, advisory groups, technical experts and other interested parties are incorporated into the Final Plan Update, along with the Clean Fuels Annual Report, which are due to the Legislative Analyst by March 31 of every year.

The overall strategy of the TAO's Clean Fuels Program is based, in large part, on emission reduction technology needs identified through the Air Quality Management Plan (AQMP) process and the SCAQMD Governing Board's directives to protect the health of residents in Southern California, with its approximately 17 million people (nearly half the population of California). The AQMP is the long-term regional "blueprint" that relies on fair-share

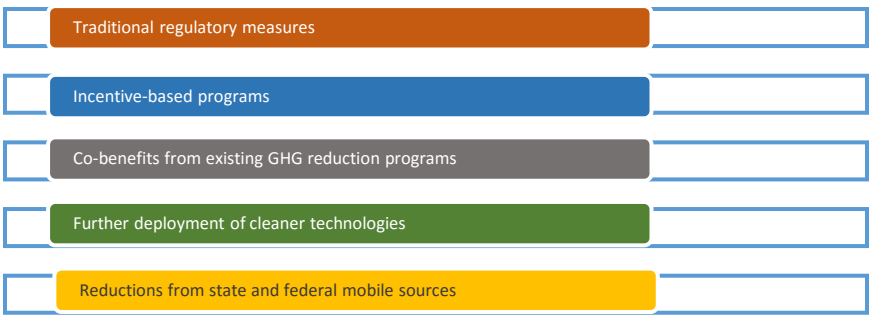


Figure 1: 2016 AQMP Components

emission reductions from federal, state and local levels. The 2016 AQMP is composed of stationary and mobile source emission reductions from traditional regulatory control measures, incentive-based programs, co-benefits from climate programs, mobile source strategies and reductions from federal sources, which include aircraft, locomotives and ocean-going vessels.

The emission reductions and control measures in the 2016 AQMP, which was adopted by the SCAQMD Governing Board on March 3, 2017, rely on a mix of currently available technologies as well as the expedited development and commercialization of lower-emitting mobile and stationary advanced technologies in the Basin to achieve air quality standards. The 2016 AQMP projects that an approximate 45 percent reduction in NOx is required by 2023 and an additional 55 percent reduction by 2031. The majority of these NOx reductions must come from mobile sources, both on- and off-road. Notably, the SCAQMD is currently only one of two regions in the nation recognized as an extreme ozone nonattainment area (the other is San Joaquin Valley). Ground level ozone (a key component of smog) is created by a chemical reaction between NOx and volatile organic compound (VOC) emissions. This is especially noteworthy because in the South Coast Air Basin the largest contributor to ozone is NOx emissions, and mobile sources contribute approximately 88 percent of the NOx emissions in this region as summarized by Figure 2. Furthermore, NOx emissions, along with VOC emissions, also lead to the formation of PM2.5 [particulate matter measuring 2.5 microns or less in size, expressed as micrograms per cubic meter ($\mu g/m^3$)]. Figure 3 illustrates the South Coast Air Basin's need for NOx reduction in tons per day and illustrates the sharp reductions needed for attainment.

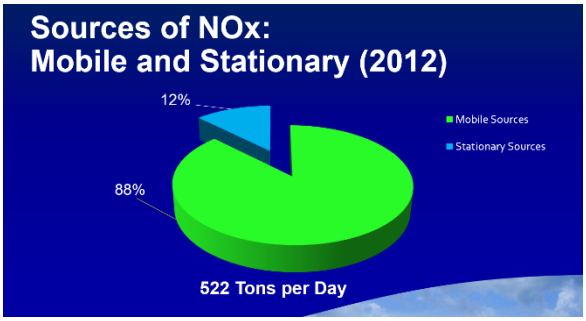


Figure 2: Sources of NOx 2012 Base Year

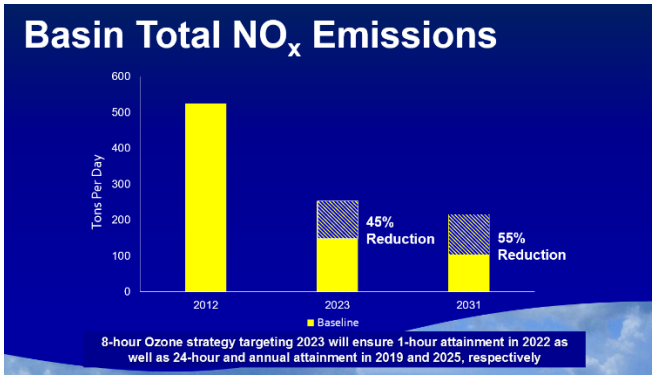
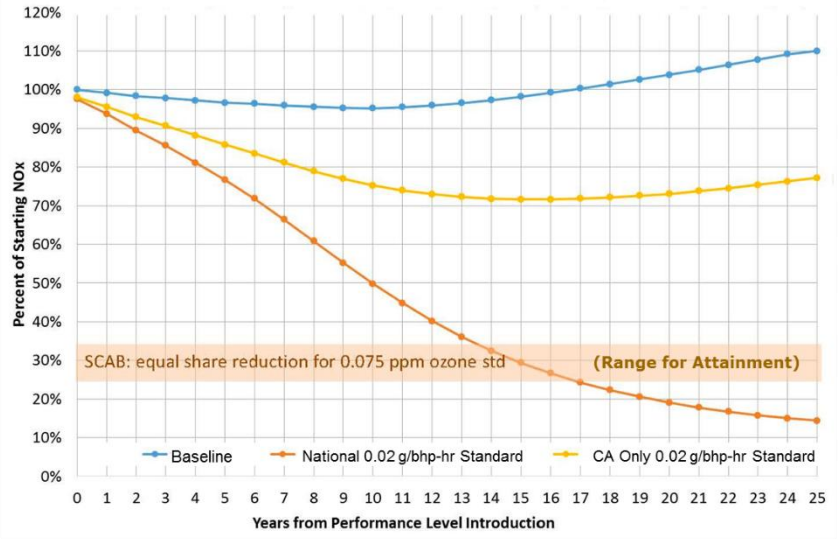


Figure 3: Total NOx Reductions Needed

On a positive note, the 2016 AQMP for the first time envisions Southern California achieving attainment through regulations and specifying further deployment of cleaner technologies formerly undefined as "blackbox" measures. This is due in part because of deployment of zero and near-zero technologies either commercialized or nearing commercialization, albeit with pathways that still require more specificity and scalability, and in part because of the emission reduction co-benefits from carbon dioxide (CO2) reductions expected from achievement of climate change goals as well as an adequate level of funds to incentivize the deployment of these cleaner technologies. There are significant challenges to getting there, however, including EPA and CARB moving forward with changing the heavy-duty engine exhaust NOx standard from 0.2 grams per break horsepower-hour (g/bhp-hr) to 0.02 g/bhp-hr, as well as identifying financial incentives to offset the higher cost of these emerging clean technologies.

In June 2016, SCAQMD and 10 co-petitioners requested the U.S. EPA Administrator to undertake rulemaking to revise the national on-road heavy-duty engine exhaust NOx emission standard from 0.2 g/bhp-hr to 0.02 g/bhp-hr. It was recommended that the regulation be implemented by January 2022 or if not feasible, by January 2024, with a phase-in starting in January 1, 2022. A national standard is estimated to result in NOx emission reductions from this source category from 70 to 90 percent in 14 to 25 years, respectively.



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)

Given that the Basin must attain the 75 ppb ozone NAAQS by 2031 (within the next 15 years), a new on-road heavy-duty engine exhaust emissions standard for NOx is critical given the time needed for such standards to be adopted, for manufacturers to develop and produce compliant vehicles, and for national fleet turnover to occur. The chart above shows the difference in NOx reductions from heavy duty trucks between baseline (no action) emissions (in blue), a low NOx standard adopted only in California (yellow) and reductions if the same low NOx standard is implemented nationally (orange).

The 2016 AQMP also takes an initial look at the emission reductions needed to meet the new federal 8-hour ozone air quality standard of 70 ppb and projects that an additional 25 tons per day (tpd) in NOx reductions between 2031 and 2037 will be needed for attainment in 2037, to be accomplished in part through greater implementation of incentivized zero emission technologies.

The daunting challenge to reduce NOx and PM2.5 to meet standards requires the Clean Fuels Program to encourage and accelerate advancement of advanced clean fuel and transportation technologies, leading the way to commercialization of progressively lower-emitting fuels and vehicles. Given the relationship between NOx, ozone and PM2.5, the 2018 Plan Update must emphasize emission reductions in all these areas. However, the confluence of federal, state and local planning efforts on climate change, greenhouse gases (GHGs), petroleum reduction, air quality and other environmental areas should provide co-benefits that may help the region.

Given the region's thriving goods movement industry, it became clear that the effect of moving containers through the Ports of Los Angeles and Long Beach and the subsequent movement of goods throughout the region not only has a dramatic impact on air quality but also the quality of life in the communities along the major goods movement corridors. In recognition of these impacts, the SCAQMD has been leading a concerted effort to develop and demonstrate zero and near-zero emissions goods movement technologies, such as electric trucks, plug-in hybrid trucks with all-electric range, fuel cell and natural gas range-extended trucks, and catenary technology. The SCAQMD goods movement projects that have been initiated or anticipated incorporate a variety of fuels, including electricity, natural gas, biofuels, hydrogen and diesel. The prioritization of these types of projects is reflected in this Draft 2018 Plan Update.

The proposed funding allocations and prioritization are commensurate with the emissions inventory for the various categories that need significant NOx emission reductions, both in the near-term (2023) and longer-term (2031).

2018 Plan Update

The overall strategy is based in large part on technology priorities and opportunities identified in the SCAQMD's AQMP and the SCAQMD Governing Board's directives to protect the health of residents in the Basin. The NOx, VOC and PM emission sources of greatest concern are heavy-duty on-road vehicles, medium- and light-duty on-road vehicles, and off-road equipment. Ocean-going vessels and locomotives remain a concern for the region, but at this time only the federal government has the authority to regulate them. Notwithstanding, TAO works with maritime and railroad companies to co-fund development, demonstration and deployment in these areas as well.

Every year TAO staff re-evaluates the Clean Fuels Program to develop a Plan Update which essentially serves to re-assess the technology progress and direction for the agency. The Program continually seeks to support the development and deployment of lower-emitting technologies. The design and implementation of the Program Plan must balance the needs in the various technology sectors with technology readiness, emissions reduction potential and cofunding opportunities. As the state and federal governments have turned a great deal of their attention to climate change and petroleum reduction goals, the SCAQMD has remained committed to developing, demonstrating and commercializing zero and near-zero emission technologies. Fortunately many, if not the majority, of technology sectors that address our need for NOx reductions also garner reductions in greenhouse gas (GHG) and petroleum use. Due to these "co-benefits," the SCAQMD has been successful in partnering with the state and federal government, which allows the Clean Fuels Program to leverage its funding extensively.

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

The Plan Update includes projects to develop, demonstrate and commercialize a variety of technologies, from near-term to long-term commercialization, that are intended to provide solutions to the emission control needs identified in the 2016 AQMP. As noted, the 2016 AQMP analysis indicates that an approximate 45 percent reduction in NOx is required by 2023 with an additional 55 percent NOx reduction by 2031. Given the need for these significant reductions over the next 6-14 year timeframe, mid- and longer-term alternative fuels, hybrid, electric and fuel cell based technologies are emphasized. Areas of focus include:

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

Table 1 (page 17) lists the potential projects across the nine core technologies identified in this report. Potential projects for 2018 total $16.7 million, with anticipated leveraging of more than $4 for every $1 of Clean Fuels funding, for total project costs of nearly $70 million. The proposed projects may also be funded by revenue sources other than the Clean Fuels Program, especially VOC and incentive projects.

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CLEAN FUELS PROGRAM
2018 Plan Update

The Clean Fuels Program (Program) was first created in 1988, along with the SCAQMD's Technology Advancement Office (TAO). Funding for the Program is received through a $1 motor vehicle registration fee. The Clean Fuels Program continually seeks to support the development and deployment of zero and near-zero emission technologies over a broad array of applications and spanning near- and long-term implementation. Planning has been and remains an ongoing activity for the Program, which must remain flexible to address evolving technologies as well as the latest progress in the state-of-technologies, new research areas and data.

Every year the SCAQMD re-evaluates the Clean Fuels Program based on the region's ongoing need for emissions reductions and develops a Plan Update for the upcoming calendar year (CY) targeting near-term projects to help achieve those reductions. This document is for the upcoming calendar year 2018.

Overall Strategy

The overall strategy of the TAO's Clean Fuels Program is based, in large part, on emission reduction technology needs identified through the Air Quality Management Plan (AQMP) process and the SCAQMD Governing Board's directives to protect the health of residents in Southern California, with its approximately 17 million people (nearly half the population of California). The AQMP is the long-term regional "blueprint" that relies on fair-share emission reductions from federal, state and local levels. The 2016 AQMP is composed of stationary and mobile source emission reductions from traditional regulatory control measures, incentive-based programs, co-benefits from climate programs, mobile source strategies and reductions from federal sources, which include aircraft, locomotives and ocean-going vessels.

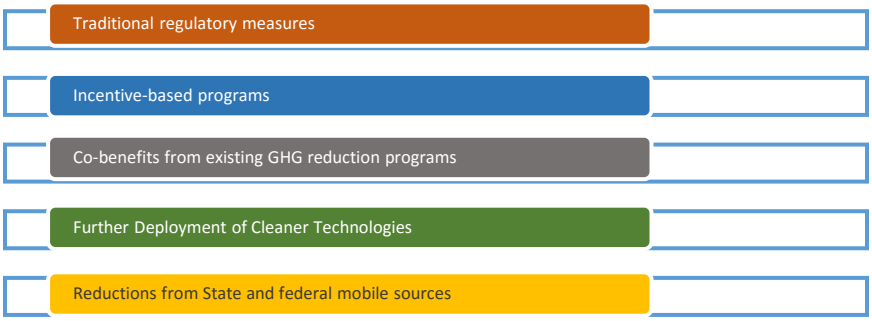

Figure 1: 2016 AQMP Components

The emission reductions and control measures in the 2016 AQMP, which was adopted by the SCAQMD Governing Board on March 3, 2017, rely on a mix of currently available technologies as well as the expedited development and commercialization of lower-emitting mobile and stationary advanced technologies in the Basin to achieve air quality standards. The 2016 AQMP projects that an approximate 45 percent reduction in NOx is required by 2023 and an additional 55 percent reduction by 2031. The majority of these NOx reductions must come from mobile sources, both on- and off-road. Notably, the SCAQMD is currently only one of two regions in the nation recognized as an extreme ozone nonattainment area (the other is San Joaquin Valley). Ground level ozone (a key component of smog) is created by a chemical reaction between NOx and volatile organic compound (VOC) emissions. This

is especially noteworthy because in the South Coast Air Basin the largest contributor to ozone is NOx emissions, and mobile sources contribute approximately 88 percent of the NOx emissions in this region as summarized by Figure 2. Furthermore, NOx emissions, along with VOC emissions, also lead to the formation of PM2.5 [particulate matter measuring 2.5 microns or less in size, expressed as micrograms per cubic meter (µg/m^3)]. Figure 3 illustrates the South Coast Air Basin's need for NOx reduction in tons per day and illustrates the sharp reductions needed for attainment.

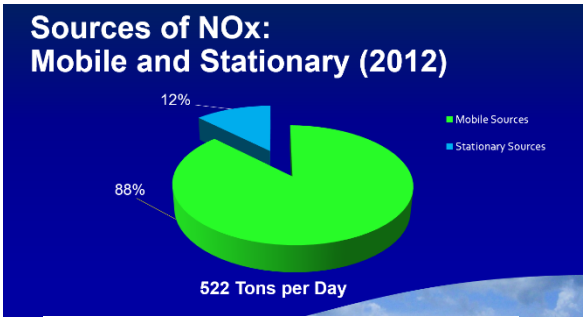

Figure 2: Sources of NOx 2012 Base Year

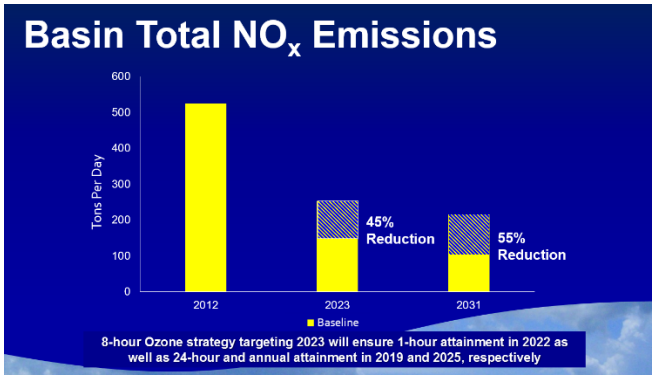

Figure 3: Total NOx Reductions Needed

The 2016 AQMP includes integrated strategies and measures to demonstrate attainment of the following National Ambient Air Quality Standards (NAAQS):

- 8-hour Ozone (75 parts per billion or ppb) by 2031
- Annual PM2.5 (12 µg/m^3) by 2025
- 24-hour PM2.5 (35 µg/m^3) by 2019
- 8-hour Ozone (80 ppb) by 2023 (updated from the 2012 AQMP)
- 1-hour Ozone (120 ppb) by 2022 (updated from the 2012 AQMP)

The 2016 AQMP also takes an initial look at the emission reductions needed to meet the new federal 8-hour ozone air quality standard of 70 ppb and projects that an additional 25 tpd in NOx reductions between 2031 and 2037 will be needed for attainment by 2037.

The daunting challenge to reduce NOx and PM2.5 to meet increasingly stringent standards require the Clean Fuels Program to encourage and accelerate advancement of clean fuel and transportation technologies, leading the way to commercialization of progressively lower-emitting fuels and vehicles. The NOx and VOC emission sources of greatest concern to this region are heavy-duty on-road and off-road vehicles. To underscore this concern, the 2015 Vehicle Technologies Market Report[1], summarizing national data, released in spring 2016 by the Oak Ridge National Laboratory for the Department of Energy, and corroborated by EMFAC 2014 projections, notes that Class 8 trucks comprise 41% of the medium- and heavy-duty truck fleet but consume 78% of the fuel use in this sector. This is especially significant since the report also notes that Class 8[2] truck sales have increased 45% from 2011 to 2015; and Class 4-7 trucks, 49%. Given the relationship between NOx, ozone and PM2.5, the 2018 Plan Update must continue to emphasize emission reductions in all these areas.

Since development of the 2012 AQMP, it became clear that the effect of moving containers through the Ports of Los Angeles and Long Beach and the subsequent movement of goods throughout the region not only have a dramatic impact on air quality but also the quality of life in the communities along the

[1] http://cta.ornl.gov/vtmarketreport/pdf/2015_vtmarketreport_full_doc.pdf

[2] 33,001 pounds and greater (Class 4-7 trucks, 14,001-33,000 pounds)

major goods movement corridors. The findings from the MATES IV[3], which included local scale studies near large sources such as ports and freeways, reinforce the importance of these impacts and the need for transformative transportation technologies, especially near the ports and goods movement corridor. In recognition of these impacts, the SCAQMD added as a key element to its strategy a concerted effort to develop and demonstrate zero and near-zero emissions' goods movement technologies, such as electric trucks, plug-in hybrid trucks with all-electric range, zero emission container transport technologies, trucks operating from wayside power including catenary technology and heavy-duty technologies. SCAQMD has initiated the process of a follow-up analysis 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, referred to as MATES V.

For over 28 years, a key strategy of the Clean Fuels Program has been its public-private partnership with private industry, technology developers, academic institutions, research institutions and government agencies. This public-private partnership has allowed the Program to leverage its funding with $3-$4 of spending on R&D projects to every $1 of SCAQMD funds. While the SCAQMD thus aggressively seeks leverage funds to accomplish more with every dollar, it also strives to act as a leader in technology development and commercialization to accelerate the reduction of criteria pollutants.

As the state government has been turning much of their attention to climate change (CO2 reductions), the SCAQMD remains committed to developing, demonstrating and commercializing zero and near-zero emission technologies and renewable fuels. Fortunately the majority of technologies that address our need for NOx reductions also enable greenhouse gas (GHG) reductions. Because of these "co-benefits," we have successfully pursued partnering with the state and federally-funded projects that promise emission reductions.

Program and Funding Scope

This 2018 Plan Update includes projects to develop, demonstrate and commercialize a variety of technologies, from near-term to long-term, that are intended to provide solutions to the emission control measures identified in the 2016 AQMP to address the increasing challenges this region is facing to meet air quality standards, including:

1) implementation of new and changing federal requirements, such as the federal 8-hour ozone standard of 70 ppb promulgated by U.S. EPA in late 2015;
2) implementation of new technology measures by including accelerated development of technologies getting ready for commercialization and deploying ready technologies; and
3) continued development of cost-effective approaches.

The overall scope of projects in the 2018 Plan Update also needs to remain sufficiently flexible to address new challenges and measures that are identified in the 2016 AQMP, consider dynamically evolving technologies, and take into account new research and data. The latter, for example, includes the findings from the MATES IV study, which was undertaken to update the emissions inventory of toxic air contaminants, measure the concentration of ultrafine particles and black carbon (an indicator of diesel particulate emissions), and conduct a regional modeling effort to characterize risk to health across the Basin, and currently in the process of being updated with MATES V.

The Clean Air Act, in addition to providing for specific control measures based on known technologies and control methods, has provisions for more general measures based on future, yet-to-be-developed

[3] http://www.aqmd.gov/home/library/air-quality-data-studies/health-studies/mates-iv

technologies. These "black box" measures are identified under Section 182(e)(5) of the Clean Air Act for regions that are extreme non-attainment areas, such as the South Coast Basin. In the past, some of the technologies that have been developed and demonstrated in the Clean Fuels Program may have served as guidance for the "black box." However, the 2016 AQMP calls for elimination on the reliance of these "black box" (future technologies) to the maximum extent possible. In fact, the 2016 AQMP for the first time envisions Southern California achieving attainment without a reliance on "black box" technology. This is due in large part to the progress in the development and commercialization of zero and near-zero technologies, albeit with pathways that still require more specificity and in part because of the emission reduction co-benefits from carbon dioxide (CO2) reductions expected from pursuit of climate change goals. There are significant challenges to getting there, however, including EPA moving forward with changing the heavy-duty engine exhaust NOx standard from 0.2 grams per break horsepower-hour (g/bhp-hr) to 0.02 g/bhp-hr as well as identifying financial incentives to offset the cost of cleaner technologies.

Within the core technology areas defined later in this section, project objectives range from near-term to long-term. However, the SCAQMD Clean Fuels Program concentrates on supporting development, demonstration and technology commercialization and deployment efforts rather than fundamental research. The nature and typical time-to-product for the Program's projects is described below, from near-term to longer-term.

- *Deployment* or technology commercialization efforts focus on increasing the utilization of clean technologies in conventional applications, promising immediate and growing emissions reduction benefits. However, it is often difficult to transition users to a non-traditional technology or fuel, even if such a technology or fuel offers significant societal benefits. As a result, in addition to government's role to reduce risk by funding technology development and testing, one of government's roles is to support and offset any incremental cost through incentives to help accelerate the transition and use of the cleaner technology. The increased use and proliferation of these cleaner technologies often depends on this initial support and funding as well as efforts intended to increase confidence of stakeholders that these technologies are real, cost-effective in the long term and will remain applicable.
- Technologies ready to begin field *demonstration* in 2018, are expected to result in a commercial product in the 2020-2021 timeframe, and technologies being field demonstrated generally are in the process of being certified. The field demonstrations provide a controlled environment for manufacturers to gain real-world experience and address any end-user issues that may arise prior to the commercial introduction of the technology. Field demonstrations provide real-world evidence of a technology's performance to help allay any concerns by potential early adopters.
- Finally, successful technology *development* projects are expected to begin during 2018 with durations of at least two years. Additionally, field demonstrations to gain longer-term verification of performance may also be needed prior to commercialization. Certification and ultimate commercialization would be expected to follow. Thus, development projects identified in this plan may result in technologies ready for commercial introduction as soon as 2022-2023. Projects are also proposed that may involve the development of emerging technologies that are considered longer term and, perhaps higher risk, but with significant emission reduction potential. Commercial introduction of such long-term technologies would not be expected until 2023 or later.

Core Technologies

The following technologies have been identified as having the largest potential and best prospects to enable the emission reductions need to achieve NAAQS and thus form the core of the Program.

Not all project categories will be funded due to funding limitations, and focus will remain on control measures identified in the 2016 AQMP, with consideration for availability of suitable projects. The technical areas identified below are clearly appropriate within the context of the current air quality challenges and opportunities for technology advancement. Within these areas there is significant opportunity for SCAQMD to leverage its funds with other funding agencies to expedite the implementation of cleaner alternative technologies in the Basin. A concerted effort is continually made to form private partnerships to leverage Clean Fuels funds. For example, in January 2016, the SCAQMD was awarded $23.5 million from CARB's Low Carbon Transportation Greenhouse Gas Emission Reduction Fund for heavy-duty truck projects. Finally, 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 an electric drive train with a fuel cell operating on hydrogen fuel or an internal combustion engine operating on natural gas or another alternative fuel as a range extender, and the core technologies overlap with each other.

These priorities may shift during the year in keeping with the diverse and flexible "technology portfolio" approach. Changes in priority may occur to leverage opportunities such as cost-sharing by the state government, the federal government, or other entities. Priorities may also shift to address specific technology issues which affect residents within the SCAQMD's jurisdiction.

The following nine core technology areas are listed by current SCAQMD priorities based on the goals for 2018.

Hydrogen & Fuel Cell Technologies & Infrastructure

The SCAQMD supports hydrogen infrastructure and fuel cell technologies as one option in our technology portfolio and is dedicated to assisting federal and state government programs to deploy light-duty fuel cell vehicles (FCVs) by supporting the required refueling infrastructure.

Calendar Years 2015-2018 are a critical timeframe for the introduction of hydrogen fueling infrastructure. In 2014, Hyundai introduced the Tucson FCV for lease, in 2015, Toyota commercialized the first FCV available to consumers for purchase, and in December 2016, Honda started delivering its 2017 Honda Clarity Fuel Cell, and other OEMS have similarly disclosed plans to commercialize FCVs in 2018 and beyond. Since hydrogen refueling stations need 18-36 month lead times for permitting, construction and commissioning, plans for stations need to be implemented now. While coordination efforts with the Division of Measurement Standards to establish standardized measurements for hydrogen fueling started in 2014, additional efforts to offer hydrogen for sale in higher volumes to general consumers are still needed. In addition, SCAQMD continues to review the market to understand new business models and new sources of funding besides grants for construction necessary to enable the station operations to remain solvent during the early years until vehicle numbers ramp up. Lastly, a deliberate and coordinated effort is necessary to ensure that the retail hydrogen stations are developed with design flexibility to address specific location limitations, and with refueling reliability matching those of existing gasoline and diesel fueling stations.

Fuel cells can also play a role in medium- and heavy-duty applications where battery capacity is insufficient to meet range requirements. The California Fuel Cell Partnership's (CaFCP) Medium- and Heavy-Duty Fuel Cell Electric Truck Action Plan completed in October 2016 focuses on Class 4 parcel delivery trucks and Class 8 drayage trucks with infrastructure development and establishes metrics for measuring progress. Toyota Motors has also displayed a Class 8 fuel cell truck with planned demonstrations at Port of Long Beach, with potential future commercialization plans.

The 2018 Plan Update identifies key opportunities while clearly leading the way for pre-commercial demonstrations of OEM vehicles. Future projects may include the following:

- continued development and demonstration of distributed hydrogen production and fueling stations, including energy stations with electricity and hydrogen co-production and higher pressure (10,000 psi) hydrogen dispensing and scalable/higher throughput;
- development and demonstration of cross-cutting fuel cell applications (e.g. plug-in hybrid fuel cell vehicles);
- development and demonstration of fuel cells in off-road, locomotive and marine applications;
- demonstration of fuel cell vehicles in controlled fleet applications in the Basin;
- development and implementation of strategies with government and industry to build participation in the hydrogen market including certification and testing of hydrogen as a commercial fuel to create a business case for investing as well as critical assessments of market risks to guide and protect this investment; and
- coordination with fuel cell vehicle OEMs to develop an understanding of their progress in overcoming the barriers to economically competitive fuel cell vehicles and develop realistic scenarios for their large scale introduction.

Engine Systems

Natural gas engines are experiencing huge market growth due to the low cost of fuel. In order to achieve the emission reductions required for the South Coast Air Basin, the internal combustion engines (ICEs) used in the heavy-duty sector will require emissions that are 90% lower than the 2010 standards. In 2016, commercialization of the Cummins 8.9-liter natural gas engine achieving 90% below the existing federal standard was a game changer. By early 2018, Cummins Westport, with SCAQMD and others as project partners, hopes to certify and commercialize a near-zero emission version of its existing 12-liter natural gas engine. The Draft 2018 Plan Update continues to incorporate pursuit of cleaner engines for the heavy-duty sector. Future projects will support the development, demonstration and certification of engines that can achieve these massive emission reductions using an optimized systems approach. Specifically, these projects are expected to target the following:

- development of ultra-low emission, natural gas engines for heavy-duty vehicles and high horsepower applications;
- continued development and demonstration of gaseous- and liquid-fueled, advanced fuels or alternative fuel medium-duty and heavy-duty engines and vehicles;
- development and demonstration of alternative fuel engines for off-road applications;
- evaluation of alternative engine systems such as hydraulic plug-in hybrid vehicles;
- development and demonstration of engine systems that employ advanced engine design features, waste heat recovery, improved exhaust or recirculation systems, and aftertreatment devices; and
- Development of cold start technologies for hybrids and diesels where high level emissions occur

The National Highway Traffic Safety Administration's finalized standards to improve fuel efficiency of medium- and heavy-duty vehicles for model year 2018 and beyond should spur further interest by manufacturers to partner on engine system development. The EPA's recent initiation to create a rule for a national low NOx standard for all on highway heavy duty engines will require all manufacturers to participate by 2024

Electric/Hybrid Technologies & Infrastructure

Growing awareness of the need for better air quality is leading to stricter emission targets for vehicles in the near future. If the region expects to meet the federal standards for PM2.5 and ozone, a primary focus must be on zero and near-zero emission technologies. A leading strategy to achieve these goals is the electrification of transportation technologies on a wide and large scale. With that in mind, the SCAQMD supports projects to address the main concerns regarding cost, battery lifetime, travel range, charging station infrastructure and original equipment manufacturer (OEM) commitment. Integrated transportation systems can encourage further reduction of emissions by matching the features of electric

vehicles (zero emissions, zero start-up emissions, modest all electric range) to typical consumer demands for mobility by linking them to transit. Additionally, the impact of fast charging on battery life and infrastructure costs needs to be better understood. This is especially important today when every month roughly 10,000 new plug-in vehicles are sold or leased in the U.S., and this number may increase significantly with the introduction of vehicles with anticipated 200+ mile ranges, such as the Chevy Bolt and Tesla Model 3.

The development and deployment of zero emission goods movement systems remains one of the top priorities for the SCAQMD to support a balanced and sustainable growth in the port complex. The SCAQMD continues to work with our regional partners, in particular the Ports of Los Angeles and Long Beach, the Southern California Association of Governments (SCAG) and Los Angeles County Metropolitan Transportation Association (LACMTA) to identify technologies that could be beneficial to and garner support from all stakeholders. Specific technologies include zero emission trucks (using batteries and/or fuel cells), near-zero emission trucks with all-electric range using wayside power (catenary or roadbed electrification) or with plug-in hybrid powertrains, locomotives with near-zero emissions (e.g., 90% below Tier 4), electric locomotives using battery tender cars and catenary, and linear synchronous motors for locomotives and trucks. Additionally, the California Sustainable Freight Action Plan outlines a blueprint to transition the state's freight system to an environmentally cleaner, more efficient and more economical one than it is today, including a call for a zero and near-zero emissions vehicle pilot project in Southern California. The Port of Los Angeles's Sustainable City Plan corroborates this effort, setting a goal of 15 percent of zero emission goods movement trips by 2025 and 35 percent by 2035. More recently, the Draft Clean Air Action Plan developed by Ports of Los Angeles and Long Beach call for zero emission cargo handling equipment by 2030 and zero emission drayage trucks by 2035. Cummins and Tesla have announced plans to demonstrate zero emission heavy-duty trucks, with future commercial plans for heavy-duty vehicle electrification.

There are now over 11 light-duty plug-in hybrid (PHEVs) certified to California's cleanest ATPZEV or TZEV standard and 16 pure battery electric vehicles (BEVs) commercially available in California. All of these vehicles offer the benefits of higher fuel economy and range, as well as lower emissions. Continued advancements in the light-duty arena may have applications for medium- and heavy-duty vehicles.

Opportunities to develop and demonstrate technologies that could enable expedited widespread use of electric and hybrid-electric vehicles in the Basin include the following:

- demonstration of electric and hybrid technologies for cargo container transport operations, e.g., heavy-duty battery electric or plug-in electric drayage trucks with all electric range;
- demonstration of medium-duty electric and hybrid electric vehicles in package delivery operations, e.g., electric walk-in vans with fuel cell or CNG range extender ;
- development and demonstration of CNG hybrid vehicle technology;
- demonstration of niche application battery electric vehicles, including school and transit buses and refuse trucks with short-distance fixed service routes;
- demonstration of integrated programs that make best use of electric drive vehicles through interconnectivity between fleets of electric vehicles and mass transit, and web-based reservation systems that allow multiple users;
- development of eco-friendly intelligent transportation system (ITS) strategies, optimized load-balancing strategies for cargo freight and market analysis for zero emission heavy-duty trucks; and
- demonstration and installation of EV infrastructure to support the electric and hybrid-electric vehicle fleets currently on the roads or soon entering the market, and to reduce cost, improve convenience and integrate with renewable energy and building demand management strategies (e.g., vehicle-to-grid or vehicle-to-building functionality).

Fueling Infrastructure and Deployment (NG/RNG)

The importance of natural gas, renewable natural gas (RNG) and related refueling infrastructure cannot be overemphasized for the realization of large deployment of alternative fuel technologies. Significant demonstration and commercialization efforts funded by the Clean Fuels Program as well as other local, state and federal agencies are underway to: 1) support the upgrade and buildup of public and private infrastructure projects, 2) expand the network of public-access and fleet fueling stations based on the population of existing and anticipated vehicles, and 3) put in place infrastructure that will ultimately be needed to accommodate transportation fuels with very low gaseous emissions.

Compressed and liquefied natural gas (CNG and LNG) refueling stations are being positioned to support both public and private fleet applications. Upgrades and expansions are also needed to refurbish or increase capacity for some of the stations installed five or more years ago as well as standardize fueling station design, especially to ensure growth of alternative fuels throughout the South Coast Air Basin and beyond, along with partial or complete transition to renewable natural gas delivered through the pipeline. Funding has been provided at key refueling points for light-, medium- and heavy-duty natural gas vehicle users traveling from the local ports, along I-15 and The Greater Interstate Clean Transportation Corridor (ICTC) Network. SB 350 (De León) further establishes a target to double the energy efficiency in electricity and natural gas end uses by 2030.

Active participation in the development of National Fire Protection Association (NFPA) fire and safety codes and standards, evaluation of the cost and economics of the new fuels, public education and training and emergency response capability are just a few areas of the funded efforts that have overcome public resistance to these new technologies. Some of the projects expected to be developed and cofunded for infrastructure development are:

- development and demonstration of renewable natural gas as a vehicle fuel from renewable feedstocks and biowaste;
- development and demonstration of advanced, cost effective methods for manufacturing synthesis gas for conversion to renewable natural gas;
- enhancement of safety and emissions reduction from natural gas refueling equipment;
- expansion of fuel infrastructure, fueling stations, and equipment; and
- expansion of infrastructure connected with existing fleets, public transit, and transportation corridors, including demonstration and deployment of closed loop systems for dispensing and storage.

Health Impacts, Emissions and Fuel Studies

The monitoring of pollutants in the Basin is extremely important, especially when focused on (1) a particular sector of the emissions inventory (to identify the responsible technology) or (2) exposure to pollution (to assess the potential health risks). In fact, studies indicate that smoggy areas can produce irreversible damage to children's lungs. This information highlights the need for further emissions and health studies to identify the emissions from high polluting sectors as well as the health effects resulting from these technologies.

Over the past few years, the SCAQMD has funded emission studies to evaluate the impact of tailpipe emissions of biodiesel and ethanol fueled vehicles mainly focusing on criteria pollutants and greenhouse gas (GHG) emissions. These studies showed that biofuels, especially biodiesel in some applications and duty cycles, can contribute to higher NOx emissions while reducing other criteria pollutant emissions. Furthermore, despite recent advancements in toxicological research related to air pollution, the relationship between particle chemical composition and health effects is still not completely understood, especially for biofuels. Therefore, a couple of years ago the SCAQMD funded studies to investigate the physical and chemical composition and toxicological potential of tailpipe PM

emissions from biodiesel and ethanol fueled vehicles to better understand their impact on public health. Studies continued in 2015 to further investigate the toxicological potential of emissions, such as ultrafine particles and vapor phase substances, and to determine whether or not other substances such as volatile or semi-volatile organic compounds are being emitted in lower mass emissions that could pose harmful health effects. In addition, as the market share for gasoline direct injection (GDI) vehicles has rapidly increased from 4% of all vehicle sales in the U.S. in 2009 to 38% in 2014, with an expectation to top 60% by 2016, it is important to understand the impact on air quality from these vehicles. As such, SCAQMD has either funded or will be funding studies to investigate both physical and chemical composition of tailpipe emissions, focusing on PM from GDI vehicles.

In recent years, there has also been an increased interest both at the state and national level on the use of alternative fuels including biofuels to reduce petroleum oil dependency, GHG emissions and air pollution. In order to sustain and increase biofuel utilization, it is essential to identify feedstocks that can be processed in a more efficient, cost-effective and sustainable manner.

Some areas of focus include:

- demonstration of remote sensing technologies to target different high emission applications and sources;
- studies to identify the health risks associated with ultrafine and ambient particulate matter including their composition to characterize their toxicity and determine specific combustion sources;
- in-use emissions studies using biofuels, including renewable diesel, to evaluate in-use emission composition;
- in-use emissions studies to determine the impact of new technologies, in particular PEVs on local air quality as well as the benefit of telematics on emissions reduction strategies;
- lifecycle energy and emissions analyses to evaluate conventional and alternative fuels; and
- analysis of fleet composition and its associated impacts on criteria pollutants.

Stationary Clean Fuel Technologies

Although stationary source emissions are small compared to mobile sources in the South Coast Air Basin, there are applications where cleaner fuel technology can be applied to reduce NOx, VOC and PM emissions. For example, a recent demonstration project funded in part by the SCAQMD at a local sanitation district consisted of retrofitting an existing biogas engine with a digester gas cleanup system and catalytic exhaust emission control. The retrofit system resulted in significant reductions in NOx, VOC and CO emissions. This project demonstrated that cleaner, more robust renewable distributed generation technologies exist that could be applied to not only improve air quality, but enhance power quality and reduce electricity distribution congestion.

Additionally, alternative energy storage could be achieved through vehicle-to-grid or vehicle-to-building technologies, as well as Power-to-Gas that could allow potentially stranded renewable electricity stored as hydrogen fuel. The University of California (U.C.) Riverside's Sustainable Integrated Grid Initiative and U.C. Irvine's Advanced Energy and Power Program, funded in part by the SCAQMD, for example could assist in the evaluation of these technologies.

Projects conducted under this category may include:

- development and demonstration of reliable, low emission stationary technologies (e.g., low NOx burners, fuel cells or microturbines);
- exploration of renewables as a source for cleaner stationary technologies;
- evaluation, development and demonstration of advanced control technologies for stationary sources; and
- vehicle-to-grid or vehicle-to-building, or Power-to-Gas demonstration projects to develop sustainable, low emission energy storage alternatives.

Emission Control Technologies

Although engine technology and engine systems research is required to reduce the emissions at the combustion source, dual fuel technologies and post-combustion cleanup methods are also needed to address the current installed base of on-road and off-road technologies. Existing diesel emissions can be greatly reduced with introduction of natural gas into the engine or via aftertreatment controls such as particulate matter (PM) traps and catalysts, as well as lowering the sulfur content or using additives with diesel fuel. Gas-to-Liquid (GTL) fuels, formed from natural gas or other hydrocarbons rather than petroleum feedstock and emulsified diesel, provide low emission fuels for use in diesel engines. As emissions from engines become lower and lower, the lubricant contributions to VOC and PM emissions become increasingly important. The most promising of these technologies will be considered for funding, specifically:

- evaluation and demonstration of new emerging liquid fuels, including alternative and renewable diesel and GTL fuels;
- development and demonstration of renewable diesel engines and advanced aftertreatment technologies for mobile applications (including diesel particulate traps and selective catalytic reduction catalysts); and non-thermal regen technology
- development and demonstration of low-VOC and PM lubricants for diesel and natural gas engines.

Technology Assessment/Transfer & Outreach

Since the value of the Clean Fuels Program depends on the deployment and adoption of the demonstrated technologies, outreach and technology transfer efforts are essential to its success. This core area encompasses assessment of advanced technologies, including retaining outside technical assistance as needed, efforts to expedite the implementation of low emission and clean fuels technologies, coordination of these activities with other organizations and information dissemination to educate the end user. Technology transfer efforts include support for various clean fuel vehicle incentive programs as well.

Target Allocations to Core Technology Areas

Figure 4 below presents the potential allocation of available funding, based on SCAQMD projected program costs of $16.7 million for all potential projects. The expected actual project expenditures for 2018 will be less than the total SCAQMD projected program cost since not all projects will materialize. The target allocations are based on balancing technology priorities, technical challenges and opportunities discussed previously and near-term versus long-term benefits with the constraints on available SCAQMD funding. Specific contract awards throughout 2018 will be based on this proposed allocation, the quality of proposals received and evaluation of projects against standardized criteria and ultimately SCAQMD Governing Board approval.

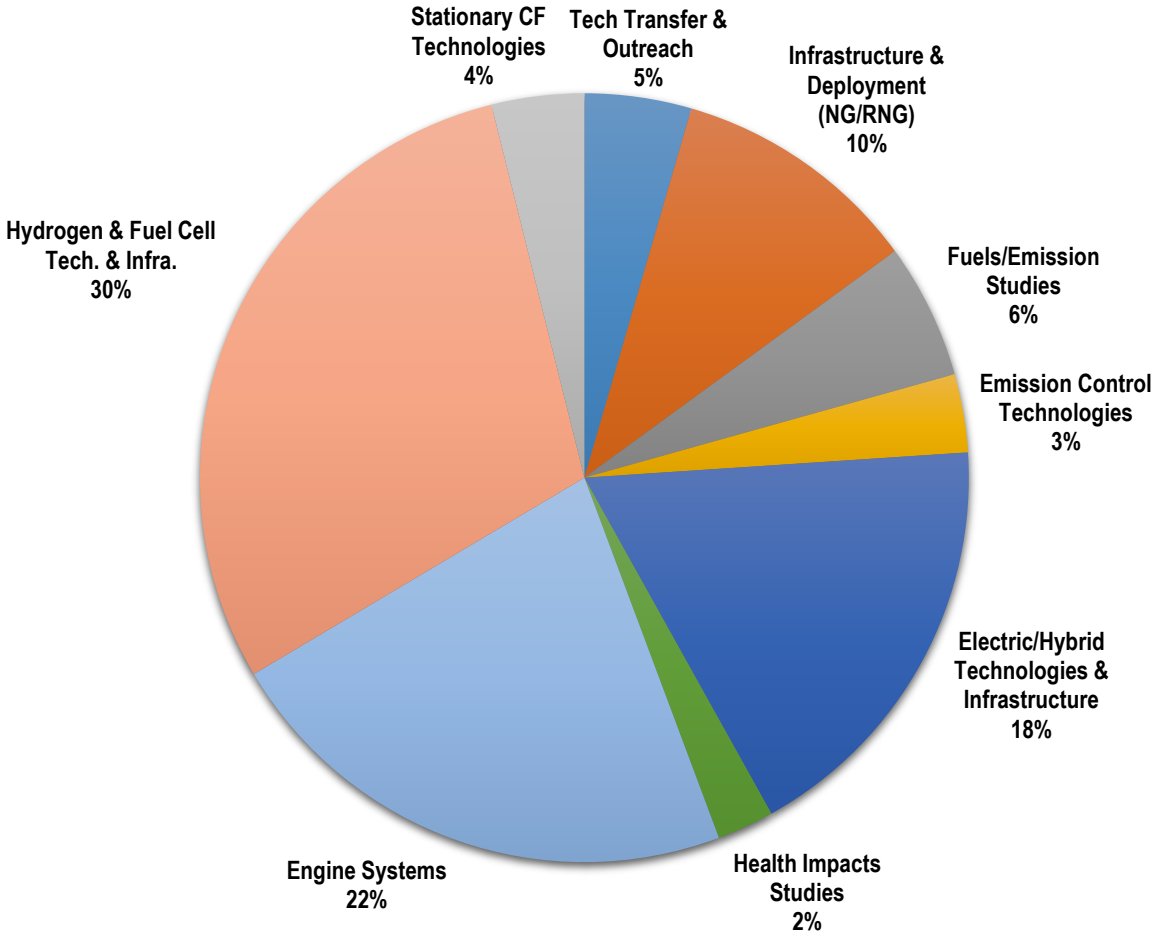

Figure 4: Projected Cost Distribution for Potential SCAQMD Projects in 2018 ($16.7M)

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Program Plan Update for 2018

This section presents the Clean Fuels Program Plan Update for 2018. The proposed projects are organized by program areas and described in further detail, consistent with the SCAQMD budget, priorities and the best available information on the state-of-the-technology. Although not required, this Plan also includes proposed projects that may be funded by revenue sources other than the Clean Fuels Program, specifically related to VOC and incentive projects.

Table 1 (page 21) summarizes potential projects for 2018 as well as the distribution of SCAQMD costs in some areas as compared to 2017. The funding allocation continues the focus toward development and demonstration of zero and near-zero emission technologies including the infrastructure for such technologies. For the 2018 Draft Plan, the SCAQMD shifts some emphasis onto hydrogen and fuel cell technologies to incentivize large-scale hydrogen infrastructure projects at the Ports and in the Inland Empire and in light of current and projected roll out of fuel cell vehicles in 2016-2018, with a small decrease in electric and hybrid-electric technologies in light of the large award the SCAQMD received in early January 2016 from the Greenhouse Gas Reduction Fund Program. A small funding shift to Engine Systems and Fueling Infrastructure and Deployment (natural gas and renewable fuels) is also recommended for biogas production and to ensure continued development and deployment of near-zero natural gas engines and liquid-fueled high horsepower engines for long-haul trucks. The other areas will continue with similar allocations for 2018. As in prior years, the funding allocations again align well with the SCAQMD's FY 2017-18 Goals and Priority Objectives. Overall, the Program is designed to ensure a broad portfolio of technologies and leverage state and federal efforts, and maximize opportunities to leverage technologies in a synergistic manner.

Each of the proposed projects described in this Plan, once fully developed, will be presented to the SCAQMD Governing Board for approval prior to contract initiation. This development reflects the maturity of the proposed technology and identifies contractors to perform the projects, participating host sites, and securing sufficient cost-sharing needed to complete the project and other necessary factors. Recommendations to the SCAQMD Governing Board will include descriptions of the technology to be demonstrated and in what application, the proposed scope of work of the project and the capabilities of the selected contractor and project team, in addition to the expected costs and expected benefits of the projects as required by H&SC 40448.5.1.(a)(1). Based on communications with all of the organizations specified in H&SC 40448.5.1.(a)(2) and review of their programs, the projects proposed in this Plan do not appear to duplicate any past or present projects.

Funding Summary of Potential Projects

The remainder of this section contains the following information for each of the potential projects summarized in Table 1.

Proposed Project: A descriptive title and a designation for future reference.

Expected SCAQMD Cost: The estimated proposed SCAQMD cost share as required by H&SC 40448.5.1.(a)(1).

Expected Total Cost: The estimated total project cost including the SCAQMD cost share and the cost share of outside organizations expected to be required to complete the proposed project. This is an indication of how much SCAQMD public funds are leveraged through its cooperative efforts.

Description of Technology and Application: A brief summary of the proposed technology to be developed and demonstrated, including the expected vehicles, equipment, fuels, or processes that could benefit.

Potential Air Quality Benefits: A brief discussion of the expected benefits of the proposed project, including the expected contribution towards meeting the goals of the AQMP, as required by H&SC 40448.5.1.(a)(1). In general, the most important benefits of any technology research, development and demonstration program are not necessarily realized in the near-term. Demonstration projects are generally intended to be proof-of-concept for an advanced technology in a real-world application. While emission benefits, for example, will be achieved from the demonstration, the true benefits will be seen over a longer term, as a successfully demonstrated technology is eventually commercialized and implemented on a wide scale.

Table 1: Summary of Potential Projects for 2018

Proposed Project	Expected SCAQMD Cost $	Expected Total Cost $
Hydrogen and Fuel Cell Technologies and Infrastructure		
Develop and Demonstrate Operation and Maintenance Business Case Strategies for Hydrogen Stations	350,000	2,000,000
Develop and Demonstrate Hydrogen Production and Fueling Stations	2,000,000	20,000,000
Develop and Demonstrate Medium- and Heavy-Duty Fuel Cell Vehicles	2,500,000	10,000,000
Demonstrate Light-Duty Fuel Cell Vehicles	100,000	100,000
Subtotal	$4,950,000	$32,100,000
Engine Systems		
Develop and Demonstrate Advanced Gaseous- and Liquid-Fueled Medium- and Heavy-Duty Engines and Vehicle Technologies to Achieve Ultra-Low Emissions	3,000,000	5,600,000
Develop and Demonstrate Alternative Fuel and Clean Conventional Fueled Light-Duty Vehicles	200,000	1,500,000
Develop and Demonstrate Cold-Start Technologies	250,000	1,000,000
Develop and Demonstrate Waste-Heat Recovery on Heavy-Duty Diesel Engines	250,000	1,000,000
Subtotal	$3,700,000	$9,100,000
Electric/Hybrid Technologies & Infrastructure		
Develop and Demonstrate Electric and Hybrid Vehicles	1,000,000	2,000,000
Develop and Demonstrate Infrastructure for Deployment of Plug-in Electric and Hybrid Electric Vehicles	500,000	3,000,000
Demonstrate Alternative Energy Storage	300,000	2,000,000
Develop and Demonstrate Electric Container Transport Technologies	1,200,000	4,000,000
Subtotal	$3,000,000	$11,000,000
Fueling Infrastructure and Deployment (NG/RNG)		
Deploy Natural Gas Vehicles in Various Applications	500,000	2,000,000
Develop, Maintain & Expand Natural Gas Infrastructure	250,000	1,500,000
Demonstrate Natural Gas Manufacturing and Distribution Technologies Including Renewables	1,000,000	10,000,000
Subtotal	$1,750,000	$13,500,000
Fuels/Emission Studies		
Conduct In-Use Emissions Studies for Advanced Technology Vehicle Demonstrations	400,000	800,000
Conduct Emissions Studies on Biofuels and Alternative Fuels	300,000	1,000,000

Table 1: Summary of Potential Projects for 2018 (cont'd)

Proposed Project	Expected SCAQMD Cost $	Expected Total Cost $
Fuels/Emission Studies (cont'd)		
Identify and Demonstrate In-Use Fleet Emissions Reduction Technologies & Opportunities	250,000	2,000,000
Subtotal	$950,000	$3,800,000
Stationary Clean Fuel Technologies		
Develop and Demonstrate Reliable, Advanced Emission Control Technologies, and Low Emission Monitoring Systems and Test Methods	100,000	250,000
Develop and Demonstrate Clean Stationary Technologies	250,000	750,000
Develop and Demonstrate Renewables-Based Energy Generation Alternatives	300,000	1,000,000
Subtotal	$650,000	$2,000,000
Emission Control Technologies		
Develop and Demonstrate Advanced Aftertreatment Technologies	300,000	5,000,000
Demonstrate On-Road Technologies in Off-Road and Retrofit Applications	250,000	1,000,000
Subtotal	$550,000	$6,000,000
Health Impacts Studies		
Evaluate Ultrafine Particle Health Effects	150,000	2,000,000
Conduct Monitoring to Assess Environmental Impacts	150,000	500,000
Assess Sources and Health Impacts of Particulate Matter	150,000	300,000
Subtotal	$450,000	$2,800,000
Outreach and Technology Transfer		
Assess and Support Advanced Technologies and Disseminate Information	425,000	800,000
Support Implementation of Various Clean Fuels Vehicle Incentive Programs	325,000	400,000
Subtotal	$750,000	$1,200,000
TOTALS FOR POTENTIAL PROJECTS	**$16,700,000**	**$81,750,000**

Technical Summaries of Potential Projects

Hydrogen and Fuel Cell Technologies & Infrastructure

Proposed Project: Develop and Demonstrate Operation and Maintenance Business Case Strategies for Hydrogen Stations

Expected SCAQMD Cost: $350,000

Expected Total Cost: $4,000,000

Description of Technology and Application:

California regulations require automakers to place increasing numbers of zero emission vehicles into service every year. By 2050, CARB projects that 87% of light-duty vehicles on the road will be zero emission battery and fuel cell vehicles with fuel cell electric becoming the dominant powertrain.

In 2013, cash-flow analysis resulting in a Hydrogen Network Investment Plan and fuel cell vehicle development partnership announcements by major automakers enabled the passage of AB 8 which provides $20 million per year for hydrogen infrastructure cofunding through the CEC. This resulted in limited fuel cell vehicle production announcements by Hyundai, Toyota and Honda in 2014-2015.

In October 2016, the CaFCP released its Medium- and Heavy-Duty Fuel Cell Electric Truck Action Plan focusing on Class 4 parcel delivery trucks and Class 8 drayage trucks with infrastructure development and establishing metrics for measuring progress. Additionally, the CaFCP released a Vision 2030 document establishing a roadmap for future fuel cell vehicle and hydrogen refueling stations, including barriers that need to be overcome.

In 2015, Hyundai and Toyota commercialized fuel cell vehicles, with Honda initiating delivery in 2016 and others to follow soon. Government actions over the last couple of years, coupled with early adopter response, is helping to establish demand and thus a business case model for hydrogen stations. Additional work in this project category includes developing a plan to secure long-term funding to complete the hydrogen fueling network build-out, provide details how funding can be invested, assess alternative revenue streams such as renewable incentives, propose alternative financing structures to leverage/extend CEC funding, and support station operation during the transition to commercial viability, including optimizing designs with flexibility to address individual site characteristics, as well as ensuring higher levels of dispensing availability and reliability.

Furthermore, in the next couple of years an evaluation of actual market penetration of FCVs should be conducted to guide and protect local and state investments in the hydrogen market.

Potential Air Quality Benefits:

The 2016 AQMP identifies the use of alternative fuels and zero emission transportation technologies as necessary to meet federal air quality standards. One of the major advantages of Fuel Cell vehicles (FCEVs) is the fact that they use hydrogen, a fuel that can be domestically produced from a variety of resources such as natural gas (including biogas), electricity (stationary turbine technology, solar or wind) and biomass. The technology and means to produce hydrogen fuel to support FCEVs are available now. The deployment of large numbers of FCEVs, which is an important strategy to attain air quality goals, requires a well-planned and robust hydrogen fueling infrastructure. This SCAQMD project, with significant additional funding from other governmental and private entities, will provide the hydrogen fueling infrastructure that is necessary in the South Coast Air Basin. The deployment of FCEVs and the development of the necessary fueling infrastructure will lead to substantial reductions in NO~~x~~, VOC, CO, PM and toxic air contaminants from vehicles.

Proposed Project: Develop and Demonstrate Distributed Hydrogen Production and Fueling Stations

Expected SCAQMD Cost: $2,000,000

Expected Total Cost: $20,000,000

Description of Technology and Application:

Alternative fuels, such as hydrogen and the use of advanced technologies, such as fuel cell vehicles, are necessary to meet future clean air standards. A key element in the widespread acceptance and resulting increased use of alternative fuel vehicles is the development of a reliable and robust infrastructure to support the refueling of vehicles, cost-effective production and distribution and clean utilization of these new fuels.

A major challenge to the entry and acceptance of direct-hydrogen fuel cell vehicles is the limited number of hydrogen refueling sites. This project would support the development and demonstration of hydrogen refueling technologies. Proposed projects would address:

Fleet and Commercial Refueling Stations: Further expansion of the hydrogen fueling network based on retail models, providing renewable generation, adoption of standardized measurements for hydrogen refueling, other strategic refueling locations and increased dispensing pressure of 10,000 psi and compatibility with existing CNG stations may be considered.
Energy Stations: Multiple-use energy stations that can produce hydrogen for fuel cell vehicles or for stationary power generation are considered an enabling technology with the potential for costs competitive with large-scale reforming. System efficiency, emissions, hydrogen throughput, hydrogen purity and system economics will be monitored to determine the viability of this strategy for hydrogen fueling infrastructure deployment and as a means to produce power and hydrogen from renewable feedstocks (e.g., biomass, digester gas).

Home Refueling Appliances: Home refueling/recharging is an attractive advancement for alternative clean fuels due to the limited conventional refueling infrastructure. This project would evaluate a hydrogen home refueler for cost, compactness, performance, durability, emission characteristics, ease of assembly and disassembly, maintenance and operations. Other issues such as building permits, building code compliance and UL ratings for safety would also be evaluated.

It is estimated that approximately 13,500 fuel cell vehicles will be deployed by 2019 in California and the majority of these vehicles will be in the South Coast Air Basin. To provide fuel for these vehicles, the hydrogen fueling infrastructure needs to be significantly increased and become more reliable in terms of availability. SCAQMD will seek additional funding from CEC and CARB to construct and operate hydrogen fueling stations.

Potential Air Quality Benefits:

The 2016 AQMP identifies the use of alternative clean fuels in mobile sources as a key attainment strategy. Pursuant to AQMP goals, the SCAQMD has in effect several fleet rules that require public and certain private fleets to purchase clean-burning alternative-fueled vehicles when adding or replacing vehicles to their vehicle fleets. Fuel cell vehicles constitute the cleanest alternative-fuel vehicles today. Since hydrogen is a key fuel for fuel cell vehicles, this project would address some of the barriers faced by hydrogen as a fuel and thus assist in accelerating its acceptance and ultimate commercialization. In addition to supporting the immediate deployment of the demonstration fleet, expanding the hydrogen fuel infrastructure should contribute to the market acceptance of fuel cell technologies in the long run, leading to substantial reductions in NOx, VOC, CO, PM and toxic compound emissions from vehicles.

Proposed Project: Develop and Demonstrate Medium- and Heavy-Duty Fuel Cell Vehicles

Expected SCAQMD Cost: $2,500,000

Expected Total Cost: $10,000,000

Description of Technology and Application:

This proposed project would support evaluation including demonstration of promising fuel cell technologies for applications using direct hydrogen with proton exchange membrane (PEM) fuel cell technology. Battery dominant fuel cell hybrids are another potential technology being mentioned by battery experts as a way of reducing costs and enhancing performance of fuel cell vehicles.

The California ZEV Action Plan specifies actions to help deploy an increasing number of zero emission vehicles, including medium- and heavy-duty ZEVs. Fleets are useful demonstration sites because economies of scale exist in central refueling, in training skilled personnel to operate and maintain the vehicles, in the ability to monitor and collect data on vehicle performance and for manufacturer technical and customer support. In some cases, medium- and heavy-duty fuel cell vehicles could leverage the growing network of hydrogen stations, providing an early base load of fuel consumption until the number of passenger vehicles grows. These vehicles could include hybrid-electric vehicles powered by fuel cells and equipped with batteries capable of being charged from the grid and even supplying power to the grid.

In 2012, the DOE awarded SCAQMD funds to demonstrate Zero Emission Container Transport (ZECT) technologies. In 2015, the DOE awarded SCAQMD additional funds to develop and demonstrate additional fuel cell truck platforms and vehicles under ZECT II.

This category may include projects in the following applications:

On-Road:	Off-Road:
Transit Buses	Vehicle Auxiliary Power Units
Shuttle Buses	Construction Equipment
Medium- & Heavy-Duty Trucks	Lawn and Garden Equipment
	Cargo Handling Equipment

Potential Air Quality Benefits:

The 2016 AQMP identifies the need to implement zero emission vehicles. SCAQMD adopted fleet regulations require public and some private fleets within the Basin to acquire alternatively fueled vehicles when making new purchases. In the future, such vehicles could be powered by zero emission fuel cells operating on hydrogen fuel. The proposed projects have the potential to accelerate the commercial viability of fuel cell vehicles. Expected immediate benefits include the establishment of zero- and near-zero emission proof-of-concept vehicles in numerous applications. Over the longer term, the proposed projects could help foster wide-scale implementation of zero emission fuel cell vehicles in the Basin. The proposed projects could also lead to significant fuel economy improvements, manufacturing innovations and the creation of high-tech jobs in Southern California, besides realizing the air quality benefits projected in the AQMP.

Proposed Project: Demonstrate Light-Duty Fuel Cell Vehicles
Expected SCAQMD Cost: $100,000

Expected Total Cost: $100,000

Description of Technology and Application:

This proposed project would support the demonstration of limited production and early commercial fuel cell passenger vehicles using gaseous hydrogen with proton exchange membrane (PEM) fuel cell technology, mainly through showcasing this technology. Recent designs of light-duty fuel cell vehicles include hybrid batteries to recapture regenerative braking and improve overall system efficiency.

With the implementation of the California ZEV Action Plan, supplemented by the existing and planned hydrogen refueling stations in the Southern California area, light-duty fuel cell limited-production vehicles are planned for retail deployment in early commercial markets near hydrogen stations by several automakers. Fleets are useful demonstration sites because economies of scale exist in central refueling, in training skilled personnel to operate and maintain the vehicles, in the ability to monitor and collect data on vehicle performance and for manufacturer technical and customer support. SCAQMD has included fuel cell vehicles as part of its demonstration fleet since our first hydrogen station began operation in 2005; strengthening support, education, and outreach regarding fuel cell vehicle technology on an on-going basis. In addition, demonstration vehicles could include hybrid-electric vehicles powered by fuel cells and equipped with larger batteries capable of being charged from the grid and even supplying power to the grid.

Recently, Hyundai, Toyota and Honda have commercialized fuel cell vehicles in California, with Mercedes-Benz announcing a plug-in fuel cell model for 2018, as well as an updated Hyundai model. Innovative strategies and demonstration of dual fuel, zero emission vehicles could expand the acceptance of battery electric vehicles and accelerate the introduction of fuel cells in vehicle propulsion.

Potential Air Quality Benefits:

The 2016 AQMP identifies the need to implement zero emission vehicles. SCAQMD adopted fleet regulations require public and some private fleets within the Basin to acquire alternatively fueled vehicles when making new purchases. In the future, such vehicles could be powered by zero emission fuel cells operating on hydrogen fuel. The proposed projects have the potential to accelerate the commercial viability of fuel cell vehicles. Expected immediate benefits include the deployment of zero-emission vehicles in SCAQMD's demonstration fleet. Over the longer term, the proposed projects could help foster wide-scale implementation of zero emission fuel cell vehicles in the Basin. The proposed projects could also lead to significant fuel economy improvements, manufacturing innovations and the creation of high-tech jobs in Southern California, besides realizing the air quality benefits projected in the AQMP.

Engine Systems

Proposed Project: Develop and Demonstrate Advanced Gaseous- and Liquid-Fueled Medium- and Heavy-Duty Engines and Vehicles Technologies to Achieve Ultra-Low Emissions

Expected SCAQMD Cost: $3,000,000

Expected Total Cost: $5,600,000

Description of Technology and Application:

The objective of this proposed project is to support development and certification of near commercial prototype low-emission medium- and heavy-duty gaseous- and liquid-fueled engine technologies and integration and demonstration of these technologies in on-road vehicles. The NOx emissions target for this project area is 0.02 g/bhp-hr and lower and the PM emissions target is below 0.01 g/bhp-hr. To achieve these targets, an effective emission control strategy must employ advanced fuel system and engine design features, aggressive engine calibration and improved thermal management, improved exhaust gas recirculation systems, and aftertreatment devices that are optimized using a system approach. This effort is expected to result in several projects, including:

- Development and demonstration of advanced engines in medium- and heavy-duty vehicles and high horsepower applications;
- development of durable and reliable retrofit technologies to partially or fully convert engines and vehicles from petroleum fuels to alternative fuels; and
- anticipated fuels for these projects include but are not limited to alternative fuels (fossil fuel-based and renewable natural gas, propane, hydrogen blends, electric and hybrid), conventional and alternative diesel fuels, ultra-low sulfur diesel, emulsified diesel, dimethyl ether and gas-to-liquid fuels. The project proposes to expand field demonstration of these advanced technologies in various vehicle fleets operating with different classes of vehicles.

The use of alternative fuel in heavy-duty trucking applications has been demonstrated in certain local fleets within the Basin. These vehicles typically require 200-400 horsepower engines. Higher horsepower alternative fuel engines are beginning to be introduced. However, vehicle range, lack or limited accessible public infrastructure, lack of experience with alternative fuel engine technologies and limited selection of appropriate alternative fuel engine products have made it difficult for more firms to consider significant use of alternative fuel vehicles. For example, in recent years, several large trucking fleets have expressed interest in using alternative fuels. However, at this time the choice of engines over 400 HP or more is limited. Continued development of cleaner dedicated alternative gaseous- or diesel-fueled engines over 400 HP would increase availability to end-users and provide additional emission reductions.

Potential Air Quality Benefits:

This project is intended to expedite the commercialization of near zero emission gaseous- and liquid-fueled medium- and heavy-duty engine technology in California, both in the Basin and in intrastate operation. The emission reduction benefit of replacing one 4.0 g/bhp-hr heavy-duty engine with a 0.2 g/bhp-hr engine in a vehicle that consumes 10,000 gallons of fuel per year is about 1,400 lb/yr of NOx. A heavy-duty 8.9L engine using natural gas and achieving NOx emissions of 0.02 g/bhp-hr has been certified and commercialized, with larger displacement engines expected to be certified in early 2018. Further, neat or blended alternative fuels can also reduce heavy-duty engine particulate emissions by over 90 percent compared to current diesel technology. This project is expected to lead to increased availability of low-emission alternative fuel heavy-duty engines. Fleets can use the engines and vehicles emerging from this project to comply with SCAQMD fleet regulations and towards implementation of the 2016 AQMP control measures.

Proposed Project: Develop and Demonstrate Alternative Fuel and Clean Conventional Fueled Light-Duty Vehicles

Expected SCAQMD Cost: $200,000

Expected Total Cost: $1,500,000

Description of Technology and Application:

Although new conventionally fueled vehicles are much cleaner than their predecessors, not all match the lowest emissions standards often achieved by alternative fuel vehicles. This project would assist in the development, demonstration and certification of both alternative-fueled and conventional-fueled vehicles to meet the strictest emissions requirements by the state, e.g., SULEV for light-duty vehicles. The candidate fuels include CNG, LPG, ethanol, GTL, clean diesel, bio-diesel and ultra low-sulfur diesel, and other novel technologies. The potential vehicle projects may include:

- certification of CNG light-duty sedans and pickup trucks used in fleet services;
- assessment of "clean diesel" vehicles, including hybrids and their ability to attain SULEV standards; and
- assessment of other clean technologies.

Other fuel and technology combinations may also be considered under this category.

Potential Air Quality Benefits:

The 2016 AQMP identifies the use of alternative clean fuels in mobile sources as a key attainment strategy. Pursuant to AQMP goals, the SCAQMD has in effect several fleet rules that require public and certain private fleets to purchase clean-burning alternative-fueled vehicles when adding or replacing vehicles to their vehicle fleets. This project is expected to lead to increased availability of low emission alternative-and conventional-fueled vehicles for fleets as well as consumer purchase.

Proposed Project: Develop and Demonstrate Cold-Start Technologies

Expected SCAQMD Cost: $250,000

Expected Total Cost: $1,000,000

Description of Technology and Application:

Cold Start of internal combustion engines has negative impacts on the environment. The thermal efficiency of the internal combustion engine is significantly lower at cold-start than when the engine reaches steady state temperatures. If an engine can start at optimal lubricant and component temperatures, an increase in fuel economy and reduction in emissions should be achievable. Diesel engines at cold start increase emissions as much as 10%. It is also now known that the smaller hybrid engines are experiencing similar warm-up issues due to the on-off drive cycles. The need for thermal efficiency at start- up has led to a variety of suggestions and trials. The primary goal in attempting to reduce energy losses so that systems and components such as the Catalytic System reach their intended operating temperature range as soon as possible after engine start. In most cases, the lubrication system is the primary target of concern. Lubricant viscosity is highly sensitive to temperature and viscosity increases at low temperatures resulting in higher frictional and pumping losses than would be observed at the target operating temperature. This technology should no longer be looked at as "Seasonal" If the oil temperature can be improved at start-up every single time, the greatest benefit may be achieved Further benefits can include, but not be limited to, adaptation of Algorithms associated with EGR fraction, Air preheaters, SCR, and fueling requirements. Emissions reductions can be gained and fuel economy improved. This project is to investigate technology to improve oil temperature at start-up with minimal economic impact and time. This technology can be applied to a range of vehicles from Hybrid electric light duty vehicles to heavy duty trucks. The following items are the most recently developed best practices with respect to cost and functionality. Emphasis should be on steady temperature control at start up at optimal degrees already proven and established through significant research.

- Design and prove a battery assisted electric oil heater to maintain a specified temperature continuously before start-up
- Design a lubricant flow system directly from engine head to oil pump to achieve oil temperature more quickly.

The project should be implemented, and fleet tested, and recorded over a minimum twelve month period. Further projects can develop from this technology and should be tested in regards to other liquid fuel burning engines.

Potential Air Quality Benefits:

The technology to reduce emissions at cold starts is beneficial to a broad spectrum of vehicles from hybrid electric, light duty to heavy duty engines in long haul trucks. The advancement in this technology will directly contribute toward the ultra-low NOx reductions soon to be required by manufacturers through a national EPA air quality standard and the current attainment policies in effect. Eliminating cold starting engine issues also directly creates a co- benefit of reducing fuel consumption.

Proposed Project: Develop and Demonstrate Waste-Heat Recovery in Heavy-Duty Diesel Engines

Expected SCAQMD Cost: $250,000

Expected Total Cost: $1,000,000

Description of Technology and Application:

The objective of this project is to support the demonstration and integration of Waste Heat Recovery (WHR) using the Rankine cycle for on road heavy duty vehicles. Current WHR programs are showing reduction in GHG of 9-15 % and a 4-5% reduction in fuel consumption in long haul trucking. Diesel engines for heavy duty commercial vehicles (HCV) convert on average approximately 40% of the primary energy into mechanical power. The residual part is released to the environment. The heat of the exhaust gas can be converted into mechanical power for the vehicle by applying a thermodynamic process. A suitable process is the Rankine process. Research on organic Rankine processes for waste heat utilization in the industry is already being reported as a successful approach. Due to the low oil prices three decades ago, these approaches were not broadly industrialized. Today waste heat recovery can be an attractive approach to reduce fuel consumption and operating costs. Additionally emissions can be lowered 9-15% accordingly. This project is expected to demonstrate in use results in:

- Exhaust gas based recovery systems
- Coolant based recovery systems

A typical Rankine Cycle is a thermodynamic cycle that uses an environmentally friendly organic working fluid such as R134a and works through four reversible processes. In transportation, Rankine cycle systems vaporize a pressurized fluid coming from a steam generator located in the exhaust pipe or from the engine coolant. As a result of the heating, the fluid is turned into steam/vapor. The pressure will then drive the expander of the Rankine engine, which could be a turbine as well as a volumetric expander and that high efficiencies can be achieved at practical operating pressures. The mechanical energy generated by the Rankine process can be delivered to the engine either directly or via a belt transmission. Compared to an electrical utilization concept the mechanical usage shows the advantage of lower energy conversion losses. A belt transmission has the advantage of reducing oscillations. In case of an expansion machine directly coupled with the engine, significant effort is necessary to dampen unfavorable oscillations. The development on going by leading manufacturers in the industry shows great potential for further research and cost saving with the use of cost saving materials such as plastics and aluminum.

Potential Air Quality Benefits:

This project is expected to contribute to the total emissions reductions in heavy duty on road engines. Emission reduction of 9-15 % in heavy duty diesel long haul trucks has already been proven when the Rankine cycle is used. This technology can add to the total reduction in emissions in order to meet the ultra-low NOx air quality standards. The fuel savings benefit is especially attractive to long haul fleet operations.

Electric/Hybrid Technologies & Infrastructure

Proposed Project: Develop and Demonstrate Electric and Hybrid Vehicles

Expected SCAQMD Cost: $1,000,000

Expected Total Cost: $2,000,000

Description of Technology and Application:

The significance of transportation in overall carbon emissions is increasing as energy utilities move toward cleaner and more sustainable ways to generate electricity. In the United States, the EPA estimated that in 2015, transportation was responsible for about 28% of the nation's carbon emissions, second only to power plants at 31%.

The global light-duty vehicle market is changing rapidly on behalf of government-led initiatives to improve fuel economy and market demand for alternative transportation options. These changes are being driven primarily by the adoption of vehicles with various levels of drivetrain electrification. The SCAQMD has long supported the concept of using increased battery power to allow a portion of the driving cycle to occur in all-electric mode for true zero emission miles. This battery dominant strategy is accomplished by incorporating an advanced battery pack initially recharged from the household grid or EV chargers. This "plug-in" hybrid EV strategy allows reduced emissions and improved fuel economy. In 2009, CARB adopted Plug-In Hybrid Electric Vehicle Test Procedure Amendments and Aftermarket Parts Certification and several automobile manufacturers have announced demonstration or early production plans of "blended" plug-in hybrid electric, extended-range electric vehicles (E-rEV), or highway capable battery electric vehicles (BEVs). Electric utilities refer to PHEVs, E-rEVs and BEVs as plug-in electric drive vehicles (PEVs) and are working with automakers to support PEVs. Long-range BEVs are now competitive in price among economy brands after subsidies and the affordable 200+ mile BEV will have a big impact on the vehicle market. Plug-in hybrids (PHEVs) are also making significant advances. Continued market expansion is likely to result from expanding OEM applications of the powertrain in new, larger vehicle body types, and most large OEMs have made statements regarding a path towards electrification of their vehicle models.

Recently, automakers have commercialized fuel cell vehicles, with some concepts with plug-in charge capability. Development and demonstration of dual fuel, zero emission vehicles could expand the acceptance of battery electric vehicles and accelerate the introduction of fuel cells in vehicle propulsion.

The SCAQMD has long been a leader in promoting early demonstrations of next generation light-duty vehicle propulsion technologies (and fuels). However, given the current and planned market offerings in this category, priorities have shifted. Nevertheless, the SCAQMD will continue to evaluate market offerings and proposed technologies in light-duty vehicles to determine if any future support is required.

Medium- and heavy-trucks make up 4.3% of vehicles in the United States and drive 9.3% of all miles driven each year, yet are responsible for more than 25% of all the fuel burned annually. However, hybrid technologies have gained momentum in the light-duty sector with commercial offerings by most of the automobile manufacturers. Unfortunately, the medium- and heavy-duty platforms are where most emissions reductions are required, especially for the in-use fleet due to low turnover.

CARB's Low Carbon Transportation programs, local support and federal funds have collectively accelerated the development and demonstration of medium-duty plug-in hybrid electric truck platforms. Analysis of project data and use profiles will help optimize drive systems, target applications for early commercialization and fill gaps in product offerings.

The SCAQMD has investigated the use of hybrid technologies to achieve similar performance as the conventional-fueled counterparts while achieving both reduced emissions and improved fuel economy. Development and validation of emission test procedures is needed, but is complicated due to the low volume and variety of medium- and heavy-duty vehicles.

Platforms to be considered include utility trucks, delivery vans, shuttle buses, transit buses, waste haulers, construction equipment, cranes and other off-road vehicles. Innovations that may be considered for demonstration include: advancements in the auxiliary power unit, either ICE or other heat engine; battery-dominant hybrid systems utilizing off-peak re-charging, with advanced battery technologies such as lithium-ion; and hydraulic energy storage technologies where applicable. Alternative fuels are preferred in these projects, e.g., natural gas, especially from renewable sources, LPG, hydrogen, GTL and hydrogen-natural gas blends, but conventional fuels such as gasoline, clean diesel, or even biodiesel may be considered if the emissions benefits can be demonstrated as equivalent or superior to alternative fuels. Both new designs and retrofit technologies and related charging infrastructure will be considered.

This project category is to develop and demonstrate:

- various PEV architectures;
- anticipated costs for such architectures;
- customer interest and preferences for each alternative;
- integration of the technologies into prototype vehicles and fleets;
- evaluation of any new promising light-duty vehicle propulsion technologies or fuels; and
- electric and hybrid-electric medium- and heavy-duty vehicles (e.g., utility trucks, delivery vans, shuttle buses, transit buses, waste haulers, construction equipment, cranes and other off-road vehicles)

Potential Air Quality Benefits:

The 2016 AQMP identifies zero or near-zero emitting vehicles as a key attainment strategy. Plug-in HEV technologies have the potential to achieve near-zero emissions while retaining the range capabilities of a conventionally gasoline-fueled combustion engine vehicle, a key factor expected to enhance broad consumer acceptance. Given the variety of PEV systems under development, it is critical to determine the true emissions and performance utility compared to conventional vehicles. Successful demonstration of optimized prototypes would promise to enhance the deployment of near-ZEV and ZEV technologies.

Expected benefits include the establishment of criteria for emissions evaluations, performance requirements, and customer acceptability of the technology. This will help both regulatory agencies and OEMs to expedite introduction of zero and near-zero emitting vehicles in the South Coast Basin, which is a high priority of the AQMP.

Proposed Project: Develop and Demonstrate Infrastructure for Deployment of Plug-in Electric and Hybrid Electric Vehicles

Expected SCAQMD Cost: $500,000

Expected Total Cost: $3,000,000

Description of Technology and Application:

There is a critical need to address gaps in EV charging infrastructure which has resulted in a deficiency of EV charging infrastructure availability. Almost half (48%) of the 679,592 EVs sold in the U.S. since 2011 were in California, and of those sales in California, it is estimated that almost half (43%) received CA rebate incentives in SCAQMD. In addition, the California ZEV Action Plan, which was updated in 2016, calls for 1.5 million ZEVs by 2025, calling for an increase of about 200,000 ZEVs annually between now and 2025.

The recent adoption of revised recommended practice SAE J1772 enables passenger vehicles to charge from 110/120V AC (Level 1), 220/240V AC (Level 2), and faster 440/480V DC charging using a common conductive connector in 30 minutes or less in the U.S. and Europe. Together with the growing adoption of long range EVs, the technology and infrastructure of three fast DC charging systems (SAE combo, CHAdeMO and Tesla) are developing as well. Technological developments improving the driving range of EVs, as well as increasing availability and speed of charging infrastructure, could change the need for charging infrastructure in the future. SCAQMD is committed to continuing to support the successful deployment of EV charging infrastructure, leveraging funds from the state and the Volkswagen Penalty Fund.

The SCAQMD is actively pursuing development of intelligent transportation systems to improve traffic efficiency of electric and hybrid cargo container trucks. This system provides truck drivers real-time vehicle operation advice based on changing traffic and road conditions where trucks can dynamically change their speed to better flow through intersections. A truck eco-routing system can provide the most eco-friendly travel route based on truck engine/emission control characteristics, loaded weight, road grade and real-time traffic conditions. Integrated programs can interconnect fleets of electric drive vehicles with mass transit via Web-based reservation systems that allow multiple users. These integrated programs can match the features of EVs (zero emissions, zero start-up emissions, short range) to typical consumer demands for mobility in a way that significantly reduces emissions of pollutants and greenhouse gases.

This project category is one of SCAQMD's continued efforts to:

- deploy a network of DC fast charging infrastructure and rapidly expand the existing network of public plug-in EV charging stations;
- develop intelligent transportation system strategies for cargo containers;
- develop freight load-balancing strategies as well as to conduct market analysis for zero emission heavy-duty trucks in goods movement; and
- support for local government outreach and charging installation permit streamlining.

Potential Air Quality Benefits:

The 2016 AQMP identifies zero or near-zero emitting vehicles as a key attainment strategy. Hybrid technologies have the potential to redirect previously wasted kinetic energy into useable vehicle power. This proposed project category will reduce Particulate Matter (PM) pollution along major roadways through the expansion of the public plug-in EV charging infrastructure network by allowing drivers to shift away from petroleum-fueled vehicles to plug-in EVs. In addition, this project will assist in achieving improved fuel economy and lower tailpipe emissions, further helping the region to achieve federal ambient air quality standards and protect public health. Expected benefits include the establishment of criteria for emissions evaluations, performance requirements and customer

acceptability of the technology. This will help both regulatory agencies and OEMs to expedite introduction of near-zero emitting vehicles in the South Coast Basin, which is a high priority of the AQMP.

Proposed Project: Demonstrate Alternative Energy Storage

Expected SCAQMD Cost: $300,000

Expected Total Cost: $2,000,000

Description of Technology and Application:

The SCAQMD has been involved in the development and demonstration of energy storage systems for electric and hybrid-electric vehicles, mainly Lithium ion chemistry battery packs. Over the past few years, additional technology consisting of nickel sodium chloride, lithium-ion and lithium iron phosphate batteries have shown robust performance. Other technology manufacturers have also developed energy storage devices including beyond lithium-ion batteries, flywheels, hydraulic systems and ultracapacitors. Energy storage systems optimized to combine the advantages of ultracapacitors and high-energy but low-power advanced batteries could yield further benefits. Beyond lithium-ion batteries (e.g., lithium-sulfur, lithium-oxygen, sodium-ion, flow, and solid-state batteries) also have opportunities to achieve higher energy density, longer cycle life, and cheaper cost.

This project category is to apply these advanced storage technologies in vehicle platforms to identify best fit applications, demonstrate their viability (reliability, maintainability and durability), gauge market preparedness and provide a pathway to commercialization.

The long-term objective of this project is to decrease fuel consumption and resulting emissions without any changes in performance compared to conventional vehicles. This effort will support several projects for development and demonstration of different types of low emission hybrid vehicles using advanced energy 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.

Potential Air Quality Benefits:

Certification of low emission vehicles and engines and their integration into the Basin's transportation sector is a high priority under the 2016 AQMP. This project is expected to further efforts to develop alternative energy storage technologies that could be implemented in medium- and heavy-duty trucks, buses and other applications. Benefits will include proof of concept for the new technologies, diversification of transportation fuels and lower emissions of criteria, toxic pollutants and greenhouse gases.

Proposed Project: Develop and Demonstrate Electric Container Transport Technologies

Expected SCAQMD Cost: $1,200,000

Expected Total Cost: $4,000,000

Description of Technology and Application:

Advanced transportation systems can be used to transfer cargo containers from ports to both local and "distant" intermodal facilities, thereby significantly reducing emissions from on-road trucks and locomotives and also reducing traffic congestion in local transportation corridors. Such systems could be stand-alone systems that use magnetic levitation (maglev), linear synchronous motors or linear induction motors on dedicated guideways. A more near-term design could use existing roadways that are electrified with catenary electric lines or linear electric motors to move containers on modified trucks equipped to run on electricity. In both scenarios, containers are transported relatively quietly and without direct emissions. The footprints for such systems are similar to conventional rail systems but have reduced impact on adjacent property owners including noise and fugitive dust. These systems can even be built above or adjacent to freeways or on elevated guideways. These container freight systems are not designed to carry any operators on the guideways, where the over-the-roadway system may require the operator to actively control the transport of the containers.

One of the container transportation concepts the SCAQMD is actively pursuing is the eHighway catenary hybrid truck system by Siemens Mobility. Siemens and their partners have developed a catenary system and hybrid electric trucks to utilize the catenary for zero emission transport of containers. The hybrid drive system will extend the operating range of the truck beyond the all-electric range of the catenary system, thus enabling the truck to perform regional drayage operations and bridge gaps in catenary infrastructure as it is deployed on a regional level. The proposed Siemens pantograph system will allow for seamless connection and disconnection from the catenary wires. When entering the catenary system corridor, the pantograph system will verify the presence of catenary lines and allow the driver to raise the pantograph from within the cab of the truck. Upon leaving the catenary system, the pantograph automatically retracts and the truck switches to on-board power systems. The on-board power systems could be a range of technologies, including batteries, fuel cells, or internal combustion engines. In addition, SCAQMD is administering a project to develop and demonstrate zero emission drayage trucks for goods movement operations, consisting of three different battery electric truck technologies and a fuel cell hybrid electric truck platform. This project is funded by a $4.2 million award from Department of Energy to promote the deployment of zero emission cargo transport technologies. These trucks can be also upfitted to connect to wayside power via a catenary or LSM system in the future. Recently, CARB awarded SCAQMD more than $23 million towards the development, demonstration and deployment of up to 43 trucks for goods movement, either with all electric operation or all electric range within disadvantaged communities. The total project cost is approximately $40 million, with the remainder funds cost-shared between five sister air quality agencies, OEMs and demonstration sites.

In addition to these technologies, there are other options for electric container applications such as dual-mode locomotives, hybrid electric technologies with battery storage, a battery tender car, fuel cell propulsion systems and other wayside power alternatives. This technical review will evaluate all available technology options to determine whether their systems can be successfully developed and deployed, financially viable, and reliably operated on a long-term basis.

Potential Air Quality Benefits:

On-road heavy-duty diesel truck travel is an integral part of operations at the ports moving cargo containers into the Basin and beyond. The 2016 AQMP proposes to reduce emissions from this activity by modernizing the fleet and retrofitting NOx and PM emission controls on older trucks. An alternative approach, especially for local drayage to the nearby intermodal facilities, is to use advanced container

transport systems that use electric propulsion for the containers on fixed guideways or modified trucks able to operate on electricity which will eliminate local diesel truck emissions. The emission benefits have not yet been estimated because the fate of the displaced trucks has not been determined.

Fueling Infrastructure and Deployment (NG/RNG)

Proposed Project: Deploy Natural Gas Vehicles in Various Applications

Expected SCAQMD Cost: **$**500,000

Expected Total Cost: $2,000,000

Description of Technology and Application:

Natural gas vehicles (NGVs) have been very successful in reducing emissions in the South Coast Air Basin due to the deployment of fleets and heavy-duty vehicles utilizing this clean fuel. In order to maintain the throughput, utility and commercial potential of the natural gas infrastructure and the corresponding clean air benefits, deploying additional models of NGVs in existing applications are needed. This technology category seeks to support the implementation of early-commercial vehicles in a wide variety of applications, such as taxis, law enforcement vehicles, shuttle buses, delivery vans, transit buses, waste haulers, class 8 tractors and off-road equipment such as construction vehicles and yard hostlers. It also seeks to deploy low-emission natural gas vehicles using renewable fuels to achieve further emission reductions.

Potential Air Quality Benefits:

Natural gas vehicles have inherently lower engine criteria pollutant emissions than conventional vehicles, especially in the heavy-duty applications where older diesel engines are being replaced. Incentivizing these vehicles in city fleets, goods movement applications and transit bus routes help to reduce the local emissions and exposure to nearby residents. Natural gas vehicles also can have lower greenhouse gas emissions and increase energy diversity depending on the feedstock and vehicle class. Deployment of additional NGVs is in agreement with SCAQMD's AQMP as well as the state's Alternative Fuels Plan as part of AB 1007 (Pavley).

Proposed Project: Develop, Maintain & Expand Natural Gas Infrastructure

Expected SCAQMD Cost: $250,000

Expected Total Cost: $1,500,000

Description of Technology and Application:

This project supports the development, maintenance and expansion of natural gas fueling station technologies and incorporate advancing concepts to increase the overall number of such fueling stations in strategic locations throughout the Basin including the Ports, reduce the cost of natural gas equipment, develop and demonstrate closed loop systems for dispensing and storage, standardize fueling station design and construction and help with the implementation of SCAQMD's fleet rules. As natural gas fueling equipment begins to age or has been placed in demanding usage, components begin to age and deteriorate. This project offers an incentive to facilities to replace worn-out equipment or to upgrade existing fueling and/or garage and maintenance equipment to offer increased fueling capacity to public agencies, private fleets and school districts.

Potential Air Quality Benefits:

The AQMP identifies the use of alternative clean fuels in mobile sources as a key attainment strategy. NGVs have significantly lower emissions than gasoline vehicles and represent the cleanest internal combustion engine powered vehicles available today. The project has the potential to significantly reduce the installation and operating costs of NGV refueling stations, besides improving the refueling time. While new or improved NGV stations have an indirect emissions reduction benefit, they help facilitate the introduction of low emission, NGVs in private and public fleets in the area, which have a direct emissions reduction benefit. The increased exposure and fleet and consumer acceptance of NGVs would lead to significant and direct reductions in NOx, VOC, CO, PM and toxic compound emissions from mobile sources. Such increased penetration of NGVs will provide direct emissions reductions of NOx, VOC, CO, PM and air toxic compounds throughout the Basin.

Proposed Project: Demonstrate Natural Gas Manufacturing and Distribution Technologies Including Renewables

Expected SCAQMD Cost: $1,000,000

Expected Total Cost: $10,000,000

Description of Technology and Application:

Lack of sufficient statewide LNG production results in increased fuel costs and supply constraints. The cost of transporting LNG from production facilities out-of-state increases the fuel cost anywhere from 15 to 20 cents per gallon of LNG and subjects users to the reliability of a single supply source. High capital costs prevent construction of closer, large scale liquefaction facilities. Small-scale, distributed LNG liquefaction systems may provide 25 percent lower capital costs than conventional technology per gallon of LNG produced. Because these smaller plants can be sited near fleet customers, costs for transporting the LNG to end users are much lower than those for remote larger plants. Beyond these cost reductions, the smaller plants offer key benefits of much smaller initial capital investment and wider network of supply than the larger plant model.

Renewable feed stocks including landfill gas, green waste and waste gases can be processed to yield LNG or CNG.

The main objectives of this project are to investigate, develop and demonstrate:

- commercially viable methods for converting renewable feed stocks into CNG or LNG (e.g., production from biomass);
- economic small-scale natural gas liquefaction technologies;
- utilization of various gaseous feed stocks locally available;
- commercialize incentives for fleets to site, install and use LNG and L/CNG refueling facilities; and
- strategic placement of LNG storage capacity sufficient to provide supply to users in the event of a production outage.

Potential Air Quality Benefits:

The SCAQMD relies on a significant increase in the penetration of zero- and low-emission vehicles in the South Coast Basin to attain federal clean air standards by 2014, 2023 and 2032. This project would help develop a number of small-scale liquefaction technologies that can reduce LNG costs to be competitive with diesel fuel. Such advances are expected to lead to greater infrastructure development. This would make LNG fueled heavy-duty vehicles more available to the commercial market leading to direct reductions in NOx, PM and toxic compound emissions.

Fuels/Emission Studies

Proposed Project: Conduct In-Use Emissions Studies for Advanced Technology Vehicle Demonstrations

Expected SCAQMD Cost: $400,000

Expected Total Cost: $800,000

Description of Technology and Application:

Hybrid electric, hybrid hydraulic, plug-in electric hybrid and pure EVs will all play a unique role in the future of transportation. Each of these transportation technologies has attributes that could provide unique benefits to different transportation sectors. Identifying the optimal placement of each transportation technology will provide the co-benefits of maximizing the environmental benefit and return on investment for the operator.

The environmental benefit for each technology class will be highly duty-cycle and application specific. Identifying the attributes of a specific application or drive cycle that would take best advantage of a specific transportation technology would speed the adoption and make optimal use of financial resources in the demonstration and deployment of a technology. The adoption rates would be accelerated since the intelligent deployment of a certain technology would ensure that a high percentage of the demonstration vehicles showed positive results. These positive results would spur the adoption of this technology in similar applications, as opposed to negative results derailing the further development or deployment of a certain technology.

The proposed project would review and potentially coordinate application specific drive cycles to for specific applications. The potential emissions reductions and fossil fuel displacement for each technology in a specific application would be quantified on a full-cycle basis. This information could be used to develop a theoretical database of potential environmental benefits of different transportation technologies when deployed in specific applications.

Another proposed project would be the characterization of intermediate volatility organic compound (IVOC) emissions which is critical in assessing ozone and SOA precursor production rates. Diesel vehicle exhaust and unburned diesel fuel are major sources of and contribute to the formation of urban ozone and secondary organic aerosol (SOA), which is an important component of PM2.5.

Finally, while early developments in autonomous and vehicle-to-vehicle controls are focused on light-duty passenger vehicles, the early application of this technology to heavy-duty, drayage and container transport technologies is more likely. The impact on efficiency and emissions could be substantial. A project to examine this technology to assess its effect on goods movement and emissions associated with goods movement could be beneficial at this time.

Potential Air Quality Benefits:

The development of an emissions reduction database, for various application specific transportation technologies, would assist in the targeted deployment of new transportation technologies. This database coupled with application specific vehicle miles traveled and population data would assist in intelligently deploying advanced technology vehicles to attain the maximum environmental benefit. These two data streams would allow vehicle technologies to be matched to an application that is best suited to the specific technology, as well as selecting applications that are substantial enough to provide a significant environmental benefit. The demonstration of a quantifiable reduction in operating cost through the intelligent deployment of vehicles will also accelerate the commercial adoption of the various technologies. The accelerated adoption of lower emitting vehicles will further assist in attaining SCAQMD's air quality goals.

Proposed Project: Conduct Emissions Studies on Biofuels and Alternative Fuels

Expected SCAQMD Cost: $300,000

Expected Total Cost: $1,000,000

Description of Technology and Application:

The use of biofuels can be an important strategy to reduce petroleum dependency, air pollution and greenhouse gas emissions. Biofuels are in fact receiving increased attention due to national support and state activities resulting from SB 32, AB 1007 and the Low-Carbon Fuel Standard. With an anticipated increase in biofuel use, it is the objective of this project to further analyze these fuels to better understand their benefits and impacts not only on greenhouse gases but also on air pollution and associated health effects.

In various diesel engine studies, replacement of petroleum diesel fuel with biodiesel fuel has demonstrated reduced PM, CO and air toxics emissions. Biodiesel also has the potential to reduce greenhouse gas emissions because it can be made from renewable feedstocks, such as soy and canola. However, certain blends of biodiesel have a tendency to increase NOx emissions for certain engines and duty cycles, which exacerbates the ozone and PM2.5 challenges faced in the Basin. In addition, despite recent advancements in toxicological research in the air pollution field, the relationship between biodiesel particle composition and associated health effects is still not completely understood.

Ethanol is another biofuel that is gaining increased national media and state regulatory attention. CARB has recently amended the reformulated gasoline regulation to further increase the ethanol content to 10% as a means to increase the amount of renewable fuels in the state. It is projected that the state's ethanol use will increase from 900 million gallons in 2007 to 1.5 billion gallons by 2012 as a result. As in the case of biodiesel, ethanol has demonstrated in various emission studies to reduce PM, CO and toxic emissions; however, the relationship between particle composition and associated health effects from the combustion of ethanol is not well understood either.

Furthermore, CARB recently proposed a regulation on the commercialization of alternative diesel fuels, including biodiesel and renewable diesel, while noting that biodiesel in older heavy-duty vehicles can increase NOx and the need for emerging alternative diesel fuels to have clear ground rules for commercialization. The impact of natural gas fuel composition on emissions from heavy-duty trucks and transit buses is also being studied.

In order to address these concerns on potential health effects associated with biofuels, namely biodiesel and ethanol blends, this project will investigate the physical and chemical composition and associated health effects of tailpipe PM emissions from light- to heavy-duty vehicles burning biofuels in order to ensure public health is not adversely impacted by broader use of these fuels. This project also supports future studies to identify mitigation measures to reduce NOx emissions for biofuels. Additionally, a study of emissions from well-to-wheel for the extraction and use of shale gas might be considered.

Potential Air Quality Benefits:

If biodiesel and biodiesel blends can be demonstrated to reduce air pollutant emissions with the ability to mitigate any NOx impact, this technology will become a viable strategy to assist in meeting air pollutant standards as well as the goals of SB 32 and the Low-Carbon Fuel Standard. The use of biodiesel is an important effort for a sustainable energy future. Emission studies are critical to understanding the emission benefits and any tradeoffs (NOx impact) that may result from using this alternative fuel. With reliable information on the emissions from using biodiesel and biodiesel blends, the SCAQMD can take actions to ensure the use of biodiesel will obtain air pollutant reductions without creating additional NOx emissions that may exacerbate the Basin's ozone problem.

Proposed Project: Identify and Demonstrate In-Use Fleet Emissions Reduction Technologies and Opportunities

Expected SCAQMD Cost: $250,000

Expected Total Cost: $2,000,000

Description of Technology and Application:

New technologies, such as alternative fueled heavy-duty engines, are extremely effective at reducing emissions because they are designed to meet the most stringent emissions standards while maintaining vehicle performance. In addition, many new vehicles are now equipped with telematics enabling motorists to obtain transportation information such as road conditions to avoid excessive idling and track information about the vehicle maintenance needs, repair history, tire pressure and fuel economy. Telematics have been shown to reduce emissions from new vehicles. Unfortunately, the in-use fleet lacks telematic systems--particularly heavy-duty engines in trucks, buses, construction equipment, locomotives, marine vessels and cargo handling equipment--have fairly long working lifetimes (up to 20 years due to remanufacturing in some cases). Even light-duty vehicles routinely have lifetimes exceeding 200,000 miles and 10 years. And it is the in-use fleet, especially the oldest vehicles, which are responsible for the majority of emissions.

This project category is to investigate near-term emissions control technologies which can be economically applied to reduce emissions from the in-use fleet. The first part of the project is to identify and conduct proof-of-concept demonstrations of feasible candidate technologies, such as:

- remote sensing for heavy-duty vehicles;
- annual testing for high mileage vehicles (>100,000 miles);
- replace or upgrade emissions control systems at 100,000 mile intervals;
- on-board emission diagnostics with remote notification;
- low-cost test equipment for monitoring and identifying high emitters;
- test cycle development for different class vehicles (e.g. four wheel drive SUVs);
- electrical auxiliary power unit replacements; and
- development, deployment and demonstration of smart vehicle telematic systems

Potential Air Quality Benefits:

Many of the technologies identified can be applied to light-duty and heavy-duty vehicles to identify and subsequently remedy high-emitting vehicles in the current fleet inventory. Estimates suggest that 5 percent of existing fleets account for up to 80 percent of the emissions. Identification of higher emitting vehicles would assist with demand-side strategies, where higher emitting vehicles have correspondingly higher registration charges.

Stationary Clean Fuel Technologies

Proposed Project: Develop and Demonstrate Reliable, Advanced Emission Control Technologies, and Low-Emission Monitoring Systems and Test Methods

Expected SCAQMD Cost: $100,000

Expected Total Cost: $250,000

Description of Technology and Application:

Currently, the inability of air/fuel ratio control (AFRC) systems to keep rich-burn engines in compliance contributes significantly to air pollution in the basin. Reliable, low-cost emission monitoring systems are needed for small-to-intermediate size combustion devices, including stationary engines, boilers, heaters, furnaces and ovens that are not large enough to justify a continuous emission monitoring system (CEMS). This class of combustion device is often permitted on the basis of a single demonstration or periodic demonstrations of NOx and CO emissions meeting SCAQMD rule requirements or a RECLAIM concentration limit. However, SCAQMD-unannounced tests on engines and boilers have found that in many cases NOx and/or CO levels have increased significantly above levels that have been initially or periodically demonstrated due to equipment malfunction and/or inadequate operator attention. It is suspected that the same may be true of heaters, furnaces and ovens.

A recent demonstration project funded in part by the SCAQMD consisted of retrofitting a biogas engine with a digester gas clean up system and catalytic oxidizer at the exhaust followed by SCR which resulted in significant reductions of NO_x, VOC and CO. Based on the successful deployment of this project, further emission reductions may be achieved by other biogas combustion sources such as gas turbines and boilers by the continued development of specialized low cost biogas clean up systems that will allow for the use of catalytic after control systems.

Demonstrations of newer technologies in recent years could result in a commercially viable alternative to CEMS that is both reliable and feasible in terms of lower costs. For example, manufacturers of flue gas analyzers have, in recent years, developed low-cost multi-gas analyzers suitable for portable or stack-mounted use. Some preliminary testing of a new type of AFRC, which uses a different type of O2 sensor known as a wide-band O2 sensor, is another alternative that can be analyzed. Another technical approach might be to deploy technology utilizing the O2 signature of a post-catalyst O2 sensor and additional control concepts being developed by manufacturers. Since an underlying problem has been that engine, catalyst and AFRC manufacturers have developed systems independently, a system being co-developed to perform continuous diagnostics to assist operators in keeping rich-burn engines in compliance is possibly another alternative for demonstration.

Potential Air Quality Benefits:

Stationary engines, boilers, heaters, furnaces and ovens account for approximately 11 percent of total NO_x emissions and about 6 percent of total CO emissions. There has been a long-standing compliance problem with rich-burn IC engines in the basin and evidence indicates that many of these devices are operating with NOx and/or CO emissions above levels required in their permits. Projects could potentially reduce a significant class of NOx and CO emissions that are in excess of the assumptions in the AQMP and further enhance SCAQMD's ability to enforce full-time compliance.

Proposed Project: Develop and Demonstrate Clean Stationary Technologies

Expected SCAQMD Cost: $250,000

Expected Total Cost: $750,000

Description of Technology and Application:

Stationary sources, including VOC sources such as large printing facilities and furniture manufacturers, have become cleaner and cleaner due to the regulatory requirements for low emissions and the advancements in technology to meet those requirements. Best Available Control Technology (BACT) regulations, however, are only required for new, modified, or relocated sources. This project category is to develop and demonstrate new technologies that can provide emissions reductions in new installations or as retrofit modifications. Possible technology examples include:

- low NOx technologies (burners and ICEs);
- low-Btu gas technologies (e.g., digester, landfill, or diary gases);
- alternative fuels and hydrogen blends;
- alternative diesel fuels (emulsified, gas-to-liquids, biodiesel with aftertreatment);
- low emission refinery flares;
- catalytic combustion;
- cost-effective fuel cell and fuel cell hybrid distributed generation;
- fumes-to-fuel technology to replace thermal oxidizers and capture VOC emissions for electricity generation while ensuring no emission of air toxics; and
- boiler optimization design and strategies to improve efficiencies.

Depending on the technology, a proof-of-concept project, demonstration, or pre-commercial deployment would be considered to garner further information on the technology. Issues to investigate include viability (reliability, maintainability and durability) of the technology, cost-effectiveness and operator ease-of-use in order to assess commercialization.

Potential Air Quality Benefits:

The SCAQMD has a substantial number of older, small, stationary source technologies within its jurisdiction. Since these devices are not subject to continuous emissions monitoring system requirements, evidence suggests that these devices may not be operating at their permitted NOx, CO, hydrocarbon and PM emissions levels. Replacing these devices with cleaner and more reliable technologies or technology/fuel combinations can have dramatic reductions in all of these criteria pollutants. VOC emission reductions may also be achieved at larger stationary VOC sources to achieve the new federal ozone and PM2.5 standards.

Proposed Project: Develop and Demonstrate Renewables-Based Energy Generation Alternatives

Expected SCAQMD Cost: $300,000

Expected Total Cost: $1,000,000

Description of Technology and Application:

The objective of this proposed project is to support the development and demonstration of clean energy, renewable alternatives in stationary and mobile applications. The technologies to be considered include thermal, photovoltaic and other solar energy technologies; wind energy systems; energy storage and conservation 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 substantially reduce tail-pipe emissions, while in fuel cells the emissions are reduced to zero.

The project is expected to result in pilot-scale production demonstrations, scale-up process design and cost analysis, overall environmental impact analysis and projections for ultimate clean fuel costs and availability. This project is expected to result in several projects addressing technological advancements in these technologies that may improve performance and efficiency, potentially reduce capital and operating costs, enhance the quality of natural gas generated from renewable sources for injection into natural gas pipelines, improve reliability and user friendliness and identify markets that could expedite the implementation of successful technologies.

Potential Air Quality Benefits:

The 2016 AQMP identifies the development and ultimately the implementation of non-polluting power generation. To gain the maximum air quality benefit, polluting fossil fuel-fired electric power generation needs to be replaced with clean renewable energy resources or other advanced zero emission technologies, such as hydrogen fuel cells, particularly in a distributed generation context.

The proposed project is expected to accelerate the implementation of advanced zero emission energy sources. Expected benefits include directly reducing the emissions by the displacement of fossil generation; proof-of-concept and potential viability for such zero emission power generation systems; increased exposure and user acceptance of the new technology; reduced fossil fuel usage; and the potential for increased use, once successfully demonstrated, with resulting emission benefits, through expedited implementation. These technologies would also have a substantial influence in reducing global warming emissions.

Emission Control Technologies

Proposed Project: Develop and Demonstrate Advanced Aftertreatment Technologies

Expected SCAQMD Cost: $300,000

Expected Total Cost: $5,000,000

Description of Technology and Application:

There are a number of aftertreatment technologies which have shown substantial emission reductions in diesel engines. These technologies include diesel particulate filters (DPFs), oxidation catalysts, selective catalytic reduction (SCR) systems and NOx adsorbers. This project category is to develop and demonstrate these aftertreatment technologies alone or in tandem with an alternative fuel to produce the lowest possible PM, ultrafine particles, nanoparticles, NOx, CO, carbonyl and hydrocarbon emissions in retrofit and new applications. With the increasing focus on zero- and near-zero emission goods movement technologies, this category should examine idle reduction concepts and technologies that can be employed at ports and airports.

Possible projects include advancing the technologies for on-road retrofit applications such as heavy-duty line-haul diesel engines, street sweepers, waste haulers and transit buses. Applications for non-road may include construction equipment, yard hostlers, gantry cranes, locomotives, marine vessels, ground support equipment and other similar industrial applications. Potential fuels to be considered in tandem are low-sulfur diesel, emulsified diesel, biodiesel, gas-to-liquids, hydrogen and natural gas. This project category will also explore the performance, economic feasibility, viability (reliability, maintainability and durability) and ease-of-use to ensure a pathway to commercialization.

Potential Air Quality Benefits:

The transfer of mature emission control technologies, such as DPFs and oxidation catalysts, to the off-road sector is a potentially low-risk endeavor that can have immediate emissions reductions. Further development and demonstration of other technologies, such SCR and NOx adsorbers, could also have NOx reductions of up to 90%.

Proposed Project: Demonstrate On-Road Technologies in Off-Road and Retrofit Applications

Expected SCAQMD Cost: $250,000

Expected Total Cost: $1,000,000

Description of Technology and Application:

Heavy-duty on-road engines have demonstrated progress in meeting increasingly stringent Federal and state requirements. New heavy-duty engines have progressed from 2 g/bhp-hr NOx in 2004 to 0.2 g/bhp-hr NOx in 2010, which is an order of magnitude decrease in just six years. Off-road engines, however, have considerably higher emissions limits depending on the engine size. For example, Tier-3 standards for heavy-duty engines require only 3 g/bhp-hr NOx. There are apparent opportunities to implement cleaner on-road technologies in off-road applications. There is also an opportunity to replace existing engines in both on-road and off-road applications with the cleanest available technology. Current regulations require a repower (engine exchange) to only meet the same emissions standards as the engine being retired. Unfortunately, this does not take advantage of recently developed clean technologies.

Exhaust gas cleanup strategies, such as SCR, electrostatic precipitators, baghouses and scrubbers, have been used successfully for many years on stationary sources. The exhaust from the combustion source is routed to the cleaning technology, which typically requires a large footprint for implementation. This large footprint has made installation of such technologies on some mobile sources prohibitive. However, in cases where the mobile source is required to idle for long periods of time, it may be more effective to route the emissions from the mobile source to a stationary device to clean the exhaust stream.

Projects in this category will include utilizing proven clean technologies in novel applications, such as:

- demonstrating certified LNG and CNG on-road engines in off-road applications including yard hostlers, switcher locomotives, gantry cranes, waste haulers and construction equipment;
- implementing lower emission engines in repower applications for both on-road and off-road applications; and
- applying stationary best available control technologies, such as SCR, scrubbers, baghouses and electrostatic precipitators, to appropriate on- and off-road applications, such as idling locomotives, marine vessels at dock and heavy-duty line-haul trucks at weigh stations.

Potential Air Quality Benefits:

The transfer of mature emission control technologies, such as certified engines and SCR, to the non-road and retrofit sectors offers high potential for immediate emissions reductions. Further development and demonstration of these technologies will assist in the regulatory efforts which could require such technologies and retrofits.

Health Impacts Studies

Proposed Project: Evaluate Ultrafine Particle Health Effects

Expected SCAQMD Cost: $100,000

Expected Total Cost: $2,000,000

Description of Technology and Application:

Reducing diesel exhaust from vehicles has become a high priority in the South Coast Air Basin since CARB identified the particulate phase of diesel exhaust as a surrogate for all of the toxic air contaminant emitted from diesel exhaust. Additionally, health studies indicate that the ultrafine portion of particulate matter may be more toxic on a per-mass basis than other fractions. Several technologies have been introduced and others are under development to reduce diesel emissions. These include among others low-sulfur diesel fuel, particulate matter traps and heavy-duty engines operating on alternative fuel such as CNG and LNG. Recent studies have shown that control technologies applied to mobile sources have been effective in reducing the mass of particulates emitted. However, there is also evidence that the number of ultrafine particles on and near roadways has increased, even while the mass of particulates has decreased. To have a better understanding of changes in ultrafine particulate emissions from the application of the new technologies and the health effects of these emissions, an evaluation and comparison of ultrafine particulate matter and the potential impacts on community exposures are necessary.

In this project, measurements and chemical composition of ultrafine particulates will be done, as well as studies conducted to characterize their toxicity. The composition of the particulates can further be used to determine the contribution from specific combustion sources. Additionally, engine or chassis dynamometer testing may be conducted on heavy-duty vehicles to measure, evaluate and compare ultrafine particulate matter, PAH and other relevant toxic emissions from different types of fuels such as CNG, low-sulfur diesel, biofuels and others. This project needs to be closely coordinated with the development of technologies for alternative fuels, aftertreatment and new engines in order to determine the health benefits of such technologies.

Furthermore, gasoline direct injection (GDI) vehicles are known for higher efficiency and power output but the PM emissions profile is not well understood especially on secondary organic aerosol (SOA) formation potential. As manufacturers introduce more GDI models in the market to meet new fuel economy standards, it is important to understand the SOA potential from these vehicles as it could lead to further impact on the ambient PM concentration in our region. Consequently, in 2015 a project was initiated with UCR/CE-CERT to investigate the physical and chemical composition of aerosols from GDI vehicles using a mobile environmental chamber that has been designed and constructed to characterize secondary emissions. Based on this initial results indicating an increase in particle numbers, follow-up in-use studies to assess PM emissions including with and without particle filters will be beneficial.

Potential Air Quality Benefits:

The AQMP for the South Coast Basin relies on significant penetration of low emission vehicles to attain federal clean air standards. Reduction of particulate emissions from the combustion of diesel and other fuels is a major priority in achieving these standards. This project would help to better understand the nature and amount of ultrafine particulates generated by different types of fuels and advanced control technologies as well as provide information on potential health effects of ultrafine particles. Such an understanding is important to assess the emission reduction potentials and health benefits of these technologies. In turn, this will have a direct effect on the policy and regulatory actions for commercial implementation of alternative fuel vehicles in the Basin.

Proposed Project: Conduct Monitoring to Assess Environmental Impacts

Expected SCAQMD Cost: $150,000

Expected Total Cost: $500,000

Description of Technology and Application:

Facilities, buildings, structures, or highways which attract mobile sources of pollution are considered "indirect" sources. Ambient and saturation air monitoring near sources such as ports, airports, rail yards, distribution centers and freeways is important to identify the emissions exposure to the surrounding communities and provide the data to then conduct the health impacts due to these sources. This project category would identify areas of interest and conduct ambient air monitoring, conduct emissions monitoring, analyze the data and assess the potential health impacts from mobile sources. The projects would need to be at least one year in duration in order to properly assess the air quality impacts in the area.

Potential Air Quality Benefits:

The proposed project will assist in the evaluation of adverse public health impacts associated with mobile sources. The information will be useful in (a) determining whether indirect sources have a relatively higher impact on residents living in close proximity; and (b) providing guidance to develop some area-specific control strategies in the future should it be necessary.

Proposed Project: Assess Sources and Health Impacts of Particulate Matter

Expected SCAQMD Cost: $150,000

Expected Total Cost: $300,000

Description of Technology and Application:

Previous studies of ambient levels of toxic air contaminants, such as the MATES series of studies, have found that diesel exhaust is the major contributor to health risk from air toxics. Analyses of diesel particulate matter in ambient samples have been based on measurements of elemental carbon. While the bulk of particulate elemental carbon in the South Coast Air Basin is thought to be from combustion of diesel fuels, it is not a unique tracer for diesel exhaust.

The MATES III study collected particulate samples at ten locations in the South Coast Air Basin. Analysis of particulate bound organic compounds was utilized as tracers to estimate levels of ambient diesel particulate matter as well as estimate levels of particulate matter from other major sources. Other major sources that were taken into consideration include automobile exhaust, meat charbroiling, road dust, wood smoke and fuel oil combustion. Analyzing for organic compounds and metals in conjunction with elemental carbon upon collected particulate samples was used to determine contributing sources.

MATES IV, initiated in mid-2012, included an air monitoring program, an updated emissions inventory of toxic air contaminants and a regional modeling effort to characterize risk across the Basin. In addition to air toxics, MATES IV also measured ultrafine particle concentrations and black carbon at the monitoring sites as well as near sources such as airports, freeways, rail yards, busy intersections and warehouse operations.

This project category would include other related factors, such as toxicity assessment based on age, source (heavy-duty, light-duty engines) and composition (semi-volatile or non-volatile fractions) to better understand the health effects and potential community exposures. Additionally, early identification of new health issues could be of considerable value and could be undertaken in this project category.

Potential Air Quality Benefits:

Results of this work will provide a more robust, scientifically sound estimate of ambient levels of diesel particulate matter as well as levels of particulate matter from other significant combustion sources, including gasoline and diesel generated VOCs. This will allow a better estimation of potential exposures to and health effects from toxic air contaminants from diesel exhaust in the South Coast Air Basin. This information in turn can be used to determine the health benefits of promoting clean fuel technologies.

Technology Assessment/Transfer & Outreach

Proposed Project: Assess and Support Advanced Technologies and Disseminate Information

Expected SCAQMD Cost: $425,000

Expected Total Cost: $800,000

Description of Project:

This project supports the assessment of clean fuels and advanced technologies, their progress towards commercialization and the dissemination of information on demonstrated technologies. The objective of this project is to expedite the transfer of technology developed as a result of Technology Advancement Office projects to the public domain, industry, regulatory agencies and the scientific community. This project is a fundamental element in the SCAQMD's outreach efforts to expedite the implementation of low emission and clean fuels technologies and to coordinate these activities with other organizations.

This project may include the following:

- technical review and assessment of technologies, projects and proposals;
- support for alternative fuel refueling and infrastructure;
- advanced technology curriculum development, mentoring and outreach to local schools;
- emissions studies and assessments of zero emission alternatives;
- advanced technology vehicle demonstrations;
- preparation of reports, presentations at conferences, improved public relations and public communications of successful demonstrations of clean technologies;
- participation in and coordination of workshops and various meetings;
- support for training programs related to fleet operation, maintenance and refueling of alternative fuel vehicles;
- publication of technical papers, reports and bulletins; and
- production and dissemination of information, including web sites.

These objectives will be achieved by consulting with industry, scientific, health, medical and regulatory experts and co-sponsoring related conferences and organizations, resulting in multiple contracts. In addition, an ongoing outreach campaign will be conducted to encourage decision-makers to voluntarily switch to alternatively fueled vehicles and train operators to purchase, operate and maintain these vehicles and associated infrastructure.

Potential Air Quality Benefits:

SCAQMD adopted fleet regulations requiring public and private fleets within the Basin to acquire alternatively fueled vehicles when making new purchases. Expected benefits of highlighting success stories in the use of advanced alternatively fueled vehicles could potentially expedite the acceptance and commercialization of advanced technologies by operators seeking to comply with the provisions of the recently adopted SCAQMD fleet rules. The resulting future emissions benefits will contribute to the goals of the AQMP.

Proposed Project: Support Implementation of Various Clean Fuels Vehicle Incentive Programs

Expected SCAQMD Cost: $325,000

Expected Total Cost: $400,000

Description of Project:

This project supports the implementation of zero emission vehicle incentive programs, the Carl Moyer incentives program and the school bus incentives program. Implementation support includes application approval, grant allocation, documentation to the CARB, verification of vehicle registration and other support as needed. Information dissemination is critical to successful implementation of a coordinated and comprehensive package of incentives. Outreach will be directed to vehicle dealers, individuals and fleets.

Potential Air Quality Benefits:

As described earlier, the SCAQMD will provide matching funds to implement several key incentives programs to reduce diesel emissions in the Basin. Furthermore, the SCAQMD recently adopted fleet regulations requiring public and private fleets within the Basin to acquire alternatively fueled vehicles when making new purchases. Expected benefits of highlighting zero emission vehicle incentives could potentially expedite the acceptance and commercialization of advanced technologies by operators seeking to comply with the provisions of the recently adopted SCAQMD fleet rules. The resulting future emissions benefits will contribute to the goals of the AQMP. The school bus program and the Carl Moyer incentives program will also reduce large amounts of NOx and PM emissions in the basin in addition to reducing toxic air contaminants.

Clean Fuels Program

2018 Draft Plan Update

November 2017

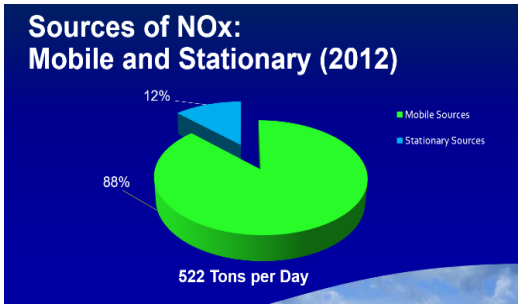
Back to Agenda

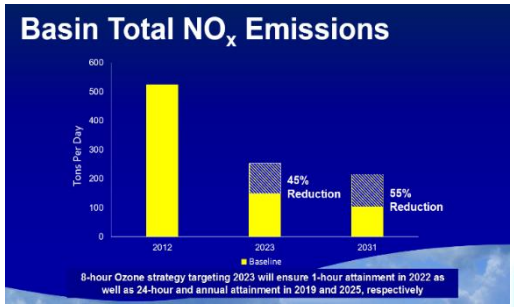
Federal/State Actions

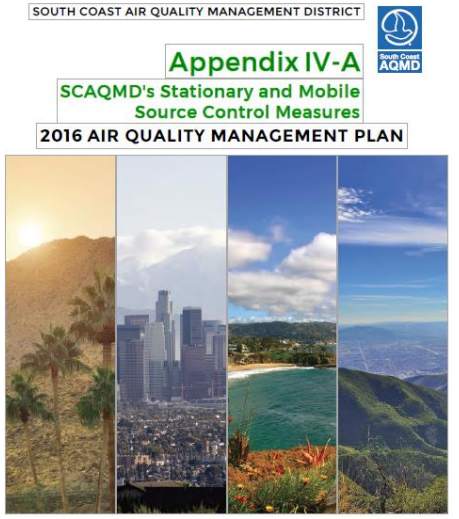
- U.S. EPA/CARB – Proposed Heavy Duty Engine Standards
- CARB – Mobile Source Strategy
- California Sustainable Freight Action Plan
  - Improve freight system efficiency 25% by 2030
  - Deploy over 100,000 ZEVs and maximize near-zero technology by 2020

South Coast Plans & Policies

- 2016 AQMP – NAAQS
  - 2008 8-hr Ozone – 75 ppb







  - Facility Based Mobile Source Measures
    - MOB-01 – Commercial Marine Ports
    - MOB-03 – Warehouse Distribution Centers
    - MOB-04 – Commercial Airports
    - EGM01 – New/Redevelopment Projects

2017 Plan
Key Proposed Projects

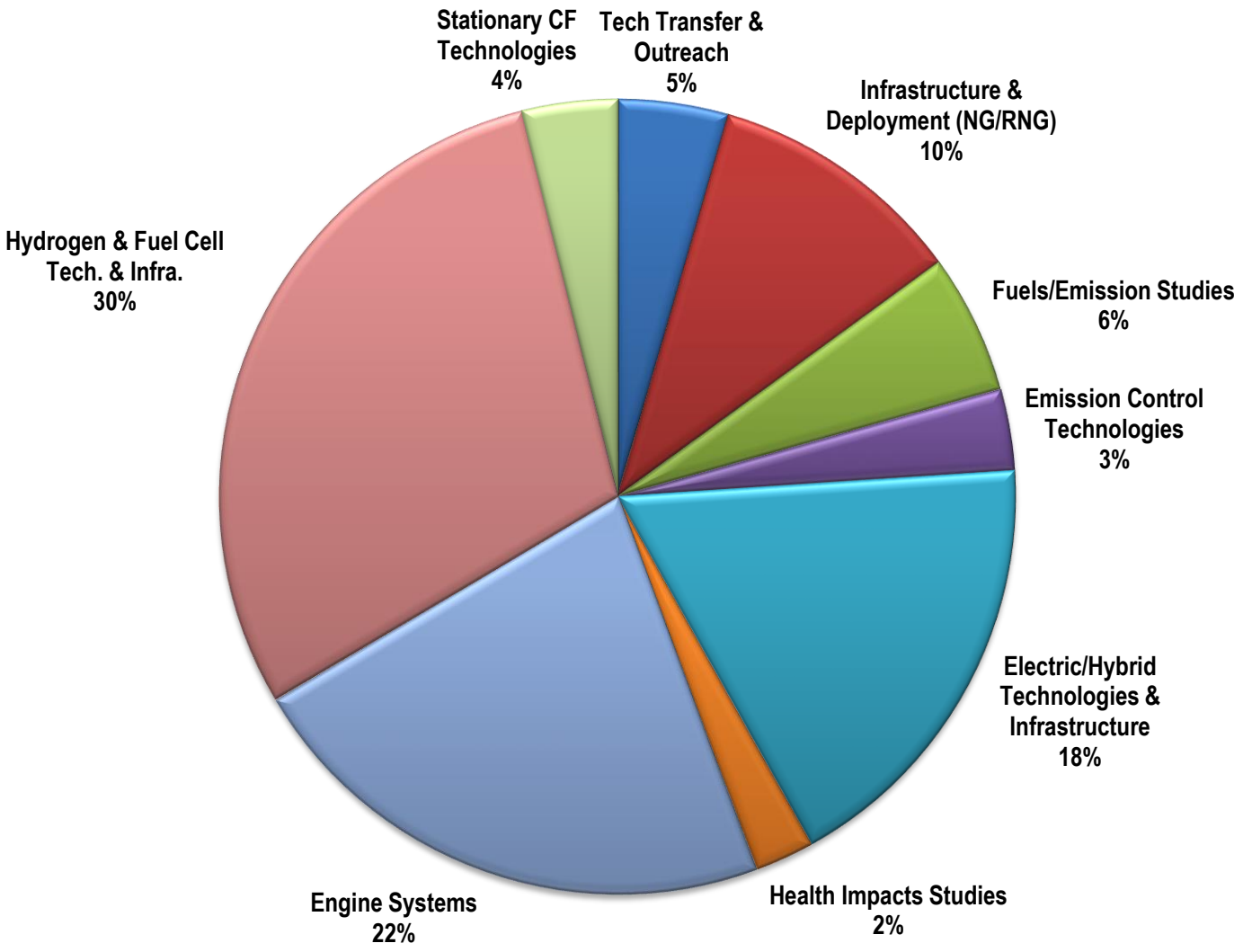
- Zero emission container truck development
- Medium- and heavy-duty fuel cell vehicles
- Hydrogen refueling stations
- Electric vehicle charging infrastructure
- Further evaluation of biogas production and use
- Development and demonstration of advanced natural gas engines
- Freight efficiency studies

Projects not funded in 2017 may be considered for funding in future years

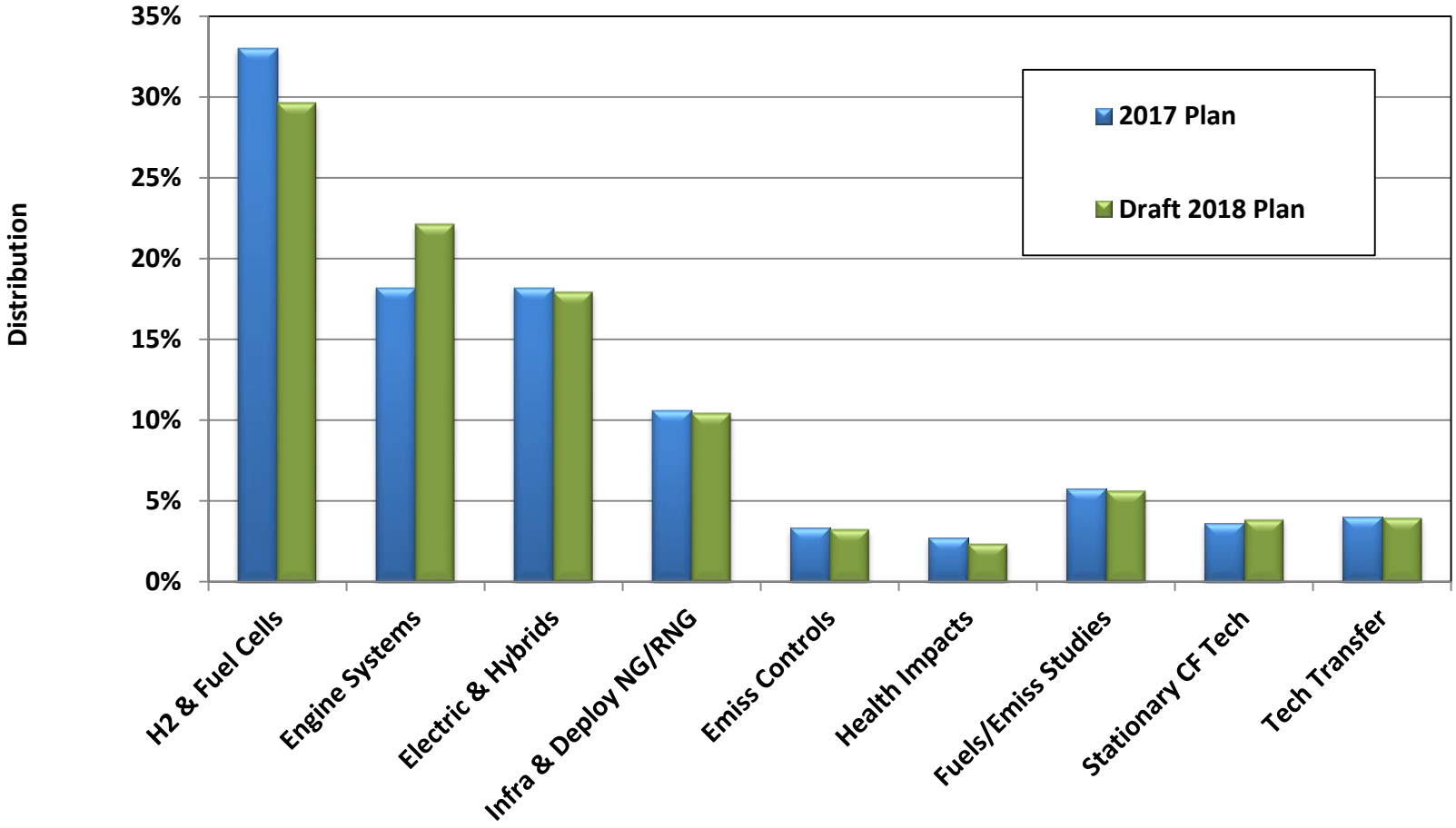
Draft 2018 Plan Update
(Key Technical Areas)

- Maintain focus on zero and near-zero emissions goods movement technologies
- Near-zero emission (gaseous and liquid fuel) engine systems, especially high HP uses
- Expand focus on local biogas production and use
- Maintain focus on hybrid, plug-in, electric-drive technologies and infrastructure
- Onsite hydrogen production and dispensing
- Maintain other areas of emphasis

Proposed 2018 Plan Distribution



Plan Update Comparison



Proposed Distribution

	2017 Plan	Draft 2018 Plan
H2 & Fuel Cells & Infra	33%	30%
Engine Systems	18%	22%
Electric & Hybrids & Infra	18%	18%
Infrastructure & Deployment (NG)	11%	11%
Emissions Controls	3%	3%
Health Impacts	3%	2%
Fuels & Emissions Studies	6%	6%
Stationary CF Tech	4%	4%
Technology Transfer	4%	4%
	100%	100%

Feedback Requested

- On proposed distribution
- Other issues impacting 2018 Plan