California Environmental Protection Agency

Air Resources Board

LOCATION:
Air Resources Board
Byron Sher Auditorium, Second Floor
1001 I Street
Sacramento, California 95814
http://www.calepa.ca.gov/EPAbldg/location.htm

PUBLIC MEETING AGENDA

June 27, 2013

This facility is accessible by public transit. For transit information, call (916) 321-BUSS, website: http://www.sacrt.com
(This facility is accessible to persons with disabilities.)

TO SUBMIT WRITTEN COMMENTS ON AN AGENDA ITEM IN ADVANCE OF THE MEETING GO TO: http://www.arb.ca.gov/lispub/comm/bclist.php

June 27, 2013
9:00 a.m.

CONSENT CALENDAR:
The following items on the consent calendar will be voted on by the Board immediately after the start of the public meeting, unless removed from the consent calendar either upon a Board member's request or if someone in the audience wishes to speak on it. Attached are the Proposed Resolutions the Board will consider for consent items listed below.

Consent Item #

13-6-1: Public Meeting to Consider 11 Research Proposals

Staff will seek Board approval of research proposals that were developed based on the Board-approved FY 2013-2014 Annual Research Plan.

1) *"Examining Factors that Influence ZEV Sales in California," University of California, Los Angeles, Proposal No. 2758-276.*

2) *"The Future of Drop-In Fuels: Life-Cycle Cost and Environmental Impacts of Bio Based Hydrocarbon Fuel Pathways," University of California, Berkeley, Proposal No. 2759-276.*

3) *"The Feasibility of Renewable Natural Gas as a Large-Scale, Low-Carbon Substitute," University of California, Davis, Proposal No. 2760-276.*

4) *"Collection of Activity Data from On-Road Heavy-Duty Diesel Vehicles," University of California, Riverside, Proposal No. 2761-276.*

5) *"Air Quality Impacts of Low Vapor Pressure-Volatile Organic Compounds," University of California, Riverside, Proposal No. 2757-276.*

6) *"Environmental Fate of Low Vapor Pressure-Volatile Organic Compounds from Consumer Products: A Modeling Approach," University of California, Davis, Proposal No. 2762-276.*

7) *"Cardiovascular Effects of Multi-Pollutant Exposure: Mechanisms and Interactions," University of California, Irvine, Proposal No. 2764-276.*

8) *"Developing a New Methodology for Analyzing Potential Displacement," University of California, Berkeley, Proposal No. 2765-276.*

9) *"Co-Exposure to Particulate Matter and Ozone: Pulmonary C-Fiber and Platelet Activation in Decreased Heart Rate Variability," University of California, Davis, Proposal No. 2763-276.*

10) *"Evaluating Technologies and Methods to Lower Nitrogen Oxide Emissions from Heavy-Duty Vehicles," Southwest Research Institute, RFP No. 12-310, Proposal No. 2767-276.*

11) *"Effectiveness of Sound Wall-Vegetation Combination Barriers as Near-Roadway Pollutant Mitigation Strategies," University of California, Los Angeles, Proposal No. 2766-276.*

13-6-2: Public Meeting to Consider a State Implementation Plan (SIP) Revision to Update the Demonstration of Contingency Measures for the Annual PM2.5 Standard for the San Joaquin Valley

The Board will consider approval of an update to the contingency measures for the annual PM2.5 standard in the San Joaquin Valley for submittal to the U.S Environmental Protection Agency (U.S. EPA). The update quantifies the benefits of ARB and San Joaquin Valley Air District regulations and incentives that will serve as contingency for the PM2.5 attainment demonstration approved by U.S. EPA on November 9, 2011.

13-6-3: Appointment of a New Member to the Environmental Justice Advisory Committee

Pursuant to Assembly Bill 32 (Global Warming Solutions Act of 2006), ARB is reconvening the Environmental Justice Advisory Committee (EJAC) to advise it on the Scoping Plan update. Staff will recommend the appointment of Luis Olmedo from Imperial County as an additional member to the EJAC.

DISCUSSION ITEMS:

Note: The following agenda items may be heard in a different order at the Board meeting.

Agenda Item #

13-6-4: CoolCalifornia City Challenge Awards

The winner and two other finalist cities in the CoolCalifornia Challenge competition will be announced and highlighted. The CoolCalifornia Challenge is a statewide competition between California cities to reduce energy and earn the title of "Coolest California City." Finalists are the cities of Davis, Tracy, and Chula Vista.

13-6-5: Informational Update to the Board on the Association of Bay Area Governments' and Metropolitan Transportation Commission's Draft Sustainable Communities Strategy

The Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC) released the draft Bay Area Plan: Strategy for a Sustainable Region in March 2013. The Bay Area Plan includes the region's Sustainable Communities Strategy (SCS) required by SB 375, the Sustainable Communities and Climate Protection Act of 2008. The draft SCS is designed to meet the greenhouse gas emissions reduction targets set by ARB for the State's metropolitan planning organizations under SB 375. ARB staff will present an update to the Board on the ABAG and MTC draft SCS and staff's review of the quantification of the greenhouse gas reductions in the draft SCS.

13-6-6: Update to the Board on Indoor Air Quality

Staff will discuss the results of the Air Resources Board's major indoor air quality studies, how they have supported regulations and policies to address unhealthful indoor exposures, and some remaining indoor pollution sources that have not been addressed.

13-6-7: Informational Update to the Board on Assembly Bill 1900 Activities and Recommendations to the California Public Utilities Commission

Staff will update the Board on recommendations provided to the California Public Utilities Commission in May 2013 for health protective standards for constituents of concern in biogas that is upgraded to biomethane and injected into the common carrier pipeline. These recommendations were developed in accordance with the provision of Assembly Bill 1900.

CLOSED SESSION

The Board will hold a closed session, as authorized by Government Code section 11126(e), to confer with, and receive advice from, its legal counsel regarding the following pending or potential litigation, and as authorized by Government Code section 11126(a):

POET, LLC, et al. v. Goldstene, et al., Superior Court of California (Fresno County), Case No. 09CECG04850; plaintiffs' appeal, California Court of Appeal, Fifth District No. F064045.

Rocky Mountain Farmers Union, et al. v. Goldstene, U.S. District Court (E.D. Cal. Fresno), Case No. 1:09-CV-02234-LJO-DLB; interlocutory appeal, U.S. Court of Appeal, Ninth Circuit Nos. 09-CV-02234 and 10-CV-00163.

American Fuels and Petrochemical Manufacturing Associations, et al. v. Goldstene, et al., U.S. District Court (E.D. Cal. Fresno), Case No. 1:10-CV-00163-AWI-GSA; interlocutory appeal, U.S. Court of Appeal, Ninth Circuit, Case Nos. 09-CV-02234 and 10-CV-00163.

Association of Irritated Residents, et al. v. United States Environmental Protection Agency, 2011 WL 310357 (C.A.9), (Feb. 2, 2011).

California Dump Truck Owners Association v. California Air Resources Board, U.S. District Court (E.D. Cal. Sacramento), Case No. 2:11-CV-00384-MCE-GGH; plaintiffs' appeal, U.S. Court of Appeals, Ninth Circuit, Case No. 13-15175.

California Construction Trucking Association v. United States Environmental Protection Agency, U.S. Court of Appeals, Ninth Circuit, Case No. 13-70562.

Engine Manufacturers Association v. California Air Resources Board, Sacramento Superior Court, Case No. 34-2010-00082774.

Citizens Climate Lobby and Our Children's Earth Foundation v. California Air Resources Board, San Francisco Superior Court, Case No. CGC-12-519554.

California Chamber of Commerce et al. v. California Air Resources Board, Sacramento Superior Court, Case 34-2012-80001313.

Morning Star Packing Company, et al. v. California Air Resources Board, et al., Sacramento Superior Court, Case No. 34-2013-800001464.

Delta Construction Company, et al., v. United States Environmental Protection Agency, U.S. Court of Appeals, District of Columbia Circuit, Case No. 11-1428.

City of Los Angeles through Department of Water and Power v. California Air Resources Board, et al., Los Angeles Superior Court, Case No. BS140620.

OPPORTUNITY FOR MEMBERS OF THE BOARD TO COMMENT ON MATTERS OF INTEREST

Board members may identify matters they would like to have noticed for consideration at future meetings and comment on topics of interest; no formal action on these topics will be taken without further notice.

OPEN SESSION TO PROVIDE AN OPPORTUNITY FOR MEMBERS OF THE PUBLIC TO ADDRESS THE BOARD ON SUBJECT MATTERS WITHIN THE JURISDICTION OF THE BOARD

Although no formal Board action may be taken, the Board is allowing an opportunity to interested members of the public to address the Board on items of interest that are within the Board's jurisdiction, but that do not specifically appear on the agenda. Each person will be allowed a maximum of three minutes to ensure that everyone has a chance to speak.

TO ELECTRONICALLY SUBMIT WRITTEN COMMENTS ON AN AGENDA ITEM IN ADVANCE OF THE MEETING GO TO:

http://www.arb.ca.gov/lispub/comm/bclist.php

(Note: not all items are available for electronic submittals of written comments.)

ONLINE SIGN-UP:
You can sign up online in advance to speak at the Board meeting when you submit an electronic Board item comment. Note: not all items are available for online sign-up. For more information go to:

http://www.arb.ca.gov/board/online-signup.htm

IF YOU HAVE ANY QUESTIONS, PLEASE CONTACT THE CLERK OF THE BOARD:
1001 I Street, 23rd Floor, Sacramento, California 95814
(916) 322-5594
ARB Homepage: www.arb.ca.gov

SPECIAL ACCOMMODATION REQUEST

Special accommodation or language needs can be provided for any of the following:

- An interpreter to be available at the hearing;
- Documents made available in an alternate format or another language;
- A disability-related reasonable accommodation.

To request these special accommodations or language needs, please contact the Clerk of the Board at (916) 322-5594 or by facsimile at (916) 322-3928 as soon as possible, but no later than 7 business days before the scheduled Board hearing. TTY/TDD/Speech to Speech users may dial 711 for the California Relay Service.

Comodidad especial o necesidad de otro idioma puede ser proveído para alguna de las siguientes:

- Un intérprete que esté disponible en la audiencia;
- Documentos disponibles en un formato alterno u otro idioma;
- Una acomodación razonable relacionados con una incapacidad.

Para solicitar estas comodidades especiales o necesidades de otro idioma, por favor llame a la oficina del Consejo al (916) 322-5594 o envíe un fax a (916) 322-3928 lo más pronto posible, pero no menos de 7 días de trabajo antes del día programado para la audiencia del Consejo. TTY/TDD/Personas que necesiten este servicio pueden marcar el 711 para el Servicio de Retransmisión de Mensajes de California.

SMOKING IS NOT PERMITTED AT MEETINGS OF THE CALIFORNIA AIR RESOURCES BOARD

California Environmental Protection Agency

Air Resources Board

PUBLIC MEETING AGENDA

LOCATION:
Air Resources Board
Byron Sher Auditorium, Second Floor
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PROPOSED

State of California
AIR RESOURCES BOARD

Examining Factors that Influence ZEV Sales in California

RESEARCH PROPOSAL

Resolution 13-18

June 27, 2013

Agenda Item No.: 13-6-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2758-276, entitled "Examining Factors that Influence ZEV Sales in California," has been submitted by the University of California, Los Angeles; and

WHEREAS, in accordance with Health and Safety Code section 39705, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2758-276, entitled "Examining Factors that Influence ZEV Sales in California," submitted by the University of California, Los Angeles, for a total amount not to exceed $302,992.

WHEREAS, the Research Division staff has reviewed Proposal Number 2758-276 and finds that in accordance with Health and Safety Code section 39701, the results of this study will be used to describe the current ZEV market and to refine future estimates of ZEV market potential in California.

NOW, THEREFORE BE IT RESOLVED that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendations of the Research Screening Committee and Research Division staff and approves the following:

> Proposal Number 2758-276, entitled "Examining Factors that Influence ZEV Sales in California," submitted by the University of California, Los Angeles not to exceed $302,992.

BE IT FURTHER RESOLVED that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $302,992.

ATTACHMENT A

"Examining Factors that Influence ZEV Sales in California"

Background
Renewed interest in zero-emission vehicle (ZEV) technology has led to growing volumes of plug-in hybrid electric vehicles (PHEV) and full battery electric vehicles (BEV) recently being sold in California. While still relatively small in market share compared to the full offerings of new vehicles sold each year, these sales numbering in the tens of thousands provide an initial opportunity for empirical research on this evolving market. ARB has recently sponsored multiple projects related to current and potential consumers of ZEVs, which rely on direct communication with consumers and their voluntary participation. Complementary research is needed to evaluate the ZEV market from a more holistic perspective and provide a measure of the representativeness of survey and interview respondents to the overall ZEV buying population.

Objective
The objective of this research proposal is to test various hypotheses related to spatial or temporal factors associated with current ZEV sales trends and factors to be evaluated include public policy (e.g. incentives, infrastructure), pricing and vehicle attributes, and socioeconomic and geographic characteristics and based on the findings, develop a method and model to project ZEV sales under different policy or market scenarios.

Methods
This research proposal would merge monthly ZEV registration data for December 2010 to December 2013 with census tract level data in order to correlate the spatial and temporal factors that influence ZEV sales across California. The researchers will employ fixed-effects and random-effect panel-data models to test how different variables affect ZEV sales in different census tracts statewide. Although causation may be difficult to establish between certain factors within a census tract and the presence of a ZEV sale, the researchers will employ quasi-experimental methods to exploit sudden/discrete events occurring during the study period, e.g. changes in rebate levels or fuel prices, or the introduction of new models, to increase confidence in a causal relationship.

Expected Results
The researchers will develop a model to project how future sales may vary under different scenarios. Scenarios may differ based on assumptions about changes in public policies, vehicle characteristics and offerings, prices, socio-economics, and/or land use patterns. Additionally, this proposal will develop and demonstrate a data analysis method that if proven useful can be fairly easily repeated in the future on an expanded data set as new ZEV types are introduced into the market.

Significance to the Board
The results of this study will be used to describe the current ZEV market and to refine future estimates of ZEV market potential in California.

Contractor:
University of California, Los Angeles

Contract Period:
24 months

Principal Investigators:
J.R. DeShazo, Ph.D.
Brett Williams, Ph.D.

Contract Amount:
$302,992

Basis for Indirect Cost Rate:
The State and the University of California, Los Angeles has agreed to a 10 percent indirect cost rate.

Past Experience with the Principal Investigators:
ARB has no direct experience with either in a Principal Investigator capacity. However, Dr. Brett Williams was a member of the research team for ARB research contract 08-312, "Potential Design, Implementation, and Benefits of a Feebate Program for New Passenger Vehicles in California" and has worked for twenty years with automakers and government agencies to support commercialization of alternative fuel vehicles.
Dr. J.R. DeShazo has a strong background in econometrics related to consumer research that will be critical for this research project. Both investigators currently serve as the prime research contractors for the United States Department of Energy and California Energy Commission's Plug-in Electric Vehicle Readiness Plan for the Southern California Association of Governments region and the Southern California Plug-in Electric Vehicle Readiness Atlas.

Prior Research Division Funding to the University of California, Los Angeles:

Year	2012	2011	2010
Funding	$400,000	$630,264	$290,000

BUDGET SUMMARY

University of California, Los Angeles

"Examining Factors that Influence ZEV Sales in California"

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	183,664	
2.	Subcontractors	$	71,233	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	5,181	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	20,700	
9.	Analyses	$	0	
10.	Miscellaneous	$	1,145	
	Total Direct Costs			$281,923
INDIRECT COSTS				
1.	Overhead	$	21,069	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$ 21,069
TOTAL PROJECT COSTS				**$302,992**

Attachment 1

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: University of California, San Diego

Description of subcontractor's responsibility: The subcontractor will be the primary econometrician, collecting and preparing data as well as developing and running the econometric models.

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	39,639	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	0	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	0	
9.	Analyses	$	0	
10.	Miscellaneous	$	27,630[1]	
	Total Direct Costs			$67,269
INDIRECT COSTS				
1.	Overhead	$	3,964	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$ 3,964
TOTAL PROJECT COSTS				**$71,233**

[1] Miscellaneous costs are dedicated exclusively to graduate student in-state fees which are required by university policies when hiring graduate student personnel.

PROPOSED

State of California
AIR RESOURCES BOARD

The Future of Drop-In Fuels: Life-Cycle Cost and Environmental Impacts of Bio-Based Hydrocarbon Fuel Pathways

RESEARCH PROPOSAL

Resolution 13-19

June 27, 2013

Agenda Item No.: 13-6-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2759-276, entitled "The Future of Drop-In Fuels: Life-Cycle Cost and Environmental Impacts of Bio-Based Hydrocarbon Fuel Pathways," has been submitted by the University of California, Berkeley; and

WHEREAS, in accordance with Health and Safety Code section 39705, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2759-276 entitled "The Future of Drop-In Fuels: Life-Cycle Cost and Environmental Impacts of Bio-Based Hydrocarbon Fuel Pathways," submitted by the University of California, Berkeley, for a total amount not to exceed $400,000.

WHEREAS, the Research Division staff has reviewed Proposal Number 2759-276 and finds that in accordance with Health and Safety Code section 39701, this research project will provide essential information on the most cost effective and environmentally friendly pathways for commercially producing renewable drop-in fuels in California.

NOW, THEREFORE BE IT RESOLVED that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendations of the Research Screening Committee and Research Division approves the following:

> Proposal Number 2759-276 entitled "The Future of Drop-In Fuels: Life-Cycle Cost and Environmental Impacts of Bio-Based Hydrocarbon Fuel Pathways," submitted by the University of California, Berkeley not to exceed $400,000.

BE IT FURTHER RESOLVED that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $400,000.

ATTACHMENT A

"The Future of Drop-In Fuels: Life-Cycle Cost and Environmental Impacts of Bio-Based Hydrocarbon Fuel Pathways"

Background

In order to achieve California's climate and air quality goals, emissions from transportation will need to decline significantly in the coming decades. ARB's Low Carbon Fuel Standard (LCFS) calls for a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020. The LCFS incentivizes the production and sale of low carbon-intensity transportation fuels by establishing a set of performance standards in the form of declining carbon-intensity levels that fuel producers and importers must meet each year for their fuel pools beginning in 2011.

Studies have indicated that biofuels will be needed to achieve long-term energy and climate goals in the transportation sector, especially for aviation, shipping, heavy-duty and off-road vehicles that cannot be easily electrified. Certain industry studies contended that the fuels necessary to comply with the LCFS standards in the 2015 timeframe will not be available when they are needed, but these studies are both pessimistic with respect to availability, and also focus on the assertion that the LCFS will have large cost impacts on consumers. Although drop-in fuels are essential to meeting California's climate change goals, the technology and infrastructure needed to commercially produce these fuels through economically viable pathways still requires significant research.

Objective

This project will investigate the technology, feasibility, costs, barriers, and environmental impacts associated with producing drop-in fuels on a commercial scale for use in California.

Methods

The researchers will gather existing information and analyze the technology and feasibility, and the life-cycle costs and environmental impacts, at both demonstration and commercial scales. This information will be gathered from a thorough literature reviews and direct contact with laboratory researchers and technoeconomic modelers at the EBI, JBEI, and the National Renewable Energy Laboratory (NREL). Using Excel-based process summary sheets and the CA-GREET model, the life-cycle analysis will focus on all life-cycle phases of fuels (biomass production, feedstock transportation, biorefining, fuel storage and distribution, fuel combustion), relevant environmental inventory metrics (GHG, criteria air, and toxic emissions, water withdrawal and consumption) and environmental impact categories (global warming potential, human and ecological health damage potential, resource depletion, water quality and quantity). The researchers will perform a geospatial analysis, using ArcGIS, to estimate where facilities could potentially be located in order to maximize production while minimizing environmental impacts. Research needs and barriers to the success of these technologies will be identified, as well as strategies to overcome these barriers. Strategies to monitor and track progress of these technologies as well as supplies and costs will also be developed.

Expected Results
This research project will provide essential information on the most cost effective and environmentally friendly pathways for commercially producing renewable drop-in fuels in California.

Significance to the Board
The project results will provide data that will influence LCFS policy in California or other jurisdictions worldwide that are developing their own LCFS-like programs. If this research leads to the development of lower carbon fuels, it will be to the benefit of regulated parties under the LCFS and to California consumers. In the longer term, the data will inform many other initiatives of ARB that might support the need for drop-in fuels.

Contractor: University of California, Berkeley

Contract Period:
36 months

Principal Investigator:
Arpad Horvath, Ph.D.

Contract Amount:
$400,000

Basis for Indirect Cost Rate:
The State and the University of California, Berkeley have agreed to a 10 percent indirect cost rate.

Past Experience with the Principal Investigator:
ARB staff has had several positive experiences working with Dr. Arpad Horvath on previous ARB-funded research projects. The research team from the University of California, Berkeley (UC Berkeley) has a wealth of experience with life cycle analysis (LCA), biofuels, infrastructure, and the other scientific areas relevant to this project. Professors Horvath and McKone have approximately 50 collective years of relevant experience. They have published over 220 articles and reports in the areas of air and water quality, human and ecological impact assessment, product and service LCA, transportation and industrial energy analysis, and product life-cycle optimization.

Prior Research Division Funding to the University of California, Berkeley:

Year	2012	2011	2010
Funding	$1,320,000	$754,264	$801,587

BUDGET SUMMARY

University of California, Berkeley

"The Future of Drop-In Fuels: Life-Cycle Cost and Environmental Impacts of Bio-Based Hydrocarbon Fuel Pathways"

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	148,611	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	0	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	0	
9.	Analyses	$	0	
10.	Miscellaneous	$	217,613[1]	
	Total Direct Costs			$366,224
INDIRECT COSTS				
1.	Overhead	$	33,776	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs	$	33,776	
TOTAL PROJECT COSTS				**$400,000**

[1] This cost is not employment on the UC Berkeley campus, because the person is employed by LBNL, but is not a subcontract either because LBNL is run by UC Berkeley.

PROPOSED

State of California
AIR RESOURCES BOARD

The Feasibility of Renewable Natural Gas as a Large-Scale, Low-Carbon Substitute

RESEARCH PROPOSAL

Resolution 13-20

June 27, 2013

Agenda Item No.: 13-6-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2760-276, entitled "The Feasibility of Renewable Natural Gas as a Large-Scale, Low-Carbon Substitute," has been submitted by the University of California, Davis; and

WHEREAS, in accordance with Health and Safety Code section 39705, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2760-276 entitled "The Feasibility of Renewable Natural Gas as a Large-Scale, Low-Carbon Substitute," submitted by the University of California, Davis, for a total amount not to exceed $330,934.

WHEREAS, the Research Division staff has reviewed Proposal Number 2760-276 and finds that in accordance with Health and Safety Code section 39701, this research project will provide essential information on the most cost effective and environmentally friendly pathways for commercially producing renewable natural gas in California.

NOW, THEREFORE BE IT RESOLVED that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendations of the Research Screening Committee and Research Division staff and approves the following:

> Proposal Number 2760-276 entitled "The Feasibility of Renewable Natural Gas as a Large-Scale, Low-Carbon Substitute," submitted by the University of California, Davis not to exceed $330,934.

BE IT FURTHER RESOLVED that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $330,934.

ATTACHMENT A

"The Feasibility of Renewable Natural Gas as a Large-Scale, Low-Carbon Substitute"

Background

In order to achieve California's climate and air quality goals, emissions from transportation will need to decline significantly in the coming decades. ARB's Low Carbon Fuel Standard (LCFS) calls for a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020. The LCFS incentivizes the production and sale of low carbon-intensity transportation fuels by establishing a set of performance standards in the form of declining carbon-intensity levels that fuel producers and importers must meet each year for their fuel pools beginning in 2011.

Certain industry studies have contended that the fuels necessary to comply with the LCFS standards in the 2015 timeframe will not be available when they are needed, but these studies are both pessimistic with respect to availability, and also focus on the assertion that the LCFS will have large cost impacts on consumers. There are already examples of low carbon intensity fuels coming into the market, for example, the landfill gas-to-liquefied natural gas (LNG) facility at the Altamont landfill produces enough LNG to power a portion of Waste Management's fleet. Maximizing the market penetration of renewable natural gas requires research to identify the technical, commercial, financial, marketplace, and regulatory barriers that are specific to renewable natural gas production.

Objective

This project will determine the technological and commercial feasibility of producing large quantities of renewable natural gas fuels for use in California.

Methods

The research team will complete a literature review of information related to renewable natural gas production and distribution for transportation fuel use in California and the United States. This literature review will cover the variety of technologies that are needed to convert the diverse biomass resource base into renewable natural gas. Particular attention will be paid to the United States Environmental Protection Agency's Waste to Energy program in order to evaluate potential sources from out of state. The team will also review existing and recent literature concerning leakage and greenhouse gas life-cycle emissions for the renewable natural gas pathways and its application to CA-GREET and the LCFS, and studies on feasibility and costs. The researchers will conduct a series of greenhouse gas emissions and criteria pollutants life-cycle analyses of some of the most relevant renewable natural gas pathways in California using the CA-GREET model. The researchers will then develop a geo-referenced dataset of current and potential sources for renewable natural gas production and facility locations in both California and the United States. This will be combined with techno-economic models of the conversion technologies in a profit maximizing optimization model. Cost evaluation will include, amongst others: a) the competition between biofuel and bio-power industries for

biomass feedstock, b) the cost of upgrading biogas/digester gas/landfill gas to pipeline quality gas, and, c) the cost of injecting upgraded biomass into the existing natural gas pipeline and truck network. The analysis will consider optimizing facility locations in order to maximize production of renewable natural gas while minimizing potential environmental impacts, and will provide a preliminary estimate of the life-cycle greenhouse gas emissions as well as localized emissions of criteria and toxic air pollutants, and other potential environmental and public health impacts that are of significant concern. Feedstock choices will include manure, food waste, landfill gas, wastewater treatment sludge, forest and agricultural residues, and organic municipal solid waste. Technologies under consideration will include anaerobic digestion and thermal conversion. Researchers will also compile and categorize barriers to the successful expansion of renewable natural gas production into thematic areas that will be useful for making recommendations to policymakers and industry decision-makers. The team will also conduct interviews with stakeholders that are currently engaged, or anticipate being engaged, in the production and distribution of renewable natural gas to better understand the obstacles to successful development. These interviews will allow for comparisons of different types of renewable natural gas resources, obstacles to development and distribution across California, and future research needs.

Expected Results
This research project will provide essential information on the most cost effective and environmentally friendly pathways for commercially producing renewable natural gas in California.

Significance to the Board
Results will provide essential data that will inform future refinements to the State's LCFS program and other climate change initiatives.

Contractor:
University of California, Davis

Contract Period:
24 months

Principal Investigator:
Amy Jaffe

Contract Amount:
$330,934

Basis for Indirect Cost Rate:
The State and the University of California, Davis have agreed to a 10 percent indirect cost rate.

Past Experience with the Principal Investigator:
ARB staff has worked with a number of staff at the University of California, Davis' Institute for Transportation Studies (ITS) in the past, but have no experience working

directly with the principle investigator, Amy Jaffe. However, Mrs. Jaffe is a widely published, leading expert on global energy policy and energy and sustainability. The ITS team also includes experts on life cycle analysis, carbon accounting, alternative fuel modeling and geospatial analysis. A portion of the work for this project will build on previous work that members of the ITS team have completed for the California Biomass Collaborative.

Prior Research Division Funding to the University of California, Davis

Year	2012	2011	2010
Funding	$4,949,363	$1,394,560	$508,267

BUDGET SUMMARY

University of California, Davis

"The Feasibility of Renewable Natural Gas as a Large-Scale, Low-Carbon Substitute"

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 275,428	
2.	Subcontractors	$ 0	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 0	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 0	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 27,834[1]	
	Total Direct Costs		$303,262
INDIRECT COSTS			
1.	Overhead	$ 27,672	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$ 27,672
TOTAL PROJECT COSTS			**$330,934**

[1] This cost includes general liability insurance for salaries and resident student fees for two graduate student researchers, which are required by university policies when hiring graduate student personnel.

PROPOSED

State of California
AIR RESOURCES BOARD

Collection of Activity Data from On-Road Heavy-Duty Diesel Vehicles

RESEARCH PROPOSAL

Resolution 13-21

June 27, 2013

Agenda Item No.: 13-6-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2761-276, entitled "Collection of Activity Data from On-Road Heavy-Duty Diesel Vehicles," has been submitted by the University of California, Riverside; and

WHEREAS, in accordance with Health and Safety Code section 39705, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2761-276 entitled "Collection of Activity Data from On-Road Heavy-Duty Diesel Vehicles," submitted by the University of California, Riverside, for a total amount not to exceed $371,724.

WHEREAS, the Research Division staff has reviewed Proposal Number 2761-276 and finds that in accordance with Health and Safety Code section 39701, this project will provide critical information to accurately quantify the NO_X emissions and SCR functionality from heavy-duty diesel trucks operating in California. The information will help ARB to update NO_X emissions inventories and to develop emissions reduction strategies for statewide air quality plans.

NOW, THEREFORE BE IT RESOLVED that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of the Research Screening Committee and Research Division staff and approves the following:

> Proposal Number 2761-276 entitled "Collection of Activity Data from On-Road Heavy-Duty Diesel Vehicles," submitted by the University of California, Riverside not to exceed $371,724.

BE IT FURTHER RESOLVED that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $371,724.

ATTACHMENT A

"Collection of Activity Data from On-Road Heavy-Duty Diesel Vehicles"

Background

Considerable reduction of nitrogen oxides (NO_X) emissions is needed for the State of California to meet ambient air quality standards for ozone and particulate matter. To achieve some of the reductions, the Board adopted a NO_X emission standard for model year 2010 and later heavy-duty on-road engines of 0.20 grams per brake horsepower-hour (g/bhp-hr). This represents a 90 percent reduction compared to the pre-2010 standard. To meet the new standard, diesel engine manufacturers are, in most cases, using selective catalytic reduction (SCR) in advanced engine exhaust aftertreatment systems. SCR reduces NO_X in the exhaust stream, but requires adequate temperatures for the reduction to take place. Typically, the SCR needs to be at least 200 degrees Celsius (°C) before significant NO_X reduction is achieved. However, there will be times when this temperature is not met, such as during cold engine startup, and during low loads experienced when the engine is idling or when the vehicle is moving slowly on flat terrain. The frequency of low temperature and low duty operations varies depending on the type of truck and on its vocational use. It is critical to characterize heavy-duty diesel truck activity profiles including duty cycles, number of engine starts, and engine soak time durations, by vocation type. The heavy-duty diesel truck activity profiles are fundamental for updating emission inventories and quantifying real-world NO_X emissions from trucks meeting the 2010 NO_X certification standard.

Objective

The objectives of this research are to improve understanding of the real world effectiveness of SCR for reducing emissions from heavy-duty trucks, and to evaluate whether certification test cycles are representative of how heavy-duty trucks are actually used.

Methods

The contractor will conduct a screening analysis to determine truck categories and truck vocation types that contribute the most to the state's NO_X emission inventories. Then 100 trucks will be recruited focusing on the truck categories and trucks vocations identified in the screening analysis. The recruited trucks will be instrumented with GPS or ECU+GPS data loggers, and their instantaneous activity data will be collected. The data collection will be continuous for at least one month and up to six months. For each truck category and vocation type, the investigators will analyze the ECU and GPS data to determine the number of starts per day, soak time distribution per day, and other trip statistics (e.g., average distance, average duration, average speed, etc.). Using the second-by-second vehicle speed from the GPS data, the investigators will develop a representative chassis-dynamometer duty cycle for each truck category and vocation type and compare it to the certification cycle.

Expected Results
The heavy-duty diesel truck activity profiles collected from this project will be used for updating emission inventories, quantifying real-world NO_X emissions from trucks meeting the 2010 NO_X certification standard, and comparing duty cycles by vocation type to the certification duty cycles. The deliverables of this project include a final report detailing the screening analysis and sampling design, recruiting efforts, data collection methods, and data analyses. It will present the results from each task including the comparison between the developed duty cycles and the certification duty cycles in terms of speed, travel duration, acceleration, deceleration, and others.

Significance to the Board
This project will provide critical information to accurately quantify the NO_X emissions and SCR functionality from heavy-duty diesel trucks operating in California. The information will help ARB to update NO_X emissions inventories and to develop emissions reduction strategies for statewide air quality plans.

Contractor:
University of California, Riverside

Contract Period:
24 months

Principal Investigators:
Kanok Boriboonsomsin, Ph.D.
Kent Johnson, Ph.D.

Contract Amount:
$371,724

Basis for Indirect Cost Rate:
The State and the University of California, Riverside have agreed to a 10 percent indirect cost rate.

Past Experience with the Principal Investigators:
The team of investigators is very strong, having a great deal of experience in the collection and analysis of truck activity data. ARB has collaborated very successfully with this team at University of California, Riverside on a number of related projects. Prior work with ARB has included research on heavy-duty truck cold-starts and a number of projects to measure emissions for various fuels.

Prior Research Division Funding to the University of California, Riverside

Year	2012	2011	2010
Funding	$ 0	$ 390,004	$ 0

BUDGET SUMMARY

University of California, Riverside

"Collection of Activity Data from On-Road Heavy-Duty Diesel Vehicles"

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 148,425	
2.	Subcontractors	$ 0	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 9,000	
5.	Electronic Data Processing	$ 70,000[1]	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 900	
8.	Supplies	$ 0	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 116,066[2]	
	Total Direct Costs		$344,391
INDIRECT COSTS			
1.	Overhead	$ 27,333	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$ 27,333
TOTAL PROJECT COSTS			**$371,724**

[1] Data Processing Services provided by the University of California, Riverside are required to meet the research requirements for this project. These costs are estimated based on previous experience in similar projects and cover maintenance and management for the duration of this contract.

[2] Miscellaneous costs include $45,000 for consultants to assist with truck recruitment, and $71,066 for Facilities Fees to recover costs of off-campus facilities at 26% of modified total direct costs.

PROPOSED

State of California
AIR RESOURCES BOARD

Air Quality Impacts of Low Vapor Pressure-Volatile Organic Compounds

RESEARCH PROPOSAL

Resolution 13-22

June 27, 2013

Agenda Item No.: 13-6-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2757-276, entitled "Air Quality Impacts of Low Vapor Pressure-Volatile Organic Compounds," has been submitted by University of California, Riverside; and

WHEREAS, in accordance with Health and Safety Code section 39705, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2757-276 entitled "Air Quality Impacts of Low Vapor Pressure-Volatile Organic Compounds," submitted by the University of California, Riverside, for a total amount not to exceed $405,338.

WHEREAS, the Research division staff has reviewed Proposal Number 2757-276 and finds that in accordance with Health and Safety Code section 39701, the results will improve estimates of the emission rates of low vapor pressure volatile organic compounds (LVP-VOCs) and their impacts on air quality, which can be used to improve air quality models and will inform ARB's assessment of the air quality impacts of the exemption for LVP- VOCs in the Consumer Products regulations.

NOW, THEREFORE BE IT RESOLVED that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of the Research Screening Committee and Research Division staff and approves the following:

> Proposal Number 2757-276 entitled "Air Quality Impacts of Low Vapor Pressure-Volatile Organic Compounds," submitted by the University of California, Riverside not to exceed $405,338.

BE IT FURTHER RESOLVED that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $405,338.

ATTACHMENT A

"Air Quality Impacts of Low Vapor Pressure-Volatile Organic Compounds"

Background
Low vapor pressure volatile organic compounds (LVP-VOCs) are ingredients used in some consumer product formulations, and are exempt by ARB from compliance with VOC limits for consumer products based on their low vapor pressure/high boiling point. The LVP-VOC exemption was initially developed to exclude compounds that do not readily participate in ozone formation and typically represented a small fraction of the overall composition of a formulated product. Some recent laboratory testing indicates that certain LVP-VOCs may contribute to the formation of ozone, but the rates of volatilization of LVP-VOCs in different formulations of consumer products are not well characterized. Research efforts, including emission tests and chamber studies, are needed to further understand the role of LVP-VOCs on ozone and secondary organic aerosol (SOA) formation and to improve air quality modeling for State Implementation Plans (SIPs).

Objective
The objective of this project is to investigate the emissions of low vapor pressure-volatile organic compounds from consumer products and their impacts on air quality. It is designed to evaluate the evaporation flux, and therefore atmospheric availability, of specific LVP-VOCs both as pure compounds and in consumer products sold in California. The project will also evaluate the ozone and secondary particle formation of these compounds once they enter the atmosphere using a state-of-the-science environmental chamber.

Methods
The research team will conduct laboratory and environmental chamber experiments to develop key parameters for the evaluation of the ozone and SOA formation potential of consumer products containing LVP-VOCs. The ambient evaporation rates of LVP-VOCs both as pure compounds and in consumer products sold in California will be experimentally determined using three separate analytical approaches. A state-of-the-science environmental chamber will be used to investigate ozone and SOA formation from LVP-VOCs, including: (1) new method development for injection of LVP-VOCs and consumer products into the environmental chamber while minimizing thermal degradation of the compounds studied; (2) development of a chamber model to account for partitioning of LVP-VOCs to surfaces within the chamber (walls or particles); and (3) development of chemical mechanisms necessary to more accurately estimate ozone and particulate matter (PM) formation from the LVP-VOCs.

Expected Results
The volatility of the LVP-VOC species will be used to evaluate the availability of LVP-VOCs for ozone and PM formation. Environmental chamber studies of ozone and secondary organic aerosol impacts of LVP-VOCs will assess the atmospheric impacts

of LVP-VOCs and provide the baseline data necessary to improve ozone and PM2.5 modeling.

Significance to the Board
The results will improve estimates of the emission rates of LVP-VOCs and their impacts on air quality, which can be used to improve air quality models and will inform ARB's assessment of the air quality impacts of the exemption for LVP- VOCs in the Consumer Products regulations.

Contractor:
University of California, Riverside

Contract Period:
36 months

Principal Investigator:
David R. Cocker III, Ph.D.

Contract Amount:
$405,338

Basis for Indirect Cost Rate:
The State and the University of California, Riverside have agreed to a 10 percent indirect cost rate.

Past Experience with the Principal Investigator:
ARB staff has worked with Dr. David Cocker on several projects including measurement of the emissions of VOCs, environmental chamber studies, and development of chemical mechanism for ozone and particulate matter modeling.

Prior Research Division Funding to the University of California, Riverside

Year	2012	2011	2010
Funding	$ 0	$390,004	$ 0

BUDGET SUMMARY

University of California, Riverside

"Air Quality Impacts of Low Vapor Pressure-Volatile Organic Compounds"

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 208,570	
2.	Subcontractors	$ 0	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 750	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 48,690[1]	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 121,527[2]	
	Total Direct Costs		$ 379,537
INDIRECT COSTS			
1.	Overhead	$ 25,801	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$ 25,801
TOTAL PROJECT COSTS			**$ 405,338**

[1] This project will utilize the environmental chamber facility and advanced gas-phase and particle-phase instrumentation for measurements of LVP-VOC evaporation rates and ozone/SOA forming potential. The "supplies" budget item includes supplies necessary for the operation of the chamber facility and the repair/maintenance of the instruments. Reporting costs and publication costs for peer-reviewed journal submissions are also included.

[2] The "miscellaneous" budget item includes a facility rental charge because the majority of the research will be performed at The Center for Environmental Research and Technology (CERT), which is an off-campus facility. The university policy also requires inclusion of partial fees and tuition remission and Graduate Student Health Insurance (GSHIP) for Graduate Student Researchers employed during each academic year with an appointment of 25 percent time or more.

PROPOSED

State of California
AIR RESOURCES BOARD

Environmental Fate of Low Vapor Pressure – Volatile Organic Compounds from Consumer Products: A Modeling Approach

RESEARCH PROPOSAL

Resolution 13-23

June 27, 2013

Agenda Item No.: 13-6-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2762-276, entitled "Environmental Fate of Low Vapor Pressure – Volatile Organic Compounds from Consumer Products: A Modeling Approach," has been submitted by the University of California, Davis; and

WHEREAS, in accordance with Health and Safety Code section 39705, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2762-276 entitled "Environmental Fate of Low Vapor Pressure – Volatile Organic Compounds from Consumer Products: A Modeling Approach," submitted by the University of California, Davis, for a total amount not to exceed $200,000.

WHEREAS, the Research Division staff has reviewed Proposal Number 2762-276 and finds that in accordance with Health and Safety Code section 39701, this research project will advance ARB's understanding of the impact of emissions from consumer products on California's air quality. These results will improve air quality models and will inform ARB's assessment of the air quality impacts of the exemption for low vapor pressure volatile organic compounds in the Consumer Products regulations.

NOW, THEREFORE BE IT RESOLVED that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendations of the Research Screening Committee and Research Division staff and approves the following:

> Proposal Number 2762-276 entitled "Environmental Fate of Low Vapor Pressure – Volatile Organic Compounds from Consumer Products: A Modeling Approach," submitted by the University of California, Davis not to exceed $200,000.

BE IT FURTHER RESOLVED that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $200,000.

ATTACHMENT A

"Environmental Fate of Low Vapor Pressure – Volatile Organic Compounds from Consumer Products: A Modeling Approach"

Background

Low vapor pressure volatile organic compounds (LVP-VOCs) are currently exempt from compliance with VOC limits for consumer products regulations based on their low vapor pressure/high boiling point. However, recent research indicates that certain LVP-VOCs may contribute to ozone and particulate matter (PM) formation. However, there is limited information about how the use of consumer products containing LVP-VOCs results in releases and transport, and the ultimate environmental fate of LVP-VOCs. In addition, for LVP-VOCs that are disposed down the drain and enter wastewater treatment facilities, the fate and transport of the compounds in ambient environments needs to be modeled to estimate the impact on air quality. Better understanding of the emission and multi-media pathways of these LVP-VOCs and their atmospheric availability is needed to assess their impacts on ozone and secondary organic aerosol (SOA) formation. This project is designed to develop multimedia environmental modeling tools to estimate the fraction of emitted LVP-VOCs in the gas phase that is available for ozone formation reactions

Objective

The overall objective of this project is to develop multimedia environmental modeling tools to determine: a) what portion of LVP-VOCs disposed of down the drain will be emitted to air, and b) what portion of LVP-VOCs emitted either through consumer product use or from a wastewater treatment facility will be available in the gas phase to form ozone.

Methods

The project includes development of multimedia environmental fate models to determine the fraction of emitted LVP-VOCs from consumer product use and disposal that is available for potential formation of ozone. First, a wastewater emission model will be developed to predict emission rates of LVP-VOCs that may occur at wastewater treatment facilities or in the discharge zone of the facilities. Then, an appropriate multimedia model will be developed to evaluate what portion of the compounds emitted from consumer product use (as determined from chamber experiments) will participate in ozone formation. The multimedia environmental model will be integrated with the wastewater emission model and other necessary model components into a multimedia mass-balance model to predict the fate and transport of emitted LVP-VOCs among various compartments. The model will be applied to LVP-VOCs to predict the fraction of LVP-VOCs that leads to formation of ozone. Based on the modeling results, a simple estimation tool of the fraction of LVP-VOCs available to form ozone in the air will be developed.

Expected Results
It is anticipated that this project will provide ARB with both a full model and a simple estimation tool to determine the impact of the emissions of LVP-VOCs on total ozone formation.

Significance to the Board
This research project will advance ARB's understanding of the impact of emissions from consumer products on California's air quality. These results will improve air quality models and will inform ARB's assessment of the air quality impacts of the exemption for LVP- VOCs in the Consumer Products regulations.

Contractor:
University of California, Davis

Contract Period:
24 months

Principal Investigator:
Deborah H. Bennett, Ph.D.

Contract Amount:
$200,000

Basis for Indirect Cost Rate:
The State and the University of California, Davis have agreed to a 10 percent indirect cost rate.

Past Experience with the Principal Investigator:
The Principal Investigator has contracted with ARB previously to validate down-the-drain emission factors for several consumer products and has successfully managed several large research projects for ARB.

Prior Research Division Funding to the University of California, Davis:

Year	2012	2011	2010
Funding	$4,949,363	$1,394,560	$508,267

BUDGET SUMMARY

University of California, Davis

"Environmental Fate of Low Vapor Pressure – Volatile Organic Compounds from Consumer Products: A Modeling Approach"

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 158,730	
2.	Subcontractors	$ 21,954	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 240	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 895	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 0	
	Total Direct Costs		$181,819
INDIRECT COSTS			
1.	Overhead	$ 18,181	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$ 18,181
TOTAL PROJECT COSTS			**$200,000**

Attachment 1

SUBCONTRACTOR'S BUDGET SUMMARY

Subcontractor: University of California, Berkeley (UC Berkley)

Description of subcontractor's responsibility: UC Berkeley will provide guidance and model development support.

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 19,958	
2.	Subcontractors	$ 0	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 0	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 0	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 0	
	Total Direct Costs		$ 19,958
INDIRECT COSTS			
1.	Overhead	$ 1,996	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$ 1,996
TOTAL PROJECT COSTS			**$ 21,954**

PROPOSED

State of California
AIR RESOURCES BOARD

Cardiovascular Effects of Multi-Pollutant Exposure: Mechanisms and Interactions

RESEARCH PROPOSAL

Resolution 13-24

June 27, 2013

Agenda Item No.: 13-6-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2764-276, entitled "Cardiovascular Effects of Multi-Pollutant Exposure: Mechanisms and Interactions" has been submitted by the University of California, Irvine; and

WHEREAS, in accordance with Health and Safety Code section 39705, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2764-276 entitled "Cardiovascular Effects of Multi-Pollutant Exposure: Mechanisms and Interactions" submitted by the University of California, Irvine, for a total amount not to exceed $740,429.

WHEREAS, THE Research Division staff has reviewed Proposal Number 2764-276 and finds that in accordance with Health and Safety Code section 39701, the results of the study will provide insight into: (1) the relative importance of primary versus secondary PM, (2) the role of semi-volatile components in the PM2.5 fraction, and (3) the extent of interaction or synergy between PM2.5 and ozone for development and progression of atherosclerosis.

NOW, THEREFORE BE IT RESOLVED that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of the Research Screening Committee and Research Division staff and approves the following:

> Proposal Number 2764-276 entitled "Cardiovascular Effects of Multi-Pollutant Exposure: Mechanisms and Interactions" submitted by the University of California, Irvine not to exceed $740,429.

BE IT FURTHER RESOLVED that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the

research effort proposed herein, and as described in Attachment A, in an amount not to exceed $740,429.

ATTACHMENT A

"Cardiovascular Effects of Multi-Pollutant Exposure: Mechanisms and Interactions"

Background

Previous research by this investigator and others has demonstrated that when mice from a strain having genetic impairment of lipid metabolism and increased susceptibility to development of atherosclerotic plaques are exposed daily for two months to concentrated ambient particles (CAPs, fine and ultrafine) plaque development is accelerated. Also, there is a more rapid progression of atherosclerosis than in the same strain of mice exposed to clean air. The investigator's recently completed ARB-funded study extended previous findings by examining the role of particle associated semi-volatile compounds in atherosclerotic progression. The results suggested that much of the atherosclerotic potential of ultrafine particles (UFP) lies in the semi-volatile constituents, in that removal of the semi-volatiles from the aerosol blocked acceleration of atherosclerotic plaque development. To date no studies have investigated the atherosclerotic potential of O_3 exposure, concurrent exposure to PM2.5 and O_3, or the role of PM2.5-associated semi-volatile compounds in conjunction with ozone exposure.

Objective

The objective of this study is to investigate the atherosclerotic potential of ambient PM2.5 from the Irvine, California area. Both intact particles and particles denuded of the semi-volatile constituents of PM2.5 will be used with and without concurrent exposure to ozone in a mouse model of atherosclerosis. The principal goals are to elucidate the role of the semi-volatile components of PM2.5 and ozone in the progression of atherosclerosis, and the extent to which concomitant ozone exposure interacts with disease progression.

Methods

Acute and chronic cardiopulmonary inflammation, vascular injury, and myocardial function will be examined using genetically susceptible mice implanted with electrocardiogram (ECG) telemetry devices. There will be six experiments, each with several exposure conditions. Experiment 1: filtered air, CAPs, CAPs + 0.2 ppm ozone, and 0.2 ppm ozone without CAPs during a period of high ambient photochemical activity (ozone 0.07-0.12 ppm). Experiment 2: filtered air, CAPs, CAPs + 0.2 ppm ozone, and 0.2 ppm ozone without CAPs during a period of low ambient photochemical activity (ozone 0.03 – 0.06 ppm). Experiment 3: filtered air, 0.2 ppm ozone, denuded CAPs, and 0.2 ppm ozone + denuded CAPs during a period of high ambient photochemical activity (ozone 0.07-0.12 ppm). Experiment 4: filtered air, 0.2 ppm ozone, denuded CAPs, and 0.2 ppm O_3 + denuded CAPs during a period of low ambient photochemical activity (ozone 0.03 – 0.06 ppm). Experiment 5: filtered air, 0.2 ppm ozone, volatile phase gases, and the volatile phase gases + ozone during a period of high ambient photochemical activity (ozone 0.07-0.12 ppm). Experiment 6: filtered air, 0.2 ppm ozone, volatile phase gases, and the volatile phase gases + ozone during a period of low ambient photochemical activity (ozone 0.03-0.06 ppm).

Groups of 16 animals will be exposed for five hours per day, 4 days per week for 8 weeks to each of the exposure conditions using an in-vivo rodent exposure system, in combination with a VACES particle concentrator that incorporates a thermal denuder.

Endpoints will include markers of inflammation, histological examinations for evidence of vascular and myocardial pathology, ventricular hypertrophy and biomarkers of lipid, protein and DNA oxidation, all using standard methods. The *in vivo* biological responses will be correlated with physical and chemical composition of the particles and the *in vitro* potential of these particles to produce free radicals and induce cytotoxicity.

Expected Results
The results of the study will provide insight into: (1) the relative importance of primary versus secondary PM, (2) the role of semi-volatile components in the PM2.5 fraction, and (3) the extent of interaction or synergy between PM2.5 and ozone for development and progression of atherosclerosis.

Significance to the Board
People are typically exposed to mixtures of air pollution, in contrast to the single pollutant approach used with National Ambient Air Quality Standard development. The United States Environmental Protection Agency (U.S. EPA) has recently adopted a multi-pollutant perspective, particularly with reference to NAAQS implementation and development of emissions reduction regulations. The results of this project will contribute to ARB's and U.S. EPA's efforts to strengthen the biological support for epidemiological associations between PM2.5 exposure and adverse health effects. The results will also address concerns about potential confounding of ozone effects by concomitant PM2.5 exposure that add uncertainty to interpretation of ozone epidemiological studies. This, in turn, will contribute to ensuring that future revisions to the PM and ozone NAAQS are adequately health protective.

Contractor:
University of California, Irvine

Contract Period:
48 months

Principal Investigator:
Michael T. Kleinman, Ph.D.

Contract Amount:
$740,429

Basis for Indirect Cost Rate: The State and the University of California, Irvine have agreed to a 10 percent indirect cost rate.

Past Experience with the Principal Investigator:
This investigator has successfully completed many ARB-funded projects over the past 15 years.

Prior Research Division Funding to the University of California, Irvine:

Year	2012	2011	2010
Funding	$519,997	$285,000	$274,931

BUDGET SUMMARY

University of California, Irvine

"Cardiovascular Effects of Multi-Pollutant Exposure: Mechanisms and Interactions"

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 495,827	
2.	Subcontractors	$ 0	
3.	Equipment	$ 20,000	
4.	Travel and Subsistence	$ 2,794	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 1,000	
7.	Mail and Phone	$ 1,000	
8.	Supplies	$ 122,925[1]	
9.	Analyses	$ 20,000	
10.	Miscellaneous	$ 11,389	
	Total Direct Costs		$674,935
INDIRECT COSTS			
1.	Overhead	$ 0	
2.	General and Administrative Expenses	$ 65,494	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$ 65,494
TOTAL PROJECT COSTS			**$740,429**

[1] Supplies include the experimental model, and necessary supplies and materials to determine the effects of the exposures on the selected endpoints. The main items included in this category are mice, ECG telemetry implants, filters for air quality analysis, supplies for tissue and slide preparation, chemical reagents and antibodies, bioassay analysis kits, and general disposable laboratory plastic ware.

PROPOSED

State of California
AIR RESOURCES BOARD

Developing a New Methodology for Analyzing Potential Displacement

RESEARCH PROPOSAL

Resolution 13-25

June 27, 2013

Agenda Item No.: 13-6-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2765-276, entitled "Developing a New Methodology for Analyzing Potential Displacement," has been submitted by the University of California, Berkeley; and

WHEREAS, in accordance with Health and Safety Code section 39705, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2765-276 entitled "Developing a New Methodology for Analyzing Displacement," submitted by the University of California, Berkeley, for a total amount not to exceed $695,792.

WHEREAS, the Research Division staff has reviewed Proposal Number 2765-276 and finds that in accordance with Health and Safety Code section 39701, this project will result in a series of planning tools that will be developed in partnership with Metropolitan Planning Organizations (MPOs) that can help MPOs, local jurisdictions, community-based organizations, and other stakeholders better understand the social equity impacts of land use and transportation planning decisions, as well as potential options for minimizing adverse displacement impacts.

NOW, THEREFORE BE IT RESOLVED that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of the Research Screening Committee and Research Division staff an approves the following:

> Proposal Number 2765-276 entitled "Developing a New Methodology for Analyzing Displacement," submitted by the University of California, Berkeley not to exceed $695,792.

BE IT FURTHER RESOLVED that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $695,792.

ATTACHMENT A

"Developing a New Methodology for Analyzing Displacement"

Background

Many regions in California are pursuing more compact, transit-oriented development (TOD) in order to achieve regional greenhouse gas reductions from passenger vehicles set by ARB as required by Senate Bill (SB) 375. Transit-oriented development has raised concerns about potential social equity impacts, including the potential for displacement. The concern is that transit investment and development will lead to higher housing and rent prices, displacing low-income communities out of the area. While some Metropolitan Planning Organizations (MPOs) have attempted to assess the potential for this negative impact as part of the environmental justice evaluations of their Regional Transportation Plans/Sustainable Communities Strategy (RTP/SCS), current methods are limited and do not take into account investment type and magnitude and market dynamics. In addition, there has been no analysis to date on whether displacement of public transit users with higher income, car-owning households, has potential implications for travel behavior, which may impact reduction benefits assumed to be achieved through the pursuit of transit-rich development.

Objective

The objective of this study is to improve our understanding of the relationship between transit-oriented development, the potential for displacement in California, and the impact it may have on travel behavior. This study also aims to advance how displacement is assessed in transportation and land use planning processes by developing a set of tools that can be used by MPOs, local governments, and other stakeholders. Finally, this project will analyze the effectiveness of policies at minimizing displacement.

Methods

This analysis will specifically be conducted for the San Francisco Bay Area and Los Angeles County—both strong market regions with transit investment and the presence of TOD, which may create displacement pressures. The project will examine how transit investment and market factors have reshaped the socio-economic and physical profiles of the neighborhoods surrounding fixed-rail transit stations compared to neighborhoods without such transit investment. Using census data and detailed parcel data that cover a 30 year period (1980-2010), the research team will build typologies of neighborhood transit investment type and amount, as well as neighborhood displacement in order to build a model that analyzes mobility for areas around rail stations, controlling for income and housing price appreciation levels. The results of this analysis will be used to develop a set of tools to examine the likely outcomes around TODs. Specifically, this project will develop an off-model tool, as well as expand the capabilities of the PECAS and UrbanSim modeling tools used by the Southern California Association of Governments (SCAG) and the Metropolitan Transportation Commission (MTC) respectively. These tools will help MPOs and local governments incorporate social equity into planning processes, including the development of their SCSs.

This project will also begin to examine the potential net impact displacement may have on travel behavior using four different analytic approaches employed on pre-existing data sources.

Finally, this project will identify strategies with the potential to minimize displacement despite pressures from transit investment and TOD. A series of six case studies will be conducted to analyze the effectiveness of such policies in different contexts.

Expected Results
This project will result in a series of planning tools that will be developed in partnership with MPOs that can help MPOs, local jurisdictions, community-based organizations, and other stakeholders better understand the social equity impacts of land use and transportation planning decisions, as well as potential options for minimizing adverse displacement impacts.

Significance to the Board
MPOs are doing their part to achieve the goals of SB 375 by creating long range transportation and land use plans to reduce greenhouse gas emissions and meet the State assigned targets. ARB support in this area can help MPOs as they evaluate and pursue land use and transportation strategies that uphold social equity, ensuring all Californians benefit from the State's greenhouse gas reduction strategies. Working with MPOs, this project will directly inform the SCS planning process, allowing planners to assess the potential for transit-oriented development to displace low-income communities. This research will support the development of regional and local plans that are not only environmentally valuable, but are also beneficial to all California communities.

Contractor:
University of California, Berkeley

Contract Period:
26 Months

Principal Investigator:
Karen Chapple, Ph.D.

Contract Amount:
$695,792

Basis for Indirect Cost Rate:
The State and the University of California, Berkeley have agreed to a 10 percent indirect cost rate.

Past Experience with the Principal Investigator:
Dr. Karen Chapple is a member of the research team for the ARB research contract titled "Analyzing the Economic Benefits and Costs of Smart Growth Strategies."
Dr. Karen Chapple has pioneered research on gentrification and affordable housing in TOD, and recently advised MTC/ABAG on the affordable housing allocation for their

Sustainable Communities Strategy. She specializes in translating academic work into decision-making tools for policymakers, and as part of the Great Communities Collaborative has provided technical assistance to over 20 cities in the Bay Area on linking affordable housing and transit.

Prior Research Division Funding to the University of California, Berkeley:

Year	2012	2011	2010
Funding	$1,320,000	$754,264	$801,587

BUDGET SUMMARY

University of California, Berkeley

"Developing a New Methodology for Analyzing Potential Displacement"

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 216,943	
2.	Subcontractors	$ 254,949	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 4,800	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 2,500	
7.	Mail and Phone	$ 750	
8.	Supplies	$ 42,948	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 143,438[1]	
	Total Direct Costs		$666,328
INDIRECT COSTS			
1.	Overhead	$ 29,464	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$ 29,464
TOTAL PROJECT COSTS			**$695,792**

[1] Miscellaneous costs include Graduate Student Researcher Tuition Remission per UC Berkeley Policy. This project requires 4 semesters (2 years) of registration fees and tuition for 4 Graduate Student Researchers. Tuition and fees are based on 2013-2014 and 2014-2015 academic year rates of $8,437/semester and $9,281/semester, respectively.

Attachment 1

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: University of California, Los Angeles

Description of subcontractor's responsibility: UCLA Co-PIs will share responsibility with Professor Chapple on four of the contract tasks: the literature review, analysis of historical neighborhood change, analysis of the impact of displacement on auto ownership and use, and identification of strategies to minimize displacement.

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 176,445	
2.	Subcontractors	$ 0	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 4,000	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 750	
7.	Mail and Phone	$ 500	
8.	Supplies	$ 3,500	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 1,122	
	Total Direct Costs		$186,317
INDIRECT COSTS			
1.	Overhead	$ 18,632	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$18,632
TOTAL PROJECT COSTS			**$204,949**

Attachment 2

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: Southern California Association of Governments (SCAG)

Description of subcontractor's responsibility: SCAG will focus on integrating displacement indicators into its PECAS model, as well as developing the off-model assessment methodology with the researchers.

DIRECT COSTS AND BENEFITS				
11.	Labor and Employee Fringe Benefits	$	50,000	
12.	Subcontractors	$	0	
13.	Equipment	$	0	
14.	Travel and Subsistence	$	0	
15.	Electronic Data Processing	$	0	
16.	Reproduction/Publication	$	0	
17.	Mail and Phone	$	0	
18.	Supplies	$	0	
19.	Analyses	$	0	
20.	Miscellaneous	$	0	
	Total Direct Costs			$50,000
INDIRECT COSTS				
5.	Overhead	$	0	
6.	General and Administrative Expenses	$	0	
7.	Other Indirect Costs	$	0	
8.	Fee or Profit	$	0	
	Total Indirect Costs			$0
TOTAL PROJECT COSTS				**$50,000**

PROPOSED

State of California
AIR RESOURCES BOARD

Co-Exposure to Particulate Matter and Ozone: Pulmonary C-Fiber and Platelet in Activation Decreased Heart Rate Variability

RESEARCH PROPOSAL

Resolution 13-26

June 27, 2013

Agenda Item No.: 13-6-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2763-276, entitled "Co-Exposure to Particulate Matter and Ozone: Pulmonary C-Fiber and Platelet Activation in Decreased Heart Rate Variability," has been submitted by the University of California, Davis; and

WHEREAS, in accordance with Health and Safety Code section 39705, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2763-276 entitled Co-Exposure to Particulate Matter and Ozone: Pulmonary C-Fiber and Platelet Activation in Decreased Heart Rate Variability," submitted by the University of California, Davis for a total amount not to exceed $600,782.

WHEREAS, the Research Division staff has reviewed Proposal Number 2763-276 and finds that in accordance with Health and Safety Code section 39701, the results of this study will improve understanding of the mechanisms and potential interactions between ozone- and PM2.5-induced effects on the cardiovascular system and can inform setting health protective ambient air quality standards.

NOW, THEREFORE BE IT RESOLVED that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendations of the Research Screening Committee and Research Division staff and approves the following:

> Proposal Number 2763-276 entitled "Co-Exposure to Particulate Matter and Ozone: Pulmonary C-Fiber and Platelet Activation in Decreased Heart Rate Variability" submitted by the University of California, Davis not to exceed $600,782.

BE IT FURTHER RESOLVED that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $600,782.

ATTACHMENT A

"Co-Exposure to Particulate Matter and Ozone: Pulmonary C-Fiber and Platelet Activation in Decreased Heart Rate Variability"

Background

Epidemiologic studies have consistently shown, contrary to expectations, that particulate matter (PM)-related health effects on the cardiovascular system are larger and more clinically significant than those on the respiratory system. Although these studies are the basis for the fine particulate matter (PM2.5) National Ambient Air Quality Standards (NAAQS), there are substantial gaps and uncertainties in our understanding of the biological mechanisms through which inhaled PM2.5 influences heart function. In contrast to the PM2.5 NAAQS, the ozone NAAQS is primarily based on human exposure studies that have investigated the relationship between well-defined ozone exposures and changes in clinical endpoints, primarily of the respiratory system. Several mechanistic pathways are known through which ozone exposure causes respiratory health effects. Recent research suggests that ozone exposure may also have cardiovascular effects, which have not been appreciated to date; however, little is known about potential biological mechanisms for these cardiovascular effects. More importantly, from a public health perspective, very little is known about whether or not there are interactions or synergies between mechanisms with concomitant exposure to ozone and PM2.5.

Objective

The objective of this study is to examine a hypothesized mechanistic pathway for the cardiovascular effects of ozone and PM2.5, and to examine whether the effects of co-exposure to these pollutants are additive or synergistic in laboratory animals.

Methods

The proposed experiments will address the hypothesis that co-exposure to PM2.5 and ozone leads to synergistic activation of pulmonary C-fibers and platelets. This activation will lead to alteration of autonomic nervous system control of the heart, which will be manifested as decreased heart rate variability (HRV). Further, concomitant exposure to PM2.5 and ozone is expected to lead to greater adverse responses in all endpoints in spontaneously hypertensive (SH) rats, compared to normal rats.

Platelet-related endpoints will include platelet activation, formation of platelet-monocyte and platelet-leukocyte aggregates, microthrombi, and the release of platelet-derived bioactive lipids. The influence of pulmonary C-fiber activation will be assessed by examining breathing pattern and heart rate variability, release of thromboxane-2 and serotonin, as well as immunocytochemical analyses of heart and lung tissues. Pathological analyses of lung tissues will include airway epithelial changes, extent of inflammation, number of immune cells in the lung inflammatory exudate, density of visible particles, vascular wall changes in the pulmonary arterioles, and density of platelets in arteriolar lumens. Pulmonary arteriolar constriction will be evaluated through assessment of vascular wall thickness. Heart tissues will be evaluated for

myocyte and vascular lesions. All endpoints will be examined using well established, standard methods.

Expected Results
The resulting data will help to elucidate the specific roles of platelets, the vascular endothelium, pulmonary C-fibers, and pulmonary vascular vasoconstriction in altering cardiovascular function. The results of this study will advance our understanding of the biological mechanisms mediating the cardiovascular and pulmonary effects of multi-pollutant exposures, and how different mechanistic pathways converge to induce adverse health effects.

Significance to the Board
The results of this study will improve understanding of the mechanisms and potential interactions between ozone- and PM2.5-induced effects on the cardiovascular system and can inform setting health protective ambient air quality standards.

Contractor:
University of California, Davis

Contract Period:
36 months

Principal Investigator:
Fern Tablin, VMD, Ph.D.

Contract Amount:
$600,782

Basis for Indirect Cost Rate:
The State and the University of California, Davis have agreed to a 10 percent indirect cost rate.

Past Experience with the Principal Investigator:
The Principal Investigator (PI) has been PI or Co-PI on three previous ARB-funded projects. Each project was successfully completed within the time and budget allotted. The results have been useful to the State in assessing the health effects of particulate matter exposure, and they have been published in quality journals.

Prior Research Division Funding to University of California, Davis:

Year	2012	2011	2010
Funding	$4,949,363	$1,394,560	$508,267

BUDGET SUMMARY

University of California, Davis

"Co-Exposure to Particulate Matter and Ozone: Pulmonary C-Fiber and Platelet Activation in Decreased Heart Rate Variability"

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 414,531	
2.	Subcontractors	$ 0	
3.	Equipment	$ 22,304	
4.	Travel and Subsistence	$ 6,000	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 99,358[1]	
9.	Analyses	$ 6,000	
10.	Miscellaneous	$ 0	
	Total Direct Costs		$548,193
INDIRECT COSTS			
1.	Overhead	$ 52,589	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$ 52,589
TOTAL PROJECT COSTS			**$600,782**

[1] Supplies include the experimental model, and necessary supplies and materials to determine the effects of the exposures on the selected endpoints. The main items included in this category are rats, microscopy charges for histopathology, supplies for tissue and slide preparation, chemical reagents and antibodies, bioassay analysis kits, and general disposable laboratory plastic ware.

PROPOSED

State of California
AIR RESOURCES BOARD

Evaluating Technologies and Methods to Lower Nitrogen Oxide Emissions from Heavy-Duty Vehicles

RESEARCH PROPOSAL

Resolution 13-27

June 27, 2013

Agenda Item No.: 13-6-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2767-276, entitled "Evaluating Technologies and Methods to Lower Nitrogen Oxide Emissions from Heavy-Duty Vehicles," has been submitted by Southwest Research Institute; and

WHEREAS, in accordance with Health and Safety Code section 39705, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2767-276 entitled "Evaluating Technologies and Methods to Lower Nitrogen Oxide Emissions from Heavy-Duty Vehicles," submitted by the Southwest Research Institute, for a total amount not to exceed $1,599,744.

WHEREAS, the Research Division staff has reviewed Proposal Number 2767-276 and finds that in accordance with Health and Safety Code section 39701, this project will provide critical information on the feasibility of achieving NO_X emissions lower than the current engine standard for two heavy-duty engines: one natural gas engine with three way catalysts, and one diesel engine with selective catalytic reduction. The information will help ARB to develop future air quality plans.

NOW, THEREFORE BE IT RESOLVED that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of the Research Screening Committee and Research Division staff and approves the following:

> Proposal Number 2767-276 entitled "Evaluating Technologies and Methods to Lower Nitrogen Oxide Emissions from Heavy-Duty Vehicles," submitted by the Southwest Research Institute not to exceed $1,599,744.

BE IT FURTHER RESOLVED that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $1,599,744.

ATTACHMENT A

"Evaluating Technologies and Methods to Lower Nitrogen Oxide Emissions from Heavy-Duty Vehicles"

Background

The 2010 nitrogen oxides (NO_X) emission standard for heavy-duty engines establishes a limit for NO_X emissions of 0.20 grams per brake horsepower-hour (g/bhp-hr). Nevertheless, it is projected that even when the entire on-road fleet of heavy-duty vehicles operating in California is compliant with the 2010 emission standards, upcoming National Ambient Air Quality Standards (NAAQS) requirements for PM2.5 and ozone cannot be achieved in California without further significant reductions in NO_X emissions from the heavy duty fleet. The main technologies employed by diesel and natural gas engine manufacturers to meet the 2010 NO_X engine standard are selective catalytic reduction (SCR) and three way catalysts (TWC), respectively. Both of these technologies are relatively new in heavy-duty truck applications, and manufacturers of SCR systems, TWCs, and heavy-duty engines are still optimizing their systems to achieve the required reductions in the most efficient and cost-effective manner. As these technologies mature, there should be opportunities to reduce NO_X emissions below the level required by the 2010 NO_X standards.

Objective

The objective of this research is to obtain the maximum NO_X reduction possible from heavy-duty diesel and natural gas engines through the combination of engine tuning practices, thermal management strategies, and aftertreatment strategies, while continuing to meet all applicable standards for hydrocarbons, non-methane hydrocarbons, carbon monoxide, and PM, without incurring a greenhouse gas (GHG) penalty, and consistent with a technological path to meeting the upcoming United States Environmental Protection Agency (U.S. EPA) requirements for GHG emissions from heavy-duty vehicles. The target NO_X emission rate for this project is 0.02 g/bhp-hr, which is a 90 percent reduction from the current standard.

Methods

The contractor shall first refine a research plan identifying engine test cycles, specific engines to be tested, and aftertreatment technologies for consideration in the screening and final demonstration efforts. They shall then characterize two stock engines, one for diesel and another for natural gas, using reference laboratory equipment and procedures following Title 40, Code of Federal Regulations, Part 1065 (40 CFR 1065), determine stock engine characteristics for colds starts, hot starts, normal operation, and low-load-low-temperature operation, and determine possible engine control strategies. Based on the identified engine performance and possible engine control strategies, the contractor shall select aftertreatment technologies and engine control strategies for screening using low-cost exhaust emission sources and test benches, and identify candidate engine-aftertreatment systems for on-engine demonstration. Finally, the contractor shall perform engine dynamometer tests following 40 CFR 1065 for selected aftertreatment technologies to demonstrate low NO_X emissions over the heavy-duty

Federal Test Procedure, a low-load-low-temperature cycle such as World Harmonized Transient Cycle, and the extended idle test cycles.

Expected Results
The feasibility of achieving NO_X emissions lower than the current engine standard will provide information for technical consideration during future development of rules with low emission limits for new engines. The deliverables of this project include a final report detailing methods, NO_X emissions reduction strategies, summary data tables, findings from the research, as well as the final dataset in spreadsheet or database format consisting of second-by-second test data from the demonstration testing, data tables reporting integrated emissions and other key parameters from each individual test, and tables summarizing overall test results.

Significance to the Board
This project will provide critical information on the feasibility of achieving NO_X emissions lower than the current engine standard for two heavy-duty engines: one natural gas engine with TWC, and one diesel engine with SCR. The information will help ARB to develop future air quality plans.

Contractor:
Southwest Research Institute

Contract Period:
36 months

Principal Investigators:
Cynthia C. Webb, M.S.
Chris Sharp
James Chiu, M.S.
Darius Mehta, M.S.

Contract Amount:
$1,599,744

Basis for Indirect Cost Rate:
The Southwest Research Institute proposal was received using a competitive bid process in which the cost proposal is rated. Therefore, the indirect cost rate of 138 percent of 'Labor' and 'Fringe Benefits' plus 3.78 percent of 'Materials and Supplies' is accepted as proposed.

Past Experience with the Principal Investigators:
Southwest Research Institute is one of the most distinguished research groups with experience in fuels, lubrication oil, engines, emissions, and advanced after treatment systems. They have provided research and development services to ARB, U.S. EPA, Department of Energy, private companies, and others. Their prior experience with ARB has included studies of emissions from locomotives, light-duty gasoline vehicles, methanol-fueled vehicles, off-road engines, and heavy-duty diesel engines.

Prior Research Division Funding to the Southwest Research Institute:

Year	2012	2011	2010
Funding	$ 0	$ 0	$ 0

BUDGET SUMMARY

Southwest Research Institute

"Evaluating Technologies and Methods to Lower Nitrogen Oxide Emissions from Heavy-Duty Vehicles"

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 579,877	
2.	Subcontractors	$ 0	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 5,250	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 106,661[1]	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 0	
	Total Direct Costs		$ 691,788
INDIRECT COSTS			
1.	Overhead, General and Administrative Expenses and Material Handling	$ 804,453	
2.	Fee or Profit	$ 103,503	
	Total Indirect Costs		$ 907,956
TOTAL PROJECT COSTS			**$1,599,744**

[1] Supplies for vehicle testing tasks include fuel, span gases, exhaust tubing, clamps, thermocouples, stainless and Teflon sample tubing, and various other necessary materials.

PROPOSED

State of California
AIR RESOURCES BOARD

Effectiveness of Sound Wall-Vegetation Combination Barriers as Near-Roadway Pollutant Mitigation Strategies

RESEARCH PROPOSAL

Resolution 13-28

June 27, 2013

Agenda Item No.: 13-6-1

WHEREAS, the Air Resources Board (ARB or Board) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2766-276, entitled "Effectiveness of Sound Wall-Vegetation Combination Barriers as Near-Roadway Pollutant Mitigation Strategies," has been submitted by the University of California, Los Angeles; and

WHEREAS, in accordance with Health and Safety Code section 39705, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2766-276 entitled "Effectiveness of Sound Wall-Vegetation Combination Barriers as Near-Roadway Pollutant Mitigation Strategies" submitted by the University of California, Los Angeles, for a total amount not to exceed $516,139.

WHEREAS, the Research Division staff has reviewed Proposal Number 2766-276 and finds that in accordance with Health and Safety Code section 39701, the focus of the study is to collect data on traffic–related pollutants adjacent and downwind of sound walls for four sites in two air basins in California. In addition to providing the most comprehensive database in California to date, the results will provide insights into the value and best practices for siting and design of sound walls, and vegetation in combination with sound walls, to reduce downwind pollution from roadways.

NOW, THEREFORE BE IT RESOLVED that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of the Research Screening Committee and Research Division staff and approves the following:

Proposal Number 2766-276 entitled "Effectiveness of Sound Wall-Vegetation Combination Barriers as Near-Roadway Pollutant Mitigation Strategies" submitted by the University of California, Los Angeles not to exceed $516,139.

BE IT FURTHER RESOLVED that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $516,139.

ATTACHMENT A

"Effectiveness of Sound Wall-Vegetation Combination Barriers as Near-Roadway Pollutant Mitigation Strategies"

Background

Recognizing the health impacts associated with nearby sources of pollution, including high traffic roadways, Air Resources Board published the Air Quality and Land Use Handbook in 2005, which recommends not siting sensitive receptors, including residences, within 500 feet of a high traffic roadway as a preventative measure. However, there are currently many people already living within this zone. With the passage of Senate Bill 375, which encourages the pursuit of infill development near transit, there is the potential to increase the number of people living near high traffic roadways. Although emissions near high traffic roadways are expected to decrease due to ARB regulation, it is anticipated that these areas will still have higher pollutant levels. While separating sensitive receptors from highly trafficked roadways is the most preventative and health-protective solution, other mitigation options (including sound barriers and vegetation) may also play a role in reducing the air pollution exposure of nearby residents. However, to date, studies of the effect of sound/vegetation barriers have not yet produced definitive results and few studies have been performed for California's roadway geometries and Mediterranean climate. Further research is needed to understand the effectiveness of these mitigation options.

Objective

The overall objective of this study is to provide state and local planners with information on potential mitigation options for near-roadway air pollution. More specifically, the investigators will evaluate the impacts of sound wall/vegetation combinations on downwind levels of traffic-related pollution including PM2.5, ultrafine particles, black carbon, and oxides of nitrogen. A comprehensive database, as well as look up tables and other decision support, will be developed using the collected data and summarized using a semi-empirical dispersion model.

Methods

The focus of this study is to collect data on traffic–related pollutants adjacent and downwind of sound walls for four sites in two air basins in California. A pilot study will be conducted in each location, and the main field campaign (also one site in each location) will occur over 10 weeks encompassing all four seasons. Sampling is scheduled such that a large range of meteorological variability will be captured. Sampling will include stationary monitoring (two fully instrumented sites, with three additional ultrafine particle monitoring sites), a network of passive monitoring, meteorological monitoring, and mobile monitoring.

Expected Results

In addition to providing the most comprehensive database in California to date, the results will provide insights into the value and best practices for siting and design of sound walls, and vegetation in combination with sound walls, to reduce downwind pollution from roadways.

Significance to the Board
Strategies to reduce the air pollution exposure of current and future residents living near high traffic roadways are needed. A better understanding of the effectiveness of potential mitigation options, in particular sound wall (barrier) and vegetation combinations is required.

Contractor:
University of California, Los Angeles

Contract Period:
36 months

Principal Investigator:
Suzanne E. Paulson, Ph.D.

Contract Amount:
$516,139

Basis for Indirect Cost Rate:
The State and The University of California, Los Angeles have agreed to a ten percent indirect cost rate.

Past Experience with the Principal Investigator:
Professor Suzanne Paulson has more than a decade of research experience in atmospheric science and has recently published a manuscript on characterization of air pollution concentrations in a neighborhood highly impacted by vehicle pollution under ARB contract, 09-357, "Characterizing Spatially Inhomogenous Non-Criteria Pollutants in the Los Angeles Air Basin." Several other manuscripts related to this contract are in progress. Professor Paulson has also led previous ARB-funded studies with success.

Prior Research Division Funding to the University of California, Los Angeles:

Year	2012	2011	2011
Funding	$400,000	$630,264	$290,000

BUDGET SUMMARY

The University of California, Los Angeles

"Effectiveness of Sound Wall-Vegetation Combination Barriers as Near-Roadway Pollutant Mitigation Strategies"

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 273,958	
2.	Subcontractors	$ 177,374	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 8,000	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 1,910	
8.	Supplies	$ 1,200	
9.	Analyses	$ 15,600	
10.	Miscellaneous	$ 7,300	
	Total Direct Costs		$485,342
INDIRECT COSTS			
1.	Overhead	$ 30,797	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$ 30,797
TOTAL PROJECT COSTS			**$516,139**

Attachment 1

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: University of California, Riverside

Description of subcontractor's responsibility: Perform 3-D meteorological measurements and semi-empirical modeling of results

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 154,281	
2.	Subcontractors	$ 0	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 6,811	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 4,043	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 0	
	Total Direct Costs		$165,135
INDIRECT COSTS			
1.	Overhead	$ 12,239	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$12,239
TOTAL PROJECT COSTS			**$177,374**

RESOLUTION 13-30, SAN JOAQUIN VALLEY PM2.5 CONTINGENCY MEASURES UPDATE, WILL BE AVAILABLE ON JUNE 21, 2013, ON ARB'S WEBSITE AND AVAILABLE AT THE BOARD MEETING.

PROPOSED

State of California
AIR RESOURCES BOARD

APPOINTMENT OF A NEW MEMBER TO THE ENVIRONMENTAL JUSTICE ADVISORY COMMITTEE

Resolution 13-31

June 27, 2013

Agenda Item No.: 13-6-3

WHEREAS, sections 39600 and 39601 of the Health and Safety Code authorize the Air Resources Board (ARB or Board) to adopt standards, rules and regulations and to do such acts as may be necessary for the proper execution of the powers and duties granted to and imposed upon the Board by law;

WHEREAS, the Legislature has adopted and the Governor has signed Assembly Bill 32, the California Global Warming Solutions Act of 2006 (Act), which designates the Board as the State agency charged with monitoring and regulating sources of emissions of greenhouse gases that cause global warming;

WHEREAS, the Act further directs the Board to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective greenhouse gas emission reductions;

WHEREAS, section 38561(a) of the Health and Safety Code directed the Board, on or before January 1, 2009, to prepare and approve a Scoping Plan for achieving the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions by 2020;

WHEREAS, section 38591(a) of the Health and Safety Code directed the Board to convene an Environmental Justice Advisory Committee of at least three members by July 1, 2007, to advise the Board in developing the scoping plan of emission reduction measures (Scoping Plan) and any other pertinent matter in implementing the Act;

WHEREAS, section 38591(a) of the Health and Safety Code further directs that the Environmental Justice Advisory Committee shall be comprised of representatives from communities in the state with the most significant exposure to air pollution, including, but not limited to, communities with minority populations or low-income populations;

WHEREAS, section 38591(b) of the Health and Safety Code directs the Board to appoint the Environmental Justice Advisory Committee members from nominations received from environmental justice organizations and community groups;

WHEREAS, on January 25, 2007, the Board appointed an Environmental Justice Advisory Committee of ten members and eleven alternates, to advise the Board in developing the initial Scoping Plan;

WHEREAS, on December 12, 2008, the Board approved the 2008 Climate Change Scoping Plan (Scoping Plan), and re-approved the Scoping Plan on August 24, 2011, following consideration of the Supplement to the Functional Equivalent Document;

WHEREAS, section 38561(h) of the Health and Safety Code directs the Board to update its scoping plan at least once every five years;

WHEREAS, the Board is developing an updated 2013 Scoping Plan that focuses on strategies to reduce greenhouse gas emissions and achieve co-benefits in the State, including disadvantaged communities, both in the near-term and beyond 2020;

WHEREAS, on March 21, 2013, the Board conducted a public hearing to consider reconvening the Committee to advise the Board in developing the updated 2013 Scoping Plan;

WHEREAS, on May 3, 2013, the Executive Officer signed Executive Order G-13-047, set forth in Attachment A, appointing three additional Committee members from underrepresented regions of the State, including the Central Valley and the Inland Empire;

WHEREAS, at the public hearing held on March 21, 2013, the Board adopted Resolution 13-10 reconvening the Environmental Justice Committee (Committee) and appointing the individuals set forth in Attachment A to Resolution 13-10 to serve on the Committee;

WHEREAS, Resolution 13-10 delegated to the Executive Officer, and his or her designee, authority to select and appoint up to three additional Committee members from underrepresented regions of the State, including the Central Valley and the Inland Empire;

WHEREAS, on May 2, 2013, Comite Civico Del Valle and State Assembly member V. Manuel Pérez's Chief of Staff submitted a nomination for Luis Olmedo from the Imperial County as an additional member to the Committee;

WHEREAS, on May 10, 2013, the Special Assistant to State Senator Ben Hueso also submitted a nomination for Luis Olmedo from the Imperial County as an additional member to the Committee;

WHEREAS, the Board finds that the proposed additional member of the Committee is nominated by environmental justice organizations and community groups; and

WHEREAS, the Board further finds that the proposed additional member of the Committee is a representative from a community in the State with significant exposure to air pollution or a community with a minority population or low-income population.

NOW, THEREFORE, BE IT RESOLVED that the Board hereby appoints Luis Olmedo to serve on the Environmental Justice Advisory Committee.

BE IT FURTHER RESOLVED that pursuant to section 38590(c) of the Health and Safety Code, the Board shall reimburse travel and per diem expenses, consistent with State travel policy, for advisory committee members from nonprofit organizations, for attendance at Environmental Justice Advisory Committee meetings.

Resolution 13-31

June 27, 2013

Identification of Attachments to the Board Resolution

Attachment A: Executive Order G-13-047

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER G-13-047

Relating to the Public Hearing to Appoint the Environmental Justice Advisory Committee Under AB 32

WHEREAS, section 38561(a) of the Health and Safety Code directed the Air Resources Board (ARB or Board), on or before January 1, 2009, to prepare and approve a scoping plan for achieving the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions by 2020;

WHEREAS, on December 12, 2008, the Board approved the 2008 Climate Change Scoping Plan (Scoping Plan), and re-approved the Scoping Plan on August 24, 2011, following consideration of the Supplement to the Functional Equivalent Document;

WHEREAS, section 38561(h) of the Health and Safety Code directs the Board to update its scoping plan at least once every five years;

WHEREAS, the Board is developing an updated 2013 Scoping Plan that focuses on strategies to reduce greenhouse gas emissions and achieve co-benefits both in the near-term and beyond 2020, including in disadvantaged communities;

WHEREAS, section 38591(a) of the Health and Safety Code directed the Board to convene an Environmental Justice Advisory Committee (Committee) of at least three members by July 1, 2007, to advise the Board in developing the Scoping Plan and any other pertinent matters in implementing Assembly Bill 32, the California Global Warming Solutions Act of 2006;

WHEREAS, section 38591(b) of the Health and Safety Code directs the Board to appoint the Committee members from nominations received from environmental justice organizations and community groups;

WHEREAS, on January 25, 2007, the Board appointed a Committee of ten members and eleven alternates based on nominations received, to advise the Board in developing the initial Scoping Plan;

WHEREAS, on March 21, 2013, the Board conducted a public hearing to consider reconvening of the Committee to advise the Board in developing the updated 2013 Scoping Plan;

WHEREAS, following the public hearing on March 21, 2013, the Board adopted Resolution 13-10, included as Attachment 1, reconvening the Committee and appointing the individuals set forth in Attachment A to Resolution 13-10, to serve on the Committee;

WHEREAS, Resolution 13-10 delegated to the Executive Officer, and his or her designee, authority to select and appoint up to three additional Committee members from underrepresented regions of the State, including the Central Valley and the Inland Empire;

WHEREAS, pursuant to the Board's direction, ARB staff solicited nominations for three additional committee members from the Central Valley and the Inland Empire to recommend for appointment to the Committee;

WHEREAS, the proposed additional members of the Committee are representatives from communities in the State with the most significant exposure to air pollution, including, but not limited to, communities with minority populations or low-income populations;

NOW, THEREFORE, IT IS ORDERED that the recitals and findings contained in Resolution 13-10 are incorporated herein.

IT IS FURTHER ORDERED that the three individuals set forth in Attachment 2 are appointed as additional members of the Environmental Justice Advisory Committee.

Executed this 3rd day of May 2013 at Sacramento, California.

Richard W. Corey
Executive Officer

Attachments

Executive Order G-13-047

May 3, 2013

Identification of Attachments to the Executive Order

Attachment 1: Resolution 13-10.

State of California
AIR RESOURCES BOARD

APPOINTMENT OF ENVIRONMENTAL JUSTICE ADVISORY COMMITTEE UNDER AB 32

Resolution 13-10

March 21, 2013

Agenda Item No.: 13-3-4

WHEREAS, sections 39600 and 39601 of the Health and Safety Code authorize the Air Resources Board (ARB or Board) to adopt standards, rules and regulations and to do such acts as may be necessary for the proper execution of the powers and duties granted to and imposed upon the Board by law;

WHEREAS, the Legislature has adopted and the Governor has signed Assembly Bill 32, the California Global Warming Solutions Act of 2006 (Act), which designates the Board as the State agency charged with monitoring and regulating sources of emissions of greenhouse gases that cause global warming;

WHEREAS, the Act further directs the Board to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective greenhouse gas emission reductions;

WHEREAS, section 38561(a) of the Health and Safety Code directed the Board, on or before January 1, 2009, to prepare and approve a Scoping Plan for achieving the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions by 2020;

WHEREAS, section 38591(a) of the Health and Safety Code directed the Board to convene an Environmental Justice Advisory Committee of at least three members by July 1, 2007, to advise the Board in developing the scoping plan of emission reduction measures (Scoping Plan) and any other pertinent matter in implementing the Act;

WHEREAS, section 38591(a) of the Health and Safety Code further directs that the Environmental Justice Advisory Committee shall be comprised of representatives from communities in the state with the most significant exposure to air pollution, including, but not limited to, communities with minority populations or low-income populations;

WHEREAS, section 38591(b) of the Health and Safety Code directs the Board to appoint the Environmental Justice Advisory Committee members from nominations received from environmental justice organizations and community groups;

WHEREAS, on January 25, 2007, the Board approved an Environmental Justice Advisory Committee of ten members and eleven alternates, to advise the Board in developing the initial Scoping Plan;

WHEREAS, on December 12, 2008, the Board approved the 2008 Climate Change Scoping Plan;

WHEREAS, on August 24, 2011, the Board re-approved the 2008 Climate Change Scoping Plan after approving amendments to the Functional Equivalent Document for the Scoping Plan;

WHEREAS, section 38561(h) of the Health and Safety Code directs the Board to update its plan for achieving the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions at least once every five years;

WHEREAS, the Board is developing an updated 2013 Scoping Plan to focus on strategies to reduce greenhouse gas emissions and achieve co-benefits both in the near-term and beyond 2020, including in disadvantaged communities;

WHEREAS, the Board is reconvening the Environmental Justice Advisory Committee to advise the Board in developing the updated 2013 Scoping Plan;

WHEREAS, from January 22, 2013, through March 1, 2013, the staff solicited nominations for the Environmental Justice Advisory Committee from environmental justice organizations and community groups, including posting a formal solicitation on the Board's Climate Change website;

WHEREAS, a public hearing was held to consider the appointment of the nominated members;

WHEREAS, the Board finds that the proposed members of the Environmental Justice Advisory Committee, set forth in Attachment A, were all nominated by environmental justice organizations and community groups; and

WHEREAS, the Board further finds that the proposed members of the Environmental Justice Advisory Committee are representatives from communities in the State with the most significant exposure to air pollution, including, but not limited to, communities with minority populations or low-income populations.

NOW, THEREFORE, BE IT RESOLVED that the Board hereby reconvenes the Environmental Justice Advisory Committee and appoints the individuals set forth in Attachment A to serve on the Committee.

BE IT FURTHER RESOLVED that the Board delegates to the Executive Officer, and his or her designee, authority to select and appoint up to three additional committee members from underrepresented regions of the State, including the Central Valley and the Inland Empire.

BE IT FURTHER RESOLVED that pursuant to section 38590(c) of the Health and Safety Code, the Board shall reimburse travel and per diem expenses, consistent with State travel policy, for advisory committee members from nonprofit organizations, for attendance at Environmental Justice Advisory Committee meetings.

I hereby certify that the above is a true and correct copy of Resolution 13-10, as adopted by the Air Resources Board.

Tracy Jensen, Clerk of the Board

Resolution 13-10

March 21, 2013

Identification of Attachment to the Board Resolution

Attachment A: Proposed Members of the Environmental Justice Advisory Committee.

ATTACHMENT A

Proposed Members of the Environmental Justice Advisory Committee

Martha Arguello, Physicians for Social Responsibility

Nicole Capretz, Environmental Health Coalition

Gisele Fong, End Oil

Tom Frantz, Association of Irritated Residents

Kemba Shakur, Urban Releaf

Mari Rose Taruc, Asian Pacific Environmental Network

Susan Riggs Tinsky, San Diego Housing Federation

Monica Wilson, Global Alliance for Incinerator Alternatives

Ryan Briscoe Young, The Greenlining Institute

Executive Order G-13-047

May 3, 2013

Identification of Attachments to the Executive Order

Attachment 2: Additional Members of the Environmental Justice Advisory Committee.

ATTACHMENT 2

Additional Members of the Environmental Justice Advisory Committee

Kevin Hamilton, Clinica Sierra Vista

Rey Leon, Valley LEAP

Penny Newman, Center for Community Action and Environmental Justice

State of California
AIR RESOURCES BOARD

Staff Report: CoolCalifornia City Challenge Awards

Date of Presentation: June 27, 2013

I. INTRODUCTION AND BACKGROUND

In 2006, Governor Schwarzenegger signed the California Global Warming Solutions Act of 2006 (AB 32), which requires California to reduce greenhouse gas emissions to 1990 levels by 2020. To achieve this goal, the California Air Resources Board (ARB) is pursuing a variety of strategies, including regulations, market-based measures (e.g., cap-and-trade), and voluntary actions.

ARB committed to providing quantification tools and other resources for California small businesses and local governments to foster voluntary greenhouse gas emission reductions. Through a partnership with the University of California, Berkeley, and the non-profit Next 10, ARB has developed the CoolCalifornia.org website to provide local governments and small businesses with easy access to those resources. CoolCalifornia.org also provides tools and information to encourage households and schools to voluntarily reduce their emissions. Features of the website include carbon calculators, climate action planning resources, tips for reducing emissions, emission reduction success stories, a searchable database of financial incentives for emissions-reducing projects and purchases, and recognition programs, such as the CoolCalifornia Small Business Award program, and, most recently, the CoolCalifornia City Challenge Award.

The CoolCalifornia City Challenge is a statewide competition engaging thousands of households in cities across California to conserve energy, reduce their carbon footprints, and help build more vibrant and sustainable communities. Competing cities engage residents in local campaigns to reduce greenhouse gas emissions from driving and household energy use, and the cities earn points, with the goal of being named the "Coolest California City." The competition is designed to foster connections between local governments and households with the goal of encouraging significant, voluntary carbon footprint reductions.

In its pilot year, the CoolCalifornia Challenge enrolled over 2,500 households in eight California cities. The 1,000 most engaged households used 50 percent less energy than similar households and reduced energy an additional 7 percent during their involvement with the program. The Challenge is also an ongoing research project evaluated by researchers at the University of California, Berkeley, and sponsored by ARB. The study will help inform future efforts to promote voluntary carbon footprint reductions and strengthen the connections among California households, communities, and the State.

The recipients of the CoolCalifornia City Challenge Awards are:

- City of Davis – "Coolest California City"
- City of Chula Vista – "Cool California City"
- City of Tracy – "Cool California City"

II. BACKGROUND FOR EACH WINNING CITY

The City of Davis – "Coolest California City"

The City of Davis, with a population of 65,000, has long been an environmental pioneer. Davis boasts many "firsts", including the first bike lanes in the nation (1968), the first Climate Specific Energy Code in the nation (1970s), the first utility-scale solar power plant in the nation, the first farmland protection mitigation program in the nation (1995), the first citywide deployment of LED traffic signals in the state, the first solar sustainable subdivision in the world (Village Homes - 1970s), the first (and possibly only) student planned and operated campus and community transit system in the nation, the first dedicated bike traffic signals in the nation, and is the first City in the nation to adopt greenhouse gas standards for new residential development projects. Many of these efforts have influenced state- or nation-wide standards and programs, such as CalTrans and U.S. Department of Transportation standards for bike lanes, California's Title 24 building standards code, and the California Solar Initiative. Davis has been implementing other environmental innovations for decades, including smart growth principles since before the term was coined, one of the first municipal recycling programs (started in the 1970s), a solar-powered wastewater treatment plant, 100+ miles of bike lanes and the only dedicated bike tunnel under an interstate, early adoption of electric vehicles as part of the City fleet (since 1993), and the adoption of a comprehensive Climate Action and Adaptation Plan.

Davis also has a history of engaging the local community in its environmental efforts, as demonstrated by its popular farmers' market, the local food served in Davis schools, and the creation of the Cool Davis Initiative, a community based organization focused on greenhouse gas reduction and improving the quality of life for Davis residents. The City and Cool Davis actively engaged Davis residents in the Challenge through events such as the Cool Davis festival and provided tools to encourage households to take action, such as individual household action checklists.

Davis has set a goal to engage 75 percent of Davis households in voluntary greenhouse gas reduction activities by 2015. Davis' participation in the CoolCalifornia Challenge was a key part of the overall citywide effort to achieve that goal, and over 400 Davis households signed up for the Challenge. Throughout the Challenge, Davis participants have demonstrated a strong commitment to tracking and reducing greenhouse gas emissions from household energy use and travel. As a result of these accomplishments, Davis is being named the "Coolest California City".

The City of Chula Vista – "Cool California City"

The City of Chula Vista, with a population of approximately 250,000, is the second largest jurisdiction in San Diego County. It is located at the center of one of the richest cultural, economic, and environmentally diverse zones in the United States, and boasts more than 50 square miles of coastal landscape, canyons, rolling hills, and a variety of natural resources. Chula Vista was one of the first cities in California to develop a Climate Action Plan (in the late 1990s) and recently updated it to include climate adaptation strategies. Local leaders recognize that reducing greenhouse gas emissions and improving sustainability are essential to ensuring a healthy and prosperous community for residents, businesses, and visitors.

Through the CoolCalifornia Challenge, Chula Vista saw an opportunity to demonstrate its sustainability commitment and leadership both to its residents and to other jurisdictions and regions across the state. The City is proud to be the only southern California jurisdiction to successfully compete in the Challenge. The CoolCalifornia Challenge provided a useful statewide platform for Chula Vista to promote and track the sustainability efforts of its community members. The Challenge also helped to create and reinforce a "new normal" in the City, in which working to reduce energy use is common and expected, and the Challenge's "friendly-competition" helped to create a sense of community pride around local sustainability actions and accomplishments.

Through the CoolCalifornia Challenge, the City of Chula Vista was interested in implementing a community-wide campaign to "connect" its multiple sustainability-related programs and services (e.g., energy efficiency and alternative transportation assistance for residents and businesses). The Challenge was instrumental in linking these efforts into a single campaign. For example, the City leveraged its annual Holiday Lighting Exchange and quarterly Sustainable Landscape workshops, and numerous other events including the Third Avenue and Otay Ranch Town Center Farmers Markets, the Otay Ranch Town Center Parade Band Review, the Third Avenue Village Association April Street Festival, and the Go Green and Clean Family Day, to recruit participants into the Challenge and educate them on the broader impacts of climate change on Chula Vista's quality of life. Nearly 700 Chula Vista households participated in the Challenge, and diligently tracked and reduced their carbon footprints throughout the competition. Chula Vista took 2nd place in the competition, and is being recognized as a "Cool California City."

The City of Tracy – "Cool California City"

The City of Tracy, with a population of 84,000, still has that small, hometown feeling. Tracy is located at the edge of the San Joaquin County, and has the distinction of being the first city in the County to have an approved comprehensive sustainability action plan. The action plan focuses on greenhouse gases and climate change, energy, transportation and land use, solid waste, water, agriculture and open space, biological resources, air quality, public health, and economic development.

The City's emphasis on sustainability and desire to engage local residents in that effort were met by the CoolCalifornia Challenge, which Tracy pursued in partnership with PG&E. The City and PG&E engaged households in the competition through a variety of events, including city-sponsored Block Parties, the weekly Farmers' Market, Movies in the Plaza, the Dry Bean Festival and many, many more events throughout the year.

For Tracy, the CoolCalifornia Challenge helped distill large issues such as climate change and sustainability down to the grass roots level. The Challenge brought awareness of the importance of environmental sustainability to the community and the nearly 400 households that participated, and it gave Tracy residents both recognition for their sustainability efforts, and a sense of pride in the accomplishment of a community-wide environmental goal. Tracy's accomplishments led to its 3rd place ranking in the Challenge, and Tracy is being recognized as a "Cool California City."

CALIFORNIA AIR RESOURCES BOARD

NOTICE OF PUBLIC MEETING TO PROVIDE AN INFORMATIONAL UPDATE ON THE ASSOCIATION OF BAY AREA GOVERNMENTS' AND METROPOLITAN TRANSPORTATION COMMISSION'S DRAFT SUSTAINABLE COMMUNITIES STRATEGY

The Air Resources Board (ARB or Board) will conduct a public meeting at the time and place noted below to hear an informational update on the Association of Bay Area Governments' (ABAG) and Metropolitan Transportation Commission's (MTC) Draft Sustainable Communities Strategy, prepared pursuant to the Sustainable Communities and Climate Protection Act of 2008.

DATE: June 27, 2013

TIME: 9:00 a.m.

PLACE: California Environmental Protection Agency
Air Resources Board
Byron Sher Auditorium
1001 I Street
Sacramento, California 95814

This item will be considered at a one-day meeting of the Board, which will commence at 9:00 a.m., June 27, 2013. Please consult the agenda for the meeting, which will be available at least 10 days before June 27, 2013, to determine the order of the agenda items.

California State law (the Sustainable Communities and Climate Protection Act of 2008, or SB 375, Statutes 2008, Chapter 728) requires each of the State's 18 Metropolitan Planning Organizations (MPO) to prepare either a Sustainable Communities Strategy or an Alternative Planning Strategy to meet the regional greenhouse gas emission reduction targets for 2020 and 2035 set by the Board in September 2010. The statute also requires ARB to review each MPO's determination that its Sustainable Communities Strategy (SCS) would, if implemented, achieve the greenhouse gas emission reduction targets.

ARB staff will make a presentation to the Board on the status of ABAG's and MTC's Draft Sustainable Communities Strategy. The Board will not be taking any action on this informational item at this meeting. The ABAG Board members and MTC Commissioners are scheduled to consider adoption of this SCS in July 2013.

Interested members of the public may present comments orally or in writing at the meeting and may be submitted by postal mail or by electronic submittal before the meeting. To be considered by the Board, written comments not physically submitted at

the meeting must be received **no later than 12:00 noon, June 26, 2013,** and addressed to the following:

Postal mail: Clerk of the Board, Air Resources Board
1001 I Street, Sacramento, California 95814

Electronic submittal: http://www.arb.ca.gov/lispub/comm/bclist.php

You can sign up online in advance to speak at the Board meeting when you submit an electronic board item comment. For more information go to: http://www.arb.ca.gov/board/online-signup.htm.

Please note that under the California Public Records Act (Government Code section 6250 et seq.), your written and verbal comments, attachments, and associated contact information (e.g., your address, phone, email, etc.) become part of the public record and can be released to the public upon request.

ARB requests that written and email statements on this item be filed at least 10 days prior to the meeting so that ARB staff and Board members have additional time to consider each comment. Further inquiries regarding this matter should be directed to Ms. Jennifer Gray, Land Use and Sustainability Planning Section, at (916) 327-0027.

SPECIAL ACCOMMODATION REQUEST

Special accommodation or language needs can be provided for any of the following:

- An interpreter to be available at the hearing;
- Documents made available in an alternate format (i.e., Braille, large print, etc.) or another language;
- A disability-related reasonable accommodation.

To request these special accommodations or language needs, please contact the Clerk of the Board at (916) 322-5594 or by facsimile at 916) 322-3928 as soon as possible, but no later than 10 business days before the scheduled Board hearing. TTY/TDD/Speech to Speech users may dial 711 for the California Relay Service.

Comodidad especial o necesidad de otro idioma puede ser proveído para alguna de las siguientes:

- Un intérprete que esté disponible en la audiencia.
- Documentos disponibles en un formato alterno (por decir, sistema Braille, o en impresión grande) u otro idioma.
- Una acomodación razonable relacionados con una incapacidad.

Para solicitar estas comodidades especiales o necesidades de otro idioma, por favor llame a la oficina del Consejo al (916) 322-5594 o envíe un fax a (916) 322-3928 lo más

pronto posible, pero no menos de 10 días de trabajo antes del día programado para la audiencia del Consejo. TTY/TDD/Personas que necesiten este servicio pueden marcar el 711 para el Servicio de Retransmisión de Mensajes de California.

CALIFORNIA AIR RESOURCES BOARD

Richard W. Corey
Executive Officer

Date: 5/25/13

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website at www.arb.ca.gov.