

# Addendum II – Public Input on Research Priorities

## Introduction

On March 25, 2021, the Board approved the Fiscal Years 2021-2024 Triennial Strategic Research Plan (Plan). The Plan describes past and current research activities, as well as remaining research needs that the Research Program intends to prioritize in the three future fiscal years that the Plan addresses.

The Research Program prioritizes research that supports CARB’s mission, and often focuses on topics that are unique to California’s priority populations. In order to better understand what data and information needs would address air quality, health, and climate concerns, CARB provides public engagement opportunities. There are multiple ways in which the Research Program collects this input: 1) through the research comment and concept collection survey, 2) at public meetings, and 3) through the public docket that is made available before each public Board meeting. Since the release of the Fiscal Years 2021-2024 Triennial Strategic Research Plan in March of 2021, the Research Program has hosted several public meetings, has deployed the survey twice (for fiscal years 2022-2023 and 2023-2024) and has gone to the Board once (January 27, 2022). Through those venues several research priorities were collected.

This addendum summarizes all the input received.

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## Received in 2021

### Public docket for March 25, 2021 Board Meeting

*Meeting recording*

*Slides*

On March 25, 2021, Research Program staff presented the proposed Triennial Strategic Research Plan for Fiscal Years 2021-2024 (the Plan). The Board approved the Plan, which guides CARB in selecting annual research projects during the designated years. It also provides guidance to the public and research collaborators on CARB's research priorities and provides details on the research planning process. The [agenda](#), [slides](#) and [recording](#) of the meeting can all be found online. The [public docket entries](#) are summarized below.

#### 1. Support for California Sustainable Freight Action Plan

Submitter advocated for supporting this plan to decrease emissions around ports, freight facilities and in disadvantaged and low-income communities.

#### 2. Greenhouse gas reductions using hydrogen fuel

The submitter advocated for greater emphasis on hydrogen fuel to displace fossil fuels in the transportation sector as a method to reduce overall greenhouse gas emissions in the state. The submitter also advocated for more efficient energy cycles (Brayton cycle), for geothermal plants to operate as electrolyzers for hydrogen production and for greater electric grid balance.

#### 3. Improve engagement with environmental justice communities

"CARB has failed to adequately engage environmental justice communities in either the development or deployment of its research priorities." CARB is called upon to improve the Research Program and to build upon the AB 617 process, and focus on "direct pollution reduction mandates through a streamlined and sector-based approach..." It is further recommended that the Plan should meaningfully prioritize the health and well-being of all communities. Their suggested action is that the Plan prioritize direct emission reductions identified by AB 617 communities and build capacity in local communities, foster dialogue on research.

#### 4. Air toxics in historically disadvantaged communities

The submitter urges CARB to address air toxics as a fundamental step in eliminating structural racism. The submitter highlights the need to perform community scale assessments as part of the Criteria and Toxics Reporting rule and the 2588 "hot spots" program. The submitter explains that the Research Plan does not address these topics

directly. The submitter urges the Board to direct staff to focus projects on cumulative impacts in Environmental Justice communities as related to non-diesel air toxics.

## Public comments during the March 25, 2021 Board Meeting

### Commenter #1: Speaking on non-diesel air toxic contaminants and environmental justice

The overall research strategy should reflect the various on-going efforts to understand non-diesel air toxic contaminants. Community scale efforts are needed to understand impacts of toxicants. The Research Program lacks strategy to reduce emissions or get to zero-emissions. In a previous Board meeting, the Board recommended CARB staff form a cohesive strategy related to toxics in environmental justice communities. Research and technical assistance is needed to address various needs.

### Commenter #2: Speaking on solar policy

CARB and other agencies are not considering the evidence and policy implications presented by the Public Solar Power Coalition.

### Commenter #3: Speaking on zero-emission vehicle battery chemistry

Research effort should focus on granular details of battery chemistry. Cobalt-based lithium batteries are the main battery type used in zero-emission vehicles. Cobalt mining has severe human rights issues. This includes bodily injury, including of child laborers, as well as unknown long-term health impacts from environmental and occupational exposure to environmental health hazards. The Board is encouraged to move away from cobalt and other toxic chemistries. Effective battery recycling policy should be implemented now with the push to electrify transportation to avoid future battery pollution. It is recommended to use fuel cells in lawn and garden equipment that is not well suited for battery technology.

### Commenter #4: Speaking on how to operationalize racial equity in CARB's Research Program

It is recommended that researchers working with CARB be required to demonstrate capacity in working with communities, vulnerable populations, disadvantaged communities and environmental justice communities and adhere to research to action models or community participatory research models.

It is further recommended that an advisory committee overseeing research activities be established.

The CARB Research Program should work with researchers from communities, since University of California and California State Universities do not always operate in disadvantaged communities.

The current research planning model does not demonstrate how racial equity will be operationalized. For example, final research priorities are approved by the Executive Officer and Board.

## Research comments and concepts received in preparation for fiscal year 2022-2023 research

June 16, 2021 Public meeting to introduce the comment and concept collection survey

### Slides

On June 16, staff hosted a public meeting to introduce the comment and concept collection survey process to inform the selection of fiscal year 2022-2023 research projects. Below are the results of the live polls administered during the meeting that described non-CARB participant roles as well as a summary of comments submitted verbally or in the chat by participants.



Figure 1: Polling results on previous experience submitting a comment or concept for June 16, 2021 public meeting to introduce comment and concept collection survey in preparation for fiscal year 2022-2023 research projects.

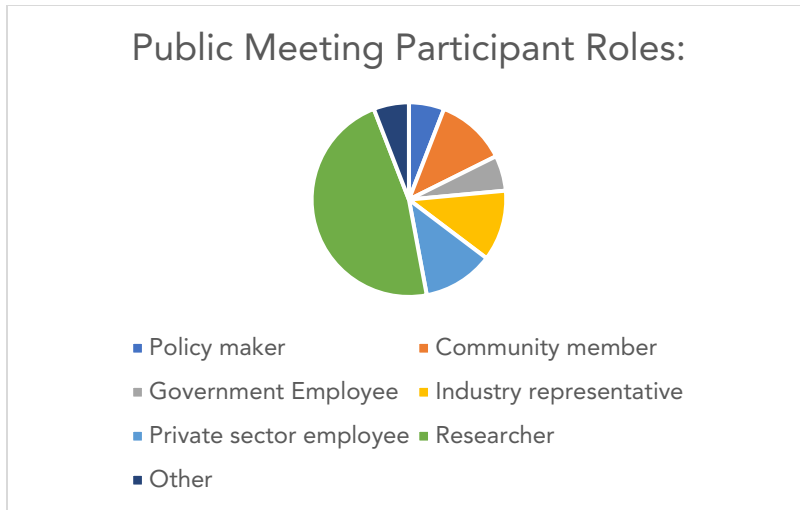


Figure 2: Polling results on participant roles for June 16, 2021 public meeting to introduce comment and concept collection survey in preparation for fiscal year 2022-2023 research projects.

### Summary of comments

#### Commenter #1: Speaking on biota as indicators of climate change and partnering with communities

Biota can be studied and measured as indicators of climate change. Neighborhood scale deposition can be measured at schools. This idea lends itself to community engagement.

#### Commenter #2: Speaking on research related to city sustainability

Are there examples of research projects funded by CARB that tie into the work of cities? And do any such project results inform general plans or environmental justice related plans?

#### Commenter #3: Speaking on mitigating short-lived climate pollutants (SLCPs)

In the Stockton area, pollutants include irritants, climate pollutants, particularly SLCPs and others. What mitigation options are there to help alleviate health impacts? Why is CARB not focusing more on SLCPs? And, are there low-cost methane sensors?

#### Commenter #4: Speaking on sustainable transport and other issues

More awareness is needed of existing battery conversion methods. More mobility options are needed and there is potential for thin film solar to power rapid transit. A suggested solution for revamping cities is to bring pedestrians and city dwellers above traffic corridors. In addition, can there be an overhaul of truck usage to lower impact in environmental justice communities? Finally, is there any research on telomeres and the impact of their exposure?

## Funding Year 2022-23 Research Priorities: Summary of Public Concepts and Comments (Submitted May 26 – July 16, 2021)

Each year, CARB initiates the annual research planning process by collecting research comments and concepts from the public. These submissions help to inform CARB's priorities for supporting future research.

CARB uses a survey to collect both comments and concepts from the public on topics they would like CARB's Research Program to address. The comment option provides a way to submit research questions and concerns related to air quality, health, environmental justice, and climate change. These comments can be more open ended and be submitted by members of the public who feel their local community concerns could be addressed by CARB's research program.

Community and academic researchers can submit more detailed research concepts on the various topics that the CARB Research Program focuses on. Below are the results of the comment and concept collection survey for funding year 2022-2023.

### We received 28 public concepts regarding Funding Year 2022-23.

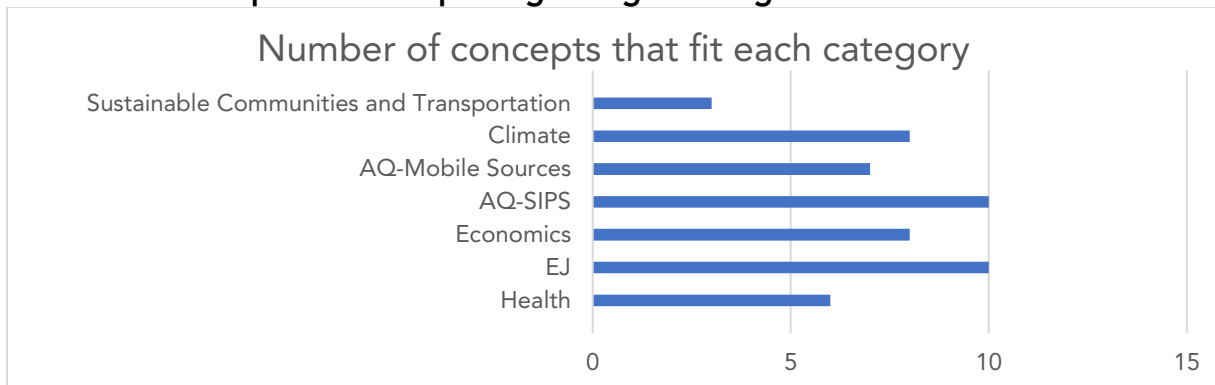


Figure 3: Summary of statistics on number of research concepts that fit each research category from the funding year 2022-2023 concept/comment survey.

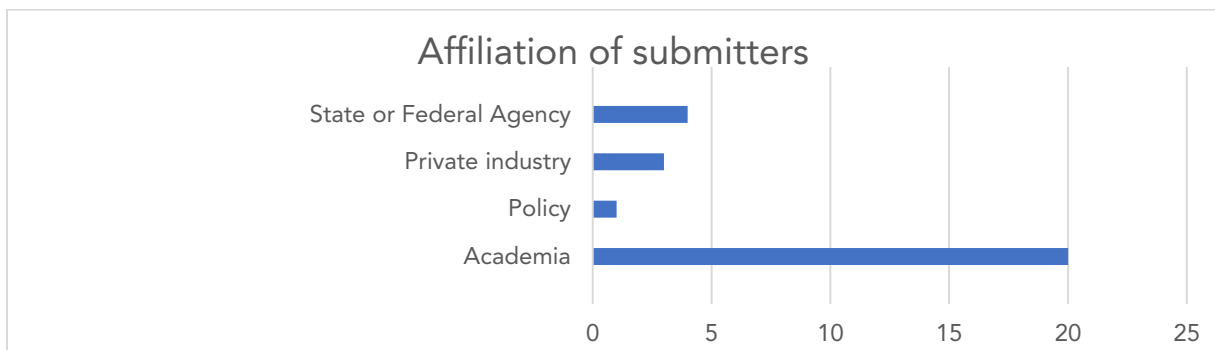


Figure 4: Summary of statistics on affiliation of submitters from the funding year 2022-2023 concept/comment survey.

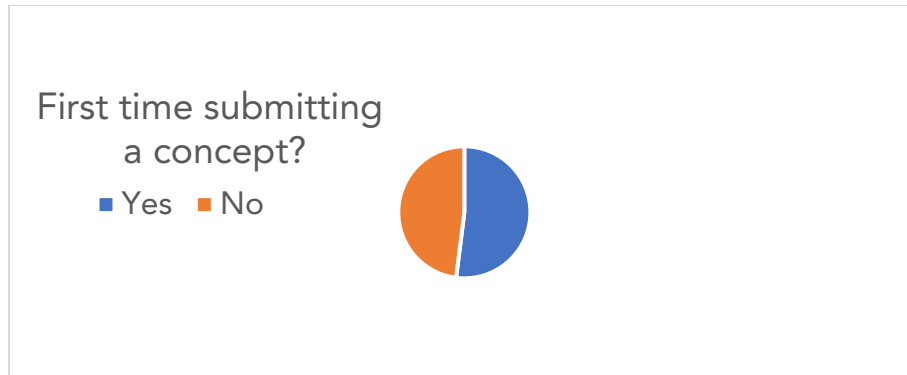


Figure 5: Summary of statistics on first time submitters from the funding year 2022-2023 concept/comment survey.

## Public Concepts

### Health and Environmental Justice

- Particulate matter toxicity of non-tailpipe emissions from brakes, tires, and road wear
- Use of biomarkers to identify toxic volatile organic compounds
- Innovating passive collection system to identify biomarkers of heavy metal toxins in DACs
- Wildfire smoke and adverse maternal and infant health effects: the role of environmental justice
- Toxicity of infiltrated outdoor PM in the indoor environment
- Quantifying the toxins within smoke and their human health damages
- Assessment of PAIR program indoor air monitor and filtration pilot test data

### Climate

- Pathway to supplying low carbon fuels
- Clean emissions from compact, mobile gassifiers
- Consuming forestry waste at the source
- Converting biofuels for bioenergy
- Model the dynamics of local climate and social equity factors impacting wildfire pollution exposure
- Harnessing geothermal energy for electricity and hydrogen fuel
- Combining economic and biogeochemical models to design strategic policy to reduce GHG emissions from natural and working lands.
- Remote sensing methods to refine GHG pollution tracking and hot spot identification
- Quantifying GHG and criteria-pollutant emissions, carbon life-cycle assessments, and carbon-sequestration potentials for two unique low-emissions burn techniques
- Performance evaluation of hydrogen fuel cell vehicles



## Policy impacts and economics

- Behavioral Economics to Inform Energy Labels and Information Provision
- Impact of electrification on pollution burdens
- Effect of policy on prescribed fires and prevalence of wildfires
- The Roles of Environmental Policies, Transportation Policies, and Environmental Justice
- To assess the local economic impact of reallocation of public streets and parking spaces in downtown Davis for Restaurants, retailers and professional service providers

## Characterizing pollution sources

- Refining brake wear emissions testing methods
- Characterizing burning emission sources and their impacts at the US-Mexico border region
- Expanding emissions measurements from farm equipment
- Smoke chemistry and ozone formation
- Sensor deployment to refine emissions estimates from off-road sources
- Community involved drone-borne sensing to characterize emissions and locate toxic hot-spots
- How Emissions of Different Vehicles Affect Air Quality in Different Communities

## Public Comments

We received a total of 6 public comments

- Pesticide Exposure
- Support American manufacturing and invention – Electric vehicle industry
- Heavy-duty Vehicles
  - Truck parking/idling
  - Illegal modifications, super high emitters
  - SMOG certification facilities that are allowing modified vehicles to operate
  - Warehouse construction permits near low-income neighborhoods
- Valley fever mitigation strategies – revegetation
- Wood burning concerns – air quality impacts

## Public comments during the September 22, 2021 public meeting

### Slides

After CARB reviews all comments and concepts submitted by the public, as well as from CARB staff, a list of high priority projects is presented to the public. The list of projects presented exceeds the available budget. Public input at this stage is critical in creating a short list of projects that fit the allocated funding for research.

During this public meeting, CARB staff presented the list of projects by research category and allowed time for questions and discussion.

### Proposed mobile sources research

#### Commenter #1: Speaking on microplastics

CARB should look at the impacts of microplastics. Related to brake and tire wear, for communities surrounded by major roadways and where roadways impact waterways. At the nexus of water and air quality – tire wear is emitting PM and microplastics.

#### Commenter #2: Speaking on air pollution impacts near ports and from non-exhaust

Environmental justice issues remain for communities living near Port of Los Angeles and Port of Long Beach. There are too few proposed projects focused on mobile sources. Were there others that did not make the high priority list? Why are tire-wear emissions being researched? The amount of tire-wear is measured from the tread thickness. Money should instead go to funding zero emission vehicles. Focus on zero emission technologies that are available. Make catalog of available zero emission vehicles (light, medium and heavy duty, and off-road) available to fleet operators. A large fraction of emissions near ports comes from heavy duty trucks, like drayage trucks, that drive exclusively within a short-haul range of the ports. Zero emission vehicles can replace those. Public approved spending on Alameda Corridor to remove trucks off the highways. A research question is to understand how emissions have shifted due to these policies.

#### Commenter #3: Speaking on charging infrastructure and vehicle electrification costs

Battery swapping could be an option for improved electric vehicle infrastructure. Electric vehicle drivers who don't have access to home charging are penalized economically. Charging publicly has a high cost (8 \$ equivalent per gallon). Per vehicle cost of electrification is high. What are the real-world consequences on infrastructure? Alternative technology pathways can solve these issues. This also affects Transportation Network Company drivers (example, Uber).

#### Commenter #4: Speaking on calculation of idling emissions in EMFAC

This commenter submitted a written comment as well. Emission rates of idling is infinite the way EMFAC calculates it. The units of emission rate should be changed to grams per minute instead of grams per mile.

#### Commenter #5: Speaking on transparency in research planning

What was the process for selecting topics, that should be put in the chat. Where is citizen science (also known as Community Based Participatory Research) being included in this proposed research?

### Proposed air quality research

[Commenter #6: Speaking on port infrastructure and impacts on local air quality](#)  
Ports have to pick up empty chassis before they enter the port. Empty storage containers are dropped off in container storage yards/warehouses in Wilmington. Assessments don't include all sites. These storage centers, repair and installation yards are located near EJ communities. The distribution of this extended port infrastructure impacts local communities negatively. An important research need includes studying the air pollution impacts of this extended port infrastructure.

[Commenter #7: Speaking on citizen science](#)  
Citizen science is needed to track the issues raised by previous speaker, and other emerging issues. Compare and contrast air pollution issues downwind of ports with clean marine background air.

[Commenter #8: Speaking on policy relevance](#)  
Do these projects include policy implications? For example, what policy outcomes are expected from the brake and tire wear project? Focus on practical issues that lead to measurable results and mitigation solutions.

[Commenter #9: Speaking on contractor affiliation](#)  
Do contractors need to be affiliated with a University of California or California State University? And at what point do partners with that affiliation need to become part of the project?

[Commenter #10: Speaking on forest management for smoke mitigation](#)  
Forestry management would mitigate fire and smoke. Why does CA still charge smog fees when wildfire smoke is not controlled?

[Proposed sustainable community, climate and economics research](#)

[Commenter #11: Speaking on Clean Air Shelters](#)  
Everyone knows air pollution is bad, what do you hope to understand or learn from the Clean Air Shelter project?

[Commenter #12: Speaking on calculation of idling emissions in the Emissions Factor Model \(EMFAC\)](#)  
Reiterated previous comments (#4) on calculating emissions when vehicles are stopped.

[Commenter #13: Speaking on communicating air quality benefits to the public](#)  
Should be broken down into a few simple categories: What can a member of the public do at home? What are their choices with regards to public transportation? What is available on the market to replace dirty trucks including cost and emissions? Present this information in a holistic and digestible form leveraging manufacturer information and long-term cost and maintenance information.

#### Commenter #14: Speaking on carbon neutral goals

Need to have a standard for low-cost air monitoring devices. Make criteria for carbon dioxide atmospheric levels. Provide on-the-job training programs to fill in the data gaps.

#### Commenter #15: Speaking on being race-forward

There is a missing piece in all the research being proposed and it is connected back to race. People of color are most impacted in all settings including urban, semi-urban, agricultural areas and rural. The most burdened communities lack affordable housing and protections from local government and don't have services that address the disproportionate impacts. The missing language is where are the Black and Brown community members being advanced in sustainable communities and economics research? And where researchers that are Black, indigenous and people of color, and from and know our communities? Oakland started in the late 1990s reducing the public housing units throughout and instead put in more home ownership for those that didn't live in housing projects. Issue of affordability in income-based housing. State, local and federal governments have participated in not being mindful of what it takes to address injustice. This is a combined problem not just an equity issue. This is also about race. The word race needs to be explicit in the slide (slide contained titles of the proposed projects).

#### Commenter #16: Speaking on increasing affordable housing on the ground

A huge housing and transportation burden exists and the housing and transportation project should be prioritized. For the housing and transportation project, how does it result in more units on the ground? A more proactive approach is needed for investment in impacted communities for extreme events that do more to mitigate pollution. Research funds should be put towards proactive approach in investment in impacted communities in anticipation of extreme events that lead to high pollution events

#### Proposed health research

#### Commenter #17: Speaking on health analysis

Chemicals selected for studies and health analysis are pre-selected and limited, whereas the public is exposed to a mixture of chemicals. Communities are fence line to various types of emissions sources. Select 4-5 major categories (industry, roadways, ports, etc.) of communities in surveys. Speaker's organization started a survey. The public pushed back on the length. Outreach on surveys led to higher response rate, including various health outcomes.

#### Commenter #18: Speaking on PM2.5 standards

Bay Area Air Quality Management District had report on particulate matter smaller than 2.5 micrometers in diameter (PM2.5), main conclusion: there is no lower limit medically established for PM2.5. Current limit is too high. Is there any intent to look at health effects of PM2.5 to promulgate reduction in current standard?

### Commenter #19: Speaking on commercial buildings

Is this project focused on exposure and epidemiology? It will be difficult to tease out both exposure and health effects.

### Proposed environmental justice research

### Commenter #20: Speaking on pesticides research

Pesticide research concepts submitted for the Triennial Plan and this round of concept collection have been ignored. CARB should look at greenhouse gas (GHG) intensity of pesticide production and increases in nitrous oxide (N<sub>2</sub>O) emissions and volatile organic compounds (VOCs) that may contribute to tropospheric ozone (O<sub>3</sub>). These issues are important yet there is no response from CARB. More transparency is needed on how projects get prioritized. Slides should be posted in advance of the meeting so it's easier to process. Research management agreed to a meeting.

### Commenter #21: Speaking on refinery related particulate matter pollution

Modeled refinery emissions lack spatial resolution and are based on monitoring stations that are sparsely sited. Approved monitors are expensive. As part of the environmental justice research, affordable monitors need to be provided in low-income neighborhoods to better understand exposure.

### Commenter #22: Speaking on PM reductions versus health improvements

Although there has been a significant reduction in PM emissions, there isn't an equivalent improvement in public health. It's based on PM<sub>2.5</sub>, but ultrafine PM may still be the issue. A standard for ultrafine PM is needed.

## Received in 2022

### Public docket for the January 27, 2022 Board Meeting

#### *Public docket*

#### Comment #1: Comment on several proposed research topics

Commenter proposed that CARB pursue the following research topics: Decrease vehicle miles traveled by shifting toward high-density and more walkable communities along with other solutions; Research enteric methane emissions from cattle using novel techniques such as bioreactors and alternative feeds; Implement behavioral economics to decrease demand for meat and dairy intake; Study the feasibility of replacing hydrofluorocarbons with natural refrigerants; Investigate the benefits of sealing home fireplaces; Determine the technological advantages of renewable electrolytic hydrogen; Investigate the lifecycle of biofuels; Fast-track the expansion of health analysis research; Research feasibility of replacing small off-road engines (SORE) with zero emission alternatives.

### Public comment during the January 27, 2022 Board Meeting

## Meeting recording

### Slides

Commenter #1: Speaking on impact of pesticides on greenhouse gas emissions and toxic air pollution exposure

The speaker urged the Board to investigate emissions from pesticide application as a source of greenhouse gas emissions and source of toxic air contaminants. This topic has not been considered a research priority in the past. Fumigants are toxic air contaminants containing harmful chemicals that are carcinogenic and cause reproductive and developmental health impacts. The mechanism of exposure is not well understood. CARB's Research Program claims to support holistic projects. This topic covers all the major research categories sponsored by the Research Program.

Commenter #2: Speaking on effects of residential fireplaces and campfires on air quality and on the health risks of pesticide drift

Wood smoke is toxic and in Oceanside, CA, fire rings at the harbor beach pollute the air significantly. The local air district claims to not have jurisdiction over those fire rings or fireplaces. CARB should have jurisdiction over any source of air pollution. Wood smoke is a complex mixture of gases and particulate matter pollution with health impacts such as asthma, heart attacks, strokes and others. Wood smoke contains carcinogenic toxins such as polyaromatic hydrocarbons (PAHs). CARB should educate the public on the dangers of wood smoke exposure.

It is recommended that CARB fund a white paper on the health risks of pesticide drift. Pesticides are sprayed very close to where people live and work and it has been shown to have health impacts.

Commenter #3: Speaking on recommended white paper concepts

CARB must investigate pesticide drift. The U.S. bans fewer pesticides than other countries, allows children to work in the agricultural industry and inhalation risks for children working in fields is excluded while only examining dermal risks. California studies show elevated childhood cancer from agricultural pesticides applied up to 2.5 miles away. In addition, it is recommended that a white paper on the dangers of wood smoke be funded. There are also concerns on health risks of inhalation of synthetic turf and crumb rubber. Per- and polyfluoroalkyl substances, or PFAS, continue to be a concern.

## Funding Year 2023-24 Research Priorities: Summary of Public Concepts and Comments (Submitted February 25 – April 22, 2022)

We received 65 public concepts this year

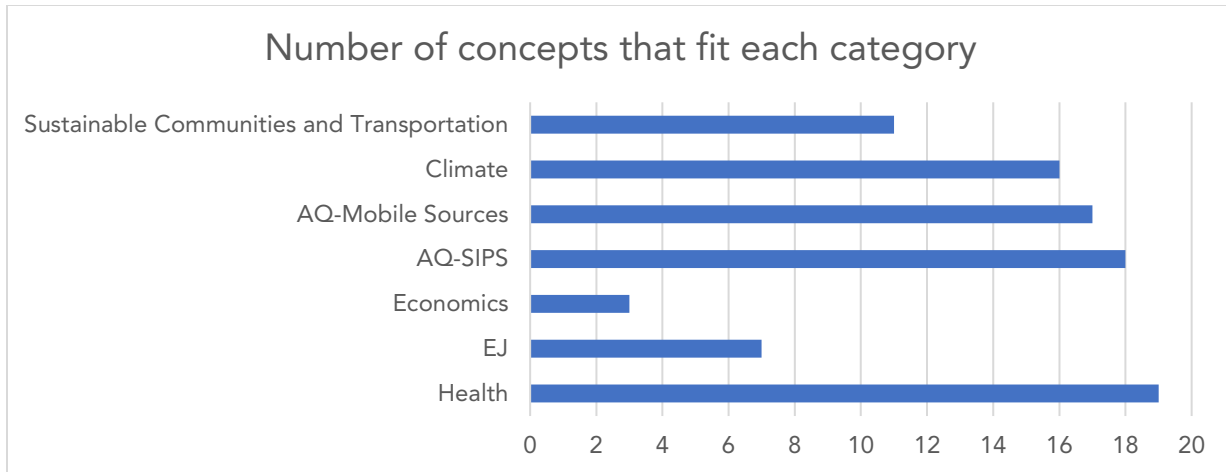


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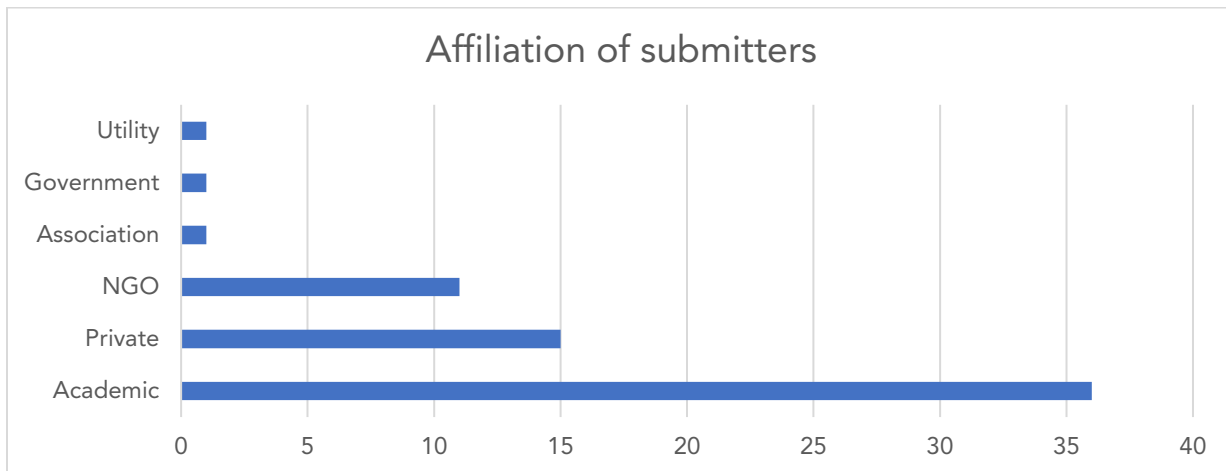


Figure 7: Summary of statistics on affiliation of submitters from the funding year 2023-2024 concept/comment survey.

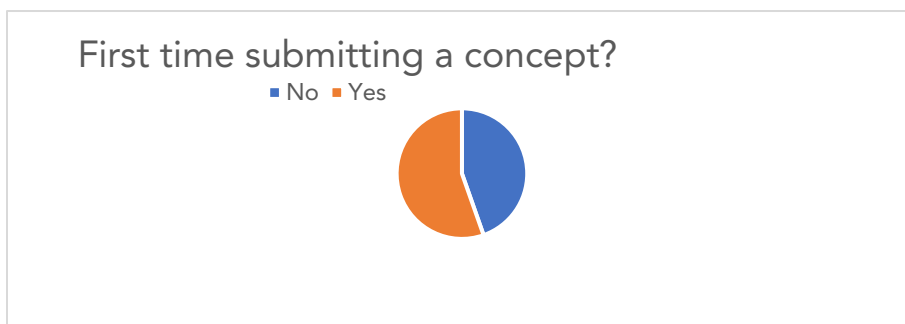


Figure 8: Summary of statistics on first time submitters from the funding year 2023-2024 concept/comment survey.

## Summary of Concepts by Category

### Air Quality

- Accurately identifying the sources and trends of oxides of nitrogen (NO<sub>x</sub>) emissions in California

- Long-term characterization of chemical composition and source apportionment of PM<sub>2.5</sub> in the San Joaquin Valley
- Characterization of gaseous and particulate pollutants in ambient air to mitigate PM pollution in San Joaquin Valley
- Quantification of volatile organic compounds and particulate matter from consumer additive manufacturing devices
- Fighting fire with fire: does clean air policy abate prescribed fires?
- Air quality standards and the composition of ambient fine particulate matter
- Quantifying greenhouse gasses and volatile organic compounds emitted following pesticide applications in specialty crops grown on the central coast of California
- Lowering the atmospheric footprint from California ports: greenhouse gases, pollutants, and health implications
- Characterizing aerial microplastic density and composition
- Measuring in situ performance of 3M's roofing materials that photocatalytically abate NO<sub>x</sub> and Ozone
- Digital camera based visible emissions monitoring
- "Air pollution mapping in California urban environments: sources, sinks, and community level exposure assessment"

## Climate

- Life-cycle greenhouse gas emissions associated with agricultural use of soil fumigants
- Monitoring carbon uptake and methane production along the salinity gradient of the San Francisco Bay estuary
- Identifying best dairy practices to reduce sustainably and holistically the climate, air quality, and health implications of dairy emissions
- Feasibility of reliable on-site production of hydrogen from a combined electrolyzer and methanol reforming fueling site
- A fused hyperspectral-lidar mobile imaging platform for quantification of methane emissions
- Electric production to meet the demands of an all-electric car, truck, tool and construction equipment future.
- Recycle, Reuse, Zero emissions & sustainment of the planet, now.
- Addressing California's looming dust storm crisis
- Methane and other air emissions from poorly abandoned oil & gas wells
- Quantifying the carbon offset benefit of solar-reflecting surfaces to drive wide-scale deployment of cool-surface projects
- Quantifying the carbon-offset benefit of solar-reflecting surfaces to drive wide-scale deployment of cool-surface projects



- Assessing the effectiveness of continuous monitoring in capturing, predicting, and preventing refinery releases

#### Health and Environmental Justice

- Knowledge, behaviors, and benefits of air filtration in environmental justice (ej) communities
- Inclusion of Community Emissions Reduction Program (CERP) goals into state implementation plans
- Switching to cooking with electric: indoor air quality for low-income households in California
- Expanding the health scenario tool to assess the health benefits of conserving, restoring and managing natural and working lands in California from extreme heat
- Assessment of collected air quality data from indoor air monitors in Portside Environmental Justice Neighborhood of San Diego County
- Cleaning the air: do air purifiers reduce exposures and health impacts from wildfire smoke among low-income people with asthma?
- Advancing health equity: examining air pollution exposures and health effects at the intersection of climate change, environmental injustice, and social vulnerability
- Reducing wildfire PM 2.5 exposure in California residential buildings with smart thermostats
- Vulnerability to particulate matter exposure from wildfires in California
- Population vulnerability to compound climate hazards in California
- Risks of airborne agrochemicals from concentrated animal feeding operations (CAFOs)
- White paper on reducing daily exposure to mobile source air toxics by improving vehicle cabin air quality
- Quantification of carcinogenic components from meat-cooking activities
- Ozone and by-product chemistry assessment of Far-ultra-violet C light
- Big data exposome paradigm for identification of changes in air pollution exposure on respiratory disease outcomes from the pre-COVID to the pandemic period

#### Mobile Sources

- Driving environmental justice: community monitoring of diesel truck emissions and impacts on air quality and health outcomes
- Study of electrified short-haul rail between the Ports of LA/Long Beach and the Inland Empire
- Emissions particulate ultrafine 0.3 technology
- Energy-based port transportation

- A steam flow engine
- Real world brake activities of California fleets
- Assessment of long-term electrolyzer performance and reliability
- Understanding the impact of human drivers in tire-wear and brake-wear PM emissions
- Eco-tourism with electric boats on Lake Tahoe
- Development of methodologies for measurement, testing and compliance for electric vehicle efficiency
- Utilization of machine learning software for optimizing EV fleet utilization.
- Construction equipment dust control system
- Farming equipment dust control system
- Mining emission factors / California & Southwest desert regions of the United States

### Sustainable Communities and Transportation

- Equitable distribution of EV charging stations across Southern California to improve accessibility among socially disadvantaged communities
- Emissions reductions from implementing mobility elements
- Automating GHG inventories for California local governments
- Air quality and health benefits from reducing vehicle emissions through ZEV-for-all adoption policies in California
- Can hydrogen fueled FCEVs increase ZEV penetration in high-density, low-income communities?
- Comparison of smart cities and relocalized towns
- New housing development relative to sustainability, affordability, and equity
- Sustainability and equity implications of COVID-19 on travel
- Telecommuting and telehealth strategies as part of broadband digital equity for air quality improvement and GHG reduction in Southern California region.
- Passive homes
- R&D project on the impacts of variable capacity residential HVAC systems. The industry needs hard evidence of the energy savings and GHG reduction potential of this technology.
- Evaluate of the impacts of commissioning on residential heat pump water heaters
- Health risks of vehicle-derived chemicals within Inland Southern California commuters
- Scalable and cost-effective free air carbon dioxide enrichment (FACE) leads to global carbon neutrality by 2030

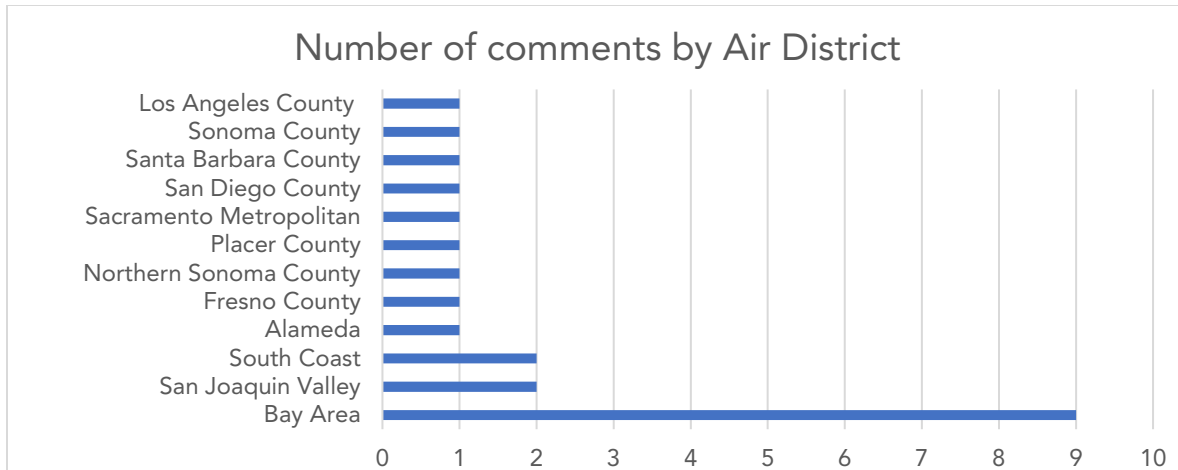


Figure 9: Summary of statistics on the comment submitter's home air district location from the funding year 2023-2024 concept/comment survey.

- Exposure concerns
  - Concerns over city general plans – lack of information regarding exposure to vehicle emissions
  - Living near automotive shops
  - Concerns about living near airports and associated emissions
  - Oil fields adjacent to homes/schools
  - Concentration of pollution sources at Port of San Diego
  - 2-stroke engine emissions from tourism industry
  - Waste-management vehicles, lack of oversight
- Fragrances
  - Dryer exhaust from neighbors and health impacts
  - Pervasive use of fragrance chemicals in range of products, study of health impacts
  - Migraines tied to fragrances
- Incentives and Regulatory Compliance
  - Support low emission farming equipment funding CV
  - Barriers to registering diesel trucks in CA
- Climate
  - Climate change should be the main concern
  - More school programs that include climate education
  - Focus on solving climate issues rather than doing research
- Sustainable Communities and Transportation
  - SB 375 has failed so far, a clearer path to sustainable future needed
  - VMT not happening fast enough, role of infill development
  - Effects of suburban sprawl, car dependency on city financial health and climate
  - Concerns over EV charging availability/feasibility in dense urban areas

## Public comments during the September 14, 2022 public meeting

[Slides](#)

[Recording](#)

After CARB reviews the comments and concepts submitted by the public as well as from CARB staff, a list of high priority projects is presented to the public. The list of projects presented exceeds the available budget. Public input at this stage is critical in creating a short list of projects that fit the allocated funding for research.

During this meeting, CARB staff presented the list of projects by research category and allowed time for questions and discussion. CARB staff also provided opportunities for members of the public to vote on projects during the meeting and held the poll open for an additional 4 weeks. The results of the poll are provided after the summary of public comments.

### Proposed health and environmental justice research

#### [Commenter #1: Speaking on benefits of cancer reduction](#)

This project seems like something another agency, Office of Environmental Health Hazard Assessment (OEHHA), would do. A lot of work has been done on this topic. Why is it a priority?

#### [Commenter #2: Speaking on the Scoping Plan](#)

Please expand on tools to better estimate health impact of practices to decrease wildfires or increase urban greening. Are they separate? Are these being considered at a high level? What assumptions are you making regarding effectiveness of these practices? This is a controversial area. Does analysis allow for sensitivity analysis?

#### [Commenter #3: Speaking on urban greening](#)

There is an assumption that any urban greening will have a net positive impact, but different types of trees can impact air quality. This is a multifaceted problem. There is evidence that ozone may be driven by biogenic sources. The type of tree matters. There can be orders of magnitude difference in ozone formation potential. Must consider a lot of factors like ozone uptake, particulate matter deposition, supporting ecosystem services, urban heat island effect, mental health services, etc.

### Proposed air quality research

#### [Commenter #4: Speaking on improvements to air conditioning](#)

Why do we need to put public money towards increasing efficiency of climate control features in electric vehicles? Manufacturers are likely doing this themselves. The market is likely to take care of this problem.

Follow up from commenter in chat: California Energy Commission (CEC) may be a more appropriate funding source.

#### Commenter #5: Speaking on regulations implemented in SJV

How does the proposal differ from what the SIP proposes or projects in the future?

Follow-up question: does this include all pollutants or just PM? Does this include greenhouse gas emissions?

#### Proposed air quality research

#### Commenter #6: Speaking on residential growth patterns

Open land versus housing. New construction technology is available, makes it possible to build new towns on top of old towns done sustainably. Pricing strategies can impact transportation choices. Deliberately introduce and subsidize active transportation and electric vehicle options. Stacked transportation modes are attractive and sustainable.

#### Proposed climate, and sustainable communities and transportation research

#### Commenter #7: Speaking on landfill study and regarding residential growth

This project looks like it is within CalRecycle's purview. Are they funding this study as well? Why is CARB studying residential growth? Other agencies have greater jurisdiction over this area.

#### Commenter #8: Speaking on connection of VMT and residential growth

Scoping plan – pricing. Use triple pricing, embed kilo-Watt-Hours (kWhs) and GHG emissions into pricing of products/services. This could be a source of offsets.

#### General comments

#### Commenter #9: Speaking on lowering VMT through increased broadband access

Higher level of broadband usage and deployment, speed, affordability, could lead to reduction of GHGs due to lower VMT. Support of telecommuting can lead to reduction of trips. There isn't enough emphasis on affordability and access to broadband. Messaging around telecommuting should emphasize environmental benefits.

#### Commenter #10: Speaking on air cleaners to prevent asthma exacerbation

Air cleaners during wildfire smoke – how effective are they at preventing asthma incidence? Increasing number of vulnerable communities are exposed to wildfire smoke. What is the role of household air cleaners in mitigating asthma?

### **Public polling results on the high priority projects proposed for funding in fiscal year 2023-2024**

During the September 14, 2022 meeting, polling was used to allow meeting participants to select projects they thought were high priority and recommended for funding. The poll was kept open for several more weeks after the public meeting. Below is the final polling result for these projects.

Table 1: Public polling results for high priority research concepts presented during the September 14, 2022 meeting. Concepts with an asterisk (\*) next to the cost were approved for funding by the Board on January 26, 2023.

Research Question	Cost	Public Support
<b>Proposed Health and EJ Concepts</b>		
What are the combined impacts of multiple climate change stressors on health, taking into account environmental justice, racial equity and social vulnerability factors (i.e., heat, air pollution, wildfires)?	\$500,000*	76%
Can we better support land management practices with improved quantification of health impacts from reduced wildfires and increased urban greening?	\$550,000*	74%
Are there ways to further quantify the benefits of cancer risk reduction?	\$500,000*	46%
Can advanced air purifiers reduce non-PM pollutants including ozone, nitrogen dioxide, volatile organic compounds and hydrogen sulfide?	\$400,000	51%
<b>Proposed Health and EJ White Paper Concepts</b>		
What guidance is needed on how the public can use indoor air quality monitors to maximize health protection?	\$75,000	56%
Pilot a webinar series to communicate to the public the health effects from air pollution, what actions they can take, and what incentives are available.	\$75,000	60%
<b>Proposed Air Quality and Mobile Sources Research</b>		
As regulations are implemented, which air pollution sources will dominate impacts on air quality in the San Joaquin Valley?	\$950,000*	62%
What are the potential air quality benefits of prescribed burns used to manage wildfires?	\$600,000*	67%
Understanding sources and health impacts of air pollution in Imperial Valley – Phase 1 (informed by community engagement project)	\$200,000	66%
How can we make the novel Toxic-metal Aerosol Real-Time Analysis (TARTA) instrument more user-friendly and deploy it in areas of concern?	\$150,000*	42%
What are the potential exposure impacts of locomotive wheel and brake wear emissions on nearby communities?	\$900,000*	39%
Which technological improvements can be applied to air conditioning and heating in electrified vehicles that significantly improve efficiency and extend battery capacity?	\$150,000	56%
<b>Proposed Climate, and Sustainable Communities and Transportation Research</b>		

Can we better understand the relative amount of methane emissions from industrial sectors in the southern San Joaquin Valley?	\$900,000*	57%
What do real-world methane measurements at landfills tell us to inform the state-wide inventory?	\$500,000*	59%
How can California’s residential growth pattern advance climate, housing, and equity goals? How can the State address barriers to residential growth in priority development areas?	\$500,000	61%
How do different pricing strategies affect transportation, equity, and revenue outcomes?	\$500,000	39%
Are land use and transportation trends equitable? What are the equity benefits of VMT reduction, and what metrics are the most useful for tracking the equity impacts land use, housing, and transportation?	\$600,000	48%

## Received in 2023

### Public docket for January 26, 2023 Board Meeting

#### *Comments log*

Comment #1: Comment on the global warming potential of emissions from venting versus flaring from fracking wells

Commenter asked which emission source produces higher global warming potential (GWP), taking into consideration the toxicity of co-emitted pollutants and potential secondary products such as ozone.

### Public comment during the January 26, 2023 Board Meeting

#### *Meeting Slides*

#### *Recording*

Comment #1: Speaking on support for health analysis research

Commenter expressed support for continuing the health analysis research and taking into consideration the various impacts that air pollutions has on public health.