CALIFORNIA
AIR RESOURCES BOARD

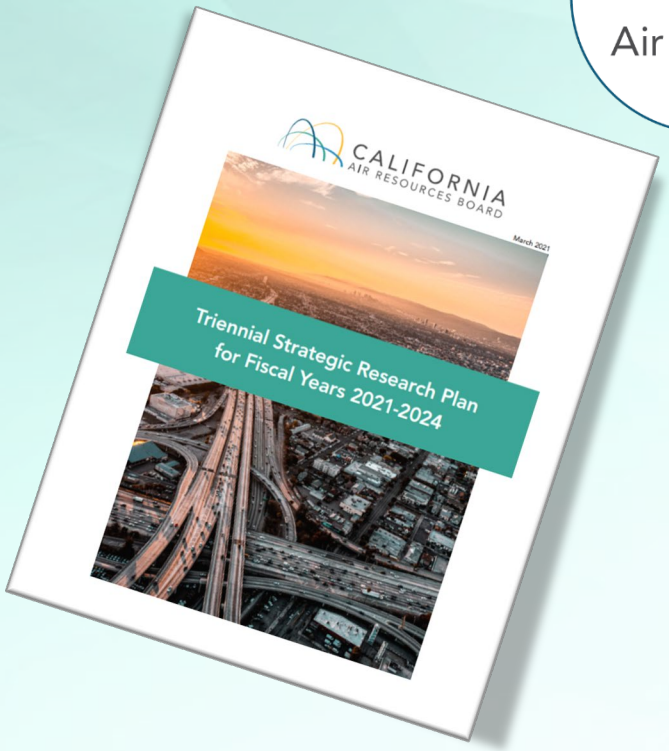
Proposed Research Projects for Fiscal Year 2023-2024

January 26, 2023

Board Item 23-1-5

Success through Science

- Leader in air quality and climate change 50+ years
- Legislatively mandated Research Program
  - Scientifically sound rulemaking
  - Protects public health
  - Best available science and technology
- Triennial Strategic Research Plan (2021-2024)
  - Developed with public process
  - Aids in research planning and outreach
  - Guides annual project selection
  - Delineates new priorities



CARB

CARB Research Project Priorities

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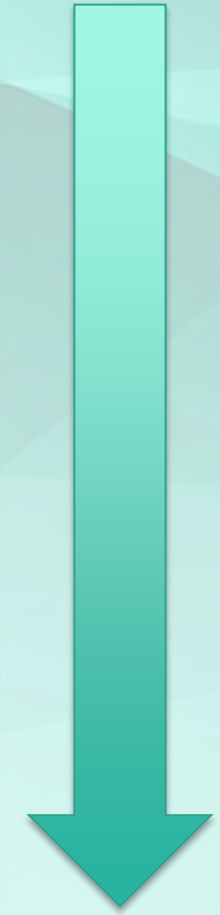
Annual Research Planning Process

Step Description	CARB Action Needed	Opportunities for External Guidance
Identify Research Priorities	Executive Officer (EO) /Board member review	• Comment & concept collection • Public meeting
Develop Projects	Board approval	• Community driven research roadmap projects to inform future projects • Meetings with research entities and community partners
Solicit and finalize Proposals	Research Screening Committee (RSC) recommendation	• Encourage diverse partnerships through Empower Innovation site • Public meeting
Active Project Kickoff	EO approval	• Progress updates on project website • Progress meetings • Project advisory committees
Active Project Closing	RSC approval of results	• Requirements for outreach documents • Public seminar to present results



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Proposed Changes on Board Updates

Practice	Current	Proposed
Plans	3-year	5-year
Board meeting frequency	Annually	2-3 years
Delegation to EO	Annually	5-years
Board Member briefings	Annually	Annually or as needed
Board updates on research results	Brief updates	Topical presentations
Final results & research gaps	Final reports	Final reports + Research symposia

- Why change it?
  - More holistic, comprehensive, topical Board discussions
  - Increase flexibility to leverage additional funds
  - Allows for broader engagement and focused discussions

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How do we operationalize racial equity in CARB research?

- New Actions Implemented
  - Leveraging tools, increasing transparency, more opportunities for public input
  - Community engagement in projects, community-driven research roadmaps, cultural humility statements, scoring criteria and/or requirements for community partners where appropriate
- Lessons learned
  - Transparency requires capacity, community engagement and community expertise requires more solutions.
  - Current process/timelines limit ability for meaningful engagement
- Leverage tools in development
  - Cal/EPA Community Science Model

CalEPA California Environmental Protection Agency | OEHHA California Office of Environmental Health Hazard Assessment | CalRecycle | California Air Resources Board | California Department of Pesticide Regulation | DTSC Department of Toxic Substances Control | California Water Boards State Water Resources Control Board

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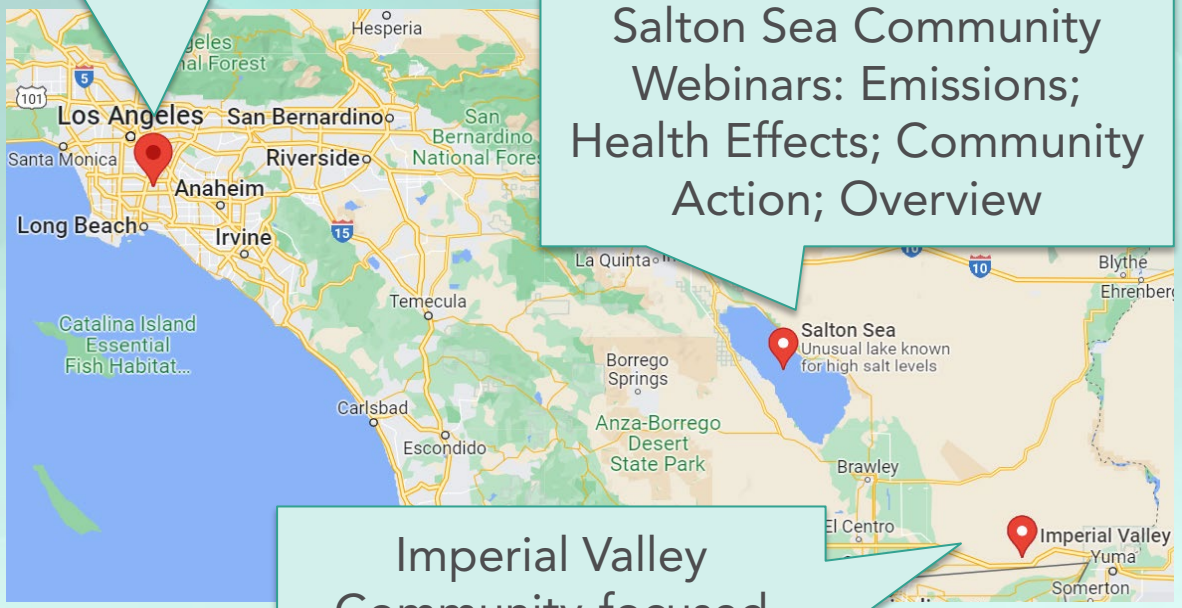
Community-Driven Research Roadmap Projects

Community-centric Research Roadmap on Toxic Metal Emissions

Salton Sea Community Webinars: Emissions; Health Effects; Community Action; Overview



Imperial Valley Community-focused Collaborative Research Plan on Air Pollution Sources of Concern

- Roadmap development contract
  - Identify topics, interested communities, and partners
  - Outline research conducted in community
  - Develop community engagement plans
  - Collect community input, create community-driven research roadmap, and note findings relevant in other communities

After roadmap completion

- Outlines future research priorities
- Future projects, if funded, could allow public access to data that can be used by communities and others

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Summary of Proposed FY23-24 Projects

- Developing tools and understanding local issues
  1. The next step for the TARTA instrument $150k
  2. Environmental Justice and air quality in Imperial Valley $200k
- Understanding Air Quality Emission Sources
  3. Impact of regulations and evolving pollution sources in San Joaquin Valley $950k
  4. Characterization of train wheel- and brake-wear emissions $900k
  5. Understanding air quality impact from wild and prescribed fires in California at the wildland-urban interface $600k
- Improving Understanding of Greenhouse Gas Emission Quantification
  6. Emissions monitoring of landfill methane in California $500k
  7. Industrial sector contributions to methane emissions in San Joaquin Valley $900k
  8. Greenhouse gas emissions associated with pesticide use $400k
- Improving Health Analysis and Understanding Nexus of Health and Climate Change Impacts
  9. Health impacts of land-management practices $550k
  10. Combined impacts of climate change stressors $500k
  11. Health and economic benefits of cancer risk reduction $500k

Total - $6.2M

Developing tools and understanding local issues

- Research Question: What tools and metrics do we need to understand disproportionate air pollution and climate impacts experienced in priority communities?
- Proposed Projects
  1. The next step for the Toxic-metal Aerosol Real-Time Analysis (TARTA) instrument $150k
  2. Environmental Justice and air quality in Imperial Valley $200k

Understanding Air Quality Emissions Sources

- Research Question: How can we improve our understanding of pollution sources in highly impacted areas?
- Proposed Projects
  3. Impact of regulations and evolving pollution sources in San Joaquin Valley
  4. Characterization of train wheel- and brake-wear emissions
  5. Understanding air quality impacts from wild and prescribed fires in California at the wildland-urban interface

Improving Understanding of Greenhouse Gas Emission Quantification

- Research Question: How can we expand quantification of greenhouse gas sources across the state of CA?
- Proposed Projects
  6. Emissions monitoring of landfill methane in California
  7. Industrial sector contributions to methane emissions in the San Joaquin Valley
  8. Greenhouse gas emissions associated with fumigant use

Updates on Health Research

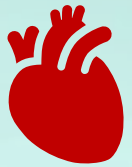
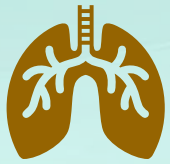
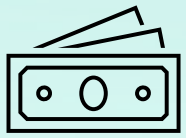
Expanded

Health

Analysis

Expanded $PM_{2.5}$ Health Endpoints

Updated Endpoints	New Endpoints
Cardiovascular Hospital Admissions	Cardiovascular ED Visits
Respiratory Hospital Admissions	Acute Myocardial Infarction, Nonfatal
Respiratory ED Visits	Asthma Onset
	Asthma Symptoms / Exacerbation
	Lung Cancer Incidence
	Lost Work-Days
	Alzheimer's Disease
	Parkinson's Disease


- Described in Bulletin released Nov 2022
- Initial phase of project to expand health analysis
- Response to recent research and Board direction

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Research Projects Support Expanded Health Analysis

Projects/Health Outcomes	Criteria Pollutants	Air Toxics
Birth Outcomes and Neuro-degenerative (Preterm Birth, Low Birth Weight, Autism, Alzheimer's and Parkinson's diseases)	$PM_{2.5}$, NO_2, O_3	Yes
Children's Health and Neuro-development (Neurodevelopmental milestones, attention, standardized test scores)	$PM_{2.5}$, PM_{10}, NO_2, NOx, O_3 (and BC as a component of PM)	Yes
Lost Work-Days	$PM_{2.5}$	
Metabolic illnesses (Diabetes)	$PM_{2.5}$, NO_2, O_3	Yes
Impacts of Freight Pollution on Respiratory Symptoms (Asthma medication use, respiratory symptoms and ED visits)	$PM_{2.5}$, NO_2, NOx	Yes
Improved Assessment and Tracking of Health Indicators (Various health indicators in vulnerable and impacted communities including AB 617 communities)	$PM_{2.5}$, NO_2	

New Research Includes More Focus on Community Health Issues

Racial/ethnic subgroups	Community Subcontractors Consultants	Community Advisors
• Health Endpoints • Multiple Health Research Projects	• Freight Pollution • Health Indicators • Wildfire Smoke • Neurodevelopment • San Joaquin Valley AP Exposure	• Building Decarbonization • Indoor Air Quality Report Update

Improving Health Analysis and Understanding Nexus of Health and Climate Change Impacts

- Research Question: What are the benefits of different climate and pollution reduction strategies? And how can we improve those strategies to maximize health for all Californians?
- Proposed Projects
  9. Health impacts of land-management to reduce wildfire
  10. Combined impacts of climate change stressors
  11. Health and economic benefits of cancer risk reduction

Research Gaps Remaining

- Health: How do we quantify and communicate health benefits for clean indoor and outdoor air?
- EJ: How do we develop and track metrics to evaluate changes in health over time at the community level?
- Economics: How do we equitably accelerate the transition to zero-emissions?
- AQ: What are the priorities to understand pollutant exceedances and what mitigation strategies can be developed?
- Climate: What research can support implementation of the 2022 Scoping Plan?

Next Steps

- 2023-2024 Research Plan
  - Develop full project scopes
  - Solicit proposals from University of California and California State University researchers
    - Connect researchers and community partners on Empower Innovation
    - Host public solicitation meeting

Staff Recommendation

- Approve Resolution 23-5
  - Proposed project concepts for FY 2023-2024
  - Delegation of contract approval to the executive officer for contracts covering fiscal years 2023-2025