# Proposed Annual Research Plan

## Fiscal Year 2017-2018

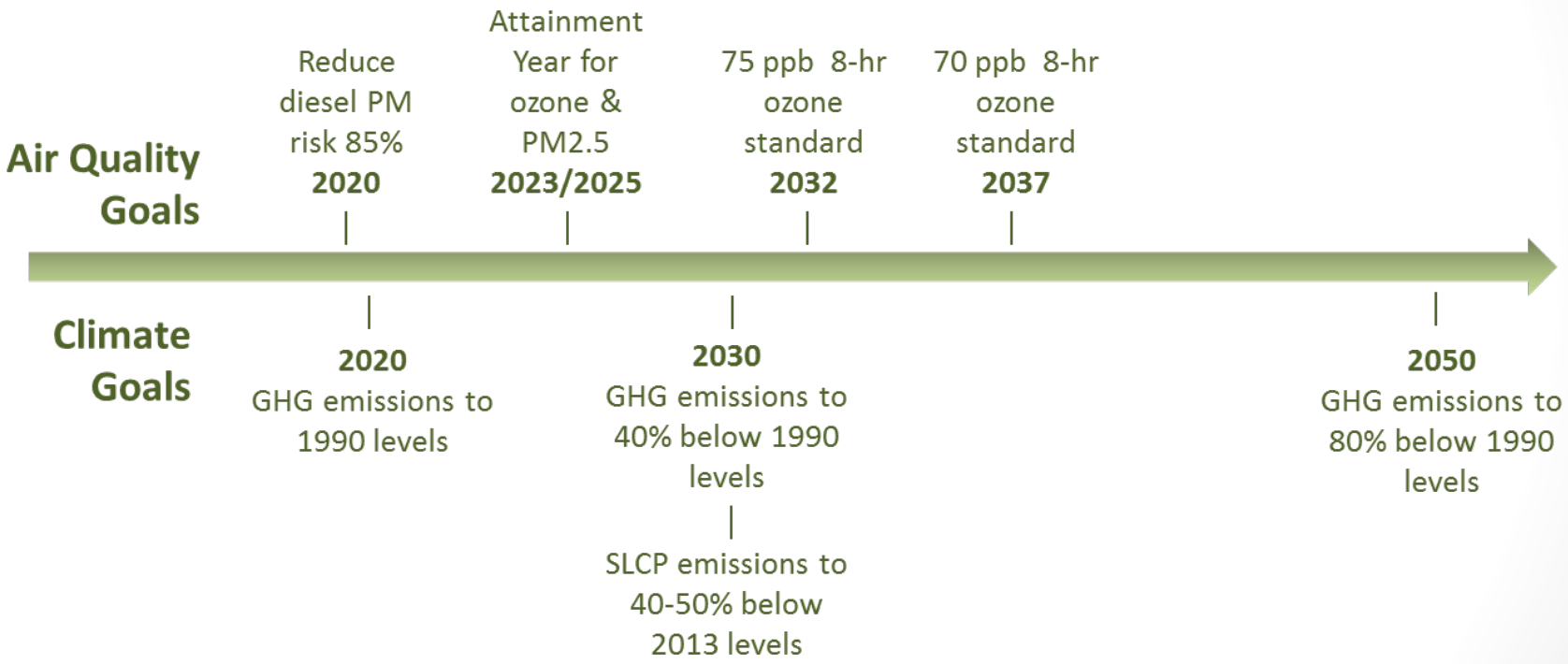
**April 27, 2017**

California Environmental Protection Agency
Air Resources Board

# Today's Action


- Approve Fiscal Year 2017-2018 Research Plan
  - $4.2 M total budget
  - 20 new research projects

# Planning Considerations

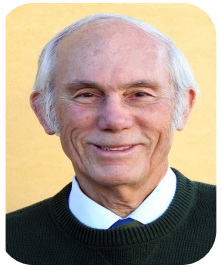


# Research to Inform Policy

# ARB Research Program

- Created by the Legislature in 1971
- External contracts and in-house research
- Multiple coordination mechanisms
  - ARB leverages $5 from collaborators for every $1 of ARB research funds spent

# Research Screening Committee



Harold Cota, Ph.D.
Cal Poly, San Luis Obispo
**(Chairman)**

Philip Fine, Ph.D.
SCAQMD

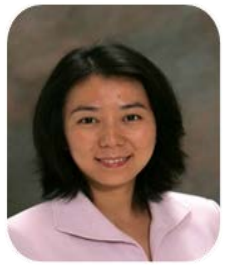
Alan Vette, Ph.D.
U.S. EPA

Rashid Shaikh, Ph.D.
Health Effects Institute

Suzanne Paulson, Ph.D.
UCLA

William Eisenstein, Ph.D.
U.C. Berkeley

Forman Williams, Ph.D.
U.C. San Diego



Yifang Zhu, Ph.D.
UCLA

Tim Wallington, Ph.D.
Ford Motor Company

J.R. DeShazo, Ph.D.
UCLA

Rachel Morello-Frosch,
Ph.D., M.P.H.
U.C. Berkeley

# Annual Planning Process

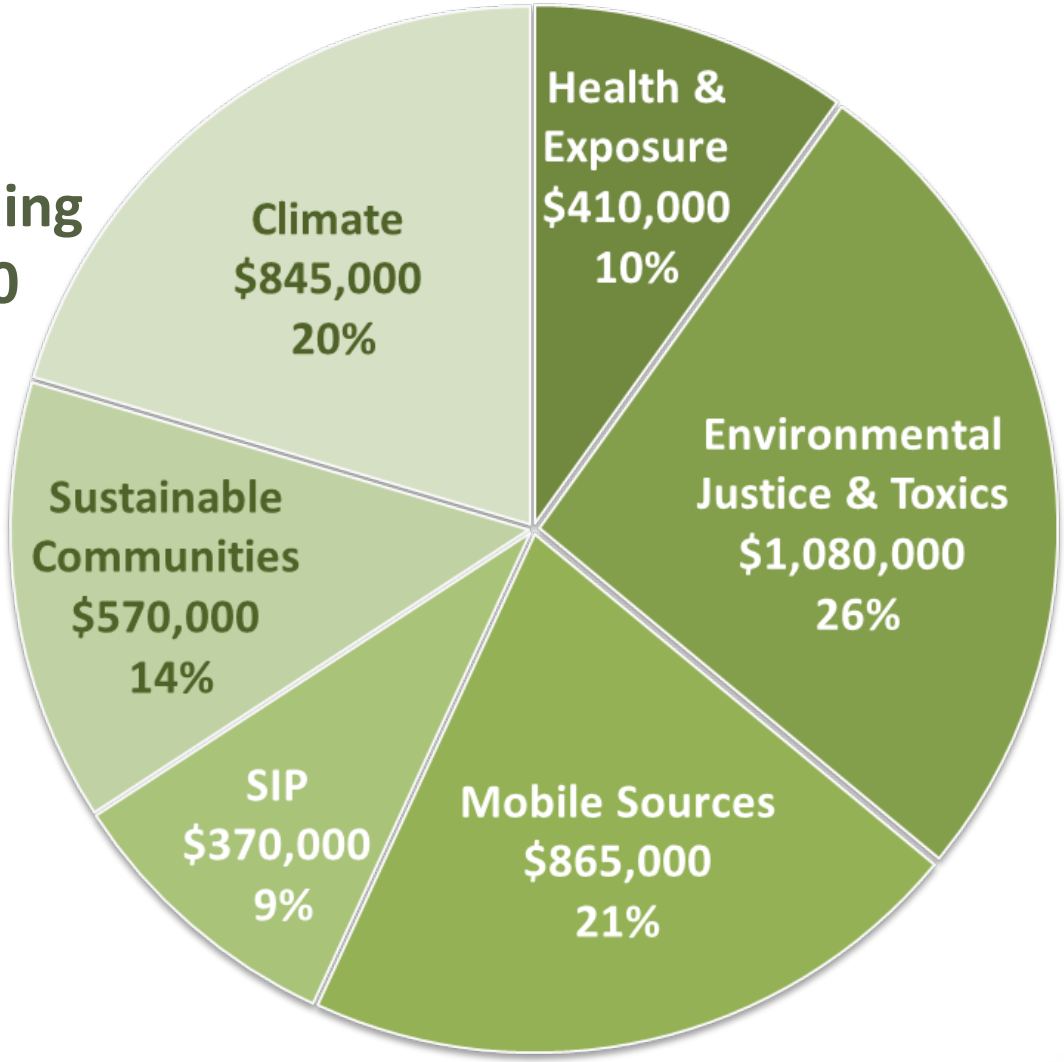
- **Research Plan Development**
  - Solicit research ideas from the public
  - Identify program-driven research needs
  - Prioritize needs via internal & external coordination
  - Board approves proposed Research Plan
- **Contract Development**
  - Develop solicitations for proposed projects
  - Review committees identify winning proposals
  - Board approves funding for proposals
- **Project Oversight**
  - Staff manage projects and solicit input
  - Large projects include advisory panels
  - Research Screening Committee approves final reports

**External Coordination Opportunities**

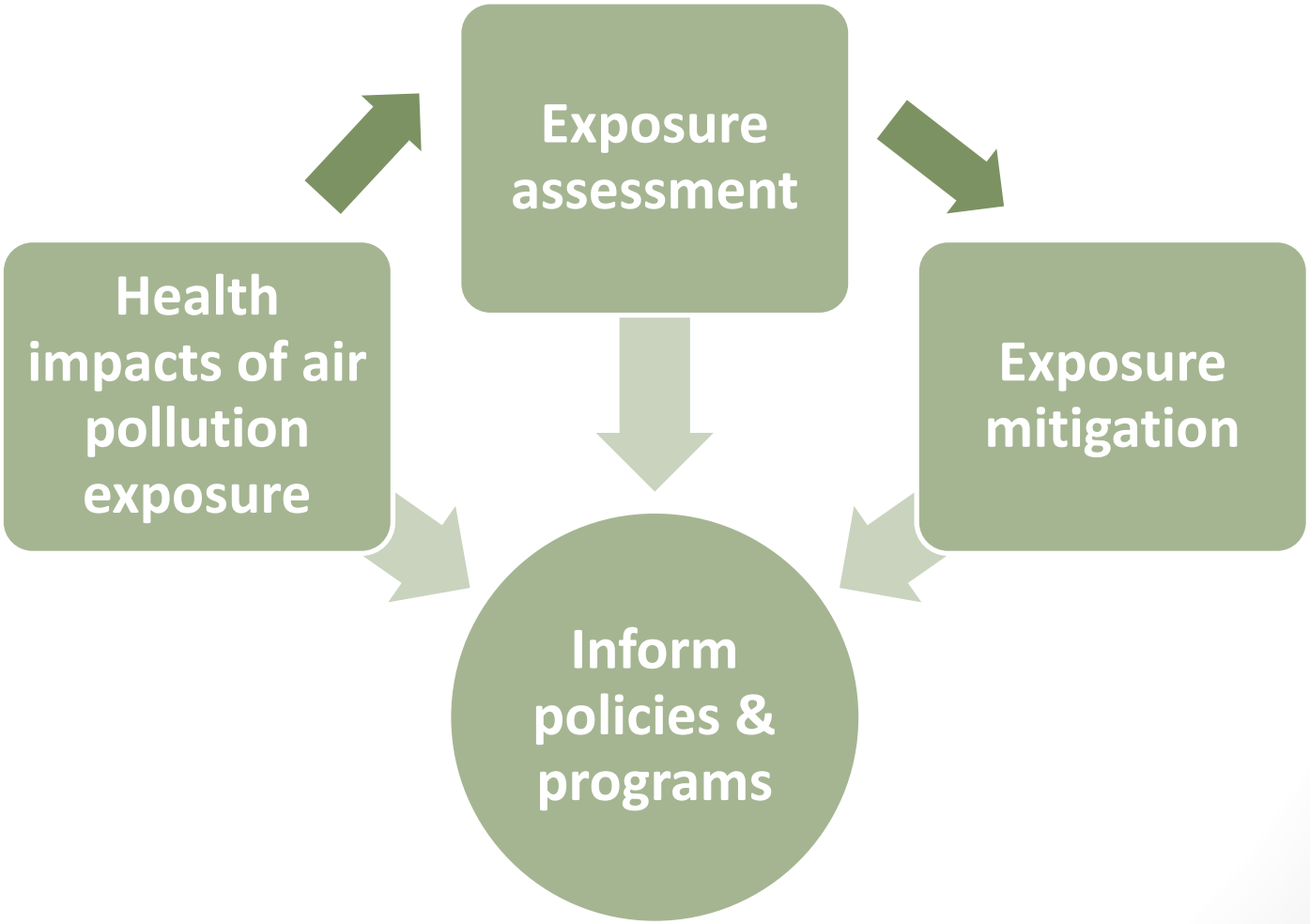
# Priorities Based on Program Needs

*Fiscal Year 2017-18 Funding*

**Total Funding**
**$4,180,000**

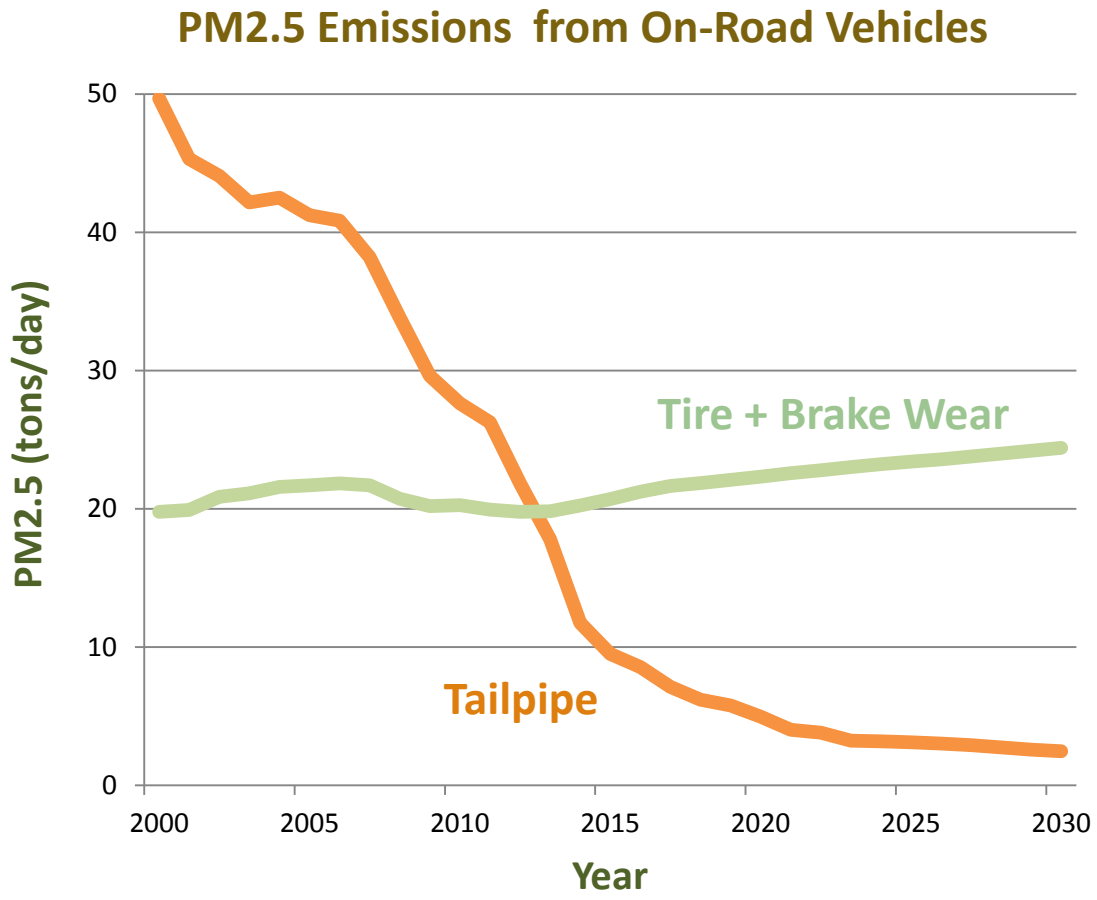


# Health & Exposure



# Health & Exposure

## *Challenges*



# Health & Exposure

*Recommended Research Projects*

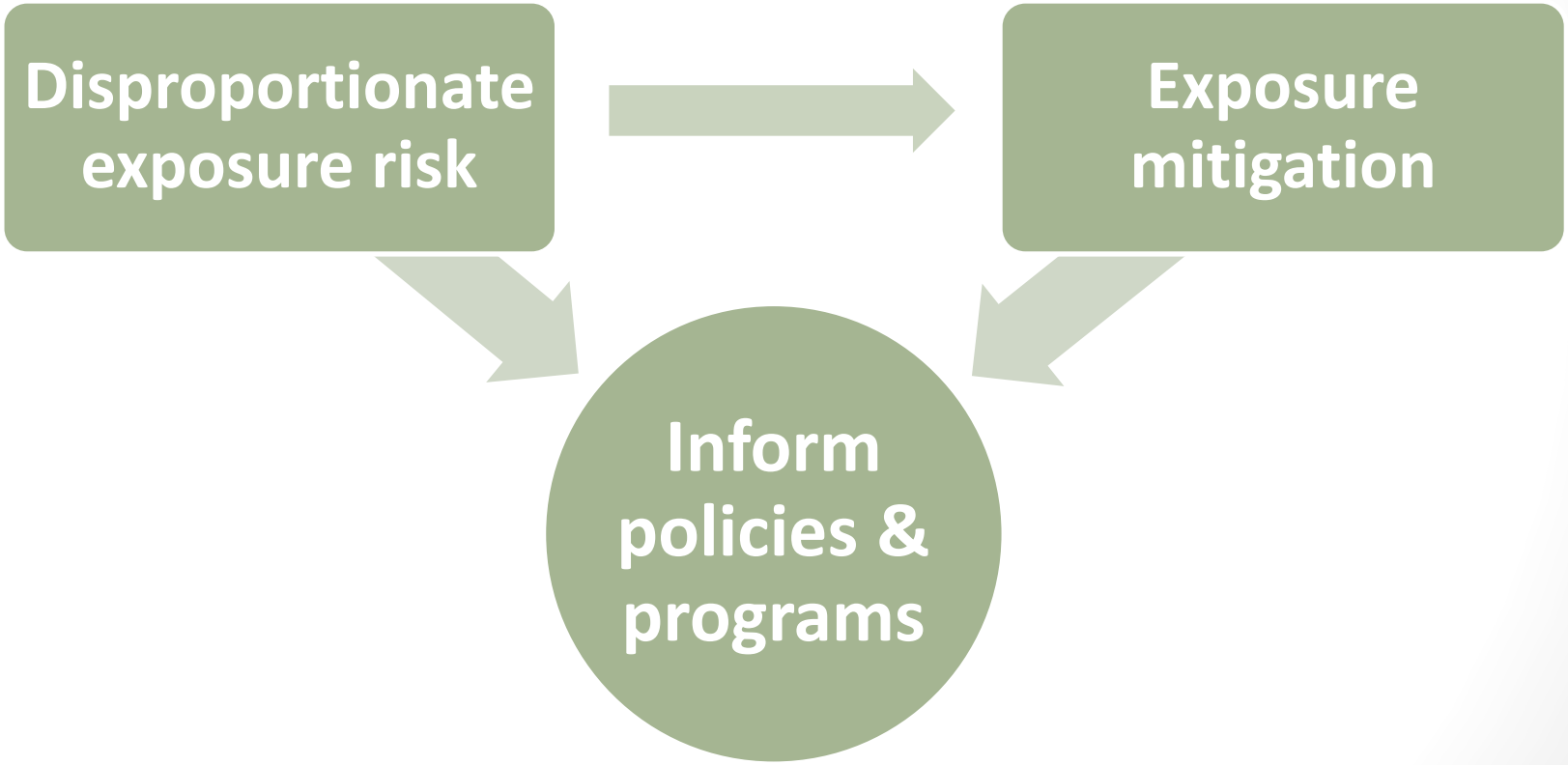
**Exposure assessment**

1. Health impacts of emissions from tire and brake wear ($250k)

**Health impacts of air pollution exposure**

2. The impact of combined exposures to PM2.5 and ozone on human health ($160k)

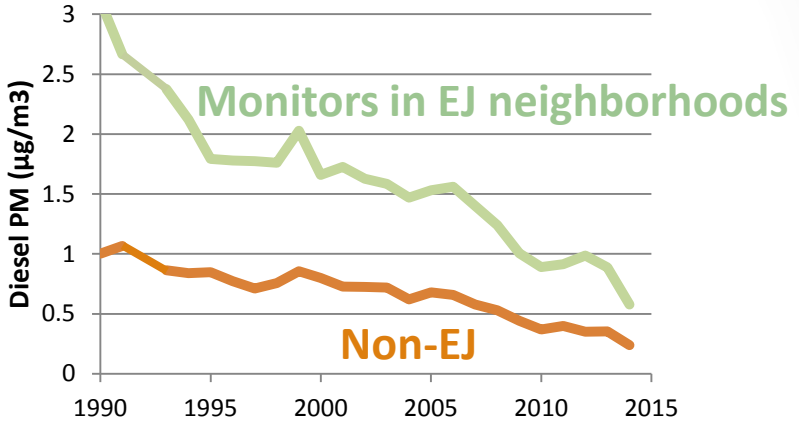
# Environmental Justice



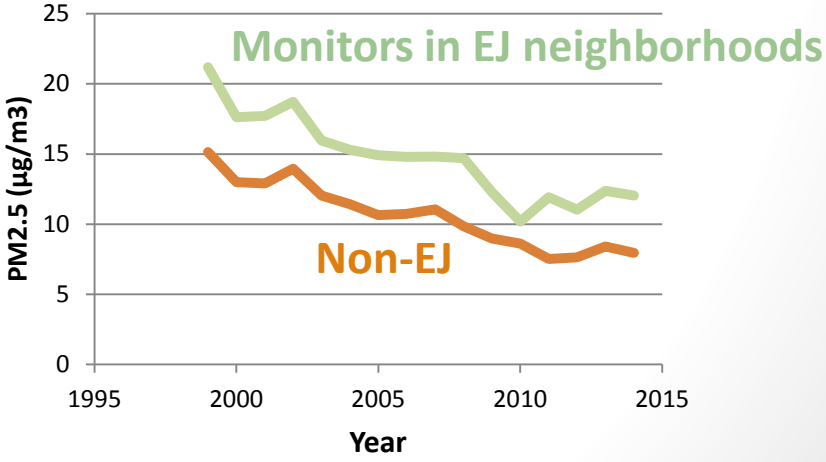
# Environmental Justice

*Challenges*

- PM2.5 in EJ communities are higher than those located in non-EJ communities




- Real-time community monitoring technologies are not available for toxic metals



# Environmental Justice

## *Recommended Research Projects*

**Disproportionate exposure risk**

1. Sources contributing to higher levels of PM2.5 in disadvantaged communities ($180k)
2. Sources contributing to higher levels of benzene and other air toxics in disadvantaged communities ($200k)
3. Development of real-time, portable monitoring methods for toxic metals ($400k)

**Exposure mitigation**

4. Geofencing as a strategy to lower emissions in disadvantaged communities ($300k)

# Mobile Sources

*Challenges*

- Supporting enforcement and improving inventory data
  - Real world emissions may be different than those measured during certification
  - Insufficient data to track the long-term effect of the LEV II regulation
  - Cold-start emissions from plug-in hybrids result in higher emissions than traditional engine cold starts

# Mobile Sources

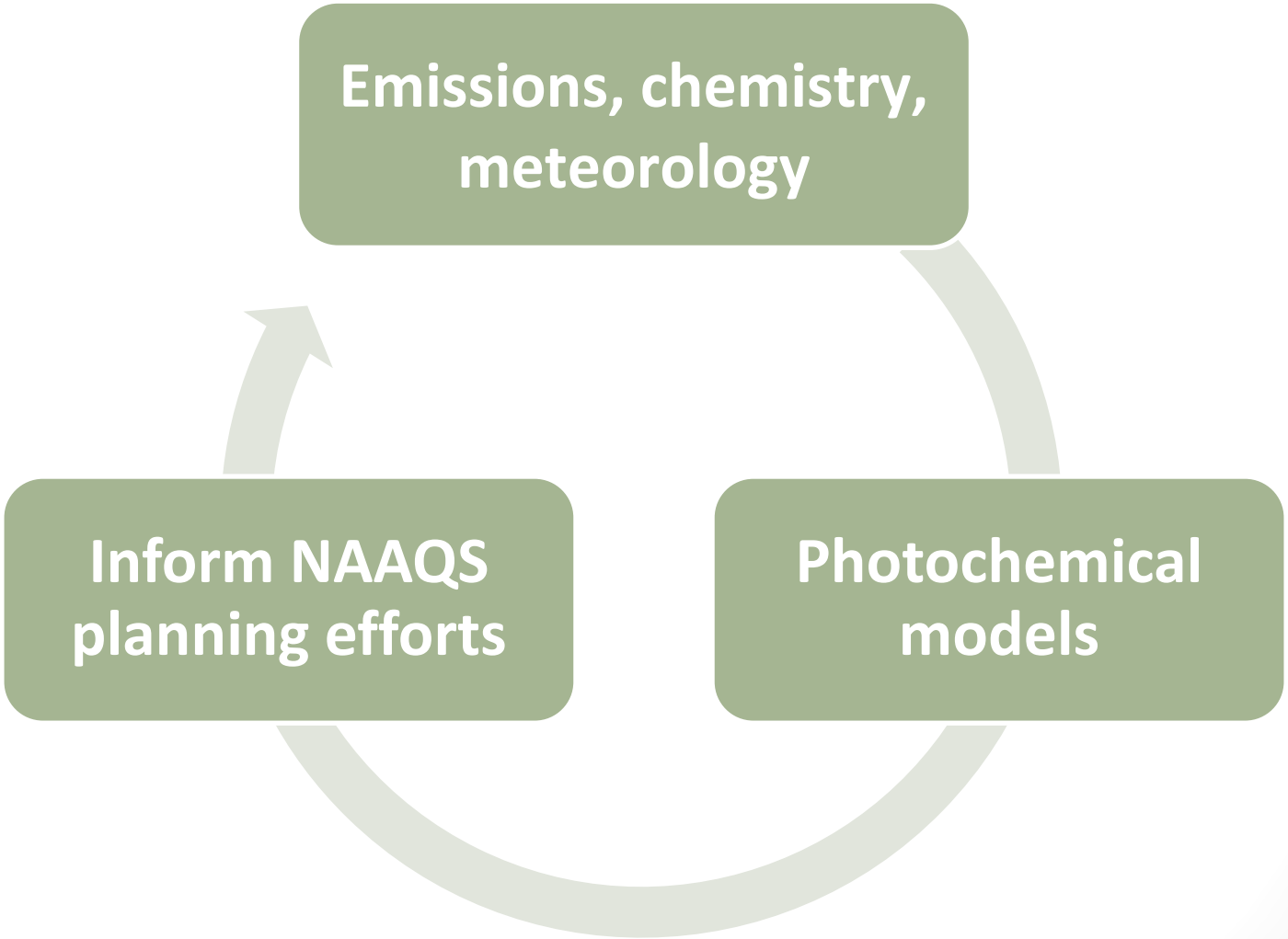
## *Recommended Research Projects*

**Mobile sources emission inventory**

**Track program effectiveness**

1. Activity data of off-road engines in construction ($200k)
2. Cold start emission impacts of blended plug-in hybrids ($75k)
3. Vehicle brake and tire wear emissions ($350k)
4. Identification of high emitting light-duty vehicle makes and models ($200k)
5. Light-duty vehicle trends from a remote sensing measurement campaign ($40k)

# SIP


Emissions, chemistry, meteorology
Photochemical models
Inform NAAQS planning efforts

# SIP

## *Challenges*

- As regulations reduce local ozone formation, background ozone is an increasing concern
- Conditions that led to recent PM2.5 exceedance events need to be better understood

# SIP

## *Recommended Research Projects*

**Emissions, chemistry, meteorology**

1. Vertical ozone distribution over California ($50k)

**Photochemical models**

2. Long-term characterization of PM2.5 in the San Joaquin Valley ($320k)

# Sustainable Communities


*Challenges*

- Studies have identified the potential for health co-benefits of active travel
- Accounting for GHG reductions in buildings should include factors beyond energy savings
- Inform policy on the intelligent deployment of connected and automated vehicles

# Sustainable Communities

*Recommended Research Projects*

**Evaluation of co-benefits & impacts**

1. Updating the Integrated Transport and Health Impact Model (ITHIM) ($100k)
2. Policy, planning and program frameworks for zero-net carbon communities ($250k)

**VMT reduction strategies**

3. Emissions impact of connected and automated vehicle deployment in California ($220k)

# Climate

*Challenges*

- Quantifying and mitigating emissions from dairies can be challenging due to the complexity of these systems
- Emissions from smaller refrigeration systems are not as well understood as larger systems
- As black carbon is reduced, brown carbon needs to be better understood

# Climate

*Recommended Research Projects*

**Mitigation options**

1. Multiple pollutant mitigation strategies from dairy sources ($400k)
2. Strategies to reduce methane emissions from enteric and lagoon sources ($150k)

**Emission inventory**

3. F-gas emissions from small commercial and industrial refrigeration equipment ($250k)

**Modeling & monitoring**

4. Brown carbon modeling and source attribution ($45k)

# Communication

- **Outreach in the past year**
  - 13 Research Seminars
  - 3 Technical Advisory Papers
  - 6 Research Syntheses
  - 2 Newsletters
- **Upcoming Board Meetings**
  - Methane Super-emitters (November 2017)
- **Get Involved**
  - Visit http://www.arb.ca.gov/research/research.htm
  - Join the research listserv

# Recommended Board Action

Approve Fiscal Year 2017-2018 Research Plan