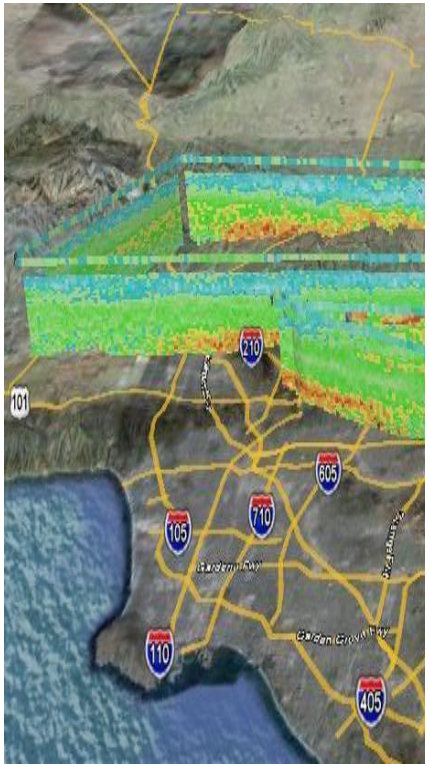
Proposed Research Plan

Fiscal Year 2015-2016



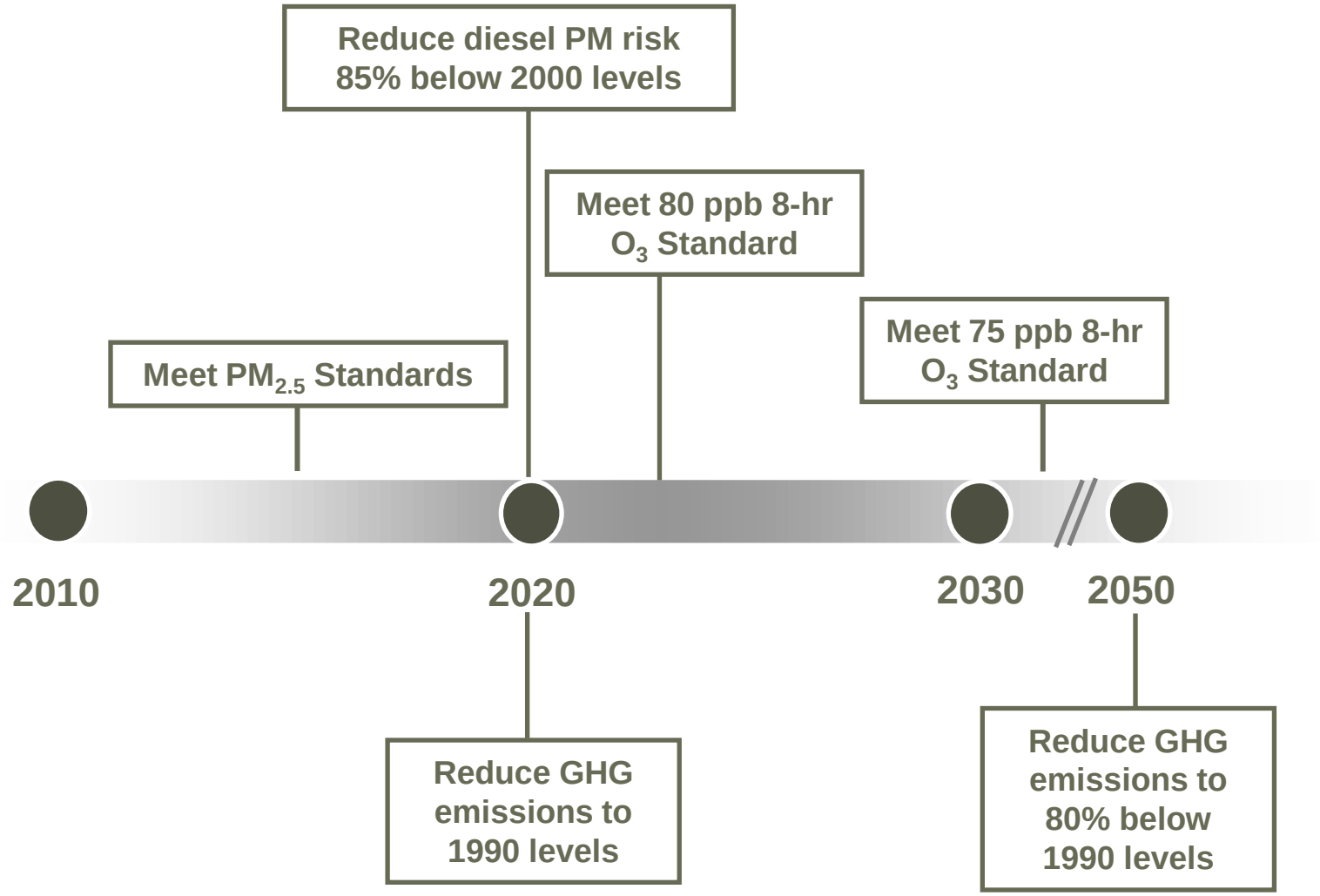
California Environmental Protection Agency

Air Resources Board

Today's Action

- Approve Fiscal Year 2015-2016 Research Plan
- Total $6.5 million
- 17 research concepts

Planning Considerations



Developing the Research Plan

- Identified priorities based on ARB program needs
- Open call to the public for research ideas
- Concepts and proposals reviewed by ARB's Research Screening Committee

Emerging Research Topics

1970

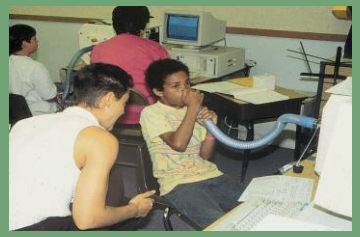
Ozone & Car Emissions

1980

SIP Models, PM_{10} & Indoor Air Quality

1990

Children's Health & Diesel Emissions



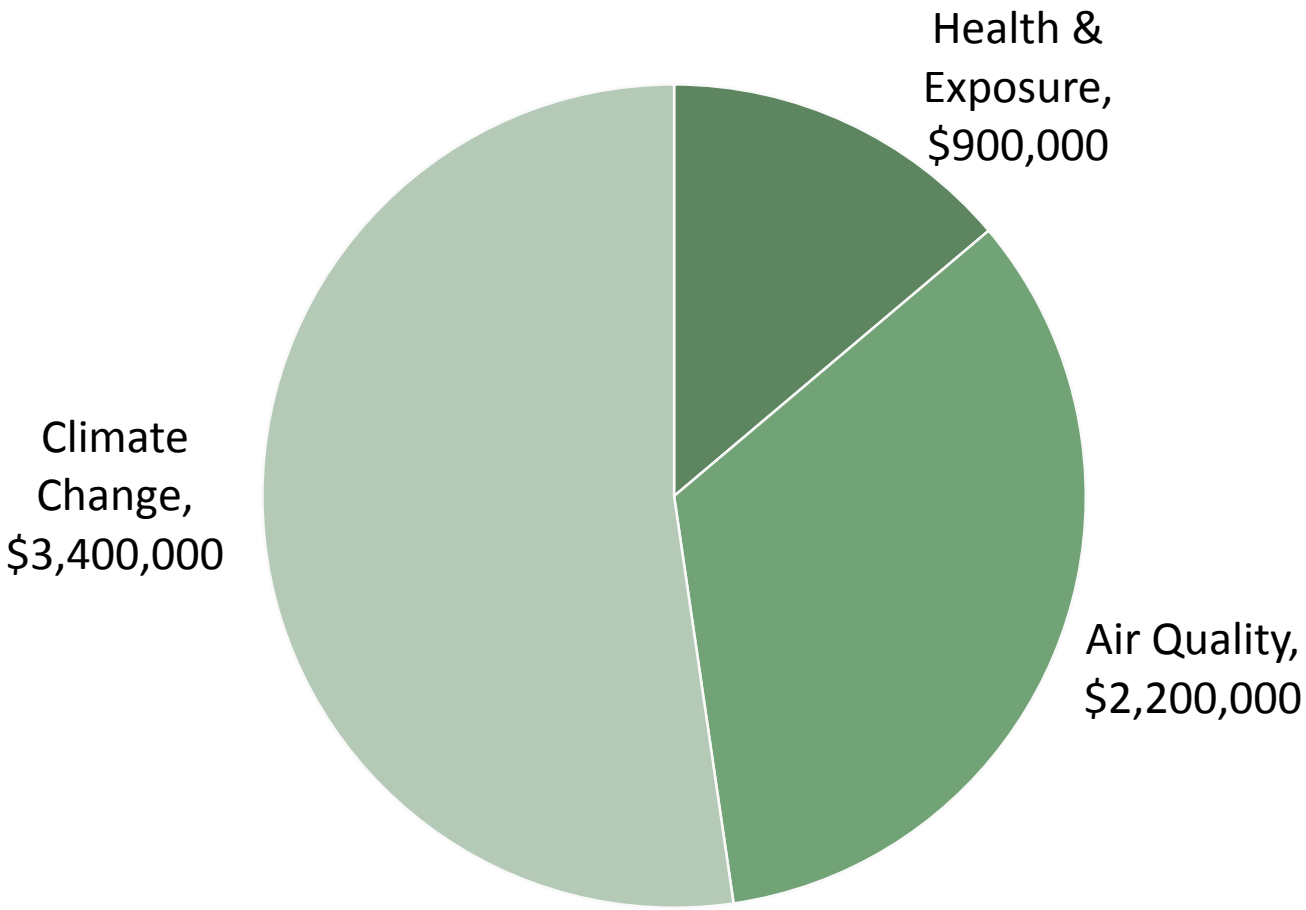
2000

$PM_{2.5}$ & Greenhouse Gas Mitigation

2010

Sustainable Communities & Low Carbon Strategies

Priorities Based on Program Needs
2015-2016 Program Areas



2015-2016 Program Areas

- Health & Exposure
- Atmospheric Science
- Trucks and Buses
- Passenger Vehicles
- Sustainable Communities
- Short-Lived Climate Pollutants and Nitrous Oxide

Health & Exposure

Health & Exposure Research

Recent Findings

- Epidemiological evidence indicating that $PM_{2.5}$ exposure may lead to a greater risk of cardiovascular effects for women than men, particularly when post-menopausal

- Exposure to wildfire smoke in infancy is associated with suppressed immune function and health effects later in life

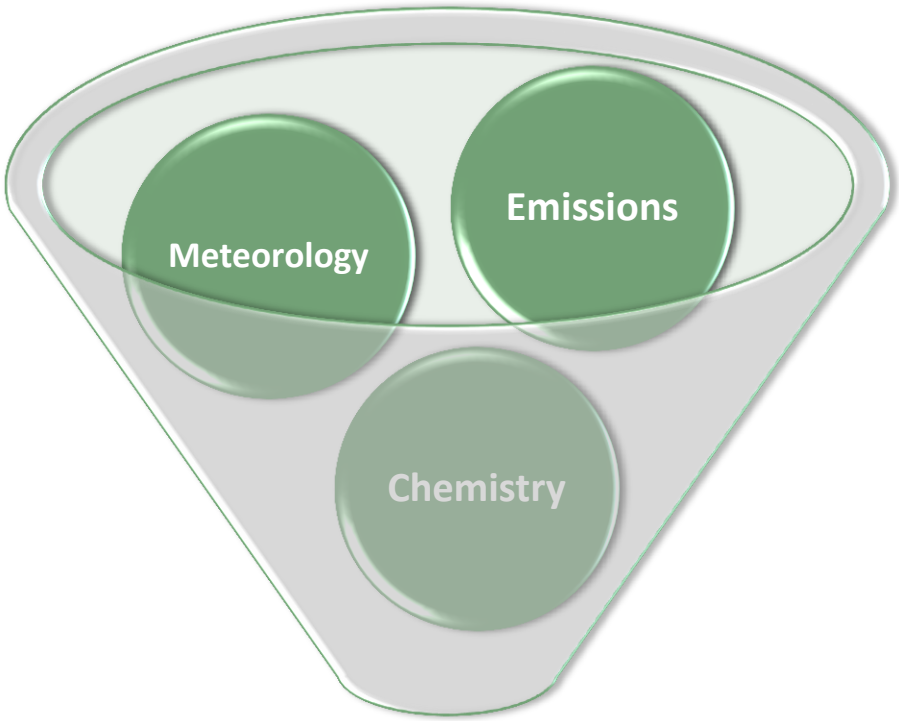
Health & Exposure
Recommended Research Projects

Women's Cardiovascular Risk from PM Exposure ($600,000)

Heritability of Adverse Health Effects from Air Pollution Exposure ($300,000)

Air Quality

Atmospheric Science Research



Photochemical Models

Inform NAAQS Planning Efforts

Recent Findings

- Field studies document that background ozone is increasing
- Conditions that led to recent $PM_{2.5}$ exceedance events need to be better understood

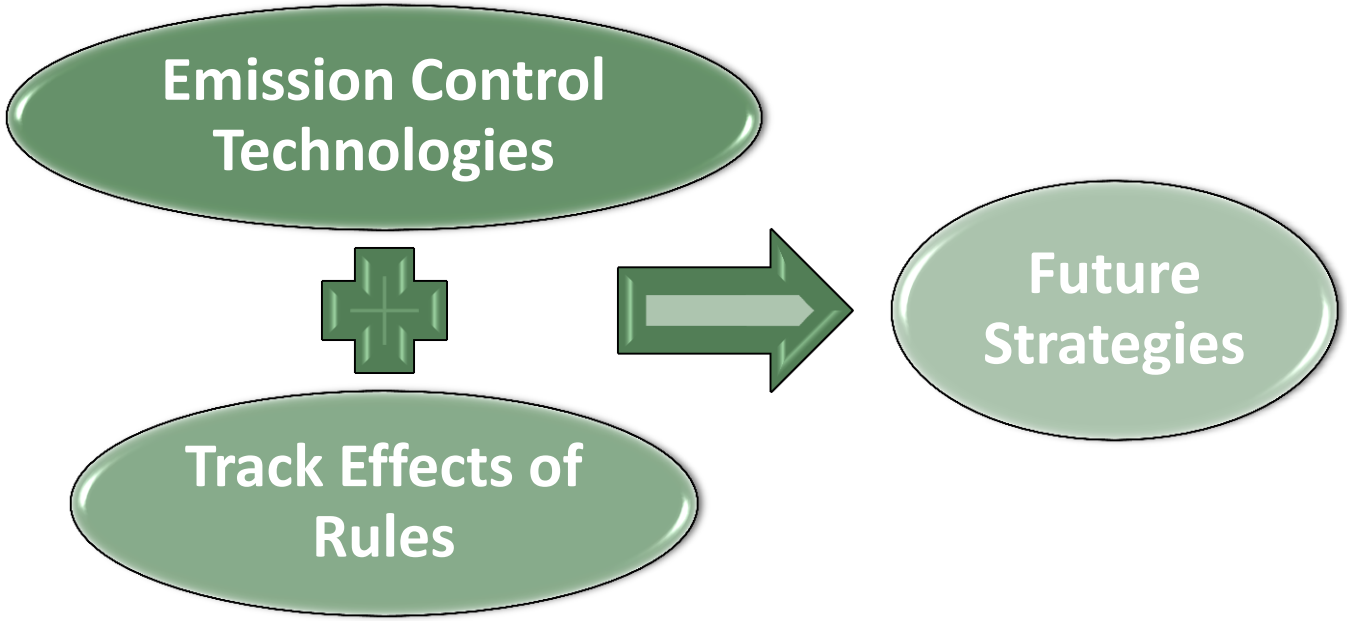
Atmospheric Science

Recommended Research Projects

Improved Understanding of Pollution Sources and Atmospheric Processes Contributing to Ozone Exceedances in the San Joaquin Valley ($400,000)

Modeling High $PM_{2.5}$ Episodes in the South Coast and San Joaquin Valley ($200,000)

Emissions Research



Recent Findings

- Preliminary field study results suggest that on-road emissions are being reduced as ARB regulations come into effect
- Real world emissions may be different than those measured during certification

Trucks and Buses

Recommended Research Projects

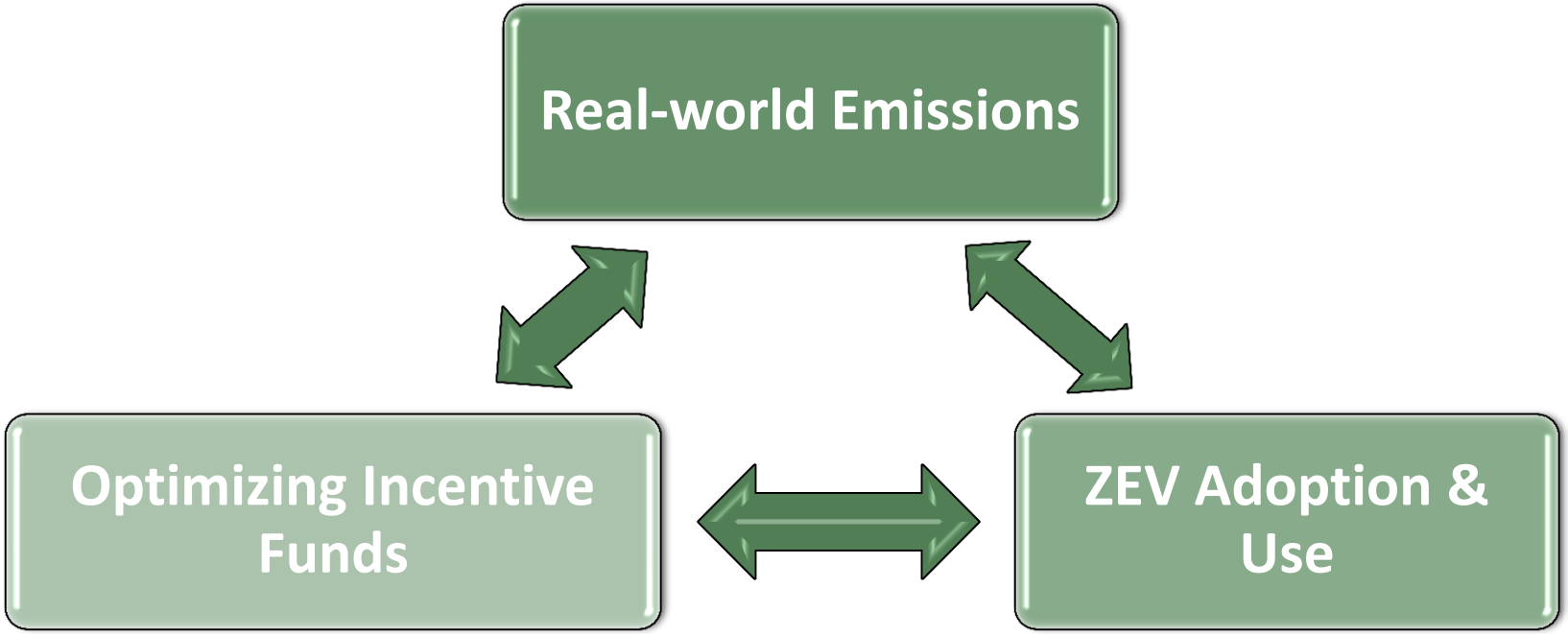
Expand Measurements of Real World Emission Rates ($400,000)

Certification and In-Use Compliance Testing for HD Diesel Engines ($500,000)

Prototype Heavy-Duty Vehicle Emission Verification Program ($500,000)

Climate Change

Advanced Clean Cars Research



Recent Findings

- Many factors affect ZEV adoption and use and in turn affect real world emission benefits
- Recent legislation requires changes to CVRP and EFMP that require research

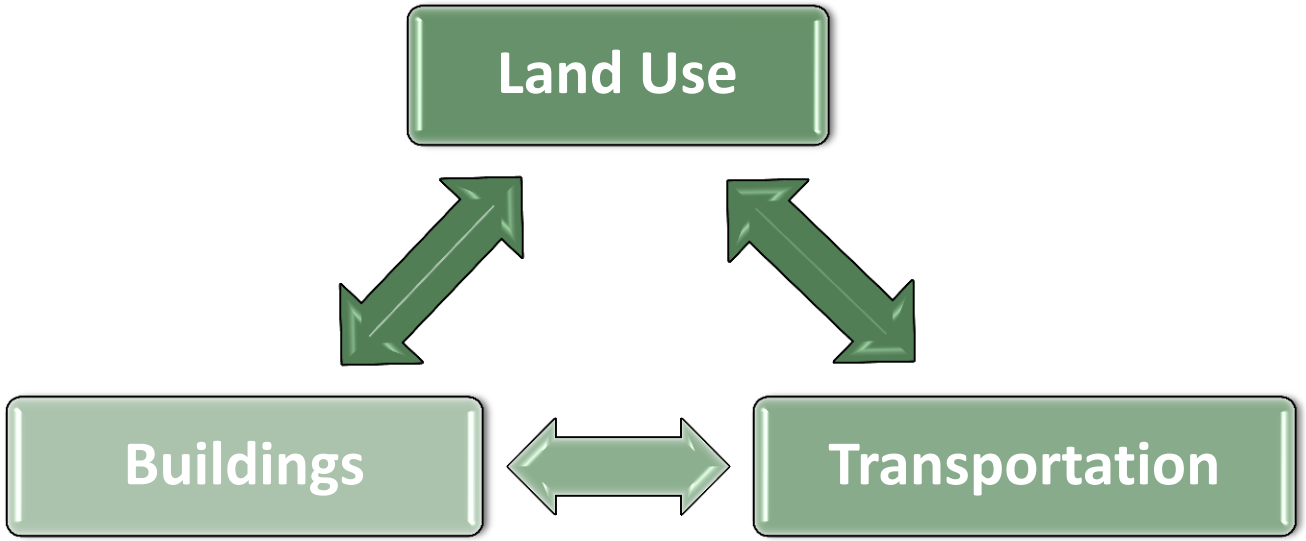
Passenger Cars

Recommended Research Projects

Tracking Emissions Benefits of Older PEVs and New ZEV Technologies ($650,000)

Maximizing the Air Quality, Climate, and Social Equity Benefits of Light-Duty Vehicle Incentive Programs ($500,000)

Sustainable Communities Research



Recent Findings

- GHG benefits of affordable housing in transit-oriented developments are poorly characterized
- Green buildings have GHG benefits beyond energy use

Sustainable Communities

Recommended Research Projects

Tracking Land Use Changes That Support Sustainable Communities ($150,000)

Evaluation of Impact of Transit-Oriented Affordable Housing on Travel Demand ($300,000)

Zero Carbon Building Technical Feasibility Study ($400,000)

Short-lived Climate Pollutants and Nitrous Oxide Research

Recent Findings

- Field studies suggest that CH_4 and N_2O emissions are underestimated
- F-gas emissions continue to grow; further reductions will be needed to reach 2050 goal

Short-lived Climate Pollutants

Recommended Research Projects

California Dairy Manure Methane Emissions ($400,000)

California-Specific Cattle Feed Rations to Improve Modeling of Methane from Enteric Fermentation ($100,000)

Evaluation of a Variety of F-Gas Emission Reduction Strategies ($300,000)

Nitrous Oxide

Recommended Research Projects

Additional and Uncertain Nitrous Oxide Emissions ($400,000)

Continuation of Nitrous Oxide Monitoring ($200,000)

Research Program Impact

- Rigorous scientific foundation for ARB's regulatory programs
- Identifies new emission reduction strategies
- Tracks program effectiveness

Leveraging Other Research

- Collaboration with federal and state agencies
- More than $20 million of leveraged research over last 5 years
- Relevant research by others
  - $PM_{2.5}$ measurements in the San Joaquin Valley (NASA)
  - GHG emission measurements in Los Angeles (NIST)
  - Ultrafine cohort study (U.S. EPA)
  - Sustainable transportation research (U.S. DOT)

Sharing Research Results

- Increasing emphasis on research dissemination
  - Press releases, seminars, trainings
  - Improved ARB research website

- Planned dissemination
  - Research syntheses to highlight key themes
  - Biannual newsletter highlighting recent results

Recommended Board Action

Approve Fiscal Year 2015-2016 Research Plan