Primary Quality Assurance Organization - Module 3 Training
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Air Monitoring Data for Informing Clean Air and Climate Policy

Alberto Ayala, Ph.D., M.S.E.
Deputy Executive Officer

California Environmental Protection Agency
Air Resources Board

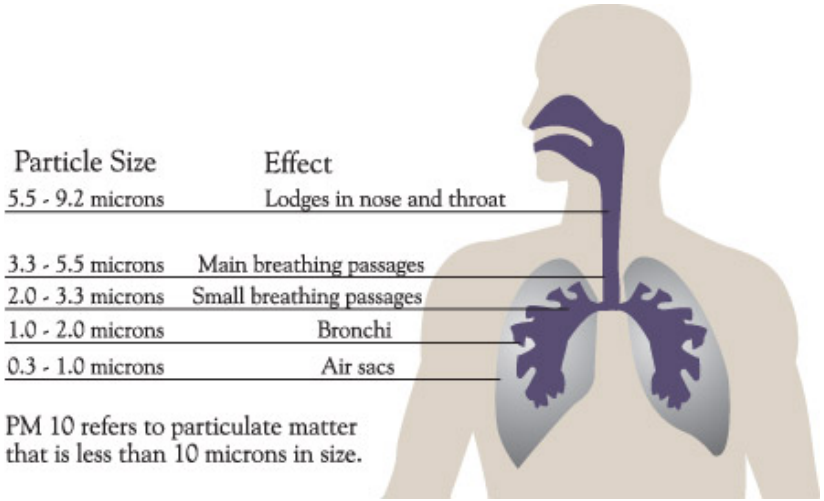
"If you can't measure it, you can't manage it"

- While this may not apply universally, it certainly does to air quality management
- It also applies to managing climate change due to GHG emissions (HFCs, N_20, CH_4, BC)
- Scientifically and legally defensible monitoring (and other) data underpins every State action

Today's Air Monitoring Network

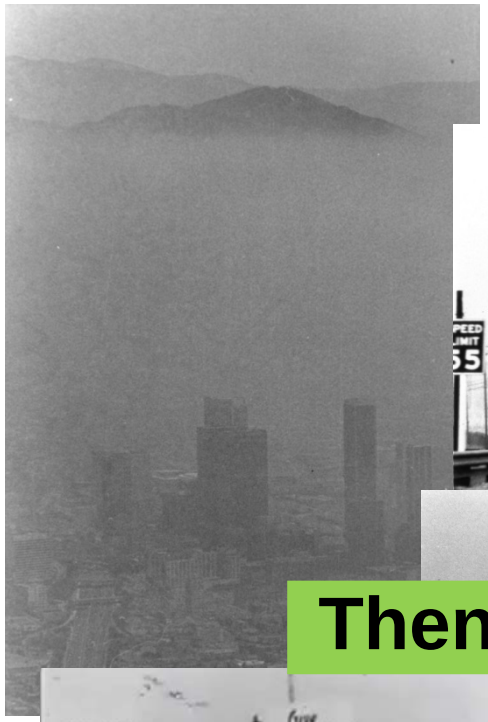
- Over 250 air monitoring sites statewide
- Combination of filter-based and continuous monitoring technology
- Selected sites for chemical speciation

Air Monitoring Why?

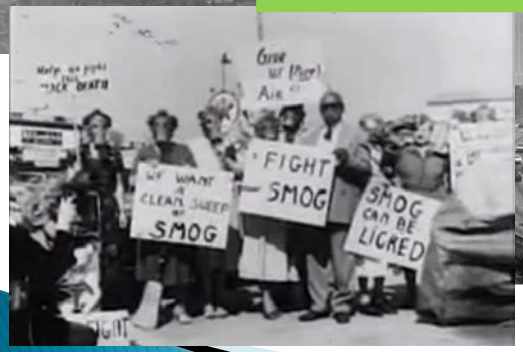


- First and foremost to protect public health
- Link between air pollution and adverse health outcomes is well established and undisputable
- World Health Organization, air pollution, and the Global Burden for Disease
- Pollution costs us lives (and money)
- O_3, CO, NO_2, SO_2, and PM – all linked to various morbidity and mortality outcomes
- Over time, we learn about new airborne threats to health (e.g., exposure to traffic-generated particles)
- New air monitoring data is essential

We have come a long way……and we have data to prove it



Then **Now**



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Air Monitoring – Why?

Twenty-five Years Ago

- Unhealthy levels of pollutants were common
- In Los Angeles:
  - Over 100 air pollution alerts annually
  - Over 200 days with unhealthy air annually
  - Peak ozone level several times allowable limits

Ten Years Ago

- In San Joaquin Valley:
  - PM2.5 peak concentrations reached 160 ug/m^3
  - Concentrations exceeded federal standard approximately 70 days per year
  - All monitoring locations exceeded standard

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Today…

NO_2: Attain

SO_2: Attain

CO: Attain

O_3: Los Angeles peak – reduced over 60%

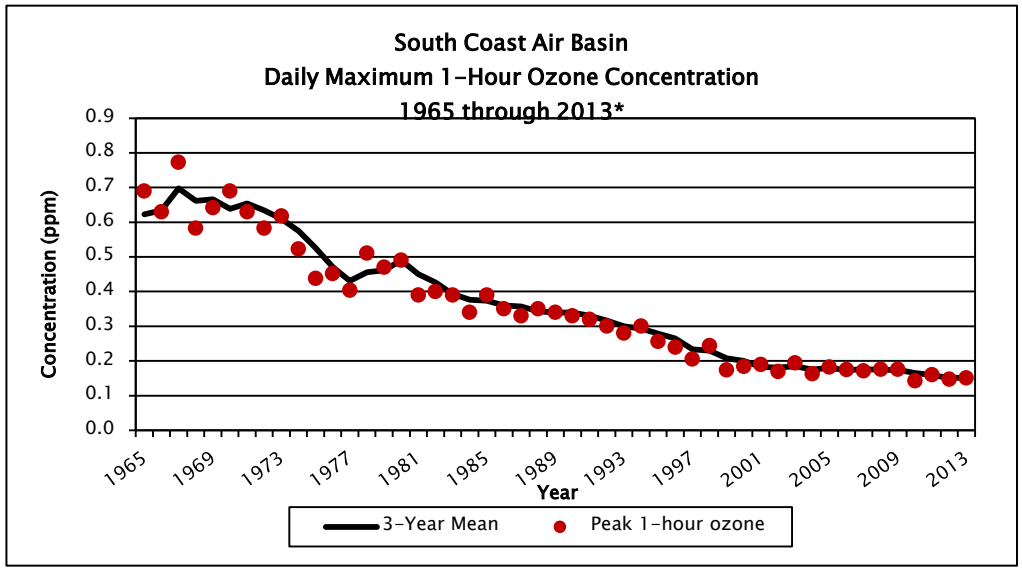
Hours of exposure – reduced 90%

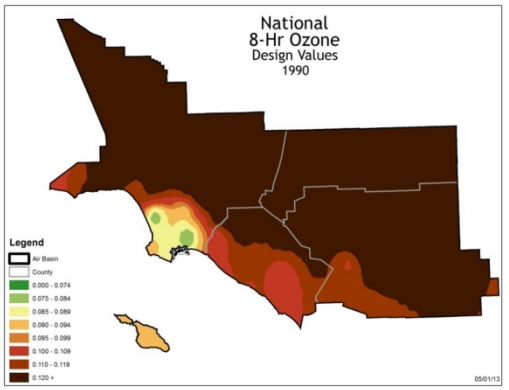
PM2.5: Levels cut by ~70%

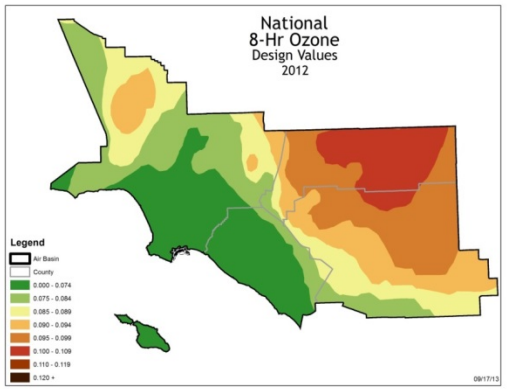
NOx: Additional actions

GHGs: Control program in place

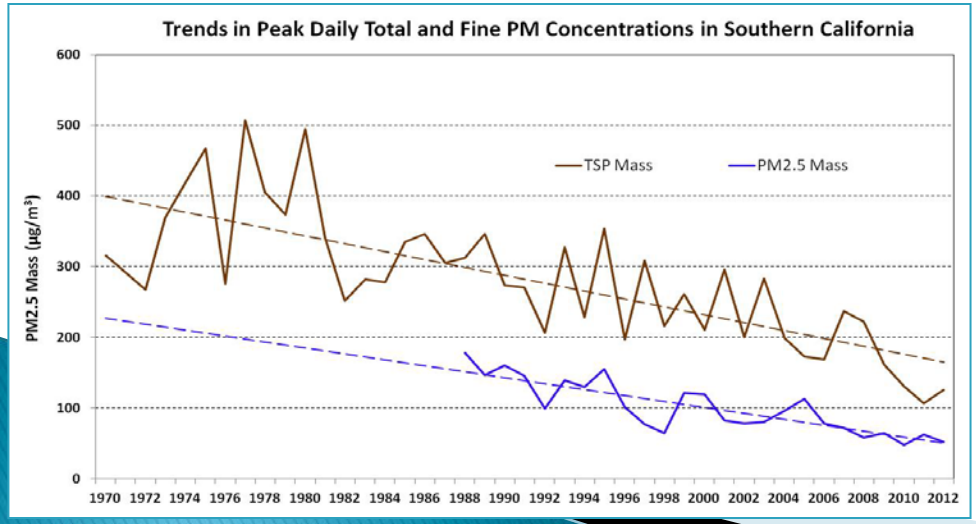
Success of California's Control Programs for Ozone and PM

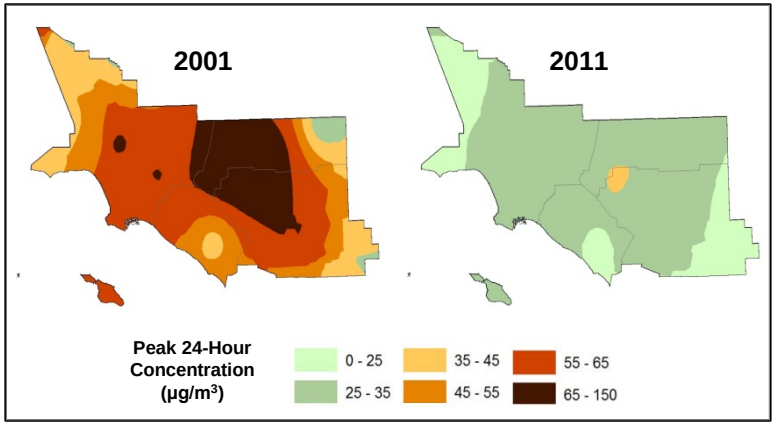






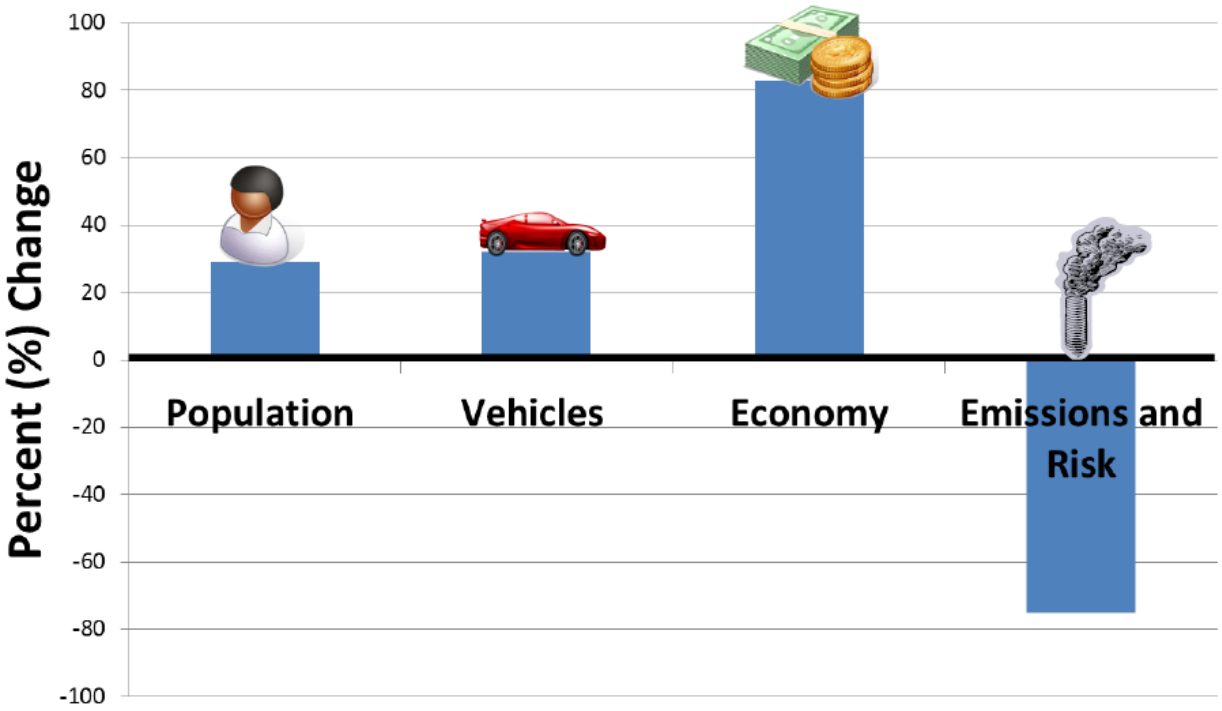
** Ozone monitoring began in 1979; data through 1978 represent oxidant measurements converted to ozone equivalent. 2013 data are preliminary.*





Emissions and risk are trending down while economic development enjoys growth

75% reduction in air toxics statewide since 1990



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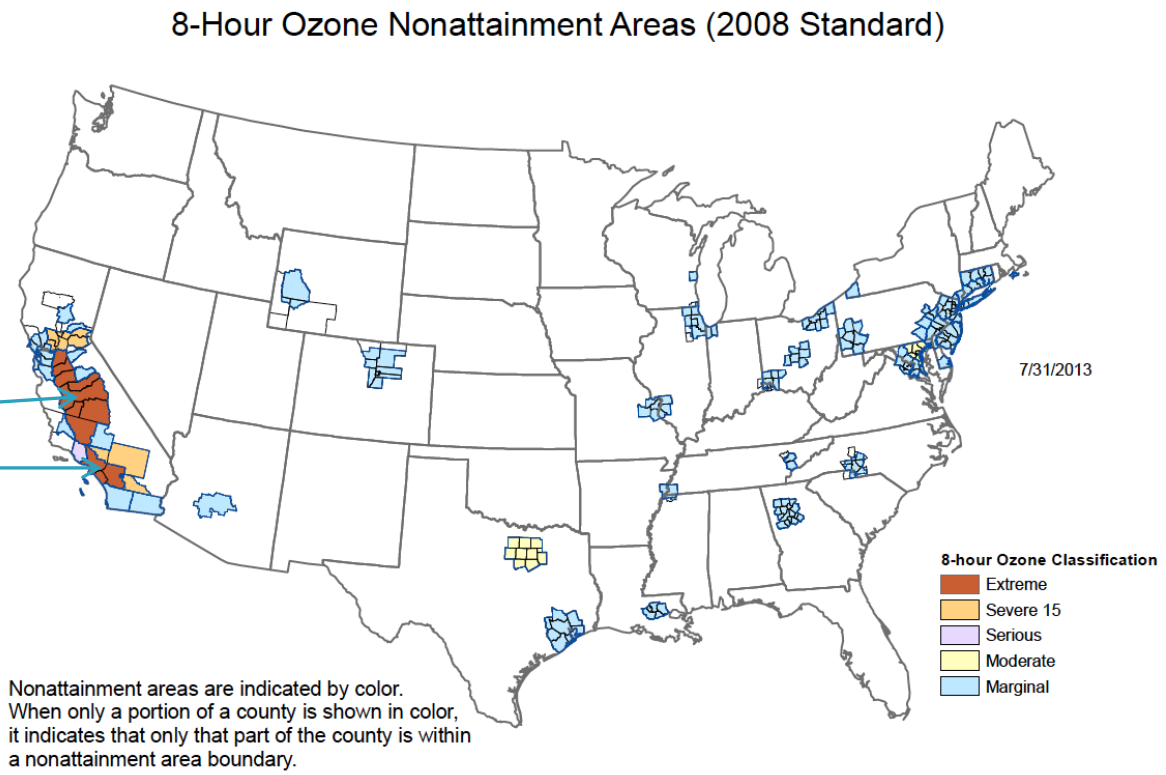
Ozone attainment – California's biggest challenge

91% of California population in Ozone Non-Attainment areas

Extreme Non-Attainment Areas:

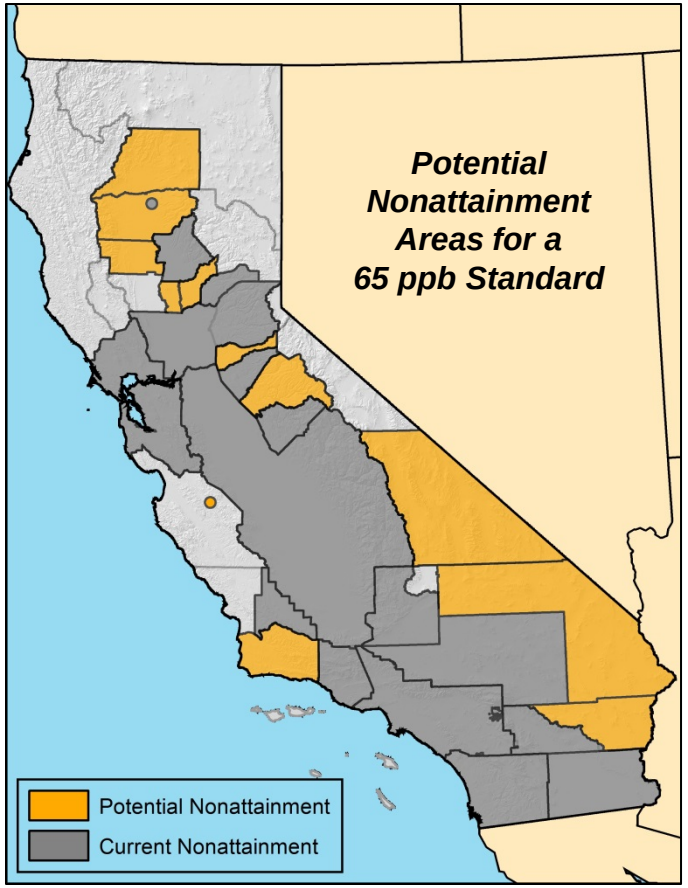
- San Joaquin Valley
- South Coast

Additional measures needed beyond current programs for 2031 South Coast attainment goal



Health science suggests even lower ambient O_3 levels needed

- US-EPA considering lower 8-hr ozone standard
- Decision this October
- A lower standard will bump more CA regions into nonattainment
- Map = example if new standard is 65 ppb



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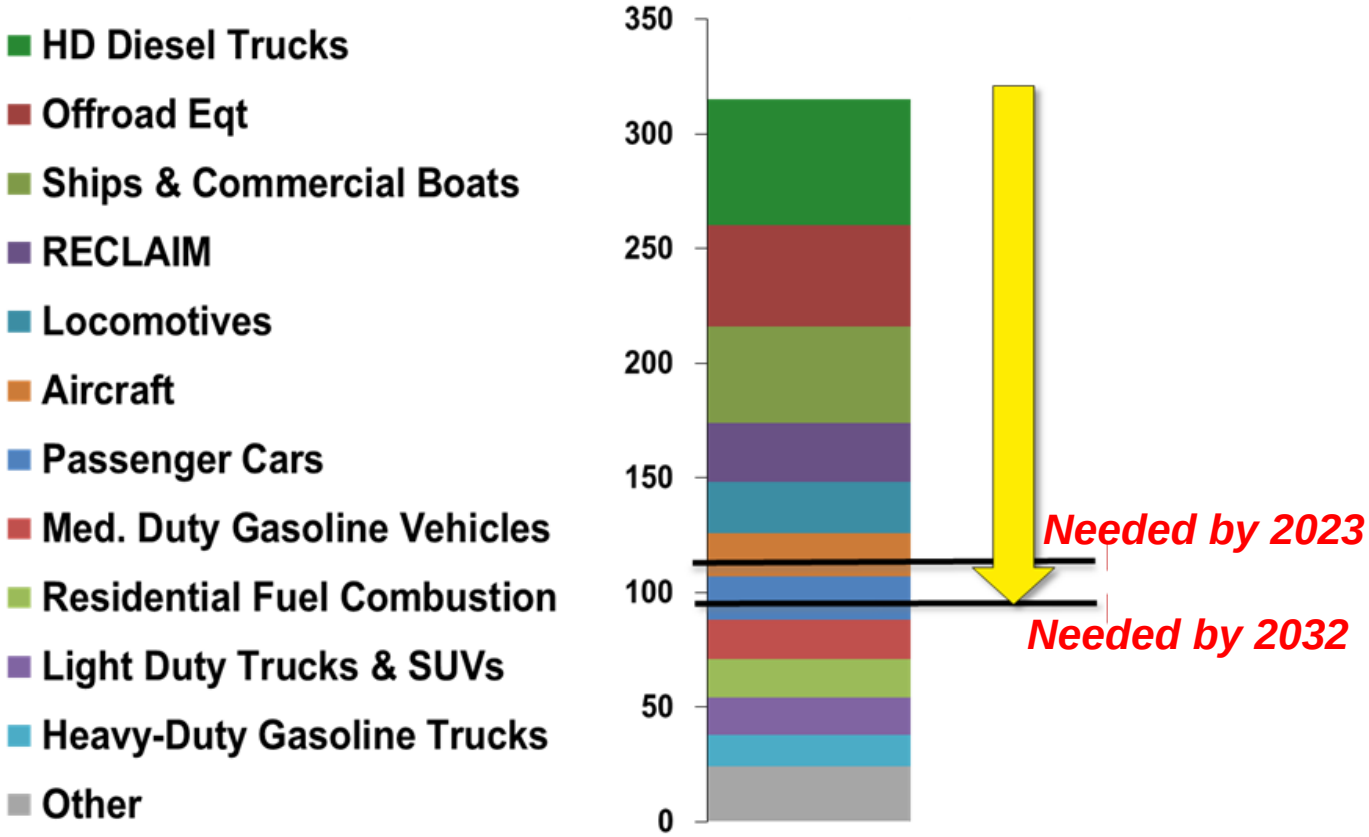
California's Remaining Challenges – PM2.5

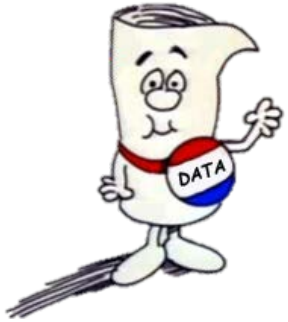
- **For upcoming SIP**
  - 12 μg/m³ annual PM2.5 standard
  - Due in 2016
  - 4 nonattainment areas with unique challenges:
    - Calexico
    - Portola
    - South Coast
    - San Joaquin Valley

Control programs, specially for mobile sources, must continue and accelerate



Projected 2023 Inventory in Tons Per Day

Electrons and molecules – *the "no compromise" alternative to petroleum combustion*



Data Driving Decisions

Air Quality & Greenhouse Gas Monitoring

Emission Inventories

Air Quality Modeling

Control Strategies and Investment Plans

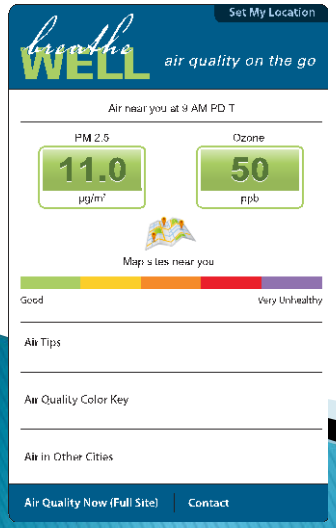
Scoping Plan and State Implementation Plan

Clean Air

Importance of Air Monitoring Data

Key to California's Success

- Vehicle and Engine Emission Standards
- Diesel Control Programs
- Clean and low-carbon Fuel Programs
- Agricultural Burn Programs
- Incentive Programs
- Determining progress towards meeting NAAQS
- Real-time data for decision-making

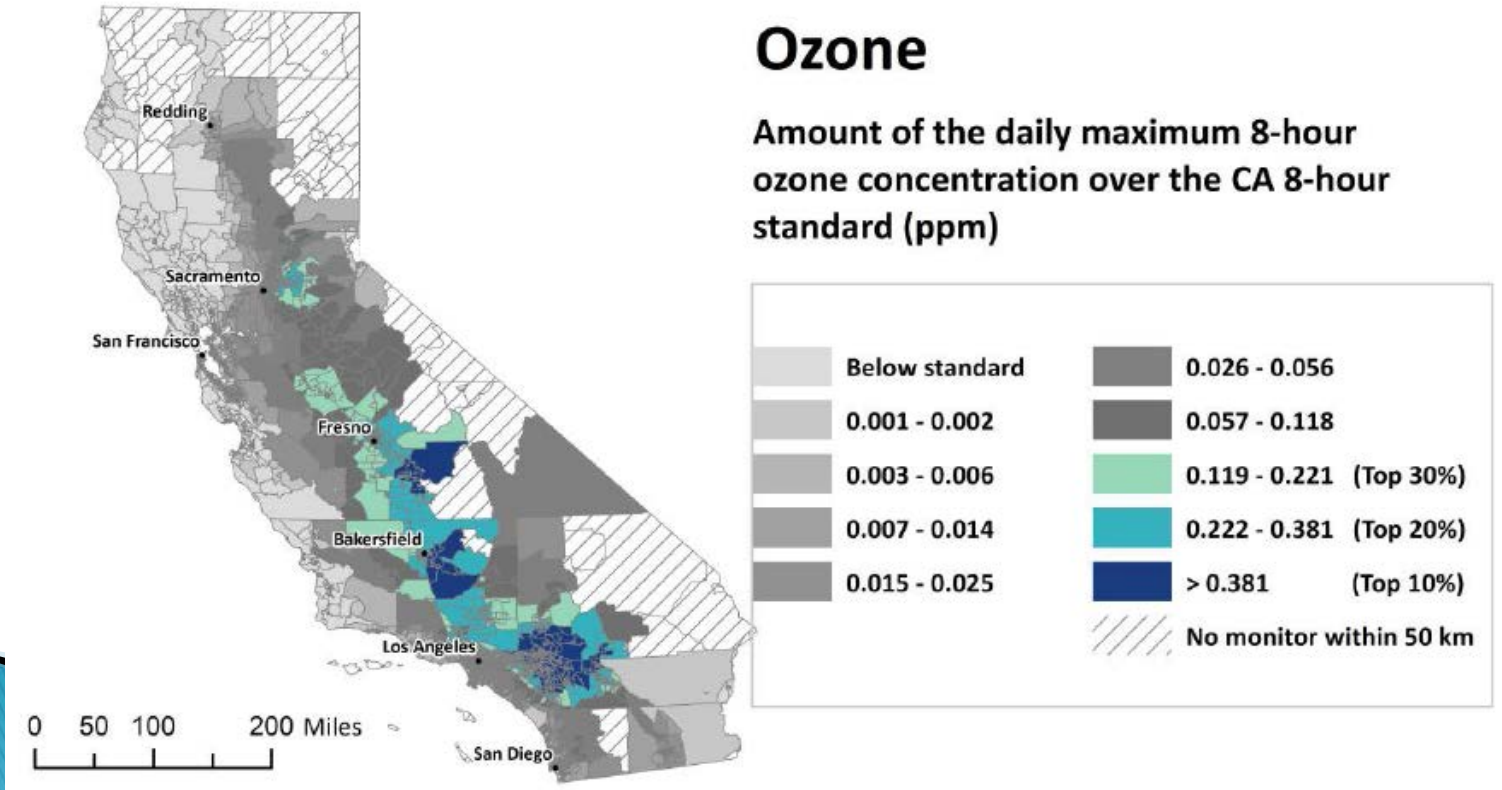


Air Quality Index for Ozone

Index Values (Conc. Range)	Air Quality Descriptors	Cautionary Statements for Ozone
0 – 50 (0-60 ppb)	Good	**No health impacts are expected when air quality is in this range.**
51 – 100 (61-75 ppb)	Moderate	**Unusually sensitive people should consider limiting prolonged outdoor exertion**
101 – 150 (76-104 ppb)	Unhealthy for Sensitive Groups	**Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion**
151 – 200 (105-115 ppb)	Unhealthy	**Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children should limit prolonged outdoor exertion.**
201 – 300 (116-374 ppb)	Very Unhealthy	**Active children and adults, and people with respiratory disease, such as asthma, should avoid all outdoor exertion; everyone else, especially children, should limit outdoor exertion.**

California Communities Environmental Health Screening

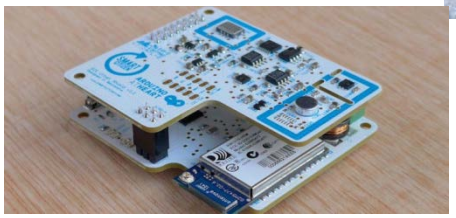
- Importance of environmental justice in every action
- Multimedia screening
- Driving investment decisions
- Ambient air monitoring data is key input, for example:



Looking Ahead – Air Monitoring

Importance of Technological Advancements

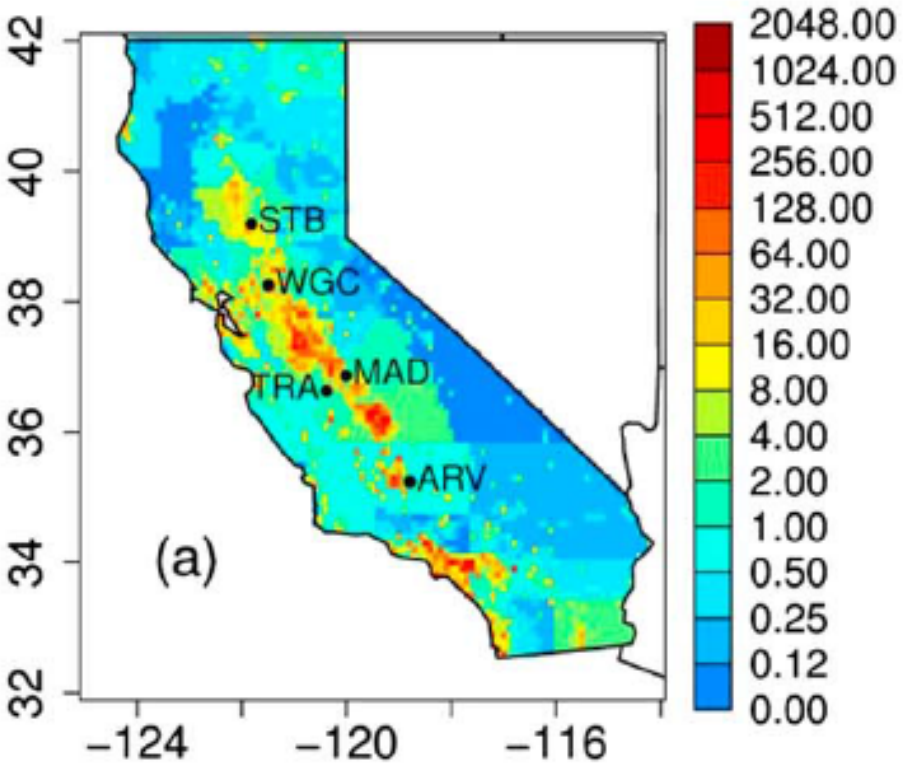
- Keep pace with emerging needs
- Trace/Low Level Monitoring
  - CO and SO_2
- Instrument Innovation
  - Lower Limits of Detection
  - Improved Sensitivity
  - Response Stability
  - Data Reliability
- Improving efficiencies – QA/QC
- Low cost sensors (citizen science)
  - Rapidly expanding portable technology
  - South Coast AQ-SPEC laboratory
  - Sensors, cameras, and drones



Technological Advancements
Access to Real-Time Data

- Public Health
  - Spare-the-air days
  - School flag program
  - No-burn decisions
  - Health advisories
  - Outdoor activity restrictions
- Public is More Informed
  - Easier access to data – Smartphones
  - Expectation to have information readily available

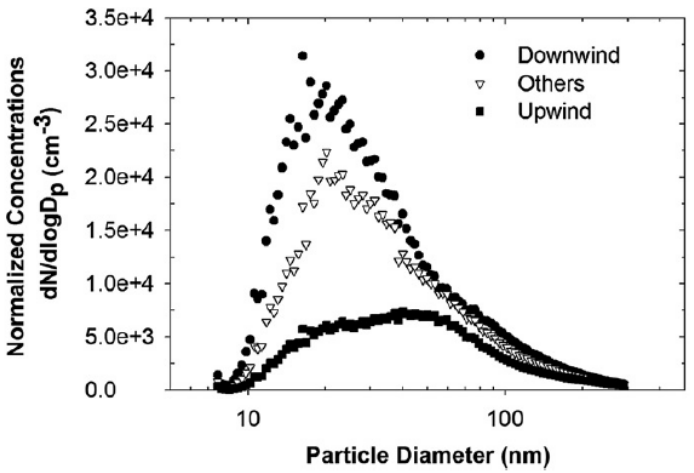
Technological Advancements
Greenhouse Gas Monitoring

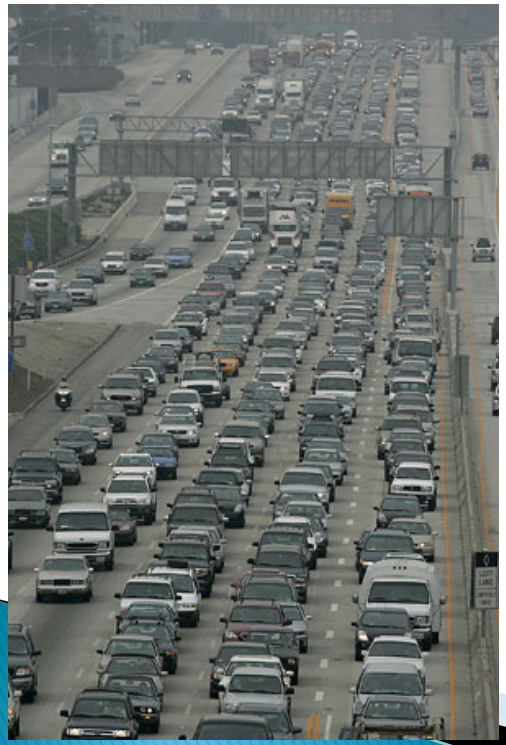


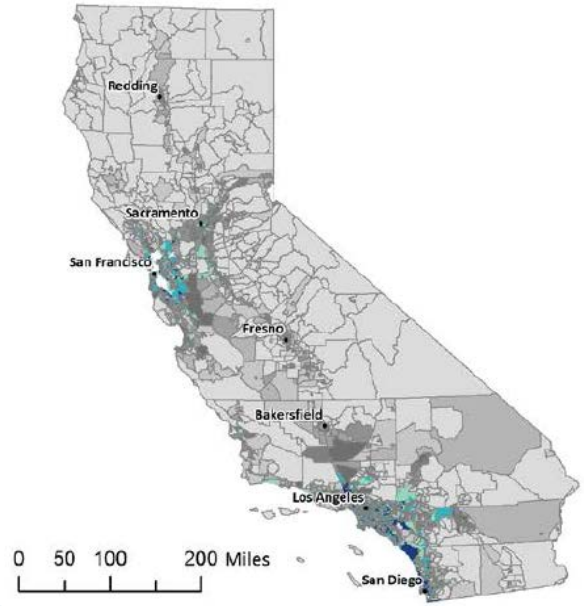
CH_4 monitors

Assessing near-roadway exposure to traffic emissions

- Mitigation of exposure is important to protect health
- New roadside air monitoring network will help
- Tracking ultrafine particles (e.g., particle counters)







Traffic Density

Vehicle-km per hour divided by road length

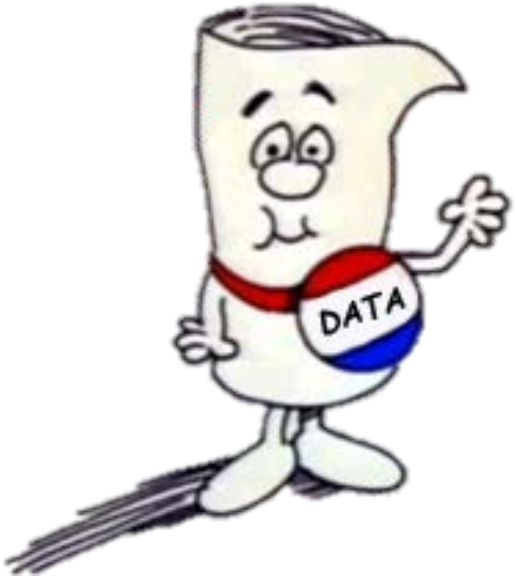
< 272		848 - 1,015	
272 - 450		1,016 - 1,327	
451 - 592		1,328 - 1,941	(Top 30%)
593 - 714		1,941 - 2,919	(Top 20%)
715 - 847		> 2,919	(Top 10%)

Summary

A lot remains to be done:

- De-carbonizing energy and fuels
  - emphasis on e^- and H_2
- De-carbonizing transportation
  - Advanced super-clean technologies, ZEVs (batteries and fuel cells)
- Driving for more system efficiency
  - Smarter, more integrated land use planning, reduced travel demand, traffic system management

- **Data quality – it starts with you!**
- **Foundation for clean air decisions**
- **Critical to achieving our health-based air quality and climate goals**



Questions?