

# Zero Emission Vehicle Technology Symposium

*Dr. Robert Sawyer, Chair  
California Air Resources Board*

September 25, 2006

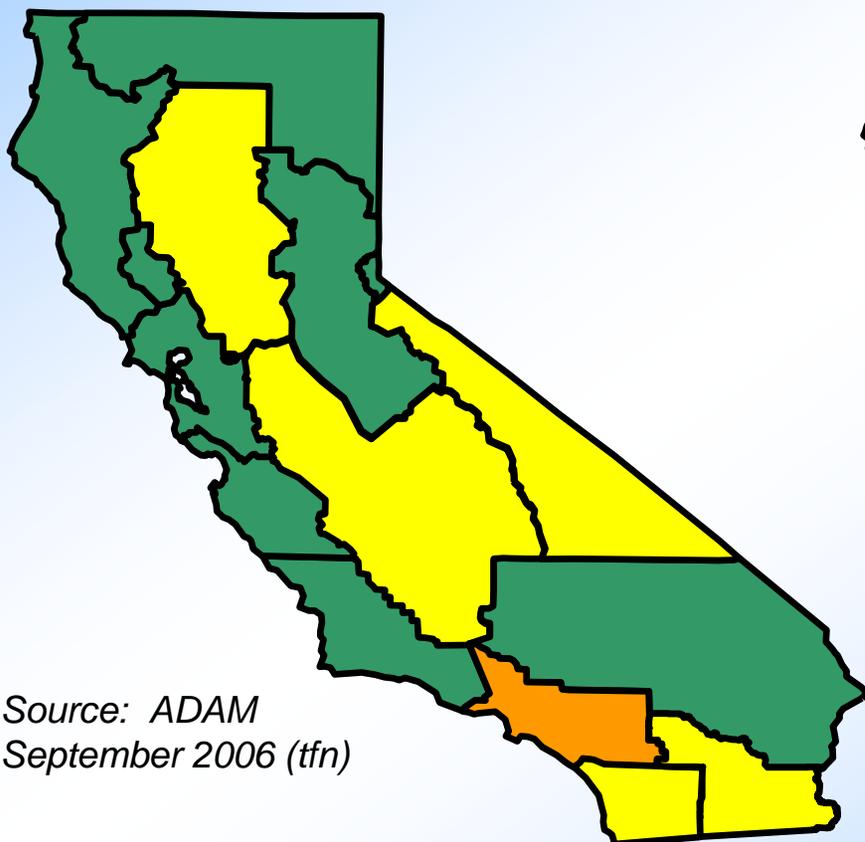
# Overview

- Background
- The ZEV Regulation - A Historical Perspective
- The ZEV Regulation - Today
- Independent Expert Review Panel
- ZEV Technology Symposium
- Next Steps
- Additional Activities

# Over 90% of Californians Breathe Unhealthy Air at Times

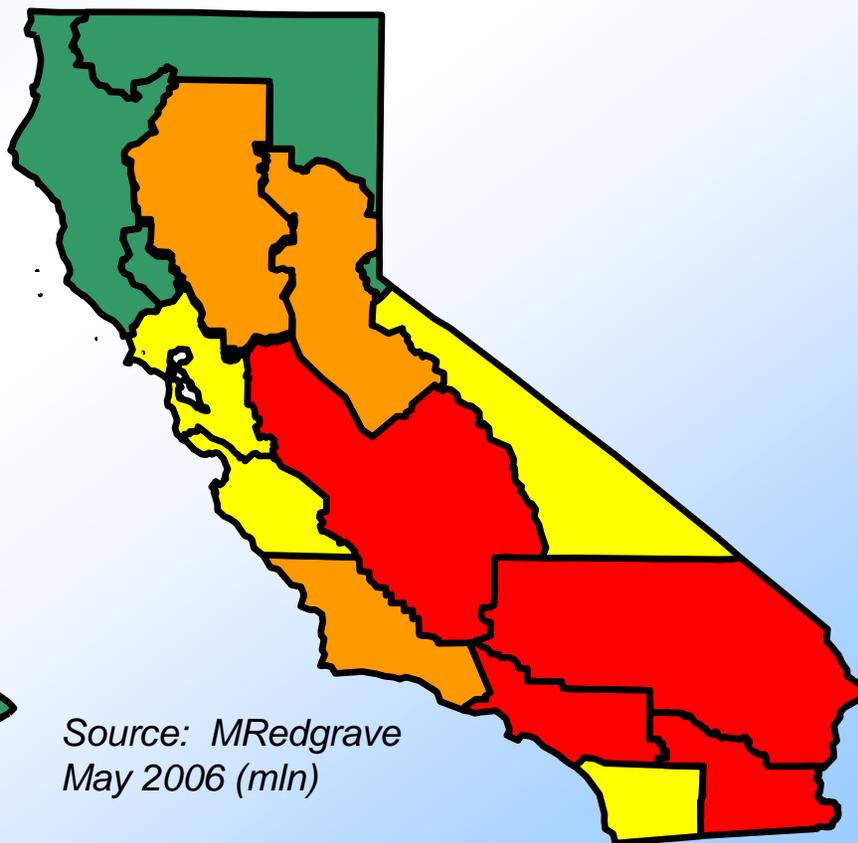
3

**Days Over State 24-Hour  
PM10 Standard**



Source: ADAM  
September 2006 (tfn)

**Days Over State 8-Hour  
Ozone Standard**



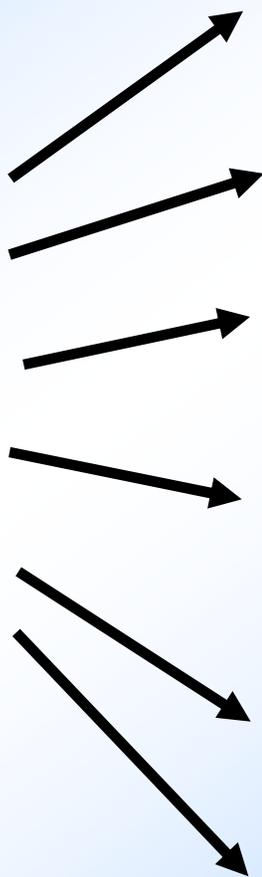
Source: MRedgrave  
May 2006 (mln)

**0-5 Days**    **6-50 Days**    **50-100 Days**    **>100 Days**

# Potential Impacts of Climate Change on California

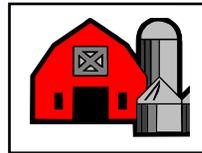
**Climate Changes**

-  Temperature Increase
-  Precipitation Patterns and Extremes
-  Sea Level Rise



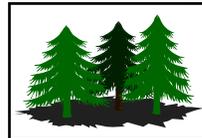
## Health

Air Quality - Respiratory Illness  
Weather-related Mortality  
Infectious and Tropical Diseases



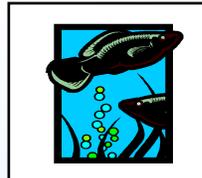
## Agriculture

Crop Yields  
Irrigation Demands



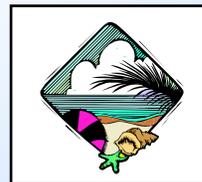
## Forests

Forest Composition  
Geographic Range of Forests  
Forest Health and Productivity



## Water Resources

Water Supply  
Water Quality  
Competition for Water



## Coastal Areas

Erosion of Beaches  
Inundation of Coastal Wetlands  
Additional Costs to Protect Coastal Communities



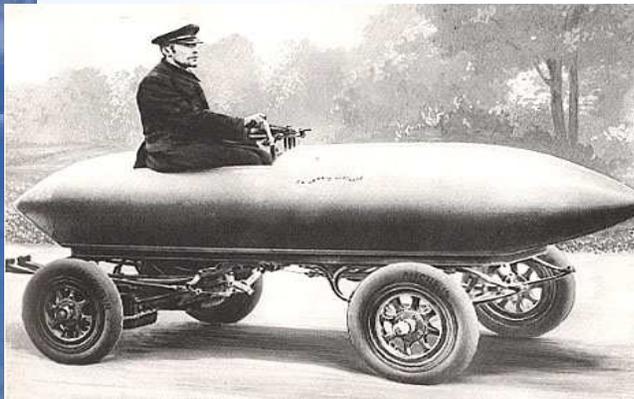
## Species and Natural Areas

Loss of Habitat and Species

Source: Anne Grambsch, 1998

# The ZEV Regulation – A Historical Perspective

- ZEV Regulation originally adopted in 1990
- The Regulation has been adjusted over time to consider cost, lead time and technological challenges



# ZEV Program – A Success

- The ZEV program has been a success for California spurring advances in cleaner transportation choices
  - Over 500,000 partial zero emission vehicles and the number is growing
  - Over 80,000 hybrid-electric vehicles on our roads
  - Investment in new technologies

# 2003 Changes

- Allowed manufacturers to meet regulation using the “base path” or “alternative path”
  - Base path – uses percentage ZEV requirements structured like those in the 2001 ZEV amendments
  - Alternative path – allows AT PZEVs to be used to meet 50% of the pure ZEV requirement while the other 50% must be met with Type II or Type III ZEVs.
- Board directed staff to conduct a technology review
  - Independent Expert Review Panel
  - Technology Symposium

# ZEV Regulation – 2003

## Large Manufacturer Obligation in 2009 (Percent of Sales)

PZEVs

~33 %



~1 %



Newly produced  
Type III ZEVs

AT PZEVs

~6 %



# Independent Expert Review Panel

- Report to the Board early 2007
- Assessing the current and future state of all ZEV technologies
  - Fuel cells
  - Balance of plant
  - On-board hydrogen storage
  - Battery technology
  - Electric drive components

# ZEV Technology Symposium

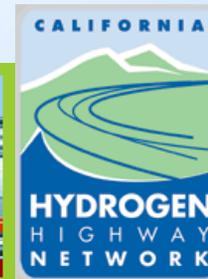
- Opportunity to hear from industry and other experts on the state of all ZEV technologies
- Looking for technical information
- Not looking to discuss changes to the ZEV regulation

# Next Steps

- Written Report from Independent Expert Review Panel – January 2007
- Board meeting in early 2007
  - Panel will present findings
  - Staff will present on Symposium and other relevant information e.g. infrastructure
  - If appropriate, the Board may ask staff to come back with recommended changes to the ZEV Regulation

# Additional Activities

- California engaged in a number of activities related to zero and near-zero emission vehicles and infrastructure:
  - CaH2Net
  - CaFCP
  - Alternative Fuel Infrastructure Program
  - Education and Outreach



# Our Goal Is Clean Air Everyday

Controlling emissions from today's technologies...



working towards tomorrow's zero emission technologies