

The California Global Warming Solutions Act of 2006

Public Workshop to Discuss Discrete Early Emission Reduction Actions



January 22nd , 2007
Sacramento

Workshop Agenda

- 1:30 PM ■ Welcome/Housekeeping
- Opening remarks and overall context
- 1:45 PM ■ Presentation 1 – Discrete early actions
- 2:25 PM ■ Presentation 2 – Low carbon fuels
 standard
- 3:00 PM ■ Presentation 3 – High-GWP refrigerant
 restrictions
- 3:50 PM ■ Open discussion
- 4:45 PM ■ Closing remarks/adjournment

Overview

- Why does climate change matter for California?
- The magnitude of the challenge
- Scope of early action plan
- Early action selection consideration
- Process for identifying potential candidates
- Candidates for early action by ARB
- Public process and timeline
- Stakeholder input on early actions

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Why Does Climate Change Matter?

- Global climate change is real – warming already underway
- Global warming poses a serious threat to the economic well-being, public health, natural resources, and environment of California
- Global warming will have detrimental effects on many of California's largest industries
- California, in its long standing tradition of environmental stewardship, has positioned itself at the forefront of climate protection efforts

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Climate Impacts

Over the Past 100 Years

0.7 °F higher temperatures

3-8 inch sea level rise

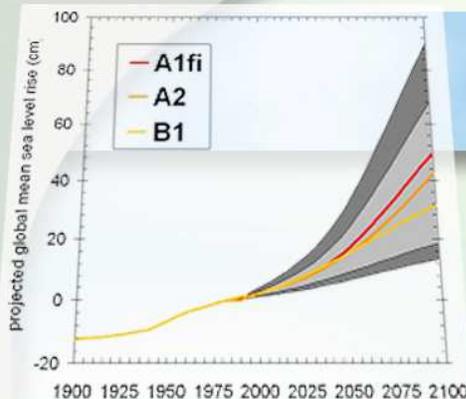
12% spring run-off decrease

**Snowmelt and spring blooms
advanced 1-3 weeks (since 1975)**

Source: Cal/EPA Environmental Indicators Report (2002)

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Climate Impacts



California Projected Impacts

75% loss in snow pack

1-2 foot sea level rise

70 more extreme heat days/year

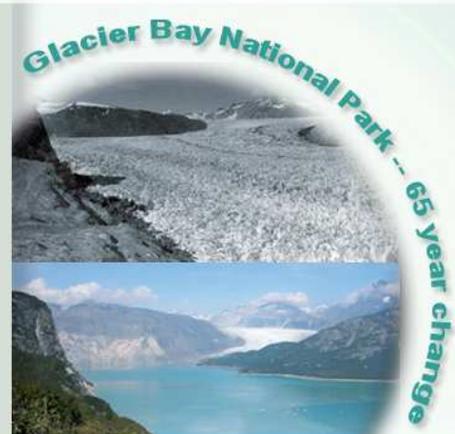
• Hotter days \Rightarrow more emissions and smog

80% more 'likely ozone' days

55% more large forest fires

Twice the drought years

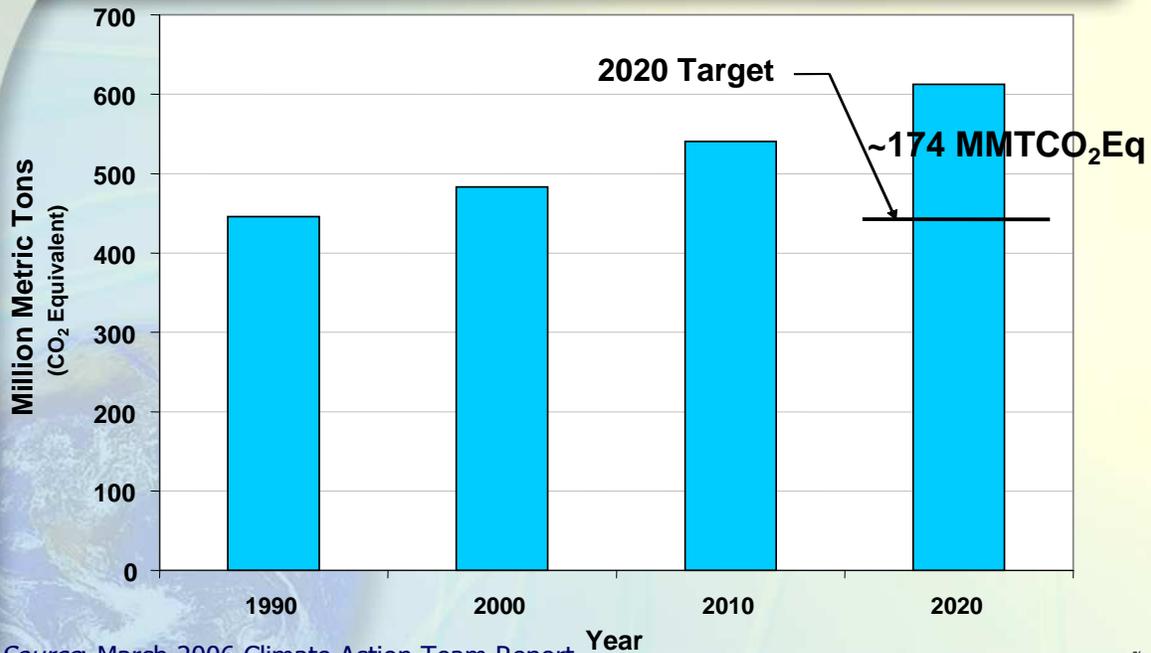
Source: Climate Action Team Report (2006)



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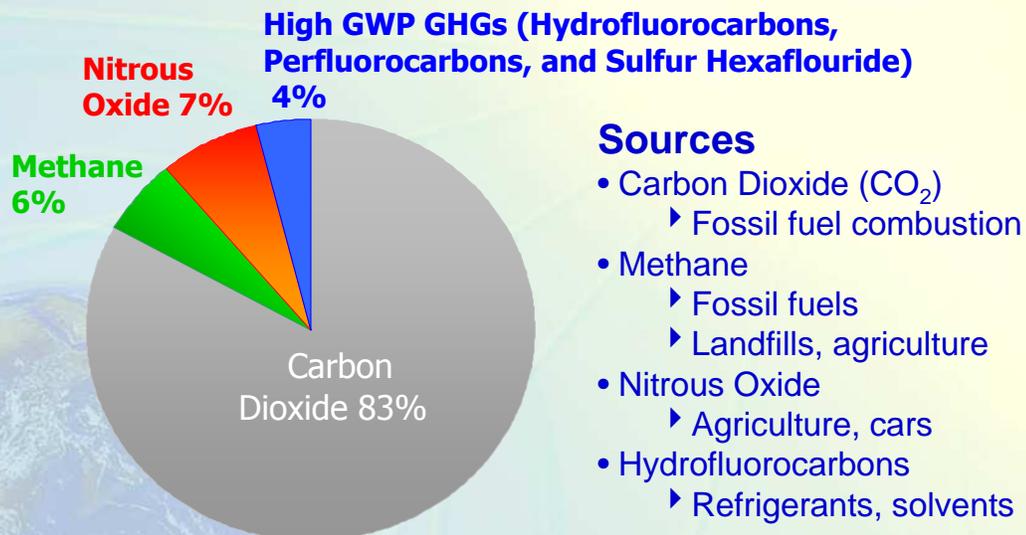
The Magnitude of the Challenge

California's GHG Emission Inventory



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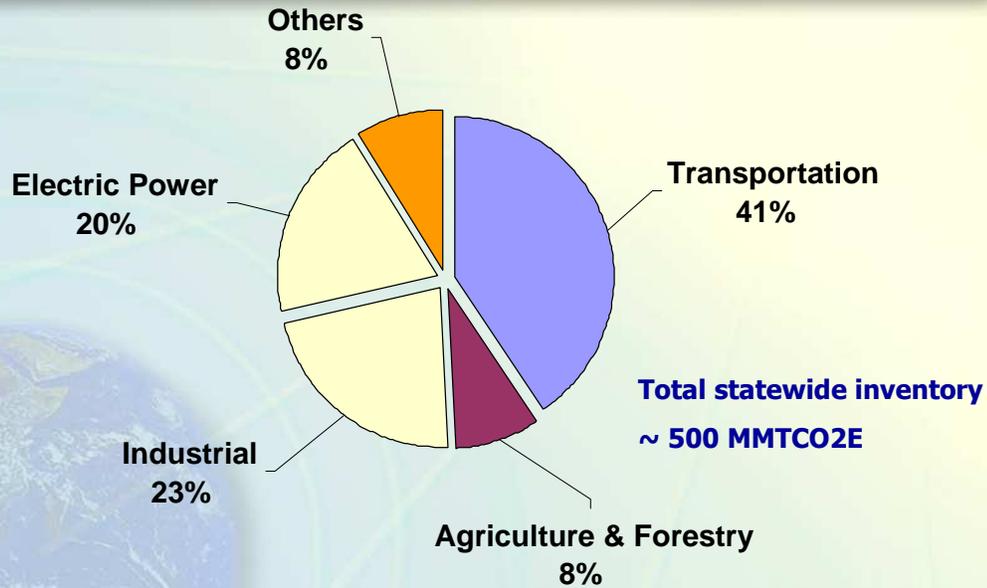
California's Anthropogenic GHG Emissions 2002 (CO₂-equivalent)



Source: California Energy Commission, June 2005 (CO₂-equivalents)

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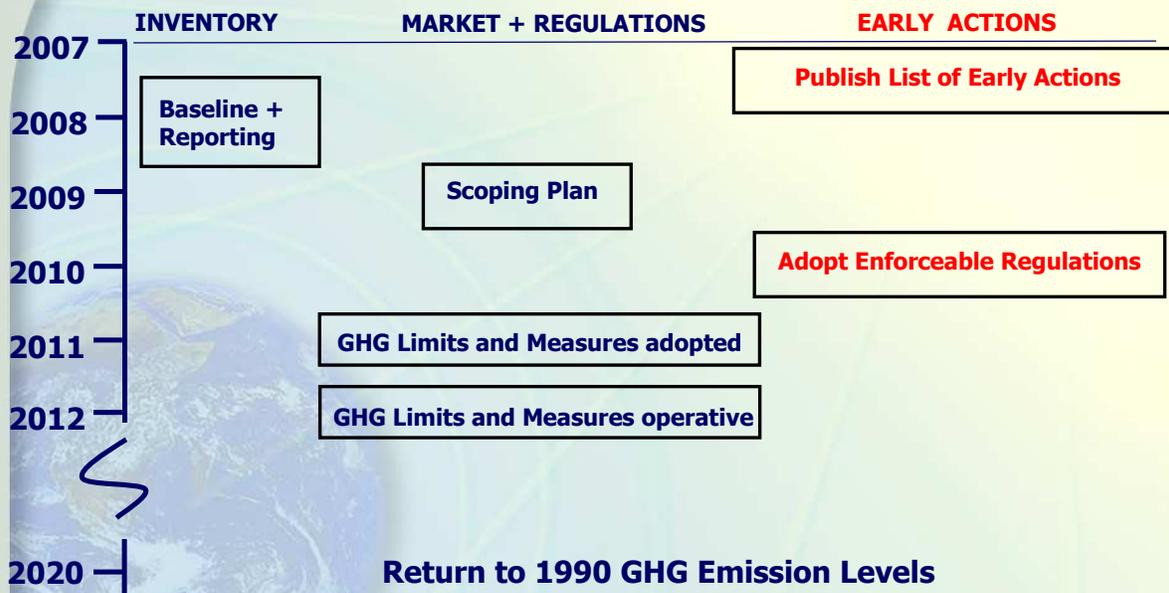
California's Anthropogenic GHG Emissions 2002 (CO₂-equivalent)



Source: March 2006 CAT Report, adapted from CEC, 2005

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The Global Warming Solutions Act of 2006



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Discrete Early Actions

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Scope of Early Action Plan

- Report to the Board in April 2007
- List of early regulatory actions
- List of other potential regulations (for scoping plan)
- Voluntary efforts
 - Opportunities for GHG emission reduction measures from verifiable and enforceable actions
 - Staff will come back to discuss Voluntary Action Protocols
 - Public Workshop April 2007
- Description of process for identification of early actions

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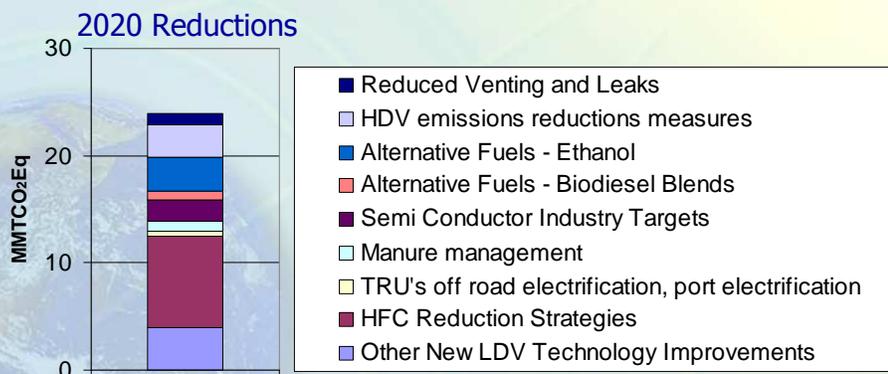
Early Action Selection Considerations

- Enforceable by January 1, 2010
- Technologically feasible and cost-effective
- Not likely participant in market program (but would not necessarily be precluded from future participation)

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Process for Identifying Potential Candidates

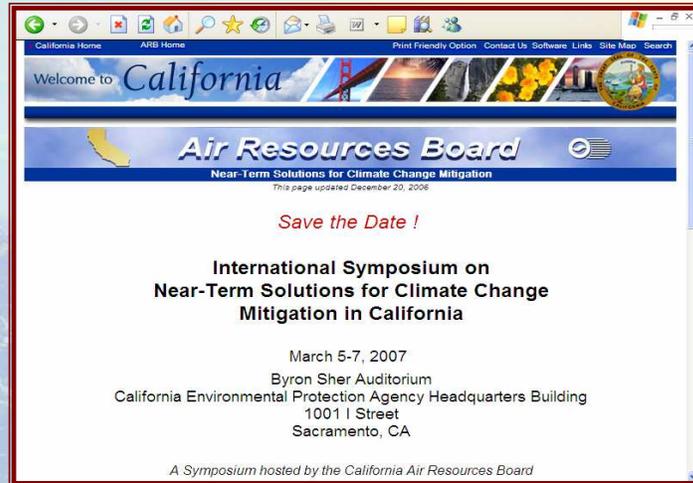
- *first place we looked....* Strategies in the March 2006 Climate Action Team Report



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International Symposium

Explore cost and emission reduction potential of early feasible options (regulations, technology, voluntary programs, etc)



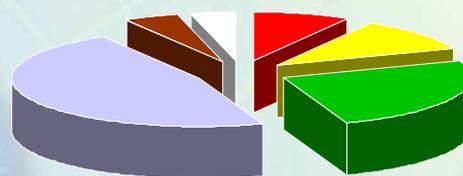
<http://www.arb.ca.gov/cc/cc.htm#030507symp>

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Other Sources Being Considered

- Stakeholder recommendations
- Extensive consideration of other programs
 - USEPA, European Union, UK, and Japanese programs,
 - Chicago Climate Exchange, California Climate Action Registry
 - Local governments and businesses

Review of projects in Kyoto Protocol's Clean Development Mechanism



- Fugitive Emissions from Fuels
- Agriculture
- Waste Handling & Disposal
- Energy Industries
- Manufacturing
- Miscellaneous

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Key Dates and Schedule

- Winter 2006 Initial work of internal team
- January 22, 2007 Public workshop
- January 2007 Begin drafting Early Actions Report
- March 5-7, 2007 Near-term Solutions Conferences
- March 2007 Review and analyze conference information
Release Staff Report (Early Actions Plan)
- April 26, 2007 **Early Action Plan to Board**

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Achieving the Governor's Targets

EARLY ACTIONS

Low carbon fuels standards

High-GWP refrigerant restrictions

MEASURES UNDERWAY

Motor vehicle climate change Standards

Diesel anti-idling

Measures by other State Agencies*

** Ongoing as well as planned climate change mitigation strategies by other State agencies will be addressed via the Climate Action Team's process.*

Stakeholder Input

- Many good suggestions already submitted by various stakeholders
 - Discussions to follow later on
- Opportunity to continue to make suggestions
- Regulatory process involves substantial opportunity for input

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Questions ?

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Presentation 2

Candidate Early Regulatory Action 1 Low Carbon Fuels Standard

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Background

- Transportation represents over 40% of GHG emissions in California
- California relies on petroleum for 96% of its transportation fuel needs
- Governor is establishing transportation fuel policy
- Governor signed an Executive Order

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Low Carbon Fuel Standard

- Governor has established a low carbon fuel standard goal
- Requires declining standard in GHG emissions (measured in CO₂-equivalent grams per BTU)
- Standard reduces carbon intensity of transportation fuels by 10% by 2020
- To be considered by ARB as an early action measure under AB32

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Examples of Lower Carbon Fuels

- E10: increase ethanol blend from current E6 (6% ethanol, 94% gasoline)
- E85: high blend ethanol for flex fuel vehicles
- Low carbon ethanol: "cellulosic" materials have 4-5 times lower GHGs than today's corn
- Hydrogen
- Electricity
- CNG, LPG
- Biogas

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Benefits of LCFS for AB32

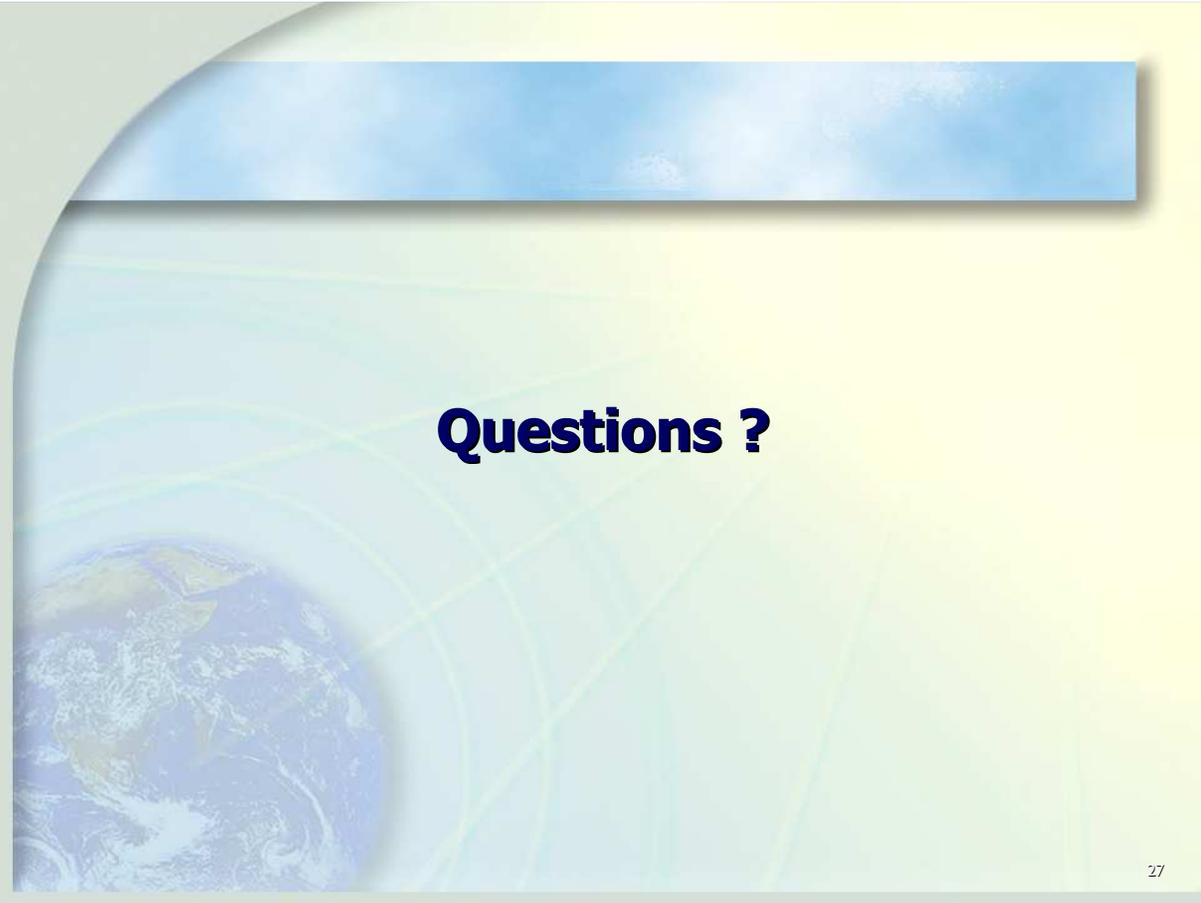
- 13.4 million metric tons of CO₂-equivalent reductions in direct emissions from vehicles
- Equivalent to removing 3 million cars from the road
- Less petroleum consumption: displace 20% of on-road gasoline consumption
- Expand renewable fuels market by 3 to 5 times
- Increase the number of alternative fuel and hybrid vehicles to 7 million (20 times current number)

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Implementation Process

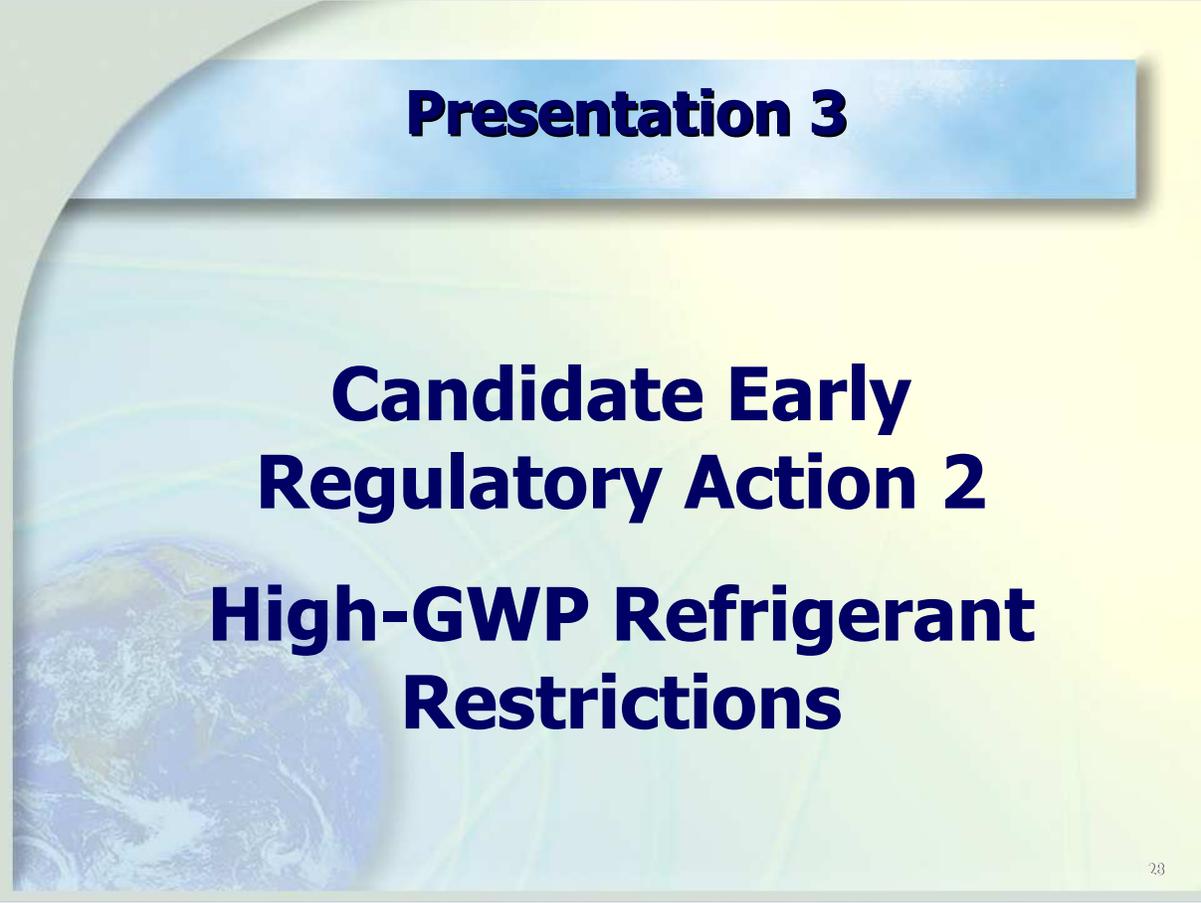
- Study by University of California, CEC, and ARB to be completed Spring 2007
- Study will be incorporated into CEC's AB1007 Report (Pavley, 2005)
- CEC will propose compliance schedule as part of AB1007 Report
- ARB to initiate regulatory proceedings to establish and implement the LCFS
- Anticipated adoption by late 2008

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Questions ?

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Presentation 3

**Candidate Early
Regulatory Action 2
High-GWP Refrigerant
Restrictions**

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Overview

- Background & introduction
- The HFC reduction measures presented in the March 2006 Climate Action Team (CAT) Report
- Key issue: recurring leaky A/C systems
- Current understanding of emissions
- Proposed restrictions on high-GWP HFC-134a refrigerant retail sales
- Public process and next steps
- Questions and comments

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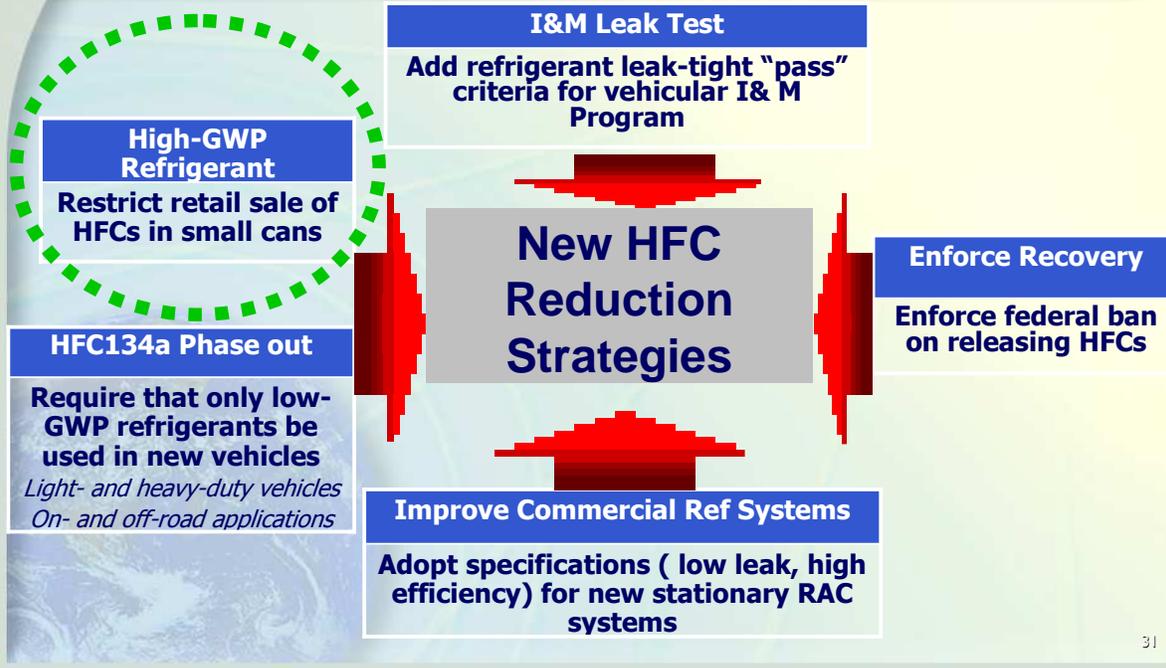
Background

- Hydrofluorocarbons (HFCs) are substitutes for Ozone Depleting Substances (ODS)
- HFCs are used extensively in refrigeration and air conditioning
- High-GWP GHGs* constituted about 3.5% of California's CO₂E GHG emissions inventory in 2002
- Reductions in emissions of high-GWP GHGs are part of a suite of strategies in the Climate Action Team Report
- Reductions of direct and indirect emissions are equally important:
 - Direct emissions (refrigerant releases) are a small component
 - Dominant issue is indirect emissions (system efficiency)

* HFCs, PFCs, and SF₆

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Five HFC measures with potential reductions of ~ 8.5 MMTCO₂E emissions in 2020



Key issue: leaky A/C systems

- Small cans of refrigerant are available to the non-professional "do-it-yourselfer" (DIY) at retail outlets
- Small cans are use for recharging leaky MACS
- Non-professional servicing has higher emissions than professional servicing, but professional servicing is not emission-free
- Industry reports total pounds of HFC-134a sold to DIY in small cans in California in 2006 = 0.7 MMTCO₂E
- ARB's corresponding emission estimate (2003) from AB1493 regulation work = 0.8 MMTCO₂E
- Most of this refrigerant is emitted unchecked

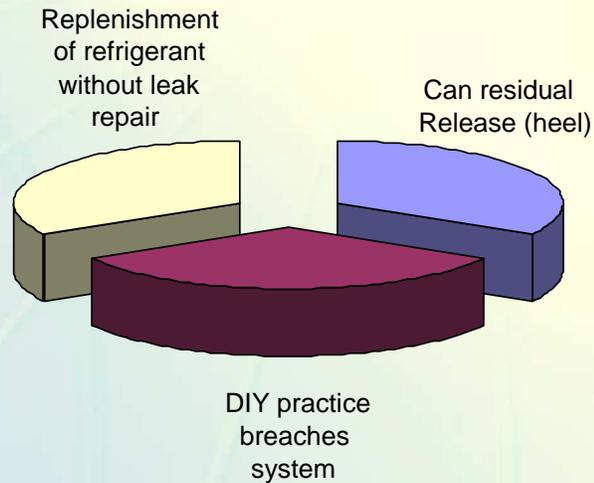
Sources of HFC Emissions

Two key concerns

Excess leakage

Refrigerant left in the can (can heel)

Three mechanisms for refrigerant loss due to DIY practice and use of small cans



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Automotive Refrigerant Products Institute (ARPI) Study

- ARPI - organization that represents the small can industry
- Industry has delivered significant and new information
- 1.2 million pounds of HFC-134a sold to DIY in small cans
- Impacts in California (annual basis)
 - Cost of professional service due to banning the sale of small cans
 - \$166 million
 - Estimated Annual Emissions
 - Can Heel <22,000 pounds (0.013 MMTCO₂E)
 - Discarding Partial Can <40,000 pounds (0.024 MMTCO₂E)
 - Total <0.037 MMTCO₂E
- ARB evaluating results of industry study

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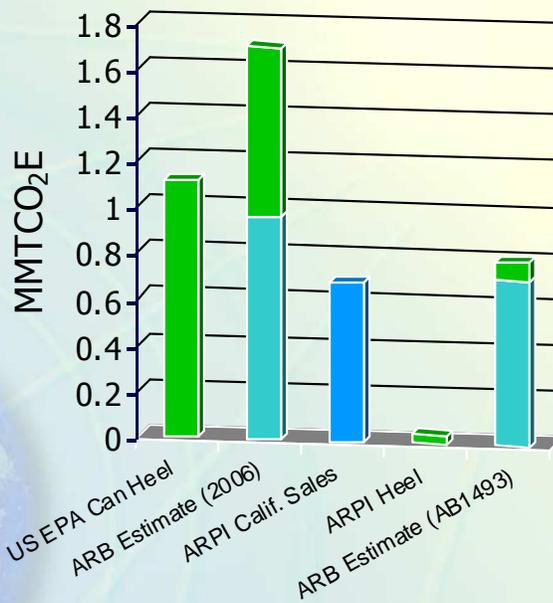
U.S. EPA Container Heel Study

Findings:

- Recharging refrigerant as a liquid minimizes charging time and can heel
- DIYers have limited access to the information and equipment for effective use of small cans and proper charging of MACS
- Estimated average discarded can heel as high as 52% of the fully charged can
- Estimated national annual emissions as high as 12.5 million pounds of refrigerant
 - Estimated California heel emissions of 1.11 MMTCO₂E per year

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Estimated Annual R-134a Emissions in CA



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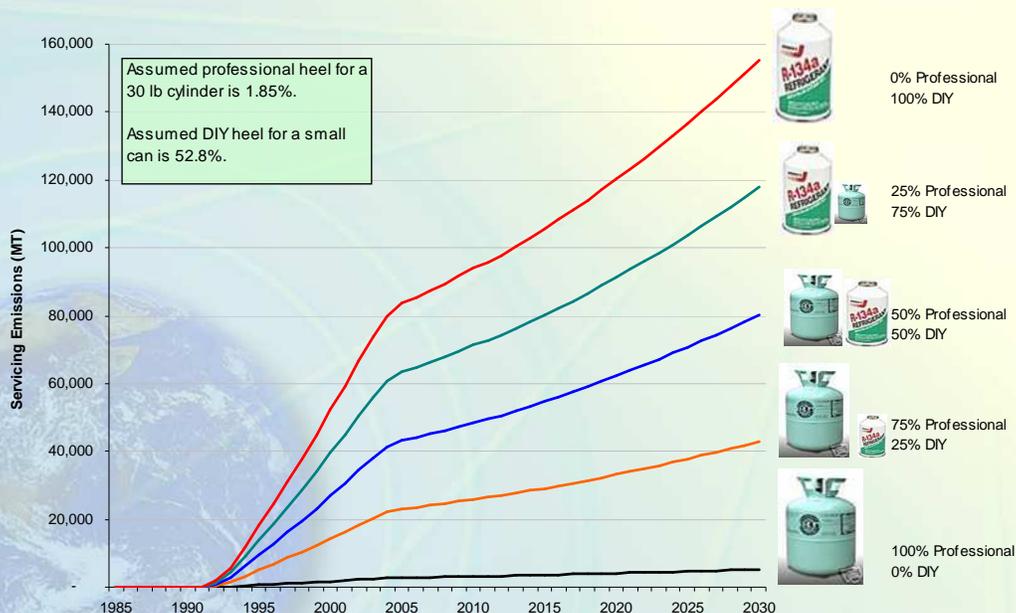
Solution to Reducing Emissions

- Restrict the retail sale of HFC-134a in small cans
- Most effective approach to yield real reductions by:
 - Reducing impact of servicing existing leaky MACSs with small cans
 - Controlling potential measure leakage by restricting importation of refrigerant
 - Allow only professional servicing of MACSs
- Proposed measure has potential to reduce 1 to 2 MMTCO₂E GHG emissions in 2020
- Alternative strategies proposed by Industry will be considered
- Implement this measure and remaining four strategies in the future for best results

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US EPA Vintaging Model Scenarios

Servicing Emissions (MT) Using High DIY Average Heel



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Process for Regulation Development

- Follow own formal process including public input
- Draw heavily from significant research already accomplished by U.S. EPA and ARPI
- Consider impacts of non-professional servicing of MACSs and of use of refrigerants available at retail
- Quantify benefit of professional servicing
- Conduct extramural research
- Continue working with Industry, U.S. EPA, and other stakeholders

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For More Information

To stay current on the latest ARB Climate Change activities, visit our website: <http://www.arb.ca.gov/cc/cc.htm>

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Questions ?