

# **CONTROLLING GHG EMISSIONS FROM VEHICLES: CALIFORNIA PERSPECTIVE**

*presented by*  
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# CALIFORNIA GHG LAW (AB 1493)

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- By January 1, 2005, California Air Resources Board (CARB) must adopt regulations that achieve maximum feasible and cost-effective reduction of greenhouse gas emissions from passenger vehicles
- Regulations apply only to 2009 and later model years



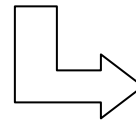
# SHORT TIMELINE TO GATHER DATA

2002	2003				2004			
4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q

## Technical Assessment

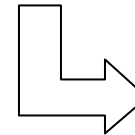
(Individual tasks)

Staff findings/Workshops/Board update



## Staff Proposal

Draft report  
Workshop



## Board Adoption

Staff report  
Board hearing

### •Draft staff proposal

Release staff draft

Workshop

May 04

June 04

### •Final staff proposal

July 04



# GHG EMISSION STANDARDS

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- CARB is evaluating technologies to reduce CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, and HFCs.
- Overall package must meet criteria of technically feasible and cost effective.
- We expect AC GHG control technologies to be an important part of final package of technologies.



# California's Clean Car Future

A Sample of the Technologies Available NOW to Cut Global Warming Pollution

## Engine

### 4 Valves Per Cylinder with Overhead Camshaft

**Description:** 4 valves per cylinder instead of 2. Allows engine to pump exhaust from combustion cylinders more efficiently. Uses less fuel and produces less carbon pollution.

**Status:** Off the shelf – Standard in most cars and smaller SUVs, but not offered in most medium and large pickups and SUVs.

**Estimated CO<sub>2</sub> reductions:** 2-5%

### Variable Valve Timing

**Description:** Valve timing varies to better match engine power requirements. Uses less fuel and produces less carbon pollution.

**Status:** Off the shelf – Available on some Honda and Toyota models already.

**Estimated CO<sub>2</sub> reductions:** 2-3%

## Air Conditioning

### Reduce or Eliminate HFC Refrigerant Pollution

**Description:** HFC refrigerants are 1,300 times more potent as global warming pollutants than CO<sub>2</sub>. Better seals and joints reduce leakage into atmosphere. Non-global warming refrigerant could replace HFCs entirely.

**Status:** Technology exists. Production possible in the next few years.

**Estimated CO<sub>2</sub> reductions:** 1-5% (CO<sub>2</sub> equivalent)

## Catalyst

### Recalibrate Catalyst to Reduce or Eliminate Nitrous Oxide and Methane

**Description:** Nitrous oxide and methane are respectively 310 times and 21 times more potent as global warming pollutants than CO<sub>2</sub>. Recalibrating catalyst and engine operations eliminates or reduces these emissions.

**Status:** Off the shelf

**Estimated CO<sub>2</sub> reductions:** 1-5% (CO<sub>2</sub> equivalent)

## Aerodynamics

### Slicker Aerodynamics

**Description:** Better design can reduce aerodynamic drag, fuel consumption and carbon pollution.

**Status:** Off the shelf.

**Estimated CO<sub>2</sub> reductions:** 1-2%

## Tires

### Smoother Rolling Tires

**Description:** Better tread design and materials to reduce rolling friction. Cuts fuel consumption and CO<sub>2</sub> pollution without compromising handling, comfort, or braking.

**Status:** Off the shelf.

**Estimated CO<sub>2</sub> reductions:** 1-1.5%

## Transmission

### Continuously Variable Transmission

**Description:** Automatic transmission with an infinite number of gears. Engine operates more efficiently with less carbon pollution.

**Status:** Off the shelf for cars and smaller SUVs.

Can be adapted for medium and large light trucks.

**Estimated CO<sub>2</sub> reductions:** 4-8%



# AIR CONDITIONING GHG EMISSIONS

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- Automaker will have flexibility to implement any package of technologies to meet overall standards, including HFC-152a, HC, and CO<sub>2</sub> systems.
- Law allows “emission reduction credits” for automakers who reduce GHGs prior to model year 2009.
- Law allows “alternative compliance methods” for “off vehicle” measures, possibly enhanced maintenance, end of life recovery, or retrofits of AC systems.
- Tremendous opportunity for suppliers of environmentally superior options.

