

Proposed Amendments to the Zero Emission Vehicle Regulation

March 27, 2003

April 24, 2003

Overview

- Recap of March Board meeting
 - Including testimony and proposed alternatives
- Additional staff analysis
- Summary of proposed regulation
- Staff recommendation

Recap of March Meeting

- What brought us to today
- Basic structure of proposed regulation
- Testimony and discussion
- Outstanding issues
- Board directives to staff

Amendments Needed

- To address legal challenges
 - ARB prohibited from enforcing regulation
 - 2005 earliest practical restart date

Amendments Needed

- To align with technology status and market demand
 - No pure ZEV ready for mass deployment
 - Future ZEV development difficult to predict
 - Tremendous progress on PZEVs (bronze) and AT PZEVs (silver) providing new opportunities



Technology Status

– 140,000 PZEV sales expected in MY 2003

Graphic Courtesy Sacramento Bee

The cleanest everyday cars

Automakers are rolling out gasoline cars with near-zero emissions for California. Called PZEVs, or partial zero-emission vehicles, these models run 90 percent cleaner than the average 2003 passenger car.

2003 Volvo S60

Computerized fuel control adjusts the air/fuel mixture for more complete combustion. It receives data from sensors in the exhaust system.

Vapor trap captures gasoline fumes after the engine is turned off.

Muffler

Vapor canisters catch fumes during fueling.

Airtight gas tank eliminates vapor leaks.

Leak-tight fuel lines minimize vapor leakage with thicker metal, fewer connections and a shorter route.

Improved catalytic converter removes more pollutants from the exhaust, especially after cold-engine starts.

2003 Ford Focus SVT

Near-zero emission cars sold in California

Make and models	Engine	MPG: city/intry (auto trans.)	Manufacturers' suggested price
BMW 325i Sport Wagon	2.5L 6-cyl, 184 hp	20/28	\$30,400
BMW 325Ci	2.5L 6-cyl, 184 hp	20/28	\$28,600
BMW 325i	2.5L 6-cyl, 184 hp	20/28	\$27,800
Ford Focus	2.3L 4-cyl, 145 hp	24/30	\$12,850
Ford Focus Wagon	2.3L 4-cyl, 145 hp	24/30	\$17,280
Honda Accord sedan EX/LX	2.4L 4-cyl, 160 hp	24/33	\$22,900/\$23,000
Honda Civic GX	1.7L 4-cyl, 100 hp	30/34	\$20,510
Nissan Sentra XE/GXE	1.8L 4-cyl, 126 hp	28/35	\$12,099/\$14,099
Toyota Camry SE	2.4L 4-cyl, 157 hp	23/32	\$19,875
Volkswagen Jetta	2L 4-cyl, 115 hp	23/29	\$17,100
Volvo S60	2.4L 5-cyl, 168 hp	22/31	\$26,370
Volvo V70	2.4L 5-cyl, 168 hp	22/30	\$27,870

Illustration: Phil Gels, Chicago Tribune; Knight-Ridder Tribune

Preserving 2001 Compliance

- Some companies complied in good faith
- Built, marketed, placed ZEV products
- Earned legitimate credits
- Efforts should be recognized

Two Path Concept

- “Base Path” - for OEMs that invested early and have banked credits
- “Alternative Path” - smaller, fresh gold (demonstration level), with higher silver option (4%), subject to review

March Testimony

- Few strong objections to “Base Path”
 - Some concern about relaxation on changes related to later start date of 2005 vs. 2003
- Significant opposition to “Alternative Path”
 - Included initial target, out years, BEV role, and timing and role of review panel

Staff's Sense of the Board

- Add future year targets for FCVs
- Explore all feasible means to bring BEVs back to the market place
- Fix plug-in hybrid definition if that technology is moved to “gold”

Staff's Sense of the Board

- Draft resolution captures appropriate role of Independent Expert Review Panel - Board's discretion fully preserved
- 2011 sunset for travel provision addresses "leakage" concern for now

Still Unresolved

- 250 vs. 500 for initial FCV demo?
- Rationale, numbers for future FCVs?
- Incentivize or mandate BEVs?
 - The latter by direct or indirect methods
- Call plug-in HEVs “silver” or “gold”?

Directive to Staff

- Frame issues
- Discuss implications of alternatives
- Describe combined effects
- Clarify what Board is voting upon

The Big Picture

- Aiming for long term, mass market penetration
- Zero emissions still the goal
- Biggest hurdles are performance, affordability, consumer acceptance, and (for some vehicles) infrastructure

The Big Picture

- Bronze vehicles (zero evaporative emission, extremely durable) and silver vehicles (ZEV enabling) represent tremendous progress
- Pure ZEVs still elusive

The Big Picture

- Existing mandate has resulted in “work-arounds,” litigation, and intermittent product black-outs
- OEMs are voting with their R&D dollars for fuel cell vehicles

The Big Picture

- Third party BEV manufacturers willing to enter, but only if price and/or subsidies are sufficient and sustained

Issue-by-Issue Analysis

- 250 vs. 500 demonstration requirement
- Bringing BEVs back to market
- Future year FCV targets
- Plug-in hybrids

Alternative Path - 250 vs. 500

- 250 based on stretch goal for FCVs
- 500 appears to be intended to indirectly leverage BEV production

Impact of Choosing 250

- Manufacturers able to respond
- Base path OEMs may move to alternative path, increasing number of fresh ZEVs
- BEV substitution possible but unlikely

Impact of Choosing 500

- Costs double from ~\$250M to ~\$500M
- Exceeds FCV developmental needs; could slow advancement as OEMs seek lowest cost options
- BEV substitution more economically attractive but still unlikely

Impact of Choosing 500

- Worst case outcome
 - OEMs avoid alternative path entirely
 - Seek banked credits
 - Delay action until 2008 hoping for change
 - Bottom line risk--
 - Fewer fresh ZEVs
 - No additional AT PZEVs

Alternative Path - 250 vs. 500

- Staff recommendation
 - Select 250 for 2001-2008 demonstration period
 - Allow BEV substitution
 - Retain 50% fresh FCV floor

Future FCV Targets

- Staff proposed “TBD,” following input from Independent Expert Review Panel
- Several witnesses and Board Members sought specific targets now, even if revisions needed later

Basis for Targets

- - Growth by Stages (10X)
 - Progression of early production for unique vehicles, where units grow from tens to hundreds to thousands
- CalETC
 - Annual doubling
- UCS
 - DOE national goals, OEM public statements
- South Coast AQMD
 - 2% gold plus 4% silver

2009 and Beyond

	10X	Cal ETC	UCS	SCAQMD
2009-2011	2500	2800	5000	32000
2012-2014	25000	22400	30000	55000
2015-2017	50000	71000	71000	73000
2018-2020	89000	89000	89000	91000
Cumulative Total	166500	185200	195000	251000

2009 and Beyond

- Implications
 - All approaches are similar in long term
 - All numbers are subject to Board review
 - Key point today is rationale

2009 and Beyond

- Staff recommendation in light of Board direction
 - Follow 10X rationale
 - Consistent with DOE, scaled to CA
 - Consistent with manufacturer discussions
 - Align with “red line” in 2018
 - Allow BEV substitution to continue

Concern About “Abandoning” BEVs

- Desire to keep existing BEVs rolling
- Desire to bring fresh BEVs to market by any feasible means

Incentives for Existing BEVs

- Staff recommendation
 - Increase credit for BEVs in use beyond three years
 - Remove battery warranty requirement

Incentives for New BEVs

- Staff recommendation
 - Provide 1.25 multiplier for City EVs (Type I) and Full Function EVs (Type II) sold or leased with consumer option to purchase or re-lease
 - Make effective in 2003 model year

BEV Substitution on Alternative Path

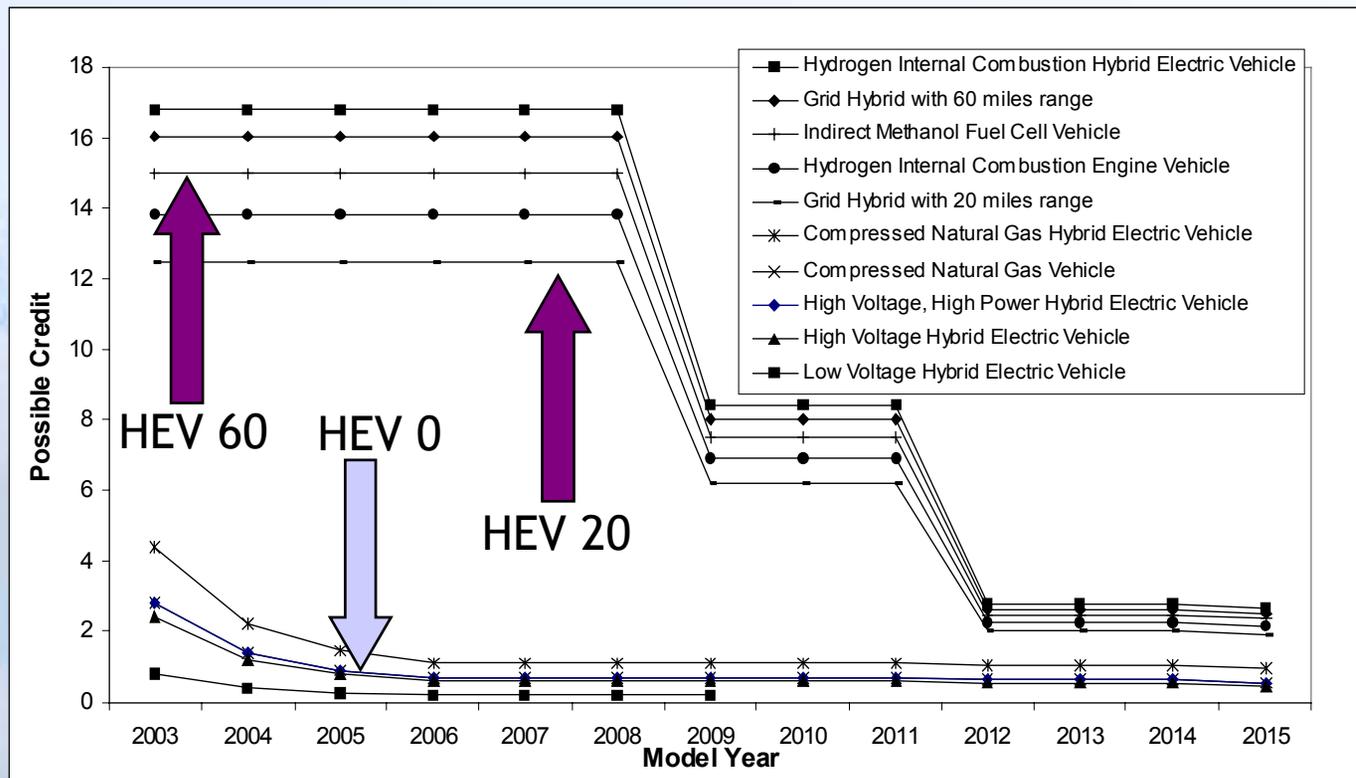
- Staff Recommendation
 - Allow BEVs to meet 50% of alternative path fresh credit requirement
 - Applies to 2003 and later new vehicles
 - Use cost-based ratio, biased towards BEVs
 - 20:1 for Type 1 BEVs (city cars)
 - 10:1 for Type 2 (full function)

Incentives for BEVs

- Summary of BEV incentive impacts
 - Encourage continued availability of used BEVs
 - Encourage sale and open-ended lease
 - Provide incentive for BEV production (cost per credit is less than FCVs)
 - No guarantee BEVs will be marketed; depends mostly on availability of financing for third party manufacturers
 - Higher BEV credits and BEV substitution would reduce total FCV numbers and reduce need for AT PZEVs

Plug-in HEVs

- Current status
 - Plug-in HEVs receive large silver credit



Plug-in HEVs

- Current status (continued)
 - OEMs have significant need for silver credits
 - Plug-in HEVs more attractive than regular hybrids on cost per credit basis

Estimated Dollars Per ZEV Credit					
	2005	2006	2007	2008	2009
Plug-in HEV	\$ 2,381	\$ 2,381	\$ 2,381	\$2,381	\$3,175
Level 2 HEV	\$ 5,500	\$ 2,500	\$ 2,500	\$2,500	\$2,000

Plug-in HEVs

- Staff recommendation
 - If plug-in HEVs become “gold,” credit needs to be reduced to put plug-ins on appropriate scale
 - Also, minimum range should be increased
 - Will add cost, possibly negating the change
 - Staff recommends leaving in “silver” category

Summary of Proposal with Board Direction

- Major elements
 - Base and alternative paths
 - Credit calculations
 - Independent Expert Review Panel
- Total vehicles (gold, silver, bronze)
- Air quality analysis

Base Path

- Preserve 2001 regulation structure
- Percentage ZEV requirements
 - 2 % Gold
 - 2 % Silver
 - 6 % Bronze
- Allow use of banked credits

Alternative Compliance Path

- Requires market share of FCV totals:

2005-2008	250
2009-2011	2500
2012-2014	25000
2015-2017	50000

- Allows:
 - 50% of FCV requirement to be met with BEVs
 - Rest of ZEV obligation to be met with AT PZEVs

ZEV (Gold) Credits

- Remove efficiency multiplier
- Extend credit incentive for early FCVs
- Create and weight ZEV categories:
 - NEV, Type 0, Type I, Type II, Type III
- Adjust credits over time

AT PZEV (Silver) Credits

- Remove efficiency multiplier and fuel economy references
- Modify credit calculations
 - Level 1, 2 and 3 HEVs
 - Zero emission range
 - Low fuel cycle emissions
 - CNG

Other Modifications

- Incentives for early PZEV production
- Reaffirm addition of LDT 2 to baseline
- Transportation system credit
- Placed-in-service deadline
- Banked NEV credit cap
- Severability clauses

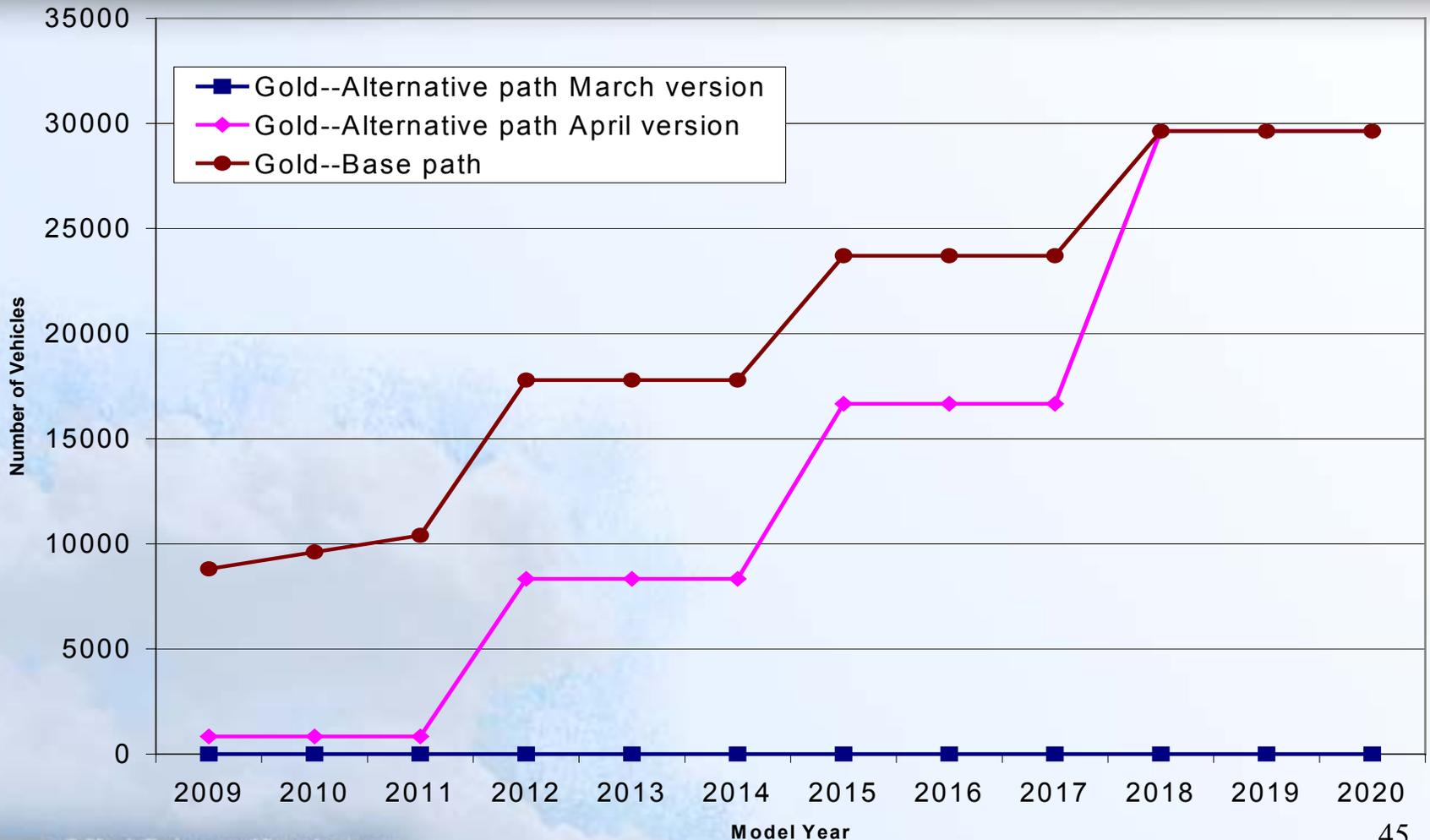
Expert Review Panel

- Independent experts
- Assess ZEV and AT PZEV technologies
 - Fuel cell, battery, advanced componentry
 - Technology and market readiness
 - Provide Board with data to support review of future ZEV requirements

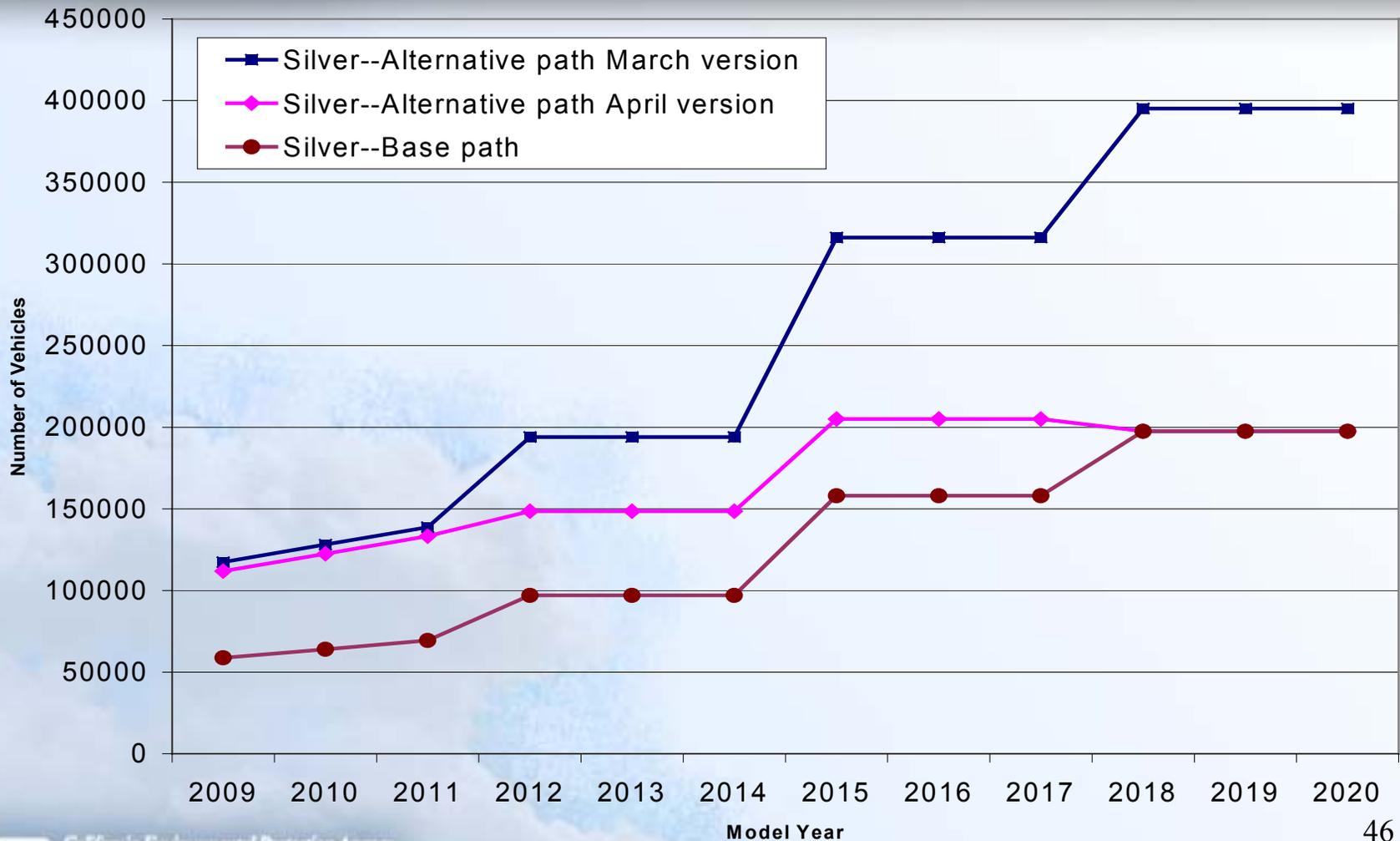
Number of Vehicles

- General effect of today's changes
 - Increases number of fresh ZEVs on alternative path by adding later year targets
 - Decreases AT PZEVs on alternative path since fewer offsets needed
 - No change to base path, 2001-2008 demonstration period, or PZEV requirements

Number of Vehicles-ZEVs



Number of Vehicles--AT PZEVs



Air Quality Analysis

- Emission reductions
- Response to environmental issues raised
 - Fleet turnover effect
 - Upstream emissions from hydrogen infrastructure

Emission Reductions (Tons per day, South Coast Air Basin)

	ROG	NOx
Net Change from March amendments		
2010	0.06	0.00
2020	0.12	0.21
Net Change from 2001 amendments		
2010	0.03	-0.06
2020	0.08	0.04
Net Change from no ZEV program		
2010	-0.32	-1.02
2020	-3.16	-2.02

- Will also reduce CO and air toxics

Response to Environmental Issues Raised (CEQA)

- Fleet turnover
 - Based on analysis to date, no reason to modify previous staff conclusion
- Emissions from hydrogen infrastructure
 - In near term, insignificant
 - Many options
 - Long term vision--sustainable and renewable production

Staff Recommendation

- Approve the proposed amendments to the 2001 ZEV regulation
 - Maintains air quality benefit
 - Addresses litigation
 - Allows ZEV program to be implemented
 - Maintains progress towards transforming California's vehicle fleet to zero emissions