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
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

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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

<table>
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<th>Estimated Dollars Per ZEV Credit</th>
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<td>Level 2 HEV</td>
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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:

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<th>Requirement</th>
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<td>2009-2011</td>
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<td>25000</td>
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<tr>
<td>2015-2017</td>
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• 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

- Gold--Alternative path March version
- Gold--Alternative path April version
- Gold--Base path

Model Year
Number of Vehicles
Number of Vehicles--AT PZEVs

- Silver--Alternative path March version
- Silver--Alternative path April version
- Silver--Base path

Model Year

Number of Vehicles
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)

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- 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