

**State of California  
California Environmental Protection Agency  
AIR RESOURCES BOARD**

**FINAL STATEMENT OF REASONS FOR RULEMAKING  
Including Summary of Comments and Agency Responses**

**2008 AMENDMENTS TO THE ZERO EMISSION VEHICLE REGULATIONS**

**Public Hearing Date: March 27, 2008  
Agenda Item No.: 08-3-5**

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## Table of Acronyms

AER	.....	All Electric Range
ARB	.....	California Air Resources Board
AT PZEV	.....	Advanced Technology Partial ZEV Allowance Vehicle
CAFE	.....	Corporate Average Fuel Economy
CCR	.....	California Code of Regulations
CNG	.....	Compressed Natural Gas
EAER	.....	Equivalent All Electric Range
EMFAC	.....	ARB's mobile emissions inventory modeling program
EV	.....	Electric Vehicle
FSOR	.....	Final Statement of Reasons
GHG	.....	Greenhouse Gas
HEV	.....	Hybrid-Electric Vehicle
HICE	.....	Hydrogen Internal Combustion Engine
ISOR	.....	Initial Statement of Reasons
IVM	.....	Intermediate Volume Manufacturers
LDT1	.....	Light Duty Truck with a loaded vehicle weight of 0-3750 pounds
LDT2	.....	Light Duty Truck with a loaded vehicle weight of 3751 pounds to a gross vehicle weight of 8500 pounds, or a "LEV I" light-duty truck with a loaded vehicle weight of 3751-5750 pounds
LEV I	.....	First generation Low Emission Vehicle program, adopted in a 1990-1991 rulemaking, and generally applicable in the 1994 to 2003 model years
LEV II	.....	Second generation Low Emission Vehicle program, adopted in a 1998-1999 rulemaking, and generally applicable in the 2004 and subsequent model years
LEV III	.....	A future generation Low Emission Vehicle program
LFCE	.....	Low Fuel Cycle Emissions
LVM	.....	Large Volume Manufacturers
MY	.....	Model Year
NEV	.....	Neighborhood Electric Vehicle
NOx	.....	Oxides of Nitrogen
PHEV	.....	Plug-in Hybrid-Electric Vehicle
PZEV	.....	Partial ZEV Allowance Vehicle
R <sub>cda</sub>	.....	Charge depletion range actual
ROG	.....	Reactive Organic Gases
Type 0	.....	Utility EV, less than 50 mile range
Type I	.....	City EV, range of 50 to less than 75 miles
Type I.5	.....	City EV, range of 75 to less than 100 miles
Type II	.....	Full Function EV, range of 100 or more miles
Type III	.....	ZEV, range of 100 or more miles plus fast refueling
Type IV	.....	ZEV, range of 200 or more miles plus fast refueling
Type V	.....	ZEV, range of 300 or more miles plus fast refueling
UDDS	.....	Urban Dynamometer Driving Schedule
UF	.....	Utility Factor
US06	.....	US-06 Supplemental Federal Test Procedure

VMT ..... Vehicle Miles Traveled  
ZEV ..... Zero Emission Vehicle

State of California  
California Environmental Protection Agency  
AIR RESOURCES BOARD

**Final Statement of Reasons for Rulemaking,  
Including Summary of Comments and Agency Responses**

**PUBLIC HEARING TO CONSIDER REGULATORY AMENDMENTS TO THE ZERO  
EMISSION VEHICLE REGULATION**

Public Hearing Date: March 27, 2008  
Agenda Item No.: 08-3-5

**I. GENERAL**

**Summary.** In this rulemaking Air Resources Board (ARB or the Board) has amended its regulation that requires auto manufacturers to develop and commercialize zero emission vehicle (ZEV) technologies. The amendments have given manufacturers increased flexibility to comply with the ZEV requirements, recognized and given credit to the environmental benefits of plug-in hybrid electric vehicles (PHEV), and established ZEV categories in recognition of new developments in fuel cell and battery electric vehicles (EV). The Board has amended the following sections of title 13, in the California Code of Regulations (CCR): section 1900 "Definitions" and section 1962 for Zero Emission and Hybrid Electric Vehicles and its incorporated test procedures "California Exhaust Emission Standards and Test Procedures for 2005 through 2008 Model Zero Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes" (renamed from "California Exhaust Emission Standards and Test Procedures for 2005 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck, and Medium-Duty Vehicle Classes"). The Board has renumbered the section 1962.1 "Electric Vehicle Charging Requirements" of title 13, CCR to section 1962.2. The Board has adopted the following section of title 13, CCR: section 1962.1 for Zero Emission and Hybrid Electric Vehicles for 2009 and Subsequent MY Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, and its incorporated test procedures "California Exhaust Emission Standards and Test Procedures for 2009 and Subsequent Model Zero Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium duty Vehicle Classes" (renamed from "California Exhaust Emission Standards and Test Procedures for 2009 and Subsequent Model Zero-Emission Vehicles").

The rulemaking was formally initiated on February 8, 2008, with the Board's publication of a notice of public hearing scheduled for March 27, 2008. The Staff Report: Initial Statement of Reasons, entitled "2008 Proposed Amendments to the California Zero Emission Vehicle Program Regulations" (Staff Report or ISOR) was made available for

public review and comment beginning on February 8, 2008. The Errata to the Staff Report corrected a table and a paragraph in the regulatory text contained in the ISOR, and was released February 19, 2008, for public review and comment. The Staff Report, which is incorporated by reference herein, describes the rationale for the originally proposed amendments. The text of the proposed amendments was included as Appendix A to the Staff Report. The ISOR and the notice of public hearing were also posted on February 8, 2008, and the Errata posted on February 19, 2008, on ARB's Internet site for this rulemaking at <http://www.arb.ca.gov/regact/2008/zev2008/zev2008.htm>.

The Board received written and oral comments at the hearing. At the conclusion of the hearing, the Board adopted Resolution 08-24, in which it approved the originally proposed amendments along with several modifications, some of which were suggested by staff in a document entitled "Proposed Modifications to Staff Proposal", distributed at the hearing. Resolution 08-24 directed the Executive Officer to make the text of the modified proposal, with other conforming modifications as might be appropriate, available to the public for a supplemental written comment period of at least 15 days. The Executive Officer was then directed either to adopt the amendments with such additional modifications as might be appropriate in light of the comments received, or to present the regulations to the Board for further consideration if warranted.

The regulatory text with the modifications clearly identified was made available starting July 25, 2008, for a 22-day comment period ending August 15, 2007, by issuance of a Notice of Public Availability of Modified Text and supporting documents. Fifty-nine written comments were received.

In response to comments received during the first post-Board Hearing comment period, further modifications to the regulatory text were proposed and made available on October 3, 2008, for an 18-day comment period ending October 20, 2008, by issuance of a Second Notice of Public Availability of Modified Text and supporting documents. Eleven additional comments were received.

This Final Statement of Reasons for Rulemaking (FSOR) updates the Staff Report by identifying and explaining the modifications that were made to the original proposal at the Board's direction and in response to comments, and summarizes and responds to written comments and hearing testimony.

**Fiscal Impacts.** Pursuant to Government Code sections 11346.5(a)(5) and 11346.5(a)(6), the Executive Officer determined that the regulatory action would not create costs or savings to any state agency or in federal funding to the state, costs or mandate to any local agency or school district whether or not reimbursable by the state pursuant to part 7 (commencing with section 17500), division 4, title 2 of the Government Code, or other nondiscretionary savings to state agencies.

The total estimated avoided costs to motor vehicle manufacturers are approximately \$5.8 billion from 2012 to 2017. The total avoided costs are based on estimated costs

over the six-year period to the six large volume manufacturers or LVMs (Toyota, Honda, Ford, General Motors, Nissan, and Chrysler) that produce California-certified light-duty vehicles and are subject to the ZEV regulation if the existing regulation were fully implemented. Four additional intermediate volume manufacturers or IVMs (BMW, Mercedes, Volkswagen, and Hyundai) may transition into a large volume manufacturer status, but the cost associated with their transition is unknown. The only increase in cost is for Enhanced advanced technology partial allowance ZEVs (Enhanced AT PZEV), as additional vehicles of this type are needed to meet the ZEV requirement if a manufacturer chooses to produce fewer ZEVs. However, the proposed amendments greatly decrease overall cost due to the reduction in vehicle numbers for the more expensive ZEV technologies.

There is no additional cost to businesses, local government, state government, or individuals associated with this regulation.

**Consideration of Alternatives.** The Board has determined that no reasonable alternative considered by staff or that has otherwise been identified and brought to the attention of staff would be more effective in carrying out the purpose for which the regulatory action was proposed, or would be as effective and less burdensome to affected private persons or small businesses than the action taken by the Board.

## **II. SUMMARY OF MODIFICATIONS TO ORIGINALLY PROPOSED AMENDMENTS**

### **Summary of Modifications – First 15-Day Comment Period**

The following sections summarize the substantive modifications and the rationale for making such modifications as released on July 25, 2008, for public comment.

#### **1. Number of Vehicles Required for the Pure ZEV (Gold) Floor 2012 to 2014 Annual Requirement Percentage**

The original proposal increased flexibility in the regulation by giving LVMs the option, during the 2012 to 2014 timeframe, to meet their pure ZEV obligation or gold requirement by producing a minimum number of ZEVs (2,500 Type IV ZEVs) and backfilling the rest of the gold requirement with Enhanced AT PZEVs (75,000).

The Board increased the minimum number of ZEVs a manufacturer is required to produce to comply with the regulation. The minimum floor was increased from 2,500 to 7,500 Type IV ZEVs for the 2012 to 2014 timeframe. Though the number of Enhanced AT PZEVs required to backfill the pure ZEV requirement decreases due to this direction, the modification furthers ZEV technology development and encourages commercialization. The regulatory text in section 1962.1(b)(2)(D) and associated percentages in the table in section 1962.1(b)(2)(D)3. reflect the Board's modifications.

## **2. New ZEV Type**

The Board directed creation of a new Type V ZEV. This is a vehicle with a 300 mile or greater range and 15-minute fast refueling capability. The new Type V earns seven credits in MY 2009 through 2017. In 2018 MY and later, a Type V ZEV will earn three credits. The Board recognized that a long driving range ZEV would better meet consumer needs. Criteria and appropriate credit level for a Type V ZEV has been added to tables in 1962.1(d)(5)(A) and (d)(5)(C), and to all sections of the ZEV regulation that reference ZEV types.

## **3. Transition for IVMs**

The Board did not approve staff's proposal to lengthen the IVM transition as the IVM becomes subject to LVM requirements. The modification to section 1962.1(b)(7)(A) reflects this decision. Other minor conforming modifications were also made in this section to clarify regulatory intent.

## **4. PHEV Multiplier During 2009 to 2011 Timeframe**

At the March 27, 2008 Board Hearing, the Board gave direction on two issues relating to Enhanced AT PZEV credits. First, the Board directed consideration of the nine loopholes presented by non-governmental organizations (NGO) in their March 26 comment letter. The following loophole relates to Enhanced AT PZEV credits:

*Loophole #2: "Extend carry-forward provision to Enhanced AT-PZEVs to ensure that banked credits do not create long "blackout" periods when none of these vehicles are produced."*

ARB does not agree that the carry-forward provision should apply to Enhanced AT PZEV credits. ARB does not expect large numbers of Enhanced AT PZEV credits to be banked and carried forward during the 2009 to 2011 time frame. These vehicles have never been produced in large production volumes, and it is unlikely that a sudden ramp-up of volumes would occur. Additionally, if a manufacturer were to be successful in its production of an Enhanced AT PZEV, it would be unlikely that it would stop production during the 2012 through 2014 timeframe. However, ARB does believe that the 3.0 multiplier offered to PHEVs delivered for sale during the 2009 to 2011 timeframe could create an artificial bank of credits that could be used to comply during the 2012 to 2014 timeframe. This multiplier would allow a manufacturer to earn three times the credit for each PHEV delivered for sale, which reduces the number of vehicles and increases the number of credits.

ARB also considered applying a multiplier to battery EV credits earned during the 2009 to 2011 timeframe for IVMs in order to assure there is not a disincentive to produce gold vehicles. ARB concluded that adding an additional multiplier to allow ZEV credits to be

used in place of AT PZEV credits for IVMs was not considered advisable as it would increase program complexities.

ARB chose to approach both issues in the context of credit multipliers and to address the overall credit discrepancy between PHEVs and pure ZEVs during the 2009 to 2011 timeframe. Because a PHEV would earn a 3.0 multiplier if produced and delivered for sale in California, a PHEV could earn more than a ZEV during the 2009 to 2011 timeframe.

For this reason, ARB instead has decreased the value of the 3.0 multiplier to 1.25 for PHEVs in the 2009 through 2011 MYs. The decreased value reflects a value of a similar multiplier offered to ZEVs during the 2009 to 2011 timeframe. An additional modification requires that in order to qualify for the multiplier, the PHEV must be sold or leased for three years, with a lease option for two additional years. Reducing the 3.0 multiplier to 1.25 limits the potential for an excessive number of banked credits which could cause a blackout during the 2012 to 2014 timeframe. The modification provides additional credit, though less than the vehicle would have received in the original proposal, to PHEVs produced and delivered for sale during the 2009 to 2011 timeframe while ensuring that pure ZEVs would not be put at a comparative disadvantage.

Section 1962.1(c)(7)(B) was modified to reflect these changes to the original proposal.

## **5. Plug-in Hybrid Allowances**

The Board directed consideration of additional overall credit for PHEVs that can achieve 10 miles in all-electric mode on the US06 Driving Cycle. As a consequence, ARB made several modifications that affect HEV allowances that included (1) making use of a corrected Utility Factor (UF) that will also be used in the next version of the Society of Automotive Engineers (SAE) Hybrid Test Procedure, (2) revising the zero-emission vehicle miles traveled (VMT) allowance equation, and (3) adjusting advanced componentry allowances for Type F AT PZEVs, and adding a new Type G advanced componentry allowance.

*Utility Factor.* The Society of Automotive Engineers (SAE) committee working on revisions to the HEV test procedures (SAE J1711) discovered mathematical errors in the UF derivation described in the March 1999 version of SAE J1711. Subsequent to the publication of the original proposal, a revised zero-emission range allowance determination method was developed based on the newly revised UF that ARB anticipated would be published in SAE J2841. The revised UF affects the blended PHEVs by increasing the overall credit earned by this category of vehicles. ARB incorporated by reference the draft SAE procedure as SAE J2841 PropDft 2008 in the modified regulatory text of section 1962.1(c)(3)(A).

*Zero-Emission VMT Allowance Equation.* The former constant of 14.6 has been revised downward to 11.028 to compensate for the change in the revised UF as well as yield a Type G 40-mile PHEV overall allowance of 2.5, an increase of 0.1 over that proposed in

the ISOR. The credit allowance has also been made constant for PHEVs with actual charge depleting ranges greater than 40 miles. As modified, these higher range PHEVs will earn the same as a PHEV with exactly 40 miles capability. The equation in section 1962.1(c)(3)(A) was modified to reflect the new constant and a new equation has been added to specify the allowance earned by a HEV with greater than 40-mile charge depleting range actual ( $R_{cda}$ ).

*Advanced Componentry.* An additional high-power Type G category for HEVs was added with an increased advanced componentry allowance of 0.95 for this new category. This new Type G requirement requires a drive and energy storage system that is sufficient to propel a vehicle on the more aggressive US06 driving cycle for 10 miles. The advanced componentry allowance for Type F HEVs was decreased by 0.08 from what was presented at the Board Hearing to make overall credit levels consistent, as well as account for the modified UF and modified equation. The following table shows the advanced componentry allowance earned by Type F and Type G HEVs.

### Proposed HEV Advanced Componentry Allowance Schedule

Year	Type C 10 kW	Type D 10 kW	Type E 50 kW	Type F (NEW) ≥ 10 mile UDDS* Capable	Type G (NEW) ≥ 10 mile US06 Capable
2005-2011	0.2	0.4	0.5	0.72	0.95
2012-2014	0.15	0.35	0.45	0.67	0.90
2015+	0.1	0.25	0.35	0.57	0.80

\*Urban Dynamometer Driving Schedule

Regulatory language in section 1962.1(c)(4)(B)7. was modified to reflect the increased advanced componentry allowance for Type F and Type G HEVs. These changes to HEV allowances result in the following changes in overall credit for AT PZEVs:

AT PZEV Types		Prior Proposal		15-Day Proposal	
		Credit '09-'11	Credit '12-'14	Credit '09-'11	Credit '12-'14
<b>Other AT PZEV</b>	<b>CNG</b>	0.70	0.70	0.70	0.70
	<b>H2ICE</b>	2.30	2.30	2.30	2.30
<b>Type E</b>	<b>Non PHEV</b>	0.70	0.65	0.70	0.65
	<b>B12.5/0.8 BPHEV</b>	1.24	1.19	<b>1.35</b>	<b>1.30</b>
	<b>B20 /0.8 BPHEV</b>	1.45	1.40	<b>1.56</b>	<b>1.51</b>
	<b>B22 /0.8 BPHEV</b>	1.50	1.45	<b>1.60</b>	<b>1.55</b>
	<b>B40 /0.8 BPHEV</b>	1.78	1.73	<b>1.78</b>	<b>1.73</b>
<b>Type F</b> (≥10 mile UDDS Capable)	<b>P10 AER PHEV</b>	1.62	1.57	<b>1.62</b>	<b>1.57</b>
	<b>P20 AER PHEV</b>	1.99	1.94	<b>2.00</b>	<b>1.95</b>
	<b>P40 AER PHEV</b>	2.40	2.35	<b>2.27</b>	<b>2.22</b>
<b>Type G</b> (≥10 mile US06 Capable)	<b>P10 AER PHEV</b>	1.62	1.57	<b>1.85</b>	<b>1.80</b>
	<b>P20 AER PHEV</b>	1.99	1.94	<b>2.23</b>	<b>2.18</b>
	<b>P40 AER PHEV</b>	2.40	2.35	<b>2.50</b>	<b>2.45</b>

## **6. High Pressure Storage System Requirements**

One of the nine “loopholes” in the NGOs’ March 26 comment letter pointed out potential ways for manufacturers to flood the market with cheaply made hydrogen internal combustion engine (HICE) vehicles.

*Loophole # 1: “Limit hydrogen internal combustion engine vehicles to AT-PZEV (non-Enhanced) and PZEV credits due to their limited benefit and potential for gaming.”*

Although it was not necessary to limit HICEs to the AT PZEV category as these vehicles provide large emission benefits and promote tank and infrastructure development, to ensure that only the most advanced HICE vehicles are placed, the requirements for the hydrogen storage system on HICE vehicles increased from 3600 to 5000 pounds per square inch. The increase promotes the use of advanced hydrogen storage systems and furthers the development and commercialization of hydrogen tanks that could also be used on a fuel cell vehicle. Regulatory language in section 1962.1(c)(4)(A) was modified to reflect this change.

## **7. Travel Provision**

The Board directed modification of the ZEV regulation to include suggestions from the State of New York and other states that asked for a modification to the provision that gives credit in California to ZEVs placed in another state (the travel provision) that has adopted California’s ZEV program regulations pursuant to Section 177 of the federal Clean Air Act (Section 177 states). Because California’s vehicle market is much larger than any Section 177 state and because a manufacturer’s production volumes vary between Section 177 states, credits generated by California ZEVs could overwhelm the other Section 177 states’ ZEV requirements, including the states’ AT PZEV and PZEV requirements. Therefore, the travel provision was modified to provide for proportionality of California’s credits to the Section 177 states’ credits. This is achieved by multiplying the required credits by the ratio of a LVM’s total sales in the state receiving credit to the LVM’s total sales in California. This still allows manufacturers to place a vehicle in a Section 177 state and receive full ZEV credit in California. This change only affects the value of the credit earned in the Section 177 state in which the vehicle is placed or the value of the ZEV credit which is being used to comply with a Section 177 state’s requirement. The language in section 1962.1(d)(5)(E) was modified to reflect these changes.

## **8. Advanced Demonstration Credits**

The original proposal was modified to include Enhanced AT PZEVs along with ZEVs as eligible for advanced demonstration credit. Since no manufacturer has released an Enhanced AT PZEV for commercial sale, it is appropriate to allow these vehicles to earn advanced demonstration credit. Also, ARB increased the cap on the allowable number

of advanced demonstration credits from 6 to 25 vehicles, per state, per model, per year. This increase responds to a manufacturer comment that the six-vehicle cap was too low to adequately demonstrate vehicle technology. All advanced demonstration credit continues to be subject to Executive Officer approval. Section 1962.1(g)(4) was modified to reflect the additional vehicle category and the revised cap on vehicles earning credit.

## **9. Credit Transparency**

The Board directed that the ZEV credit bank be fully transparent including trades beginning in 2010. Section 1962.1(l)(2) was modified to reflect this change, with specific language relating to the transparency of transactions within the ZEV credit bank.

## **10. Use of Transportation Systems Credits**

Transportation systems credits provide vehicles extra ZEV credit if the vehicle is placed in a shared use application, and/or provide linkage to mass transit. ARB modified the original proposal to exclude extra credits earned by ZEVs in transportation systems to be used in compliance with the portion of the obligation that must be met with ZEVs during the 2012 to 2014 timeframe. The modification preserves a limitation that has been in ZEV requirements for LVMs on the Alternative Path since the 2005 MY. During the hearing, the Board clearly indicated concern that the minimum gold floor be met with real vehicles rather than banked credits. This change also ensures the Board's directed 7,500 minimum ZEV floor will be met with vehicles rather than credits. This provision was added to 1962.1(b)(2)(D) as subsection 4.

## **11. Inclusion of Enhanced AT PZEVs into ZEV Credits for Transportation Systems**

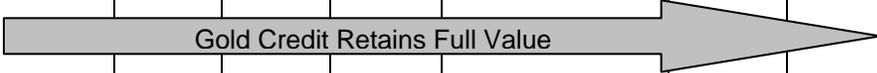
ARB's modifications include Enhanced AT PZEVs in provisions relating to ZEV credits for transportation systems. Like AT PZEVs, Enhanced AT PZEVs will earn four credits, through the 2011 MY, if the vehicle is in a project demonstrating shared use and the application of intelligent technologies. Also, Enhanced AT PZEVs will earn an additional two credits through the 2011 MY, if the vehicle is used in a project that includes linkage to transit.

Enhanced AT PZEVs will continue to qualify for transportation system credits in the 2012 and subsequent MYs, earning one credit for shared use and application of intelligent technologies, and one additional credit for linkage to transit. Section 1962.1(g)(5) was modified to reflect these changes.

## **12. Banking of Gold Credits Until Subject to LVM Requirements**

The Board directed necessary modifications to allow manufacturers who are not subject to LVM requirements to bank 2008 and subsequent model-year gold credits without

having the limited carry-forward provision apply until the manufacturer becomes subject to LVM requirements. Staff modified section 1962(g)(6) and section 1962.1(g)(6) to include a provision that allows a manufacturer other than an LVM, who produces gold credits, to bank those gold credits until they are subject to LVM ZEV obligations. The limited carry-forward provision in each respective regulation will then apply, beginning with the year the manufacturer becomes subject to the stepped up LVM requirements. Below is an example of how this provision would work for an IVM who produces a gold credit in 2010, but does not become subject to LVM requirements until 2014:

2010	2011	2012	2013	2014	2015	2016	2017 and Beyond
Gold Credit Produced				IVM Subject to LVM Requirements			2010 Earned Gold Credit only allowed in Enhanced or lesser credit earning categories
							

If a manufacturer other than an LVM chooses to trade their gold credits, then the limited carry-forward provision applies to the credits traded and begins in the MY in which the credits were earned. Below is an example of a credit earned by an IVM (e.g., Manufacturer A) in 2009 that is traded to another manufacturer (e.g., Manufacturer B) in 2011:

	2009	2010	2011	2012	2013
<b>Manufacturer A</b>	Credit Earned		Credit Traded to Manufacturer B <ul style="list-style-type: none"> <li>○ Limited carry-forward provision applies to the traded credit</li> </ul>		
					
<b>Manufacturer B</b>	Credit Earned by Manufacturer A		Traded Credit Received <ul style="list-style-type: none"> <li>○ May be used to meet Gold Obligation</li> </ul>	Traded credit may only be applied to Enhanced AT PZEV or lesser credit earning categories	
					

### 13. Use of Neighborhood Electric Vehicle (NEV) Credits

Historically, NEV production generated credits that created long blackout periods in the ZEV program. This was commented on by NGOs in their March 26 comment letter:

*Loophole #8: "Prevent product blackouts caused by NEV credits for the pure ZEV minimum requirement and early introduction of Enhanced AT-PZEVs. This can be accomplished by limiting the use of NEV credits earned before 2008 to the (non-Enhanced) AT-PZEV or PZEV categories after 2011 and restricting NEV credits earned after 2008 from the pure ZEV floor."*

ARB considered the comment and modified the regulation to clarify the limits and allowed use of NEV credits in complying with the ZEV program. The following tables were added to section 1962.1(g)(6) as a new subsection (A):

(2001 through 2005 Banked NEV Credits)

<u>Years</u>	<u>ZEV Obligation that:</u>	<u>Percentage limit for NEVs allowed to meet each Obligation:</u>
<u>2009 – 2011</u>	<u>Must be met with ZEVs</u>	<u>50 percent</u>
<u>2009</u>	<u>May be met with AT PZEVs but not PZEVs</u>	<u>75 percent</u>
<u>2010 – 2011</u>		<u>50 percent</u>
<u>2009 – 2011</u>	<u>May be met with PZEVs</u>	<u>No Limit</u>
<u>2012 – 2014</u>	<u>Must be met with ZEVs</u>	<u>0 percent</u>
	<u>May be met with Enhanced AT PZEVs and AT PZEVs</u>	<u>50 percent</u>
	<u>May be met with PZEVs</u>	<u>No Limit</u>

(2006 and subsequent MY NEVs)

<u>Years</u>	<u>ZEV Obligation that:</u>	<u>Percentage Limit for NEVs allowed to meet each Obligation:</u>
<u>2009 - 2011</u>	<u>May be met through compliance with Primary Requirements</u>	<u>No Limit</u>
	<u>May be met through compliance with Alternative Requirements, and must be met with ZEVs</u>	<u>0 percent</u>
	<u>May be met through compliance with Alternative Requirements, and may be met with AT PZEVs or PZEVs</u>	<u>No Limit</u>
<u>2012 – 2014</u>	<u>Must be met with ZEVs</u>	<u>0 percent</u>
	<u>May be met with Enhanced AT PZEVs, AT PZEVs, or PZEVs</u>	<u>No Limit</u>

With these modifications, the 2001-through-2005-MY NEV credits are not available to meet the portion of the obligation that must be met with ZEVs in 2012 through 2014. Also, the 2001-through-2005-MY NEV banked credits are capped at 50 percent usage within the obligation that may be fulfilled with Enhanced AT PZEVs or AT PZEVs for the 2012 to 2014 timeframe. These modifications limit the use of 2006 and beyond NEV credits within the minimum ZEV floor during the 2012 to 2014 timeframe while still allowing them to be fully used to meet requirements that may be met with Enhanced AT PZEVs, AT PZEVs, and PZEVs.

#### **14. Additional NEV Requirements**

In conjunction with the modifications on the use of 2001-through-2005-MY-NEV credits and 2006-and-subsequent-MY-NEV credits, ARB added more stringent requirements for 2010 and subsequent MY NEVs. This was also in response to the NGOs previously mentioned “Loophole #8.” The requirements include minimum technical specifications including acceleration, top speed, and constant speed range requirements. Staff based these requirements on the U.S. Department of Energy’s “NEV America Technical Specifications” (Version 2) document, released on December 1, 2004. ARB slightly altered the NEV America requirements to better fit with the intent of the ZEV program. Additionally, ARB added language which points to test procedures developed by the U.S. Department of Energy. These can be found at the following links:

- Acceleration: ETA-NTP002 (revision 3) document, released on December 1, 2004, “Implementation of SAE Standard J1666 May93: Electric Vehicle Acceleration, Gradeability, and Deceleration Test Procedure” found at: <http://www1.eere.energy.gov/vehiclesandfuels/avta/pdfs/nev/ntp002.pdf>
- Constant Speed Range: ETA-NTP004 (revision 3) document, released on February 1, 2008, “Electric Vehicle Constant Speed Range Tests” found at: <http://www1.eere.energy.gov/vehiclesandfuels/avta/pdfs/nev/ntp004.pdf>

Also, 2010 and subsequent MY NEVs are required to be equipped with sealed, maintenance-free batteries, and meet minimum warranty requirements. ARB added sections 1962.1(d)(5)(F)(1),(2), (3) and 1962.1(h)(2) to reflect these modifications.

#### **15. Other Technical and Minor Modifications**

Other post-Board Hearing conforming modifications were made to the regulation for clarification and simplification:

1962(c)(5)(A): The provision relating to the fast refueling requirements in the table has been modified to reflect the number of miles needed to be replaced rather than the percentage maximum rate energy capacity for Type III ZEVs.

1962(c)(5)(B): For clarification, language in this section has been modified to specify the calendar year rather than the MY in which the vehicle was placed. The table heading in the same section was also modified.

1962.1(b)(1)(B): The marketing manufacturer provision states that a passenger vehicle or light-duty vehicle produced by a manufacturer but marketed by another manufacturer under the other manufacturer name place will count towards the marketing manufacturer's production for purposes of determining any manufacturer's obligation. This provision was modified to apply to all manufacturers, rather than to only small volume manufacturers.

1962.1(b)(1)(B): The regulation has been modified to specify the MYs (2003 through 2005) that a manufacturer will use to determine its ZEV obligation during the 2009 to 2011 timeframe.

1962.1(b)(1)(B)1.b.: The percentage ZEV requirement has been corrected for the Alternative Path during the 2009 to 2011 timeframe. As released in staff's notice errata, the percentage has been adjusted from .80 to .82.

1962.1(c)(6)(B)1. The MY affected by the 3.0 cap on the value of an AT PZEV allowance has been changed from the 2012 MY to the 2009 MY. The modification in the applicable MY makes the cap for the 2009 through 2011 MY vehicles consistent with the cap for the 2012 and subsequent MY vehicles.

1962.1(d)(5)(A) and (B): Fast refueling requirements for Type IV ZEVs has been modified to correct the refueling time to 15 minutes instead of 10 minutes.

1962.1(f): Staff has added extended service multiplier language found in section 1962(f) into section 1962.1 as subsection (f) because the provision still applies through the 2011 MY.

1962(j) and 1962.1(j): The abbreviations sections have been updated to accurately reflect the abbreviations applicable to each regulation.

Other minor conforming and harmonizing modifications have been incorporated.

The substantive and minor conforming and harmonizing modifications were also made to corresponding provisions in the incorporated "California Exhaust Emission Standards and Test Procedures for 2009 and Subsequent Model Zero Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes."

## **Summary of Modifications – Second 15-day Comment Period**

### ***Travel Provision***

In the first 15-day notice, ARB modified the travel provision to provide for proportionality of California's credits to a Section 177 state's credits. This was accomplished by multiplying ZEV credits earned in another state by a ratio of a manufacturer's Section 177 state sales to its California sales for a given MY. Auto manufacturers commented that this proportionality equation might have unintended consequences if the carry-forward and carry-back provisions are used in combination with the travel provision. Comment was also received regarding the MY first affected by the proportional travel provision.

Responding to these comments, ARB further modified the text. Proportionality continues, but is proposed to begin in the MY 2010. The further modification also specifies that a credit earned in a Section 177 state is earned at a proportional value in the Section 177 state, while credit is earned in the full amount in California. Lastly, a manufacturer complying with the Alternative Path requirements in the 2010 and 2011 MYs in a Section 177 state will not be affected by proportionality if those credits are produced in California. The maximum number of credits allowed for compliance in the Section 177 state for the 2010 and 2011 MYs, however, is limited to the Section 177 state's Alternative Path minimum ZEV percentage. Any credits earned in California and used in a Section 177 state beyond the minimum Alternative Path ZEV percentage are subject to proportionality. Section 1962.1(d)(5)(E) has been modified to reflect these further changes.

### ***Minimum ZEV Percentage***

Due to an error in calculating the included percentage of light-duty trucks in the heavier weight category (LDT2s), staff released an incorrect percentage for the minimum ZEV percentage that must be met during the 2012 through 2014 timeframe. The correct ZEV percentage is 0.79 percent. For this reason, both the minimum and maximum percentages found in the table in section 1962.1(b)(2)(D)3. have been modified along with the maximum percentage allowed for Enhanced AT PZEVs found in section 1962.1(b)(2)(D)1.

### ***Transportation Systems Credits***

The first notice's modified text disallowed the use of additional credits earned by transportation systems for the portion of the ZEV requirement that must be met with ZEVs (minimum ZEV floor). ARB received comment from auto manufacturers that disallowing the use of transportation system credits in the minimum ZEV floor would greatly discourage the use of ZEVs in transportation systems. Agreeing that the use of ZEVs in transportation systems furthers the Board's overall ZEV commercialization and environmental goals, ARB modified the text to allow use of credits earned by ZEVs placed in transportation systems to meet up to one tenth of the portion that must be met by ZEVs. Section 1962.1(b)(2)(D)4 has been modified to reflect these changes.

### ***Additional Modifications***

#### CCR, title 13, Section 1962

1962(b)(1)(C): ARB received comment from auto manufacturers concerning the unnecessary inclusion of the LDT2 percentage for the 2007 MY. This was an oversight and the provision has been modified to exclude the 2007 MY to be consistent with a January 16, 2007 advisory to auto manufacturers.

#### CCR, Title 13, Section 1962.1

1962.1(b)(1)(B): In response to auto manufacturers' comments, ARB modified the language in this section to base the 2012 and subsequent MY requirements on a rolling average of the fourth, fifth, and sixth year previous to the compliance MY. Manufacturers are also allowed to base their annual sales on the same MY in which they are complying. Manufacturers are allowed to switch every year between these two methods. For example, a manufacturer complying for the 2014 MY would be allowed to use the average number of vehicles produced and delivered for sale from the 2008 through 2010 MYs, or projected sales volumes for the 2014 MY.

1962.1(b)(2)(B)1.b. and (b)(2)(B)1.b.ii.: Auto manufacturers commented that the modifications in the first notice inappropriately allowed manufacturers complying with the Alternative Path requirements to switch between applicable sales volume determination methods during the 2009 through 2011 MYs. Because the Alternative Path requirements have been based on designated periods or time frames, ARB agreed with this comment and deleted language that would have allowed manufacturers to switch between applicable sales volume determination methods.

1962.1(b)(2)(D)1., (b)(2)(D)2., and (b)(2)(D)3.: Auto manufacturers commented that the allowed use of Type 0 ZEVs needed to be more explicitly stated. ARB concurred and modified the regulatory text in each provision and the table to reflect the allowed use of Type 0 ZEVs in meeting the ZEV requirements. Section 1962.1(b)(2)(D)3. was reworded to improve clarity.

1962.1(c)(3)(A): An auto manufacturer commented requesting the zero-emission vehicle miles traveled (VMT) allowance for an Enhanced AT PZEV with a equivalent all-electric range (EAER) of exactly 10 miles. ARB added the allowance to the table in section 1962.1(c)(3)(A) shown as: EAER $\geq$  10 miles

1962.1(c)(4)(A): An auto manufacturer commented requesting allowance of cryogenic storage for the high pressure hydrogen storage. Since cryogenic storage of hydrogen could be at a lower pressure than allowed by the language released in the first notice, ARB modified the language to include storage at cryogenic temperatures as another basis for the advance componentry allowance.

1962.1(c)(4)(B)1.: An auto manufacturer commented requesting ARB to delete a provision from section 1962.1(c)(4)(B)1. that only allowed HEVs to receive credit if they qualified for a zero-emission VMT allowance. To correct this oversight in the first notice modifications, the sentence was deleted.

1962.1(d)(5)(B): The South Coast Air Quality Management District (SCAQMD) commented with a proposal that the fast refueling requirements for Type IV and V ZEVs be deleted to allow for plug-in fuel cell vehicles within the regulation. Though maintaining the fast refueling requirements for Type IV and V ZEVs, ARB modified the provision to allow the Executive Officer to waive the requirements if a vehicle utilizes more than one ZEV fuel and to base the amount of credit earned on UDDS ZEV range.

1962.1(d)(5)(F)3.: Auto manufacturers commented regarding the required length of the NEV warranty requirements added during the first notice. ARB modified the language to clarify the intent of a 24-month warranty.

1962.1(g)(8): Auto manufacturers commented on the modifications in the first notice regarding the penalty for failure to meet the ZEV requirements. ARB has deleted “production period” from this provision and reverted back to the original language released in the ISOR: specified time period. A cross-reference to section 1962.1(g)(7)(A) was added to clarify that the ZEV deficit can be made up within the time period specified by that section.

1962.1(j)(2) and 1962.1(j)(9): Due to the changes in sections 1962.1(d)(5)(E) and 1962.1(g)(8), definitions in section 1962.1(j) were modified: “production period” was removed and “Section 177 state” was added.

#### Other Modifications:

Modifications that correspond with those described for the regulations were also made to the incorporated test procedures. For both the regulations and the test procedures, ARB also made other non-substantial modifications for clarification such as correcting typographical, grammatical or numbering errors, and correcting references and cross references.

### **Final Non-Substantial Modifications**

The Board has also added or corrected cross-references and made other non-substantial or grammatical changes to the text of the final regulation order. These include the addition of cross-references to the adopted section 1962.1 in section 1900, grammatical changes, and the addition of appropriate punctuation in both the regulation and incorporated test procedures.

### III. SUMMARY OF COMMENTS AND AGENCY RESPONSE

Below is a list of those who submitted comments or testified at the Board Hearing:

Abe, Kazuo	Toyota Motor North America, Inc. (Toyota)
Acquaro, Skip	private citizen (Acquaro)
Adams, Noel	private citizen (Adams)
Adcock, James	private citizen (Adcock)
Ahnger, Sally	private citizen (Ahnger)
Alexa, John	private citizen (Alexa)
Allen, Jerry	private citizen (Allen)
Anderson, Lydell	private citizen (Anderson)
Anglin, JoAnn	private citizen (Anglin)
Bakker, Deborah	Hyundai Motor Cars (Hyundai)
Balkmann, Thad*	Phoenix Motorcars (Phoenix)
Ballan, Mikael	private citizen (Ballan)
Baragona, David	private citizen (Baragona)
Barkley, Michael	private citizen (Barkley)
Baxley, Phil*	Shell Hydrogen LLC (Shell)
Bayha, Elizabeth	private citizen (Bayha)
Beedie, James	private citizen (Beedie)
Bird, Gladys	private citizen (Bird)
Borelli, Adam*	Google.org (Google)
Boschert, Sherry*	Sierra Club of California (Sierra)
Bostwick, Christopher	Large Volume Manufacturers (Toyota, GM, Honda, Ford, Chrysler, Nissan) (submitted by Christopher Bostwick)
Brenann, David	private citizen (Brenann)
Brickley, Erin	private citizen (Brickley)
Brody, Jeff	private citizen (Brody)
Brown, Benjamin	private citizen (Brown)
Brushaber, Pam	private citizen (Brushaber)
Brysk, Seth	Los Angeles Chapter of American Jewish Committee (AJC)
Bundy, Robert	private citizen (Bundy)
Burgess, Mike	private citizen (Burgess)
Burrus, Greg	private citizen (Burrus)
Burt, Laurie	Commonwealth of Massachusetts (Massachusetts)
Byram, Michael	private citizen (Byram)
Carmichael, Tim	Coalition for Clean Air (CCA)
Cassidy, Robert	Nissan (Nissan)
Chamberlain, Abbey	private citizen (Chamberlain)
Chaudhary, Ashay	private citizen (Chaudhary)
Chen, Allen	private citizen (Chen)
Choquette, Francois*	private citizen (Choquette)
Cimino, Ant	private citizen (Cimino)
Clare, Brian	private citizen (Clare)

Clifford, Mark	private citizen (Clifford)
Cochran, Ronald	private citizen (Cochran)
Colburn, Michael	private citizen (Colburn)
Conlyn, Andrew	private citizen (Conlyn)
Cornish, Grant	private citizen (Cornish)
Cree, Ian	private citizen (Cree)
Cross, Chris	private citizen (Cross)
Daltrey, Barrington	private citizen (Daltrey)
Davids, Daniel	Seattle Electric Vehicles Association (SEVA)
Davies, Douglas	private citizen (Davies)
Davis, Jon	private citizen (Davis)
DePaschoal, Roberto	private citizen (DePaschoal)
DeSaulnier, Mark	Assemblymember DeSaulnier (Assemblymember DeSaulnier)
Drori, Ze'ev*	Tesla Motors, Inc. (Tesla)
Duncan, Robert	private citizen (Duncan)
Dunlap, Besir*	private citizen (Dunlap)
Dunn, Richard	GreenWheels Sustainable Transportation (GreenWheels)
Durst, Rick	private citizen (Durst)
Duvall, Mark	Electric Power Research Institute (EPRI)
Eggers, Eddie	private citizen (Eggers)
Ehlmann, James	General Motors (GM)
Ellingson, Jerry	private citizen (Ellingson)
Ellis, Stephen	American Honda Motors Co. (Honda)
Emmett, Daniel	Energy Independence Now (EIN)
England, Christopher	Electrochimica Laboratories LLC (Electrochimica)
Enos, Z.	Miles Electric Vehicles (Miles)
Farinacci, John	private citizen (Farinacci)
Field, Malcolm	private citizen (Field)
Fields, John	private citizen (Fields)
Flanagan, Dave	United Technologies Company Power (UTC)
Fletcher, Peter	private citizen (Fletcher)
Flint, Steven	New York State Department Environmental Conservation (New York)
Flittner, Steven	1 Ample World (Ample)
Folks, Tom	Mightycomm (Mightycomm)
Ford, Ben	private citizen (B. Ford)
Foster, Jay	private citizen (Foster)
Frank, Andrew*	private citizen (Frank)
Freund, Ron*	Electric Auto Association (EAA)
Friedland, Jay	Plug In America (PIA)
Friedland, Jay	private citizen (Friedland)
Fuddpucker, Fred	private citizen (Fuddpucker)
Fugere, Danielle	Friends of the Earth (FOE)
Gaffney, Anne	private citizen (Gaffney)
Galcher, Leo	Private citizen (Galcher)

Galliani, Joe	private citizen (Galliani)
Garabedian, Harold	private citizen (Garabedian)
Garcia, Giselle	private citizen (G. Garcia)
Garcia, Quin	private citizen (Q. Garcia)
Gaydos, Gerry	private citizen (Gaydos)
Geller, Marc	San Francisco Electric Vehicle Association (SFEVA)
Gifford, Warren	private citizen (Gifford)
Gillock, Richard	private citizen (Gillock)
Gilot, Kevin	private citizen (Gilot)
Green, Gordon	private citizen (Green)
Greene, David	Oak Ridge National Laboratory (ORNL)
Greer, Peter*	private citizen (Greer)
Gronich, Sigmund*	Charisma Consulting (Gronich)
Gysler, Steven	private citizen (Gysler)
Haines, D. Mark	Freedom Formula Foundation (FFF)
Hanson, Robert	private citizen (Hanson)
Harralson, David	private citizen (Harralson)
Harris, Gardner	private citizen (Harris)
Heacock, David	private citizen (Heacock)
Heckerth, Steve	American Solar Energy Society (ASES)
Henderson, Joseph	private citizen (Henderson)
Hendren, Gilbert	private citizen (Hendren)
Henry, Charles	private citizen (Henry)
Hernandez, Bill	private citizen (Hernandez) (50 signatures included)
Herndon, Jean	private citizen (Herndon)
Hessing, Mark	private citizen (Hessing)
Hoffner, John	private citizen (Hoffner)
Holmes-Gen, Bonnie*	American Lung Association of California (ALA)
Holroyd, John	private citizen (Holroyd)
Hoverson, John	private citizen (Hoverson)
Howland, John	private citizen (Howland)
Ireland, Lisa	private citizen (L. Ireland)
Ireland, Stanton	private citizen (S. Ireland)
Irvine, Star	private citizen (Irvine)
Jahn, Harold	Clean Electric, Inc. (Clean Electric)
Jensen, Mark	private citizen (Jensen)
Johansson, Lars	private citizen (Johansson)
John, Frank	private citizen (John)
Johnson, Stuart	Volkswagen Group of America (Volkswagen)
Jones, Charlton	private citizen (Jones)
Juarez, Tina	private citizen (Juarez)
Kadzielski, Mark	private citizen (Kadzielski)
Kasper, Rick	Global Electric Motorcars (GEM)
Keirns, Ann Catherine	private citizen (Keirns)
Kelly, Kelli	private citizen (K. Kelly)
Kelly, Richard	private citizen (R. Kelly)

Kennedy, Clinton	private citizen (Kennedy)
Koenig, Jerald	private citizen (Koenig)
Killian, Earl*	private citizen (Killian)
Knapp, Jamie	ZEV Alliance, speaking on behalf of Danielle Fugere (Friends of the Earth or FOE)
Knight, Ben*	American Honda Motors Co. (Honda)
Korthof, Doug*	private citizen (D. Korthof)
Korthof, William	private citizen (W. Korthof)
Krill, Jennifer	Rainforest Action Network (RAN)
Larsen, Mark	private citizen (Larsen)
Lee, Waidy	private citizen (Lee)
Lindholm, Lyle	private citizen (Lindholm)
Lipmen, Eli	Los Angeles Chapter of American Jewish Committee (AJC)
Little, Elizabeth	private citizen (Little)
Lococo, Al	private citizen (Lococo)
Lord, Michael*	Toyota Motor North America, Inc. (Toyota)
Lowe, Aaron	Automotive Aftermarket Industry Association (AAIA)
Love, Ernest	private citizen (Love)
Lussier, Devin	private citizen (Lussier)
MacMillan, Lou	private citizen (MacMillan)
Magel, Nick	Global Exchange (Global Ex)
Manley, Tom	private citizen (Manley)
Margulis, Michael	private citizen (Margulis)
Marin, Arthur	Northeast States for Coordinated Air Use Management (NESCAUM)
Matula, Edward	private citizen (Matula)
McCarthy, Gina	State of Connecticut, Department of Environmental Protection (Connecticut)
McDonough, Brian	private citizen (McDonough)
McLaughlin, Michael	private citizen (McLaughlin)
Medvecky, Joe	private citizen (Medvecky)
Meehan, Tim	private citizen (Meehan)
Melamid, Elan	private citizen (Melamid)
Meyer, Richmond	private citizen (Meyer)
Miller, Rod	private citizen (Miller)
Mills, Rodney	private citizen (Mills)
Minich, Michael	private citizen (Minich)
Mitten, Nathan	private citizen (Mitten)
Miyasato, Matt	South Coast Air Quality Management District (SCAQMD)
Modisette, Dave*	California Electric Transportation Coalition (CalETC)
Modlin, Reginald*	Chrysler LLC (Chrysler)
Neff, Fred	private citizen (Neff)
Neil, Chris	private citizen (Neil)
Newlin, Jeremy	private citizen (Newlin)
Newsom, Gavin	San Francisco Mayor Newsom (Mayor Newsom)
Nicholes, Linda	Rain Forest Action Network (RAN)

Nicholes, Linda	private citizen (Nicholes)
Olenski, Paul	private citizen (Olenski)
Olson, Paul	private citizen (Olson)
Olum, Ken	private citizen (Olum)
Paine, Chris	private citizen (Paine)
Palmer, David	private citizen (D. Palmer)
Palmer, Michael	private citizen (M. Palmer)
Parent, Sean	private citizen (Parent)
Pascarella, Bill	private citizen (Pascarella)
Patterson, David*	Mitsubishi Motors R&D of America (Mitsubishi)
Patton, Gary	Planning and Conservation League (PCL)
Paul, Alexandra	private citizen (Paul)
Pease, Gerald	private citizen (Pease)
Peirini, Rodney	California Automotive Wholesalers Association (CAWA)
Perry, Oliver	Eastern Electric Vehicle Club (EEVC) (13 signatures included)
Perzinski, Edwin	private citizen (Perzinski)
Pew, Stephen	private citizen (Pew)
Pierce, David	private citizen (D. Pierce)
Pierce, James	private citizen (J. Pierce)
Pierce, Nigel	private citizen (N. Pierce)
Plotkin, Norman	California Automotive Wholesalers Association/Automotive Aftermarket Industry Association (CAWA/AAIA)
Pohorsky, Jerry	private citizen (Pohorsky)
Pritt, Joshua	private citizen (Pritt)
Pucci, Steven	private citizen (Pucci)
Puetz, William*	Daimler AG (Mercedes)
Quan, Raymond	private citizen (Quan)
Quong, Spencer*	Union of Concerned Scientists (UCS)
Ralls, Wilma	private citizen (Ralls)
Ramone, Monica	Synergy (Synergy)
Rasmussen, Pat	private citizen (Rasmussen)
Rassweiler, Clifford	private citizen (Rassweiler)
Reese, Symmon	private citizen (Reese)
Reinert, Bill	Toyota Motor North America, Inc. (Toyota)
Reisinger, Randy	Speaking on behalf of Felix Cramer of CalCars (CalCars)
Rodamaker, Scott	private citizen (Rodamaker)
Rosen, Lisa*	private citizen (Rosen)
Rosson, Terry	private citizen (Rosson)
Rudy, Sara*	Ford Motor Company (Ford)
Ruskin, Ira	Assemblymember Ruskin (Assemblymember Ruskin)
Ryder, Terry	private citizen (Ryder)
Sawyer, Robert	private citizen (Sawyer)
Saxton, Tom	private citizen (Saxton)
Schmiedlin, Mark	private citizen (Schmiedlin)
Schneider, Matt	private citizen (Schneider)

Scholz, Sibylle	private citizen (Scholz)
Sclar, Trudy	EnVironmental Motors (EnVironmental Motors)
Scott, Paul	private citizen (Scott)
Scott, Paul	Southern California Electric Vehicle Association (SCEVA)
Seal, Kathy	private citizen (Seal)
Seidler, Mark	private citizen (Seidler)
Seldon, Robert	private citizen (Seldon)
Selleck, Judy	private citizen (Selleck)
Sexton, Bob	private citizen (Sexton)
Sexton, Chelsea*	Plug In America (PIA)
Shanab, Jeff	private citizen (Shanab)
Shears, John	Center for Energy Efficiency and Renewable Technologies (CEERT)
Sheffield, Scott	private citizen (Sheffield)
Shott, Bill	private citizen (Shott)
Siebert, Robert	private citizen (Siebert)
Silva, John	private citizen (Silva)
Silver, David	private citizen (Silver)
Simpson, Andrew	Tesla Motors, Inc. (Tesla)
Sipp, Brian	private citizen (Sipp)
Skye, Coby	Long Beach Greens (Greens) (86 signatures included)
Smalenberger, Skip	private citizen (Smalenberger)
Smallwood, Edward	private citizen (Smallwood)
Smith, Adam	Google.org (Google)
Smith, Christina	private citizen (C. Smith)
Smith, Fraser	private citizen (F. Smith)
Smith, Jay	private citizen (J. Smith)
Sokolow, Taryn	private citizen (Sokolow)
Soref, Gil	private citizen (Soref)
Spradley, ohn	private citizen (Spradley)
Spruit, Howard	private citizen (Spruit)
Stack, Jim	private citizen (Stack)
Stahmer, Aubyn	private citizen (A. Stahmer)
Stahmer, Carl	private citizen (C. Stahmer)
Stelling, Robert	private citizen (Stelling)
Stewart, Ken	United Technologies Corporation (UTC)
Stobbe, Michael	private citizen (Stobbe)
Strand, Muriel	private citizen (Strand)
Sullivan, Tim	private citizen (Sullivan)
Sun, Randolph	private citizen (Sun)
Swansburg, Bryan	private citizen (Swansburg)
Sydney, Russel	Sustainable Transport Club (STC)
Stewart, Ken	United Technologies Company Power (UTC Power)
Tabascio, Stefano	private citizen (Tabascio)
Tabor-Beck, Linda	private citizen (Tabor-Beck)
Tavill, Mark*	private citizen (Tavill)

Terry, Carlton	private citizen (Terry)
Thagard, Elizabeth	private citizen (Thagard)
Thwaite, Michael	private citizen (Thwaite)
Tonachel, Luke	Natural Resources Defense Council (NRDC)
Tramiel, Leonard	private citizen (Tramiel)
Trudeau, Colby	private citizen (Trudeau)
Turock, David	private citizen (D. Turock)
Turock, Joy	private citizen (J. Turock)
Underwood, Dave	Plug Power (Plug Power)
U'Ren, Jeff	private citizen (U'Ren)
Verdugo-Peralta, Cynthia	Asthma and Allergy Foundation of America (AAFA)
Verdugo-Peralta, Cynthia	private citizen (Verdugo-Peralta)
Vieira, Claudia	private citizen (Vieira)
Wakefield, Thomas	private citizen (Wakefield)
Wallerstein, Barry	South Coast Air Quality Management District (SCAQMD)
Wang, Yong	private citizen (Wang)
Washburn, Morgan	private citizen (Washburn)
Wedaa, Henry	private citizen (Wedaa)
Weeden, Noreen	private citizen (Weeden)
Weinman, Sherry	Los Angeles Chapter of American Jewish Committee (AJC)
Weitz, Stephan	private citizen (Weitz)
Wells, Timothy	private citizen (Wells)
Weverstad, Alan	General Motors (GM)
Williams, James	private citizen (Williams)
Woolsey, James	private citizen (Woolsey)
Yasuoka, Aki	American Honda Motors Co. (Honda)
Yeung, Candace	private citizen (C. Yeung)
Yeung, Darren	private citizen (D. Yeung)
Yoder, R. Christopher	private citizen (Yoder)
Young, Barbara	private citizen (Young)
Ziwica, Karl Heinz*	Bayerische Motoren Werke of North America (BMW)
Zulauf, Mat	private citizen (Zulauf)

The people listed above with a single asterisks (\*) submitted written comments and gave oral testimony at the March 27, 2008 Board Hearing.

The following is a list of form letters received during the 45-day comment period and the first 15-day comment period, how they are referred to in ARB's response to the comments, the title of the comment as listed on the Board Meeting Comments Log website<sup>1</sup>, and the approximate number of form letters received:

Form Letter # 1	"MSV definition and inclusion in ZEV 2008"	2
Form Letter # 2	"Plug-In Cars"	280
Form Letter # 3	"California Zero Emission Vehicles"	345

<sup>1</sup> <http://www.arb.ca.gov/lispub/comm/beecomlog.php?listnmae=zEV2008>

Form Letter # 4	“Zero Emission Vehicles Now”	16
Form Letter # 5	“Please save the electric car”	1487
Form Letter # 6	“MSV”	41
Form Letter # 7	“A stronger ZEV Program: more clean vehicles, no more loopholes”	2002
Form Letter # 8	“Don’t weaken ZEV regulation”	600
Form Letter # 9	“Plug in Cars, Plug-in-hybrids, all-electric cars”	4
Form Letter #10	“Strength California’s ZEV instead of weakening it...”	13

During the first 15-day supplemental comment period, the Board received written comments from:

Aller, Wayne	private citizen (Aller)
Baloga, Thomas	BMW of North America, LLC (BMW)
Bohanon, Randall	private citizen (Bohanon)
Bostwick, Christopher	Large Volume Manufacturers (Chrysler, Ford, GM, Honda, Nissan, Toyota) (Submitted by Christopher Bostwick)
Bradley, Mike	private citizen (Bradley)
Carmichael, Tim	Coalition for Clean Air (CCA)
Cimino, Anthony	private citizen (Cimino)
Connor, Paul	private citizen (Connor)
Cox, Earl	private citizen (Cox)
Cree, Ian	private citizen (Cree)
Cummings, Charles	private citizen (Cummings)
Davies, Stephen	private citizen (Davies)
Drori, Ze’ev	Tesla Motors, Inc. (Tesla)
Ehlmann, James	General Motors (GM)
Elliott, Steve	private citizen (Elliott)
Emmett, Daniel	Energy Independence Now (EIN)
Faulkner, Dennis	private citizen (Faulkner)
Fermi, Steve	private citizen (Fermi)
Foster, Matt	private citizen (Foster)
Friedland, Jay	Plug-In America (PIA)
Fugere, Danielle	Friends of the Earth (FOE)
Gillock, Richard	private citizen (Gillock)
Glatman, Themis	private citizen (Glatman)
Glener, Doug	private citizen (Glener)
Gonder, Jeff	National Renewable Energy Laboratory (NREL)
Harman, R.M. ‘Auros’	private citizen (Harman)
Hoke, Robert	private citizen (Hoke)
Holmes-Gen, Bonnie	American Lung Association of California (ALA)
Jan, James	private citizen (Jan)
Jungreis, Jason	private citizen (Jungreis)
Korthof, Doug	private citizen (D. Korthof)
Kulongoski, Justin	private citizen (Kulongoski)
Lange, Robert	private citizen (Lange)

Larsen, Mark	private citizen (Larsen)
Lord, Michael	Signing for Kevin Webber from Toyota Motor North America, Inc. (Toyota)
Magavern, Bill	(Sierra Club California)
Marin, Arthur	Northeast States for Coordinated Air Use Management (NESCAUM)
Marion, Steve	private citizen (Marion)
McCurdy, Ronald	private citizen (McCurdy)
Modisette, David	California Electric Transportation Coalition (CalETC)
Modlin, Reginald	Chrysler, LLC (Chrysler)
Munson, Krystin	private citizen (Munson)
Nater, Pete	private citizen (Nater)
Orndorff, Graham	private citizen (Orndorff)
Patterson, David	Mitsubishi Motors R&D of America (Mitsubishi)
Power, Jeffrey	private citizen (Power)
Pritt, Joshua	private citizen (Pritt)
Quong, Spencer	Union of Concerned Scientists (UCS)
Rahm, Yoshaany	private citizen (Rahm)
Roche, Matthew	private citizen (Roche)
Ruskin, Ira	Assemblymember (Assemblymember Ruskin)
Saidak, Thomas	private citizen (Saidak)
Shaw, David	New York State Department Environmental Conservation (New York)
Shears, John	Center for Energy Efficiency and Renewable Technologies (CEERT)
Swennes, Robin	private citizen (Swennes)
Tonachel, Luke	Natural Resources Defense Council (NRDC)
Trudeau, Colby	private citizen (Trudeau)
Valentinitetti, Richard	Northeast States for Coordinated Air Use Management (NESCAUM)
Verma, Arjun	private citizen (Verma)
Wallerstein, Barry	South Coast Air Quality Management District (SCAQMD)
Ward, Aaron	private citizen (Ward)
Warren, Mark	private citizen (Warren)
Webster, Jason	private citizen (J. Webster)
Webster, Letitia	private citizen (L. Webster)
Yoney, Domenick	private citizen (Yoney)

During the second 15-day supplemental comment period, the Board received written comments from:

Bostwick, Christopher	Large Volume Manufacturers (Chrysler, Ford, GM, Honda, Nissan, Toyota) (Submitted by Christopher Bostwick)
Cabrera, John	private citizen (Cabrera)
Elliott, Steve	private citizen (Elliott)
Guldenbrein, Ross	private citizen (Guldenbrein)

Haskell, William	private citizen (Haskell)
Kunhardt, Tom	private citizen (Kunhardt)
Larsen, Mark	private citizen (Larsen)
Modlin, Reginald	Chrysler, LLC (Chrysler), Business Confidential Comment
Rosen, Douglas	Miles Electric Vehicles (Miles)
Wallerstein, Barry	South Coast Air Quality Management District (SCAQMD)
Yelverton, Bonnie	private citizen (Yelverton)

Set forth below is a summary of each objection or recommendation made regarding the specific adoption, amendment, or repeal proposed, together with an explanation of how the proposed action has been changed to accommodate each objection or recommendation, or the reasons for making no change. Only objections or recommendations directed at the agency’s proposed action or the procedures followed by the agency in proposing or adopting the action are summarized as permitted by CCR, title 2, section 11346.9. Repetitive or irrelevant comments have been aggregated and summarized as a group. A comment is “irrelevant” if it is not specifically directed at the agency’s proposed action or to the procedures followed by the agency in proposing or adopting the action. The comments have been grouped by topic whenever applicable.

**COMMENTS AND TESTIMONY PRESENTED PRIOR TO, OR AT THE MARCH 27, 2008 HEARING**

***Part I. Non-Specific Regulatory Comments***

Comments grouped in this section refer generally to the proposal presented in the ISOR, but to not specifically speak to the proposed for the ZEV regulation. Other comments in this section refer to parts of the regulation which were not modified in this rulemaking.

**A. General Support**

1. Comment: Vote for the adoption of the 2008 Amendments to the California Zero Emission Vehicle Regulation. (D. Palmer)

General support for the proposed amendments as articulated in the 45-day notice. (Nissan)

Agency Response: The Board approved the ZEV regulation as proposed by staff along with other modifications.

2. Comment: Support for amendments to the regulation which encourages auto manufacturers to produce ZEVs. (Heacock)

Support for changes to the ZEV program that allow greater flexibility. (Nissan, VW)

Support for the goal of zero emissions from automobiles and the development of technologies in support of this goal. (Toyota)

Support for staff efforts to refine the ZEV program in order to maintain incentives for advanced technology implementation while providing manufacturers with necessary flexibility to ramp up development, production, and marketing of these technologies. (Hyundai)

Support for CARB in its efforts to walk a fine line between fostering continued zero emission vehicle technology development while recognizing true technology limitations. (FOE)

Agency Response: ARB appreciates the support for the goal of achieving zero emissions, increasing flexibility in the regulation, and considering technology development and limitations. The Board's approval of the proposal with modification is in line with these goals.

3. Comment: I generally agree with you on your decisions to improve air quality. (Hendren)

Agency Response: ARB appreciates the acknowledgement of its efforts to improve California's air quality.

4. Comment: The commenter states general support for the New Path. (Killian, SCAQMD)

Agency Response: ARB appreciates the support for the New Path. The Board approved the New Path concept as a part of California Code of Regulations, title 13, section 1962.1.

## **B. General Opposition**

5. Comment: ARB received several comments urging the Board to reject staff's proposal. (Pucci, SFEVA, Sierra, Tavill, Tesla, Thwaite)

Agency Response: Though much of staff's proposal was adopted, the Board chose to modify or reject parts of staff's proposal. These modifications included increasing the number of pure ZEV required during the 2012 through 2014 timeframe, not amending the transition time for IVMs becoming subject to LVM ZEV requirements, and modifying the travel provision as proposed by staff. Overall, the amended regulation continues to further technology development while taking into account technological and cost barriers to ZEV technologies.

6. Comment: The Board should send this proposal back to staff to rework it so that it also encourages the long-term phase for fuel cell vehicles and the hydrogen infrastructure. (Verdugo-Peralta, Wedaa)

Agency Response: The focus of this rulemaking is the 2009 through 2011 timeframe and 2012 through 2014 timeframe. Overall, the amended regulations encourage long term ZEV commercialization. Additionally, the Board directed staff to return to the Board with another ZEV regulation, focusing the program exclusively on the gold requirement, that is battery, fuel cell, and Enhanced AT PZEV technologies; ensuring California as the central policy for moving advanced, low greenhouse gas (GHG) technology vehicles from the laboratory and demonstration phase to commercialization, where they are critical to achieving the Governor's GHG emission reduction goals.

7. Comment: ARB received comments expressing general opposition to the regulation as proposed or the Board's decision to revisit the regulation. (Adams, Gifford, Greer, Hendren, Killian)

Agency Response: The Board directed an Expert Panel (the Panel) to conduct an assessment of vehicle technology readiness compared to the ZEV regulation. After the Panel presented its findings to the Board in May 2007, the Board saw a need to modify the numbers required during the 2012 through 2014 timeframe, as well as provide more equal treatment of battery EVs. These findings, coupled with the current cost and state of ZEV technology development lead to the proposed amendments to the ZEV regulation in March 2008.

8. Comment: Terminate any programs that purport to enable or mandate the so-called zero emission vehicle. There is no such thing as a zero emission vehicle. The proposed program to subsidize the EV is fatally flawed. I request that you do not support EV programs in any form. (Harralson)

Now is not the time to manufacture electric cars! When an electric car can be made cheaper, more spacious and comfortable, cheaper to operate and give the builder and dealer a profit for building and selling it, only then will they become practical. This isn't likely to happen in our lifetime! (Fuddpucker)

Vote no to EVs. (Perzinski)

Agency Response: The Board believes the ZEV program is necessary to meeting California's environmental goals. Zero-emission technologies can greatly reduce or even eliminate some of the persistent environmental problems from motor vehicle emissions. Both battery EV and fuel cell vehicles can be powered by fuels created from 100 percent renewable energy. The ZEV program has become even more important for California in meeting goals under the Global Warming Solutions Act of 2006 (Assembly Bill (AB) 32).

9. Comment: The commenter states opposition to the ZEV program because it is an emission regulation based on a sales mandate. The best pathway to cleaner air is through performance based emission standards that allow auto manufacturers to choose the technologies that comply with California's clean air targets. (VW)

Agency Response: The ZEV program sets a performance standard: a zero emission standard. In recognition that this performance standard will not be met by all passenger cars and light-duty trucks given available technologies or technologies that are anticipated to become available in the future, the standard is phased in and capped and may be met, in part, with low-emission technologies that are not zero emission technologies but that foster attainment of California's clean air goal for the transportation sector.

10. Comment: Forcing certain vehicle quantities required within a timeframe can have unintended effects and could possibly lead to market failure, which is not an option for ARB or industry. (Chrysler)

Agency Response: Comment noted. The Board has amended the current program in recognition of this comment, decreasing the original 25,000 Alternative Path requirement for the 2012 through 2014 timeframe. The Board believes the pure ZEV requirement of 7,500 vehicles is appropriate for the 2009 through 2014 MYs. It is necessary for the Board to maintain pressure on auto manufacturers to produce the cleanest technologies throughout a development phase of ZEV technologies until commercialization makes them economically beneficial. Also, it is necessary for ARB to require minimum floors for the number of ZEVs to provide certainty for ZEV technology providers.

11. Comment: The ZEV mandate does not align with market demand thereby imposing high costs on society, and it diverts manufacturer resources from the development of future clean technologies by imposing artificial near term obligations. (Ford)

Agency Response: The Board does not agree with the premise that ZEV requirements do not "align" with market demand and has received substantial comments and hearing testimony to the contrary. There are also other auto manufacturers with publicly announced product plans to sell ZEV program vehicles that exceed ARB's requirements because they believe there will be sufficient market demand.

12. Comment: ARB must recognize that when forcing technology, it may be necessary to make adjustments if technology improvements or market acceptance of advance technology vehicles has not met expectations. In light of the technological uncertainty, there should be no so-called "no backsliding" rules, when such aggressive targets are set. (Ford)

Agency Response: The Board has amended the ZEV regulation based on assessment of the current state of ZEV technologies, providing sufficient flexibility in the regulation so that if a particular technology does not improve as anticipated, there are other technologies that can be substituted.

13. Comment: The proposal undermines the opportunity for ZEV regulation in the State of California to bring the highest standard of pollution and petroleum-free vehicles into the marketplace. (RAN)

Agency Response: ARB must balance technology feasibility with economic impacts, while continuing to improve California's air quality. Overall, the 2008 modifications will bring an air quality benefit due to the inclusion of Enhanced AT PZEVs. The mandated levels of pure ZEVs required are appropriate for the 2009 through 2014 timeframe given the current state of development for ZEV technologies and market needs for vehicle capabilities.

14. Comment: Some of the provisions being proposed by Staff are overly stringent and inconsistent with the findings of the Expert Review Panel commissioned by the Board to objectively study and report on the state of ZEV technologies. (Chrysler, Ford, GM, Honda, Nissan, Toyota)

Agency Response: The Board used the Panel's findings as guidance to staff in developing the amendments. The 2008 rulemaking is in line with Resolution 07-18. Overall, the 2008 rulemaking gives manufacturers more flexibility in meeting the ZEV regulation and adequately takes into account the Panel's findings.

15. Comment: The proposed regulation would limit the vehicles and eliminate anyone I know from being able to afford one. This is accomplished by cutting back on electric car benefits and replacing them with hydrogen vehicle benefits. (Hendren)

Agency Response: ARB does not agree with this comment. Forcing ZEV technologies, either battery or fuel cell, into the market before commercially ready, durable, and fully warranted could result in an increased cost to the consumer. The 2008 rulemaking allows manufacturers to fully meet the ZEV requirements with battery EVs or fuel cell vehicles, allowing manufacturers to choose the technology most appropriate for development. The number of ZEVs required represents technological feasibility as well as cost considerations.

### **C. General Requests to the Board**

16. Comment: ARB received several comments urging the Board not to amend or weaken the ZEV regulation, to hold the auto manufacturers to their promise, keep the mandate for ZEVs at a high level, reconsider their decision, continue with the ZEV program, or to maintain the current program. (Anderson, Baragona, Connecticut, EEVC, Form Letter #8, Gillock, Greer, Gysler, Harris, Johansson,

John, D. Korthof, Lococo, Margulis, Mitten, Paine, PCL, Phoenix, Rosen, Scott, Washburn, Weeden, Wells, Young)

Agency Response: Overall, the Board's most recent amendments to the ZEV regulation strengthen the program and will help with the successful commercialization of ZEVs. The Expert Panel concluded that fuel cell and battery technology was sufficiently mature to meet the requirements in place for the 2012 through 2014 timeframe. The Board's amendments maintain pressure on the auto manufacturers to continue in their research and development (R&D), without requiring commercialization before the technology is ready.

17. Comment: ARB received comments urging the Board for help to put electric cars on the road, stimulate production of electric cars, or to require a ZEV mandate. (Alexa, Bird, Byram, Cornish, Chamberlain, Conlyn, Davies, Farinacci, Form Letter # 2, Galliani, G. Garcia, Q. Garcia, Greer, Hessing, L. Ireland, S. Ireland, Kadzielski, D. Korthof, Love, Melamid, Minich, D. Pierce, J. Pierce, N. Pierce, Rodamaker, Sun, A. Stahmer, C. Stahmer, Yoder)

Agency Response: The ZEV program requirements have resulted in over 4,000 battery electric and fuel cell vehicles on California's roads over the past 15 years. The ZEV program has also lead to the development of conventional HEVs that use ZEV technologies, now deployed by the tens of thousands on California's roads. The Board's most recent amendments to the ZEV regulation will continue to stimulate the development and production of ZEVs and ZEV technologies in hybrids and other ZEV technology vehicles.

18. Comment: Staff received numerous comments urging the Board to do the right thing, to show leadership, to stand up for clean air, to stand up to auto manufacturers and oil companies, to save the electric car, to not let auto companies off the hook, or to tell the auto companies to produce ZEVs. (Acquaro, Adams, Adcock, Allen, Bird, Brickley, Brody, Chamberlain, Chaudhary, Clare, Cross, Duncan, Durst, EVASC, Form Letter #8, Gaffney, G. Garcia, Gaydos, Gilot, Greer, Heacock, Koenig, D. Korthof, Larsen, Lussier, Manley, Mitten, Olenski, Parent, PIA, D. Pierce, J. Pierce, N. Pierce, Pohorsky, Pucci, Quan, Rodamaker, Rosson, Saxton, Schneider, Seidler, Seldon, SEVA, SFEVA, Shanab, Sheffield, Shell, Siebert, Smallwood, Soref, Stack, A. Stahmer, C. Stahmer, Swansburg, Thagard, J. Turock, U'Ren, Weitz)

Agency Response: The Board made modifications to staff's proposal to increase the minimum pure ZEV requirement from 2,500 to 7,500 in the 2012 through 2014 timeframe along with other modifications which show the Board's commitment to the ZEV regulation and ZEV technologies. While the auto manufacturers wanted fewer ZEVs required, the Board chose to increase the overall number required, sending a clear message to the automotive industry.

19. Comment: Staff received numerous comments urging the Board to support ZEVs. (Conlyn, Davis, Dunlap, G. Garcia, K. Kelly, Lussier, Matula, Mitten, Quan, Weeden)

Staff received numerous comments in general support of ZEVs and zero emission technologies, namely battery technology. Staff also received many comments which explained the commenter's own experience with ZEV technology or desire to own an EV. (Ahnger, Alexa, Allen, ASES, Ballan, Barkley, Beedie, Chaudhary, Chen, Cimino, Colburn, Conlyn, Dunlap, Durst, EAA, Eggers, Ellingson, Field, Fletcher, Galcher, Harris, Herndon, L. Ireland, S. Ireland, Jensen, Jones, K. Kelly, W. Korthof, Lussier, Matula, Mills, Nicholes, Olum, Paine, Parent, Pohorsky, Rassweiler, Seidler, Selleck, SEVA, SFEVA, Shott, Silva, J. Smith, Spradley, Stack, Stelling, Tesla, RAN, Tabor-Beck, Thagard, J. Turock, U'Ren, Weitz, Williams, D. Yeung, Yoder)

Agency Response: The Board's 2008 rulemaking supports ZEV and Enhanced AT PZEV, including PHEV, development and commercialization while taking into account technology feasibility and cost.

20. Comment: ARB received comments urging the Board to strengthen the mandate, adopt the strongest possible amendments, or expand the ZEV regulation. (ALA, Anglin, Bayha, Cross, Choquette, Foster, GreenWheels, Greer, D. Korthof, Lindholm, McDonough, PIA, Seal, SEVA, Sierra, Soref, Stobbe, Synergy, Terry, Tesla, Thagard, U'Ren, Young)

Agency Response: The Board's modifications to the proposal strengthen the ZEV regulation, taking into account current technology feasibility and costs. The 2008 rulemaking provides more flexibility to automakers in meeting the ZEV requirements, creates a new vehicle category, Enhanced AT PZEVs, and gives credit to more types of battery EVs.

21. Comment: I implore you to set a high standard for zero emissions vehicles and for the amount required to be sold in California. Setting high standards and production requirements for ZEV will boost a dying, decrepit industry and spur innovation badly needed in the automobile industry's ranks. (G. Garcia)

Agency Response: The 2008 rulemaking allows for the most technologically advanced ZEVs to receive ZEV credits that reflect the level of technological advancement. It is not in the interest of the program at this time to limit credit too stringently, as most ZEV technologies are still in the development stages. The Board increased staff's proposed pure ZEV requirement, which signaled a commitment to ZEV commercialization.

22. Comment: Please don't kill the electric car a second time! (Brushaber)

Please don't limit the benefits of electric transportation again. Please don't damage the development of the electric car again! (Hendren)

Please don't kill the electric car again! (Larsen)

Please don't cut the electric car mandate! (Olum)

Please don't roll back the zero emission vehicle program again! (Seldon)

Please don't let this chance slip by us! (Sexton)

Please, give us back the electric car. (Wang)

Agency Response: The Board's decision to increase staff's proposed number of pure ZEVs required during the 2012 through 2014 timeframe from 2,500 to 7,500 shows its commitment to the ZEV regulation and the vehicles it mandates. The Board's 2008 rulemaking will strengthen the overall program, allowing manufacturers greater flexibility in meeting their requirements, as well as providing for more equal treatment of battery EVs in the program.

23. Comment: ARB received comment urging the Board to not postpone or delay the ZEV requirements! (Adcock, B. Ford)

The consequences of delaying implementation of ZEVs means more Americans will die from pollution. (EVASC)

Agency Response: No timelines were modified in this rulemaking.

24. Comment: Why would you weaken a mandate regarding EVs? (Mills)

Why weaken the ZEV program now when the Board has the enviable power to propel our state and then our country towards a pollution-free future? (RAN)

Agency Response: See response to Comment 7.

25. Comment: You have an opportunity to make up for the mistake of eliminating that zero emission rule. Please don't make the same mistake again by turning your back on this technology that is available now. (Brody)

Reinstate the zero emission vehicle regulation that was taken off the books in 2003! (Brickley)

Reinstate battery EVs. (Jensen)

Reinstate the mandate. The commenter provided an article titled "GM, Toyota Doubtful on Fuel Cells' Mass Use" to support their argument. (Galcher)

I would like to see a return of mandates for purchasable (not rental) battery cars. (Burgess)

Agency Response: The Board never eliminated the ZEV regulation. The ZEV program has been modified five times since its inception. The 2008 rulemaking supports the development of all ZEV enabling and pure ZEV technologies.

26. Comment: Please take a more active role in protecting our air. (Olson)

Please take advantage of this huge opportunity to help the US become more energy efficient and independent. (Zulauf)

I'd like to urge you to be true to your original mission and mandate that is ensuring clean air. (Dunlap)

Agency Response: The Board continues to lead California into a future with clean air, requiring the most stringent air pollution regulations in the nation. The 2008 rulemaking increases emission benefits over the existing program as well as promotes the development and commercialization of ZEVs, which use domestically produced fuels such as electricity and hydrogen.

27. Comment: Please make sure the CARB doesn't lose sight of their end goal, which is to reduce fuel consumption and therefore every form of pollutant and contaminant that comes out of an exhaust pipe. (FFF)

Agency Response: ARB has primary authority to regulate vehicle emissions. The goal of the ZEV regulation is to see to the successful development, production, and commercialization of ZEVs. The ZEV mandate is not inconsistent with other benefits.

28. Comment: I believe we should challenge the automakers with the original goal. (Newlin)

It is imperative that the California Air Resources Board remain dedicated to improving to the original intent of the ZEV Program. (Assemblymember DeSaulnier, Assemblymember Ruskin)

It's time to return the ZEV program to its original purpose and get ZEVs into consumers' hands ASAP, not 13 or more years from now. (Sierra)

Restore the ZEV mandate to its original intent. (Spradley)

Agency Response: The original intent of the program remains unchanged, to see to the successful commercialization of ZEVs in California. The 2008 rulemaking, though requiring fewer pure ZEVs than the 25,000 minimum in the

current ZEV regulation, continues to push technology development and furthers commercialization.

29. Comment: The CARB should do everything in its power to pressure the auto companies to resume EV production, resume R&D, and invest in the necessary marketing to make EVs a success. (Ellingson)

Agency Response: The Board's understanding is that OEMs never stopped their investment into the R&D of ZEVs. The 2008 rulemaking maintain the necessary pressure on OEMs to continue and accelerate their ZEV development programs.

30. Comment: Make the requirement for ZEVs meaningful beginning with the next MY, and don't be distracted by the smoke and mirrors offered by the automotive and oil industries. (Colburn)

Agency Response: The Board did not alter the requirements for the 2009 or 2010 MYs, other than to allow for greater flexibility in meeting the requirements. The LVMs, depending on the ZEV technologies produced, could make up to 10,000 ZEVs during the 2009 through 2011 timeframe. This is a significant step, considering that currently no LVM has a ZEV available to the public.

31. Comment: It seems clear that you have been misinformed about the availability of pure ZEVs and that the staff has erred in recommending that the Board substantially loosen for years to come, requirements that can in fact be met today. The ISOR is seriously flawed. Among other erroneous conclusions are that "no manufacturers will produce any battery EV prior to 2012." The facts clearly dispelled that finding. (Tesla)

Agency Response: The Board disagrees with this comment. No manufacturer, small volume nor large volume, has met the pure ZEV requirements solely with ZEVs. Additionally, no manufacturer has produced a ZEV in commercially viable numbers. The mandates are necessary to maintain pressure on the LVMs to develop and produce ZEVs at commercially available levels. The Board adopted levels necessary for near-term timeframes to continue the trajectory for successful commercialization of ZEVs.

32. Comment: ARB received comments urging the Board to accelerate the ZEV mandate or schedule. (ALA, Brenann, McDonough, Pew, Schmiedlin, Tavill, Terry, Tesla)

Push car companies to do what Tesla is already doing and far earlier than the dates proposed in the 2008 amendments. (Pucci)

Agency Response: The Board adopted the timeline as presented in the ISOR. The 2008 MY was largely unaffected by the Board's rulemaking. The 2009 through 2011 timeframe remained mostly unchanged, apart from allowing greater

flexibility in meeting the pure ZEV requirements. Also, please see the response to Comment 16.

33. Comment: Set in motion the steps needed to strengthen the ZEV Program. (Sierra)

Agency Response: The Board's 2008 rulemaking requires OEMs to be on a path towards further ZEV development and eventual commercialization. Additionally, Resolution 08-24 directs staff to return with a ZEV program focused on the pure ZEV requirement.

34. Comment: Mass production of zero emission vehicles won't happen soon unless pressure is maintained. (Green)

Agency Response: ARB concurs with this statement. This is why the Board chose to increase staff's proposed pure ZEV requirement from 2,500 to 7,500 Type IV ZEVs during the 2012 through 2014 timeframe.

35. Comment: We lost valuable time in 2003, let's not fail to produce a practical answer in March 2008. (Siebert)

There was no basis for delays in 2003, and there is no basis today in 2008. (Killian)

Agency Response: The Board's 2008 rulemaking is much different than their 2003 modifications. The 2008 rulemaking continues to push ZEV technology development forward while taking into account the current state of ZEV technology and the associated cost.

36. Comment: CARB needs to mandate that auto manufacturers start to reproduce the technology they have already built and proved could work. (Brenann)

Agency Response: Though ZEVs have been produced by many of the OEMs, ARB sees the benefit in encouraging new technology development and innovation. New developments in lithium-ion batteries could lead to better ZEVs than were seen in previous years. Additionally, ARB has not mandated the use of specific technologies, but has recognized that various technologies present various challenges and advantages.

37. Comment: Please do not delay the production of significant number of Zero Emission Vehicles. (Jones)

Agency Response: The Board's 2008 rulemaking does not delay any production of ZEVs.

38. Comment: In order to ensure a trend to zero emissions, automakers must be allowed to deliver the right vehicle at the right time. Market failure of a ZEV product could have lasting effects on the respective ZEV technology. (Chrysler)

Agency Response: ARB concurs with this statement. However, the Board sees the benefit in maintaining pressure on OEMs to develop ZEV technology and move these vehicles from demonstration volumes to pre-commercial and commercial volumes. The Board's 2008 rulemaking allows manufacturers to fulfill most of their ZEV requirement with Enhanced AT PZEVs, a ZEV enabling technology, while requiring manageable volumes of ZEVs to be produced between the 2009 and 2014 timeframe.

39. Comment: ZEVs should be prioritized above Enhanced AT PZEVs, and our recommendations are made in the spirit of getting ZEVs into consumers' hands as soon as possible. (RAN)

Agency Response: The Board's 2008 rulemaking only regulates the production of ZEVs. Enhanced AT PZEVs are not required, but are an option for manufacturers in meeting the ZEV requirements. Also, see response to comment 38.

40. Comment: Supplying a quantity of ZEVs that is sufficient for market testing to monitor consumer trends, usage, durability, etc. will allow the automaker to utilize its resources most effectively. (Chrysler)

Agency Response: Comment noted. As production proceeds under the ZEV regulation, it is important to move from demonstration levels to larger production fleets. Increased volume production results in reduction in price, and therefore more affordable clean vehicles for consumers. The Board adopted appropriate pure ZEV mandates for the upcoming timeframes.

41. Comment: If ZEVs succeed, it will occur outside of California and may have no benefit for Californians, costing us a priceless opportunity to lead the way into the new generation of transportation technology. (RAN)

Agency Response: ARB believes that the success of ZEVs is not a matter of "if", but rather, "when". Because of the ZEV regulation and a variety of other favorable factors, ARB believes California will be one of the key locations for the increased deployment of ZEVs in the next few years.

42. Comment: It is critical that in considering changes to the ZEV regulation, the Board needs to hold automakers accountable to the statements they make to the public and the press about the status and places for their zero emissions vehicles.

The commenter provided many examples of statements from auto manufacturers and energy providers regarding product development and commercialization plans. (EIN)

Agency Response: ARB must balance OEM announcements with the reality of ZEV technology development. Due to comments such as these presented by EIN, the Board increased the minimum ZEV floor of 2,500 as proposed in the ISOR to 7,500 for the 2012 through 2014 timeframe. If a manufacturer were to surpass the ZEV regulation requirements, it would mean the manufacturer was ready for ZEV commercialization. The Board would see this as a success. However, as foreseen by comments and testimony from the automotive industry, it seems the 2008 rulemaking remains sufficiently stringent.

43. Comment: The Board should understand that the ZEV program cannot be considered a research program. It was clearly defined as a production quota for automakers who wanted to continue to do business in the state. (EAA)

Agency Response: ARB concurs with this comment. However, ZEV technologies are not ready for full commercialization. The Board's 2008 rulemaking moderately ramps up production, accelerating ZEV technology R&D.

44. Comment: Please follow the resolution of the Board of May 2007. (Rosen)

Agency Response: The following was included as directions to staff in Resolution 07-18:

- Adjust the numbers of required ZEVs as appropriate to reflect the current state of technology;
- Adjust credits for more even treatment of battery electric vehicles (EV);
- Include plug-in hybrid EV (PHEV) as appropriate to encourage commercialization;
- Consider increasing the credit value for neighborhood electric vehicles (NEV);
- Consider extending the "travel provision" post-2011;
- Encourage the production of vehicles meeting pollutant emissions far below PZEV standards; and
- Take a broad legal view regarding the "disclosure of credits" issues in order to achieve a transparent public process;

The Board's 2008 rulemaking incorporated all of these directions. Also, see response to Comment 10.

45. Comment: The staff report needs to be corrected to the actual number of battery EVs on the road, not the sleight-of hand number produced then crushed. (D. Korthof)

Agency Response: All battery EVs produced as a result of the regulatory requirements have provided insights to technology improvements. The current number of battery EVs on the road does not reflect the benefits of the regulation.

46. Comment: Make ZEV regulation simpler, you don't have to agree with staff proposals to complicate and mystify them further. (D. Korthof)

This mandate needs to be simplified. It seems every version is more and more complex. Keep things simple. (Choquette)

Agency Response: In this rulemaking, the Board adopted the New Path, a single compliance option for LVMs in meeting the ZEV requirement. This modification along with other modifications provides more flexibility and simplicity within the program. Additionally, Resolution 08-24 directs staff to revisit the program and place PZEV and AT PZEV technologies in other ARB programs. This direction encourages simplification of the ZEV regulation.

47. Comment: The Board should consider taking at least six months, during which time a task force can be formed, that includes the stakeholders, to resolve the credit issue, which would result in a better, more comprehensive, technology encouraging ZEV mandate. (Verdugo-Peralta, Wedaa)

Agency Response: It was appropriate for the Board to vote on staff's proposal in March 2008. These modifications affected 2009 and subsequent MY vehicles. An additional 6 months would not have resulted in a more technology encouraging ZEV mandate. Extensive public outreach was conducted during this rulemaking, including over 40 meetings and teleconferences with interested stakeholders during the rulemaking process, as well as held one workshop attended by over 60 people.

#### **D. Battery EV Technology**

48. Comment: Battery powered vehicles are the best automobiles at storing electrons. They are more efficient than hydrogen powered vehicles. A 100 percent battery powered vehicle can be powered by photovoltaic panels. This scenario should be the highest priority for CARB because most externalities are eliminated through this type of transportation. (Miller)

Agency Response: ARB does not agree that a single technology is the answer for successful commercialization of ZEVs. The Board envisions both battery EVs and fuel cell vehicles as part of the future vehicles mix in California.

49. Comment: Staff received several comments urging that EV technology, namely battery EV technology is currently ready for commercialization, viable, or that electric cars currently work. (Acquaro, ASES, Burgess, Choquette, Daltrey, Dunlap, Durst, Ellingson, Field, B. Ford, Gysler, L. Ireland, S. Ireland, Jones, Killian, W. Korthof, Lussier, Manley, Nicholes, Phoenix, Ralls, RAN, Rasmussen, Schmiedlin, Schneider, Soref, Tesla, Vermont, Wang)

Battery technology is advanced enough to support 100 percent ZEVs. This is a fact that your rulemaking record should assert. If you do not assert this fact then you are not in compliance with the authorizing statute. (Miller)

Battery EVs that were produced under the ZEV Program before 2003 and that are still on the road prove that the technology is ready, and has been ready for some time. (Sierra)

Battery EVs are becoming cost competitive with gasoline cars and are becoming technically feasible for commercialization. (NESCAUM)

The commenter provided many visual examples and commentary on manufacturers' plans for PHEVs and battery EVs. (Ample)

Agency Response: Many ZEV types have demonstrated technological feasibility. Much was learned from early-introduction battery EVs, and the next generation of vehicles will benefit greatly from the resulting improvements so that cost-effective battery EVs are now anticipated to be produced in the very near future. ARB agrees that battery EVs are ready for limited production and assumes that many ZEVs to be built for regulatory compliance in the next decade may be battery EVs. However, ARB recognizes that battery EVs still face considerable engineering, charging infrastructure, and marketability challenges. Even if battery EVs do not become a dominant vehicle technology, they are still expected to play a key role in California's future, and ARB will continue to encourage their deployment in every way possible.

50. Comment: According to your paper, battery tech for autos is not yet available. This is not so. The new Lithion [sic] (Li-Ion) batteries are powerful and safe and battery companies are ramping up production. (Gysler)

Agency Response: ARB concurs that limited volumes of lithium-ion batteries in formats suitable for automotive applications are now becoming available and will be ready for significant volume production within about four years.

51. Comment: Let's start with the battery technology as it exists today and work to improve it. (Howland)

Agency Response: ARB concurs with this statement. ARB also recognizes that future battery technologies or battery technologies currently in development could have merit and a sustainable future in automotive applications.

52. Comment: The battery EV is the superior way of dealing with the energy/climate crises we are now entering. Please consider renewing your previous support for the battery EV. (Henderson)

Agency Response: The Board's rulemaking action provides for more equal treatment of battery EVs by eliminating caps within the Alternative Compliance Path and creating new ZEV types to recognize mid-range battery EVs.

53. Comment: The comparison by ARB of releasing the ZEV credit data, to that of releasing our own tax records is not quite the same. If the government allocated large sums of monies to automakers to spur battery EV development, we as the general public should be able to see how it was and is being spent. (Acquaro)

Agency Response: California has not allocated funding to spur battery EV development. The credit data being discussed does not involve expenditure of public funds. The appropriation for expenditure of government funds for battery development would require approval by the California legislature.

54. Comment: Commenters gave several problems that battery EVs could address including, national security, the environment, public health, human rights, social justice, and economic hardship. (Keirns, Ralls)

Agency Response: The Board's goal for focus on ZEV technologies meets the Board's clean air goals for California. The 2008 rulemaking allows for more even treatment of battery EVs, allowing them to meet all the pure ZEV requirements in the regulation. Under the rulemaking, battery EVs can continue in helping to meet California's clean air goals.

## **E. Fuel Cell Technology**

55. Comment: Fuel cells and the associated hydrogen highway are simply unrealistic and unworkable goals, both in the short and long terms. Fuel cells ZEV credits should be dropped altogether. Hydrogen is simply an energy carrier, much less efficient than other much simpler choices such as batteries. It takes a lot of energy to produce hydrogen (now primarily from fossil fuels) and there is no infrastructure to distribute it. Hydrogen, for use in transportation simply makes no sense and it is a failure. (Choquette)

Please do not be distracted by the myth of the FCV! (Colburn)

Stop spending my money on hydrogen fantasies and start focusing on getting proven technology on the road today. (Brenann)

Fuel cells never made any sense. Why? Because fuel cell design is essentially a HEV. (Daltrey)

Why replace one costly distributed fuel with another? Those who lobby for hydrogen are not interested in a new fuel technology, they are interested in controlling distribution. Hydrogen is not really even a fuel so much as an energy storage mechanism, manufactured at low efficiency. Hydrogen fuel cells are still a marginal technology, and add another layer of technical challenge to an all EV. Internal combustion hydrogen power carries with it all of the inefficiencies of the ICE including waste during idling. (Gillock)

Hydrogen is not the future. (Henderson)

Rise to the forefront and vote out hydrogen dreams and insist the automakers produce the EVs they are capable of producing. (Koenig)

Fuel cells are the dead end. (D. Korthof)

California should stop pursuing hydrogen vehicles and put more pressure on car makers to develop battery powered cars. (M. Palmer)

Don't wait for H<sub>2</sub> – Fuel cells have proven themselves technically difficult to be economically viable in the next decade. (Schneider)

As transportation necessarily becomes more electrified, in order for California and the nation to comply with international treaties to combat global warming, it is essential that we not be burdened by the fuel cell's inefficient use of electrical power, i.e., from hydrogen manufacture to power to the vehicle's wheels requires nearly 4 times the electrical power of EVs. Of course, other practical problems, e.g., cost, durability, complexity, lack of infrastructure, also argue against the fuel cell approach. (Siebert)

Reforming natural gas energy into hydrogen is extremely inefficient. Hydrogen is impractical for the public. (J. Turock)

Stop wasting money on the so-called hybrid fuel cell. (Wang)

Agency Response: ARB supports the use of hydrogen fuel cell vehicles to meet the ZEV regulation because these vehicles produce zero criteria pollutants, GHG and toxic emissions during vehicle operation. The full fuel cycle emissions range from below average gasoline vehicle down to zero.

The Board sees promise in both battery EV and fuel cell vehicle technologies, and views both as part of the California's future vehicle fleet. Hydrogen and electricity happen to operate with zero emissions; if another fuel could operate a

vehicle this way, then the fuel would also be included into the regulation. Both battery EVs and fuel cell vehicles have the potential to have zero upstream emissions. Both also have technology and infrastructure challenges that need to be overcome before they are commercially viable.

The Board supports the development of all zero emission vehicle technologies and does not view battery EVs or fuel cell vehicles as a myth.

The battery EV is more efficient than a fuel cell vehicle, but ARB only requires emissions reductions, and does not regulate vehicle efficiency.

56. Comment: CARB is conducting a hydrogen fuel cell vehicle research program rather than making a serious attempt at cleaning our air. Imagine if California had chosen to wait for hydrogen fusion research to come to fruition instead of implementing its Renewable Portfolio Standard (SB 107). Where would we be today? And yet, CARB is making exactly this mistake today. (Killian)

Agency Response: ARB does not agree with this comment. The rulemaking has focused on making changes to the number of vehicles that were required to comply with the ZEV regulation. Also, see the response to comment 55.

57. Comment: The commenter informed the Board about a study conducting of the transition to hydrogen in transportation. The commenter provided assumptions and scenarios surrounding this study. (ORNL)

Agency Response: ARB appreciates the information provided, and took this study into account in its final decision making.

58. Comment: Government cost sharing at a national scale and a program to promote the development of infrastructure will be necessary in order to overcome the natural barriers of fuel availability, make and model availability scale, and learning by doing. (ORNL)

Agency Response: Comment noted. However, neither cost sharing nor infrastructure was considered in this rulemaking.

59. Comment: While it might be tempting to put a greater emphasis on Enhanced AT PZEVs and battery EVs as an interim step, to remain a leader in ZEV initiatives, California must not lose focus on hydrogen power transportation. (UTC)

Agency Response: The Board's 2008 rulemaking supports all pure ZEV technologies. In support of fuel cell vehicles, the Board created the Type V ZEV which will earn 7 credits by providing a range of 300 miles or greater and 15 minute fast refueling capabilities. Also, the Board directed staff to modify existing programs, or create a program to mandate hydrogen infrastructure development.

These modifications demonstrate the Board's commitment to hydrogen vehicle technology. However, the Board's rulemaking made the ZEV program more technology neutral and leveled the playing field for battery EVs.

60. Comment: We cannot be blind to the actual pace of advancement of this technology. And we must not prevent a proven and more affordable technology, battery EVs, of making the positive near-term benefit the Board desires. (SFEVA)

Agency Response: ARB's rulemaking continues to support battery EV production. The credit structure favors those technologies needing further development. The Board believes both battery EVs and fuel cell vehicles will make up California's future fleet mix.

61. Comment: Hydrogen is a R&D program. (Paine, Woolsey)

Agency Response: ARB supports all ZEV technologies. The commenter is correct that manufacturer's demonstration efforts continue in pursuit of hydrogen. However, the Board's modification requires a substantial amount of ZEVs during the 2009 through 2014 timeframe, and is structured to move all ZEV technologies from demonstration to pre-commercialization levels.

62. Comment: Consider the efficiency of producing hydrogen through electrolysis. If you're doing it through electrolysis, you have to look at it as if you're pumping the water out of the ground. Those cities are treating that water. Then it has to go through a treatment plant that has to purify that. That water then has to go through a low of different filters and typically a reverse osmosis. And a certain part of this goes to the sewer system. (Pascarella)

Agency Response: Hydrogen can be produced through electrolysis, steam methane reformation, or auto thermal reformation. However, ARB's rulemaking did not mandate production of hydrogen for use in transportation. This comment is directed at an issue beyond the scope of the rulemaking. Senate Bill 1505, statutes of 2006, ensures that hydrogen used for transportation will meet environmental performance standards on a well-to-wheel basis as compared to gasoline production.

## **F. Enhanced AT PZEVs**

63. Comment: Limit hydrogen internal combustion engine vehicles to AT PZEV (non-Enhanced) and PZEV credits due to their limited benefit and potential for gaming. At low vehicle volumes, hydrogen internal combustion engine (HICE) vehicles are unlikely to significantly push hydrogen infrastructure development. These hydrogen fueled vehicles fail to drive ZEV technology because their drive trains are not electrified. Another concern was that these vehicles present auto manufacturers with a low cost alternative to gain credits with minimal investment

in ZEV vehicles. The authors proposed that HICE be limited to fulfill non-Enhanced AT PZEV or PZEV credits only, because these vehicles do not offer the same technology advancement benefits. (ALA, CCA, CEERT, EIN, FOE, NRDC, UCS)

Silver+ vehicles should be limited to plug-in hybrids (and not hydrogen internal combustion engine vehicles, which have no zero-emission capability) that have at least enough zero-emission miles to cover the average commute to and from work (around 30 miles). (Sierra)

Agency Response: ARB increased the requirements for the hydrogen storage system on HICE vehicles from 3600 to 5000 pounds per square inch to ensure that only the most advanced HICE vehicles are placed to meet ZEV requirements. This will promote the use of advanced hydrogen storage systems and further development and commercialization of hydrogen tanks. Also, see response to comment 216.

64. Comment: We believe that HICE technology is in line with the goals of CARB to achieve a sustainable clean environment while at the same time maintaining consumers' choice in propulsion systems. (BMW)

Agency Response: ARB concurs. The Board's modifications to the ZEV regulation encourage the development of HICE technology through its inclusion in the definition of an Enhanced AT PZEV. See response to Comment 63.

65. Comment: The test procedures for PHEVs are still not defined. (Ford)

Agency Response: ARB agrees and is developing test procedures for PHEVs in a separate rulemaking that will be considered in early 2009.

66. Comment: Support for staff's assessment that PHEVs are "an even more significant technology bridge to ZEVs than conventional AT PZEVs." (Toyota)

Agency Response: ARB appreciates the support for the creation of the Enhanced AT PZEV category, and its recognition of PHEVs.

67. Comment: PHEV batteries must be further developed for durability and robustness, including the ability to withstand a large number of deep discharge cycles over the life of the vehicle, cold temperature charge acceptance, and ability to operate in a large range of operating temperatures. PHEV challenges include control of cold start emissions under load, ability to meet evaporative emissions with less engine operation, and cost. (Ford)

Agency Response: Several years ago, ARB participated in an EPRI working group on PHEVs that concluded that PHEVs were viable even with nickel-metal hydride (NiMH) battery technology, especially if these were incorporated in

“ground-up” vehicle designs. Lithium ion battery technology is very promising, but if necessary, near-term PHEVs can be introduced with proven NiMH battery technology instead.

While extremes in temperature will affect battery performance, these are less prevalent in California than elsewhere, and unlike conventional HEVs, PHEVs could also make use of grid electricity to maintain battery temperature at a narrower range of temperatures than ambient. Since thermal management of engine block temperature is already achieved with grid electricity in cold climates, it would seem reasonable to consider this option with batteries also.

68. Comment: Range is directly related to battery size. There is a balance between cost, utility charging time, and infrastructure. If we add batteries to extend EV driving range, space for passengers and luggage would decrease. We believe we need to have some flexibility in finding optimum range. (Toyota)

Agency Response: ARB agrees that there is no “correct” range for a PHEV, and believes that there may ultimately be PHEVs with a variety of ranges to suit particular segments of the vehicle market. The adopted changes to the regulation continue to provide manufacturers with flexibility when it comes to finding the optimum range for various PHEV models. Vehicle design involves finding the optimal compromise between many several competing features.

69. Comment: There is a lack of lead time to introduce this new technology and the volumes required considering the high cost. The enabling technology for PHEVs, the Li-Ion battery, is still not ready. (Ford)

Agency Response: While tremendous progress is being made with lithium-ion battery technology, ARB does not consider this a full-developed enabling technology for PHEVs. However, ARB considers that PHEVs could also be deployed with NiMH battery technology. Furthermore, progress with lithium-ion batteries also appears to still be on-track for deployment as outlined by the ARB Expert Panel in 2007.

70. Comment: Make available and promote plug-in vehicles. (Form Letter #7)

I urge CARB to provide every available stimulus to the market adoption of plug-in vehicles. (F. Smith)

Support the development of plug-in hybrid vehicles. Plug-ins offer the best hope for reducing emissions from the transportation sector. Plug-in hybrids in California would replace emissions on city streets with emissions from very clean natural gas burning [sic] combined cycle power plants. Plug-in hybrids also offer the best opportunity for reducing the country’s dependence on oil. (Neil)

Let’s put PHEVs on the road now. (Howland)

Agency Response: The Board's rulemaking promotes and encourages manufacturers to produce Enhanced AT PZEVs, including PHEVs, in meeting their ZEV requirement. ARB believes many manufacturers will choose to produce a mixture of ZEVs and Enhanced AT PZEVs, particularly PHEVs, in meeting this requirement.

71. Comment: I'm afraid CARB may enact regulations that do not encourage the type of vehicle (a gas-electric Plug-In Series Hybrid) represented by the Chevy Volt; which delivers a new effect of 150 miles per gallon when analyzed against the average American's driving patterns. (FFF)

Agency Response: ARB disagrees with this comment. The 2008 rulemaking provide allowances for all PHEVs, including a series hybrid able to complete 10 miles AER on the US06 test drive cycle. ARB also adjusted the zero emission VMT allowance to award the highest credit to those PHEVs with greater AER or EAER.

72. Comment: Plug-in hybrid vehicles and other technologies still under development appear significantly over weighted in the current proposal. Plug-in hybrids are also not a silver bullet. There are a number of authoritative studies indicating that well-to-wheel cost in terms of CO2 emissions for plug-in hybrids can be higher than that of fuel cell vehicles, depending of course on the carbon intensity of the grid-supplied electricity versus the carbon intensity of the hydrogen source. (Shell)

Agency Response: ARB considers PHEVs to be an enabling technology for manufacturers to develop on their path to ZEV commercialization. However, the 2008 rulemaking still prioritizes ZEVs above all enabling technologies. PZEVs, conventional hybrids and PHEVs are options for manufacturers to produce in lieu of a greater number of ZEVs. Also, ARB reduced the early introduction multiplier offered for those PZEVs with off-board charge capability, in order to ensure most PHEVs would never earn more than a limited range ZEV.

## **G. Incentives**

73. Comment: Once these vehicles are on the market they can be subsidized by assessing a fee on diesel and gasoline engines that are below average efficiency. (Miller)

Create additional incentives for start-up companies developing battery EVs, including streamlines permitting, grants and loans, etc. (Greens)

Incentivize plug-in hybrids that have the most on-board electricity storage. (Burrus, Form Letter #3, Global Ex)

I support incentives for hybrid vehicles which have electric-only short range capacities, such as 20 miles or more. (Heacock)

Provide incentives to those individuals who convert gas vehicles to battery powered ZEVs. (Byram, Heacock)

Please continue and/or increase planned incentives for battery EV and PHEV production. Incentives should include minimum percentages of vehicles per year, tax credits for consumers, and expanding the HOV lane decal program. (Meyer)

Provide funds to companies that want to create EVs. (Shanab)

A \$5000 tax incentive should be provided for all purchasers of ZEVs and plug-in hybrids for a 3-year time frame from the first car availability. (Wakefield)

ZEVs and plug-in hybrids should be provided with a special sticker for the rear window permitting the owner to ride in the carpool lane. (Wakefield)

Consider inclusion of incentives for state certified and standardized plug-in conversions to achieve additional emission and GHG reduction benefits from the large hybrid fleet already on the ground. (ALA, CEERT, CCA, EIN)

I urge you to promote tax breaks for purchasers of PHEV conversions for existing hybrid vehicles as these pioneering citizens will lead the country and auto industry in adoption of the only real practical means of incorporating automotive electric drive technology. (Quan)

There is a need for incentives for plug-in hybrids in the early years. (Toyota)

The commenter expressed general support for tax incentives. (Hoverson)

You could set innovative programs of direct economic incentives to help buyers make more appropriate choices. The commenter provided examples of incentives such as higher registration fees for gasoline vehicles, free parking for ZEVs, and proportional tolls. (Gifford)

I also think we should give breaks and incentives [sic] to converted gas cars to electric. (Fletcher)

Agency Response: Comments noted. ARB cannot provide financial incentives without authorization resulting from California Legislative action. Therefore, these comments are outside the scope of this rulemaking. However, ARB remains committed to working through regulations and programs outside of the ZEV regulation to provide consumers with incentives to purchase and use PHEVs and ZEVs.

74. Comment: Please discontinue incentives for fuel cell vehicle production. (Meyer)

Agency Response: Currently, the ZEV regulation provides no financial incentives for fuel cell vehicle production. Other incentives offered by the State or Federal government are outside the scope of this rulemaking. Also, see the response to Comment 55.

## H. Infrastructure

75. Comment: The Board must develop a plan for fueling infrastructure development to assist with future ZEV goals. (ALA, CEERT, CCA, EIN)

Develop policies to ensure the simultaneous development of both vehicle and hydrogen infrastructure in order to gain consumer confidence of fuel cell vehicles. Reassurance is required that hydrogen will be easily accessible as the vehicles ramp up in market penetration. (Chrysler)

There is no real measurable requirement for a hydrogen infrastructure. ARB should review its policy development to ensure that the energy groups stay engaged to develop an infrastructure that complements vehicle implementation timing. The infrastructure must make consistent and successful steps towards marketability. (Chrysler)

Governments and the energy industry need to be as committed to developing a hydrogen infrastructure as manufacturers are to developing the vehicle technology, and there has not been that commitment thus far. Auto manufacturers need the necessary investment by energy companies to make sure an adequate hydrogen refueling infrastructure will be in place to support the vehicle placements. As auto manufacturers invest in fuel cell vehicle technology, there needs to be comparable investment in energy companies in hydrogen refueling technology. (GM)

All we need is a station mandate and the hydrogen fuel cell vehicles will follow. (Gronich)

Develop a plan that we can count on to ensure there is a hydrogen infrastructure in California. (Mercedes)

We need a strong program to increase hydrogen infrastructure. (Toyota)

Agency Response: ARB concurs. While these comments are outside of the scope of the 2008 rulemaking, the Board directed staff to develop regulations or amend current regulations, such as the Clean Fuel Outlet, to encourage the production of hydrogen for transportation fuel.

## I. Future ZEV Revisions

76. Comment: Technical and commercial assessments of ZEV technologies should be a more regular and ongoing exercise. It is essential to continuously improve the ZEV program. (Toyota)

A review should be conducted in a few years to evaluate the technology development and market acceptance of the various ZEV technologies. (Ford)

Agency Response: ARB concurs with these statements. Innovations in ZEV technology are continuously being achieved, and it is appropriate for ARB to review the status as often as possible. The Board directed staff to return to the Board as soon as possible with a goal of returning by the end of 2009.

77. Comment: There is a ten-fold increase in the FCV requirement in the 2015 MY. The ability to meet this volume increase will highly depend on improvements in fuel cell technology. Because the travel provision expires for battery EVs, there is an even greater increase in the battery EV volumes in the 2015 MY; a 30+ fold increase. The ability to meet the battery EV volume increase is difficult because of the limited market for these vehicles. A technology review should be conducted in 2010, to allow enough time to evaluate and plan for the 2015 MY requirements. (Ford)

Agency Response: The Board directed staff to focus on the pure ZEV requirement during its redesign of the ZEV program. The Board directed staff to return to the Board as soon as possible with a goal of returning by the end of 2009

78. Comment: ARB received comment regarding the future revision of the ZEV program, and suggested the following key steps to strengthen the ZEV program: 1) continue sustained investment in innovation and deployment without loss of benefits; 2) restructure the ZEV program to integrate goals of reducing GHGs and criteria pollutants; 3) simplify the ZEV program; 4) set overarching technology advancement goals: fleet-wide electric drive penetration; 5) maintain strong pure ZEV floor to spur technology advancement; 6) link the ZEV program and fueling infrastructure requirements; and 7) require transparency in ZEV information. Extensive reasoning and specific suggestions were given to support each of these steps. (ALA, CEERT, CCA, EIN)

Create a New Vision for the ZEV program which places it on the road to a major role in reaching California's long term global warming, air quality, and petroleum reduction goals, in conjunction with California's other greenhouse gas and air quality regulations. (ALA, CCA, CEERT, EIN, FOE, NRDC, UCS)

Agency Response: ARB concurs with these comments. Board Resolution 08-24 directs staff to do the following:

- Review the ZEV, LEV, and Pavley programs from the perspective of being able to reduce smog-forming pollution, to address the problem of the state's contribution to global warming, and to reduce California's dependence on petroleum
- Redesign the 2015 and beyond requirements for the ZEV program, strengthening the requirement more than the current program and focusing exclusively on the gold requirement, that is battery, fuel-cell, and Enhanced AT PZEV technologies, ensuring California as the central location for moving advanced, low GHG technology vehicles from the laboratory and demonstration phase to commercialization, where they are critical to achieving the Governor's GHG emission reduction goals, looking more specifically at blended plug-in hybrid credit being based on different parameters such as battery energy capacity rather than range, and to return to the Board as soon as possible, with a goal to return by the end of 2009

ARB remains committed to this direction and will work with stakeholders in redesigning the ZEV program.

79. Comment: By January, 2010, ARB should adopt a revision of the ZEV program that fully integrates air quality and GHG emission reduction goals and requires a increasing level of pure ZEV vehicles and electric drive technology across the new vehicle fleet to reach the interim goal of 10 percent of new vehicles produced that are pure ZEVs and 100 percent of new vehicles with electric drive technology by 2020. (ALA, CEERT, CCA, EIN)

Agency Response: The Board directed staff to focus on the pure ZEV requirement in its redesign of the ZEV regulation. The appropriate number of ZEVs required as well as how AT PZEVs and PZEVs fit into other programs will be considered over the next two years.

80. Comment: A positive progress review in 2009 in meeting revised 2010 targets, would mean that 2015 is the time to consider hydrogen fuel cell vehicle mass production to reduce their pre-commercial costs. (Gronich)

Agency Response: All ZEV technologies will be considered in the redesign of the ZEV regulation.

81. Comment: Direct the staff to plan the coordination of the AB 32, AB 1493, LEV-III, AB118, the low carbon fuel standard (LCFS), and the ZEV programs to accelerate the reduction of GHG emissions, attainment of air quality standards, and reduction of dependency upon petroleum in California and to ensure that

ARB's regulatory programs in the light-duty vehicle sector are complementary and cost-effective. (Sawyer)

Agency Response: ARB is committed to all programs that reduce criteria air pollution, as well as reduce GHG emissions. The Board directed staff to look at two of the mentioned programs, LEV-III and AB 1493 (Pavley II), from the perspective of being able to reduce smog-forming pollution, reduce California's contribution to global warming, and to California's dependence on petroleum. The Board's direction was to redesign the ZEV programs in an effort to focus on ZEVs. However, the Board sees the ZEV program as being instrumental to meeting AB 32 GHG emission goals.

82. Comment: The commenters expressed general support for the Board's call for a redesign of the ZEV program. (ALA, CalETC, VW)

Agency Response: ARB appreciates the support for the Board's direction.

## **J. Technology Parity**

83. Comment: General support for ARB's proposal to provide more even treatment of battery EVs in the regulation, as compared to fuel cell vehicles. (Ford, CalETC)

Support for the elimination of the cap on use of full-function EVs and for the changes in the ratio for substitution for battery EVs. (Mitsubishi)

Support parity between EVs and fuel cell vehicles. (Nissan)

It appears staff is recommending that the use of battery electrics intended for short-range, lower speed use on local roads be given proportionate credit. I support this leveling of the playing field. (Strand)

Support of the parity for battery EV vehicles. (VW)

Agency Response: ARB appreciates the support received for its more equal treatment of battery EVs and technology neutrality within the ZEV regulation.

84. Comment: CARB should avoid choosing winners and losers in the technology race for future sustainable automotive propulsion systems. We believe the ultimate solution may involve multiple technologies, and it would be in CARB's best interest to provide regulatory support and flexibility for our approach. (BMW)

The commenter expressed support for a level playing field. (CalCars)

The regulation should not pick winners and losers. (Ford)

It is not appropriate for CARB to be deciding on which ZEV technology is best. (Killian)

I ask that you implement a level playing field between all types of ZEVs instead of trying to pick winners. (Lee)

CARB must stop treating ZEV technologies in an unequal manner. (SFEVA)

I'd like to see a level playing field for battery electric and hydrogen. (J. Smith)

Agency Response: The focus of the ZEV program is on zero emissions from vehicles irrespective of the technology. The Board's 2008 rulemaking promotes technology neutrality. Battery EVs are now allowed to fully meet the Alternative Compliance Path requirements during the 2009 through 2011 timeframe. The Board sees California's future fleet as having a mix of battery EVs and fuel cell vehicles.

85. Comment: CARB capitulated to the auto companies and their hype regarding Fuel Cell technology. The alternative rejected by CARB, battery EVs, worked then and works now. CARB missed its chance to really stimulate the R&D and the production of real, practical ZEV cars last time around. (Pew)

Agency Response: The 2008 rulemaking reflects greater technology neutrality in regards to fuel cell and battery EV technologies. Manufacturers can fulfill their Alternative Compliance Path requirements, during the 2009 through 2011 MYs, with battery EVs. Also, the overall credit structure in the regulation has been modified to further ZEV technology neutrality. The Board sees a combination of fuel cell and battery EVs in California's future vehicle fleet.

86. Comment: Battery electrics should be given favored status in new CARB requirements since the technology is ready. Hydrogen has a long way to go, please move it to the back burner. (Lindholm)

Agency Response: The amendments adopted by the Board reflect the benefits attributed to both technologies including range and refueling. Fuel cell technology is more expensive to develop and produce at this time. The Board does not favor one technology over the other and believes both battery EVs and fuel cell vehicles will be found in California's future vehicle mix.

87. Comment: The Board's expressed desire for more even treatment of battery EVs should be realized by a 1:1 ratio for Type II and Type III ZEV requirements in the Alternative Path after 2008. Any ratio that provides hydrogen fuel-cell vehicles greater credits than battery EVs unnecessarily delays mass introduction of ZEVs. Please be technology neutral. Any ratio or any system that favors one ZEV

technology over another is only going to delay and possibly even prevent the commercialization of ZEVs. (Sierra)

Agency Response: ARB has considered simplifying the credit structure in the past but has been concerned that awarding all vehicles the same credit would encourage manufacturers to produce low performance vehicles that would not be attractive to consumers. The least costly way to satisfy a “one-ZEV to one-credit” requirement would be to build vehicles with the minimum capabilities needed to meet the threshold. There would be no incentive to add additional performance capability. The Board adopted the credit structure in the 2008 rulemaking that is appropriate for this timeframe for technology neutrality. Also, see response to Comment 86.

88. Comment: Staff have recommended to the Board that hydrogen technology, again, be treated with more credits and funding for automakers than battery EV technology. What this has led to in the past is investment in hydrogen technology, which is less efficient, mostly derived from fossil fuels and, by its proponents, labeled as “far off” in even small-scale implementation. (Ralls)

CARB continues to tailor its ZEV program for fuel cell vehicles. In favoring fuel cell vehicles, CARB is choosing a technology that makes it more difficult for California to meet its 2050 AB32 GHG emission goals. (Killian)

Why is CARB’s ISOR document so obviously biased toward this technology? Should your position be one of technological neutrality, setting the air quality standards and letting the marketplace do the rest? (D. Turock)

Agency Response: The Board believes battery EVs and fuel cell vehicles will both be necessary to meet California’s long term environmental goals. The credit structure recognizes the current state of development in fuel cell vehicles compared to the state of development of battery EVs by awarding one to four more credits. However, the Board’s 2008 modifications promote the regulation towards technology neutrality.

89. Comment: Opposition to ARB’s recommendation to provide more equal treatment of battery EVs, because these technologies are not expected to meet the range requirements of today’s vehicles, recharge time remains a significant obstacle to consumer acceptance, and CO2 emissions are pushed back to the electrical power plant. Increased focus on battery EVs will likely add delays to fuel cell vehicle commercialization and hinder the build-up of the hydrogen infrastructure by diverting some of the investment to battery charging stations. Investing in two new infrastructures would be too costly and disruptive. (UTC)

Agency Response: While the 2008 rulemaking provides for more equal treatment of battery EVs, the Board continues to promote all ZEV technologies. There are benefits as well as challenges to both battery EV and fuel cell

technologies, including infrastructure and lifecycle emissions. Because refueling time is one of the challenges, the ZEV regulation offers one to four more credits to a ZEV with fast-refueling capabilities, such as a fuel cell vehicle. This signals ARB’s commitment to fuel cell vehicles as well as battery EVs.

90. Comment: ARB should reinstate battery EVs and plug-in hybrids as the choice to fulfill the ZEV mandate. Electric vehicles are clearly the answer for our future transportation needs. (Jensen)

Agency Response: The Board’s 2008 modifications provide for more overall flexibility, particularly in 2009 and beyond. A manufacturer can meet its full ZEV requirement with battery EVs and Enhanced AT PZEVs, including PHEVs.

**K. Overall Regulatory Structure**

91. Comment: Adjust the ZEV point values for additional incentives. Either increase Enhanced AT PZEV ZEV credits, reduce Bronze and Silver credits, or both. Let me suggest the following percentage changes:

	Phase III (2012-2014), 12% of total sales	Phase IV (2015-2017), 14% of total sales
Gold (pure ZEV)	3% (replacing 0.3-3%)	4% (replacing 3-6%)
Silver+ (Enhanced AT PZEV)	0-3% (replacing 2.7%)	0-4%(replacing 0-3%)
Silver (AT PZEV)	0-3% (replacing 3%)	0-4% (replacing 2%)
Bronze (PZEV)	6% (unchanged)	6% (unchanged)

(Green)

We propose that the percentage of the program requirements allowed to be met by PZEVs be reduced to 4 percent in Phase III, 2 percent in Phase IV, and phase out completely after 2018. In each phase, the reduced PZEV requirement would be transferred up to the Enhanced AT PZEV category, creating a stand-alone requirement for these vehicles without distracting from commercialization efforts of true ZEVs. (Clifford, Greer, Hoffner, Medvecky, Pease, PIA, RAN, SEVA, Synergy)

While mandating is one way to force EV technology, is it the best? It would seem that some other initiative, tax credits, fuel/emission quota points similar to the Flexfuel quotas would be much preferred. (Minich)

Agency Response: There were a wide variety of opinions on the appropriate percentages or structure for the ZEV program in future timeframes. The overall percentages adopted by the Board provide environmental benefit to the program and are appropriate for the near-term timeframes.

92. Comment: ARB received requests to eliminate ZEV credits. (McDonough, Pew, Terry)

Agency Response: ARB in the past has considered simplifying the credit structure but has concluded that awarding all vehicles the same credit or eliminating credits altogether would encourage manufacturers to produce low performance vehicles that would not be attractive to consumers. There would be no incentive to add additional performance capability.

93. Comment: Rather than quotas, the simple thing is to just make proved EVs available for sale. (McDonough, Pew, Terry)

Agency Response: ARB continues to require certain production of a certain number of ZEVs annually due to the high cost of the technology and to foster commercialization. Manufacturers may eventually produce ZEVs mandates; without this regulation, however, mandates accelerate the timeline for the production of these vehicles. Also, see the response to Comment 92.

94. Comment: Instead of reducing the Gold ZEV requirement to such a low level, it would be better to take percentages from PZEV or AT PZEVs, not from the "Gold" standard. (Green)

Agency Response: Currently the PZEV and AT PZEV components provide the greatest environmental benefit. While vehicles are commercially available in California, their availability to consumers is fostered by the ZEV requirement. Additionally, PZEVs, AT PZEVs, and Enhanced AT PZEVs are all options in fulfilling the ZEV requirement. The ZEV requirement percentages were reduced to align with technology readiness and cost.

95. Comment: Enhanced AT PZEVs should not come at the expense of ZEVs, and merit requirements of their own to support their commercialization. There should be no use of Enhanced AT PZEVs to backfill for any portion of the ZEV requirement and the commenters prefer to see separate, appropriate requirements created for ZEVs and Enhanced AT PZEVs. (Clifford, FOE, Greer, Hoffner, Medvecky, PIA, RAN, Pease, SEVA, Synergy)

Create a separate requirement for plug-in hybrids that lets them replace the dirtiest vehicles in CARB's regulations rather than the cleanest ZEVs. (AJC, Burrus, EAA, Form Letter #3, Galliani, Global Ex, Heacock, Love, Mayor Newsom, Parent, RAN, F. Smith)

Create a separate additional requirement for plug-in hybrids. (Ahnger, Durst, FOE, Friedland, SFEVA, Sierra, Woolsey)

Plug-in hybrids are another intermediate step, but they should not be used to offset pure EVs. Rather they should offset lower power, high mileage, ICE vehicles of similar or worse performance. (Gillock)

PHEVs should not reduce pure ZEVs. (Lee)

If you are going to increase the numbers of pure ZEV vehicles as has been talked about this morning, we think you should de-couple the PHEV numbers from the ZEV numbers so we don't have a decrease in the number of PHEV numbers below what staff has proposed. (CalETC)

Agency Response: ARB believes the Enhanced AT PZEV category is an intermediate step towards increased pure ZEV production. PZEVs and AT PZEVs do not have separate requirements in the ZEV program, but may backfill only a portion of the ZEV requirement as an option to fulfilling the ZEV obligation with pure ZEVs. A separate category for any one of these enabling technologies might distract from the ZEV regulation's main goal: pure ZEV development and commercialization.

96. Comment: More ZEVs and less backfill with partial gasoline cars. (Paul)

Agency Response: PZEVs and AT PZEVs provide most of the environmental benefits in the ZEV program at this time, as pure ZEV numbers remain in demonstration volumes. The Board's 2008 rulemaking continues the pure ZEV requirement in an upward trend. Additionally, the Board directed staff to redesign the ZEV regulation, and focus mainly on the pure ZEV requirement for the 2015 and subsequent MYs.

97. Comment: It also appears that the existing program may rely too much on existing large manufacturers who have a consistent history of sabotaging battery EVs. Consumers would be better served by a more open market where smaller manufacturers face lower entry costs. (Strand)

Agency Response: Even though small volume and independent low volume manufacturers are not required to produce ZEVs, nothing in the regulation prohibits these manufacturers from producing ZEVs. These ZEVs would earn credits just like LVM- and IVM-produced ZEVs and the credits may be sold or traded.

98. Comment: Address the bottom line: The total emissions of all cars you sell in California (in terms of gallons of fuel consumed) must drop by 10 percent (compared to 2007) in 2012 and drop 5 percent per year after that, until we have a net reduction of 75 percent. You can use any technologies, combination of hybrids, smaller-lighter cars, all-electric, fuel-cell, hydrogen etc, only the bottom line counts.

Physics dictates how much energy is required to accelerate a car from 0 to V mile/hour, so the real question that CARB should regulate is "how much fuel did it take to get you to V?"

Ask. "Is it better for the State of California if by 2015 :

1. 20 percent of the cars reduce fuel consumption by 50 percent or
2. 1 percent of the cars reduce fuel consumption by 100 percent?

Answer: Option 1 is ten times better!

So just focus on the bottom line, keep the formulas simple and keep the end goal in sight by reducing fuel consumption and therefore every pollutant associated with it. And most of all, keep the potential solutions affordable for a large percentage of California's citizens. (FFF)

Agency Response: ARB's ZEV regulation focuses on reducing vehicle emissions from the vehicle itself to zero. Federal statutes, specifically the Energy Conservation and Policy Act, preempt states, including California, from regulating the corporate average fuel economy (CAFE) standards for motor vehicles.

99. Comment: Require a portion of the market be 100 percent ZEV. (Miller)

Agency Response: The Board's 2008 rulemaking continues to require a percentage of LVM's production to be pure ZEVs.

100. Comment: An interim goal for CARB could be to require plug-in hybrids. (Miller)

Agency Response: Though PHEVs are not required to be produced, the 2008 rulemaking allows manufacturers to fulfill their ZEV requirement with both pure ZEVs and Enhanced AT PZEVs, including PHEVs. ARB believes many manufacturers will choose to produce PHEVs to help fulfill their ZEV requirement.

101. Comment: It is my opinion that if the manufacturers were allowed to meet the 25,000 car requirement with some combination of battery electric, plug-in hybrid and fuel cell vehicle, even including NEVs using a small multiplier as part of the ZEV requirement, it would do a lot more to promote ZEVs than letting the six largest manufacturers get away with producing as little as 450 fuel cell vehicles. (Adams)

Automakers should be allowed to meet ZEV targets with battery EVs or fuel cell vehicles, or a combination. (Killian)

Agency Response: The Board's 2008 rulemaking allows LVMs to fulfill their pure ZEV requirement, beginning in the 2009 MY with battery EVs, fuel cell vehicles, or both. Manufacturers may also choose to produce the minimum number of pure ZEVs (7,500 vehicles) as battery EVs and/or fuel cell vehicles, and produce a large number of Enhanced AT PZEVs, including PHEVs, or NEVs (dependent on MY).

102. Comment: At this time, restore the ZEV program to its original goal of 10 percent annual sales of zero emission vehicles, to be attained by 2020, as a major contribution to meeting GHG reductions. The successful PZEV and AT PZEV programs should become part of the LEV program, where they belong. Other than a possible interim credit for PHEVs, based on the actual displacement of hydrocarbon fuels, the ZEV program should be returned to a zero means zero, simple, easy-to-understand, easy to enforce, program. Continue to promote fuel cell vehicles as a promising technology, if combined with a low carbon hydrogen technology, for meeting 2050 GHG reduction goals. (Sawyer)

Agency Response: Comment noted. The 2008 rulemaking focused on adjusting the minimum floor, i.e., the minimum number of vehicles, needed under the ZEV requirement in light of the Expert Panel's finding on the status of ZEV technology development and cost barriers to technology. While the Board did not view the March 2008 rulemaking as the appropriate time to require large numbers of pure ZEVs, the Board directed staff to redesign the program, focusing mainly on the pure ZEV requirement, returning to the Board with a proposal by the end of 2009. At that time, staff will recommend the most appropriate placement of PZEVs and AT PZEVs as well as the pure ZEV requirements.

#### **L. Expert Panel Report**

103. Comment: ARB received comments regarding the Expert Panel Report, released April 2007, in opposition to its use. (Vermont)

The commenter submitted a rebuttal to the Panel's position on the market potential for lithium-ion full-performance battery EVs. The commenter provided extensive reasoning for their stance on the report's findings. (Tesla)

Agency Response: Comments noted and considered in the Board's actions. The Panel's report was used as general guidance for the 2008 rulemaking. The Board considered the Panel's advice, but acted independently of the Panel's specific findings. For example, while the Panel report would suggest that the 2014 through 2014 MY minimum ZEV requirement be 7,500, the Board ruled that 7,500 was more appropriate, especially given comments such as these.

#### **M. Miscellaneous**

104. Comment: I believe there is another easy and readily available solution; scooters that take advantage of cheap electricity and reduce the oil consumption. The solution is using plug-in electric scooters for the short distance/city speed applications. I need your help to work with the local government to create a friendlier environment for electric scooter riders. Things like additional traffic lanes for electric scooters, free parking spaces in downtown, and heavy shopping areas would encourage more riders. (Chen)

Bicycles, the first and best zero-emission vehicles, are unaccountably missing from the regulation. ARB should address this oversight by ensuring that this regulation provides a truly level playing field so that bicycles and other human powered vehicles can get the credit they and their riders deserve for achieving some subzero-emission transportation. This is also an opportunity to increase environmental justice, as bicycles are economically available to virtually everyone. (Strand)

Agency Response: The ZEV regulation only affects motor vehicles. These comments fall outside the scope of the regulation.

105. Comment: Design the vehicle-to-grid interface that will help solve another problem we suffer from in this state. (Colburn)

I like the idea of vehicle-to-grid. Thinking ahead that way down the road would help the utilities be able to generate electricity at nighttime when they're idling and be able to pick up the load and prevent peaking utilities starting up in the afternoon and putting electric cars I think should be looked at down the road and should be a goal that will help increase the utilities efficiency along with the EVs. (Pascarella)

Agency Response: ARB has funded research identifying the potential of vehicle-to-grid technology and will continue to participate in research and upcoming standardization issues relating to vehicle-to-grid technology and implementation. However, ARB believes that it is premature to modify the ZEV regulation with regard to the vehicle-to-grid technology and interface.

106. Comment: Vehicles in the ZEV Program should be defined and credited based on their overall energy efficiencies using a well-to-wheel or lifecycle analysis. (Clifford, Greer, Hoffner, Medvecky, Pease, PIA, RAN, SEVA, Synergy)

CARB should incentivize ZEVs based on their overall energy efficiencies on a well-to-wheel basis, and not consider vehicles alone, divorced from energy production. Incorporating overall efficiency into considerations today will prepare us for the time when both vehicles and some energy sources will be zero-emission, and ZEV choices will be based on efficiency and economies. (Sierra)

Agency Response: See response to Comment 98.

107. Comment: The ability to sell ZEV credits would be a big boost to some of the up and coming battery EV manufacturers. (Adams)

Agency Response: The ZEV regulation allows manufacturers to sell or trade their ZEV credits.

108. Comment: CARB should consider requiring public fleets to purchase ZEVs and Enhanced AT PZEVs when available and where practical for their intended use. However, because these vehicles are purchased with public funds, we propose that fleets must choose the most economical vehicle technology (lifetime cost) for a given air-quality benefit. (RAN)

Agency Response: This comment is outside the scope of the 2008 rulemaking. However, the Federal Energy Policy Act of 1992 requires that 75 percent of the state's light duty vehicle purchases must be alternative fueled vehicles. Procurement of vehicles for the State fleet is handled by the California Department of General Services. Recent legislation amended the Section 104.2 of the California Streets and Highway Code to require the "best value procurement" method for evaluating all fleet bid proposals based on the following factors in addition to price: total cost of ownership, including warranty, repair costs, maintenance costs, fuel consumption or salvage value; performance and productivity; suppliers ability to perform contract requirements; and environmental benefits, including reduction of GHG emissions, reduction of air pollutant emissions, or reduction of toxic or hazardous materials.

109. Comment: By March 27, 2008, the Board should investigate the potential for near-term use of plug-in conversion battery modules. (ALA, CEERT, CCA, EIN)

Agency Response: This comment is outside the scope of the 2008 rulemaking.

110. Comment: Take out the loophole the auto manufacturers used to their advantage in the past in regards to no zero emission requirements if there is no public desire to purchase these vehicles. (Brickley)

Agency Response: Currently, the ZEV regulation requires specific numbers of ZEVs to be placed in service in California within certain timeframes irrespective of consumer demand.

111. Comment: Consider the gold credits for locally produced transportation energy such as home solar and wind. (Choquette)

Agency Response: The 2008 rulemaking regulates auto manufacturers. It is not within the scope of this regulation to award credit for transportation energy production.

112. Comment: A three phase, near-term, mid-term and long-term approach is needed to reach our clean air goals and reduce toxic emissions from mobile sources throughout the states. Without a third, long-term phase, there is no continued vision for the future of zero emission vehicles and the necessary refueling infrastructure. We also encourage CARB to keep the goals high to ensure a robust suite of options near-term, mid-term and long-term to address this critical issue. (Verdugo-Peralta, Wedaa)

Agency Response: The Board's 2008 rulemaking does not alter the 2018 and later beyond requirements in the ZEV regulation. Additionally, the Board directed staff to redesign the ZEV program for the 2015 and subsequent MYs, refocusing on the pure ZEV requirement in a future rulemaking.

113. Comment: We should define ZEV as that, miles achieved of ZEV. What that does is opens the door to hybrids and other new technologies. (Frank)

The Board's decision should be based on a performance standard, and environmental benefit standards. (SFEVA)

The regulation should be founded on performance-based metrics where a definition of zero is not up for debate. Any wavering or definition of zero or program delays will send a strong signal to stakeholders that are currently working on fuel cell vehicles. (UTC)

Agency Response: The 2008 rulemaking continues to set a performance based standard of zero emissions. The definition of a "zero emission vehicle" was not modified in this rulemaking.

114. Comment: For a plug-in hybrid, we could define ZEV as all-electric range. All-electric range fits with Tesla and pure electric cars as well. (Frank)

Agency Response: The 2008 rulemaking did not include a definition of a PHEV. However, the rulemaking did include a definition for Enhanced AT PZEVs, which includes PHEVs. At this time, ARB believes both PHEVs with EAER and AER are valuable to meeting California's air quality and ZEV regulation goals.

115. Comment: Consumers in the United States are not ready for some of the changes in the ZEV regulation. We need to do three things: develop the technology, prepare society, and have established standardized codes and regulations that help ease these changes in the marketplace. (Toyota)

Agency Response: Comment noted. ARB agrees that certain factors need to be in place before mass commercialization of ZEVs is realized. However, in light of the wide array of public testimony received during the March 27, 2008 Board Hearing, ARB believes the marketplace is more ready than ever for ZEV technologies, especially with rising gasoline prices and economic decline.

116. Comment: Start a California EV partnership and maybe even a California EV highway. (Friedland)

Agency Response: This comment is outside of the scope of the 2008 rulemaking.

117. Comment: We have a clear insight into the ways the automakers might try to game the system. Possibilities include using the banked credits they have achieved against either gold or the new Silver+ Enhanced AT PZEVs requirements. Skewing the credit amounts for particular vehicles, buying credits from other manufacturers, and abusing any of the carry-forward of travel provisions, and just by asking for low numbers in the first place. (Friedland)

Agency Response: ARB considers that the 2008 rulemaking will help to limit historical loopholes and to strengthen the ZEV program. Availability of banked credits was considered in establishing ZEV requirements for each phase.

118. Comment: The first principle we need to get back to is technology-forcing for real. Not technology-forcing based on projected costs and estimates that we have to come up with to justify the technology. The original principle of the Clean Air Act was that technology should be driven by the needs of public health and the environment, not based on estimated or projected costs. I think inadvertently with the periodic reviews, that we sort of got ourselves boxed into a situation where it becomes incumbent on the staff to prove the car companies that they can do what we need them to do. We need to restore that balance or that burden of proof onto the car companies, and in fact, to assert the principle that the public health and the planet's health, as so well documented in the Lung Association report, ought to be what drives a policy. (CCA, CEERT)

Agency Response: The Board continues to adopt the most stringent emissions regulations in the United States in support of cleaner air for California. There are a number of different influences in regards to decisions about the ZEV regulation, including air quality, cost, technology readiness and availability, and infrastructure. California statutes, specifically Government Code, section 11346.5, require a description of the cost impacts of rulemaking actions.

119. Comment: We need to eliminate portable credits. That should be phased out as quickly as possible. The cars need to be placed in service. There needs to be a real commitment to the market by all manufacturers. Putting cars on the road in California and then transporting them to New York for secondary credits raises questions. (W. Korthof)

Agency Response: The ZEV regulation does not include "portable credits", as mentioned above by the commenter. See response to Comment 238.

#### **N. Comments not specific to this rulemaking**

The following were specific suggestions made to the Board regarding parts of the ZEV regulation not addressed in this rulemaking, nor broached by the Board during its March 27, 2008 Board Hearing.

120. Comment: It's up to you to enable the provision of these vehicles that will be sold, not leased. (Harris)

ZEV credit must only be granted for vehicle sales, complete change of ownership to willing buyers, so that this sort of misleading accounting does not recur. CARB must force auto companies to offer oil-free EVs on the free market, for sale, not on "boomerang" leases. (D. Korthof)

We need ZEVs that are for sale, not on boomerang leases. I think the staff needs to look at how they can require that the vehicles be sold so that they don't go back to the manufacturer to be crushed after a nominal trial period. (W. Korthof)

Make them make real cars for sale! Don't allow them to limit the quantities, stop producing, or just lease the cars. Make them sell and support the cars and the technology. (Pew)

I noticed when you talk about vehicles in service, you're talking about placement. I guess I take a dim view of placement, because there were vehicles placed with us that were certainly displaced from us, taken away, and crushed. Manufacturers should not be given credit for any vehicle unless it is sold to the public. (Rosen)

CARB must insist that EVs be offered for sale on the free market without trick or artifice, at a fair price and without lengthy delivery delays. (Schmiedlin)

Manufacturers must be forced to make EVs available for sale. (Terry)

Please do everything you can to encourage the sale of EVs and plug-in hybrids in California. (Thagard)

Agency Response: The Board continues to support the definition for "Placed in service" as meaning having been sold or leased to an end-user and not a dealer or other distribution chain entity, and having been individually registered for on-road use by the California Department of Motor Vehicles. (CCR, Title 13, section 1962.1(i)(7)) Because some ZEV technologies are still in development, the ZEV regulation allows for manufacturers to exercise control over contractual arrangements with consumers while still requiring the vehicles' on-road use. Additionally, roughly 50 percent of conventional vehicles are leased by consumers; to dictate that ZEVs must be sold would limit the consumer base.

121. Comment: CARB staff continues to act contrary to the intentions of the legislature in ensuring competition by supporting extended warranties that act to reduce consumer choice and convenience, and threaten the economic viability of the independent aftermarket. The aftermarket requests that CARB remove the extended warranty provisions from this rulemaking. The commenter provided

three reasons that it disagreed with the AT PZEV warranty: 1) CARB does not have the authority to extend the warranty beyond the 3 year/50,000 mile warranty currently in the California statute; 2) CARB has no evidence that extending the warranty will provide any incentive to car companies to build more durable or defect free vehicle parts or that the car owners will be sufficiently aware of the extended warranty so that they can obtain replacement of the defective part without cost; and 3) studies by both the aftermarket and CARB indicate that extended warranties have a negative economic impact on the small businesses that compose the independent aftermarket. The commenter provided extensive explanation and argument for each of these reasons. The commenter also asked the Board to undertake an economic impact study and resolve to reexamine the need for an extended warranty provision at a future rulemaking. (CAWA/AAIA)

There should be a temporary reprieve in this requirement for PHEVs using lithium batteries only, in order to encourage automakers to commercialize vehicles sooner. The following warranty schedule still provides sufficient consumer protection and ensures a low emissions profile for a reasonable amount of time.

Phase II: Five (5) years/ 60,000 miles

Phase III: Seven (7)/100,000 miles

Phase IV: Ten (10)/150,000 miles

(PIA, Clifford, Medvecky, Pease, Hoffner, Synergy, Greer, SEVA)

We believe that a temporary adjustment of battery warranty for plug-in hybrids is justified, especially to the degree that it is limited to the “early adopter” phase. (FOE)

We are concerned about the PHEV battery warranty requirement. This is a new battery technology. We are concerned that a battery warranty requirement of that magnitude may actually act as an impediment to early introduction of these PHEVs. (CaIETC)

Please also ease any unfair restraints on the manufacture of EVs such as the 10-year battery life requirement. (Reese)

Requiring that new vehicle manufacturers put their company’s future on the line behind this new and experimental technology is unreasonable. The requirement means that the manufacturers are at the mercy of the companies that produce the batteries, the battery management systems and the chargers. Keeping the 10-year specification would require the manufacturer to increase prices substantially to cover this burdensome requirement. The 10-year requirement is going to delay the start of this market more than encourage it. If you want ZEVs on the road then let us know by adjusting part of the regulations. It may be appropriate to require a disclosure notice of the estimated maintenance cost to new consumers over the 10-year period so that they know what to expect. If you

want to push technology then start by exceeding the industry standard of one year and require the current industry extreme high end of a 4-year warranty. (STC)

Agency Response: The 2008 rulemaking did not amend to the existing 10-year warranty requirement for hybrid batteries, ARB believes that this level of warranty is less onerous for the smaller battery packs on PHEVs, and that this warranty is a necessity for significant market penetration.

## **O. Unrelated Suggestions**

The following comments were specific suggestions made to the Board, but fall outside the scope of the rulemaking.

Comment: We need Smart Meter as mandatory law tied to the PHEV options now to give it life. (Bundy)

Comment: The problematic monopoly on the lithium batteries by oil companies needs to be addressed so that the ZEVs are more affordable, cost effective and improved. (Dunlap)

Comment: We ask the State to encourage the use of ZEVs in airport and port bus transport vehicles. (Electrochimica)

Comment: If the alternate path is being retained, keep the volume requirements at the original higher levels, so automakers will move to the New Path, or deliver meaningful volumes under the alternate path. (Green)

Comment: There should be a federally funded demonstration program as to not burden the industry. (Gronich)

Comment: Don't loosen up on the present restrictions on gas powered cars. (Henry)

Comment: May I suggest the following activity for your March 27<sup>th</sup> meeting: To test the success of California's Air Quality board, lets everyone kneel behind our vehicles and breathe the "fresh" air. The ones who get up are the winners. The ones who get up will be the folks building and driving their own EVs and a couple of big corporates standing behind multi-million dollar fuel cell vehicles. (Juarez)

Comment: The SAE should require all EVs to use the same size interchangeable battery pack. One pack for small cars and large trikes [sic]. Two packs for large cars and SUVs. More for semi trucks. These packs should contain all the battery management systems if necessary. (MacMillan)

Comment: CARB must work with California DMV to expand access to clean-burning CNG vehicles—allow HOV permits for all pure-CNG and hybrid CNG/gas vehicles to support faster adoption of CNG, America’s Clean, available here and now fuel alternative. (Melamid)

Comment: Please do the citizens of California the justice of (1) being free of the strangle-hold of OPEC and the like. (2) Give the folks in your state a chance to breathe some fresh air in their own towns. (3) Review the previous decision your board made on this proposal; which seems to have put the nails into the coffin of GM’s EV1. (D. Palmer)

Comment: Stationary fuel cells for emergency backup power are a short-term step in building the hydrogen infrastructure and using commercially available fuel cells across California now. The commenter provided many benefits of stationary fuel cells. (Plug Power)

Comment: Please add a paragraph to your regulation that says: “GM must release its patent on nickel-metal hydride batteries, (since they say this type of battery is no good), so that anyone who wishes may use[sic] it”. (Ryder)

Comment: Shopping centers, sports venues, multi screen theatres, corporate, and government employee parking lots, major retail outlets, such as, Costco, Sam’s Club, and Walmart [sic] should be required to provide convenient parking spaces with electrical outlets to charge these vehicles while the owner is shopping. The electricity should be provided by the local electric company free of charge for a period of at least 3 years while the program is being initiated. Corporations should then be encouraged to share the cost of the electricity for another designated period of time. (Wakefield)

Comment: The manufacturers should provide a free 5-7 minute audio visual presentation on CD or DVD describing the benefits of plug-in hybrid or all-electric ZEV vehicles. These DVDs should go to every new owner of these vehicles and should be provided to every prospective showroom buyer. Auto dealers should share the cost of these DVDs with the manufacturers and send them by mail to a qualified dealer prospect list for viewing in the home, with an invitation to visit the showroom to receive a small gift and test drive or view these cars. (Wakefield)

Comment: Dealers could offer prospective customers a free one year lease of a ZEV or plug-in hybrid for visiting the showroom and registering for a drawing. (Wakefield)

Agency Response: These comments are either outside the Board’s jurisdiction or outside the scope of the 2008 ZEV rulemaking.

## **Part II. Regulatory Comments**

Comments grouped in this section are specific to Staff's suggested modifications and the regulatory language presented at the March 27, 2008 Board Hearing.

### **A. Pure ZEV Requirement**

122. Comment: General support for the 2012 through 2014 pure ZEV requirements. (Gronich)

Agency Response: ARB appreciates support for staff's proposed 2012 through 2014 timeframe pure ZEV requirements. However, the Board modified staff's proposal for the pure ZEV requirements during this timeframe from 2,500 to 7,500. The Board believes the modified pure ZEV requirement better maintains pressure on the automotive industry to produce ZEVs, while still recognizing technological and cost barriers to the technology.

123. Comment: ARB received comments generally requesting that the Board not amend the number of ZEVs required. (Cochran, EAA, John, K. Kelly, Margulis, Neil, Smalenberger, UTC)

ARB received comments specifically requesting that the Board not amend the requirements for the 2012 through 2014 timeframe and for the 2015 through 2017 timeframe. (PIA, Clifford, Medvecky, Fields, Pease, Hoffner, Synergy, Green, Parent, Greer, SEVA, Sullivan)

ARB received comments urging the Board not to change the ZEV requirements for the 2012 through 2014 timeframe, or to set 25,000 as the minimum. (Ahnger, AJC, Burrus, CalCars, CCA, Cornish, Durst, EIN, Form Letter #3, Friedland, Global Ex, Greens, Hanson, Mayor Newsom, SFEVA, Sierra, Tesla, D. Turock)

Agency Response: The Expert Panel concluded that automakers would not be able to meet the production numbers for the 2012 through 2014 MY timeframe. The Board concurred. ARB's 2008 rulemaking maintains the continuing goal of pure ZEV commercialization while taking into consideration the current cost and technological barriers. The 2008 rulemaking significantly reduces an automaker's cost of compliance, but still provide increased air quality benefits primarily from the proven emission benefits of commercially viable and increasingly available AT PZEVs. ARB considers that relinquishing a portion of the production volume during this R&D timeframe in exchange for reduced costs to automobile manufacturers and increased near-term emission benefits is a compromise that benefits almost all stakeholders.

124. Comment: ARB received various suggestions on the appropriate number of ZEVs required by 2012, ranging from 10,000 to 25,000, and suggestions on the

appropriate number of ZEVs to be required per year, though no date was specified, ranging from 10,000 to 25,000 (Larsen, Lee, Nicholes, Schneider)

ARB received many suggestions on the appropriate number of ZEVs to be required during the 2012 to 2014 timeframe, ranging from 10,000 to 100,000. (Galliani, Google, Neff, RAN, Sierra, Sipp, J. Smith, Trudeau, Vieira)

ARB received suggestions on the appropriate number of ZEVs to be required during the 2012 to 2017 timeframe, ranging from 75,000 to 500,000. (Gronich, Killian, McLaughlin)

ARB received suggestions on the appropriate number of ZEVs (up to 379,000) to be required during MYs subsequent to 2017, or by 2020. (Form Letter #7, Killian, Rosson)

ARB received comments generally requesting that the Board increase the number of ZEVs required or to return to higher numbers. (ALA, Allen, Ample, Anglin, Bayha, Brown, CCA, CEERT, Chaudhary, EIN, Form Letter #4, Frank, Kennedy, Larsen, Little, MacMillan, Mayor Newsom, Rasmussen, Reese, SCAQMD, SEVA, Sierra, Smallwood, C. Smith, Tavill, J. Turock, Weitz,)

The 2015 numbers must be moved up. (Terry, McDonough, Pew)

It is imperative that you vote to direct the automakers to make more electric cars by 2017, not less! 2010 should be your goal. (Bird, Chamberlain, D. Pierce, J. Pierce, N. Pierce, A. Stahmer, C. Stahmer)

Agency Response: Comments noted. The pure ZEV requirement was one of the more contentious issues during this rulemaking process. The Board chose to increase staff's proposed pure ZEV requirement from 2,500 to 7,500 for the 2012 through 2014 timeframe. The Board adopted staff's proposed 25,000 pure ZEV requirement for the 2015 through 2017 timeframe. The Board's modifications also allow manufacturers flexibility in meeting the requirement, allowing them to fully meet their ZEV obligation with pure ZEVs, or with a combination of Enhanced AT PZEVs and pure ZEVs. ARB believes the pure number of ZEVs required is appropriate in recognition of current technological and cost barriers. Additionally, the Board directed staff to redesign the ZEV regulation, focusing mainly on the pure ZEV requirements, meaning in a future rulemaking ZEV requirements could be modified.

125. Comment: ARB received numerous comments of opposition to staff's proposed pure ZEV requirement for the 2012 through 2014 timeframe. (Beedie, Assemblymember DeSaulnier, FOE, Green, Killian, Larsen, Paul, RAN, Rosson, Assemblymember Ruskin, SCAQMD, SEVA, Stobbe)

ARB received comments of opposition to Staff's proposed pure ZEV requirements, though a specific timeline was not stated. (EEVC, FOE, Form Letter # 4, Galliani, Johansson, Little, Lee, Tesla)

ARB received comments in opposition to changes to the current legislation that would dilute or delay the requirement for pure ZEVs and infrastructure. (UTC)

Agency Response: Comments noted. In response to many stakeholders and public comments and testimonies, the Board modified staff's pure ZEV floor, increasing the number from 2,500 to 7,500 during the 2012 through 2014 timeframe.

126. Comment: ARB received comment urging the Board to return to the original ZEV mandate. (Field, W. Korthof, Meehan)

ZEV goals were one 2 percent in 1998 and 10 percent in 2003...then delayed a decade. 10 percent for 2013 should stay a goal! (Olson)

Agency Response: The original ZEV mandate required 2 percent of a manufacturer's production be pure ZEVs by 1998, increasing to 10 percent by 2003. 10 percent of new vehicle production would be close to 140,000 ZEVs per year from the LVMs in 2006. Both the Expert Panel and the Board concur that current ZEV technology would not be able to successfully meet this volume. The Board adopted the most appropriate pure ZEV requirement for the upcoming timeframes, taking into account the current state of technology and costs.

127. Comment: Reject the 90 percent reduction in the minimum number of pure ZEV required in the period of 2012 to 2014. (Assemblymember DeSaulnier, Assemblymember Ruskin)

Agency Response: Comment noted. The Board decided to increase staff's proposed pure ZEV floor for the 2012 through 2014 timeframe from 2,500 to 7,500.

128. Comment: Why is CARB considering a reduction in the number of ZEVs required of automakers by 90 percent in such a crucial time? (Parent)

Agency Response: See response to Comment 7.

129. Comment: I urge you to make the number of ZEVs required in California as high as possible. (Smallwood)

Agency Response: The Board views the pure ZEV requirements it adopted for the 2009 and subsequent MYs to be the most aggressive requirements feasible in light of the status and cost of battery and fuel cell development.

130. Comment: Keep a certain number of fuel cell vehicles mandatory in the revised ZEV regulation. (Mercedes)

Agency Response: The 2008 rulemaking allows manufacturers to meet the pure ZEV requirement (ZEV floor) with battery EVs or fuel cell vehicles. At its May 2007 Board meeting, the Board directed more equal treatment of battery EVs in the ZEV regulation. The Board also directed greater simplicity. For this reason, the 2008 rulemaking eliminates the Alternative Compliance Path in the 2012 and subsequent MYs, and offers the New Path, a single compliance path allowing manufacturers to produce either battery EVs or fuel cells.

131. Comment: Our overall recommendation is to consider a lower percentage multiplier than the percentages proposed in the CARB staff paper. (VW)

The proposed fuel cell floor remains too high from the perspective of the state of the technology, costs and infrastructure. These requirements could divert resources away from the task of resolving technical challenges and coordinating vehicle development with infrastructure availability. (Toyota)

The ZEV percentage requirements proposed by the Staff remain a concern in light of the lack of infrastructure, projected costs for fuel cell vehicles and the Independent Expert Review Panel's assessment of the technology. (GM)

Our greatest concern is the volume of Gold vehicles required and the disproportionate credit levels for those vehicles relative to the Expert Panel findings on the state of ZEV technology. These volumes have increased for all Gold vehicles and for the new Silver+ category with the release of Staff's February 8, 2008 45-day Notice. Staff is proposing a 25 percent increase in the number of Gold vehicles required from the LVMs relative to the November 2007 Concept Paper and a 67 percent increase in the number of Silver+ vehicles required. The volume of vehicles being proposed in the November Concept Paper were inconsistent with the findings of the Expert Panel, yet staff proceeded to further increase those volumes and provided no rational explanation or justification for doing so. (Chrysler, Ford, GM, Honda, Nissan, Toyota)

Increasing the ZEV quantities to an unmanageable level increases the possibility of launching vehicles that are not ready for the market and may not be sufficiently supported. Substantial increases in vehicle quantities in the short term will drive automakers to produce and deliver ZEVs that are still in the pre-commercial stage and at a very high cost, as opposed to focusing those resources on advancing the technology and reducing the cost to produce ZEV products that meet customer expectations to assure ZEV mandate success. (Chrysler)

Agency Response: The Board took into account the Panel's findings as well as a myriad of other factors in the final decision to increase the pure ZEV requirement during the 2012 through 2014 timeframe. The Board's modifications

to the 2014 through 2014 pure ZEV requirement maintain pressure on auto manufacturers to produce ZEVs, increasing the number currently available and eventually moving ZEVs from demonstration programs to full commercialization. The ZEV program will also need to play a role in meeting the Board's goals to reduce GHG emissions from the transportation sector.

132. Comment: Retain the 25,000 vehicles Gold requirement in the 2012 to 2014 timeframe with staff's 10 percent/90 percent Enhanced AT PZEV option based on a 3-credit Type III ZEV while also providing a 5 credit incentive for the new Type IV ZEV. (Chrysler)

Agency Response: ARB considered many options for the ZEV requirement in developing this rulemaking. The Board did retain the a requirement for manufacturers to produce 25,000 ZEVs, with the option of meeting 30 percent of the ZEV requirement with pure ZEVs and 70 percent of the requirement with Enhanced AT PZEVs. The Board adopted the credit structure, as based on a Type IV, five credit earning ZEV, because the Type IV ZEV is more indicative of a ZEV able to replace one gasoline vehicle. See the response to Comment 122.

133. Comment: Increasing the fleet from the 30 vehicles that we have today to the hundreds of vehicles required by the proposed ZEV regulations would not further the advancement of the technology. Putting large volumes of vehicles on the road frustrates the goal of advancing the technology because the resources that would have been used to progress the technology are being spent figuring out how to integrate the technology into a production vehicle program, and tracking and maintaining those vehicles. (Ford)

Agency Response: The ZEV regulation's primary objectives are 1) to encourage the development of zero emission technologies, and 2) to deploy them in vehicles in order to actually realize emissions reduction benefits. If ZEV requirements remain at extremely low volumes, manufacturers will not be as strongly incentivized to advance the necessary technologies. ARB also believes that there is still substantial benefit to real-life, on-road deployment as it may reveal vehicle technology shortcomings that might not otherwise be observed with lab testing, and it also provides real-life fueling infrastructure testing that cannot occur in the lab.

134. Comment: The volume requirements mandated by the ZEV regulations detract from manufacturer's ability to overcome these remaining challenges through fuel cell R&D because resources must be diverted to building and placing in service high volumes of immature technology vehicles. We recommend that the fuel cell volume requirement be reduced until there are significant breakthroughs in technology and cost. (Ford)

Agency Response: Overall, the 2008 rulemaking provides an economic benefit to manufacturers, allowing them to meet a significant portion of their pure ZEV

requirements during the 2012 through 2017 MYs with Enhanced AT PZEVs. The Board believes its modifications to the pure ZEV requirement reflect the current state of technology and are appropriate for the near-term timeframes.

135. Comment: Reducing the number will reverse the likelihood that ZEVs will become commercially available. Lower numbers reduce the likelihood that ZEVs will reach mass production and viable economy of scale. (RAN)

Agency Response: ARB does not agree with this comment. The ZEV program still acts as an incubator for new emerging technologies. Forcing mass production of ZEVs before the vehicles have proven durability and are economically feasible for consumers could lead to inferior and cheaply produced ZEVs. The Board believes its 2008 rulemaking will enable manufacturers to direct resources into pre-commercial production of ZEVs, ensuring only the most advanced and durable ZEVs are placed into consumers' hands.

136. Comment: The numbers of ZEVs proposed by staff constitute backsliding, not progress. (Sierra)

If the CARB reduces the number of ZEVs/PHEVs required of automakers, this is a significant step backwards. (Chaudhary)

ARB staff's proposed ZEV numbers required between 2012 and 2014 do not put the state on a path to meet its long term global warming goals. (ALA, CCA, CEERT, EIN, FOE, NRDC, UCS)

Agency Response: See response to Comment 135.

137. Comment: The large reduction in pure-ZEVs sends strong signals to battery and fuel cell suppliers, along with infrastructure providers, not to invest in ZEV technologies. (ALA, CCA, CEERT, EIN, FOE, NRDC, UCS)

Agency Response: ARB does not agree with this comment. The Board's 2008 rulemaking continue to require more ZEVs than currently being produced by any manufacturer. Current battery production capacity would not be able to meet demand generated from vehicles produced to meet the ZEV requirements. Auto manufacturers have indicated difficulty in purchasing ZEV technologies due to the lack of availability. The Board's 2008 modifications balance consumer demand with the realities of current ZEV technology.

138. Comment: In light of the automotive industry's investment and progress the proposed 2,500 pure ZEVs proposed in the ISOR is not defensible and in fact undermines recent progress. (EIN)

Agency Response: Comment noted. See response to Comment 127.

139. Comment: Rather than recommend an increase in the minimum number of pure ZEVs required in the years 2012 to 2014, the ISOR asks for 90 percent reduction from 25,000 to a mere 2,500. Is this in line with “maintaining the pressure on the commercialization of pure ZEV technologies”? The staff proposal will decrease the number of pure ZEVs by two-thirds from 75,000 to 25,000 between the years 2012 and 2017. How does one reconcile this with the Board’s stated mission and directive to “strengthen the overall objective of the program”? (Tesla)

Agency Response: See responses to Comments 124 and 127.

140. Comment: The proposed 2015 to 2017 program is ineffective, expensive and does not have a vision of how to commercialize hydrogen fuel cell vehicles. (Gronich)

Agency Response: While the Board adopted staff’s proposed requirement for the 2015 through 2017 timeframe, the Board also directed staff to redesign the ZEV regulation, refocusing on the pure ZEV requirement for the 2015 and beyond timeframe. During the redesign, ARB invites all stakeholders to share their ideas and plans.

141. Comment: Technical challenges include fuel cell stack and system durability and robustness, on-board fuel packaging, and weight. Commercial challenges include cost and availability of hydrogen infrastructure. The volume requirements mandated by the ZEV regulations detract from manufacturer’s ability to overcome these remaining challenges through fuel cell R&D because resources must be diverted to building and placing in service high volumes of immature technology vehicles. (Ford)

Agency Response: While ARB recognizes that fuel cell durability and costs are still a near-term challenge to high volume deployment, the ZEV regulation does not specify a specific time period for fuel cell vehicle durability when placed in service. Furthermore, the costs of fuel cell technology were considered when the Board revised the minimum ZEV volume requirements. The ZEV requirement can also be met with other zero emission technologies such as battery EVs.

142. Comment: The staff proposal is missing a ramp. If we really want to achieve any of the goals that this program talks about, even in the staff proposal, a ramp is just common sense. And that’s missing from the staff proposal, at least a realistic and assertive ramp from our perspective. (CCA)

Agency Response: Comment noted. The Board increased the number of pure ZEVs required during the 2012 through 2014 timeframe, creating a more realistic ramp to the number of ZEVs required in the 2015 and subsequent MYs.

## **B. Enhanced AT PZEV Option**

143. Comment: I fully support the staff's proposal to significantly increase the number of plug-in hybrids that must be produced and appreciate staff's vision in including these cars in the ZEV requirement. (Young)

The commenter expressed support for Enhanced AT PZEVs as a backfill. (Nissan, SCAQMD)

Agency Response: ARB appreciates the support for the Enhanced AT PZEV option to meeting the ZEV requirement.

144. Comment: Large numbers of PHEVs proposed for Phase III may force production before vehicles and the market are ready. (Toyota)

Agency Response: Manufacturers are not required to produce Enhanced AT PZEVs. Producing Enhanced AT PZEVs is an option for manufacturers.

145. Comment: ARB's proposal requires 25,000 PHEVs in the 2012 to 2014 MY timeframe in California. ARB should not mandate the production of such large volumes of new technology vehicles when it is clear that the market cannot bear the costs of such vehicles. There is a lack of lead time to introduce this new technology and the volumes required considering the high cost. There should be a more gradual ramp-up of the PHEV volumes in recognition of the significant costs. The Silver+ PHEV requirement should be implemented in 2014 MY in recognizing the huge shift in the ZEV mandate technology requirement and the required lead time to introduce this new technology. (Ford)

Agency Response: See the response to Comment 144. The options for earning credits have been available before the 2008 rulemaking and remain available.

146. Comment: Do not allow 90 percent of ZEV requirements in 2012 to 2014 to be met by non-ZEVs, as proposed by CARB staff. Allowing plug-in hybrids to replace some ZEVs puts these two needed technologies in competition with each other. (Sierra)

Agency Response: Enhanced AT PZEVs are a technology enabling option for manufacturers to fulfill their ZEV requirements. Manufacturers have expressed to the Board that development, testing, and production of these vehicles are an even greater bridging technology to ZEVs over currently available hybrids. The Board does not see these technologies as competing with each other. Battery EVs will have limited range, and therefore a limited market, while Enhanced AT PZEVs will essentially have unlimited range and therefore, a potentially wider market. ARB believes both vehicle technologies will provide option for California's fleet.

147. Comment: Limit the backfilling to 50 percent of a 100,000 ZEV requirement for 2012 to 2014, so that at least 50,000 ZEVs reach the market. (Sierra)

Agency Response: See response to Comment 123.

148. Comment: The CARB ISOR requirements for Enhanced AT PZEVs are insufficient. CARB should strengthen their proposal with significantly larger volumes of Enhanced AT PZEVs that continue to grow from 2012 through 2017. The commenters based their recommendations on the following reasons: 1) manufacturers' announcements project numbers higher than CARB's proposal, 2) the CARB proposal fails to keep up with commercialization stages, 3) historic sales trajectories of advanced technology vehicles like the Prius shows that CARB proposal should be increased; the CARB requirements are too low as compared to national projections in the growth of hybrid vehicles. Each of these claims is supported by extensive reasoning, graphics, and figures. CARB should strengthen the Enhanced AT PZEV requirement through an annual increase of at least 40 percent per year to ensure a rapid commercialization of Enhanced AT PZEVs from 2012 and through 2017. A 40 percent/year ramp-up can be viewed as only a first step. CARB must continue to ramp up plug-in hybrids beyond the 40 percent/year penetration rate to meet long term 2050 global warming goals. (ALA, CEERT, CCA, EIN, FOE, NRDC, Sierra, UCS)

Agency Response: ARB believes a more rapid PHEV deployment rate may be possible sometime beyond 2015, but not in the earlier time period suggested. There are still significant challenges to deployment in larger volumes than what the Board chose for the 2012 through 2014 MYs. One of the key challenges is the build-up in the necessary large-format battery production capacity necessary to support the manufacture of these vehicles.

149. Comment: Increase the number of PHEVs required to hundreds of thousands. (Friedland)

We recommend a 50 percent increase in the number of Enhanced AT PZEVs (e.g., 112,500) in order to accelerate battery technology development, manufacturing investment, and further air quality reductions through vehicle replacements. (SCAQMD)

I'd like to see 75,000 plug-in hybrids. (J. Smith)

The PHEV offsets in the pure ZEV requirement should be 50 percent in 2012 through 2014 and 25 percent in 2015 through 2017 for those PHEV vehicles that run on H2. (UTC)

Agency Response: The Board's 2008 rulemaking will potentially bring the placement of between 50,000 and 70,000 vehicles on the road during the 2012

through 2014 timeframe. These numbers are sufficiently aggressive, considering manufacturers still have yet to produce a single PHEV. The redesign of the ZEV program will evaluate the appropriate number of Enhanced AT PZEVs as an option in future years.

150. Comment: Only PHEV20s or better can backfill (PHEV10s can still get credit in Silver). Enhanced AT PZEVs of any kind would backfill at half the credit they would otherwise earn in the Silver category. (PIA, Clifford, Medvecky, Pease, Hoffner, Synergy, FOE, Friedland, Greer, SEVA)

Agency Response: LVMs have yet to produce any PHEVs. ARB believes it is not appropriate to restrict credit for a new vehicle technology that promotes pure ZEV technology. The zero emission VMT credit allowance favors those PHEVs with greater EAER or  $R_{cda}$ . However, the Board adopted staff's definition of an Enhanced AT PZEV, a PZEV earning more than one-credit per vehicle without multipliers and makes use of a ZEV fuel. Also, see response to Comment 216.

151. Comment: General opposition to the pure ZEV requirement being offset by PHEVs, which use gasoline or diesel and have tailpipe emissions, long recharge times and can worsen the peaking problems for California's electric grid. The commenter expressed opposition to the pure ZEV requirement being offset by HICEs because tailpipe emissions are still present. (UTC)

Agency Response: ARB sees Enhanced AT PZEVs, including PHEVs and HICE vehicles, as a more advanced zero-emission enabling technology for manufacturers to pursue on their path to ZEV commercialization. ARB believes Enhanced AT PZEVs, including PHEVs and HICE vehicles, are a reachable technology step that provides greater environmental benefits to California. Also, manufacturers are not required to offset their pure ZEV requirement with these technologies.

152. Comment: Support for a higher Silver category credit for HICE vehicles that incorporate a fuel cell as an auxiliary power unit (APU) or as part of a hybrid-vehicle traction system. Such vehicles stimulate progress in fuel cell development, help to advance on-board hydrogen storage technologies and promote the build-up of the hydrogen infrastructure. (UTC)

Agency Response: The Board approved the definition of an Enhanced AT PZEV as a PZEV earning more than 1.0 allowance and which utilizes a ZEV fuel. A PHEV with a fuel cell auxiliary power unit would also fall into this category.

153. Comment: I don't think it does the people of the state any great benefit to have a number of fuel cell vehicles on the road for some testing that may or may not benefit us in the long run if we can't have them permanently in service if they aren't part of a long term solution. (Rosen)

Agency Response: The Board 2008 rulemaking allows manufacturers to fulfill the portion of their requirement that must be met with ZEVs through placing battery EVs or fuel cell vehicles. The Board believes both vehicle technologies will be essential in meeting ARB's long term environmental goals.

**C. Enhanced AT PZEV (General)**

154. Comment: General support for the proposed Silver+ or Enhanced AT PZEV category. (CalETC, FOE, VW)

Agency Response: ARB appreciates the support for the Enhanced AT PZEV category.

155. Comment: Near-zero emission natural gas vehicles promote a pathway to zero emission fuel cell vehicles, and rival even battery EVs for well-to-wheel emissions. These vehicles should qualify as Enhanced Silver, at least for an interim (transitional) period, e.g. through 2014. Natural gas is a dominant clean energy source for electricity and hydrogen near term. ZEV policy needs to encourage this ZEV-enabling path and option. Qualify the direct use of natural gas for a transitional period as a ZEV fuel. Natural gas is a clean energy source for ZEV fuels today (electricity and hydrogen). The credit value for the natural gas vehicle is not consistent with other Enhanced AT PZEVs proposed, based on environmental performance and ZEV enabling component technology as well as infrastructure development contribution. (Honda)

Agency Response: To receive credit in the Enhanced AT PZEV category, the Board has chosen to require these vehicles to use a ZEV fuel. Natural gas is relatively clean, but it is not zero emission at the tailpipe. The ZEV regulation takes a longer-term perspective and encourages fuels and technologies that play a key role in the future for zero emission technologies for tailpipe emissions.

156. Comment: Should a Type I 'pure EV' with more all-electric range receive 3.5 times less credit than an P40 AT PZEV? It seems directionally wrong that even a SULEV should gain more credits than a ZEV. (Mitsubishi)

Agency Response: ARB agrees that an Enhanced AT PZEV should not earn more than a pure ZEV. In response to this comment, ARB modified the 3.0 multiplier to a 1.25 multiplier for manufacturers that sell or lease PZEVs with off-board charging capabilities for three years and offer for an extended lease period of two years. This credit is the same amount currently earned by ZEVs sold or leased for the same amount of time. This still encourages PHEVs to be produced and sold, while ensuring these vehicles do not earn more credit than a pure ZEV that is produced and sold.

157. Comment: The base credit level for the extended range EV category, i.e., the credit level before application of any multipliers, should be higher for the extended range EV category than for blended or urban capable PHEVs. (GM)

Agency Response: While not adjusting the base credit level for PZEVs in this rulemaking, the Board adjusted the advanced componentry allowance for those vehicles able to complete 10 miles AER on the US06 drive cycle. Also, the zero emission VMT allowance gives the most credit to those PHEVs with the greatest  $R_{cda}$ .

158. Comment: Increasing the volume of Enhanced AT PZEV volumes as compared to the ISOR can be accomplished by annually reducing the credits awarded to each Enhanced AT PZEV (correspondingly reducing credits for lower technology AT PZEVs and PZEVs). This methodology preserves CARB's ability to increase the pure ZEV requirements over time while staying within the current regulatory constraints of new vehicle fleet sales allocated to ZEVs and the percentage splits between each vehicle category proposed in the ISOR. (ALA, CEERT, CCA, EIN, FOE, NRDC, Sierra, UCS)

Agency Response: The 2008 ZEV Rulemaking has stricken an appropriate balance between aggressive introduction of Enhanced AT PZEVs in the 2012 through 2014 timeframe and adjusting the pure ZEV requirements to an achievable level. As the program is redesigned for the 2015 and subsequent MYs, a set of requirements that balances increases in both categories will be established. Also, see response to Comment 157.

159. Comment: PHEVs should be defined and credited by a more straightforward metric such as kWh (either on-board or net usable) rather than miles. It is more important to encourage maximum electrification of all vehicles more than any one particular vehicle. Defining by miles unfairly biases toward small PHEVs, and will result in more similar vehicle models competing for the same market share, while providing few options to the significant segment of California consumers who want a larger vehicle. (Clifford, Greer, Hoffner, Medvecky, Pease, PIA, SEVA)

The electric range credit structure should be replaced with a useable energy approach, e.g., kWh. (SCAQMD)

CARB policy should encourage plug-in hybrids that have the most on-board electricity storage that maximizes vehicle range. (Mayor Newsom)

The Board should reconsider defining and crediting PHEVs by kWh (either on-board or net usable) rather than miles. Using kWh provides more flexibility to the automakers to build PHEVs according to what they think will sell in the marketplace and will result in more overall cars on the road. Defining by miles biases toward small PHEVs, while defining by kWh will still encourage smaller,

more efficient vehicles because they are more cost-effective to build, but also reward manufacturers who choose to electrify larger vehicles. (RAN)

Base the ZEV credits on energy capacity. Instead of range, just assign a certain number of kilowatts for credit. The advantage of this gives a lot of flexibility, a lot of freedom to manufacturers. It will spur a lot of innovation, and it's really also valid for any technology. It will work for fuel cells, hydrogen, whatever. It's just the amount of energy that's stored on the vehicle. (Choquette)

We are in agreement that kilowatt hours is the most appropriate measurement. (GM)

Agency Response: ARB believes that assessment of relative PHEV merit based on battery capacity instead of range performance is a critically flawed approach for a number of reasons. First, there is not an agreed upon approach to test for "total capacity" in PHEV batteries, and if there were, ARB does not believe that manufacturers would all choose to make "usable capacity" a consistent percentage of "total capacity". This ratio would vary for a variety of reasons, in particular, differences in battery technology will necessitate selecting a "usable capacity" percentage to meet a lifetime goal. This would mean that a particular battery technology that restricts its "usable capacity" to a smaller fraction of "total capacity" would be encouraged by a "total capacity" kWhr regulation even if real-life range performance and emissions reduction benefits were far less. Upon careful examination of the kWhr approach, ARB believes (1) it is not a simpler approach to actually implement in a regulation, (2) it would require the development of battery capacity test procedures, and most important of all, (3) it is not directly related to vehicle emissions reduction performance. Also, see responses to Comments 209 and 210.

160. Comment: The Enhanced AT PZEVs with the lowest emissions should be rewarded with higher credits. For example, several existing AT PZEVs are currently certified at 0.01 g/mile NOx, 50 percent below the certification standard and such vehicles should be awarded higher credits. (SCAQMD)

Agency Response: Comment noted. Under the 2008 rulemaking, PHEVs with 40 mile AER and HICE vehicles receive the highest amount of credit among non-ZEVs under the ZEV program, and are the cleanest non-ZEVs currently produced by manufacturers.

161. Comment: Create a more significant credit differential among Enhanced AT PZEVs. Currently, there is little incentive to produce higher mileage plug-ins. (FOE)

It seems to be that it's very important to have a substantial spread in credit for a 35 to 40 mile plug-in hybrid that is all-electric for that range and considerably lower mileage on a single battery charge PHEV that are blended. (Woolsey)

Agency Response: The Board directed staff to award PHEVs able to complete 10 miles AER on the US06 cycle additional credit. Also, the zero emission VMT allowance gives the most credit to those PHEVs with the greatest  $R_{cda}$  and EAER.

**D. AT PZEVs**

162. Comment: Require hybrid gas/EVs to be plug-in rechargeable. (Smallwood)

Agency Response: Comment noted. At this time, ARB believes conventional non-chargeable hybrids are a good near-term solution to curbing petroleum use and promoting electric drive-trains. Additionally, because non-plug-in or conventional hybrids are commercially available, the cost to the consumer for a conventional hybrid will be substantially less than the cost for a first generation PHEV, meaning more consumers may be able to afford to make cleaner car choices.

163. Comment: Increase current natural gas vehicle credit from 0.7 to 1.0 or greater. ZEV enabling, and demonstrated emissions performed is similar to battery EVs in the South Coast Air Basin. (Honda)

Agency Response: ARB agrees that CNG vehicles have ZEV enabling characteristics, which is why they earn more credit than many other types of AT PZEVs, including HEVs. However, they do not make direct use of, nor do they encourage the transition to sustainable, ZEV fuels as do the higher-credit earning Enhanced AT PZEVs.

**E. PZEVs**

164. Comment: No credits for PZEVs or hybrids that run exclusively on gasoline. (Pohorsky)

Agency Response: PZEVs and AT PZEVs, including conventional gasoline hybrids provide the greatest current environmental benefit to the ZEV program. For this reason, ARB believes PZEVs and AT PZEVs should be able to receive credit under the ZEV program. Additionally, because some OEMs have yet to produce a commercially viable AT PZEV, and ARB believes the credit for PZEVs is still necessary. However, the Board did direct staff to return after looking at the Low Emission Vehicle (LEV) and AB 1493 (Pavley) programs, with a new ZEV program that focuses exclusively on the pure ZEV requirement. Therefore, a future ZEV regulation may no longer give credit to PZEVs or AT PZEVs, including conventional gasoline hybrids.

165. Comment: While PZEVs have served as an air-quality victory for the program, they no longer need commercialization support, and lend no ZEV-enabling value. (RAN)

Agency Response: See response to Comment 164.

166. Comment: The best pathway to cleaner air in California is through low cost, affordable clean technologies that can make a greater impact on the vehicle fleet in California. Volkswagen strongly urges the Board to consider the important impact of PZEV vehicles and mild hybrid concepts when considering changes to the ZEV Program. (VW)

Agency Response: Comment noted. AT PZEVs, including mild hybrids, have acted as ZEV enabling technologies, helping manufacturers to develop electric drive trains and gain experience with battery technologies. However, the Board finds that Enhanced AT PZEV technologies, including PHEVs, are even more promising bridges to ZEV commercialization. Eventually, PZEVs and AT PZEVs will be placed into other ARB programs to provide even more air quality benefit to California.

## **F. Travel Provision**

167. Comment: Limit travel provision for Type III and IV ZEVs to 2014 because increased volumes in the pre-commercialization phases after 2015 are necessary to encourage expansion and cost reduction in component and infrastructure suppliers. The end of the travel provision means that the auto companies must meet the ZEV regulations in California and ten other states that have adopted the ZEV regulations. This doubles the number of ZEVs the auto companies have to produce nationwide. The current regulation requirements in addition to eliminating the travel provision means the auto manufacturers have to produce 100,000 vehicles nationally. Extending the travel provision to 2017 hinders the Board's ability to remove the provision during Phase IV if the Board finds that nationwide commercialization of pure ZEVs is feasible. Because of the need to support future growth of pure-ZEV technologies, suppliers, and infrastructure, plus the advantage of future flexibility in the regulations, the authors proposed limiting the extension of the travel provision to 2014. (ALA, CCA, CEERT, EIN, FOE, NRDC, UCS)

The Board should retain the original 2011 sunset date for the fuel cell vehicle travel provision due to the following reasons: 1) manufacturers have been able to bank credits in the Northeast states, 2) effort has been made to establish a Northeast hydrogen highway, and this could delay hydrogen infrastructure indefinitely, 3) if manufacturers were to comply with fuel cell vehicles, the Northeast would not receive any ZEVs or PHEVs until 2017, and 4) extending the travel provision for fuel cells undermines the intent of leveling the playing field for EVs. (NESCAUM)

The current 2011 sunset date for the travel provision for fuel cell vehicles should be retained and should not be extended to 2017. (Massachusetts)

To extend the travel provision to 2017 would be to significantly delay, if not derail, fuel cell progress in the Northeast. (Vermont)

Pull forward the sunset of the traveling provisions for Type III and IV ZEVs to 2014, with the understanding that this segment will need to be closely monitored and the date changed if appropriate. (New York)

Agency Response: The ALA, CCA, CEERT, EIN, FOE, NRDC, and UCS comment was submitted in a document titled “2008 Proposed Solutions to Potential Loopholes in the Amendments to the California Zero Emission Vehicle Program Regulation, Agenda Item 08-3-5”, which staff responded to in Attachment C of the 1<sup>st</sup> post-Board Hearing comment period public notice. For ARB, this is an overall policy decision. Staff proposed that the travel provision be extended to 2017 during the March 27, 2008 Board Hearing, and the Board approved this provision. The principle involved is vehicle types that are pre-commercial in volume and require new fueling infrastructure are considered to be in a demonstration phase, and the benefit of requiring demonstrations from ten other states is weakened by the high cost and lack of new information obtained. ARB believes that PHEVs will jump directly to commercial volumes, and no new infrastructure is required. Thus it did not recommend a travel provision for this technology. Fuel cells, on the other hand, are likely to undergo several more demonstration phases to validate durability and lower cost designs for new fueling infrastructure (several million dollars per station). Thus, ARB believes travel through the 2017 MY is appropriate so that demonstrations are limited to only a few areas. Likewise, battery EVs may need future demonstrations to establish customer acceptance. Based on this assessment, ARB believes the travel provision for Type III, Type IV, and Type V ZEVs through 2017 is appropriate.

ARB does not think that the provision will compromise its ability to redesign the ZEV program. The redesign will begin with a “clean sheet of paper”, and all provisions of the current ZEV program will be up for reconsideration.

168. Comment: CARB should reconsider the proposed change to the ZEV program, which would remove the battery EV and fuel cell vehicle requirements in the Section 177 states until as late as 2017. (Connecticut)

Battery EVs should be removed from the travel provision altogether or have the sunset date move to 2010 rather than 2014. If it is not changed, the number of vehicles placed in Massachusetts and other Section 177 states will be limited. (Massachusetts)

Battery EVs should not be included in the travel provision for the following reasons: 1) staff's proposed travel provision could significantly reduce plug-in hybrid vehicle placement in the Northeast region; were manufacturers to comply with the ZEV requirements by placing fuel cell vehicles between 2014 and 2017, the Northeast states would not receive pure ZEVs or plug-in hybrids for a decade, 2) many Section 177 states have established a ramp-up period for full compliance with the ZEV requirement, manufacturers have been banking credits for many years which will provide them with additional time in complying with the full ZEV requirement in the other Section 177 states and some states have different MYs in which the requirement becomes effective, and 3) the Northeast would not likely receive any pure ZEVs until 2017 because the travel provision has been extended through 2017 for fuel cell vehicles. (NESCAUM)

Limit the traveling provisions for battery EVs to Type II and greater, excluding the Type I and I.5 vehicles. (New York)

Agency Response: Stakeholders expressed that Type I and Type II vehicles be eligible for the travel provision. Similar to Type III vehicles, the cost to produce and introduce Type I and Type II ZEVs remains high. This modification also promotes technology neutrality to encourage all advanced technologies to come to market as soon as possible. Much like the successful introduction of AT PZEV hybrids, manufacturers began with low volumes in select states; hybrids still represent a small percentage of the overall market. ZEV technologies must also start with low production volumes until the vehicles are commercially viable. The Board modified section 1962.1(d)(5) so that Type I, Type I.5 and Type II vehicles will only be eligible for the Section 177 travel provision through the 2014 MY when these vehicles are estimated to be commercially viable.

169. Comment: Do not amend the current Section 177 travel provision. (Google, Vieira)

The Board should decline any extension and expansion of the travel provision. Technology and the market have advanced significantly since the Expert Panel, and the dilution of the Section 177 State ZEV numbers will result in negative impacts on consumer appetite and market development. (Vermont)

Agency Response: See response to Comment 168.

170. Comment: ARB received various comments in opposition to the travel provision or recommended that the Board eliminate the travel provision. (J. Kelly, Neff, Rosen, Sierra, Trudeau)

Agency Response: The travel provision enables manufacturers to focus efforts and resources on ZEV development into limited locations. The travel provision also helps to ease manufacturer concerns surrounding hydrogen infrastructure development. Battery EVs and fuel cell vehicles continue to be in pre-

commercialization stages of development, and are better served in limited placements.

171. Comment: There should not be any travel provision in combination with decreasing the number of ZEVs required in any phase. (Clifford, Greer, Hoffner, Medvecky, Pease, PIA, RAN, SEVA, Synergy)

Agency Response: The travel provision does not decrease the number of ZEVs required in California in any MY. The travel provision allows manufacturers to focus ZEV placement efforts and infrastructure in a few locations to better foster technology development.

172. Comment: Sanctioning the idea of building fewer ZEVs not only for one state, but 11, will not lead to the market-building volume that we need. (RAN)

Agency Response: No ZEV technologies are currently ready for mass commercialization in multiple states. Focused placement efforts are still needed to test durability and reliability of all types of ZEVs. Requiring too many ZEVs before technology is proven will not further the technology, but rather could lead to market failure.

173. Comment: Under staff's proposal, none of the air quality benefits of ZEVs will accrue in Massachusetts and consumer demand for these vehicles will go unmet in the future. We want to ensure the availability and introduction of advanced technology and ZEVs so that they are available for consumers. (Massachusetts)

The proposed changes have the potential to significantly reduce the number of PHEVs that will be introduced into the Northeast fleet. (Connecticut)

Agency Response: Comment noted. ARB modified the travel provision to ensure all Section 177 States will receive the most commercially ready vehicles in the ZEV program, beginning in the 2010 MY.

174. Comment: The commenters expressed general support for Staff's initial modifications to the travel provision. (GM, Ford)

The commenters expressed general support for the extension of the travel provision for battery EVs. (Ford, Mitsubishi)

The commenters expressed general support for the extension of the travel provision. (VW, UTC)

Agency Response: ARB appreciates the support for the proposed travel provision. The travel provision will remain the same for the 2009 MY. However, due to extensive comment received during the March 27, 2008 Board Hearing, ARB decided to modify the travel provision so that manufacturers would be able

to only satisfy their requirement which must be met with ZEVs in the other Section 177 States, beginning in the 2010 MY. This means that non-ZEVs receive credit under the ZEV regulation, PZEVs and AT PZEVs, would not have their credits "travel" and so would be required to be produced in Section 177 states.

175. Comment: The travel provision for battery EVs should be extended through the 2017 MY to match the travel provision extension recommended by CARB staff for fuel cell vehicles. This allows greater assurance that battery technology is viable, while Section 177 states will still benefit from large volumes of PZEV, AT PZEV and, if adopted, Enhanced AT PZEV vehicles while the zero emission or gold technologies continue to be fully demonstrated in the California market. (VW)

Agency Response: Based on manufacturers' press releases and trade news, ARB believes battery EVs will be closer to commercialization than fuel cell vehicles by the 2015 MY. The Board adopted the staff's proposed schedule for ZEV types and applicable MYs for the travel provision.

176. Comment: ARB proposes to have the travel provision expire for battery EVs after the 2014 MY. This results in over a 30 times increase in the battery EV requirement between the 2014 and 2015 MYs. This amounts to an unprecedented quantum leap in battery EV volume from one MY to the next; it is not realistic considering the limited niche market for these vehicles. Manufacturers must invest significant resources in advancing zero emission technologies. Manufacturers must look forward several years to make sure their technology path will achieve compliance with the regulations. The huge increase in the battery EV requirement in the 2015 MY may discourage manufacturers from choosing this technology option. (Ford)

Agency Response: The travel provision allows manufacturers to deploy fewer ZEVs throughout ZEV states while this technology is still immature. Since it is an option, there is not a step up in the ZEV "requirement" because manufacturers are not forced to take this option. Furthermore, manufacturers can plan accordingly for this optional increase since they know precisely when it will occur.

177. Comment: General concern with not allowing Enhanced AT PZEVs to count towards other states' ZEV requirements. (Chrysler, Ford, GM, Honda, Nissan, Toyota)

PHEVs required to be placed in all ZEV states could deem this as cost-prohibitive and make it a disincentive for manufacturers to introduce these products to market. Due to the absence of the provision, the quantity of Silver+ vehicles required to supply to all current ZEV states will approximately triple in volume. The following example shows the costs incurred by the LVMs due to the effect of no travel provision. With a travel provision, the LVMs will be required to

supply approximately 75,000 PHEVs during the 2012 to 2014 phase at an incremental cost of \$25,000 per vehicle, totaling \$1.875 billion to LVMs. Without a travel provision, the quantity of vehicles triples, increasing the total cost to LVMs to \$5.625 billion. (Chrysler)

A travel provision would provide the needed incentive to encourage the implementation of PHEV technology. It allows a company to market-test a substantial quantity of vehicles and gain customer feedback on the usage of this all-new product, while other resources can be spent on advancing the technology and improving the cost for future higher quantities. Manufacturers will most likely focus on certain regions to market-test these products while consolidating most sales, service and other support in that region, at least during the initial stages of this emerging technology. (Chrysler)

The travel provision should also include Enhanced AT PZEVs, which may be used to comply with designated percentages of pure ZEV requirements through 2017. This approach would help assure customer acceptance and the development of necessary infrastructure Enhanced AT PZEVs, and we therefore believe that this more flexible approach would be beneficial to the ZEV program. (Hyundai)

Agency Response: The purpose of the travel provision is to allow manufacturers to concentrate efforts and resources on development programs for those vehicles in the program that are furthest from commercialization. The travel provision also eases pressure on those manufacturers dependent on hydrogen infrastructure development. Enhanced AT PZEVs are considered to be closer to commercialization than pure ZEVs, and require limited additional infrastructure development. Therefore, the Board included the vehicles furthest from commercialization in the travel provision, meaning Type I, I.5, II, III, IV, and V ZEVs, and not Enhanced AT PZEVs.

178. Comment: The first 10,000 PHEVs that a manufacturer produces should be allowed to travel. This would level the playing field to encourage manufacturers to develop this technology. (Chrysler)

High PHEV volumes could be addressed with a phase-in for the states that have adopted California standards. (Ford)

Agency Response: The Board determined to allow credit to travel for only pure ZEVs under 1962.1(d)(5)(E). Also, see response to Comment 177.

179. Comment: If it is appropriate to have the travel provision expire for battery EVs, there should be a phase-out schedule for states that have adopted California standards, so that there is a more gradual, realistic increase in the number of battery EVs required. (Ford)

Agency Response: The Board determined that limiting credit travel to the 2009 through 2014 MYs for Type I, I.5, and II ZEVs is appropriate in regards to section 1962.1(d)(5)(E). Type I, I.5, and II ZEVs are expected to be commercially available after the 2014 MY, and therefore a phase-out would not be needed.

180. Comment: HICE vehicles are dependent on a hydrogen infrastructure, which is not developed outside of California. If a manufacturer chooses this technology path, they must place these vehicles in every state that has adopted California standards. The travel provision should be extended to HICE vehicles. The credit for HICE vehicles could be reduced while the travel provision is applicable to these vehicles such that the total number of vehicles is comparable to the total number of other Enhanced AT PZEV vehicles. Once it is clear that the hydrogen infrastructure is sufficiently developed in states other than California to support the placement of HICE vehicles in those states, the travel provision and the accompanying reduced credit provisions could be phased out in tandem. (Ford)

Agency Response: Production of Enhanced AT PZEV is an option for manufacturers choosing to produce fewer ZEVs. There are options within the Enhanced AT PZEV category as well, so it is not required that a manufacturer provide HICE in all Section 177 states. The Board limited the travel provision to ZEVs because they are the least developed technologies, requiring the most effort in commercialization with two-fold concerns: availability of infrastructure and technology readiness. The Board adopted the travel provision to avoid duplicating demonstrations of prototypes when the technology was not ready to go to higher levels of production vehicles.

181. Comment: The Enhanced AT PZEV obligation in states outside of California should be reduced if those states do not offer a comparable incentive because PHEVs carry with them a significant cost compared to conventional internal combustion vehicles. California could publish their incentive schedule a few years in advance to allow other states to plan accordingly. (Ford)

Agency Response: This comment is outside of the scope of this 2008 rulemaking. Incentives in California would require authorization by the Legislature.

182. Comment: It is incumbent upon ARB to design a program that works not only in California, but also in the other states that have adopted California standards. (Ford)

Agency Response: This comment is outside of the scope of the 2008 rulemaking. Section 177 of the federal Clean Air Act authorizes other states to adopt California's emission standards. The Board adopted the travel feature in order to allow developmental ZEV technologies to receive credit in other state ZEV programs. For AT PZEVs that do not face the same technology challenges

as ZEVs, a travel provision is not necessary. Ultimately, it is up to the other states to decide whether or not the ZEV Regulation “works” elsewhere.

183. Comment: ARB’s proposal allows ZEVs placed in California to count in all states that have adopted the ZEV regulations. The opposite is also true, a ZEV placed in a state that has adopted the ZEV regulations counts in California. What is not clear is that a vehicle placed in one ZEV state should count in all ZEV states. For example, a ZEV placed in Rhode Island should count in Connecticut. ARB should revise sections 1962 and 1962.1 to clarify this situation. (Ford)

Agency Response: This comment is outside the scope of the 2008 rulemaking. ARB modified the language in section 1962.1(d)(5)(E) to specify how this regulation works in California relative to the Section 177 states. The Board also modified the regulation to state that a ZEV placed in California counts in all Section 177 states. Section 177 states are able to determine how this provision works in their own states.

184. Comment: The proposed travel provision adds restrictive provisions to the program that will result in vehicle blackouts in Section 177 states. Fuel Cell vehicles and battery EV credits from placements in California will be used by manufacturers to meet their ZEV obligations in other states. Any vehicle placed in one state that counts in all, effectively reduces the incentive to place Silver+ PHEVs, which can be used to backfill the Gold ZEV requirements, becomes drastically weakened. (Vermont)

Agency Response: Comment noted. The Board approved the timelines for Type I, I.5, II, III, IV, and V ZEVs, as stated in section 1962.1(d)(5)(E)2. However, the Board also directed proportionality for credits in section 1962.1(d)(5)(E). ARB modified the travel provision, beginning in the 2010 MY, to only allow manufacturers to meet a Section 177 state’s portion of the regulation that must be met with ZEVs with ZEV credits earned in California. With the modification, Section 177 states will receive non-ZEV commercially viable vehicles in their ZEV programs, including PZEVs, AT PZEVs, and Enhanced AT PZEVs as auto manufacturers chose to meet their ZEV requirements in each Section 177 state.

185. Comment: If the travel provision is extended, we recommend a compensatory trade-off to ensure the foregone emissions benefits are realized. (SCAQMD)

Agency Response: The modifications to section 1962.1(d)(5)(E) do not significantly impact emissions. This provision ensures that manufacturers can focus effort and resources on much needed ZEV development programs which will lead to ZEV commercialization. Credits for non-ZEVs are not subject to the travel provision so the emission benefits from these vehicles will accrue in California.

186. Comment: Include provisions to limit windfall credits from the traveling provisions in Section 177 states. (New York)

Agency Response: The Board agreed with this comment, and directed staff to modify section 1962.1(d)(5)(E) so that credits would be proportionally allocated based on a ratio of California's sales compared to the Section 177 state sales. ARB modified the travel provision to better meet the intent of proportionality in the travel provision and to account for timing and implementation. Proportionality is provided, but is proposed to begin in the 2010 MY. The Board's modification also specifies that a credit earned in a Section 177 state is earned at a proportional value in the Section 177 state, while credit is earned in the full amount in California. Lastly, a manufacturer complying with the Alternative Path requirements in the 2010 and 2011 MYs in a Section 177 state will not be affected by proportionality if those credits are produced in California. The maximum number of credits allowed for compliance in the Section 177 state for the 2010 and 2011 MYs, however, is limited to the Section 177 state's Alternative Path minimum ZEV percentage. Any credits earned in California and used in a Section 177 state beyond the minimum Alternative Path ZEV percentage are subject to proportionality.

#### **G. Transition for Intermediate Volume Manufacturers**

187. Comment: ARB received comments giving general support for the timeline extension of the IVM transition to LVM requirements. (BMW, Hyundai, Mercedes, Mitsubishi, VW)

Agency Response: ARB appreciates the support for staff's proposed extension of the IVM transition period. However, the Board did not approve this part of staff's proposal.

188. Comment: Maintain flexibility, considering that the overall market has grown and a significant gap continues to exist between large and intermediate volume manufacturers. (BMW)

Agency Response: Overall, the Board's modifications increase flexibility within the program, allowing manufacturers to meet their ZEV obligations with both pure ZEVs and Enhanced AT PZEVs. However, the Board did not approve staff's proposal to extend the transition period for IVMs becoming subject to LVM requirements. The Board believes IVMs have had sufficient time to ramp up their ZEV production in anticipation of LVM requirements.

189. Comment: It is more difficult to enter the regulation in later years due to the increased percentage requirements. (VW)

Agency Response: Comment noted. However, ARB believes IVMs transitioning to LVMs in later years will have had sufficient time to prepare for ZEV requirements for LVMs. Also, see response to Comment 188.

190. Comment: A six year lead time for companies that become Large Volume Manufacturers through aggregation as opposed to increased sales, instead of the four year lead time currently required in the regulation for companies that aggregate. Volkswagen finds it curious that CARB chooses to punish companies that become large through aggregation by reducing the lead time, especially when the two companies involved are not currently Large Volume Manufacturers. This is especially curious when CARB responded to other industry aggregations involving large manufacturers in an earlier hearing by allowing for a ten year lead time for companies that aggregated before the 2001 MY. (VW)

Agency Response: Staff's proposal did not include any modifications to the lead time that a manufacturer receives when aggregating with another manufacturer. Therefore, this comment falls outside the scope of the regulation.

191. Comment: ARB received comments in opposition to the transition period extension proposed for the IVMs. Some indicated opposition because it could put some LVMs at a competitive disadvantage. (Chrysler, Ford, GM, Honda, Nissan, Tavill, Tesla, Toyota, UTC)

Agency Response: The Board did not approve staff's proposed extended time period for IVMs transitioning to LVM requirements.

192. Comment: A company's California sales are not an accurate indicator of its ability to comply with the ZEV regulations, as many of the IVMs transitioning to LVM status are large, profitable, multinational companies. (Chrysler)

Agency Response: Comment noted. This was one factor in the Board's decision to not extend the transition time for IVMs transitioning to LVMs. The regulation specifically bases ZEV requirements and manufacturers' size on annual California sales.

193. Comment: A transitioning manufacturer will only have to provide AT PZEV vehicles 6 years after it reaches its 60,000 vehicle/year threshold. AT PZEV technology is readily available today. (Chrysler)

Agency Response: Comment noted. The Board did not approve staff's proposed extended transition period for IVMs.

194. Comment: Maintain the current phase-in for intermediate volume manufacturers transitioning to large volume status to ensure a faster trend to zero emissions. Maintaining the current phase-in requirement will not only set a trend to zero emissions sooner, it will also help to further advance the state of ZEV technology

and lead to an earlier success of the ZEV program. Having more high-technology automakers involved in the ZEV program sooner will lead to efficiencies; as costs can be driven down through the supply chains, more automakers requiring ZEV vehicles equates to increased supply base, competition and possible shared costs and common components amongst manufacturers. (Chrysler)

Agency Response: See response to Comment 193.

195. Comment: Support for a modification to the phase-in during which new LVMS must begin to introduce pure ZEVs and/or Enhanced AT PZEVs during the phase-in period. The commenter's suggested revised regulatory language is provided below:

*"If an intermediate volume manufacturer's average California production volume exceeds 60,000 units of new PCs, LDTs, and MDVs based on the average number of vehicle produced and delivered for sale for the three previous consecutive MYs, the manufacturer shall no longer be treated as an intermediate volume manufacturers and shall, beginning with the sixth MY after the last of the three consecutive MYs. Beginning with the seventh MY after the last of the three consecutive MYs, the manufacturer shall meet the ZEV requirements with a maximum of 75-percent percent PZEVs, of which at least one fourth would have to be AT PZEVs and shall, and 25-percent percent AT-PZEVs, whereby at least 0.3-percent of the AT-PZEV requirement must be met with ZEVs and/or Enhanced AT PZEVs. Beginning with the ninth MY after the last of the three consecutive MYs, the manufacturer shall meet the ZEV regulation requirements with a maximum of 67-percent PZEVs, of which at least on third would have to be AT PZEVs and 33-percent AT PZEVs, whereby at least 1.0-percent of the AT-PZEV requirement must be met with ZEVs and/or Enhanced AT PZEVs. The manufacturer would comply with all ZEV requirements for large volume manufacturers beginning with the twelfth MY after the last of the three consecutive MYs." [§1962.1(b)(7)(A)]*

The suggested revisions to the phase-in schedule will expedite introduction of ZEVs and advanced technology vehicles providing additional air quality benefits and an opportunity for new LVM to transition more gradually into the ZEV market. (Hyundai)

During the transition period, Volkswagen would support a small gold requirement to assure CARB that the company is continuing to develop these technologies. (VW)

Agency Response: The regulation does not prohibit manufacturers from producing ZEVs before the vehicles are required. Also, the Board's 2008 modifications include provisions extending IVMS' carry-forward provisions so that

ZEV credits earned prior to LVM transition remain useful. ARB does not believe it was necessary to require IVMs to have a gold requirement at this time.

## H. Carry Forward/Carry Back Provisions

196. Comment: Manufacturers invested large amounts of money in early ZEV technologies for the purpose of generating credits to meet the ZEV regulation requirements. These investment decisions were based on generating ZEV credits that could be used toward future ZEV compliance based on the current ZEV regulations, without the restrictions that the ARB Staff has proposed. ARB should not retroactively change how these credits can be used. In addition, the changes proposed will deter manufacturers from placing more ZEVs in service sooner than required to generate a compliance margin for protecting against unforeseen changes in product plans and market conditions. (GM)

LVMs develop long-range compliance plans with a margin of safety to account for market and product disruptions; however, the current provision with unrestricted Gold credit carry-forward provides the insurance necessary to account for unforeseen circumstances. Retroactively, changing the carry-forward provision would erase the safety net that LVMs count on in case of emergencies to assure compliance and would also de-value investments that manufacturers already made. (Chrysler, Ford, GM, Honda, Nissan, Toyota)

Agency Response: To provide a ramp-up to commercialization in the ZEV requirement, ARB would like to see a trend for an increasing numbers of ZEVs every year. On the New Path, the carry-forward provision gives value to banked credits, and eliminates problems surrounding banked ZEV credits and subsequent blackout periods with no ZEV placement. The carry-forward and carry-back requirements still allow LVMs to concentrate their development in certain years, while still maintaining pressure to produce new ZEVs to fulfill current and future requirements. Although ARB recognizes that OEMs built and banked significant ZEV credits in early years, it was with significant increased requirements in mind. Since the program has been modified several times, reducing the requirements for ZEVs, these banked credits that have ended up playing a much more significant role in delaying technology impacts were necessary moving forward.

197. Comment: IVMs should be allowed to earn and bank non-expiring gold credits. Once an IVM becomes or transfers the credit to a LVM, the credits are treated as earned in that year and lose value according to the carry-forward provision. (Mitsubishi)

To incentivize further IVM introduction of ZEVs and/or Enhanced AT PZEVs, Hyundai suggests that CARB modify the regulations to begin the depreciation of gold credits two years after the first year that the new LVM is required to produce pure ZEVs and/or Enhanced AT PZEVs (i.e. gold credits earned prior to Year 7

after becoming a LVM would depreciate in Year 9 after becoming a LVM).  
(Hyundai)

Agency Response: Comment noted. The Board directed staff to allow manufacturers other than LVMs to bank gold credits until subject to LVM requirements. The carry-forward provisions will be effective from the MY the IVM becomes subject to LVM requirements.

198. Comment: Extend carry-forward provision to Enhanced AT PZEVs to ensure that banked credits do not create long “blackout” periods when none of these vehicles are produced. Without the carry-forward limitation being applied to Enhanced AT PZEVs, manufacturers could bank credits and avoid production in later years. If a manufacturer chose to build low volumes of Enhanced AT PZEVs during Phase II when a 3 times multiplier is applicable or over comply in Phase III, the result could be few or no Enhanced AT PZEVs placed in Phase IV. The carry-forward provision should be extended to Enhanced AT PZEVs through the end of 2017. (ALA, CCA, CEERT, EIN, FOE, NRDC, UCS)

Agency Response: This comment was submitted in a document titled “2008 Proposed Solutions to Potential Loopholes in the Amendments to the California Zero Emission Vehicle Program Regulation, Agenda Item 08-3-5”, which staff responded to in Attachment C of the 1<sup>st</sup> Post-Board Hearing comment period public notice. Staff does not agree that the carry-forward provision should apply to Enhanced AT PZEV credits. Large numbers of Enhanced AT PZEVs, namely PHEV, are not expected to be produced during the 2009 to 2011 timeframe. These vehicles have never been produced, and it is unlikely that a sudden ramp-up of volumes would occur in such a limited timeframe. Additionally, if a manufacturer were to be successful in its early production of an Enhanced AT PZEV, it would be unlikely that the manufacturer would stop production during the 2012 to 2014 timeframe. Staff believes that extending the carry-forward provision to include Enhanced AT PZEVs would decrease the likelihood of vehicle demonstrations prior to 2012. It would penalize manufacturers deploying Enhanced AT PZEVs early by not allowing them to bank credits for more than three years. Instead, staff chose to address the overall credit discrepancy between PHEVs and pure ZEVs during the 2009 to 2011 timeframe.

#### **I. Neighborhood Electric Vehicles (NEV)**

199. Comment: ARB received comments urging the Board not to amend the current NEV allowance. (Google, Neff, Trudeau, Vieira)

Agency Response: The Board views NEVs as a limited niche vehicle with significant environmental benefit. The Board accepted staff’s proposal to double the amount of credit received by NEVs from 0.15 to 0.30. In addition, ARB modified several parts of the regulation to limit the use of NEVs, as well as increase the technical requirements for the 2010 and subsequent MY NEVs.

These modifications will ensure that the most technologically advanced NEVs receive credit within the program, while realizing their limited application.

200. Comment: No credits for NEVs. (Pohorsky)

Agency Response: See response to Comment 199.

201. Comment: The 25 miles per hour (mph) limit set by the National Highway Transportation Safety Administration (NHTSA) for low speed vehicles is perceived as too slow to be safe in mixed traffic in California cities and reduces the utility of NEVs. Several states (OR, WA, MT) have already adopted medium speed vehicle regulations permitting EVs that otherwise conform with NHTSA low speed vehicles standard 500 to operate at speeds up to 35 mph. Please allow the establishment of a new class of medium speed vehicles that are substantially equal to low speed vehicles but with an increased operating speed to 35 mph for operation on streets with a posted speed limit of 35 mph.

Please make ARB's city ZEV definition more specific as City ZEVs could be a cost-effective solution to pollution and CO2 emissions. Also, include the medium speed vehicles definition in the proposed ZEV amendments so that further steps to include it in the California Vehicle Code and NHTSA can be undertaken.

Full function EVs, costing from \$30,000 to \$100,000 are just small niche vehicles that will never achieve market volume sufficient to have a measurable impact on the California environment. Low cost medium speed vehicles could gain substantial popularity and displace small economy cars with grants and/or tax credits, resulting in reduced numbers of polluting cold starts and a reduction of 3,000 to 7,000 gasoline-fueled miles driven annually. They could also prepare the public for freeway-capable EVs.

(Clean Electric, EnVironmental Motors, Form Letter #6, Greens, Irvine, Form Letter #1, Miles, Silver, Sokolow, Spruit, Tabascio)

Agency Response: On September 26, 2008, NHTSA denied a petition for establishing a new class of motor vehicles with a maximum speed capability of 35 MPH.

ARB would like to see a broad spectrum of EV functionality (including maximum speed capabilities) and believes greater vehicle choice will hasten the move away from polluting internal combustion engine vehicles, resulting in emission reduction benefits. However, ARB has neither the authority nor the traffic safety expertise to establish safety standards for vehicles, and therefore defers to NHTSA regarding the establishment of a medium speed vehicle class.

City EVs were described by ARB's Independent Expert Panel as "battery EVs with limited acceleration and top speed (e.g. 50/60 mph) and thus not suitable for

high speed United States urban/suburban freeway driving, although at present they must meet all Federal Motor Vehicle Safety Standards (FMVSS) requirements.” The Panel further stated that a City EV’s “performance limitations allow a smaller size battery and lower power electric drive system, so that the vehicle can have a lower manufacturing cost and thus be made more affordable to the customer.”

From these two sources, it is clear that the City EV is a de-rated full function EV, meeting the same safety standards and not limited to controlled low-speed communities. It is not similar in performance or safety features to the proposed medium speed vehicle.

202. Comment: Chrysler LLC and GEM commissioned studies on NEV use. The commercial and residential NEVs in the studies traveled 3,000 and 1,200 miles per year, respectively and displaced two-thirds of internal combustion engine vehicle trips. That translates into a one-third reduction in tailpipe emissions (mostly from avoided cold starts).

Under the ZEV Amendments, a 10-mile all-electric range PHEV plugged in once a day and capable of accumulating 3,650 all-electric miles each year has a credit value of 1.57 in the 2012 MY. In contrast, a GEM NEV in commercial operation and traveling 3,000 miles per year only earns a credit value of 0.30. Additionally, the credit basis increase from a Type III ZEV at 3.0 to a Type IV at 5.0 credits in the amendments essentially devalues NEVs.

Based on the air quality benefits and the commitment that Chrysler and GEM have made to the success of these vehicles and the ZEV Program, we believe that the NEV credit value should be increased to 0.625. This value should also apply to the 2006 through 2008 NEVs MY because the environmental benefits of NEVs have been accruing since that time period. These NEVs should not be penalized solely because the regulation was not opened in 2006 as originally planned (the January 10, 2003 Staff Report stated that the credit value for 2006 and beyond would be reexamined and possibly revised at a later date when more detailed NEV customer usage and vehicle durability information was available).

Mightycomm conducted studies for DaimlerChrysler on NEV use showing that NEV were used for three of four trips, two-thirds of which were three miles or less. NEV success is based on their numbers (there are 20,000 of them in California) and the fact that they are smartly used for small trips where they reduce the number of cold starts. (Chrysler)

Agency Response: ARB has reviewed the Mightycomm study<sup>2</sup> and understands the utility and air quality benefits of NEVs. ARB also recognizes that NEVs have

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<sup>2</sup>GEM. *Surveys of NEV Owner Behavior in California*. December, 2005 Prepared for GEM by Mightycomm and Access Research Group.

some limits that must be acknowledged when determining credit value. NEV speed and range capabilities limit them to a niche market. NEVs are low speed vehicles that have a maximum speed of 25 mph and are only allowed to be driven on roads with a maximum speed limit of 35 mph. Additionally, they typically have a limited driving range on the order of 30 miles.

Even with these limitations, NEVs reduce internal combustion engine vehicle trips and provide air quality benefits. In consideration of those benefits, ARB determined that a doubling of the credit value from 0.15 to 0.30 is appropriate. However, ARB does not believe it is appropriate to grandfather in a greater credit value for NEVs placed in 2006 through 2008. Additionally, NEVs must now successfully complete a technical assessment performed by the United States Department of Energy before being eligible for the 0.30 credit value.

ARB disagrees with DaimlerChrysler's comment stating that the new credit baseline, a Type IV ZEV with a credit value of 5, essentially devalues NEVs. Type IV ZEVs have a range requirement double that of Type III ZEVs, and will be more costly to produce. Their establishment as a baseline recognizes the advances that have been made in electric drive, battery, and fuel cell technologies. The relative difference in cost and credit value between Type III ZEVs and NEVs does not change. And automakers may continue to meet their ZEV Program requirements without using Type IV ZEVs.

203. Comment: A credit mechanism needs to be developed that will promote a reduction in the carbon content of petroleum based fuels and an increase in the short term in the number of plug-in vehicles until we get a fleet of plug-in hybrids and/or battery EVs. The 20,000 NEVs that exist today can begin the process of credit banking under the low carbon fuel standard. I think the staff-recommended ZEV credit of 0.3 for NEVs is a good start, but it ought to be higher - 0.75. (Mightycomm)

Agency Response: ARB appreciates Mightycomm's comments on the need to develop a credit program to promote a reduction in the carbon content of petroleum-based fuels and bank NEV credits under the low carbon fuel standard. However, these activities are outside the scope of the 2008 rulemaking and the ZEV Program.

204. Comment: The commenter expressed general support for staff's proposed NEV credit level. (Chrysler)

Agency Response: ARB appreciates support for staff's increased proposed NEV credit level. The Board adopted the increased NEV credit as part of CCR, title 13, section 1962.1.

205. Comment: The history of earlier NEV credit stockpiling should be sufficient to raise concern. We urge the Board to direct Staff to develop precise methodology

to link credits with demonstration of effective and long term NEV deployment. (Vermont)

Prevent product blackouts caused by NEV credits for the pure ZEV minimum requirement and early introduction of Enhanced AT PZEVs. This can be accomplished by limiting the use of NEV credits earned before 2008 to the (non-Enhanced) AT PZEV or PZEV categories after 2011 and restricting NEV credits earned after 2008 from the pure ZEV floor. In the early 2000's auto manufacturers placed low cost, low technology NEV in California for a short period of time only to fulfill their pure ZEV requirement. NEVs were then abandoned or removed with almost no benefit to air quality and technology advancement. Because of this, auto manufacturers have banked over 123,000 pure ZEV credits from NEVs. Because NEVs have been used as a pure ZEV credit loophole, the authors recommended limiting the use of the existing banked credits earned before 2008 to the (non-Enhanced) AT PZEV or PZEV categories after 2011. NEV credits earned after 2008 could be applied to all categories outside of pure ZEV floor. (ALA, CCA, CEERT, EIN, FOE, NRDC, UCS)

Agency Response: ARB agrees that the large number of banked NEV credits will slow the introduction of new advanced technology ZEVs unless their use is restricted. To limit the use of NEV credits, both 2001-through-2005 credits as well as the 2006 and subsequent MY NEV credits modifications were approved. The 2001-through-2005-MY-NEV credits are not available to meet the portion of the obligation that must be met with ZEV in 2012 through 2014. Also, the 2001-through-2005-MY-NEV banked credits are capped at 50 percent usage within the obligation that may be fulfilled with Enhanced AT PZEVs or AT PZEVs for the 2012 to 2014 timeframe. These modifications limit the use of 2006 and beyond NEV credits within the minimum ZEV floor during the 2012 to 2014 timeframe while still allowing them to be fully used to meet requirements that may be met with Enhanced AT PZEVs, AT PZEVs, and PZEVs.

206. Comment: The commenter expressed general support for the limit placed on the use of old banked NEV credits. (CalETC)

Agency Response: ARB appreciates the support for this modification. Additional post-Board Hearing modifications were also made to further limit the use of banked historic NEV credits.

## **J. Zero Emission VMT Allowance**

207. Comment: Support for staff's inclusion of blended PHEVs and proposed EAER concept. (Toyota, VW, CalETC)

Agency Response: ARB appreciates the support for the modifications to the zero emission VMT allowance equation that give credit to blended PHEVs with EAER.

208. Comment: The zero-emission VMT allowance is a fairly complicated formula which is dependent on test procedures that are yet to be defined. There are significant issues that need to be addressed in changes to the test procedures. Because of the lack of lead time that the proposal provides to introduce this new technology, ARB's proposal forces manufacturers to accelerate the development of PHEVs, requiring design decisions to be made. These design decisions are being made without knowing the impact on the credit earned because the test procedures are not defined. (Ford)

Agency Response: ARB has been working diligently to revise its hybrid exhaust and evaporative emissions test procedures, and the Board will consider revisions in a separate rulemaking now noticed for the January 22-23, 2009 Board meeting. Before the December 5, 2008 release of the notice of rulemaking, all major auto manufactures have participated and provided inputs to the process of developing the test procedures. While these test procedure modifications have not yet been adopted by the Board, there have been no changes to these procedures from the early proposals that would affect development or production decisions. Furthermore, ARB's proposed HEV exhaust test procedures are significantly similar and sometimes identical to those that are under development by the Society of Automotive Engineers that are expected to be released in 2009.

209. Comment: Utility factors based on the entire population of vehicles driven in the United States are not representative of the consumer that will want to purchase a PHEV. The people likely to purchase a PHEV are expected to have relatively short commutes and highly predictable day-to-day driving patterns that will best utilize the plug-in operation of the vehicle. Until there are more data on customer usage of PHEVs, Ford recommends that the utility factor provision in the Zero Emission VMT allowance be eliminated. (Ford)

Agency Response: ARB is taking a longer-term perspective and is making use of Utility Factors based on average driving because (1) all other alternatives proposed, in particular battery kWhr, have critical flaws, (2) this Utility Factor methodology will be the eventual basis of other performance-based assessments of PHEV performance, and (3) this methodology will best represent PHEV usage as the market grows, and adopting it now avoids having to change our methodology in the future.

210. Comment: Because the battery is the key component to for a PHEV, the Zero-Emission VMT allowance should be based on total battery capacity. Total battery capacity is suggested instead of useable energy capacity to avoid the need to define test procedures to measure useable energy capacity. Given the significant expense of the battery, one can assume that manufacturers will maximize the useable capacity of a battery, so that the total capacity would be an adequate metric. Although this approach may not be as accurate as the approach proposed by ARB, we believe there are benefits to a simple approach at this stage of the technology. Once we have test procedures defined, some

experience with this technology, and data from customer usage, it may be appropriate to go to a more complicated formula. In the meantime, Ford recommends a simple Zero-Emission VMT Allowance based on total battery capacity; for example, Zero-Emission VMT allowance + 0.1 x Battery Capacity (kWh). (Ford)

Agency Response: ARB believes that assessment of relative PHEV merit based on battery capacity instead of range performance is a critically flawed approach for a number of reasons. There is not an agreed upon approach to test for “total capacity” in PHEV batteries, and if there were, ARB does not believe that manufacturers should all choose to make “usable capacity” a consistent percentage of “total capacity”. This ratio would vary for a variety of reasons, in particular, differences in battery technology will necessitate selecting a “usable capacity” percentage to meet a lifetime goal. This would mean that a particular battery technology that restricts its “usable capacity” to a smaller fraction of “total capacity” would be encouraged by a “total capacity” kWhr regulation even if real-life range performance and emissions reduction benefits were far less. Upon careful examination of the kWhr approach, ARB believes (1) it is not a simpler approach to actually implement in a regulation, (2) it would require the development of battery capacity test procedures, and most important of all, (3) it is not directly related to vehicle emissions reduction performance. Also see response to Comment 208.

211. Comment: We request clarification regarding whether the current HEV strategy of controlling battery state of charge (SOC) within narrowly-defined ranges to maximize battery life, has been accounted for in the proposed amendments, as the ISOR and proposed regulatory language are subject to varying interpretations. Narrowly-controlled SOC, if further applied to PHEVs, could in itself serve as a brake on battery development if the range of utilized SOC is not expanded through credit mechanisms. (Vermont)

Agency Response: All auto manufacturers and most other users of traction batteries are expected to program their vehicles to use less than the full rated battery SOC range in order to obtain reasonable lifetimes from them. While it is unlikely that PHEVs will operate under the same narrow SOC ranges as conventional hybrids do, automakers are working towards a battery lifetime of at least ten years and are planning to make use of whatever SOC range allows a given battery technology to meet these lifetime goals. ARB eventually chose to make use of actual vehicle range test performance results instead of battery “rated” kWhr capacity to evaluate PHEVs in the modifications to the regulation, in part, to avoid the possibility of “varying interpretations” of what is meant by battery capacity. Attempting to define and assess “usable” vs. “rated” kWhr is something we expect the Society of Automotive Engineers to address in the coming years.

## K. Advanced Componentry Allowance

212. Comment: General support for the 10-mile AER floor. (Toyota)

Agency Response: ARB appreciates the support for the 10-mile AER as proposed by staff for the Type F and Type G advanced componentry allowance.

213. Comment: Support for the restoration of silver credit for Type C hybrids. (VW)

Agency Response: ARB appreciates the support for the Type C advanced componentry allowance.

214. Comment: Eliminate extension of Type C HEVs because it is an off-the-shelf technology that offers limited benefit to advancing technology. Type C HEVs do not contribute to technology advancement and the auto companies have a financial incentive to use the technology as a loophole to meet their AT PZEV requirement. The authors recommended not extending the credits for Type C HEV unless they use lithium ion batteries or other advanced energy storage systems not currently in commercial production. (ALA, CCA, CEERT, EIN, FOE, NRDC, UCS,)

ARB received comments requesting that the Board not amend the Type C HEV sunset. (Google, Neff, Trudeau, Vieira)

Agency Response: In the regulation, a Type C HEV is a vehicle with an electric motor with greater than or equal to 10 kW of power output and less than 60 volts for its traction drive system voltage. Type C HEVs are also required to be equipped with an advanced traction energy storage system, such as lithium ion batteries, nickel metal-hydride batteries, or ultracapacitors. Staff believes that Type C hybrids still provide environmental benefits and should remain an option for a manufacturer. Manufacturers need as much flexibility as possible to design vehicles for a variety of applications. Additionally, Type C requires a manufacturer to utilize advanced batteries, which are not “off the shelf.” Not all LVMs have deployed hybrids, so to limit them could be fateful for further hybrid deployment. Additionally, an LVM who makes a larger vehicle as a mild hybrid provides greater greenhouse benefit to California than a small mild hybrid.

215. Comment: CARB should base evaluations on the US06 test cycle, not UDDS, which again favors vehicles “blended” at lower speeds and doesn’t represent “real world” driving. (Clifford, Google, Greer, Hoffner, Medvecky, Pease, PIA, SEVA, Synergy, Vieira)

Add an additional category for even stronger PHEVs. The top category in the staff proposal right now is actually relatively easy to meet. Automakers are already talking about and proposing stronger PHEVs. We suggest that you add

an additional category, make the regulation more forward looking to even stronger PHEVs. The way we would define that is a PHEV that can meet a more stringent test known as the federal US06 test on AER alone. The test which is proposed in the staff report, it's a federal driving cycle test proposed, which is used to value these vehicles and the credits they get. And it's the urban driving cycle test which is a relatively mild test. There's consensus in the technical community that the driving cycle test ready does not represent the way people drive in the real world. And there is a new test that's been adopted by the federal government called the federal US06 test, which is a much more aggressive driving schedule test. And automakers have proposed some PHEVs that can meet the test. In this new category that credit level should bump up to 2.7 or 2.8. (CalETC)

Agency Response: Comment noted. The Board directed staff to create a new Type G advanced componentry allowance or modify the Type F advanced componentry allowance to give credit to those vehicles able to achieve 10 miles AER on the US 06 test cycle. ARB decided to create a new Type G, giving credit for those vehicles able to achieve 10 miles AER on the US06 test cycle, and maintain Type F as proposed by staff in the ISOR.

216. Comment: Strengthen the Enhanced AT PZEV category to require a pure electric range of 25 miles, rather than 10. (Neff, Trudeau)

The criteria for qualifying for Silver+ status should be more rigorous, requiring a 25 mile EAER. (Google, Vieira)

ARB receive requests for PHEVs able to drive a minimum distance of 20 miles on electric only mode to be included in the program. (Johansson, J. Smith)

The proposed Silver+ credit for plug-in hybrids should not be implemented as recommended. It would not be effective in promoting CARB goals. A vehicle that can only run ten miles (at 18 mph) would not provide much in the way of clean air benefits. (Rosen)

Agency Response: ARB believes there is considerable benefit from 10-mile PHEVs and that the minimum should not be set so high as to eliminate incentives for automakers to consider offering more affordable PHEVs for those who drive below the average or cannot afford larger batteries. ARB also believes that workplace charging will be a key element in the electrification of transportation, and is working to incentivize the installation of workplace charging facilities. These 10-mile PHEVs would then be capable of 20 miles of electric commuting each day and would be fully charged well before afternoon power demand begins to peak. It may be unwise to require so much range that significant capability is left unused with many drivers under normal use. ARB believes that 10 miles will be both interesting and cost effective enough for a large number of more-affordable PHEVs to be sold. PHEVs will become commonplace in the next 10

years, and government incentives may only be available during the first several years. After that, PHEVs must show cost-effectiveness in order to sell, and retaining the 10-mile minimum will allow manufacturers to offer a variety of models to suit a variety of price ranges and capabilities.

217. Comment: Under the proposed regulations, the extended range EV would be classified as Type F urban capable PHEV. This classification falls short, both in terms of the environmental benefits that the extended range EV provides and the ZEV technologies that the extended range EV requires. A separate category within Enhanced AT PZEV needs to be established. This could be done by either adding a new Type G or modifying the proposed Type F category. The criteria to qualify for this extended range EV category should be that the vehicle is able to run the high-speed/high load US06 cycle in all-electric mode. (GM)

Agency Response: See response to Comment 215.

218. Comment: The credit for a “blended operation” PHEV should be put on equal footing with an “all-electric range” PHEV. Blended PHEVs may not provide significant all-electric range, but these vehicles achieve the same goals as an AER PHEV, e.g., advancing technology, reducing emissions, diversifying energy usage, and lowering GHG emissions. If the same zero-emission technology is put on a vehicle, one being a large vehicle in a “blended operation” and the other being a small vehicle in an “all-electric range” operating, then the same credit level should be earned. (Ford)

Agency Response: Blended operation PHEVs cannot be put on equal footing with AER type PHEVs because Blended PHEVs cannot deplete their battery packs at the same rates as AER hybrids since some amount of propulsion energy is still provided by gasoline. For example, if a Blended and AER hybrid both have the same battery pack, but it takes the Blended PHEV 40 miles instead of 20 miles to make use of this stored energy, then many drivers are not going to be able to take full advantage of this battery on a daily basis because, on average, they don't drive far enough to fully deplete it.

219. Comment: The EAER floor should be set no higher than 10 miles so as not to overly restrict design choices for PHEVs and to allow automakers to select the optimal balance of cost, utility, charge time and other factors. (Toyota)

Agency Comment: ARB concurs and also believes 10 miles on AER is an appropriate distance for Type F and Type G advanced componentry allowances. Also, see response to Comment 215.

220. Comment: Support for the proposed Type F hybrid. (VW)

Agency Response: ARB appreciates the support for the Type F advanced componentry allowance. The Board adopted the Type F advanced componentry allowance as proposed by staff in CCR, title 13, Section 1962.1.

221. Comment: Hyundai believes that differences in performance between 10kW and 50kW motor output warrant a more refined HEV classification for this range of output for three primary reasons: 1) a higher motor output increases the HEV's ability to operate in a zero emission mode, such as moving a vehicle from a stopped position with the engine off, providing air quality benefits, 2) this change closes the gap between differences in performance capabilities, and 3) a mid-range motor output HEV classification would promote the advancement of technology necessary to commercialize fuel cell and battery EV technologies.

Below is the specific addition to the regulation:

<b>HEV Classifications Beginning MY 09</b>					
<b>HEV</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
Electric Drive System Peak Output	≥10 kW	≥10 kW	≥30 kW	≥50 kW	Zero Emission VMT allowance; ≥10 miles all-electric range
Traction Drive System Voltage	<60 volts	≥60 volts	≥60 volts	≥60 volts	≥60 volts
Traction Drive Boost	Yes	Yes	Yes	Yes	Yes
Regenerative Braking	Yes	Yes	Yes	Yes	Yes
Idle Start/Stop	Yes	Yes	Yes	Yes	Yes

(Hyundai)

Agency Response: ARB made no power-related modifications to the existing HEV Advanced Componentry classifications discussed in this comment other than to delete those that had expired. ARB believes that 10 kW is a reasonable minimum threshold for significant electric drive, and that systems with power levels in between 10 and 50 do not yield sufficient additional technology forcing benefits to consider additional credit. Systems with more than 50kW power are more significant because this power level is sufficient to provide 100 percent electric propulsion power if applied to small ZEVs. These hybrid systems provide further benefits because they reach a threshold where they can share actual engineering, production-related, and volume discount related costs with drive systems installed in ZEVs.

222. Comment: A plug-in hybrid awarded ZEV credits must have demonstrated range on ZEV fuel only of at least 40 miles at highway speeds, capable of being augmented with add-on battery packs for those wishing to convert them to longer-range battery EVs. (D. Korthof)

Agency Response: ARB would like to encourage manufacturers to produce the most commercially viable PHEVs. At this time, ARB does not want to set too stringent standards that limit the commercialization of PHEVs in early years.

PHEVs with EAER or  $R_{cda}$  of 40 miles or greater receive credit in the ZEV regulation. However, ARB still believes there is validity to PHEVs with 10 mile EAER or  $R_{cda}$ . Also, see response to comment 215.

223. Comment: The staff report states Type F HEVs use “10kW” of power, instead of talking about how much all-electric range they have (kWh). The proposal creates a loophole ZEV credit for HEV that cannot run in normal driving without an internal combustion engine (ICE). (D. Korthof)

Agency Response: The staff report does not state PZEVs qualifying for Type F advanced componentry allowance to have an electric drive system peak power output. Rather, PZEVs qualifying for Type F advanced componentry allowance need to complete the UDDS drive cycle on 10 miles AER.

## L. Credit Multipliers

224. Comment: No more multipliers. One freeway-capable ZEV gets one credit since it displaces just one gasoline or diesel vehicle. One per car – not seven or some other multiplied number. (Pohorsky)

Agency Response: ZEV multipliers were included into the regulation to encourage the selling, rather than leasing, of ZEVs to consumers, and for manufacturers to keep ZEVs on the road for longer periods of time. The Board believes both these multipliers are valid through the 2011 MY, and do help to encourage manufacturers to sell their ZEVs and maintain ZEV placements. Additionally, ARB encourages a broad range of vehicle types, especially those with the potential to fully replace gasoline vehicles. Also, see the response to Comment 60.

225. Comment: ARB should establish a Gold to Silver/Silver+ multiplier. This would allow the conversion of Gold credits to Silver/Silver+ credits. To correct the numerical credit disparity, we propose the multiplier should be a minimum of 3.75. (Mitsubishi)

Agency Response: Comment noted. Although, the Board directed staff to consider Mitsubishi’s suggestion in developing the post-Board Hearing modifications upon consideration, ARB did not believe it was necessary to establish a gold-to-silver multiplier. It does not make sense for manufacturers producing ZEVs to receive more credit if they are not using the ZEV credit to meet ZEV obligations. Even the minimum Type 0 ZEV earns 5 times the amount of credit that a PZEV earns. Additionally, IVMs continue to have a basic ZEV requirement, but are given the option to meet the full requirement with credits earned from PZEVs. The regulation does not prevent manufacturers other than LVMs from using their credits earned from ZEVs to meet their requirement. ARB addressed the credit disparity between ZEV and Enhanced AT PZEVs by

changing the multipliers earned by Enhanced AT PZEVs so that they do not exceed the credit earned by gold vehicles.

226. Comment: The 3X multiplier that applies through the 2011 MY should be gradually phased-down for the extended range EV category over the time period 2012 to 2014, for example, using a linear phase-down schedule. (GM)

Ramp down the early introduction credits for PHEVs in the years 2012 and 2013. It will encourage automakers to make PHEVs in larger volumes in early years. It provides an incentive to avoid blackout. (CaIETC)

Agency Response: ARB did not propose to modify the timeline for the early introduction multiplier offered to PZEVs that are off-board charge capable. Therefore, these comments fall outside of the scope of this rulemaking.

227. Comment: Section 1962(f) of the existing ZEV regulations provided an extended service multiplier for specified 1997 to 2003 MY ZEV vehicle types for each full year the vehicle is registered in California beyond the first three years of service. This provision is only applicable thru the 2003 MY because a new provision was introduced in Section 1962(d)(5)(C) for 2004 MY that would provide a 1.25 multiplier up front if a specified ZEV was either sold or leased for three or more years to a motorist who is given the option to purchase or re-lease the vehicle for two years or more at the end of the first lease term. This later provision is easier to account for because the agreements are provided with the initial sales or lease agreement. The effect is that if a specified ZEV is registered in California for five years, it should earn 1.25 times the original credit. Manufacturers introducing a brand new technology may initially want to limit the introduction to a few years until there is more experience and data gathered. However, if the vehicle is performing well and the manufacturer is comfortable extending the initial period to five years, then those vehicles should receive the same credit as if the agreement was made up front. This will still be easier than the accounting for annual extended service credit, because it will only be requested once after five years in service. The existing ZEV regulations should be revised to apply a 1.25 multiplier to a specified ZEV that has been registered in California for five years, even if the agreement to extend the lease was not included in the initial lease agreement. This will encourage manufacturers to keep the new advanced technology vehicles on California's roads longer. (Ford)

Agency Response: ARB believes that ZEV technologies are now approaching a level of durability that no longer require the ZEV Regulation to encourage longer-duration demonstrations, and expects that market forces will now begin to encourage manufacturers to offer ZEVs for sale or lease for longer than three years. If ARB chose to continue to offer extended use multipliers and also expected most or all manufacturer's ZEVs qualified for this multiplier, then the Board would likely have chosen to increase the percentage ZEV requirement to achieve the same ZEV placement volumes.

228. Comment: Early introduction credits for PHEVs should therefore ideally be increased above the staff proposal in the ISOR to accelerate their demonstration and early commercialization. (Toyota)

Agency Response: ARB does not agree that the early introduction multiplier should be increased, but instead modified the multiplier from 3.0 to 1.25. This would provide credit, though less than what would have been given in staff's original proposal, to plug-in electric vehicles produced and delivered for sale during the 2009 to 2011 timeframe while ensuring that pure ZEVs would not be put at a comparative disadvantage. Also, there will be limited potential for an excessive number of banked credits that could result in a blackout during the 2012 to 2014 timeframe, a concern expressed in Comment 225.

#### **M. ZEV Credits and ZEV Types**

229. Comment: Support for the proposed 1.5 battery EV category. (Mitsubishi, VW)

Agency Response: ARB appreciates the support for the addition of Type I.5 ZEVs.

230. Comment: Increase the number of gold credits for fuel cell vehicles to reflect their current high and long term consumer benefits. (Mercedes)

The commenter requested that the Board establish sufficient credits for fuel cell vehicles so that companies are not discouraged from continuing their evolution of the vehicles. The commenter provided many reasons why fuel cell vehicles are valuable. (Honda)

Agency Response: In Resolution 06-18 the Board expressed its desires to provide for more even treatment of battery EVs. The Board's amended credit structure is in line with Resolution 06-18's direction. The Board also added Type V ZEV category, earning seven credits through the 2017 MY. Type V ZEVs have a range 300 or more mile ZEVs with 15-minute fast-refueling capabilities. Overall, the credit structure continues to favor those technologies needing more development. The reduced credit levels for the 2009 and subsequent MYs signify a shift from demonstration ZEVs to more advanced, commercially ready ZEVs.

231. Comment: ZEV credit levels should be increased in 2009 and later, as the ten-fold reduction in credit levels is not justified based on the technology assessment. (GM)

Agency Response: ZEV credit values historically were much higher in light of technology development. The 2008 modified credit structure and values better account for the state of all ZEV technologies.

232. Comment: A valuation problem exists. This is associated with the fact that most major automakers have years of credits going into the future. If credits are abundant, very little value is associated with them. The obvious answer is to increase ZEV credit requirements to a level that allows a credit to have real value, and to decrease the number of credits awarded per vehicle. (ORNL)

Agency Response: The Board increased the minimum floor to 7,500 for ZEVs in the 2012 through 2014 MYs and adopted a reduced value credit structure in the 2008 rulemaking. The Board believes the modified values accurately represent the state of all ZEV technologies.

233. Comment: The stipulation of Type IV hydrogen fuel cell vehicles with 200+ mile range is a mis-characterization of hydrogen fuel cell vehicles. Type IV hydrogen fuel cell vehicles should have 300+ mile range and warrant a minimum factor of ten and not five. (Gronich)

Agency Response: The Board approved proposed Type IV ZEV. But, the Board also added a Type V ZEV, earning seven credits. Type V ZEVs must have a 300-mile or greater range and 15-minute fast refueling capabilities.

234. Comment: We are extremely concerned that CARB's staff proposal, regarding the credit levels, does not support the long term true zero emission vehicles such as hydrogen fuel cell vehicles. The current staff proposal greatly reduces the incentive for a more significant potential breakthrough solution. The new credit structure has the unintended of killing the fuel cell vehicle and hydrogen infrastructure investments. Phase III requirements should recognize very high near-term costs for this path/option, so it should improve the credits/substitution ratios/reduce the number of vehicles appropriately. (Verdugo-Peralta, Wedaa)

While fuel cell vehicles are potentially a very promising longer-term solution, other more conventional alternatives should also be deployed in the near term. This, however, does not mean that CARB should cease its encouragement of such major long term solutions such as hydrogen fuel cell vehicles. Shell sees multiple mobility pathways, and CARB should take the approach of "and" instead of "or". It is simply too early now to choose the winning technology; and therefore we should keep all reasonable options open. To keep such options open, CARB needs to rebalance credits back toward the fuel cell vehicles to better reflect the long term development costs of this breakthrough technology and the intrinsic environmental and energy companies of your sustained long term support and determination. (Shell)

Agency Response: The Board approved a credit structure that promotes technology neutrality and gives the most credit to those vehicles still in early development states. The Board also added Type V ZEVs, which earn seven

credits. These Type V ZEVs must have a 300-mile or greater range and 15-minute fast refueling capabilities.

235. Comment: A plug-in hybrid fuel cell vehicle may be the optimal marriage of technologies in the future. Such a vehicle under the proposed changes would be considered a Type III due to the long battery recharge time. We recommend that this type of architecture be as highly rated as a Type IV fuel cell-only vehicle and be given the same number of credits as the Type IV vehicles. (SCAQMD)

Agency Response: Comment noted. ARB modified the fast refueling requirements to allow those ZEVs utilizing more than one ZEV fuel an option in meeting the fast refueling requirements, dependent on Executive Officer's discretion. The amount of credit earned by this vehicle will be based on its zero emission UDDS range.

236. Comment: There is a ten to one ratio between fuel cell credits and battery EVs. That's insane. Why? (Choquette)

Agency Response: The Board approved a credit structure that gives ZEVs between one and seven credits dependent on range and fast refueling capabilities. The Board also modified the credit structure to include a Type V ZEV, which earns seven credits and can travel 300 miles and has 15-minute fast refueling capabilities. The difference in credit earned from a battery EV and a fuel cell has been reduced.

237. Comment: Do not reduce the number of pure ZEV credits earned. For the year 2009 through 2011, keep the credit earned for Type II the same as for 2008 at ten ZEV credits for each pure ZEV sold. (Tesla)

Agency Response: Past ZEV credit values have been much higher in light of the need to spur technology development. The 2008 rulemaking modified the credit structure and values to better account for the state of all ZEV technologies. Additionally, maintaining or increasing the amount of credit ZEVs receive leads to less ZEVs placed to meet the ZEV requirement in any given timeframe.

## **N. Advanced Demonstration Credits**

238. Comment: Limiting Advanced Technology Demonstration Programs to six vehicles puts a constraint on LVM's that rely on this pathway to place advanced technology vehicles on the road to evaluate the functionality and address vehicle integration issues before launching full durability programs. (Chrysler, Ford, GM, Honda, Nissan, Toyota)

A regulatory limit should not be placed on the number of vehicles included in a demonstration program. (Ford)

It is our understanding that ARB's proposed demonstration program limit applies to six vehicles per year, per program, per state. There are substantial resources needed to support these advanced technology demonstration programs, including identifying a customer and signing a contract, setting up a facility to service the vehicles, setting up a fueling station to fuel the vehicles, and assigning dedicated on site personnel to monitor and service the vehicles. ARB should consider the support system needed for advanced technology demonstration programs. Limiting the credit earned to only six vehicles may discourage a facility to be set up to support such a small fleet. (Ford)

Agency Response: Comment noted. ARB modified the number of vehicles allowed in an advanced demonstration program to 25 per model, per state, per year.

239. Comment: If a PHEV demonstration fleet is able to achieve PZEV emissions standards on these vehicles, it would be appropriate to earn credit for these vehicles under the ZEV regulations. A full durability program for 10 year/150,000 miles has not been conducted on these PHEV demonstration vehicles. Therefore, it is appropriate to earn credit under the advanced technology demonstration program. (Ford)

Agency Response: Comment noted. ARB modified the advanced demonstration program to allow Enhanced AT PZEVs to also be placed in these programs.

240. Comment: It appears that ARB has proposed to eliminate the ability to earn credits for advanced technology demonstration programs after the 2014 MY. It is premature to place a time limit on the ability to earn credit for advanced technology demonstration programs. (Ford)

Agency Response: ARB limited the ability of ZEVs and Enhanced AT PZEVs placed in advanced demonstrations to earn credits in the 2014 MY or earlier, because 2014 MY is mostly likely when commercial ZEVs will be available. Additionally, the redesign of the ZEV program directed by the Board in a future rulemaking will allow ARB to reassess the need for demonstration program credits.

241. Comment: Support for ARB's proposal to require a minimum of 2 years for a demonstration program. (Ford)

Agency Response: ARB appreciates the support the advanced demonstration minimum two year requirement.

## N. Credit Disclosure

242. Comment: General support for ARB's proposal to disclose production information and ZEV credit balances. (ALA, CCA, CEERT, EIN, FOE, Ford, Nissan, NRDC, PCL, Sierra, UCS)

Agency Response: ARB appreciates the support for public disclosure of manufacturers' production data and ZEV credit balances. Staff proposal, along with the Board modification to also disclose all credit trading, was adopted as part of CCR, title 13, section 1962.1, which now provides:

**(I) Public Disclosure.** Records in the Board's possession for the vehicles subject to the requirements of section 1962.1 shall be subject to disclosure as public records as follows:

**(1)** Each manufacturer's annual production data and the corresponding credits per vehicle earned for ZEVs (including ZEV type), Enhanced AT PZEVs, AT PZEVs, and PZEVs for the 2009 and subsequent MYs; and

**(2)** Each manufacturer's annual credit balances for 2010 and subsequent years for:

**(A)** Each type of vehicle: ZEVs (minus NEVs), NEVs, Enhanced AT PZEVs, AT PZEVs, and PZEVs; and

**(B)** Advanced technology demonstration programs; and

**(C)** Transportation systems; and

**(D)** Credits earned under section 1962.1(d)(5)(C), including credits acquired from, or transferred to another party.

243. Comment: The ZEV program data is not open to the public, and the program is full of loopholes, allowing automakers to earn credits for vehicles that do not contribute to the overall goal of the program – more zero-emission vehicles on California's roads. There needs to be an end to loopholes for automakers. (Form Letter # 7)

We ask to mandate full and public disclosure from car companies on how and when they meet ZEV regulations, including credit trading. The Public Records Act requires no less. (Sierra)

The benefits of a trading market are gained only when both buyers and sellers have full information. Allowing trades to be kept confidential facilitates price fixing

and collusion, hampering the efficient functioning of the market and distorting the pollution reduction goals of the ZEV program. Allowing confidential trading also prevents the public from overseeing and ensuring a non-fraudulent market. In order for the State of California to fully implement the ZEV program, it needs to make public all information on credits it currently holds confidential. I urge you to disclose fully all information you have as it relates to emission credits you hold for automakers. (Scholz)

Banked ZEV credits are a matter of public record, not trade secret; the CARB legal department must be reproved for failing to clarify this issue, and upbraided for failing to release the banked ZEV credits. (McDonough)

Include a strong policy on transparency of ZEV compliance and credit trading information to the public. (ALA, CEERT, CCA, EIN)

We need transparency of all the ZEV credit business. (Choquette)

Agency Response: See responses to Comments 242 and 248.

244. Comment: Opening up the ZEV credit information is a necessary step in order to create a marketplace for ZEV credit exchange. A proper marketplace needs regular reporting. Public reporting, at least quarterly, should be required. Reporting should be by vehicle brand and model. Both ZEV credits and the number of vehicles should be included in the public disclosure. (Green)

Agency Response: See response to Comment 242. The Board determined that annual reporting would be the appropriate period as annual reporting is the requirement for other manufacturer credit reporting. See for example credit reporting under CCR, title 13, section 1961 for passenger cars and other vehicles in the LEV II program.

245. Comment: The citizens of California should be given an accounting of the effectiveness of this program: the actual number and type of vehicles still on the road. (Rosen)

Agency Response: See the responses to Comments 17 and 242.

246. Comment: The disclosure requirements are unclear and appear too limited. The ISOR appears to exclude from public disclosure detailed information relating to demonstration programs, transportation systems, and credit trading by automakers. Will credit balances be listed by manufacturer or generically? (ALA, CCA, CEERT, EIN, FOE, NRDC, PCL, Sierra, UCS)

Agency Response: See the response to Comment 242.

247. Comment: We request the following compliance data be made publicly available: 1) any document provided to CARB to demonstrate compliance with the program, including but not limited to automobile sale, emission information, or credit trading data, shall be publicly available, and 2) any document created, or action taken by CARB to confirm compliance, award credit, or recognize a transfer of credit, shall be publicly available, including tools for calculating and verifying such regulatory compliance. (ALA, CCA, CEERT, EIN, FOE, NRDC, PCL, Sierra, UCS)

Agency Response: See responses to Comments 242 and 248.

248. Comment: Credit trading information is not trade secret and should be made public. The commenter provided the following reasons:

A. ZEV Credits Are Records of Compliance, Not Trade Secrets

In order to demonstrate compliance with ZEV requirements, an automaker must submit annual vehicle production data to CARB. After review of such data, CARB's Executive Officer issues credits based on the information submitted. (13 CCR §1962.1(g)(5)(D)) These government issued ZEV credits are no more a trade secret than are a county's record of issuing a building permit, or self monitoring reports filed with the Regional Water Quality Control Boards. The act of purchasing ZEV credits from other automakers does not create a trade secret where none existed before.

B. Limited Nature of Trade Secret Exemption

The trade secret exemption of the Public Records Act provides only limited relief from the broad constitutional principle that the public is entitled to understand what its government is doing and to participate fully in that process. (All laws furthering the right of public access shall be "broadly construed and all exemptions "narrowly construed." Cal. Const. Article 1, Section 3(b).

C. Credit Trading Information Does Not Meet the Requirements of A Trade Secret.

The fundamental purpose of the trade secret exemption is to protect a company's investment of time and resources in developing, producing or selling a product, a formula, or a compilation of information. A trade secret is "any formula, plan, pattern, process, tool, mechanism, compound procedure, production data, or compilation of information which is not patented, which is known only to certain individuals within a commercial concern, who are using it to fabricate, produce, or compound an article of trade or service having commercial value and which gives its user an opportunity to obtain a business advantage over competitors who do not know it or use it. *Gov. Code §6254.7(d)*. In order for a piece of information to be kept from the public under this limited exception, each of the state elements must be met. Meeting one element – for instance claiming that a business advantage occurs when information is kept secret – is insufficient to keep such information from the public. Critical elements of section 6254.7(d) are not met in

the case of ZEV credit trading information. First, credit information is known to many individuals outside a commercial concern. Credits are created and issued by CARB, a public agency; by definition, they are known by persons outside a company. (Footnote: This is distinct from the scenario where trade secret information is created by a regulated entity and then submitted to an agency. In that instance, the secrecy element is retained. In contrast, when a public agency creates information at issue, there is no secrecy to maintain. By definition, such information is not “known only to individuals within a commercial concern.”) The mere act of trading those credits does not transform public compliance data into secret information. Second, credit trading information is not used “to fabricate, produce, or compound an article of trade or a service having commercial value.” Product plans, engineering details, and customer lists are the types of information that automakers use to produce and sell automobiles and would properly be the subject of trade secret protection. In contrast, credit trading information is not used in automakers’ production or sales. Rather, it is used to assure that a company is complying with the law. This does not meet the test of trade secret.

#### D. Trade Secret Protection Should Not Be Turned Into a Catch-All Exemption for Preventing Public Review.

There has been an increasing tendency for companies to try to use the trade secret exemption for anything related to conducting their business. The trade secret exemption, however, is not so encompassing. To extend trade secret protection to all compliance actions by a business, as the December 3, 2007 Report to the Office of Legal Affairs (OLA) does, not only does it go beyond the clear definition of trade secret, but it subverts the very purpose of the Public Records Act, which is to bring sunlight to government regulatory actions. The OLA’s argument, which appears to be that anything a company does to “assure they are complying” with the law and that provides a “business advantage,” if accepted, would work a massive expansion of the trade secret exemption. Pursuant to this logic, regulated industry could claim that everything they do to comply with the law is trade secret. As just one example, regulated industry could argue that submission of required monitoring data revealing violations of the law should be considered a trade secret because public disclosure could subject a company to hundreds of thousands of dollars in penalties. Keeping such data secret would provide a company a significant financial advantage. Similarly, divulging spills or information about contaminated lands could also be argued to be a competitive disadvantage. Such an attempted extension of trade secret law, in fact, has already begun. In a recent lawsuit, Union Pacific Railroad claimed that wetlands on their property constituted a trade secret that should bar citizen enforcers’ request to inspect their land. The railroad’s stated rationale was that allowing the public to know where wetlands were located could delay the development of their property and cost them significant money. The OLA’s compliance-related theory of business activity does not fit within the elements of a trade secret and would open up an enormous loophole in trade secret law.

#### E. Public Interest in Full Disclosure

Automakers have come to CARB asking for a reduction in the number of zero emission vehicles they have to produce. They would certainly like to keep the public uninformed and unable to effectively participate in this process and, to a large extent, have been successful in doing so. This type of gaming should not be allowed in the future. The ZEV program helps ensure clean air, a resource that is vital to the public. The public, therefore, has a vital stake in ensuring this regulation remains as strong as possible and is adequately enforced. There are many points at which enforcement of the ZEV law can go wrong, from incorrect information supplied by automakers, to errors in calculations, or lack of enforcement due to inadvertence, lack of resources, or lack of will. Public oversight and participation helps ensure the proper functioning of the system and therefore helps ensure clean air and reduced emissions. Absent public accountability, trading systems can go badly wrong and have done so in the past. RECLAIM's Rule 1610 program is a good example. That trading system was kept confidential and was plagued by under reporting of emissions, over reporting of emissions reductions, and outright fraud. Public participation helps curb those tendencies. When the regulated community knows that the public has access to compliance data, such as ZEV credits and the sales data on which they are based, it has an incentive to produce accurate information. Similarly, transparency around credit trading may discourage large automakers from trading with low cost, low technology providers. Further, the public should be apprised of the entities from which automakers are buying credits so that responsibility is clear in instances where such technology creates problems or where trading subverts the intent of the regulations such as occurred with NEVs in the early 2000s. If the public does not receive the full array of information on which compliance decisions are made, it cannot fully participate in the regulatory process. This participation has for decades been recognized as important in a functioning democracy. We ask that the Board require that all ZEV compliance data be made fully accessible to the public. (FOE)

Agency Response: The auto manufacturers had earlier claimed that their annual reports and other documents relating to ZEV production and credits were protected from disclosure under the California Public Records Act as trade secrets. On December 3, 2007, ARB Office of Legal Affairs (OLA) issued a legal opinion discussing whether ZEV credit data is entitled to confidentiality protection under California law. This opinion has been withdrawn because it does not represent the current position of OLA. The current position of OLA is as follows.

Historical ZEV credit data (i.e., data generated before the adoption of the 2008 rulemaking) is entitled to confidentiality protection under California law and will not be disclosed because ARB staff represented to motor vehicle manufacturers that credit data would be treated as confidential under the California Public Records Act. The manufacturers relied on these representations in making business decisions, and the disclosure of the historic data now could harm their competitive positions vis à vis other manufacturers. Under these circumstances

it would be inequitable to disclose the historic data and, therefore, ARB will not do so.

The same considerations do not apply for ZEV production and credit data “going forward.” Section 1962.1(l) specifies the categories of information that the Board will disclose to the public. The manufacturers now have no expectation of confidentiality for the production data and corresponding credits specified in the regulation. It would not now be reasonable for the manufacturers to rely on an expectation of confidentiality in making business decisions.

## **O. Miscellaneous**

249. Comment: Are alternate path car makers required to take the New Path? If they are, there is no reason to amend the 25,000 to 2,500 since no one will be on the alternate path in 2012 to 2014. (Green)

Agency Response: All manufacturers in the 2012 MY and beyond will be under the New Path that is, required to produce the same amount of pure ZEVs for compliance. There shall be no Alternative Path beyond the 2011 MY.

250. Comment: ARB’s proposal did not appropriately handle the elimination of the LFCE allowance. In an effort to simplify the regulation, ARB incorporated the PHEV LFCE allowance into the advanced componentry allowing for a Type F hybrid, which is set at 0.85. ARB did not make a similar adjustment for a Type E hybrid. Therefore, a “blended operation” Type E PHEV gets no credit for using low fuel cycle emissions energy from the grid. The purpose of the LFCE allowance was to account for the low fuel cycle energy from the grid, which is similar to the purpose of the Zero Emission VMT allowance, which accounts for the equivalent all-electric range delivered from the low fuel cycle energy from the grid. Thus, the LFCE allowance of 0.15 should be incorporated into the Zero-Emission VMT allowance, rather than the Type F advanced componentry Allowance. The Type F advanced componentry allowance could be reduced such that the effective total PHEV credit would be the same as ARB’s proposed total credit. (Ford)

Agency Response: ARB made its best effort to simplify the regulation when possible. ARB considered the proposal to incorporate the LFCE allowance into the VMT allowance alone, but chose instead to increase credit for both VMT and advanced componentry. The net result is a substantial increase – as much as a 2X the former value for Type E blended hybrids. ARB believes that Type F and G hybrids will offer significant additional reduction in carbon-fuel use due to their higher power capability because they will avoid engine starts altogether with very short trips, and that the proposed allowances reflect this significant environmental benefit.

251. Comment: The elimination of the fuel-fired heater provision may lead to a program that cannot be adopted for other states. Climates in the Northeast can be very cold. Because battery EVs are an option to meet the ZEV regulations, and because the “travel provision” is eliminated for battery EVs in the 2014 MY, it is important to consider the climatic conditions in these states before eliminating the fuel-fired heater provisions. To the extent that ARB wants these rules to be workable elsewhere, ARB should retain the fuel-fired heater provisions in the existing regulations. (Ford)

Agency Response: Alternatives to fuel-fired heaters for colder climates are available. For example, grid electricity may be used to maintain battery temperature or to pre-heat a vehicle while it is still on-tether. This is already done in a similar manner with engine block heaters in the coldest parts of the United States. ARB eliminated the fuel-fired heater provision because current demonstration ZEVs, particularly fuel cell vehicles, do not utilize a fuel-fired heater and it promotes better air quality.

252. Comment: Expanding the use of zero emission technology into different applications helps in the commercialization of the technology. Therefore the existing regulation on specialty ZEVs should be retained. (Ford)

Agency Response: The ZEV regulation continues to encourage broad application of ZEV technology by giving credits to medium duty ZEVs, although this category is not in calculating the manufacturer’s obligations. The addition of an intermediate range ZEV category also helps to encourage commercialization of some former “specialty” EVs by providing them with additional credit than they would have received prior to the 2008 rulemaking.

253. Comment: Toyota strongly supports the staff’s proposal to extend the availability of transportation system credits, but also to continue to include other advanced technologies in the “mix” beyond ZEVs alone. These integrated systems could also serve as an excellent avenue for other ZEV technologies, particularly PHEVs. (Toyota)

Agency Response: ARB appreciates the support for the extension of transportation system credits. ARB also made modifications that allow Enhanced AT PZEVs to earn credit in transportation system programs.

254. Comment: The ZEV regulations account for credit in g/mi NMOG. Because PC/LDT1s and LDT2s have a different fleet average, a different g/mi NMOG credit should be earned for a PC/LDT1 versus an LDT2. If a manufacturer introduces an LDT2 that qualifies for ZEV credit, that vehicle should earn credit based on the LDT2 fleet average NMOG regardless of where it is before or after 2009 MY. (Ford)

Agency Response: ARB promotes vehicles up to 8,500 gross vehicle weight (GVW) meeting a single NMOG emission standard. ARB believes the above-suggested change is not in line with this direction. For the purposes of the ZEV regulation, it is appropriate for a single NMOG average to be used in determining a manufacturer's credit earned.

### ***Part III. Regulatory Impact Comments***

Comments grouped in this section refer to the impacts of Staff's suggested modifications to the ZEV regulation.

#### **A. Economic Impacts**

255. Comment: The citation and reference to the EPRI research report entitled "Comparing the Benefits and Impacts of Hybrid Electric Options for Compact Sedan and Sport Utility Vehicles" should be deleted from the analysis contained in the ISOR. The numbers presented in the ISOR do not line up with EPRI report, nor do the referenced parameters (production year, annual volume or vehicle class). (EPRI)

Agency Response: The estimates for hybrid costs found in Table 6.1 were not intended to be consistent with the EPRI report due to differences in production volume and timing. Rather, the EPRI report was used to better understand the technical and cost issues surrounding hybridization of motor vehicles. Staff realized that the volumes identified in the EPRI report were for a higher production volume than required by the proposed regulatory changes but used those estimates as a starting point for estimating lower volumes. As indicated in the staff report, projecting future costs for new vehicle types and technologies is subject to great uncertainty. Using the EPRI report allowed staff to make more informed projections.

256. Comment: The staff recommendation is disturbing since in essence, not only would it substantially weaken the ZEV program, but it will also bestow a financial windfall on rich foreign automakers and domestic giants while at once penalizing a California based ZEV manufacturer. This untenable proposition is not only illogical but in fact contravenes both the letter and the spirit of the State's own code (sections 11346.3 and 11346.5 of the Government Code). (Tavill, Tesla)

Agency Response: The Board agreed with the commenter and directed the staff to modify the minimum floor for zero emission vehicle production from 2,500 vehicles to 7,500 vehicles.

257. Comment: The economic analysis described in the staff report does not appear to address the economic concerns of vehicle owners. A dual power train (both battery and ICE) will require somewhat more maintenance and thus more

expense for myself. While economic effects on business are important, the fact remains that business exists only to meet customers' needs. (Strand)

Agency Response: Overall, ARB believes vehicle maintenance costs will decrease, because electric drive trains have less moving parts than ICEs. Also, see response to Comment 258.

258. Comment: ICEs require various toxic substances such as lubricating oil, so reduction in their sale and use will reduce the widespread distribution and pollution due to these substances. This consideration should be included in the economic analysis, even though much of the pollution thus produced isn't air pollution. (Strand)

Agency Response: Both under the regulations before the 2008 rulemaking and under the 2008 rulemaking amendments to the ZEV program the production numbers for ZEVs are in the phase-in period to commercialization. Under the 2008 rulemaking the Board's amendments would replace 7,500 vehicles, rather than 25,000 vehicles with internal combustion engines, with ZEVs. The impact of this change is not significant when compared with the annual sales of over 1.8 million vehicles in California and the current California fleet of approximately 20 millions vehicles, the vast majority of which are ICE vehicles.

259. Comment: EVs do not pay any transportation infrastructure taxes, which means they wear out our roads without paying their fair share of construction and maintenance costs. (Harralson)

Agency Response: While EVs do not use gasoline and therefore, do not pay state and federal gasoline taxes that contribute to highway and road maintenance, EVs will pay annual California vehicle registration and licensing fees, a portion of which goes to highway and road maintenance

260. Comment: Citing 2003 battery cost estimates and projected 2012 to 2014 fuel cell costs to determine the incremental cost of each technology paints an inaccurate economic scenario that biases the reader against plug-in vehicles. (Clifford, Greer, Hoffner, Medvecky, Pease, PIA, RAN, SEVA, Synergy)

Agency Response: See response to Comment 255.

261. Comment: Manufacturers are facing severe challenges due to the economy and cannot afford to lose anything approaching \$25,000 per vehicle for such a large quantity of vehicles. [PHEVs] These costs cannot be spread over all the vehicles we sell because those vehicles would no longer be competitive with similar market entries offered by small and intermediate manufacturers not subject to the ZEV mandate. (Ford)

Agency Response: ARB does not agree with the claim of \$25,000 additional cost per vehicle in large quantities, and this cost is also inconsistent with product plans for other automotive manufacturers indicating plans to break even or profit as they transition to large quantities of PHEVs. Manufacturers are not required to produce PHEVs; rather it is one production option under the ZEV regulation to meet the ZEV requirement.

262. Comment: Since CARB's proposal significantly reduces the number of pure ZEVs required, automaker costs of compliance are reduced. CARB should require that these savings are put back into vehicle technologies, such as plug-in hybrids. (ALA, CEERT, CCA, EIN, FOE, NRDC, Sierra, UCS)

Recapture the \$6 billion investment that was planned for fuel cell vehicles. (ALA, CEERT, CCA, EIN)

Agency Response: The ISOR shows the incremental cost of staff's proposed changes over the existing requirement. These costs do not account for the entire cost of the program. The ZEV program will continue to require large investments from manufacturers.

263. Comment: Reducing the Phase III Gold Floor from 25,000 to 2,500 vehicles would eliminate \$163 million from potential hydrogen infrastructure suppliers, and \$68 million of revenue from potential fuel cell stack and hydrogen storage suppliers. The proposal also reduces the investment in battery suppliers during Phase III by a factor of \$10 to \$15 million. (ALA, CCA, CEERT, EIN, FOE, NRDC, UCS)

Agency Response: Comment noted. The Board set the minimum production number of ZEVs at 7,500, rather than 25,000 as ARB staff had proposed. The increased minimum production number is anticipated to sustain demand at a commensurably increased level for ZEV component and infrastructure suppliers.

264. Comment: Look at the total life cycle cost when evaluating battery EVs. (SEVA)

Agency Response: Comment noted. At this time, life cycle costs for a production battery EV are not available. In developing the ISOR economic analysis, ARB used information available, meaning pre-commercial production estimates. As information becomes available in future rulemakings, ARB will work to use life cycle costs in this analysis.

## **B. Environmental Impacts**

265. Comment: As an IVM in 2012, 60 percent of our volume sold in California would be PZEV vehicles. As a large volume manufacturer our combined PZEV and AT PZEV percentage would drop to less than 40 percent in 2012. Thus the change in BMW's manufacturer status would have the effect of increasing its average

fleet emissions, counting added evaporative and NOx exhaust emissions.  
(BMW)

Volkswagen is far cleaner than the NMOG fleet average currently required in California's LEV regulations. As a large manufacturer, the required volume for PZEV vehicles drops to 30 percent of the California fleet, a significant reduction in clean and affordable vehicles. (VW)

Agency Response: While becoming an LVM would reduce the number of PZEVs required from a manufacturer, the manufacturer would start producing ZEVs, which are the focus of this ZEV regulation. Additionally, in the 2012 through 2014 MYs, 88 percent of a manufacturer's vehicles will continue to meet the average fleet emissions or NMOG requirements under ARB regulations (see California Code of Regulations, title 13, section 1961). The total ZEV requirement in the 2012 through 2014 MYs is 12 percent. Within the 12 percent, the LVM may choose to produce between 12 and 0.79 percent ZEVs, with other credited vehicles backfilling production if less than 12 percent ZEV production is the option. For further details, see section 1962.1(b)(2)(D)3.

266. Comment: You are not going to make an impact on air quality with a few hundred cars – you need thousands. (Pohorsky)

The CARB Staff Report: Initial Statement of Reasons for the 2008 Proposed Amendments to the ZEV Program will not produce enough progress in reducing criteria pollutants and GHGs. The staff proposal by 2017 would eliminate only one-fifth of the smog-forming emissions from tailpipes that doom thousands of people to lung disease and death. We can and should do better. The proposal would eliminate an average of only 291,000 tons/year of GHGs through 2017 compared with today. California needs more than 200 times that amount of progress to meet its 2020 goals for GHG reductions from vehicle emissions.  
(Sierra)

It is not acceptable to make the ZEV Program so lenient that four-fifths of the amount of smog-forming emissions produced by today's cars will still be allowed in 2017, especially when the technology for ZEV commercialization is ready.  
(Sierra)

We need more than 200 times the average of only 291,000 tons/year by 2017 that would be eliminated by the proposed change in the ZEV program. (Seal)

The proposed amendments weaken our State's ability to end our dependence on oil which poses a threat to our national, environmental, and economic security.  
(AJC)

Agency Response: Comments noted. The Board views greater emissions benefits from the ZEV regulation being realized in the long term. The 2008

modifications increase emissions benefit, as noted in the ISOR on pages 37 and 38, while accounting for the current state of ZEV technology. ZEV commercialization will be hampered if manufacturers are required to produce a technology before it had proven reliability and durability. The Board made modifications necessary for the near term, in order to phase-in and ensure ZEV commercialization in future years. Also, as vehicle technologies mature in the ZEV program, the technologies are likely to be pulled in the LEV program, setting new fleet standards and giving California the greatest emission benefits.

267. Comment: Continue to push for ZEVs in an effort to reduce GHG enmissions [sic], and reduce fuel consumption. (Baragona)

EVs and PHEVs have the potential to significantly reduce our CO2 emission footprint from the transportation sector which is currently responsible for 42 percent of California's emissions. EVs and PHEVs have the additional benefit of reducing the trade deficit. (CalCars)

I support an agenda to reduce GHG emissions in order for us and our future generations at least the same (if not better) quality of life in the future. The most promising way to reach this goal is to give consumers the choice to buy ZEVs or PHEVs. (Chaudhary)

The ZEV regulation is a down payment to meeting 2020 and 2050 AB 32 goals. (Friedland)

Reducing our dependence on petroleum [sic] products by use of renewable sources would help with a variety of problems that are facing the United States. (Holroyd)

We need to look at our Pavley goals for 2050 which calls for rather dramatic reductions in GHG. (Killian)

Please make the greatest effort to reduce GHG emissions by requiring more electric cars and/or any ZEVs to be manufactured by automakers. (Love)

The haunting trajectory of GHG emissions and the current impact of petroleum addiction on our pocketbooks and politics demands for ZEVs for others clamoring for choice. (SFEVA)

Agency Response: ARB agrees with these comments. ARB sees the ZEV regulation aids in achieving the Board's long term environmental goals. However, at this time, the ZEV regulation is not a GHG emission reduction program.

268. Comment: Even 25,000 seems like too low of a number to really push the auto industry to do their part to improve air quality and reduce CO2 emissions. (Saxton)

Agency Response: Comment noted. See responses to Comments 8 and 267.

269. Comment: This is a critical time for California to focus on strengthening the ZEV program, not weakening it. It is especially important, given the EPA's denial of the California Clean Cars (AB1493 – Pavley) waiver and the critical need for additional pollution emission reductions to meet SIP goals. (ALA, CEERT, CCA, EIN)

Agency Response: Comment noted. ARB sees the ZEV program as being vital in meeting all of the Board long term environmental goals. California will experience an emission benefit from the 2008 rulemaking, due to the inclusion of Enhanced AT PZEVs. However, at this time, the ZEV regulation is not a GHG emission reduction program.

270. Comment: The commenter gave specific recommendations on important actions for the prevention of global warming. (Cree)

The commenter spoke about the potential of solar-charged EVs and its potential to reduce CO2 emissions. The commenter supported their claims with charts and graphs explaining in detail the relationship between solar charged EVs and AB 32. (ASES)

Agency Response: Comment noted. ARB appreciates the suggestions in meeting its other program goals, but these comments are outside of the scope of the 2008 rulemaking for ZEVs.

271. Comment: The Enhanced AT PZEVs for ZEV trade-off does not go far enough to make up for the foregone zero-emission vehicles simply because the South Coast Air Basin needs emission reductions now, not over a 150,000 mile vehicle lifetime. (SCAQMD)

Agency Response: Comment noted. See responses to Comments 8 and 265.

272. Comment: The ZEV mandate is a critical piece of dealing with smog and oil addiction. (W. Korthof)

Agency Response: ARB concurs with this comment. The Board believes the ZEV mandate is essential to meeting ARB's near term and long term environmental goals.

273. Comment: In the section of the ISOR labeled "Effect of Proposed Amendments," it states, "the ZEV program continues to provide positive air quality impacts as

compared to no program.” Is this really a standard against which the program should be compared? Is better than nothing really what we as Californians expect from our government and ourselves? (Tramiel)

Agency Response: The ZEV program acts as an incubator for new technologies that will later be moved into fleet-wide emission average programs such as the LEV and Pavley programs. It is in these programs that commercially viable ZEVs and Enhanced AT PZEVs will have the greatest emission benefit in California. Vehicles currently in the ZEV program continue to need development before reaching commercialization levels of production, meaning the volumes are much less and the near term emission benefits from the program are minimal. The ISOR (page 37) environmental impacts are determined for 2020 and 2030, assuming success of the ZEV program, using ARB’s mobile emissions inventory modeling program (EMFAC). The ISOR (page 38) shows the benefits realized from the 2008 rulemaking. Compared to the preexisting ZEV regulations, the Board expects that the amendments will result in a net lifetime emissions benefit of approximately 5,000 tons reactive organic gases plus oxides of nitrogen (ROG + NOx). This emission benefit is due to Enhanced AT PZEVs being included as an option for manufacturers to produce. Compared to having no ZEV program, the amendments are expected to reduce approximately 14 and 15.5 tons per day of ROG + NOx in 2020 and 2030, respectively, in the South Coast Air Basin.

274. Comment: The commenter mentioned a report detailing the relation between a successful ZEV regulation in California and public health. The mentioned report detailed a full fuel cycle emission benefit analysis and benefit to society analysis of converting California’s existing motor vehicle fleet to pure ZEVs. The commenter went on to explain that the report also detailed the emission benefits and benefits to society of an increased number of PHEVs on the road. (ALA)

Agency Response: The report mentioned by the commenter was not submitted to the Board during the 45-day comment period. Neither staff nor the Board proposed converting California’s fleet to 100 percent ZEVs. The amendments adjust the number of ZEVs introduced in the near term and allow manufacturers greater flexibility in complying with the ZEV requirements. The amendments do, however, provide an emission benefit, as mentioned in the response to Comment 273. The ISOR also explained the environmental benefits of the amendments on pages 37 and 38.

### **C. Impacts to Small Businesses**

275. Comment: The staff proposals enacted will have a severe negative impact on Tesla, the only car maker based in California, since having the ability to sell the accumulated ZEV rights mitigates in part some of the large costs incurred by the company in the development of a pure ZEV car. (Tavill, Tesla)

Allow homegrown companies like Tesla to flourish under the ZEV program.  
(Olenski)

Agency Response: The 2008 modifications do not impose any hindrance to small volume manufacturers, such as Tesla. By being a manufacturer not mandated to produce and sell ZEVs, small volume manufacturers may produce ZEVs and sell earned credits to other manufacturers needing to comply with the ZEV requirements.

## **COMMENTS PRESENTED DURING THE FIRST POST-BOARD HEARING COMMENT PERIOD**

### ***Part IV. Non-Specific Regulatory Comments***

Comments grouped in this section generally responded to the modifications made available July 25 through August 15, 2008; the comments do not specifically address the ZEV regulation. Other comments in this section refer to parts of the regulation which were not modified in this rulemaking.

#### **A. General Support**

1. Comment: General support for the proposed 15-day modifications.  
(NESCAUM)

Agency Response: ARB appreciates the support for the post-Board Hearing modifications.

#### **B. General Opposition**

2. Comment: This regulation will not meet the goal of the CARB. (Bohanon)

Agency Response: ARB does not agree with this comment. The post-Board Hearing modifications will continue the ZEV regulation toward meeting CARB's environmental goals and further ZEVs toward commercialization.

3. Comment: ARB received requests to not amend the ZEV regulation.  
(Kulongoski)

Agency Response: Overall, the Board's modifications to the ZEV regulation strengthen the program and will help with the successful commercialization of ZEVs. The Panel concluded that fuel cell and battery technology was not ready for the requirements in the 2012 through 2014 timeframe. The Board's amendments maintain pressure on the auto manufacturers to continue in their R&D, without requiring mass commercialization before the technology is ready.

4. Comment: ARB received comments in opposition to the Board's actions, insisting these actions weakened the mandate. (Davies, D. Korthof, Power, Trudeau)

Agency Response: ARB does not agree with this statement. The Board's modifications strengthen the ZEV regulation, mandating a realistic yet stringent pure ZEV requirement, and limit provisions in the ZEV regulation that have historically lead to large banking of credits. In particular, the LVMs' banked credits are limited to use for requirements that may be met with credits from Enhanced AT PZEVs, AT PZEVs, and PZEVs. See section 1962.1(g)(6)(B).

5. Comment: Waiting until 2015 and requiring very few vehicles on the road will not accomplish what we need and that will only serve to reduce the long term effectiveness of CARB and hurt the State of California. (PIA)

Agency Response: Comment noted. However, requiring too many ZEVs, not currently ready for commercialization could also lead to market failure. The Board's modification to the pure number of ZEVs required in the near term, increasing the ZEV floor to 7,500 pure ZEVs in the 2012 through 2014 MYs, maintains pressure on OEMs to produce a larger number of ZEVs, while taking into account the current state and cost of battery EV and fuel cell technology.

### **C. General Requests to the Board**

6. Comment: ARB received comments requesting that the Board do the right thing, do something, force automakers to produce ZEVs, continue with a strong ZEV program or strengthen the ZEV requirements, pass ZEV regulations, make ZEVs and Enhanced AT PZEVs easy to obtain. (Connor, Cox, Davies, Elliott, Faulkner, Foster, Gillock, Glatman, Jan, Marion, McCurdy, Munson, Nater, Orndorff, Pritt, Tesla, J. Webster, L. Webster, Yoney)

Agency Response: As a result of the ZEV program, over 4,000 battery electric and fuel cell vehicles have traveled California's roads over the past 15 years. The Board's most recent amendments to the ZEV regulation will continue to stimulate the development and production of ZEVs.

7. Comment: ARB received several comments in support of ZEVs, of the commenter's individual experiences with ZEVs or desires to own ZEVs. (Elliott, Foster, Kulongoski, Rahm, Roche)

Agency Response: The Board's 2008 rulemaking supports ZEV development and commercialization while taking into account technology feasibility and cost.

8. Comment: ARB received several comments insisting that ZEVs, particularly battery EV technology is ready today. (D. Korthof, Kulongoski, Orndorff, J. Webster, L. Webster)

Agency Response: While many ZEV types have demonstrated technological feasibility, the ZEV regulation must also consider the cost effectiveness of these vehicles. Much was learned from these early-introduction battery EVs, and the next generation will benefit greatly from the resulting improvements so that cost-effective battery EVs are now expected to be produced in the very near future. ARB agrees that battery EVs are ready for limited production and is assuming that most ZEVs to be built to comply with the regulation in the next decade may be battery EVs. However, ARB recognizes that battery EVs still face considerable engineering, charging infrastructure, and marketability challenges, and that they cannot be expected to demonstrate the same degree of sales growth as PHEVs will in the 2014 and beyond timeframe. Even if battery EVs do not become a dominant vehicle technology, they are still expected to play a key role in California's future, and ARB will continue to encourage their deployment in every way possible.

9. Comment: ARB received comments urging the Board to not water down the current mandates. (Roche, Swennes)

Agency Response: Overall, the Board's actions strengthen the ZEV program. The Board's modifications increased to 7,500 – the number of pure ZEVs required in the 2012 to 2014 MYs. The 2008 modifications provide for more equal treatment of battery EVs, create new ZEV types that recognize improvements in battery EV and fuel cell vehicle technology, include provisions to ensure the placement of the most technologically advanced NEVs and limit historical and future banking of NEV credits, and include a travel provision which ensure section 177 states the most commercially available vehicles in the ZEV program, AT PZEVs and PZEVs.

10. Comment: CARB needs to apply the rule fairly. Without such a provision, I believe this proposed rule is unfairly singling out PZEVs. (Jungreis)

Agency Response: ARB believes the 2008 rulemaking as modified continues to allow manufacturers to fulfill their ZEV requirement with ZEVs, AT PZEVs, and PZEVs.

11. Comment: To end this program in 2008 is to forfeit the future of our children. (Gillock)

Agency Response: For simplicity, ARB broke the regulations into two separate sections: a regulation (section 1962) applying to the 2005 through 2008 MYs, and a regulation (Section 1962.1) applying to the 2009 and subsequent MYs. ARB has no intention of ending the regulation in the 2008 MY.

12. Comment: Opposition to the lack of expediency in this subject. (Glatman)

Regulations ought to be put into effect as soon as possible, without delay.  
(Rahm)

Agency Response: ARB must complete the full rulemaking process, and has up to one year from the release date of the ISOR to file the final rulemaking package with the Office of Administrative Law (OAL). ARB will work to complete this process as soon as possible.

13. Comment: As a consumer, I want to have the choice to use cleaner, cheaper, domestic electricity to power my car. It is time for CARB to do everything in its power to advance plug-in cars, including plug-in hybrids and all-electric battery cars. Grid-connected cars can make an extraordinary contribution to reducing toxic and GHG emissions and lowering our dependence on petroleum. The ZEV mandate has already proven the technological and economic viability of all-electric cars. CARB should do everything possible to expedite and facilitate the availability of electric cars and plug-in hybrids. (Form Letter #9)

Agency Response: The 2008 modifications allow manufacturers to produce Enhanced AT PZEVs, including PHEVs, to meet their ZEV requirement in complying with the regulation in the 2012 MY and beyond. ARB concurs that these vehicles are important in meeting ARB's long term environmental goals and has provided for additional credit for their use in 2012 and later MYs when used in transportation systems. See section 1962.1(g)(5)(B).

14. Comment: Please stop passing onerous and unnecessary regulations on electric cars. Make it easy for manufacturers to get them on the roads. (Glener)

Agency Response: No response is necessary as this comment does not address the modifications to the regulations.

15. Comment: Do not allow another electric car to be killed. (J. Webster, L. Webster)

Agency Response: No response is necessary as this comment does not address the modifications to the regulations.

16. Comment: What is sorely needed is for CARB to change tack completely. It needs to simply assure that citizens are given every option available, and then let the free market work its magic. More specifically, it needs to forget about percentages (like before) or numbers and different colors of "credits" (like now). The ZEV mandate should simply require that, by 2012, the franchised dealers of all the major auto manufacturers licensed in California ...must comply with these stipulations: They must have a ZEV vehicle in their showrooms, and at least two more on the lot for customers to test drive at any time, ...capable of a top speed of no less than 80 mph, ...emissions-free range of no less than 100 miles, must meet federal safety standards, ...must cost no more than 125 percent of the

average base price of all the models in the same “class” sold by the parent company in the previous year. (Larsen)

Agency Response: ARB is constrained by law to consider the costs of the technologies it is requiring, and while many ZEV technologies are now technically feasible and can be seen in demonstration programs, our research had not yet indicated that ZEV technology can be implemented in the 2012 timeframe with a cost increase over conventional vehicles of only 25 percent. The least expensive and most feasible near-term ZEV technology, the battery EV, will likely exceed the proposed 125 percent cost limit even with a driving range of only 50 to 75 miles. Additionally, ARB does not believe that demanding a minimum of 100 miles of emission-free range is necessary for commuters who have more modest driving requirements and who cannot afford to purchase the additional battery required for a 100-mile range that they might seldom make use of. ARB believes that the current percent requirements will bring modest numbers of ZEVs and ZEV technology vehicles to market, and that once consumers are exposed to them, that market demand will be a key ingredient in driving towards higher volume sales.

#### **D. Fuel Cell Technology**

17. Comment: ARB received comments in general opposition to hydrogen. (Lange, Marion)

No special credit should be given to hydrogen-powered vehicles. (Kulongoski)

Agency Response: ARB supports the use of hydrogen fuel cell vehicles to meet the ZEV regulation because these vehicles produce zero criteria, GHG and toxic emissions during vehicle operation. Another benefit to the citizens and the State of California is the opportunity to produce hydrogen from multiple domestic resources thereby reducing petroleum dependence.

The Board sees promise in both battery EV and fuel cell vehicle technology, and views both as part of the California’s future vehicle fleet. Hydrogen fuel cell and battery EVs both operate with zero emissions; if another fuel technology could operate a vehicle this way, then the fuel would also be included into the regulation with minimum performance criteria. Both battery EVs and fuel cell vehicles have the potential to have zero upstream emissions. Both also have technology and infrastructure challenges that need to be overcome before they are commercially viable.

#### **E. Overall Regulatory Structure**

18. Comment: All major automobile manufacturers must produce for sale in California X (large number) amount of EVs. Just start with this one item. Don’t

worry about hybrids or hydrogen, nor credits, etc. These are attempts to resist change. (Bohanon)

Agency Response: The ZEV regulation provides a performance standard – zero emissions. The regulation then permits a manufacturer to choose the type of ZEV to produce to meet the pure ZEV requirement. Additionally, other technologies, such as HEVs, are given partial credit as an option for manufacturers to produce to meet their requirements. These options allow manufacturers to produce less expensive ZEV enabling technologies as well as fulfill pure ZEV requirements.

19. Comment: Set the minimum ZEV requirements on a yearly basis rather than for three years, thus preventing manufacturers from getting an additional three-year grace period and eliminating “blackout” years. A consistent, steady regulatory environment is the single best thing the CARB can provide for the clean energy sector. (Fermi, Form Letter #10, Jan, Tesla)

Agency Response: Comment noted. Many of the 2008 modifications move the ZEV requirements to yearly requirements in the 2012 and subsequent MYs. Methods for determining a manufacturer’s ZEV requirement have been adjusted to become rolling averages, rather than set MY averages. Also, percentages for the 2012 MY and beyond represent yearly pure ZEV requirements rather than period requirements. However, ARB realizes that manufacturers are still demonstrating ZEV technologies, and may want to focus their compliance for pure ZEV requirements in single years, and would carry-forward credits earned to subsequent MYs.

20. Comment: Keep it simple. Give unexpiring credits to auto manufacturers for California DMV registered ZEV only sales to residents of California. (Bradley)

Agency Response: ARB has designed the ZEV regulation to account for certain historical trends. Unexpiring ZEV credits do not encourage placements of new ZEVs in California. Also, ARB believes there is validity to small scale advanced demonstration programs, which do not require vehicles to register with the DMV. These programs allow manufacturers to test and validate emerging technologies.

21. Comment: ARB received comments suggesting Enhanced AT PZEVs merit their own support and should not come at the expense of ZEVs. (Jan, Assemblymember Ruskin, Tesla, Trudeau)

Agency Response: ARB believes that the Enhanced AT PZEV category is an intermediate step towards pure ZEV production. However, some manufacturers may not want or need to produce Enhance AT PZEV technology, especially if the manufacturer has a commitment to fuel cell vehicle development programs. Additionally, PZEVs and AT PZEVs do not have separate requirements in the ZEV program, but rather also act as a backfill to the full ZEV requirement. A

separate category for any one of these enabling technologies may be considered in future rulemakings that the Board has requested to refocus the ZEV regulation on pure ZEV technologies.

## **F. Future ZEV Revisions**

22. Comment: I fully expect CARB's 2014 redesign of the ZEV program to reflect an aggressive effort to meet our 2020 and 2050 emission reduction targets. (Assemblymember Ruskin)

Agency Response: Comment noted. ARB intends to reshape the regulations, focusing solely on the pure ZEV requirement to become effective in meeting the Board's long term environmental goals.

23. Comment: Complete the 2015 and later review by the end of 2010 calendar year to allow sufficient time for product and production planning. (Toyota)

Agency Response: Comment noted. ARB will stay within the Board's directed timeline stated in Resolution 08-24. Staff will return to the Board with a proposal by the end of 2009.

## **G. Miscellaneous**

24. Comment: ARB received requests to close the loopholes in the regulation. (Kulongoski)

Have the staff review and address the nine potential loopholes. (UCS)

Agency Response: Comments noted. The Board directed staff to review a comment submitted by environmental non-governmental organizations (NGOs) titled "2008 Proposed Solutions to Potential Loopholes in the Amendments to the California Zero Emission Vehicle Program Regulation, Agenda Item 08-3-5", and make modifications to the regulation if necessary. ARB resolved the loopholes that the Board felt was threat to the goals of the ZEV regulation. Please see Attachment C to the Notice of Availability of Modified Text, released July 25, 2008.

25. Comment: Emphasis should be placed on near-term implementation, not technologies that are still in R&D stages or otherwise have significant barriers to adoption. This suggests that technologies with existing infrastructure and/or home refueling capability receive extra credit for their potential to deliver measurable air quality benefits sooner. (PIA)

Agency Response: The Board modified the credit structure by adding a Type G advanced componentry allowance, awarded to vehicles using enabling near-term technologies. See section 1962.1(c)(4)(B)8. ARB believes both near term and

future ZEV technologies will be important in meeting long term program and environmental goals.

26. Comment: CARB must begin to treat all ZEV vehicles equally with respect to funding and personnel, establishing battery electric and PHEV and infrastructure programs, with funding and incentives equal to those of hydrogen fuel cell infrastructure or vehicle programs. (PIA)

Agency Response: ARB supports R&D programs for all ZEV technologies.

27. Comment: ARB received specific recommendations on important action for the prevention of global warming. (Cree)

Agency Response: Comment noted. ARB appreciates the suggestions in meeting its other program goals; however, this comment is outside the scope of this rulemaking.

## ***Part V. Regulatory Comments***

Comments grouped in this section responded to specific changes made available in Staff's first notice of post-Board Hearing modifications, released July 25 through August 15, 2008.

### **A. Pure ZEV Requirement**

28. Comment: ARB received comments in opposition to the Board's reduction of the number of ZEVs required or for the Board to not amend the original number of ZEVs required. (Connor, Cox, Assemblymember Ruskin, Ward, Warren)

ARB received several requests to increase the number of ZEVs required. (Cox, Form Letter #10, Fermi, Harman, Hoke, Jan, Roche, Tesla, Yoney)

ARB received comments insisting the pure ZEV requirement is too lenient, to reconsider their decision. (Aller, Hoke, Jan, Orndorff, Assemblymember Ruskin, Tesla, Trudeau, Verma, J. Webster, L. Webster)

I strongly urge you to reinstate the mandate of 25,000 pure ZEV vehicles by 2014. (Assemblymember Ruskin, Trudeau)

Agency Response: The pure ZEV requirement was one of the more contentious issues during this rulemaking process. The Board's modifications require generation of credits equal to a minimum of 7,500 Type IV ZEVs during the 2012 through 2014 timeframe and require generation of credits equal to a minimum of 25,000 Type IV ZEV during the 2015 through 2017 timeframe. If a manufacturer were to produce a Type I, Type I.5, Type II, or Type III ZEV, more ZEVs would

need to be produced relative to the number of Type IV ZEV required. The Board's modifications also allow manufacturers flexibility in meeting the requirement, allowing them to fully meet their ZEV obligation with pure ZEVs, or with a combination of Enhanced AT PZEVs and pure ZEVs. ARB believes the number of pure ZEVs required is appropriate in recognition of current technological and cost barriers. Additionally, the Board directed staff to redesign the ZEV regulation in a future rulemaking, focusing mainly on the pure ZEV requirements, meaning future ZEV requirements could be modified. Also, see the response to Comment 30.

29. Comment: At minimum, the ZEV requirements of 11 percent in 2009 to 2011, 12 percent in 2012 to 2014, 14 percent in 2015 to 2017, and 16 percent in 2018 and beyond should be sustained. (Foster)

Agency Response: The 2008 rulemaking did not amend the basic ZEV requirements in the regulation. The ZEV Requirement remain 12 percent for the 2012 through 2014 MYs, 14 percent for the 2015 through 2017 MYs, and 16 percent for the 2018 and subsequent MYs. Rather, the 2008 amendments affect the Alternative Path for the LVMs to meet these production percentages by replacing the Alternative Path with the New Path. The New Path retains the percentage pure ZEVs required and includes Enhanced AT PZEVs as an option in meeting the requirement.

30. Comment: 7,500 ZEVs per manufacturer is too few. Require 12,500 ZEVs. (Kulongoski)

Agency Response: Dependent on the Type of ZEV used to fulfill the pure ZEV requirement, manufacturers could provide over 18,000 ZEVs during the 2012 through 2014 timeframe. The Board believes it is appropriate to require 7,500 Type IV ZEVs, but if all the LVMs chose to meet the pure ZEV requirement with Type I ZEVs, 18,500 Type I ZEVs would be required.

31. Comment: ARB received comments urging faster implementation of the ZEV goals, and more ambitious pure ZEV requirements. (Verma)

Agency Response: See response to Comment 1.

32. Comment: ARB received comments urging the Board to return to the original mandate. (Harman, Cox)

Agency Response: The original ZEV mandate required 2 percent of a manufacturer's production be pure ZEVs by 1998, increasing to 10 percent by 2003. 10 percent of all new vehicle production would be close to 140,000 ZEVs per year from the LVMs. Current ZEV technology would not be able to successfully meet this volume. The Board adopted the most appropriate pure

ZEV requirement for the upcoming timeframes, taking into account the current state of technology and costs.

33. Comment: Such a sharp reduction in pure ZEVs undermines the very purpose of the program – it weakens the push for technology. More importantly, it destabilizes the certainty in future technology markets that is essential to attract investment, forge partnerships, and create the infrastructure necessary to propel those new innovations from smaller scale demonstration into the commercial market. Requiring only 7,500 ZEVs by 2014 will not be enough on the front end to meet long term goals. Even if the Board intends to hasten the pace for ZEVs when it redesigns the ZEV program for 2014 and beyond, the sharp reduction in ZEVs now will stifle investment and momentum that we will need in 2014. The recent changes essentially pull the rug out from under the efforts from EV manufacturers and suppliers based in California. (Assemblymember Ruskin)

Reducing the number of ZEVs required, yet again, will not accomplish any CARB goal. The current proposal would require less than an average of 500 ZEVs per year from any individual automaker until 2015 – few enough that several automakers can use banked credit for most of the next decade to meet this requirement. Those with fewer banked credits can easily accomplish these numbers through credit trading with small automaker, like Tesla. Worse, the lower numbers ensure that ZEVs will never leave hand built production volumes, and that costs will remain too high for commercial viability. CARB should reconsider and hold firm on the current 25,000 ZEVs required in Phase III, and 50,000 ZEVs required in Phase IV. These are numbers previously committed to by the automakers, and are appropriate to bridge the gap between R&D and commercialization. (PIA)

Agency Response: ARB does not agree with this comment. Both the Board and the ZEV Panel's assessments of the state of technology development relative to cost indicate that decreased production of pure ZEV is required. Additionally, forcing mass production of ZEVs before the vehicles have proven durability and are economically feasible for consumers could damage market acceptance. The Board believes its 2008 modifications will enable manufacturers to direct resources into appropriate pre-commercial production levels of ZEVs, ensuring only the most advanced and durable ZEVs are placed into consumer hands. Also, see the response to Comment 30.

## **B. Enhanced AT PZEV Backfill**

34. Comment: Based on several technological reasons and manufacturer public statements, the commenter asserted by 2018 that all passenger cars and light vehicle trucks sold in California should be PHEVs with high compression ICEs. The commenter also gave other specific requirements that these PHEVs should have. (Saidak)

Agency Response: The ZEV regulation focuses on the commercialization of pure ZEVs in California. This proposal does not further the goal of the ZEV regulation.

35. Comment: ARB received comments urging the Board to focus on the number of PHEVs required. (Rahm)

Agency Response: The Board's 2008 modifications will potentially bring the placement of between 50,000 and 70,000 PHEVs on the road during the 2012 through 2014 timeframe. These numbers are sufficiently aggressive, considering manufacturers have yet to produce a single commercial ready PHEV. In a future rulemaking, the redesign of the ZEV program will evaluate the appropriate number of Enhanced AT PZEVs to be required in future years.

36. Comment: We strongly recommend that the Enhanced AT PZEVs required be brought back to the original staff proposal of 75,000 as needed for the SIP. (SCAQMD)

Agency Response: See response to Comment 35.

### **C. Enhanced AT PZEV (General)**

37. Comment: PHEVs should be required to travel at least 40 miles on electric charge to get any extra credit. (Kulongoski)

Agency Response: ARB believes there is considerable benefit with 10-mile PHEVs and that the minimum should not be set so high as to eliminate incentives for automakers to consider offering more affordable PHEVs for those who drive below the average or cannot afford larger batteries. ARB also believes that workplace charging will be a key element in the electrification of transportation. These 10-mile PHEVs would then be capable of 20 miles of electric commuting each day and would be fully charged well before afternoon power demand begins to peak.

38. Comment: We continue to recommend that Enhanced AT PZEVs with the lowest emissions be rewarded with higher credits. (SCAQMD)

Agency Response: Comment noted. Currently, PHEVs with 40-mile AER and HICE vehicles receive the highest amount of Enhanced AT PZEV credit under the ZEV program, and are the cleanest, i.e., lowest emission, non-ZEVs currently produced by manufacturers.

#### D. Travel Provision

39. Comment: General support for the Board's changes to the Travel provision. (ALA, CCA, CEERT, EIN, FOE, NESCAUM, NRDC, Sierra, UCS)

Agency Response: ARB appreciates the support received for the proposed modifications to the travel provision, as released in the first post-Board Hearing comment period. However, due to comments regarding MY implementation of this proposal, ARB further modified the travel provision to better meet the intent of proportional travel and account for timing and implementation. Proportionality continues, but is proposed to begin in the 2010 MY. The further modification also specifies that a credit earned in a Section 177 state is earned at a proportional value in the Section 177 state, while credit is earned in the full amount in California. Lastly, a manufacturer complying with the Alternative Path requirements in the 2010 and 2011 MYs in a Section 177 state will not be affected by proportionality if those credits are produced in California. The maximum number of credits allowed for compliance in the Section 177 state for the 2010 and 2011 MYs, however, is limited to the Section 177 state's Alternative Path minimum ZEV percentage. Any credits earned in California and used in a Section 177 states beyond the minimum Alternative Path ZEV percentage are subject to proportionality.

40. Comment: Support for the proportional assignment of travel credits under section 4.4 (e) beginning in the 2009 MY. (NESCAUM)

Agency Response: ARB appreciates the support received for staff's proposed modifications to the travel provision, as released in the first post-Board Hearing comment period. However, ARB received comments from manufacturers on the timeline for implementing the travel provision. Because manufacturers are currently producing in the 2009 MY vehicles, there would be no lead time if the travel provision were effective in the 2008 MY. Lead time is at issue, as the travel provision affects the overall number of ZEVs required. Therefore, ARB maintained the travel provision as presented in the ISOR for the 2009 MY, and implemented proportional travel for the 2010 and subsequent MYs. Also, see response to Comment 39.

41. Comment: Any traveling provision incorporated into the regulation should be accompanied with the proportional limits. (New York)

Agency Response: Comment noted. Other than the 2009 MY, the travel provision provides for proportionality in travel for ZEV credits. Also, see responses to Comments 39 and 40.

42. Comment: If there is need to address manufacturers' compliance with the non-ZEV parts of the requirements; we believe that those issues should be handled separately. (New York)

Agency Response: ARB modified the travel provision to ensure Section 177 states will receive the most commercially ready vehicles, meaning the AT PZEV and PZEVs. See the table in section 1962.1(d)(5)(E)2. The table shows the vehicle types that are counted for compliance in all Section 177 states – these are all ZEV Types. Also, see response to Comment 39.

43. Comment: In addition to the provision starting with the 2009 MY, the extended travel provision should be applied to ZEV Credits (Type I – Type V) generated from IVMs before they are subject to the LVM requirements. This would mean that the travel provision would be applied to the 2008 MY battery EV credits. This proposal would be in line with the carry-forward provision for early generated ZEV credits of IVMs. We believe that this proposal would provide the flexibility suggested by the Board while assuring that companies like BMW will continue to provide the greatest air quality benefit to the State of California and at the same time contribute significantly to the advancement of low emission technology and the electrification of their vehicles as advocated under the ZEV mandate. (BMW)

Agency Response: Comment noted. Because the rulemaking was conducted during the 2008 MY, the Board made very few modifications to requirements for the 2008 MY. ARB does not feel it is appropriate to make a retroactive change for the 2008 MY.

44. Comment: Toyota and other manufacturers are already within the 2009 to 2011 compliance period. While additional incentives might encourage us to do more than otherwise planned or expected, we have already made decisions and taken actions to implement out ZEV compliance plans for this period. This is why we are very concerned by what we hope is an inadvertent and a completely new requirement to begin so-called “proportional travel” starting from now, as opposed to what we thought it was the common understanding of 2012. Such a significant change for a compliance period already underway would be contrary to well-established ARB considerations for adequate lead time. (Toyota)

The travel provision should not be changed until 2012 MY because manufacturers already have begun implementing plans for ZEV requirements for the 2009 to 2011 MY period. The LVMs understand and acknowledge the concept of proportionality of the travel provision introduced at the ZEV Board Hearing. However, this change may require substantial adjustment to manufacturers' compliance plans. Therefore, the LVMs request that the travel provision proportionality commence from the 2012 MY at the earliest. Implementing the proportionality sooner than 2012 MY does not provide the lead time needed to adjust product plans for new, advanced technology vehicles. For

example, many of the advanced components that go into these vehicles are linked to completed supply agreements that cannot be adjusted for short-term capacity/volume changes. As stated previously, the 2009 MY has already started, and the start of the 2011 MY is only one and one-half years from now. This simply does not allow time for compliance adjustment. (Chrysler, Ford, GM, Honda, Nissan, Toyota)

Agency Response: Comment noted. The travel provision remains unchanged for the 2009 MY. Proportional travel will commence with the 2010 MY. See responses to Comments 39 and 40.

45. Comment: There should not be any travel provision in combination with decreasing the number of ZEVs required in any phase. (PIA)

Agency Response: While the travel provision provides ZEV credits for vehicles placed in service in Section 177 states, the number of ZEV credits required in California is not changed by the travel provision. Additionally, the travel provision ensures that manufacturers can focus resources and infrastructure development in concentrated areas for those vehicles in pre-commercialization development stages.

46. Comment: If the travel provision is extended, because of SIP emission reduction needs, we recommend a compensatory trade-off to ensure the forgone emissions benefits are realized. The burden of adapting California's regulation in other states should be placed on those states. (SCAQMD)

Agency Response: The 2008 modifications to the travel provision in section 1962.1(d)(5)(E) have very little impact on emissions in California. These modifications allow manufacturers to focus resources and efforts on much needed small scaled demonstrations, designed to eventually leading to ZEV commercialization.

47. Comment: As indicated in the following mark-up of ARB's proposed regulatory language (1962.1(d)(5)(E)), the LVMs recommend replacing "any" with "all" for added clarity that the credits travel to all 177 states. The LVMs also recommend replacing "total sales" with "PCs, LDT1s, and LDT2s, as applicable, produced and delivered for sale." This change accomplishes two things. First, it makes it clear that just those vehicle classes subject to the ZEV regulations are included in the volume of vehicles used to calculate the proportional credit values. Second, it makes it clear that the vehicle volumes used in the proportional calculations are those vehicles produced and delivered for sale in the state, which is consistent with the basis for the ZEV requirements themselves.

**(E) Counting Specified ZEVs Placed in a Section 177 State.**

Specified MY ZEVs, excluding NEVs and Type 0 ZEVs, that are either certified to the California ZEV standards or as part of an advanced technology demonstration program and are placed in service in California or in a state that is

administering the California ZEV requirements pursuant to Section 177 of the federal Clean Air Act (42 U.S.C. section 7507) (hereafter "Section 177 state") applicable for the ZEV's MY may be counted towards compliance in California and in ~~allany~~ Section 177 states, with the percentage ZEV requirements in section 1962.1(b), including the requirements in section 1962.1(b)(2)(B) and (b)(2)(D), provided that the credits are multiplied by the ratio of an LVM's PCs, LDT1s, and LDT2s, as applicable, produced and delivered for sale~~total sales~~ in the state receiving credit to the LVM's PCs, LDT1s, and LDT2s, as applicable, produced and delivered for sale~~total sales~~ in California. The table below specifies the qualifying MYs for each ZEV type that may be counted towards compliance in ~~allany~~ Section 177 states.

(Chrysler, Ford, GM, Honda, Nissan, Toyota)

Agency Response: Comment noted. ARB further modified section 1962.1(d)(5)(E) to better reflect the intent of proportional travel. The commenter's suggestions in clarifying the language were added to the final language.

48. Comment: The LVMs are concerned with the proportional calculation accurately tracking compliance in cases where a manufacturer elects to use credit carry-forward or carry-back. The following examples illustrate the LVM's concerns. The LVMs understand that the intent of the proportional calculation is that if a manufacturer produces and places into service in California/177 States sufficient ZEVs to just meet the gold requirement in California that will equate to sufficient ZEVs to just meet the gold requirement in all 177 states, regardless of any use of carry-forward or carry-back. The LVMs have not developed any specific regulatory language to address this issue, but look forward to working with ARB and the 177 states to make sure that the proportional calculation provision is implemented in a manner consistent with its intended purpose.

**Example 1: Carry-Forward<sup>1</sup>**

<b>California</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
CA Volume Subject to ZEV Regulations <sup>2</sup>	100,000	100,000	100,000
ZEV Credits Earned in CA	1,210	1,220	0
ZEV Credits Required in CA (0.81-percent)	810	810	810
ZEV Credits Balance in CA	400	810	0
<b>New York</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
NY Volume Subject ZEV Regulations <sup>2</sup>	50,000	50,000	60,000
ZEV Credits Earned in NY	605	610	0
ZEV Credits Required in NY (0.81-percent)	405	405	486
ZEV Credits Balance in NY (Cumulative)	200	405	-81

1. For simplicity, the impact of multiplying credits by the fleet NMOG average is not taken into account in this example, although this is another complicating factor that will need to be considered.

2. Assumes same MY method for determining volume of vehicles subject to ZEV regulations.

## Example 2: Carry-Back<sup>1</sup>

California	2012	2013	2014
CA Volume Subject to ZEV Regulations <sup>2</sup>	100,000	100,000	100,000
ZEV Credits Earned in CA	0	1,220	1,210
ZEV Credits Required in CA (0.81-percent)	810	810	810
ZEV Credits Balance in CA	-810	-400	0
New York	2012	2013	2014
NY Volume Subject ZEV Regulations <sup>2</sup>	60,000	50,000	50,000
ZEV Credits Earned in NY	0	610	605
ZEV Credits Required in NY (0.81-percent)	486	405	405
ZEV Credits Balance in NY (Cumulative)	-486	-281	-81

1. For simplicity, the impact of multiplying credits by the fleet NMOG average is not taken into account in this example, although this is another complicating factor that will need to be considered.

2. Assumes same MY method for determining volume of vehicles subject to ZEV regulations.

(Chrysler, Ford, GM, Honda, Nissan, Toyota)

Agency Response: ARB modified the travel provision to better reflect the intention of proportional travel, but could not modify the travel provision to fit every possible scenario. The intention of the travel provision is to provide that a manufacturer meets California's ZEV requirements that must be met with ZEVs, excluding NEVs and Type 0 ZEVs, will also fully meet those requirements in the Section 177 states. Also, see response to Comment 39.

### E. Carry Forward/Carry Back

49. Comment: Support for modifications to the carry-forward provisions that allow manufacturers other than LVMs to accrue and bank credits until subject to LVM requirements. (BMW)

Agency Response: ARB appreciates the support for the modification in the carry-forward provision that allow manufactures other than LVMs to bank pure ZEV credits until subject to LVM requirements.

50. Comment: Change the carry-forward provision of gold ZEV credits earned by any manufacturer that exclusively manufactures pure ZEVs to expire 3 years from the date of transfer to another manufacturer. (Fermi, Form Letter #10)

Ironically, staff goes out of their way to safeguard the welfare and commercial interests of the IVM including BMW, Mercedes, and VW. In stark contrast, the proposed modification will perpetrate irreparable damage on Tesla, the only car maker based in California and the world's only car maker that actually develops and is committed exclusively to zero emission vehicles. How? Since Tesla makes only ZEVs we sell our gold ZEV credits to LVMs. The monies received

defray in part some of the large R&D costs incurred in pioneering the development of the zero emission electric cars. If the 3-year clock starts ticking in the MY during which we sell the car, and not the time in which we sell the ZEV credit to an LVM, (unless we are able to sell the ZEV credits immediately upon selling the car), we will be left with highly perishable ZEV credits that expire sooner than 3 years and consequently may be valued at a steep discount if not a zero value altogether. Please note we are not speculating about the huge reduction in value of the ZEV credit due to even the slightest reduction in its validity period, we have experienced it already. We respectfully request that Tesla be accorded the same considerations given to much larger and more established IVMs and that the proposed rules be modified so that for any company that solely manufactures ZEVs the 3-year period of the ZEV credit starts only upon transfer of the ZEV credit to another company. (Jan, Tesla)

Agency Response: Comment noted. The intent of the carry-forward provision limitation is to avoid creating black-out periods during which there are no placements of ZEVs in certain years. When a traded credit is used for compliance with the ZEV requirement, it essentially represents a placed ZEV. Therefore, ARB believes traded credit should be treated the same as any LVM-produced ZEV credit, with a provision that limits the credit's usefulness. This modified carry-forward provision encourages new production of ZEVs.

## **F. Neighborhood Electric Vehicles**

51. Comment: Chrysler LLC and GEM® have committed and sustained resources to research, develop, continuously improve and support NEVs over the past 10 years to make them a major contribution to the ZEV program and air quality. One-third of NEV owner's yearly tailpipe emissions are eliminated simply by the avoidance of cold starts during the short trips taken. As the majority of hydrocarbon emissions from a typical gasoline engine are produced in the first minute of operation, a NEV is able to eliminate this event completely – identical to the characteristics of any ZEV. NEVs replace cars and trucks for two out of three vehicle trips, averaging approximately 3,000 miles per year for GEM® commercial customers and 1,200 miles per year for residential customers. Based on their air quality benefits, we believe the NEV credit value should be increased to a minimum of 0.50.

An example of the disproportionate credit value between NEVs and plug-in hybrids (PHEVs) provides the basis for a higher NEV credit level. A "P10" PHEV achieving an all-electric range of 10 miles per day (assuming daily recharge) accumulates 3,650 all-electric miles annually. This vehicle has a credit value of 1.57 in the 2012 MY. In contrast, a commercial GEM® accumulating 3,000 all-electric miles annually only earns a credit value of 0.30. Additionally, NEVs could arguably be considered to provide equivalent or better air quality benefit to a P10 PHEV. Since the gasoline engine of the PHEV kicks in after 10 miles of the all-electric range operation, customers may be less inclined to plan their trips

knowing this back-up gasoline system is available, allowing continued driving in non-electric mode.

In addition, the recent credit basis or “hinge point” increase from 3 credits for a Type III ZEV to 5 credits for a Type IV ZEV further devalues NEVs. This 67 percent increase in the base credit requirement alone, if applied proportionately to the current 0.30 NEV credit, would essentially increase the value of NEVs to 0.50. (Chrysler)

Agency Response: ARB also believes that NEVs are a valuable component of the ZEV Program. However, for the reasons discussed in the agency response to 45-day comment number 44, ARB believes the modified credit level established for NEVs at 0.30, which is a doubling of the prior level at 0.15, is appropriate.

52. Comment: Emissions regulations should not set non-emissions related, customer-driven performance requirements for NEVs, or any other vehicle type. [1962.1(d)(5)(F)] We do not believe it is appropriate for ARB to set non-emissions related, customer-driven performance, battery and warranty requirements for NEVs to receive ZEV credit. These vehicle attributes are not related to emissions and should not be included as a requirement. Customers will decide which NEVs will provide them with the performance, utility and warranty specifications that they need. All NEVs are zero emitting and displace vehicle miles traveled (VMT) from other emitting vehicles; therefore, all NEVs should receive ZEV credits. (Chrysler, Ford, GM, Honda, Nissan, Toyota)

Agency Response: ARB’s modifications to the NEV requirements protect against placement of limited utility NEVs. The modifications add performance criteria to ensure the placement of the most technologically advanced NEVs in the 2010 and subsequent MYs.

53. Comment: The commenter expressed support for staff’s post-Board Hearing modifications to NEV requirements. (CalETC)

Agency Response: ARB appreciates the commenter’s support for technical requirements for NEVs.

54. Comment: Prevent product blackouts caused by NEV credits for the pure ZEV minimum requirement and early introduction of Enhanced AT PZEVs. This can be accomplished by limiting the use of NEV credits earned before 2008 to the (non-Enhanced) AT PZEV or PZEV categories after 2011 and restricting NEV credits earned after 2008 from the pure ZEV floor. In the early 2000’s, auto manufacturers placed low cost, low technology NEVs in California for a short period of time only to fulfill their pure ZEV requirement. NEVs were then abandoned or removed with almost no benefit to air quality and technology advancement. Because of this, auto manufacturers have banked over 123,000

pure ZEV credits from NEVs. Because NEVs have been used as a pure ZEV credit loophole, the authors recommended limiting the use of the existing banked credits earned before 2008 to the (non-Enhanced) AT PZEV or PZEV categories after 2011. NEV credits earned after 2008 could be applied to all categories outside of pure ZEV floor. (ALA, CCA, CEERT, EIN, FOE, NRDC, Sierra, UCS)

Agency Response: Comment noted. ARB modified the regulation to limit the use of NEV credits, both 2001-through-2005 credits as well as 2006 and subsequent MY NEV credits. With these modifications, 2001-through-2005-MY-NEV credits are not available to meet the portion of the obligation that must be met with ZEV in 2012 through 2014. Also, the 2001-through-2005-MY-NEV banked credits are capped at 50 percent usage within the obligation that may be fulfilled with Enhanced AT PZEVs or AT PZEVs for the 2012 to 2014 timeframe. These modifications limit the use of 2006 and later MY NEV credits within the minimum ZEV floor during the 2012 to 2014 timeframe while still allowing them to be fully used to meet requirements that may be met with Enhanced AT PZEVs, AT PZEVs, and PZEVs.

Also, to ensure that only the highest performing NEVs receive credit, ARB included additional requirements for the 2010 MY NEVs. These requirements mirror the NEV America Standards, set forth in “NEV America: Neighborhood Electric Vehicles (NEV) Technical Specifications” (Revision 2), including acceleration, top speed, and constant speed range specifications as well as battery and warranty requirements.

## **G. Zero Emission VMT Allowance**

55. Comment: It is confusing to now use a mixture of EAER and  $R_{cda}$  to define whether the allowance is a constant or derives from the equation. For instance, it is possible to have an EAER of 10.1 miles and an  $R_{cda}$  of 9.9 miles which presents a circumstance undefined by the table in section C-3.3. In addition, because the peak allowance is not defined by  $R_{cda}$ , a manufacturer could simply include enough battery energy to displace the minimum 10 miles worth of CO<sub>2</sub> production and slowly deplete it over 40+ miles in order to earn the maximum credit. This would be a cost-effective way for a manufacturer to maximize credit earnings, but would not provide the large CO<sub>2</sub> displacements desired. Recommendation: Return to range bins defined solely by EAER. (NREL)

Agency Response: It should not be possible for a PHEV to have an actual  $R_{cda}$  less than its EAER. It might however be possible, although extremely unlikely, for a PHEV’s test results to exhibit the maximum allowable inaccuracy in the opposite direction for each of these tests. What makes this situation even less likely to occur is that manufacturers are not expected to gamble during the PHEV design phase and bring a car for certification testing that is too close to the EAER lower limit of 10 miles. ARB believes that minimum qualifying AT PZEV, PHEVs will likely test out with EAERs of at least 11 to 12 miles.

A manufacturer who chooses to develop a PHEV with EAER equal to 10 miles and an  $R_{cda}$  of 40 miles will earn much less than the maximum allowance because the electric range fraction will be very low, and their allowance will be reduced in proportion to this electric range fraction.

56. Comment: It is confusing as written to understand what the maximum allowance should be. Is the  $EAER_{40}$  supposed to be a variable or a constant?  
Recommendation: Rewrite the maximum allowance as  $40/29.63$  or  $1.35$  if that was the intention. (NREL)

Agency Response: In most cases, the maximum zero emission VMT allowance will be  $1.35$ . The most likely high-range PHEVs will have an  $EAER_{40}$  equal to 40 miles because the fraction of driving with electric propulsion will be 100 percent. ( $EAER_{40}$  greater than or equal to the EAER that a particular 40 mile  $R_{cda}$  PHEV achieves (will vary with electric range fraction)). In the unlikely event that a manufacturer chooses to produce a “blended” PHEV with  $R_{cda}$  of  $\geq 40$  miles, the 40-mile value must be reduced by the electric range fraction to convert the value to EAER at 40 miles. ARB believes that the most likely PHEVs that push to 40 miles  $R_{cda}$  or beyond will be Type F or G, and these will usually earn the maximum zero emission VMT allowance of  $1.35$ . A blended PHEV will have an electric range fraction of less than one, and the  $1.35$  allowance will be reduced in proportion to the electric range fraction. For example, a blended PHEV with a  $.85$  electric range fraction would receive an allowance of  $(0.85 \times 40) / 29.63 = 1.15$ .

57. Comment:  $R_{cda}$  is a somewhat abstract variable compared to EAER, which is calculated from the full  $R_{cda}$  measurement multiplied by the measurable CO<sub>2</sub> offset fraction (EERF). Its application is further brought into question by the two examples shown in the spreadsheet, and by the fact that a fractional distance into a cycle may not correspond to an equivalent fractional energy use or CO<sub>2</sub> production. Recommendation: Simplify the regulation by eliminating the need for  $R_{cda}$  measurement and instead of using  $UF(R_{cda})$  in the equation, use  $UF(EAER)$  or use  $UF(R_{cda})$ . (NREL)

Agency Response: Both ARB test procedures and the upcoming SAE test procedures have proposed a consistent methodology for determination of  $R_{cda}$ . ARB believes that  $R_{cda}$  is a much more direct measurement and is less abstract than EAER, but ARB also believes it must leave the option open for “blended” PHEVs and must build in a methodology incorporating EAER in order to accommodate them. Most PHEVs are now expected to be fully UDDS-capable in electric mode, and with EAER values equal to  $R_{cda}$ .

## H. Advanced Componentry

58. Comment: Support for Type G advanced componentry allowance. (Toyota, GM, CalETC)

Support the Board's action to allow additional credits for more capable PHEVs especially using more real word [sic] metrics such as the US06 driving cycle. (PIA)

Agency Response: ARB appreciates the support for its addition of a Type G advanced componentry allowance.

## I. ZEV Multipliers

59. Comment: ARB reduced the AT PZEV multiplier from 3.0 to 1.25. While this action was directionally correct, the net effect of these changes is AT PZEVs can earn up to 3.125, still greater than Type I, I.5, and II pure EVs. (Mitsubishi)

Agency Response: Comment noted. However, those Enhanced AT PZEVs potentially receiving more credit than Type I, I.5, and II pure ZEVs will have over 40 miles EAER or  $R_{cda}$ . ARB believes these vehicles will have comparable usefulness and zero emission travel characteristics to a Type I, I.5, and II ZEV.

60. Comment: Support for keeping the 3X multiplier in place as is. This multiplier has been in the ZEV regulations since the 2003 ZEV rulemaking for vehicles that earn a zero emission VMT allowance (at least 10 miles urban AER). ARB should not be making changes to the 2009 to 2011 ZEV regulations that adversely impact manufacturer's compliance plans at this late stage. In addition, the 3X multiplier provides far greater incentive for manufacturers to try to get PHEVs to market as quickly as possible. (GM)

Agency Response: ARB believes the reduction in the multiplier offered to those Enhanced AT PZEVs sold or put into an extended lease is appropriate. The modified value reflects the amount offered for ZEVs sold or put into extended lease and is appropriate for this timeframe.

61. Comment: ARB could establish a varying multiplier based upon the category the credits are used toward, such as the following: 3X multiplier if credits are used toward the PZEV category, 2X if credits are used toward the AT PZEV category, 1.25X if credits are used toward the Enhanced AT PZEV category. This multiplier could be applicable to vehicles that earn a zero emission VMT allowance as well as ZEVs, thereby ensuring that ZEVs would receive the same credit multiplier and at least as a high a total credit level as PHEVs. It would address the concern over optional blackout periods for PHEVs since the proposed credit multiplier for credits applied to the Enhanced AT PZEV category

is 1.25, the same as the proposed by staff. Most importantly, it would provide manufacturers an incentive to bring more Enhanced AT PZEVs and ZEVs to market sooner. A separate category in the credit bank could be created to ensure accurate tracking. (GM)

ARB Response: ARB does not feel it is appropriate to multiply ZEV credits to meet other portions of the regulation. This does not further the overall goals of the ZEV regulation or ARB's future environmental goals, but leads the placement of fewer clean vehicles and significantly complicates the regulation.

62. Comment: The reduction in the introduction multiplier for PZEVs that earn zero emission VMT allowance discourages manufacturers from early placement of new technology vehicles in the field. This multiplier should not be changed. The dramatic reduction in the level of the multiplier at this late stage does not provide sufficient lead time for manufacturers to adjust product plans. In regard to the current multiplier resulting in excess credits that in turn results in blackouts of Enhanced AT PZEV vehicles, the LVMs do not believe this is a realistic concern. PHEVs are an emerging and rapidly advancing technology. The number of PHEVs produced will undoubtedly grow over time as manufacturers improve the technology, the supply base for key components such as batteries expands, recharging infrastructure expands, and education and acceptance by consumers grows. Secondly, in regard to ZEVs receiving fewer credits than Enhanced AT PZEVs, the LVMs believe this concern can be addressed by providing a higher credit value for ZEVs (both battery electric and fuel cell EVs) that are not used toward the "floor" requirements. This would have the added advantage of incentivizing intermediate volume manufacturers (and for that matter any manufacturer) to produce additional gold vehicles beyond the number required under the floor requirements. (Chrysler, Ford, GM, Honda, Nissan, Toyota)

This is the time when additional incentives are needed for PHEVs. PHEVs are not commercially available today from major automakers. They are a new technology, with an unproven market, and represent a business risk for automakers. These vehicles will undoubtedly be more costly to produce, and automakers are expected to lose money in the early years of production. Regulatory incentives, such as the "early introduction multiplier", can help to overcome these barriers and improve the business case for PHEVs in the early years of vehicle introduction. In addition, PHEVs are more difficult for an automaker to produce than battery EVs, because they are more technologically complex; another reason for the need for the larger incentives in 2009 to 2011. This proposed reduction in the "early introduction multiplier" for PHEVs was not in the proposal that went to the Board nor was it discussed during the Board Hearing, nor was it included in the Board Resolution. Do not reduce regulatory incentives for the production of PHEVs during the 2009 to 2011 time period. (CalETC)

Agency Response: ARB made this modification to section 1962.1(c)(7)(B) due to two board directions: 1) the Board directed consideration of the nine loopholes presented by NGOs in their March 26 comment letter and 2) the Board directed consideration of applying a multiplier to battery EV credits earned during the 2009 to 2011 timeframe for IVMs in order to ensure there is not a disincentive to produce gold vehicles.

The following loophole relates to Enhanced AT PZEV credits:

Loophole #2: "Extend carry-forward provision to Enhanced AT PZEVs to ensure that banked credits do not create long "blackout" periods when none of these vehicles are produced."

ARB does not agree that the carry-forward provision, which limits the use of ZEV credits in some categories, should apply to Enhanced AT PZEV credits. ARB does not expect large numbers of Enhanced AT PZEV credits to be banked and carried forward during the 2009 to 2011 time frame. These vehicles have never been produced in commercial production volumes, and it is unlikely that a sudden ramp-up of volumes would occur. Additionally, if a manufacturer were to be successful in their production of an Enhanced AT PZEV, it would be unlikely that they would stop production during the 2012 through 2014 timeframe. However, ARB recognizes that the 3.0 multiplier offered to PZEVs that earn a zero-emission VMT allowance, such as PHEVs, delivered for sale during the 2009 to 2011 timeframe could create a significant bank of credits that could be used to comply during the 2012 to 2014 timeframe. This multiplier would allow a manufacturer to earn three times the credit for each PHEV delivered for sale, which would have the effect of reducing the number of vehicles and increasing the number of credits.

ARB also concluded that adding an additional multiplier to enhance ZEV credits use in place of AT PZEV credits for IVMs was not considered advisable as it would increase program complexities without a commensurate benefit to technology development.

Rather, ARB chose to approach both issues in the context of credit multipliers and to address the overall credit discrepancy between PHEVs and pure ZEVs during the 2009 to 2011 timeframe.

For this reason, ARB instead has decreased the value of the 3.0 multiplier to 1.25 for PHEVs in the 2009 through 2011 MYs. The decreased multiplier value for PHEVs reflects a comparable value of a similar multiplier offered to ZEVs during the 2009 to 2011 timeframe.

The reduced multiplier was also advised because, as Mitsubishi pointed out otherwise, a PHEV could earn more than a ZEV during the 2009 to 2011 timeframe. This would be inconsistent with the purpose of the ZEV program, i.e., to produce ZEVs.

63. Comment: In regard to the conditions placed on the multiplier, this would also be a new requirement for this type of vehicle that does not apply under current regulations. Current regulations have no conditions relative to whether the vehicle is sold or leased for a specified period of time, but simply require that the vehicles be produced and delivered for sale in California. The most likely technology that will qualify in the Enhanced advanced technology (AT) PZEV category, plug-in hybrid electric vehicles or PHEVs, is a new and emerging technology with many new components and systems, including advanced batteries. Manufacturers are already taking on significant technical risk and cost in producing these advanced technology vehicles by the 2011 MY, and the early phase-in multiplier should reward them without conditions on how the manufacturer markets and sells the vehicle. Manufacturers want PHEVs to be successful in the market in the initial years that the vehicles are introduced as well as the longer term, and will market the vehicle in whatever manner provides the best chance for success. For example, it may be that uncertainty over the durability of the batteries of these earliest PHEVs results in shorter-term leases being the optimal marketing approach. (Chrysler, Ford, GM, Honda, Nissan, Toyota)

Agency Response: Comment noted. The conditions for a manufacturer to earn the multiplier in section 1962.1(c)(7)(B) were modified from “produced and delivered for sale” to “sold to a California motorist or is leased for three or more years to a California motorist who is given the option to purchase or re-lease the vehicle for two years or more at the end of the first lease term.” It was directionally incorrect for PZEVs with off vehicle charging capabilities, including PHEVs to have less stringent requirements than ZEVs. ARB felt it was appropriate to align the requirements for ZEVs and Enhanced AT PZEVs earning multipliers for similar reasons.

## **J. Transportation System Credits**

64. Comment: The commenter expressed support for Enhanced AT PZEVs being included into the section 1962.1(g)(5). (Toyota)

Agency Response: ARB appreciates the support for allowing Enhanced AT PZEVs placed in transportation systems to receive additional credits.

65. Comment: Opposition to the proposal to exclude the ability to use transportation system credits towards the gold obligation. ZEVs linked to mass transit and in projects demonstrating shared use, and “intelligent transportation systems” are perhaps worth more because they potentially do more. California and ARB should continue to foster the smart transit linkage and shared use that these programs enable, and continue to incentivize manufacturers to actively participate in them. The commenter provided an example of its own experience with these programs. (Toyota)

The limitation on the use of "gold" transportation system credit removes any motivation to put these zero-emitting vehicles into transportation system programs. [1962.1(b)(2)(D)4.] ARB is proposing to eliminate the ability to use credits that were earned by placing a ZEV in a transportation system credit toward the ZEV ("Gold") obligation. We believe that transportation systems should be encouraged because there are significant societal benefits to these programs. As ARB concluded in their report, "Recommendations of the Economic and Technology Advancement Advisory Committee (ETAAC)" that was presented to the Board on February 28, 2008, "Decreasing Vehicle Miles Traveled (VMT) is critical to meeting AB 32 GHG emission reduction goals". Transportation system programs provide a means to reduce VMT. ARB should be encouraging manufacturer's early involvement in the establishment of these transportation system programs to set the ground-work for growing these programs. The placement of ZEVs in transportation system programs provides greater exposure to this technology, which is important in the early stages of commercialization. Furthermore, placing ZEVs in transportation system programs have the potential to provide consumers with a means of commuting while producing zero emissions. The existing regulations already limit the use of transportation system credits to 1/10<sup>th</sup> of the "Gold" obligation; we do not believe these credits should be eliminated altogether. (Chrysler, Ford, GM, Honda, Nissan, Toyota)

Agency Response: Comment noted. ARB modified the provision allowing credits earned by ZEVs placed in transportation systems to meet up to 10 percent of the portion of the ZEV requirement that must be met with ZEVs.

#### **K. ZEV Credits/ZEV Types**

66. Comment: The New Type V ZEV should be required beginning 2015. (Kulongoski)

Agency Response: At this time, ARB supports flexibility in the option LVMs have to meet the ZEV requirement. For this reason, ZEV will not limit the use of the various ZEV types in future MYs.

67. Comment: Facilitate the sale of ZEV credits by startup ZEV manufacturers to the large vehicle manufacturers who refuse to build them. (Cox)

Agency Response: The 2008 rulemaking continues to allow manufacturers to trade and sell ZEV credits.

68. Comment: The establishment of Type IV and Type V ZEVs are thinly veiled attempts to continue to promote hydrogen fuel cell vehicles as the ultimate solution. We again call for neutrality among technologies within the Gold category. (PIA)

Agency Response: ARB disagrees with this statement. The credit structure as approved by the Board recognizes those technologies that are still in the development stages. Type I, I.5, II, and III ZEVs earn less credit because these vehicles are closer to commercialization than Type IV and V ZEVs.

69. Comment: Credit levels in 2018 MY do not recognize the significant differences in technology types, costs, or commercialization-readiness. [1962.1(d)(5)(C)] The credit values for Type V from 2018 and beyond need to be reconsidered. The implication of having ZEV Types II through V in the 2018+ timeframe all earning 3 credits suggests an equal level of technology development, technology maturity, performance, utility and cost. We believe strongly that the advantages of Type V ZEVs are significant, while the state of their development after 2018 will, in all likelihood, still need support, as reflected in the need for higher credits. We also expect a technology review will be conducted, which will evaluate these ZEV technologies in terms of performance, status, and cost. The technology review findings should also be considered in assessing changes to the credit values. (Chrysler, Ford, GM, Honda, Nissan, Toyota)

Agency Response: ARB supports technology neutrality in the regulation. A Type V ZEV earns 7 credits because this vehicle needs the greatest amount of development in the near term. In the longer term, ARB believes it is appropriate for Type V ZEVs, like the Type II, III and IV ZEVs, to earn 3 credits in the 2018 and subsequent MYs. However, the Board has directed a redesign of the ZEV program in a future rulemaking. Aspects of the program will be reviewed and evaluated and adjustments made as necessary.

#### **L. Credit Transparency**

70. Comment: The commenters expressed support for credit transparency. (ALA, CCA, CEERT, EIN, FOE, Kulongoski, NRDC, PIA, Sierra, UCS)

Agency Response: ARB appreciates the support for the Board's modification for full credit transparency including trades in the ZEV regulation.

71. Comment: For clarity, we request the addition of the words "Each manufacturer's" to section 1962.1(l)(2) as follows:  
(2) Each Manufacturer's Annual Credit balances for 2010 and subsequent years for... Without the addition of these two words, it appears that the credit balance information made available to the public is disassociated from the automaker that earned the credit, thereby making it very difficult for the public to understand the basis on which credits are issued. (ALA, CCA, CEERT, EIN, FOE, NRDC, Sierra, UCS)

Agency Response: Comment noted. This suggestion was incorporated in CCR, Title 13, Section 1962.1(l)(2)

## M. Miscellaneous

72. Comment: The proposal for an optional “gold to silver” was misconstrued by ARB staff and no action was taken. This is opposite the stated intentions of the Board who clearly directed ARB staff to include this proposal in the “15 Day Changes.” ARB staff should obey the Board’s direction and establish a Gold/Silver multiplier. The commenter provided several places in the March 27, 2008 Board Hearing transcript which supported these claims. (Mitsubishi)

Agency Response: The Board directed staff to consider Mitsubishi’s proposal. See the Comment 62.

73. Comment: BMW’s new approach to cryo-compressed hydrogen storage promises a major step forward to reach combined DOE 2010 and 2015 storage targets, including system capacity and thus, system energy density. Insulated cryo-compressed hydrogen storage can be charged with compressed liquid hydrogen as well as with chilled gaseous hydrogen at a pressure below 5000 psi and at cryogenic temperatures between 80K and 100K. Such storage of chilled gaseous hydrogen can lead to more than a double physical density and more than a double volumetric capacity than gaseous 5000 psi hydrogen storage at ambient temperature. Thus, an advanced cryo-compressed hydrogen storage system allows high energy densities in gas storage even below 5000 psi storage pressure. BMW therefore proposes to define innovative storage systems based on the DOE storage target definition of system capacity rather than on a fixed storage pressure, and to add a formula to account for systems that provide an additional storage capability. Suggested regulatory wording:

*(a) Use of high Pressure Gaseous Fuel or innovative Hydrogen Storage System.*  
...A vehicle capable of operating exclusively on hydrogen stored in a high pressure system capable of refueling at 5000 pounds per square inch or more, or stored in nongaseous form or at cryogenic temperatures, shall instead qualify for an advanced componentry PZEV allowance of 0.3. Advanced hydrogen storage systems enabling a specific storage capacity higher than that of high pressure systems capable of refueling at 5000 pounds per square inch shall receive the PZEV allowance of 0.3 multiplied by the ratio of the specific storage capacity (kWh/L) of advanced systems to the specific storage capacity of high pressure systems capable of refueling at 5000 pounds per square inch.  
(BMW)

Agency Response: Comment noted. ARB included language in section 1962.1(c)(4)(A) that allows hydrogen tanks storing hydrogen at cryogenic temperatures to earn credit. ARB did not feel BMW’s specific language was appropriate.

74. Comment: Vehicles in the ZEV Program should be defined and credited based on their overall energy efficiencies using a well-to-wheel or lifecycle analysis. We encourage the Board to look toward the future by considering overall efficiency today. (PIA)

Agency Response: The ZEV program is currently based on vehicle emissions. This is not within the scope of the modifications noticed for 15-day comment.

75. Comment: We recommend that the fast refueling requirement be eliminated from the Type IV and V vehicles such that a plug-in hybrid, electric, fuel cell vehicle would be sufficiently incentivized based on range capability. (SCAQMD)

Agency Response: Comment noted. ARB does not agree that it is appropriate to eliminate all Type IV and Type V fast refueling requirements, but did add a provision for ZEVs utilizing more than one ZEV fuel to be exempt from fast refueling requirements, subject to Executive Officer's approval.

76. Comment: The following are some miscellaneous clarifications and corrections:

- 1962.1(c)(3)(A): 1<sup>st</sup> column, 3<sup>rd</sup> row of the table should be changed from "EAER > 10 miles" to "EAER >= 10 miles"
- 1962.1(c)(4)(B)1.: 1<sup>st</sup> sentence, the word "four" should be changed to "five" to reflect the addition of the new Type G category.
- 1962.1(c)(4)(B)1.: 2<sup>nd</sup> sentence "HEVs must qualify for the Zero-Emission VMT Allowance in section 1962.1(c)(3)(A)" should be deleted.

(GM)

The comments in this section reflect those items which are being clarified.

1. There is no need to require a manufacturer to make up ZEV deficits within the production-period because the two-year carry-forward/carry-back provisions will prevent long blackout periods. Furthermore, this requirement is inconsistent with the previous section which allows deficits to be made up by the end of the third MY. [1962.1(g)(8)] In this section the wording was changed from "specified time" to "production-period" where production period is defined as each three year interval with a unique Minimum ZEV Requirement per 1962.1(b)(1)(A). The concern of the manufacturers was that this change appears to be in contrast to the intention of ARB to provide a two-year make up period for ZEV compliance as defined in 1962.1(g)(7)(A). It is our understanding that the two-year make up provision was the concept adopted by the Board. The wording in section 1962.1(g)(8) should be changed to avoid the conflict with 1962.1(g)(7)(A). This would further suggest the definition for "Production-Period" listed in section 1962.1(i)(9) may be removed.

2. The 17 percent LDT2 phase-in in 2007 MY should be removed. [1962(b)(1)(C)] In a letter dated January 16, 2007, ARB informed auto

manufacturers that it would not be enforcing the LDT2 phase-in requirement in title 13, CCR, section 1962(b)(1)(C) as it applies to the 2007 MY. For consistency, ARB should use this current rulemaking as an opportunity to remove the 2007 LDT2 phase-in percentage (i.e., 17 percent) from the regulations as well as from the corresponding section in the test procedures document (i.e., section C.2.1(c)).

3. AT PZEV obligation should be changed to be consistent 2.19 percent or 93.25 percent. [1962.1(b)(2)(D)] Section 1962.1(b)(2)(D)1. states that “no more than 92.5 percent may be met with Enhanced AT PZEVs and NEVs, as limited in section 1962.1(g)(6).” The 92.5 percent value should be changed to 93.25 percent to reflect the Enhanced AT PZEVs or NEVs percentage allowance of 2.19 percent, which is stated in 1962.1(b)(2)(D)3.

4. It should be made clear how Type 0 credits may be used. [1962.1(b)(2)(D)] In section 1962.1(b)(2)(D)1. and 2. both NEVs and Type 0 ZEVs are excluded from satisfying the ZEV requirements (there is no longer an Alternative Path) in the 2012 through 2014 MYs and in the 2015 through 2017 MYs. While these sections exclude Type 0 ZEVs from meeting pure ZEV requirements, it is not clear which requirements may be met with Type 0 ZEVs. The language in 1962.1(b)(2)(D)1. should read “No more than 93.25 percent may be met with Enhanced AT PZEVs, Type 0 ZEVs, and NEVs, as limited in section 1962.1(g)(6).” Similar changes should be made to section 1962.1(b)(2)(D)2. and 1962.1(b)(2)(D)3.

(Chrysler, Ford, GM, Honda, Nissan, Toyota)

Agency Response: ARB appreciates the commenters specifying these conforming changes. ARB agrees and has incorporated these changes into the regulation.

77. Comment: Previous MY method for the 2012 MY and later ZEV obligation calculation should be based on a constant three years average as is done today. The 15-Day Notice clarified that the production volumes for 2009 to 2011 MY are based upon the 2003 to 2005 MY three year average. The large vehicle manufacturers would like to request that the same three year average methodology be applied to subsequent three year periods such that the 2012 to 2014 production volumes would be based upon the 2006 to 2008 MY three year average and the 2015 to 2017 production volume on the 2009 to 2011 MY three year average. This has been the LVM's understanding based on the response to our questions in which ARB indicated that, "It was not staff's intent to change to a three year rolling average." (Chrysler, Ford, GM, Honda, Nissan, Toyota)

Agency Response: ARB believes this change is not appropriate. A rolling average of MYs is better in line with making the ZEV regulation an annual requirement. The example provided in the regulation correctly describes staff's

intent for the ZEV requirement determination method. Additionally, ARB made modifications to the regulation that allow manufacturers to switch annually between fourth, fifth, and sixth previous MY average and a same year average. ARB believes this modification allows manufacturers greater flexibility.

78. Comment: Alternative Requirements for the 2009 to 2011 MYs should be based on a constant 3-year average. [1962.1(b)(2)(B)1.b.] This provision states that the Alternative Path requirement be based on “*either production volume determination method described in section 1962.1(b)(1)(B).*” This allows the Alternative Path volume to be established by either the “constant 3-year average” or the “same year” method. In the prior regulations and in the 45-day notice, the Alternative Path quantity has been determined solely by the constant 3-year average method. The reasoning was to allow significant lead time for manufacturers to plan and produce the required number of Alternative Path vehicles. Therefore, the language in 1962.1(b)(2)(B)1.b. should read, “. . . 0.82 percent of the manufacturer’s sales, using the three-year average of the manufacturer’s volume of PCs and LDT1s, and LDT2s as applicable, produced and delivered for sale in California in the 2003, 2004 and 2005 model-years.” Additionally, 1962.1(b)(2)(B)1.b.ii. should be deleted. (Chrysler, Ford, GM, Honda, Nissan, Toyota)

Agency Response: ARB agrees with this comment. This was an oversight. The regulation was corrected to reflect and set the 2003 through 2005 MY average to determine the 2009 to 2011 MY Alternative Compliance Path percentage requirement.

## COMMENTS PRESENTED DURING THE SECOND POST-BOARD HEARING COMMENT PERIOD

### A. Fast Refueling Requirements

1. Comment: CARB continues to impose an inherent bias against electric vehicles due to fast refueling mandates in the regulation. The Commenter provided examples of how this might be difficult for some battery EVs to meet these mandates. CARB needs to eliminate the refueling requirements and focus exclusively on range to distinguish one Type of ZEV from another. Any vehicle that can travel over 100 miles without refueling should qualify as Type III, and any vehicle that can travel over 200 miles without refueling should qualify as a Type IV – no matter how long that refueling takes, 10 minutes or 4 hours. (Larsen)

Agency Response: ARB modified section 1962.1(d)(5)(B), ARB did not modify the intent of these requirements. The ZEV types are options, rather than mandates, within the ZEV requirement. The Board sees the fast refueling requirements as appropriate for ZEV technologies that earn more credit per

vehicle. Manufacturer may opt for battery technologies that are not have fast recharge capability, but will earn less credit per vehicle. ZEVs with fast refueling capabilities are similar to current gasoline vehicles, and have “unlimited range.” However, the Board sees a mix of ZEVs without fast refueling capabilities as well as those with fast refueling capabilities in California’s future fleet.

2. Comment: Support for modifications to the fast refueling requirements. (SCAQMD)

Agency Response: ARB appreciates the support for modifications to fast refueling requirements which allow ZEVs that utilize more than one ZEV fuel to qualify for Type IV and Type V ZEV credit.

## **B. Travel Provision**

3. Comment: Support for staff’s changes to the travel proportionality language to address cases where manufacturers are complying under the Alternative Path during the 2010 and 2011 MYs, and providing an additional MY of lead time before the proportionality provision takes effect. (Chrysler, Ford, GM, Honda, Nissan, Toyota)

Agency Response: ARB appreciates support for modifications made to the provision which allow manufacturers to count credits earned from ZEVs to be used in compliance in California and in all Section 177 states.

4. Comment: The proportionality calculation in the travel provision will serve its intended purpose in cases where the sales ratio between a Section 177 State and California remains constant over time. It will also serve its intended purpose in cases where a manufacturer is not using any carry-forward or carry-back of credits. In these cases, a manufacturer that achieves compliance with the gold requirement in California (e.g., 0.79 percent in 2012 to 2014) will achieve compliance with the gold requirement in the Section 177 State at exactly the same percentage, i.e., 0.79 percent in 2012 to 2014, without any extra credits or any shortage of credits. However, this most likely will not be the norm, since production/sales plans will not exactly match compliance requirements. Therefore, in most cases, manufacturers will use carry-forward or carry-back of credits while the sales ratio between the Section 177 State and California will change over time. This may result in a manufacturer achieving sufficient credits in California (e.g., 0.79 percent in 2012 to 2014) but not having sufficient credits in the Section 177 State. The LVM’s comments for the 1st 15-day Notice provided examples of such situations under both a carry-forward scenario and under a carry-back scenario.

Ideally, in situations where a manufacturer uses carry-forward/carry-back credits, the proportionality calculation would result in the same percentage of credits in both California and the Section 177 State for each MY for which those credits are

used. In general, if the manufacturer generated sufficient credits in California to cover the gold requirement, the manufacturer should be considered to have sufficient credits in the Section 177 State to cover the gold requirement. The LVMs request that CARB confirm that this is the intent of the travel provision proportionality calculation. (Chrysler, Ford, GM, Honda, Nissan, Toyota)

Agency Response: The commenter correctly states the intention of ARB's modifications to the proportionality provision in section 1962.1(d)(5)(E) and ARB's expectation of how credits earned in California would be regarded in Section 177 states when the applying both the carry-forward provision of 1962.1(g)(6)(B) and the requirement to make up a ZEV deficit as provided in section 1962.1(g)(7)(A) (also referred to informally as the carry-back provision).

5. Comment: If the travel provision is extended, we recommend a compensatory trade-off to ensure the foregone emission benefits are realized. (SCAQMD)

Agency Response: The 2008 rulemaking generally reduces emissions and the modification to section 1962.1(d)(5)(E) have very little impact on emissions in California. These modifications allow manufacturers to focus resources and efforts on much needed small scaled demonstrations, eventually leading to ZEV commercialization.

### **C. Unrelated Comments**

6. Comments: ARB received several comments which do not relate to the modifications presented in the second post-Board Hearing comment period. (Cabrera, Elliott, Guldenbrein, Haskell, Kunhardt, Rosen, SCAQMD, Yelverton)

Agency Response: The comments received do not speak to any modifications presented during the second post-Board Hearing comment period.