ZEV Regulation 2010
Staff Proposal

Public Workshop
November 16, 2010
Overview

- 2012-2014: Minor clarifying changes
- 2015-2017: Minor changes, some provisions extended
- 2018 and Beyond: Major changes
Guiding Principles

- 2050 Target requires a critical mass of vehicles by 2025
- 2025 Volume = high enough production to reach inflection point on cost curve
- Total ZEV program vehicle % of new sales is consistent with market demand
- Vehicle technologies are common in market place – i.e. multiple ZEV platforms
Likely Compliance Scenario
Min ZEV Compliance with expected FCV/BEV split

- FCVs: 14% of 2025 New Vehicle Sales
- BEVs: 12%
- TZEVs: 9%

Annual Vehicle Sales
# Likely Compliance Scenario

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ZEV Credit %</strong></td>
<td>6.12%</td>
<td>8.16%</td>
<td>10.20%</td>
<td>12.24%</td>
<td>16.59%</td>
<td>18.96%</td>
<td>21.33%</td>
<td>23.70%</td>
</tr>
<tr>
<td><strong>ZEV %</strong></td>
<td>3.06%</td>
<td>4.08%</td>
<td>6.12%</td>
<td>8.16%</td>
<td>11.85%</td>
<td>14.22%</td>
<td>16.59%</td>
<td>18.96%</td>
</tr>
<tr>
<td><strong>TZEV %</strong></td>
<td>3.06%</td>
<td>4.08%</td>
<td>4.08%</td>
<td>4.08%</td>
<td>4.74%</td>
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</tr>
<tr>
<td><strong># ZEVs</strong></td>
<td>23,021 (15%)</td>
<td>30,768 (2%)</td>
<td>44,894 (3%)</td>
<td>57,314 (4%)</td>
<td>80,568 (5%)</td>
<td>95,333 (6%)</td>
<td>109,513 (7%)</td>
<td>120,550 (8%)</td>
</tr>
<tr>
<td><strong># TZEVs (35 mi)</strong></td>
<td>59,471 (4%)</td>
<td>80,584 (5.5%)</td>
<td>81,807 (5.5%)</td>
<td>81,195 (5.5%)</td>
<td>95,787 (6%)</td>
<td>97,258 (6%)</td>
<td>99,484 (6%)</td>
<td>100,458 (6%)</td>
</tr>
<tr>
<td><strong>Total Vehicles</strong></td>
<td>82,493 (5.5%)</td>
<td>111,352 (7.5%)</td>
<td>126,702 (8.5%)</td>
<td>138,509 (9.5%)</td>
<td>176,355 (11%)</td>
<td>192,591 (12%)</td>
<td>208,997 (13%)</td>
<td>221,008 (14%)</td>
</tr>
</tbody>
</table>
Min ZEV Compliance (350 Mi FCV) with Max TZEV Compliance

Annual Vehicle Sales

2018 2019 2020 2021 2022 2023 2024 2025

Annual % of New Vehicle Sales

11% of 2025 New Vehicle Sales

FCVs

TZEVs
Min ZEV Compliance (100 Mi BEV)
with Max TZEV Compliance

18% of 2025 New Vehicle Sales

Annual Vehicle Sales

BEVs

TZEVs

Annual % of New Vehicle Sales

2018 2019 2020 2021 2022 2023 2024 2025
Max ZEV Compliance (No TZEV)
With Expected FCV/BEV Split

Annual Vehicle Sales

9% of 2025 New Vehicle Sales

*Assumes NO TZEV Compliance

FCVs

BEVs

*Assumes NO TZEV Compliance
New IVM/LVM & Ownership Definitions

- IVM definition: less than 20,000 vehicles on annual average
- Ownership: owned 33.4% or more by another, sales aggregated for size determination
### LVMs and IVMs (Status)

<table>
<thead>
<tr>
<th>LVMs</th>
<th>Transitioning LVMs</th>
<th>Continuing IVMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toyota</td>
<td>BMW (2012)</td>
<td>Subaru</td>
</tr>
<tr>
<td>Honda</td>
<td>Daimler (2016)</td>
<td>Volvo</td>
</tr>
<tr>
<td>Nissan</td>
<td>VW (2018)</td>
<td>Mitsubishi</td>
</tr>
<tr>
<td>GM</td>
<td>Mazda (2018)</td>
<td>JLR</td>
</tr>
<tr>
<td>Chrysler</td>
<td>Hyundai (2018)</td>
<td></td>
</tr>
<tr>
<td>Ford</td>
<td>Kia (2018)</td>
<td>* Continuing IVMs will be able to fully comply with TZEVs</td>
</tr>
</tbody>
</table>

* Continuing IVMs will be able to fully comply with TZEVs
IVM Requirements

2015 through 2017
- Currently: 14% credit requirement
- Proposal: Reduce credit requirement to 12%
  - PZEVs = 60% of IVM new vehicle sales

2018 through 2025
- Intermediate volume manufacturers can meet their entire requirement with TZEV credits
Possible Ramp-In Options

Continuing IVMs and Transitioning LVMs

1. No cap for converted PZEV credits in 2018 and 2019 for IVMs, so that their entire requirement could be met with converted credits

2. Only 75% reduction to upgrade from PZEV to TZEV
ZEV Credit Factors

- 2012-2017: No change
- 2018 and beyond: Credit based on range only
- Credit range between 1 and 4, with 50 mile (UDDS) min, and 350 mile (UDDS) max
ZEV Credits

Credit (<=2017)/ 2018/ Proposed Linear 1-4

CityEV UDDS= 50
C= 2 / 1

Leaf UDDS=100
C= 3 / 1.5

iMIEV UDDS>= 75
C= 2.5 / 1.25

FCV UDDS= 200
C= 5 / 3 / 2.5

FCV UDDS= 350
C= 7 / 3 / 4

Existing 2009-2017
Existing 2018+
NEW Credits (14)
Placed in Service (Current)

- Review: ZEVs receive 1 credit for being delivered for sale, and receive additional credits after being placed in service

- Review: NEVs must be placed in service
Placed in Service (Proposed)

2018 and Beyond:

- NEVs required to be placed in service
- ZEVs no longer required to be placed in service
- Manufacturers are to submit list of VINs for ZEVs delivered for sale
TZEVs
The New Enhanced AT PZEVs

Definition

- TZEV = Transitional Zero Emissions Vehicle
- Requires use of a ZEV fuel
  - Electricity (PHEV)
  - Hydrogen (dedicated)
- Meets SULEV emission level
- 15yrs/150k mi Emissions Warranty
- 10yrs/150k mi Battery Warranty
- Earns at least 0.5 credits
TZEV Credits

- Simplify credits by eliminating low fuel cycle emissions allowance and advanced componentry allowance

- Adjust overall credit range
  - Current: 1-2.5 credit
  - Proposed: 0.5-1.25 credit (*considering lower min credit)

- HICEs must have 200 mile range and receive 0.75 credits
  - Plug-in HICE Credits = 0.75 credits + zero emission VM T allowance
  - Total credit will not exceed 1.25
PHEVs

Qualifications:

- >=50kWe (electric kilowatts) drive
- Traction Drive System voltage >=60
- EAER (equivalent all electric range) >=10 miles (unadjusted UDDS range)
- All consumer accessible operating modes must be recharge dependant

Credits:

Based on UDDS

- Credit = \[UF_{R_{cda-d}} \times ERF \times C1\] + C2

Based on US06

- Credit = \[UF_{R_{cda}} \times ERF \times C1\] + C3

UF = Utility Factor, based on range

\(R_{cda-d}\) = Discounted Range
Charge Depletion Actual

ERF = Electric Range Fraction
\(\frac{EAER}{R_{cda}}\)

C1=15
C2=0.136
C3=0.236
Proposed TZEV-PHEV Credit VS UDDS Miles (6e)

Credit vs UDDS Curves (80%/ 90%/ 100% ERF)

US06 Option

Chevy Volt (?)

Miles, Rcda, UDDS cycle (US06 values converted to UDDS by 1.33X factor)
Advanced Componentry Allowance

- Eliminating Type C advanced componentry allowance after MY 2011
Travel Provision

- Type I, I.5, and II: extended through 2017 MY, sunset in 2018 MY
- Type III: no change, sunset in 2018 MY
- Type IV and V (ie. Fuel cell vehicles): travel until sufficient complimentary policies established in S177 states
- No travel for TZEV, AT PZEV, or PZEV
ZEV Bank

- For simplification, NMOG no longer used in ZEV bank accounting

- Process:
  - After 2013 MY reporting is complete, manufacturers’ bank balances will be divided by 0.035
  - In 2014 MY and beyond, transactions with the ZEV bank will be in terms of ZEV credits
PZEV and AT PZEVs

- PZEVs and AT PZEVs will remain as compliance options in regulation through MY 2017

- Only TZEVs and ZEVs will remain in the ZEV program 2018 and beyond
Historical Credits

- Historical PZEVs and AT PZEV credit banks converted after MY 2017 compliance

- **PZEVs: 93.75% Discount**
  - Example: 60 PZEVs = 1 TZEV

- **AT PZEVs: 75% Discount**
  - Example: 5 AT PZEVs = 1 TZEV

- Converted credits: only able to fulfill 50% TZEV category
  - IVMs allowed to fulfill entire requirement with converted credits through MY 2019
Advanced Demonstration Credits

Current:
- Available for TZEVs and ZEVs (Type I - V)
- Advanced Demo (AD) credits set to expire after MY 2014

Proposed:
- Sunset TZEV AD Credits after MY 2014
- Extend AD Credits for ZEVs (Type I - V) through MY 2017
- Sunset AD Credits for ZEVs at end of MY 2017
Transportation System Credits

- Lessen value of TS Credits for MY 2015-2017

<table>
<thead>
<tr>
<th>2015-2017</th>
<th>Shared Use, Intelligent Technologies</th>
<th>Linkage to Transit</th>
</tr>
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<tbody>
<tr>
<td>TZEVs</td>
<td>0.50</td>
<td>0.50</td>
</tr>
<tr>
<td>ZEVs</td>
<td>0.75</td>
<td>0.75</td>
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- Sunset TS Credits for ZEVs and TZEVs at end of MY 2017
Charging Requirements

- Updating 1962.2 to reflect charging requirements for all ZEVs
  - SAE J 1772 - January 15, 2010 Version
- Effective MY 2012
- Required for all MY 2014 and beyond NEVs
Penalty Equation

- 1 Full ZEV Credit = $5000 Penalty

DRAFT Regulatory Language:
2012-2013

- (No. of ZEV credits required to be generated for the model year) - (Amount of ZEV credits submitted for compliance for the model year) / (the fleet average requirement for PCs and LDT1s for the model year)

2014 +

- (No. of ZEV credits required to be generated for the model year) - (Amount of ZEV credits submitted for compliance for the model year)
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