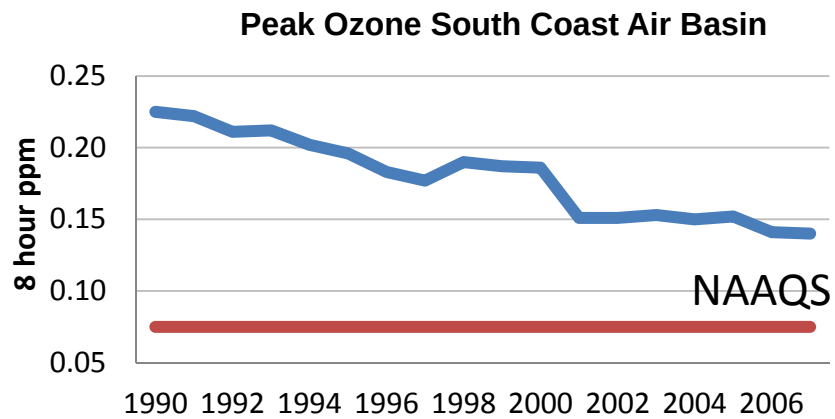
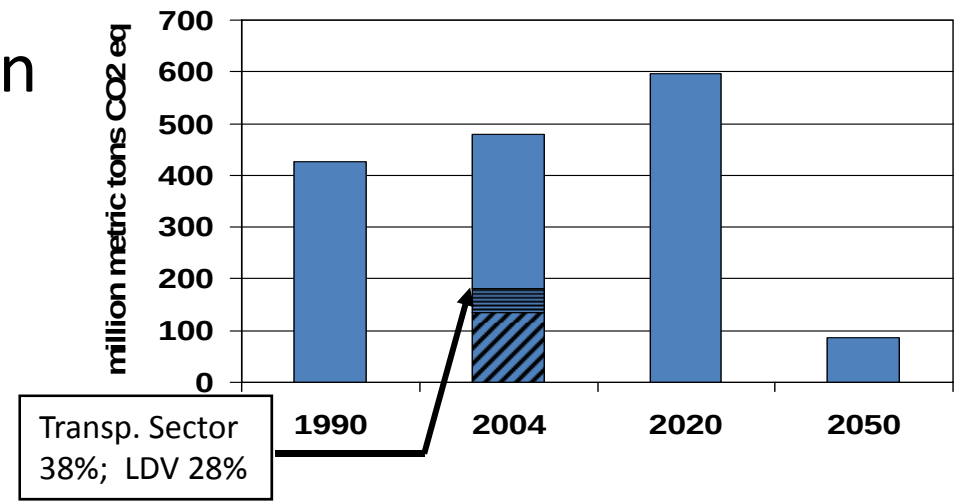
Public Hearing to Consider Advanced Clean Cars Program

Los Angeles, California
January 26th, 2012

Advanced Clean Cars Program Goals

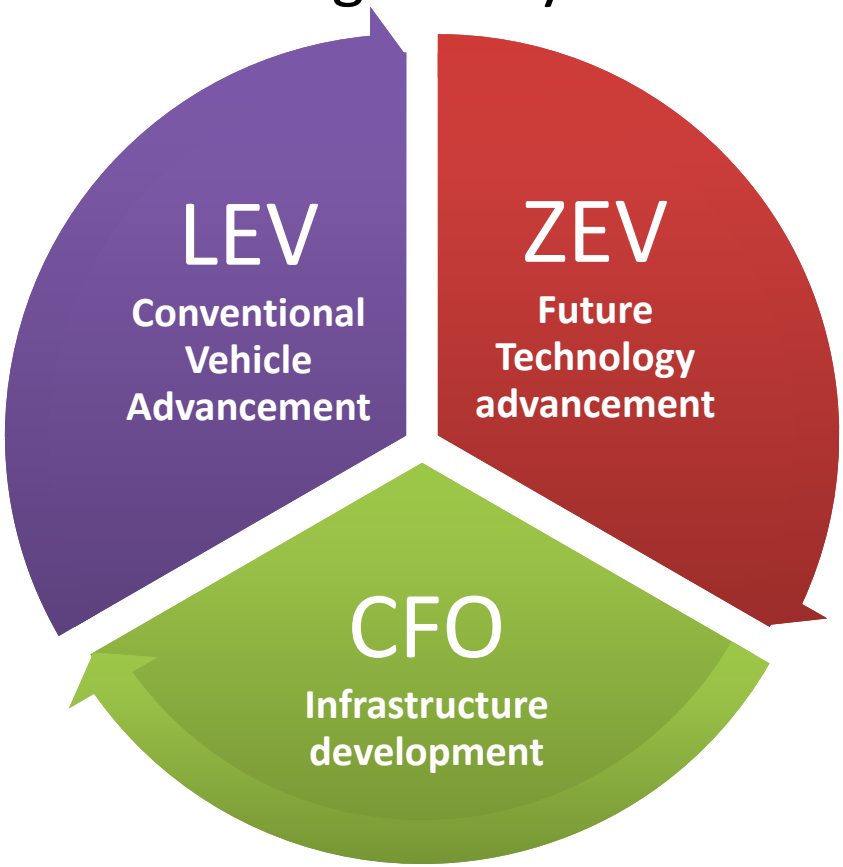
- Continued progress towards ozone attainment
- Reduce localized exposure
  - PM, toxics
- Ensure commercialization of ultra-clean vehicles
- Reduce GHG emissions
  - 80% by 2050





Advanced Clean Cars

Multi-pronged approach to meeting mid- and long-term emission reductions from light duty vehicles



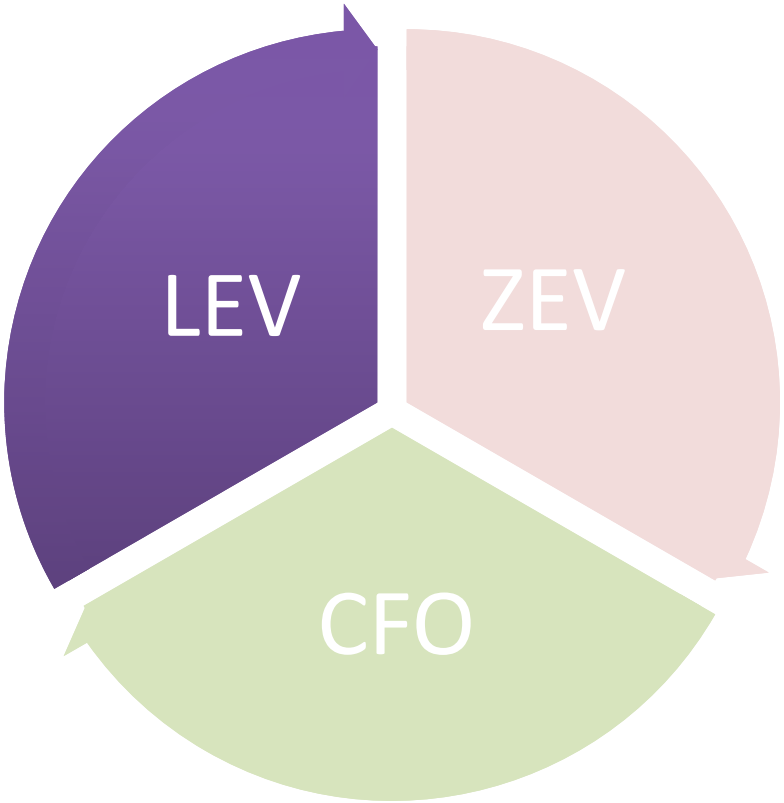
Advanced Clean Cars Program – CEQA

- Staff prepared a programmatic integrated environmental analysis in accordance with ARB's certified regulatory program under the California Environmental Quality Act
- Environmental analysis included in ISORs as Appendix B
- Analyzed proposed regulations' effects on the environment
  - Based on regulated community compliance responses
  - Beneficial air quality impacts
  - Potential adverse impacts to aesthetics, biology, cultural, hazards, hydrology, noise, transportation/traffic related to construction activities
- Feasible mitigation identified
- Alternatives analyzed

Outreach

- 10 public workshops beginning in early 2010
- Multiple meetings with stakeholders
- 3 Community Meetings in July 2011
  - A panel of experts provided a local perspective and expert information on air pollution, climate change, and transportation

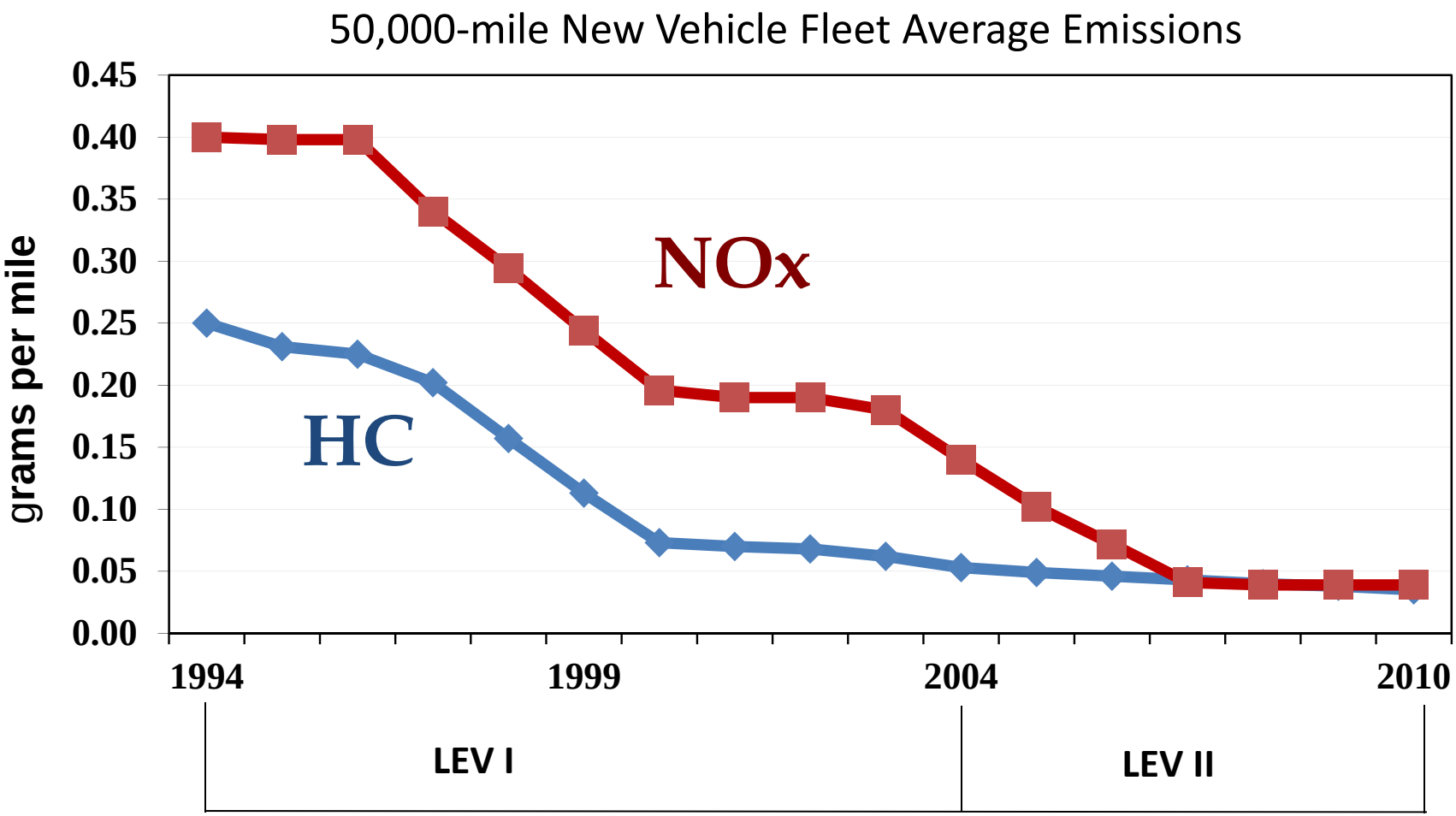
LEV III



LEV III:
Meeting Air Quality Standards

- LEV III regulations continue emission reductions for all new vehicles
  - More stringent standards – by 70% – for smog and soot pollutants

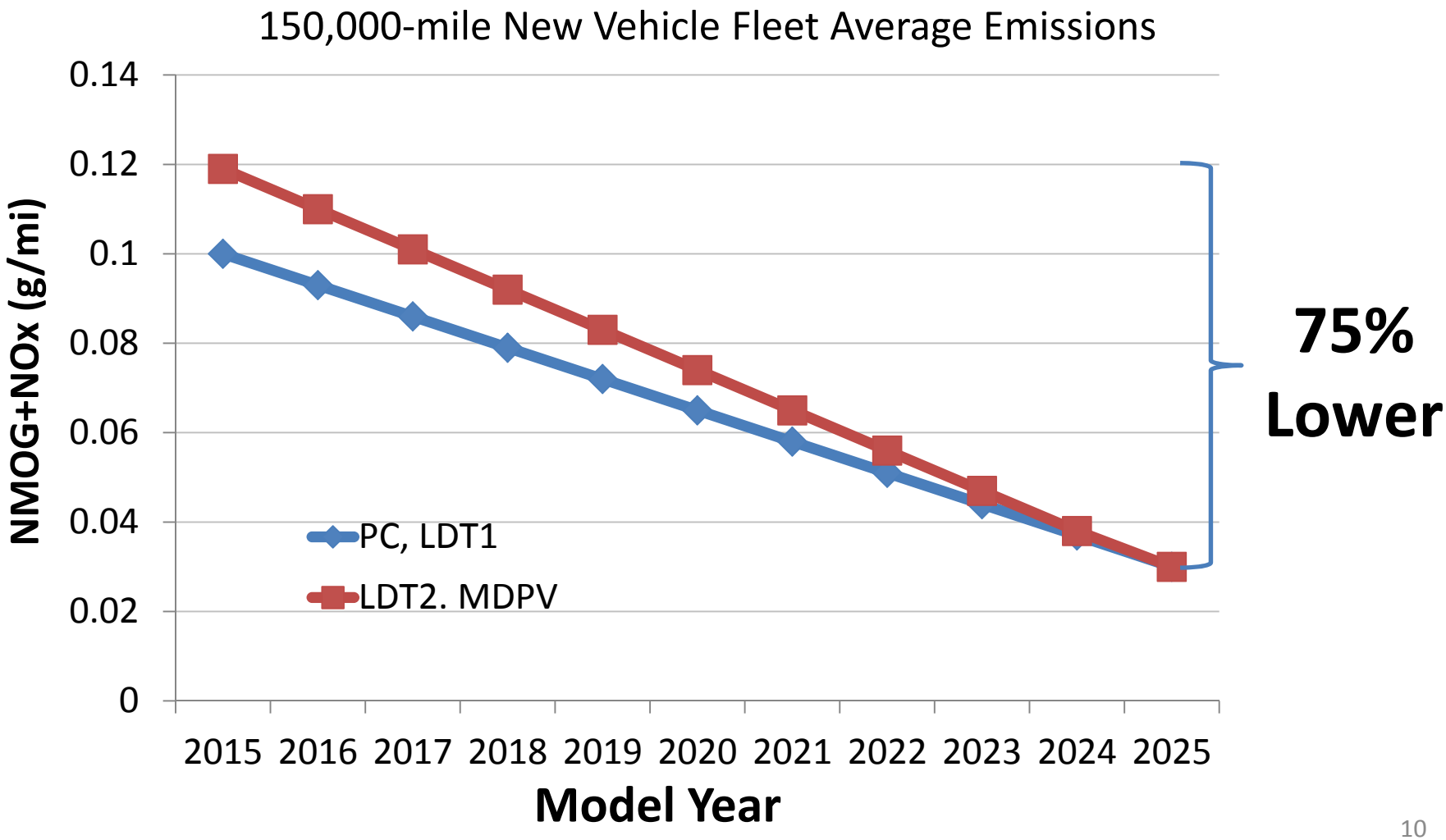
Accomplishments of the LEV Program



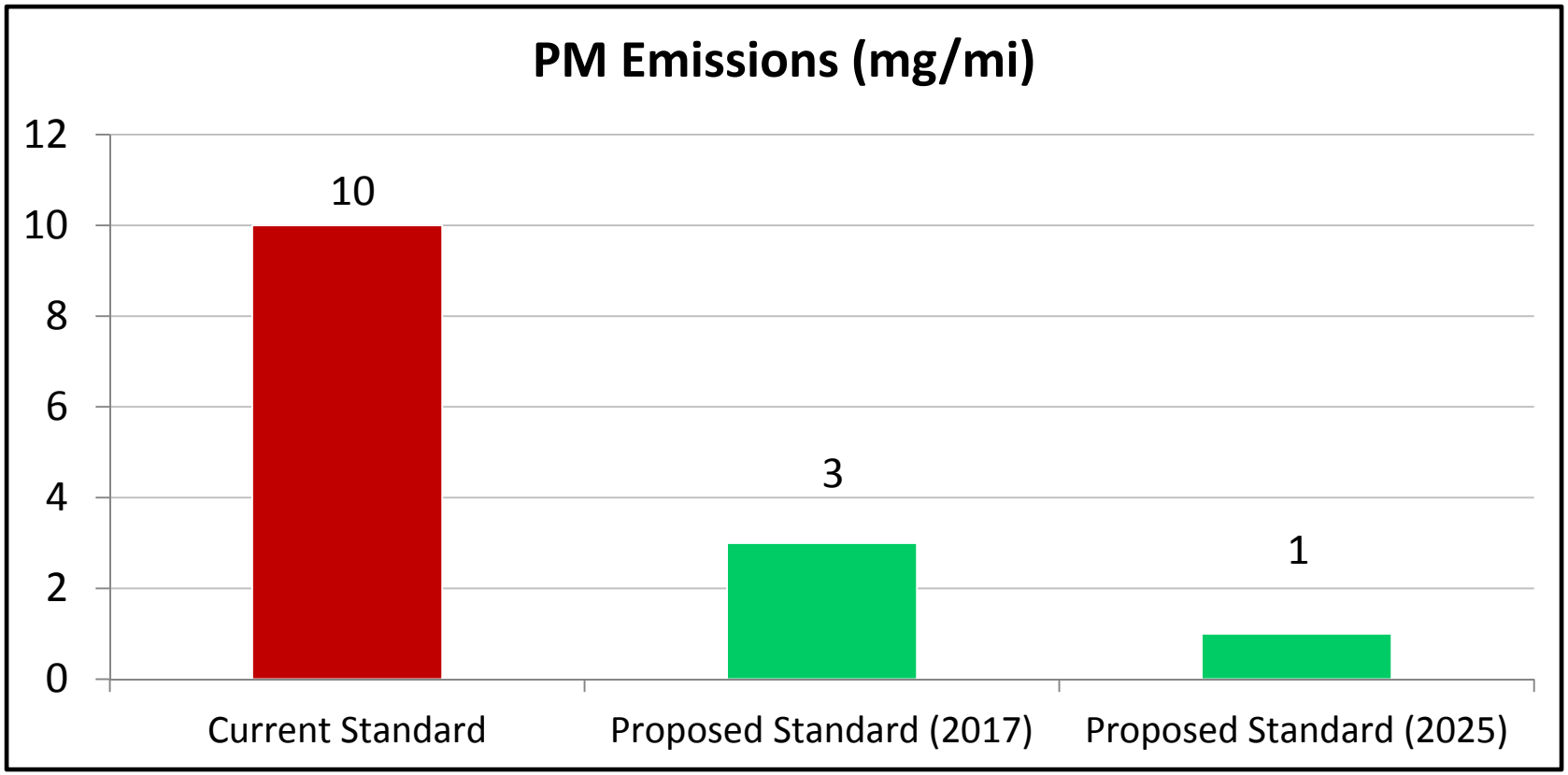
Proposed Revisions to LEV Program

- Phase-in 2015-2025
- Combined, increasingly stringent NMOG and NOx standards
- Increase durability requirement to 150,000 miles
- Emissions pooling

Proposed Fleet Average Emission Standards



LEV III Particulate Matter Standards



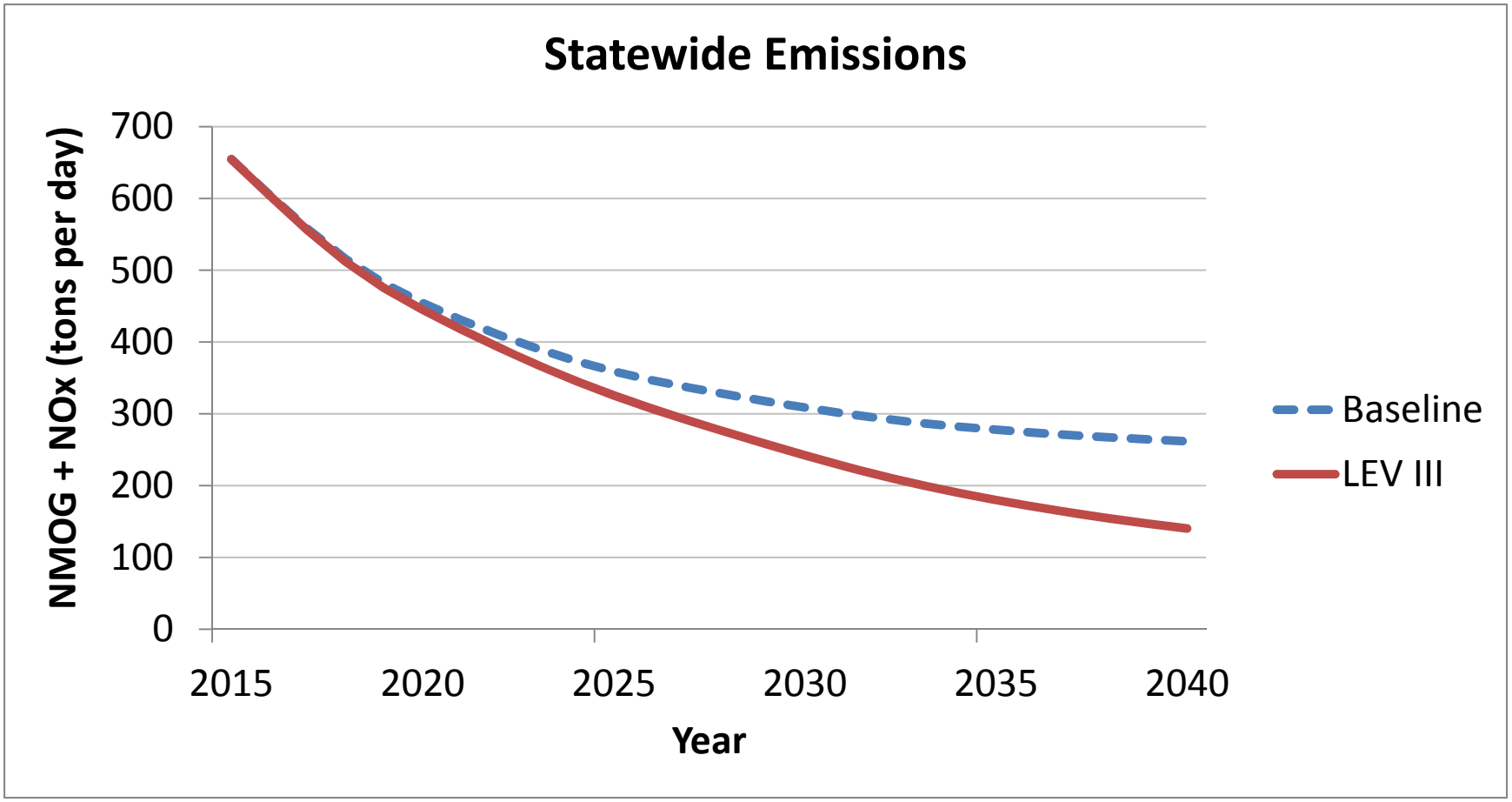
Supplemental Federal Test Procedure

- Increase stringency of standards for ULEVs and SULEVs
- Extend SFTP applicability to MDVs (8,501 lbs. – 14,000 lbs. GVWR)
- Require a SULEV-equivalent fleet average by 2025
- Increase durability requirement 150,000 miles
- New PM emission standards

Evaporative Emissions

- Extend zero-evaporative emission requirements currently in place for PZEVs to the entire light-duty vehicle fleet by MY 2022
- Added flexibility with two compliance options
- Extend Onboard Refueling Vapor Recovery (ORVR) requirements to all complete vehicles less than 14,000 pounds GVWR

LEV III Smog-Related Emission Benefits

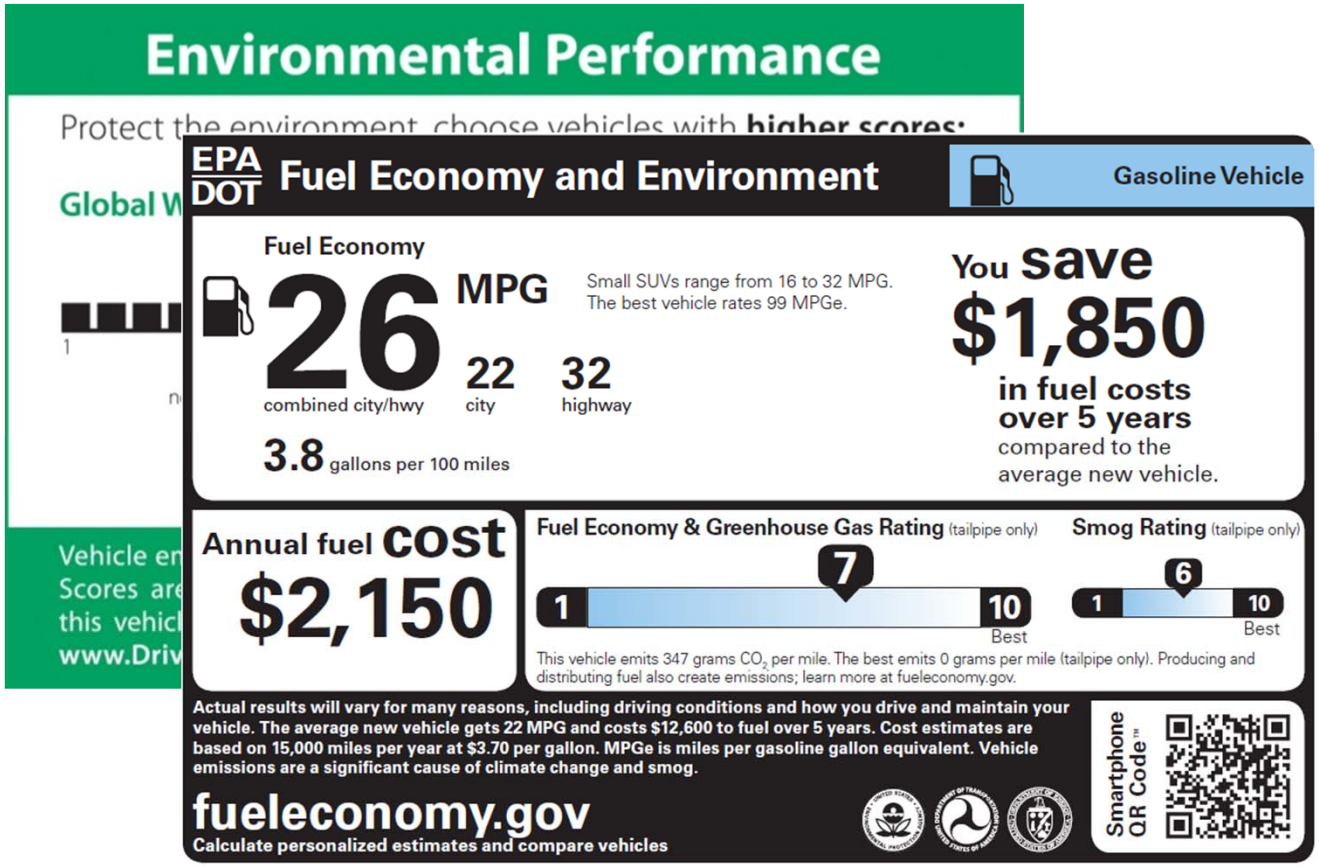


Other LEV III Amendments

- Minor amendments to the On-Board Diagnostics regulations for the 2013 Model Year

- Changes to the specifications for certification gasoline to reflect current commercial gasoline.

California Environmental Performance Label



LEV III: Reducing Greenhouse Gas Emissions

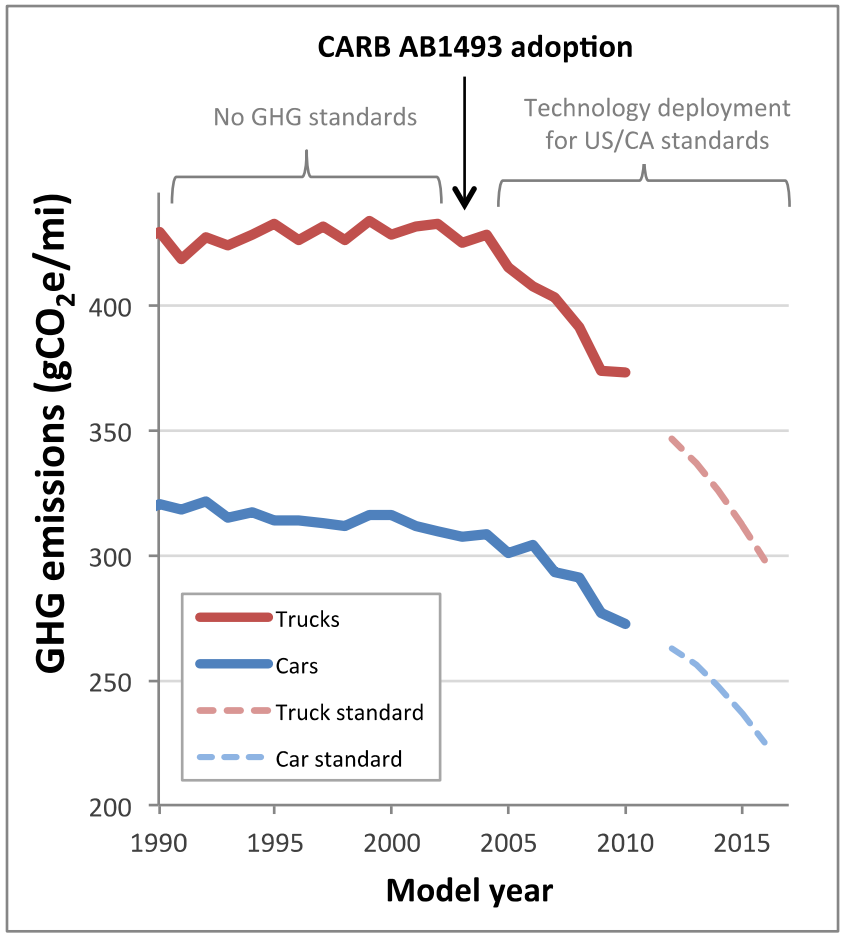
- LEV III regulations continue emission reductions for all new vehicles
  - Greenhouse gas (GHG) standards reduce climate emissions by 34%

GHG Standards: Background

- 2002: Legislature passes Pavley AB 1493
- 2004: ARB approval of 2009-2016 GHG standards
- 2010: USEPA adoption of California 2012-2016 GHG standards
- 2010-2011: Federal/California technical coordination
- Nov. 2011: USEPA proposal for 2017-2025 standards

GHG Emission Progress-to-Date

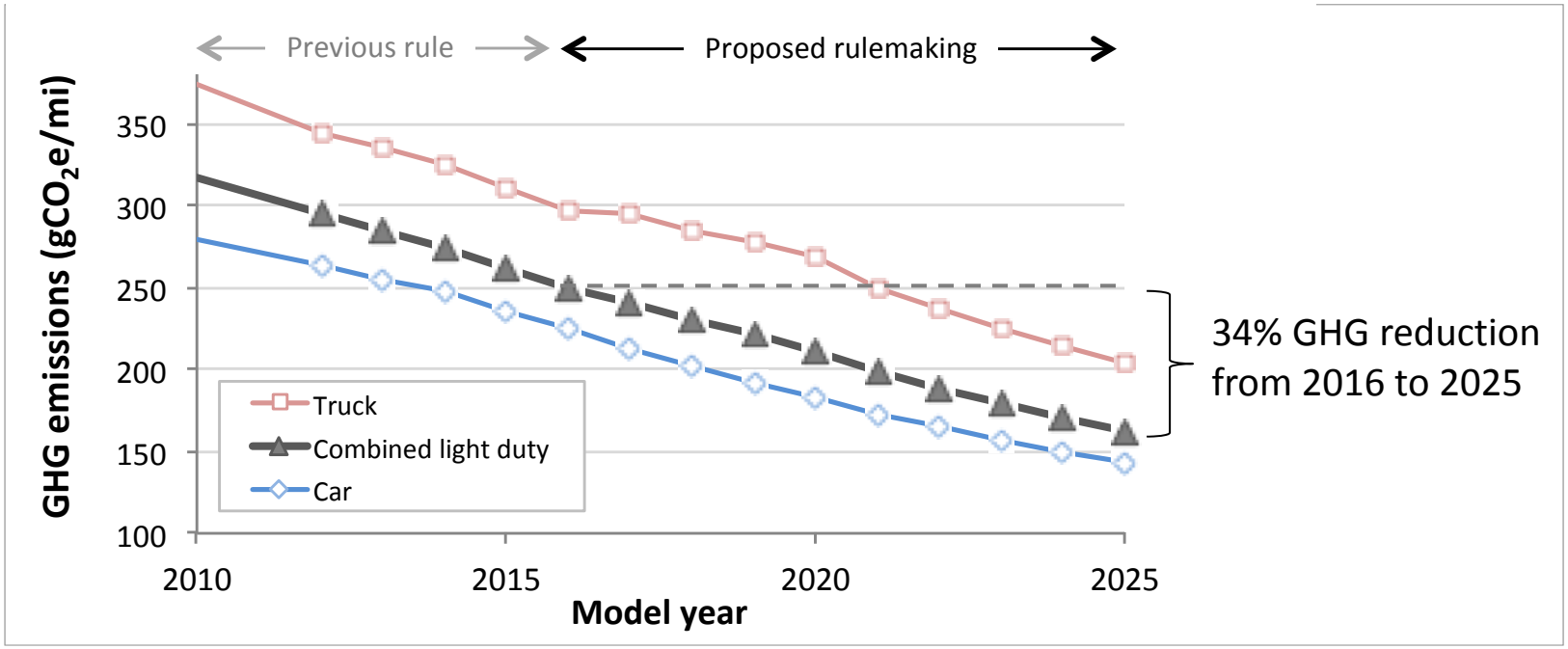
- Since 2004 ARB approval of GHG standards…
  - New vehicles are over 40% of the way toward 2016 compliance
  - Major early deployments of new engine, transmission, aerodynamics, and accessory technologies



Source: US EPA

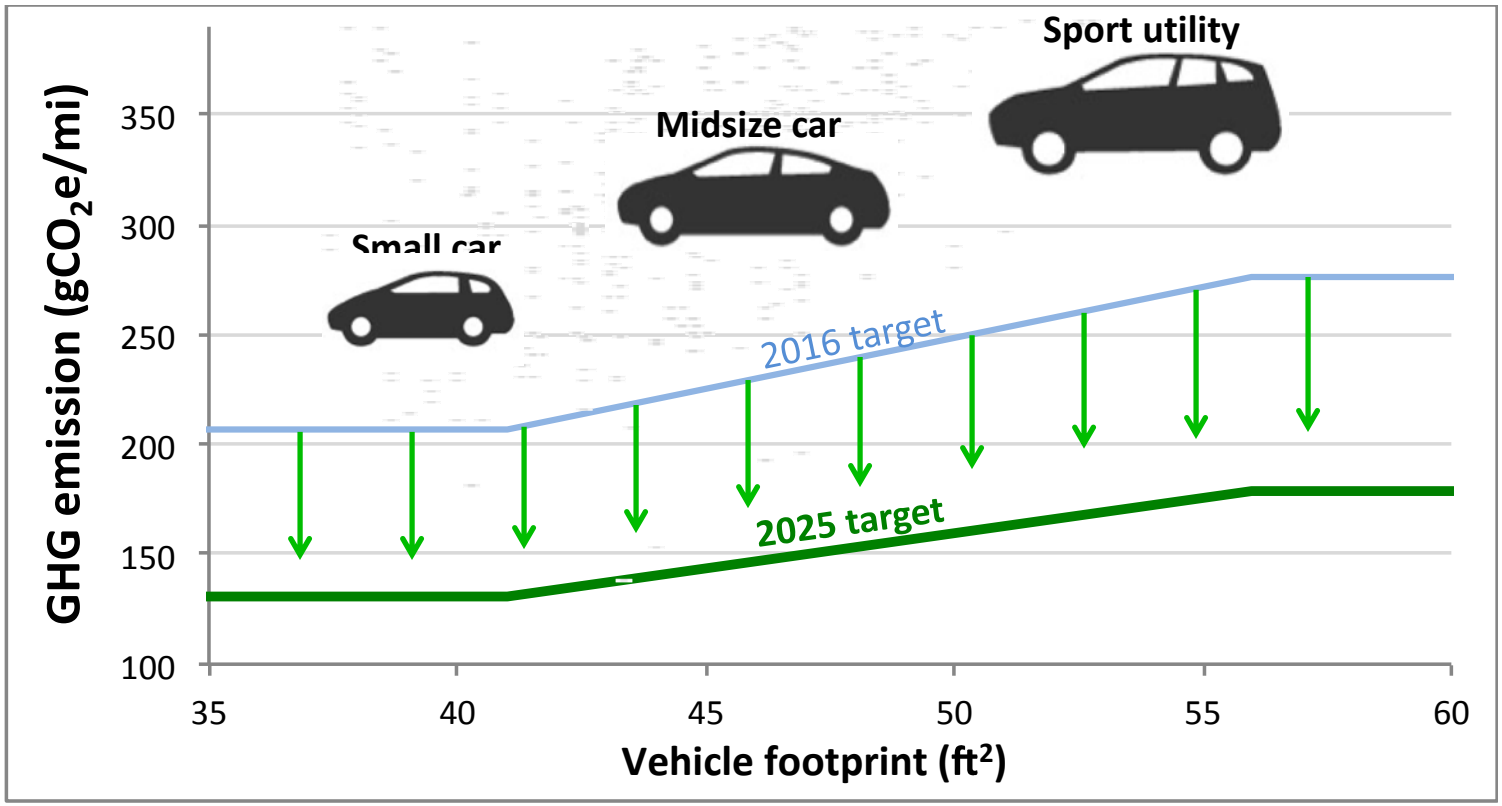
GHG Standard Proposal

- Proposal target: 166 gCO_2e/mile by 2025
  - GHG reduction of 4.6%/year for 2017-2025 model years
  - GHG reduction of 34% from 2016 to 2025



Flexible Footprint-Indexed Standards

- All vehicles must reduce GHG emissions by about the same percent



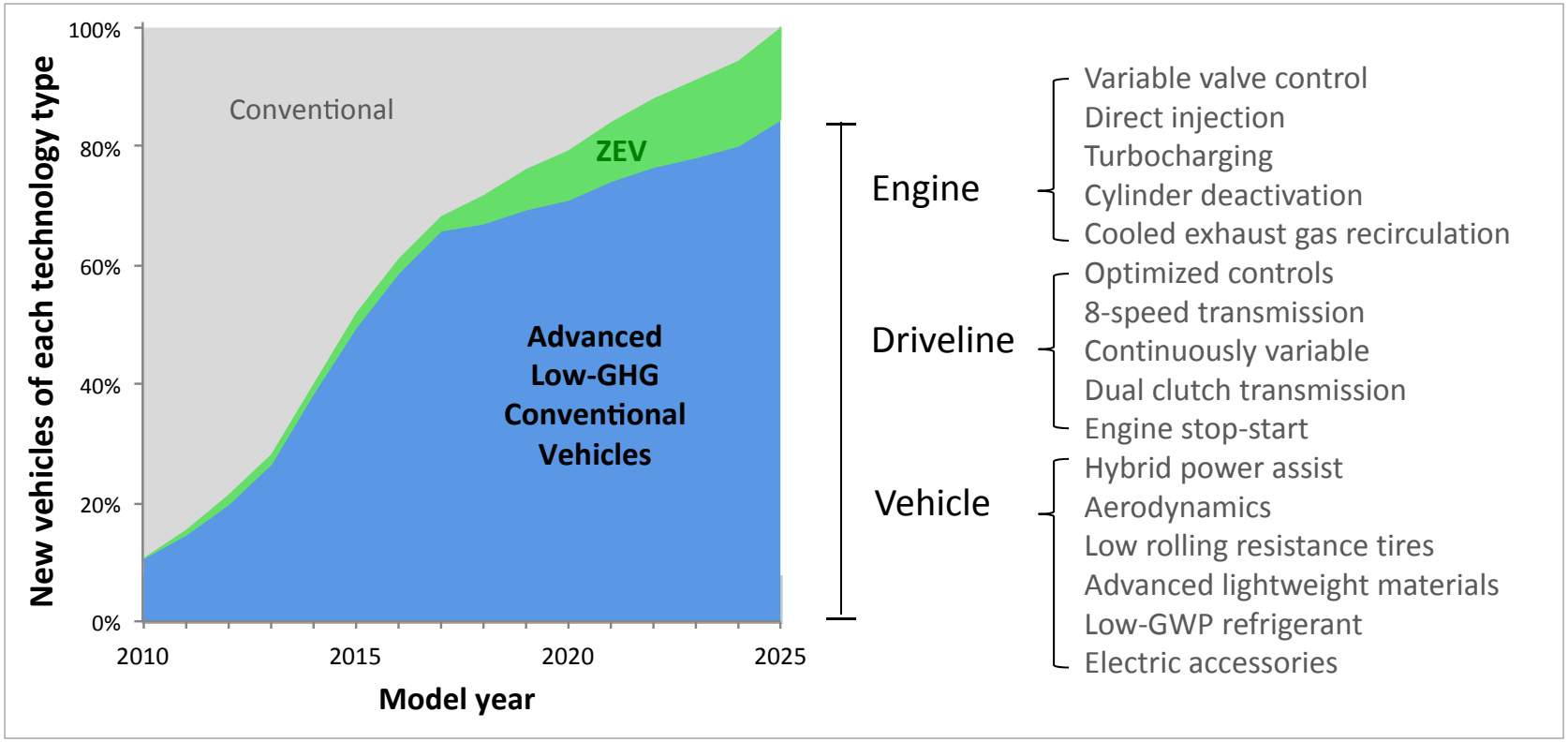
Note: There are corresponding footprint-indexed standard targets for light trucks

Flexibility Preserves Vehicle Choice

- Company sales-weighted averaging
- Footprint-indexed targets
- Separate car and truck standards
- Credit banking (5-year carryforward, 3-year carryback)
- Technology-specific credit opportunities

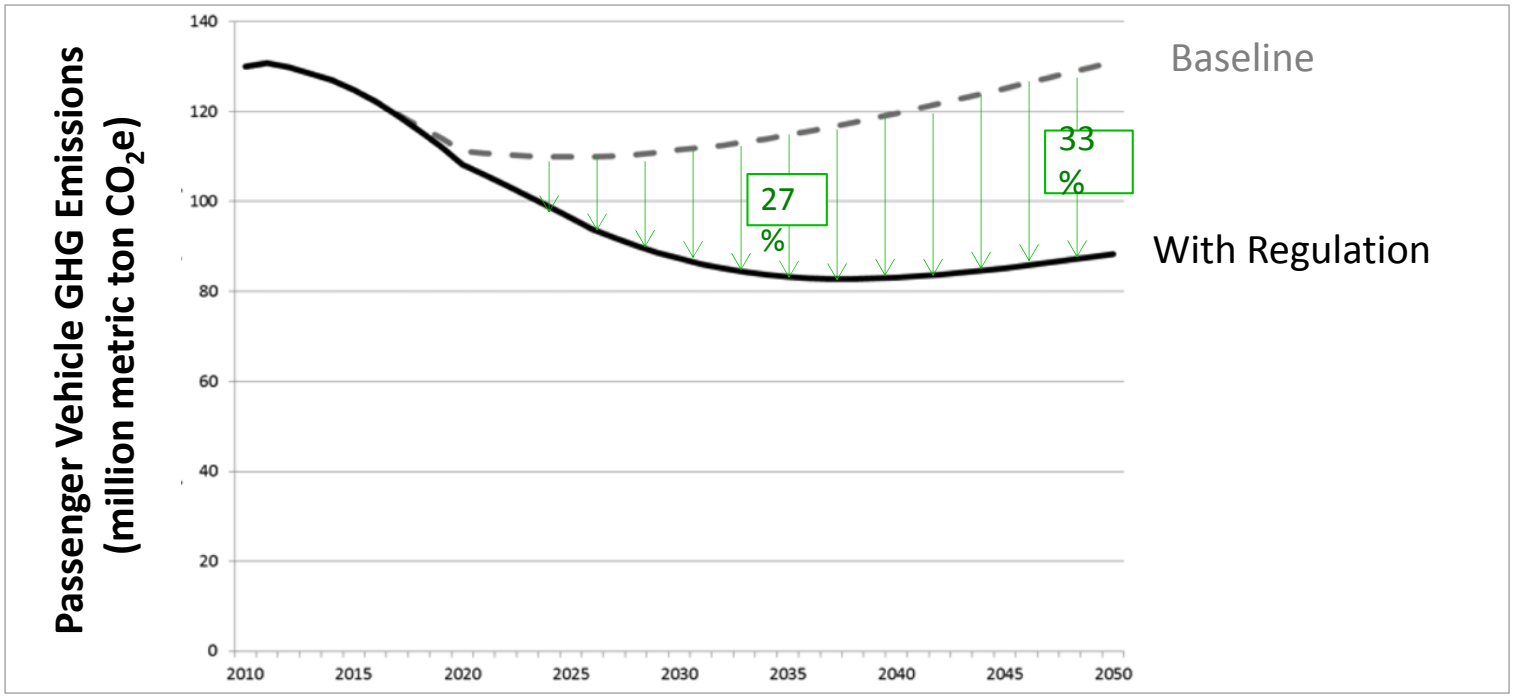
Emerging GHG Technology Solutions

- Off-the-shelf low-GHG technology becomes commonplace



Substantial GHG Reduction

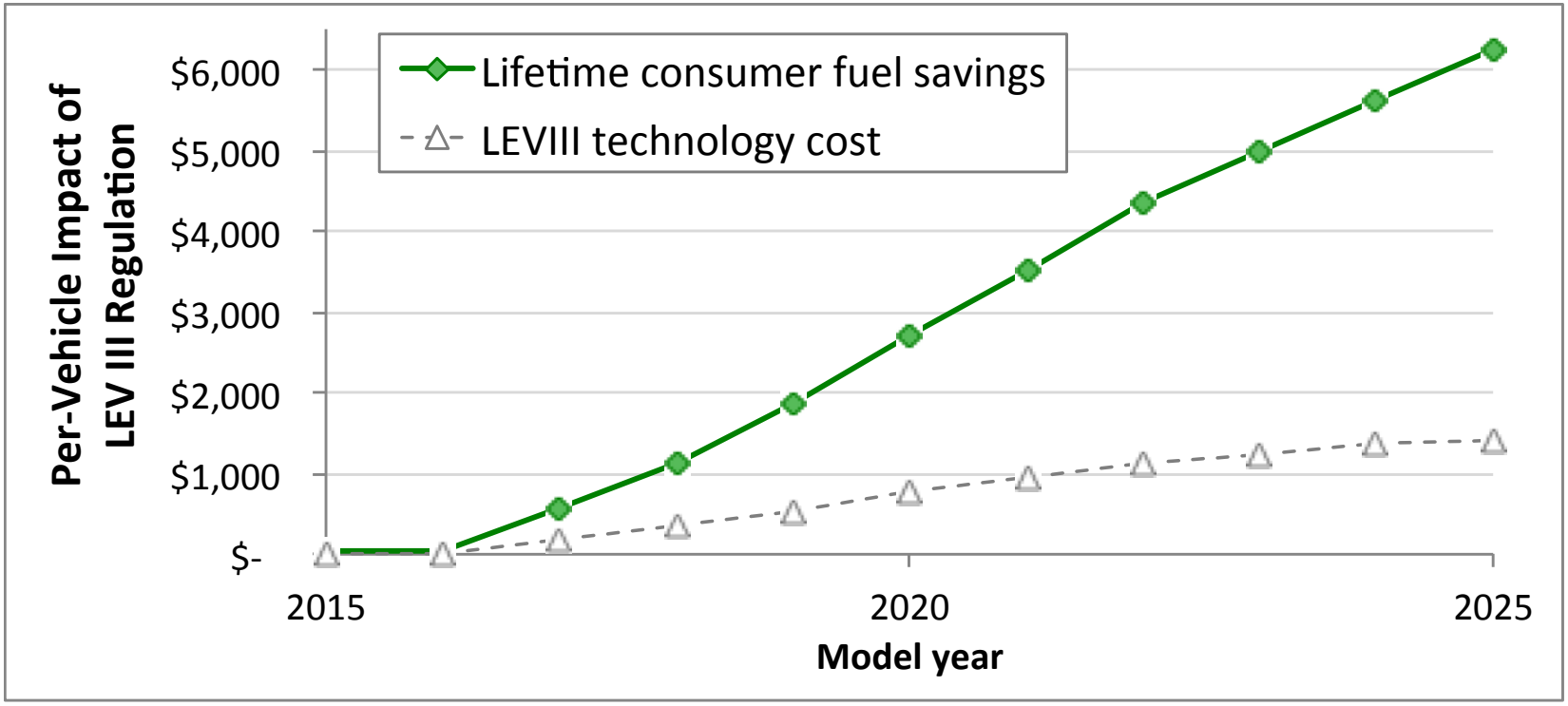
- Major impact as low-GHG vehicles replace older vehicles
  - GHG reduction in California: 27% in 2035 and 33% by 2050
  - Cumulative: 870 million metric tons through 2050



Federal Coordination

- ARB rulemaking has paralleled federal regulation timing
- "Deemed to comply" provision
  - ARB intends to deem compliance with US EPA GHG regulation as sufficient for ARB GHG regulation compliance, provided the final federal standards are substantially similar
- Mid-Term Review
  - ARB intends to participate in the federal agencies' "Mid-Term Review" to review standards for model years 2022-2025 (that is to be completed by April 2018).

Consumer Savings Exceed Technology Cost

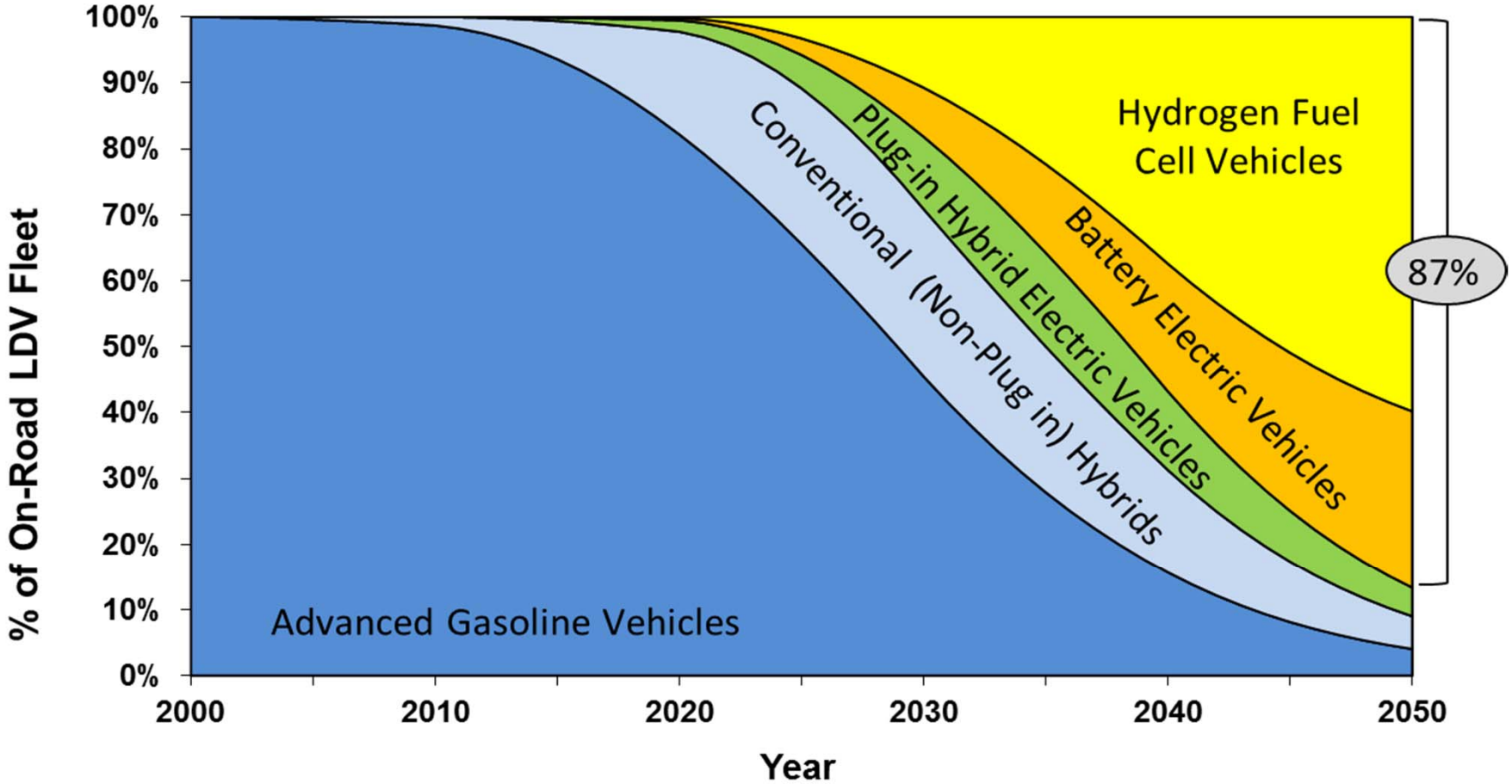


LEV III Regulation Summary

- Achieves maximum feasible and cost-effective emission reductions
- Accelerates transition to a cleaner fleet of California vehicles
- Provides manufacturers with lead time and flexibility
- Staff recommends Board adopt LEV III regulation as proposed

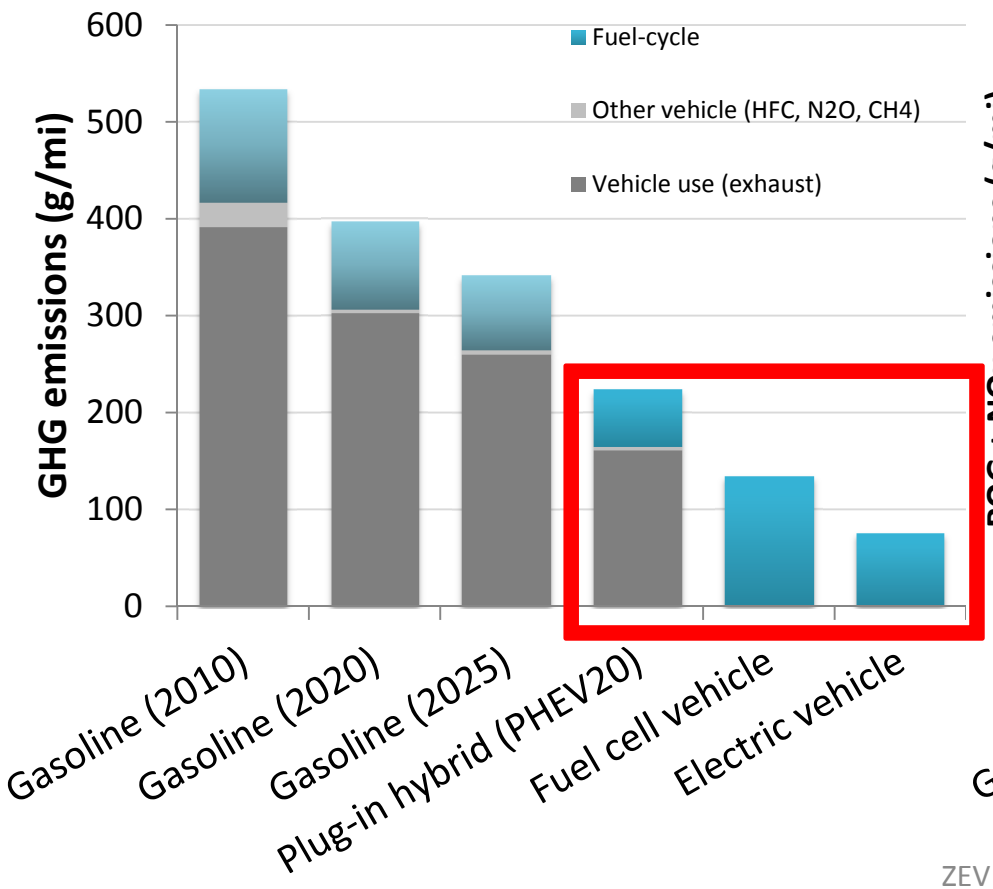
ZEV

Meeting GHG Goals

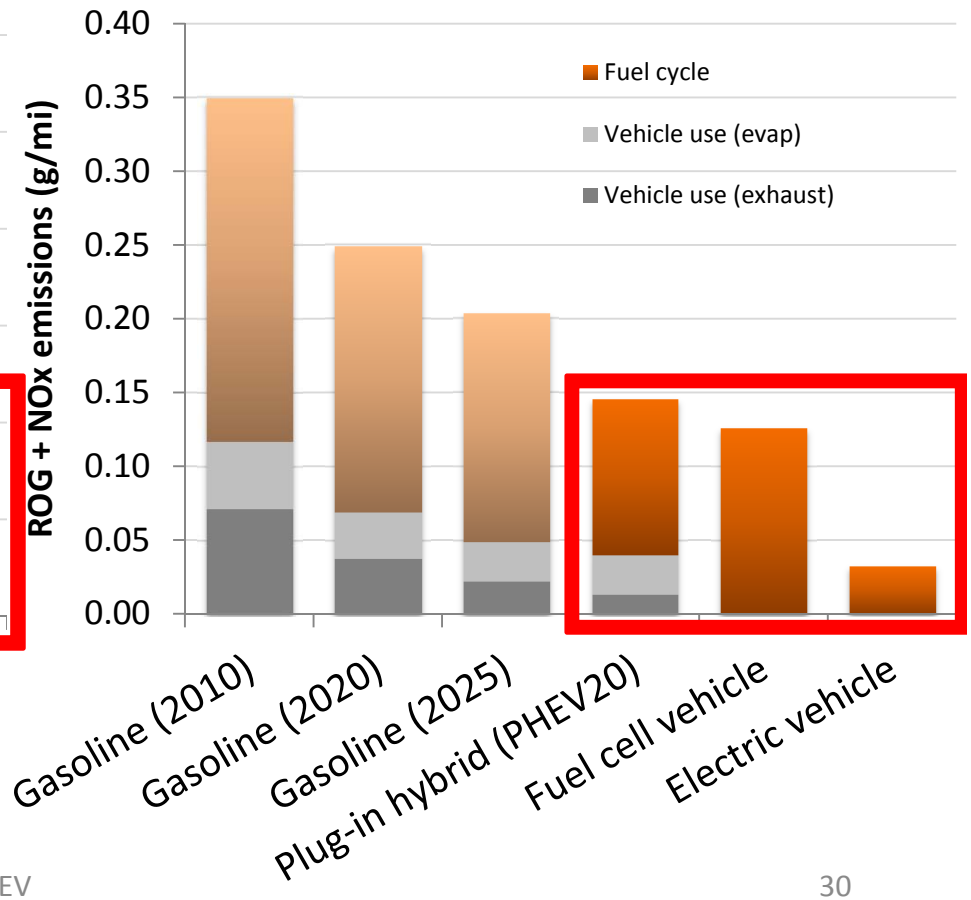


Cleaner than Advanced Gasoline Cars

GHG Comparison



Criteria Pollutant Comparison



How The Current Regulation Works

- Requires large OEMs to produce zero emitting passenger vehicles

Battery Electric Vehicles

Hydrogen Fuel Cell

- May substitute some with near-zero emission vehicles

Plug-in Hybrid Electric Vehicles

Conventional Hybrids

Clean Gasoline Vehicles

ZEV Regulation Successful

Type of ZEV	# Produced to Date for CA
Clean Gasoline Vehicles (PZEVs)	1,750,000
Conventional Hybrid (e.g. Prius)	380,000
Battery Electric	34,000
Hydrogen Fuel Cell	350

LEV III Criteria

LEV III GHG

ZEV Reg.

Lots of ZEVs!

Plug-In Hybrids

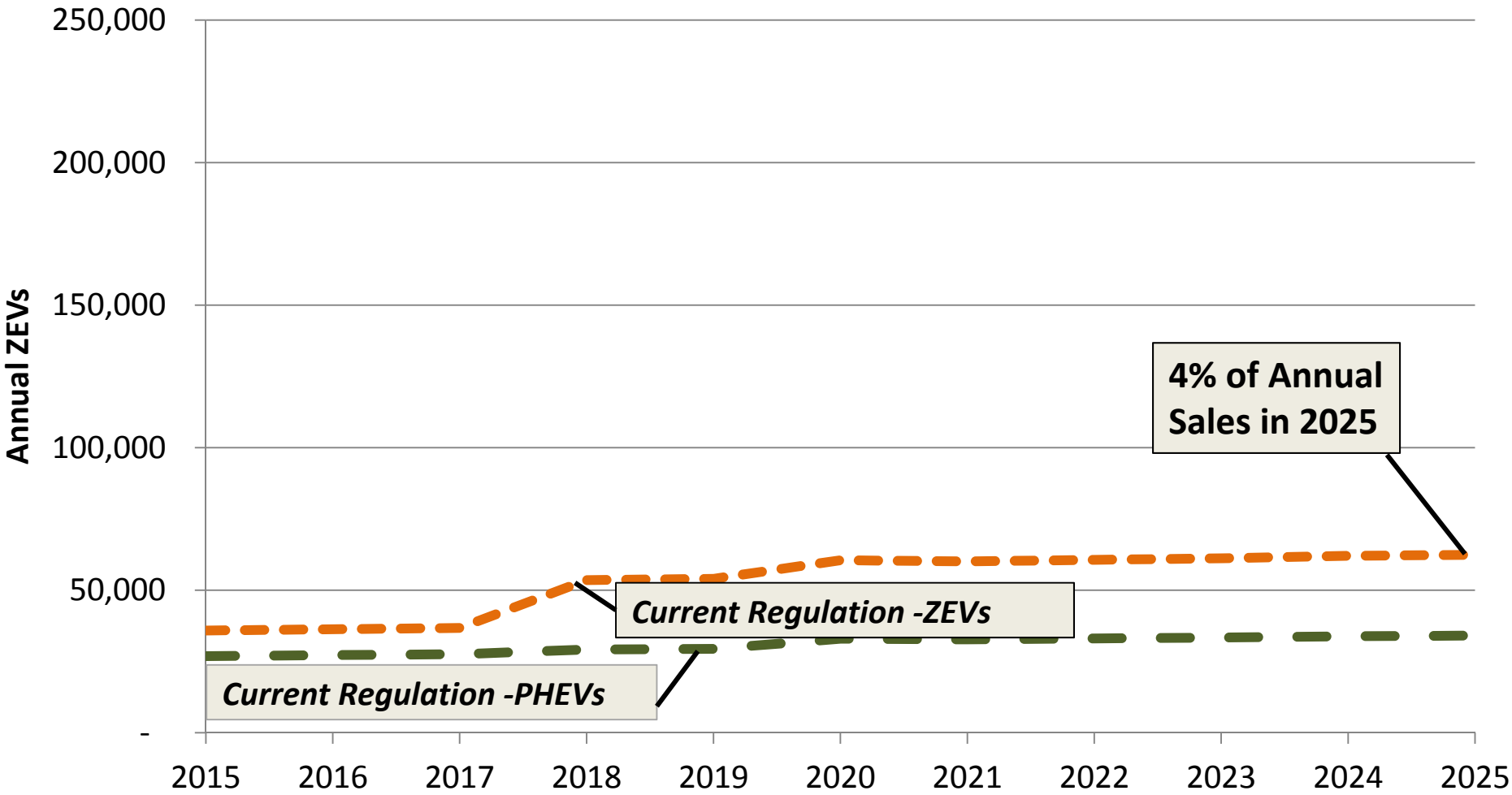
Fuel Cell Vehicles

Battery Electric Vehicles

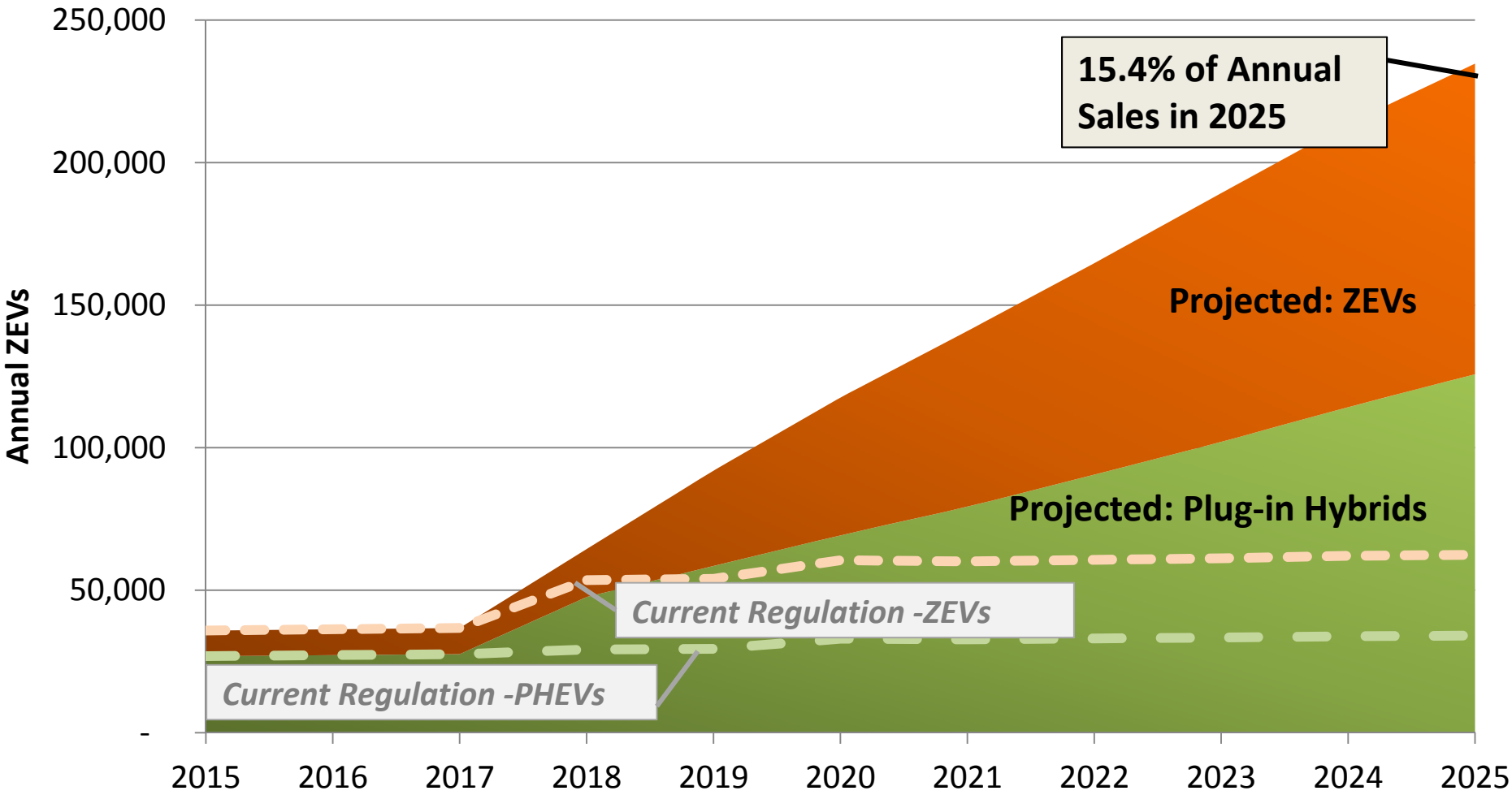
Summary of Staff's Proposal

- Increase ZEV requirement
- Include more manufacturers
- Amend ZEV Credits
- Amend PHEV Credits
- Added Flexibility

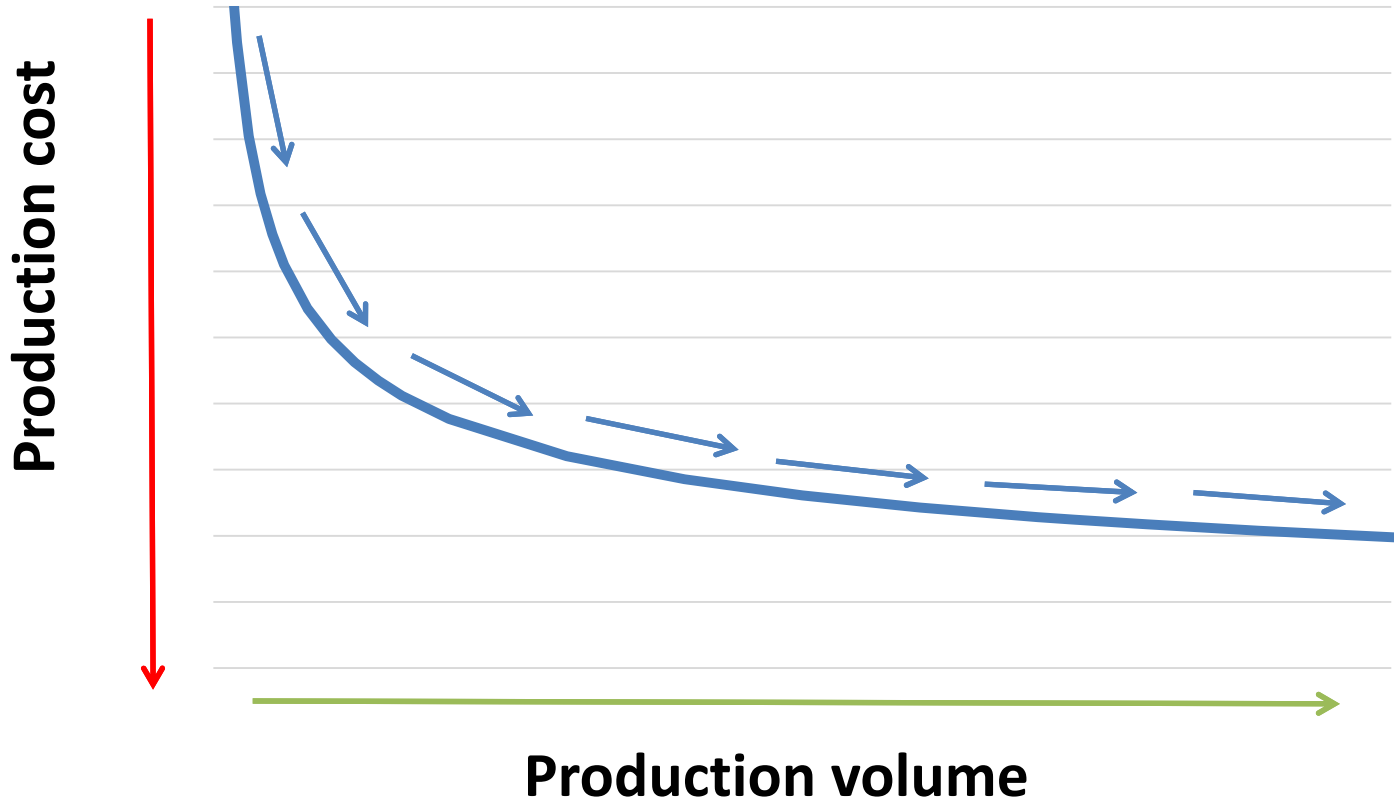
Current ZEV Requirements



Proposed ZEV Requirements



Increased Production Drives Down Price



CEO of Nissan at Detroit Auto Show

Who's Required to Comply?

Must Make ZEVs

- Chrysler
- Ford
- GM
- Honda
- Nissan
- Toyota

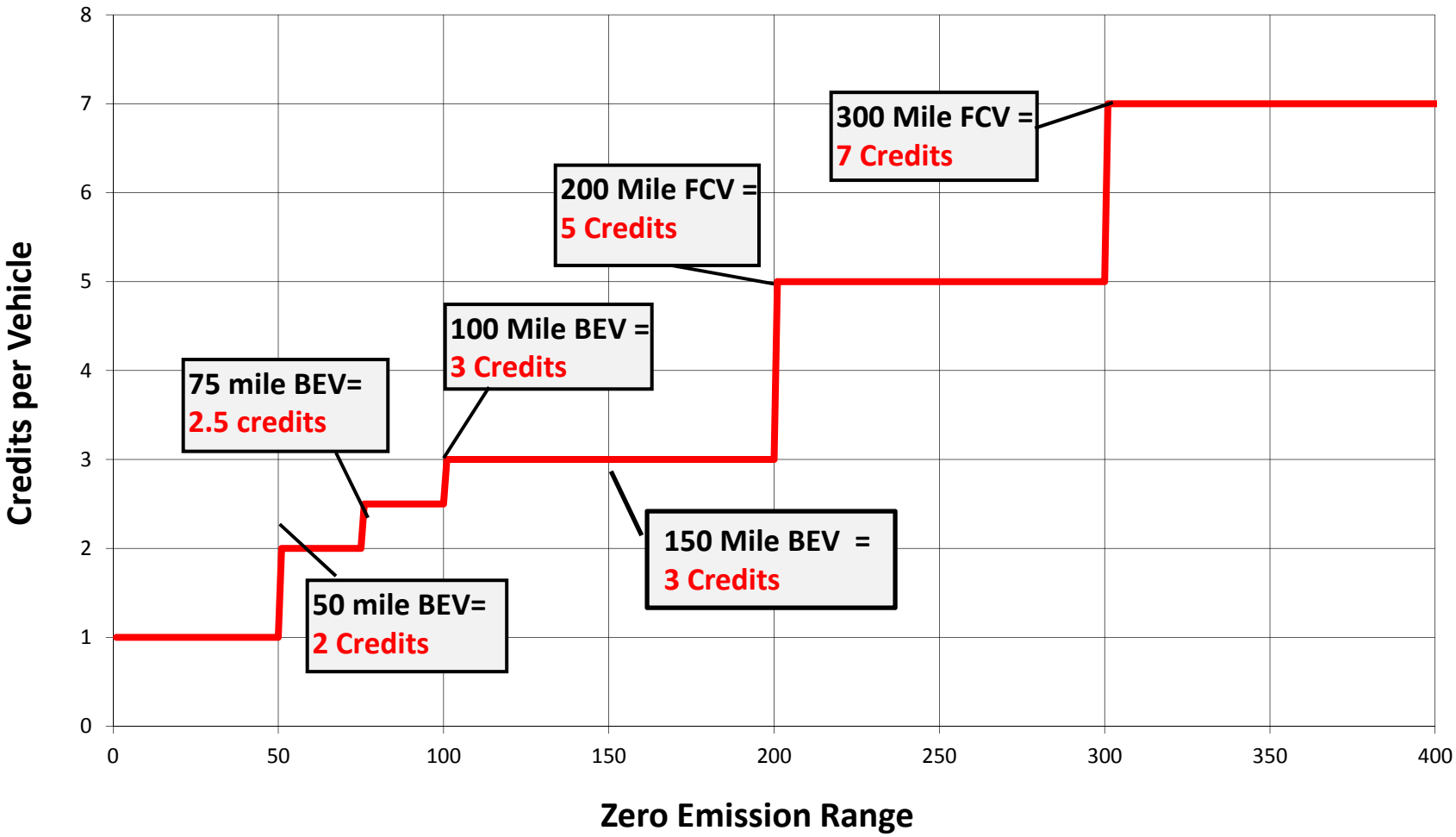
> 20,000 sales

Can make PZEVs

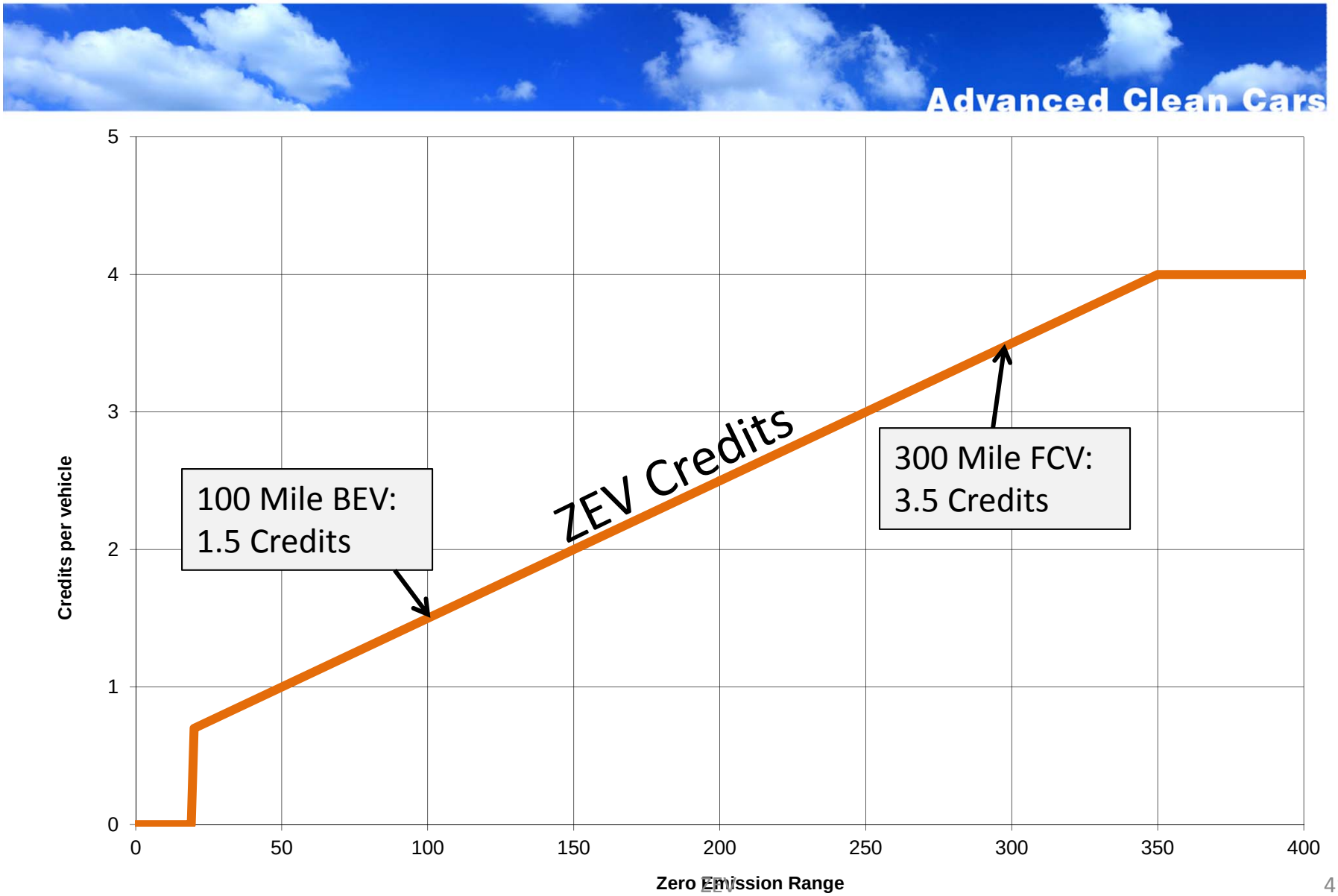
- BMW
- Hyundai
- Kia
- Mazda
- Mercedes
- Volkswagen
- JLR
- Mitsubishi
- Subaru
- Volvo

*** IVMs will be able to fully comply with Plug-in Hybrids**

Current ZEV Credits



Simplified ZEV Regulation Credits



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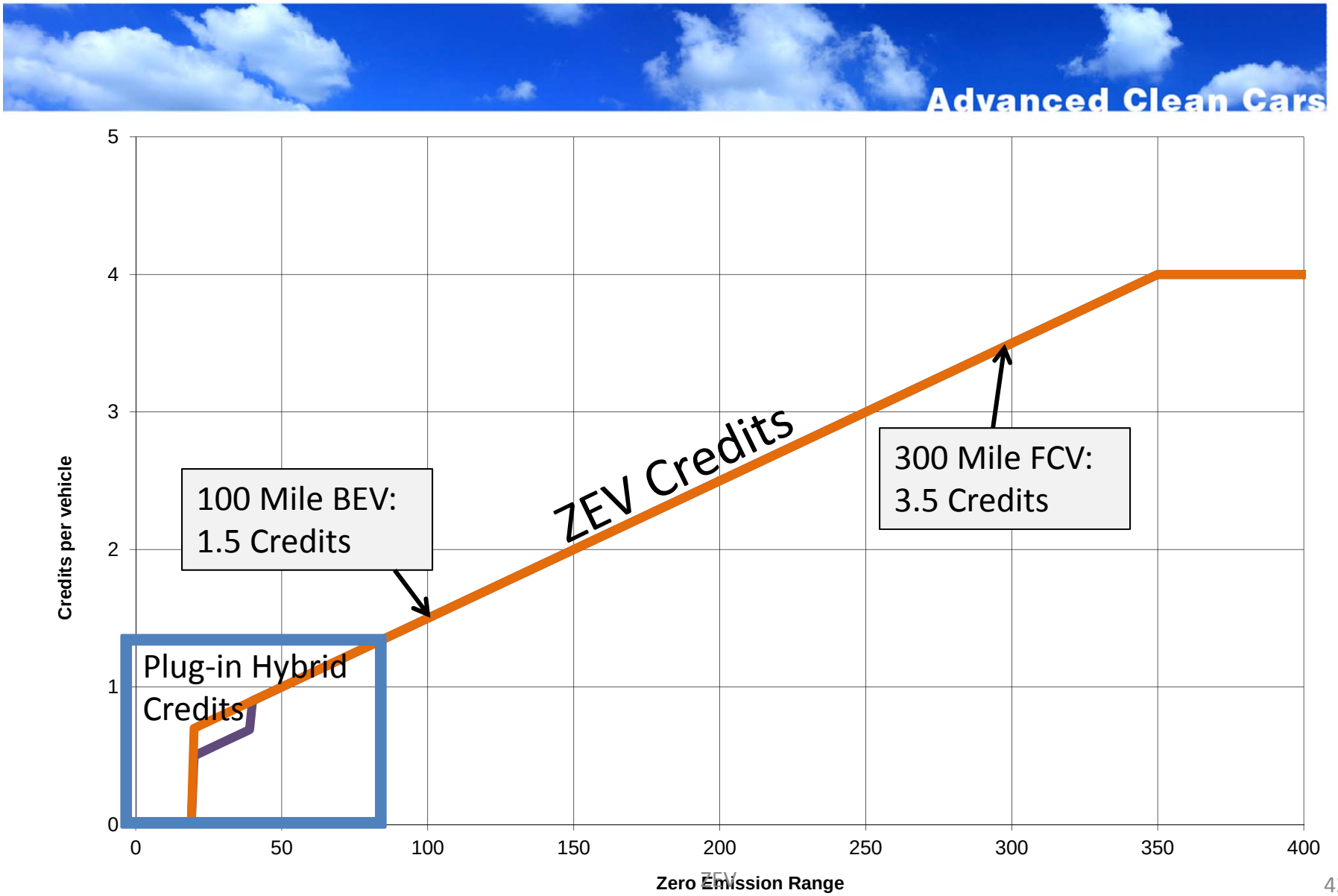
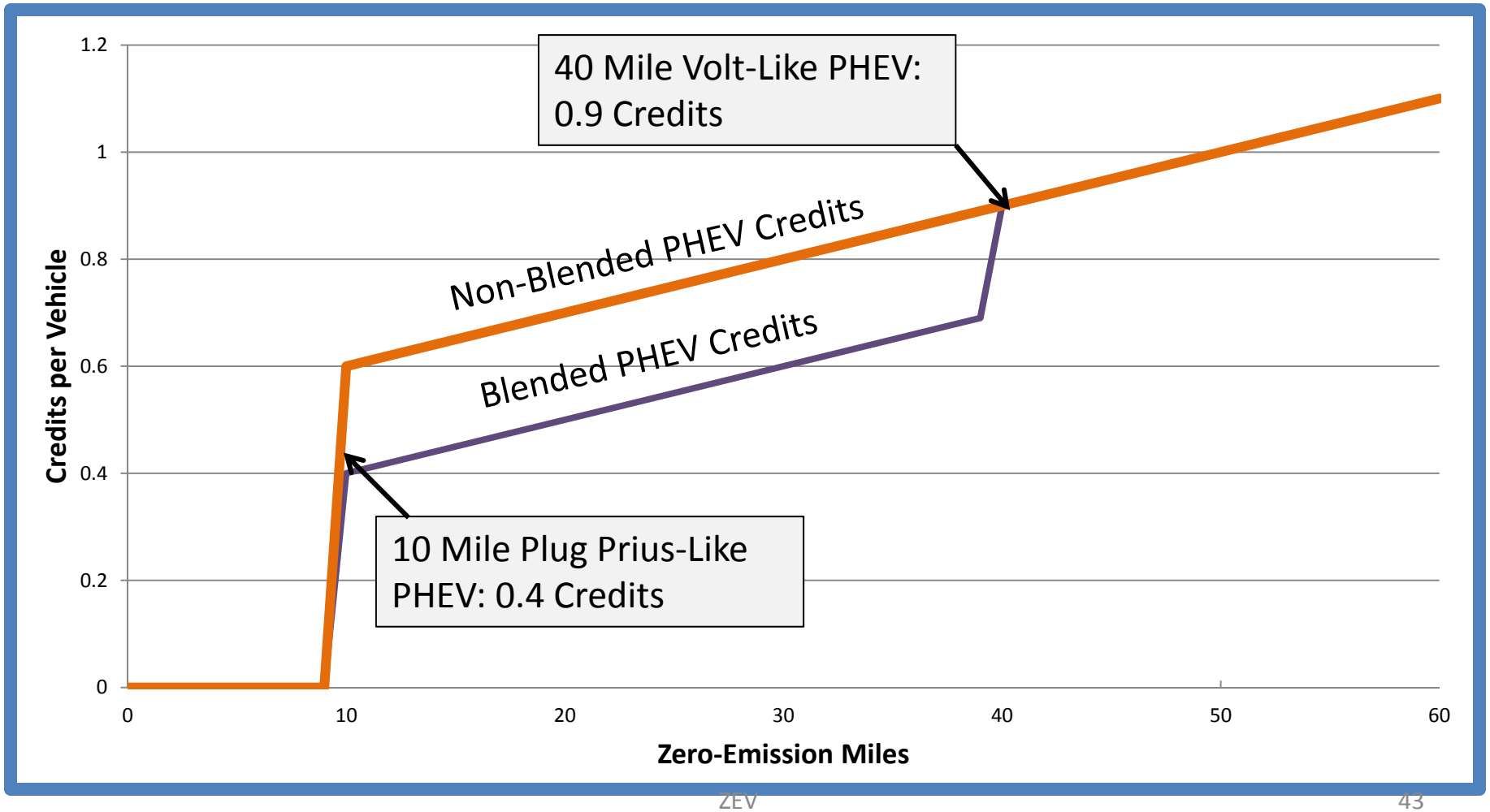


Proposed Plug-in Hybrid Credits



Additional Flexibility

- **NEW Category: Range Extended Battery Electric Vehicles**
- **GHG-ZEV Over-Compliance**
- **Travel Provision**
- Unlimited life for all credits
- Allowed use of banked PZEV and AT PZEV credits
- No more “placed in service” requirement

BEVx: Range Extended Battery Electric Vehicles

- New Vehicle Category: Full Function Battery Electric Vehicles with back-up engine
- Why? Could improve vehicle marketability, could increase total zero-emission miles driven
- Proposed Treatment
  - Credit same as BEVs, based on zero emission miles
  - 50% of pure ZEV requirement

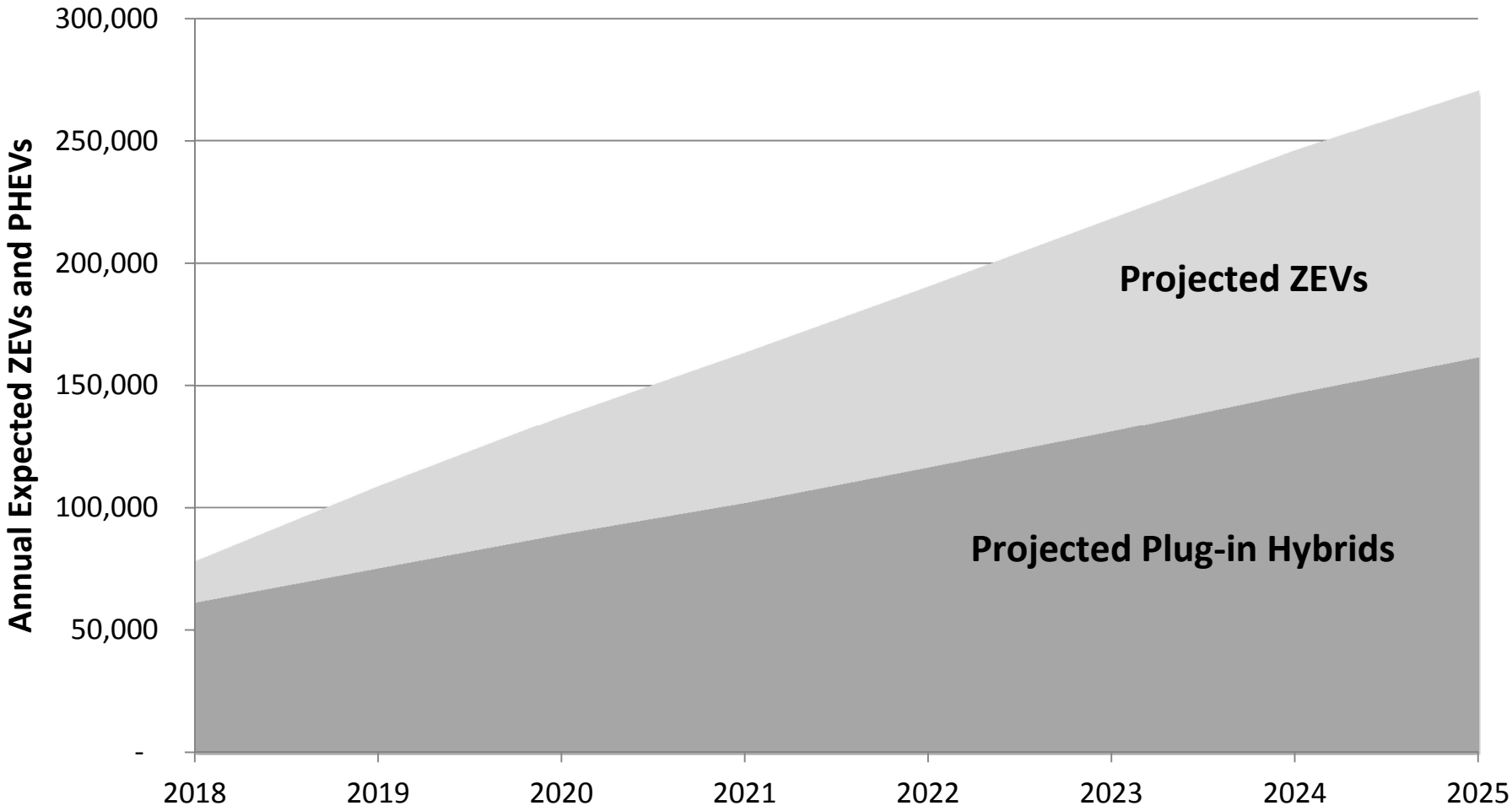
GHG Over Compliance Option

- Credits consistent and planned over-compliance with GHG fleet standard
- Available for model years 2018 through 2021
- Allow to offset ZEV Requirement:

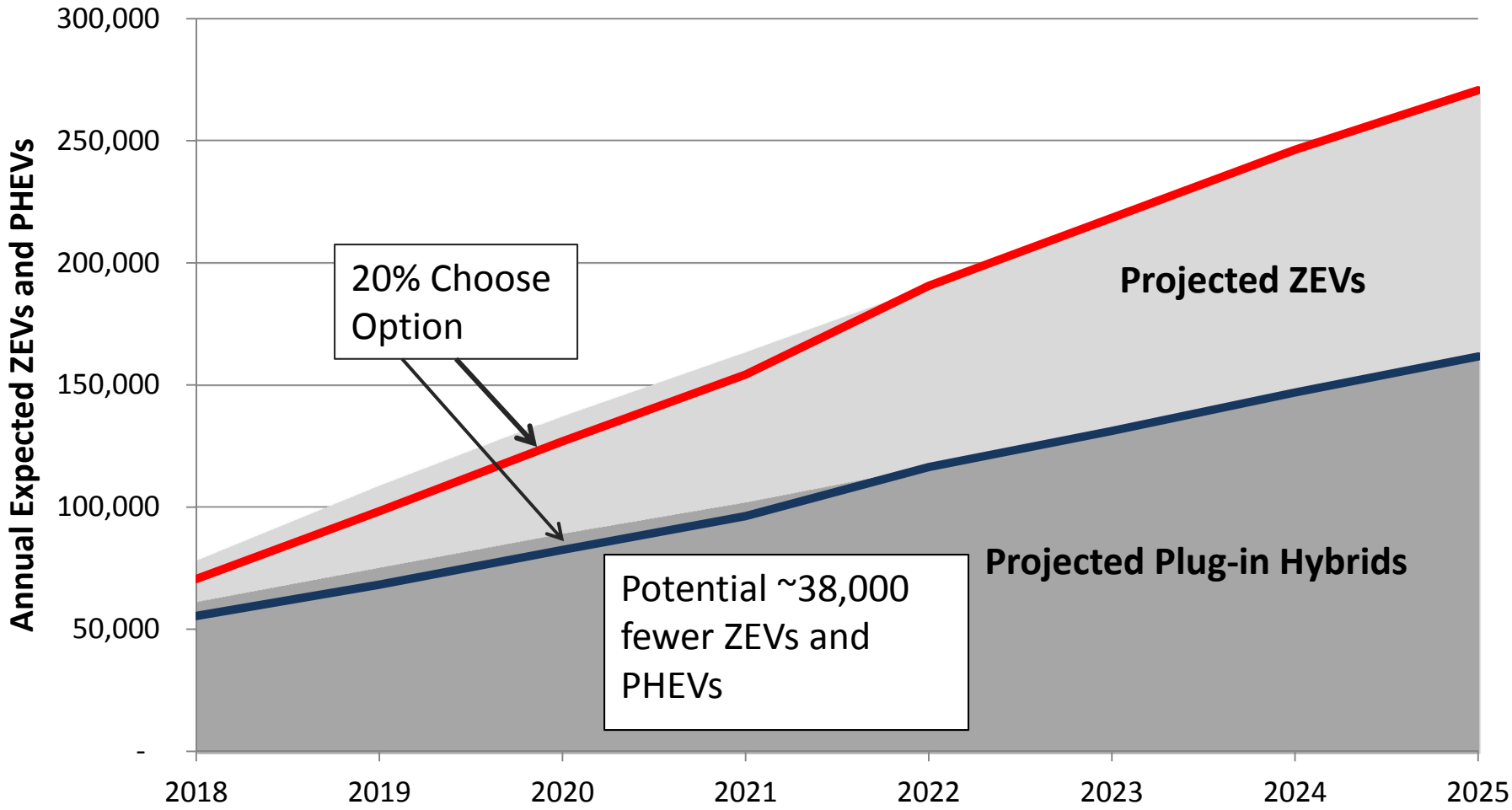
2018	2019	2020	2021	2022
50%	**50%**	**40%**	**30%**	**0%**

- Manufacturers must over-comply by at least 2gCO_2e/mile each year, all four years

Effect of Over-Compliance



Effect of Over-Compliance

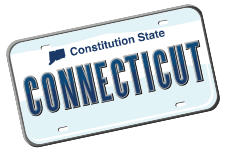


Current Travel Provision

- Travel Provision allows OEM to count BEVs and FCVs toward compliance in Section 177 ZEV States
- 10 Current Section 177 ZEV States:
  - CT, ME, MD, MA, NJ, NM, NY, OR, RI, VT
- Travel Provision set to expire
  - BEVs: 2014
  - FCVs: 2017

Proposed Travel Option

- Travel sunsets for BEVs in 2017
- Travel continues for FCVs beyond 2018
- New optional compliance path in S177 States
  - More BEVs pre-2018, for reduced requirement post-2018
  - Phase-in PHEVs in 2015 through 2018
  - Allow "pooling" of PHEVs and BEVs amongst East and West Regions



Summary

- Focus the regulation on low-carbon technologies
- Increase requirements to drive down costs and achieve commercialization
- Simplify and streamline regulatory requirements

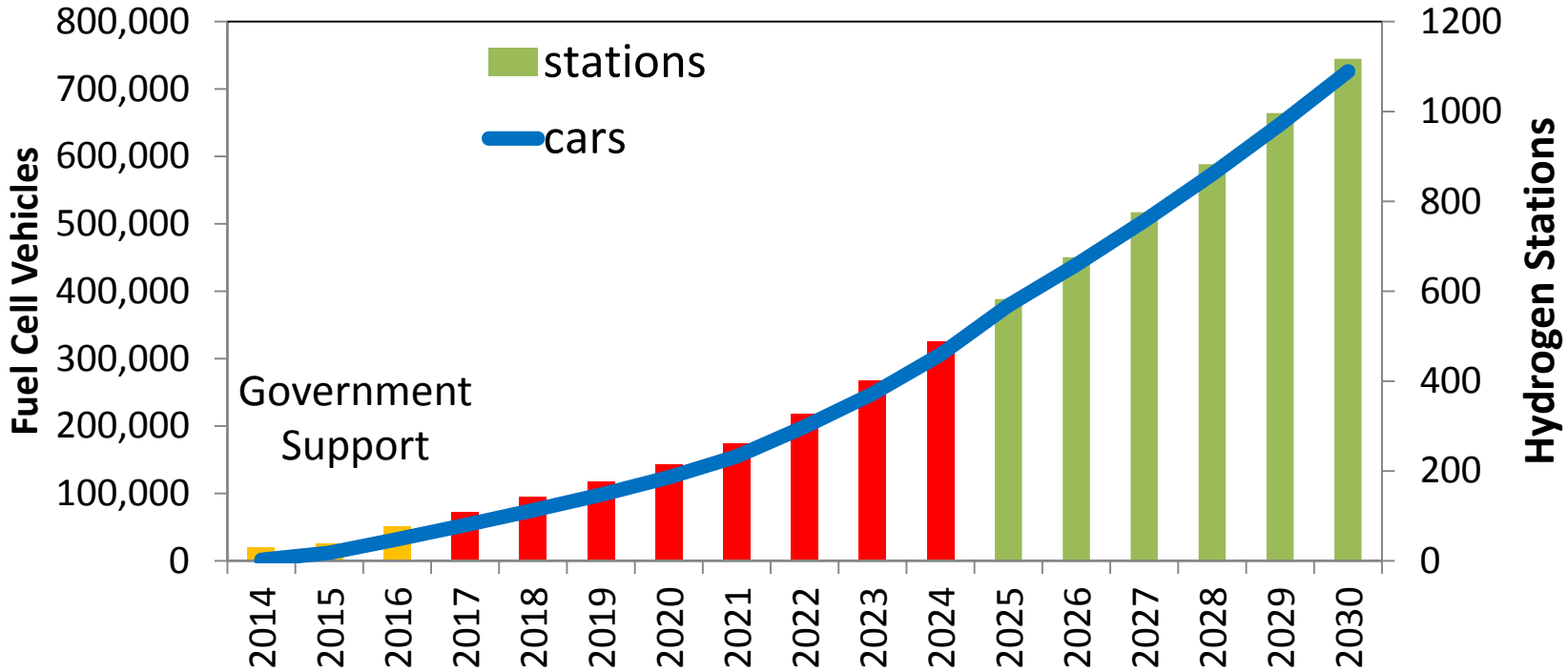
CFO

CFO Background

- Adopted in 1990, revised in 2000
- Vehicle projections drive requirement to build outlets
- Updates needed to support ZEVs

Infrastructure and ZEV Success

- Automaker surveys: 1,400 FCVs by 2014, 53,000 FCVs by 2017
- State infrastructure investment ~30 stations
- The need for CFO continues today

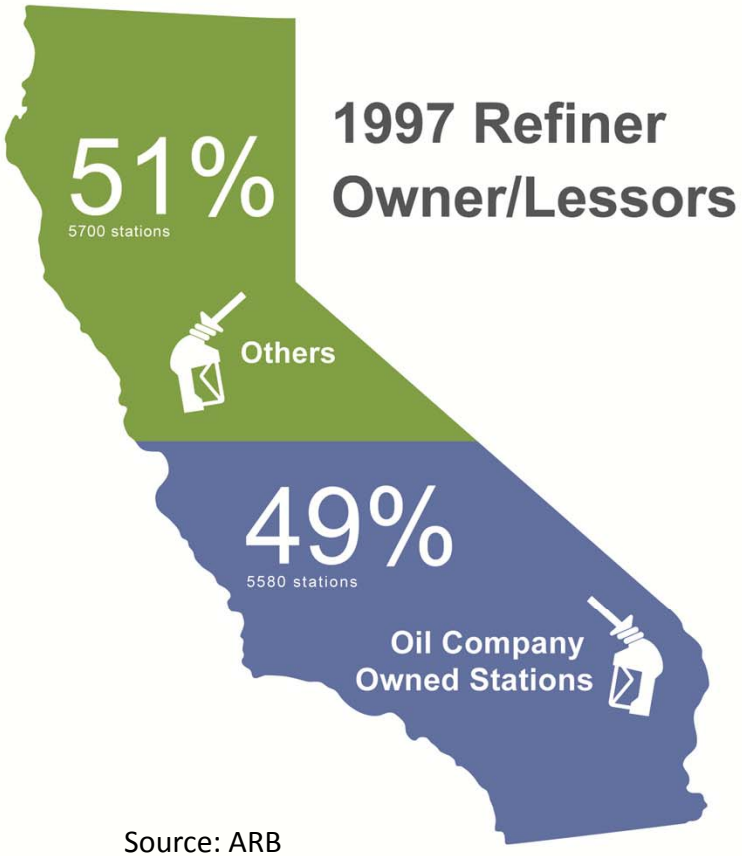


CFO Structure

1. Automaker projections and trigger calculation: 20,000 vehicles statewide
2. Estimate fuel demand
3. Determine total number of stations
4. New stations needed: $Total - existing$
5. Divide new station obligation among regulated parties
6. Install stations 18 months after first notice

Retail Gasoline Station Ownership

- CFO responsibility based on gas station ownership



Source: ARB

Source: California State Board of Equalization.

Proposed Changes-Regulated Party

- Regulated party → major refiner/importers of gasoline
  - Produce, import or purchase at least 500 million gallons in calendar year
  - CFO obligation based on share in California market

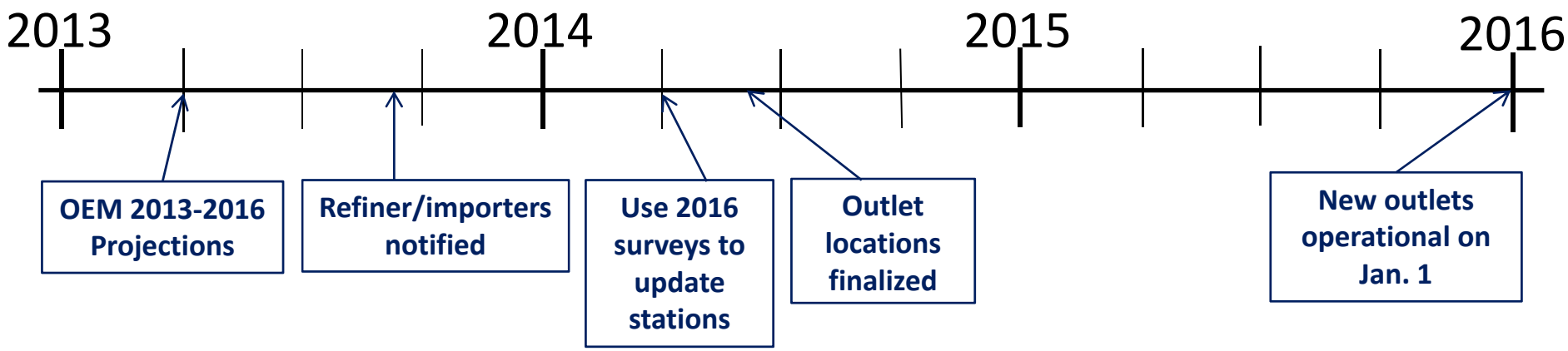
Source: California State Board of Equalization.
Monthly Motor Vehicle Fuel Distribution Reports for calendar year 2010.
www.boe.ca.gov/sptaxprog/spftrpts.htm

Additional Proposed Changes

Current Regulation	Proposed Changes
Applies to all certified clean fuels (methanol, ethanol, CNG, LNG)	Apply to ZEVs and ZEV fuels only
Electricity is excluded	Evaluate electric vehicle charging infrastructure needs by end of 2014
Triggers at 20,000 vehicles statewide	Add air basin trigger of 10,000 vehicles
Penalty: up to $7,500 per station/day	• Increased for non compliance • Automaker penalty added for significantly under-delivering
Sunsets when CFOs = 10% of all retail gasoline stations	Reduce sunset to 5%

Proposed Changes-Timeline

- Add 10 months to timeline for building stations
- Add opportunity to update automaker's projections based on next year's report



Economics of Hydrogen Stations

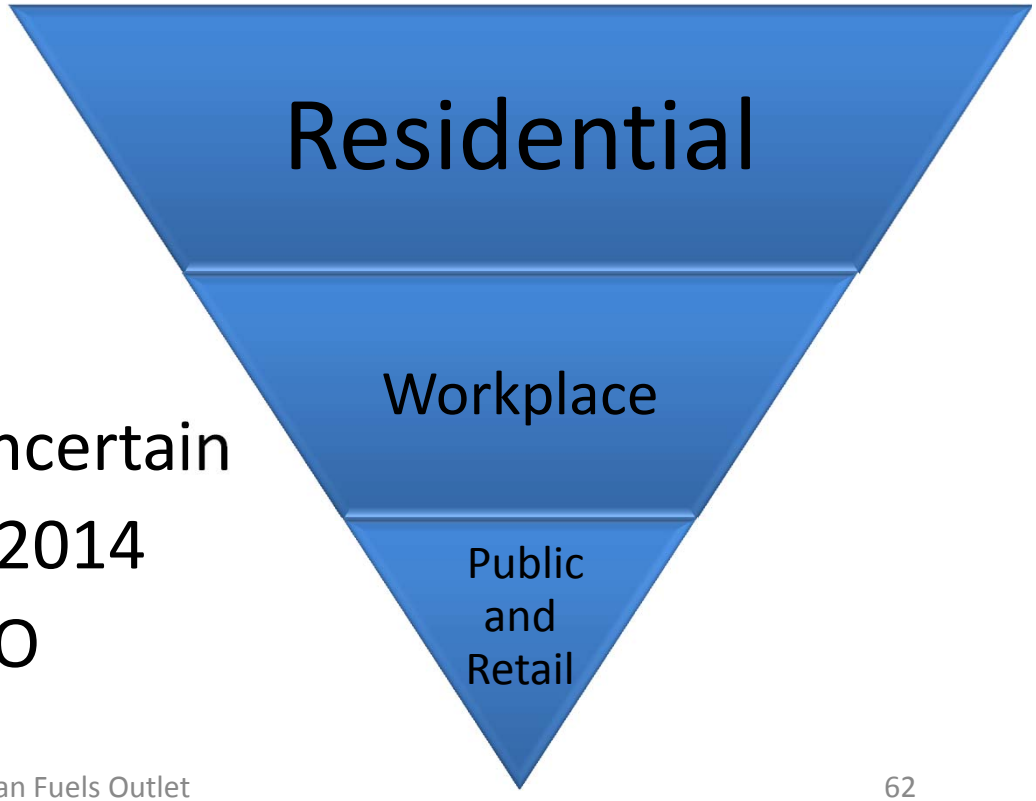
- Hydrogen stations cost $1.5 to $2M
- Profits realized in 3-4 years
- Longer ROI than typical
- Up to $88 million in capitol at risk

Alternative Approach - MOA

- Memorandum of Agreement
  - Oil companies, Automakers, Industrial Gas Suppliers, NGOs and Government
  - Obtain funding to support up to 100 stations
  - If MOA a success:
    - Regulated party's requirement to build stations is zero
    - If MOA is completed successfully, CFO sunsets for hydrogen
    - If MOA fails, CFO requirements to provide stations return

Why Not Require EV Charging Stations?

- Public Charging Station Deployments
  - Upgrade 900 to new standard
- Will assess needs as part of CFO
  - Expected demand uncertain
  - Complete by end of 2014
  - Determine roll of CFO



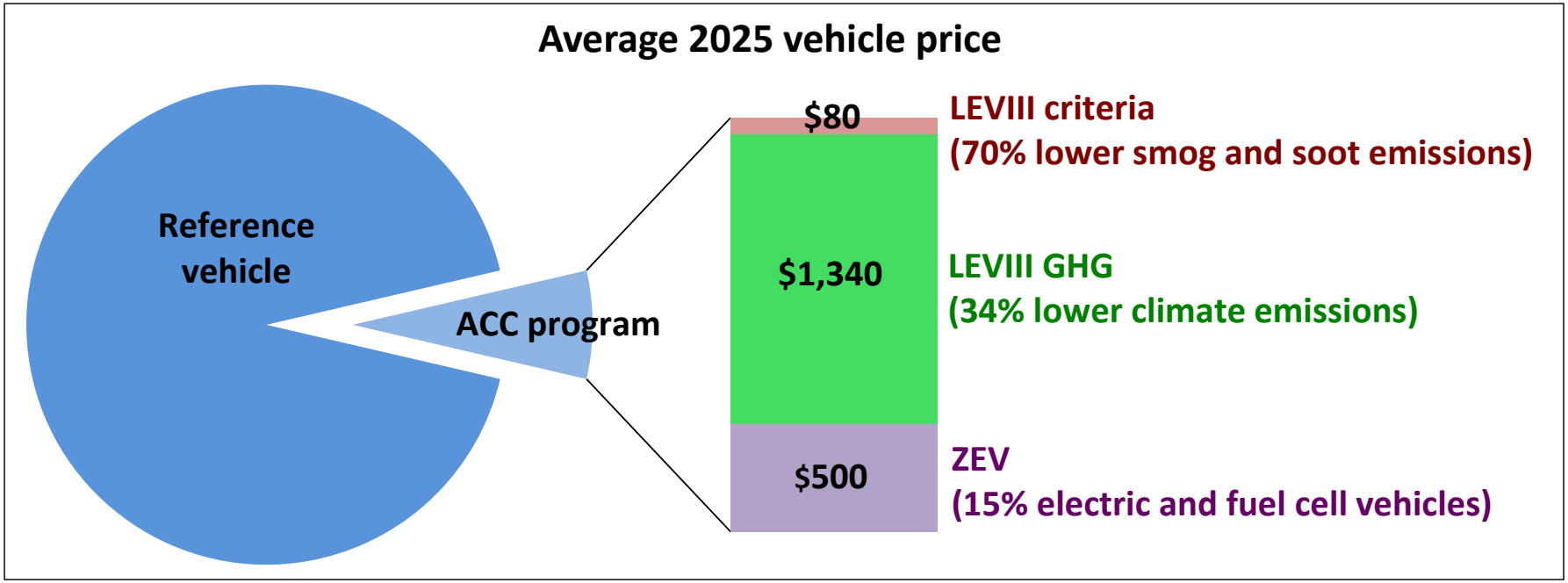
Summary

- Hydrogen fueling stations are needed to commercialize ZEVs
- CFO amendments necessary to bridge gap between funded and self-sustaining
- MOA may provide a collaborative approach to ensuring hydrogen stations

Overall Economic Impacts of ACC Program

ACC Program: Vehicle Technology Cost

- Regulations impose increasing costs from 2016 to 2025
  - Incremental 2025 price increase to consumers: $1,900/vehicle
  - At $1,900/vehicle , vehicle prices would increase by about 8%
  - Fuel savings are 3 times greater than cost; payback period is within 3 years



ACC Program: Consumer impact

- Average 2025 vehicle consumer impact:
  - Consumer savings greatly outweigh the cost (by 3-to-1 margin)
  - "Off the lot" savings from the first month
  - Overall payback within first vehicle purchaser

Lifetime effect per vehicle	Incremental technology price	$1,900
	Lifetime savings	$5,900
	Net lifetime savings	$4,000
	Payback period	3 years
Monthly effects for financed vehicle purchase	Increased monthly payment	$35
	Monthly fuel savings	$48
	Net monthly savings	$12

Note: values may not match due to rounding

ACC Program: Economic impact

- The regulations impact the economy in several ways
  - Increased vehicle prices, reduced fuel expenditures
  - Fuel savings spent throughout other sectors of the economy
- Projected impacts in year 2030
  - Positive effect on overall California economy

	Economic benefits from Advanced Clean Car program	**Improvement from baseline California economic activity**
Overall economic output	$14 billion	0.3%
Personal income	$6 billion	0.2%
Employment	37,000	0.2%