

Vehicle Regulatory And Policy Drivers

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*California Energy Commission
Investment Plan Workshop
September 29, 2009*

Overview

- Background
- Zero Emission Vehicle Regulation
- Zero Emission Bus Regulation
- SB 1505
- Clean Fuels Outlet
- Low Carbon Fuel Standard
- H2 Network

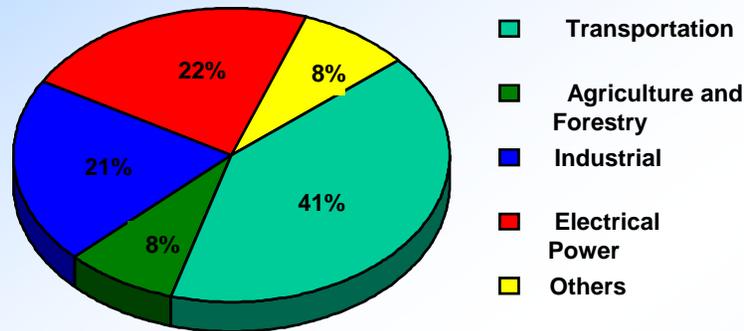
CaH2Net Background

- January 6, 2004 Governor's State of the Union Address
 - *"I am going to encourage the building of a hydrogen highway to take us to the environmental Future...I intend to show the world that economic growth and the environment can coexist"*.
- April 20, 2004 signed Executive Order, S-7-04 – called for the development of a California Hydrogen Blueprint Plan
 - Senior Review Committee (Cabinet Secretaries)
 - Executive Order Team (A. Lloyd, Baxter-Clemmons, Emmitt)
 - Advisory Panel & Teams (200 members OEMs, govt, energies, enviros, educators, misc business)
 - Societal Benefits Team
 - Economy Team
 - Implementation Team
 - Rollout Strategy Team
 - Public Education Team

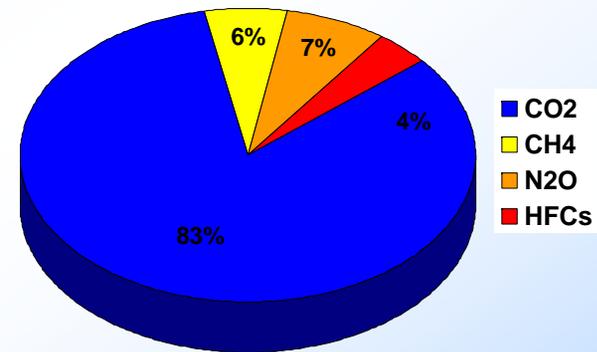


California Greenhouse Gas Emissions

GHG EMISSION SOURCES
[~500 MMT CO₂ eq]



GHG EMISSIONS BY TYPE



CO₂, N₂O



CO₂, CH₄, N₂O



CO₂



CO₂

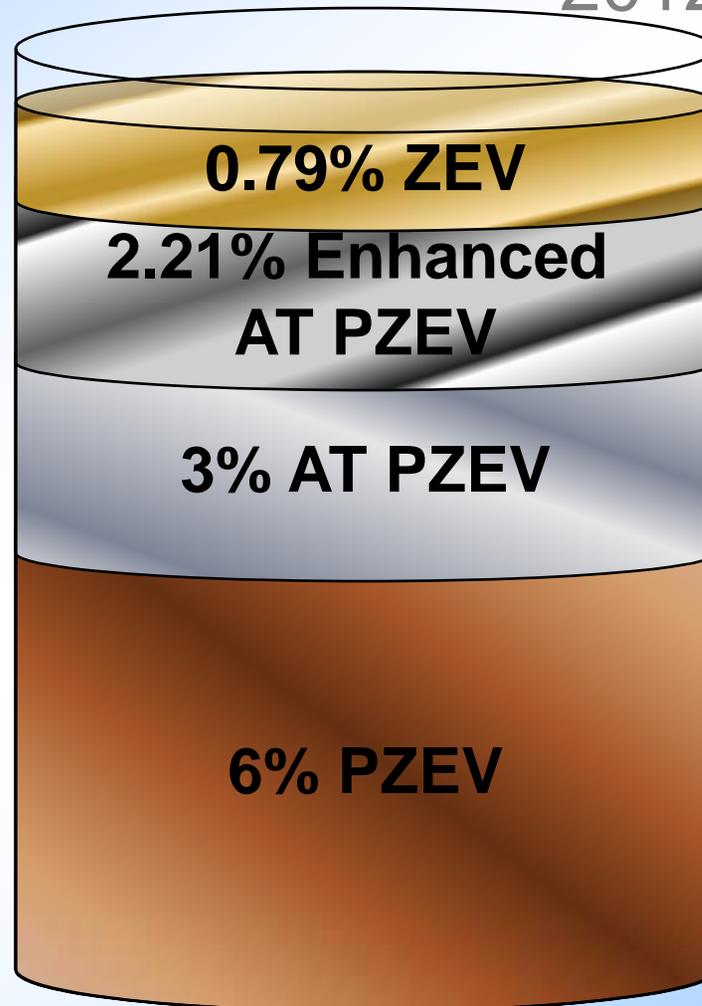


HFCs

ZEV Requirement: The ZEV Glass

2012 MY Example

A Manufacturer **MUST** fulfill their ZEV requirement, but may fulfill the rest of their ZEV requirement with Enhanced AT PZEVs, AT PZEVs and PZEVs

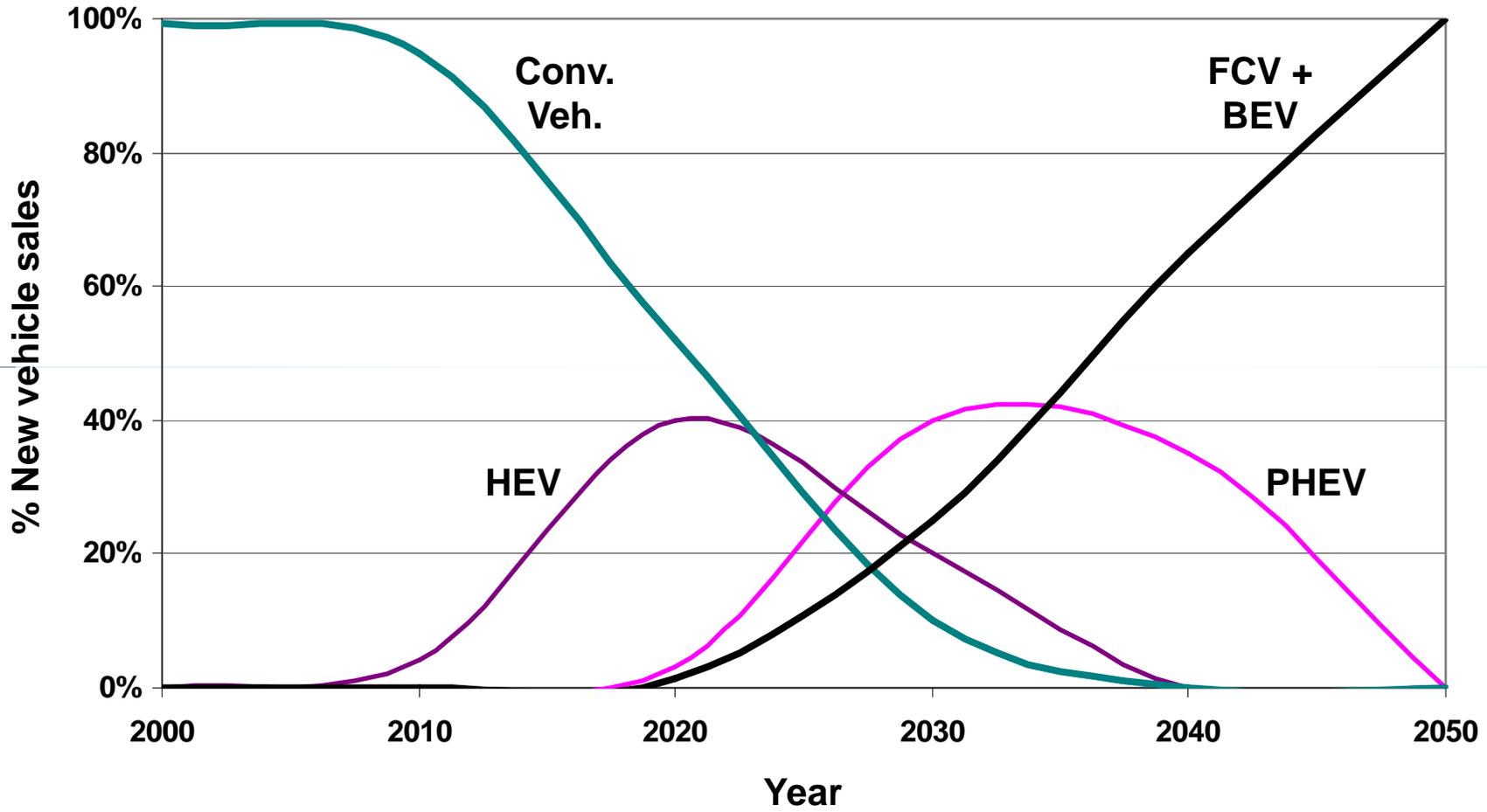


Most manufacturers choose to meet their requirement this way because it is the most cost effective way to meet the regulation

ZEV Program Achievements

- Over 30,000 ZEVs placed through 2008
 - 250 fuel cell vehicles
 - 4,700 battery EVs
 - 27,000 neighborhood EVs
- Widespread acceptance of hybrid electric vehicles (>200,000)
- Focused research and development of battery electric and fuel cell vehicles

CA LDV New Vehicle Sales (Auto only)



HEV	4% sales in 2010 (launch in 2000)	10 Year Sales Growth
PHEV	3% sales in 2020 (launch in 2010)	
BEV	1% sales in 2020 (launch in 2010)	
FCV	3% sales in 2025 (launch in 2015)	

Expected Number of Vehicles

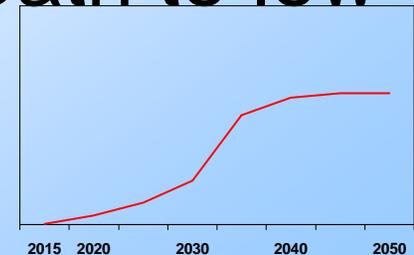
– for the purpose of meeting the requirements

Type	2009-2011*	2012-2014	2015-2017
Required Vehicles	2,500	25,000	50,000
Gold Fuel Cell Vehicles	250	5,357	25,000
Or Gold City EVs	0	15,000	50,000
Silver+	30,000	58,333	83,000
Silver	107,000	95,000	153,000
<small>*Includes probable credit use</small> Bronze	700,000	1,260,000	1,260,000

ZEV2 Program Goals

Planned Adoption 2010

- Move commercially viable vehicles to other vehicle programs (Pavley, LEV III)
 - Hybrids, clean gasoline vehicles
- Move ultra low carbon technologies (“ZEV”) from demonstration stage to early commercialization
- Scale requirement to assure on path to low carbon future
 - e.g. 80% GHG reduction by 2050
 - 2015 MY start



Zero Emission Bus Regulation

- Part of Fleet Rule for Transit Agencies
- Transit Agencies > 200 urban buses
- Demonstration and purchase requirements
 - Diesel Path Transit Agencies
 - 12 Bus demonstration starting in 2009
 - Infrastructure support required
- Purchase Requirement starts in 2011 (in review)



Regulation of Hydrogen

Senate Bill 1505

Emission reduction requirement (relative to gasoline)

- 50% reduction of NO_x plus ROG (WTT),
- 30% reduction of greenhouse gas (GHG) (WTW)*
- No increase in toxic air contaminants (WTT)

Energy source requirement

- 33.3% of H₂ produced made from renewable resources*

Threshold and who must comply

- Applies to state co-funded hydrogen stations NOW
- To all hydrogen stations once 3,500 metric tons/year (3,500,000 kg/yr) state-wide throughput is reached (~10K cars)
- Limited exemptions with Board approval **Can be met statewide*

Clean Fuels Outlet Regulation

- Adopted 1991, amended 2000
 - Designed to address M85 and CNG
- Requires retail outlet supply of alt. fuels
 - If cumulative vehicle sales >20,000
 - Applies to owners of large number of stations
- Example: at 20,000 sales trigger (non-fleet)
 - 17 800 kg/day H₂ stations required

Clean Fuels Outlet Regulation – Moving Forward

- ARB will review appropriateness of regulation for H2 in Dec. 2009.
 - Is infrastructure developing on its own?
 - Is Govt. funding available and being used?
 - Is regulation needed to assure adequate H2 infrastructure?
- If needed, regulation will be updated in late 2010 (with ZEV2 reg., and reflecting LCFS, funding etc.)

Low Carbon Fuel Standard

- Requires 10 percent reduction of carbon intensity of transportation fuel pool by 2020
 - Compared to 2010 gasoline and diesel fuel
- Fuels with lower carbon intensity:
 - Low carbon corn or sugarcane ethanol
 - Cellulosic ethanol
 - Renewable diesel and biodiesel
 - Electricity, hydrogen, natural gas
- Example market value of renewable H₂ @\$50/MT of CO₂

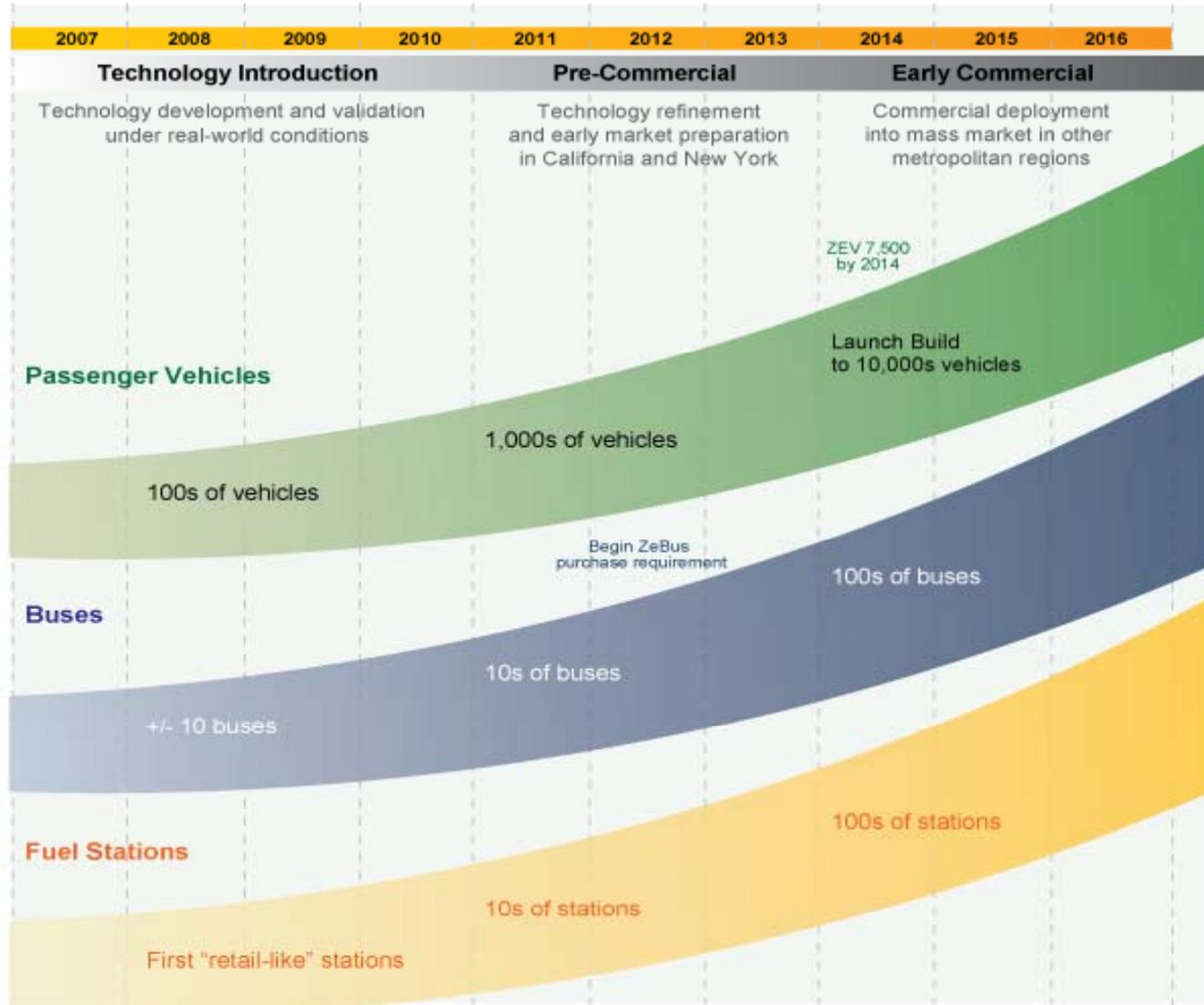
Interactions of Regulations and Funding

- ZEV2 may require minimum #s of vehicles
 - Incentives to vehicle purchaser (e.g. AB118) ok
- SB 1505 H2 renewable requirement
 - Doesn't prevent use of credits in LCFS
- LCFS
 - No restriction on using credits from a station that was mandated by a Clean Fuel Outlet regulation

Interactions of Regulations and Funding

- AB 118 funding
 - If H2 fuel subsidized, credit could not be used for other programs e.g. LCFS
 - If production process development or infrastructure funded, credits for H2 fuel sold not restricted
 - If station required by CFO, AB 118 funding not allowed for stations (renewable portion could be funded)

Fuel Cell Vehicle/Station Rollout Concept



ARB's Zero Emission Vehicle Program

[www.arb.ca.gov/msprog/zevprog/
zevprog.htm](http://www.arb.ca.gov/msprog/zevprog/zevprog.htm)

California Hydrogen Highway Network

www.HydrogenHighway.ca.gov

Zero Emission Bus Regulation

www.arb.ca.gov/msprog/bus/zeb/zeb.htm

Hydrogen Production SB1505

www.arb.ca.gov/msprog/hydprod/hydprod.htm

Low Carbon Fuels Standard

www.arb.ca.gov/fuels/lcfs/lcfs.htm