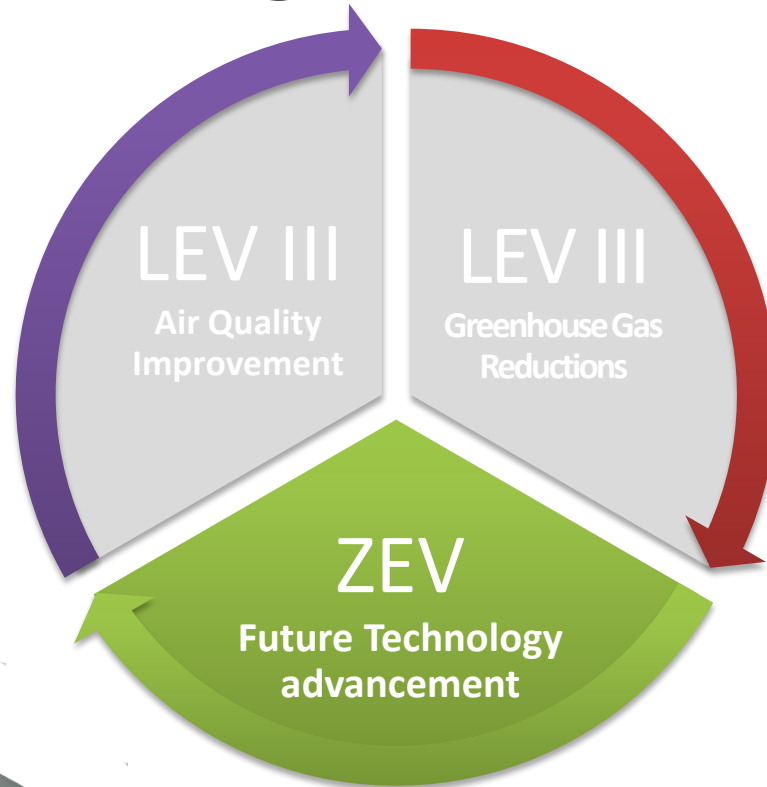


Zero Emission Vehicle (ZEV) Regulation



How The ZEV Regulation Works

Requires large volume automobile manufacturers to produce zero emitting passenger vehicles



Battery Electric Vehicles (BEV)



Hydrogen Fuel Cell (FCEV)

May substitute some with near-zero emission vehicles



Plug-in Hybrid Electric Vehicles (PHEV)



Conventional Hybrids



Clean Gasoline Vehicles



Regulated Manufacturers

Large Volume Manufacturers

> 60,000 sales

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

Large Volume Manufacturers 2018+

> 20,000 sales

- BMW
- Hyundai
- Kia
- *Mazda**
- Mercedes
- *Subaru**
- Volkswagen

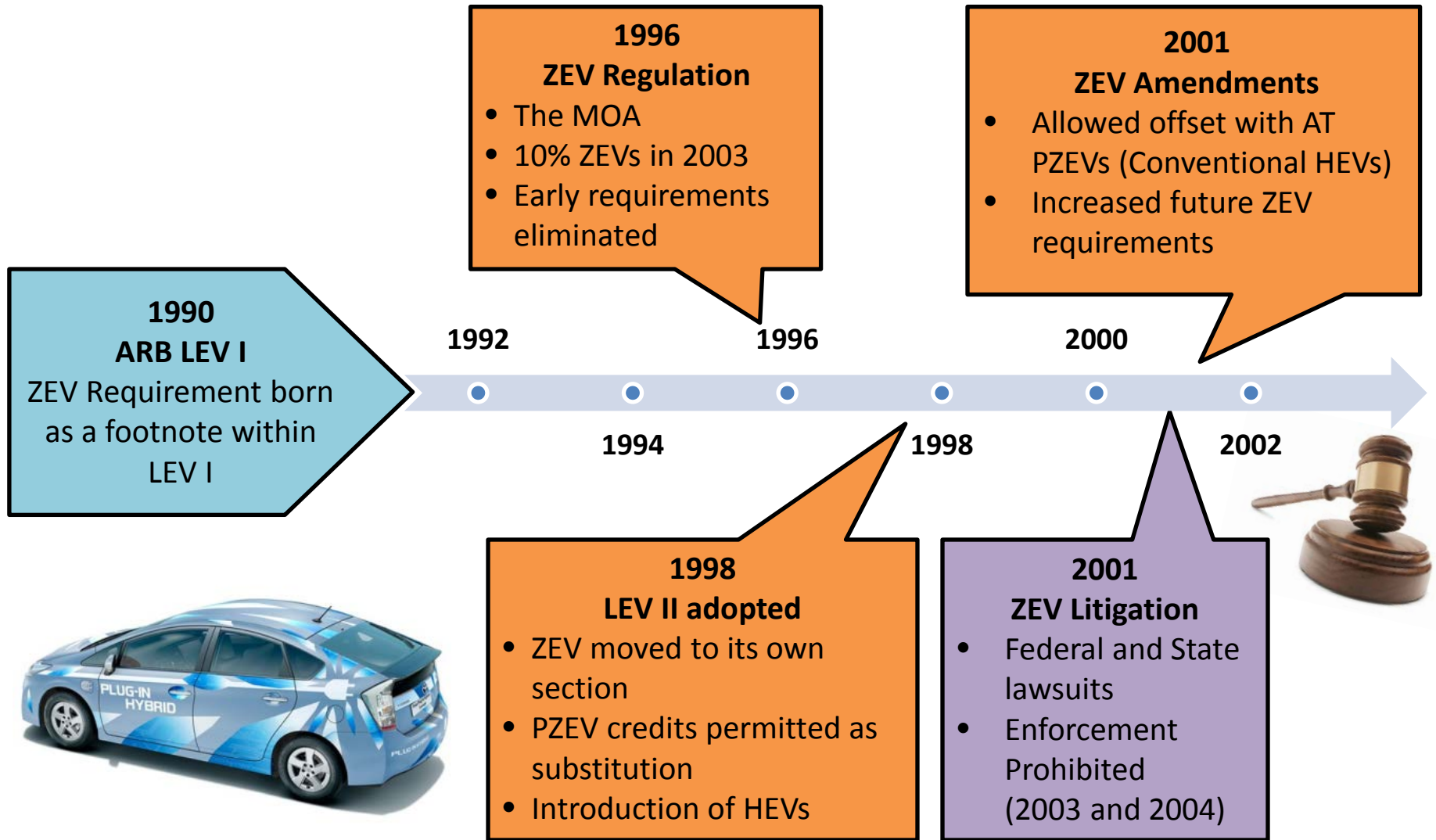
Intermediate Volume Manu.

- *Jaguar / Land Rover**
- *Mitsubishi**
- *Volvo**

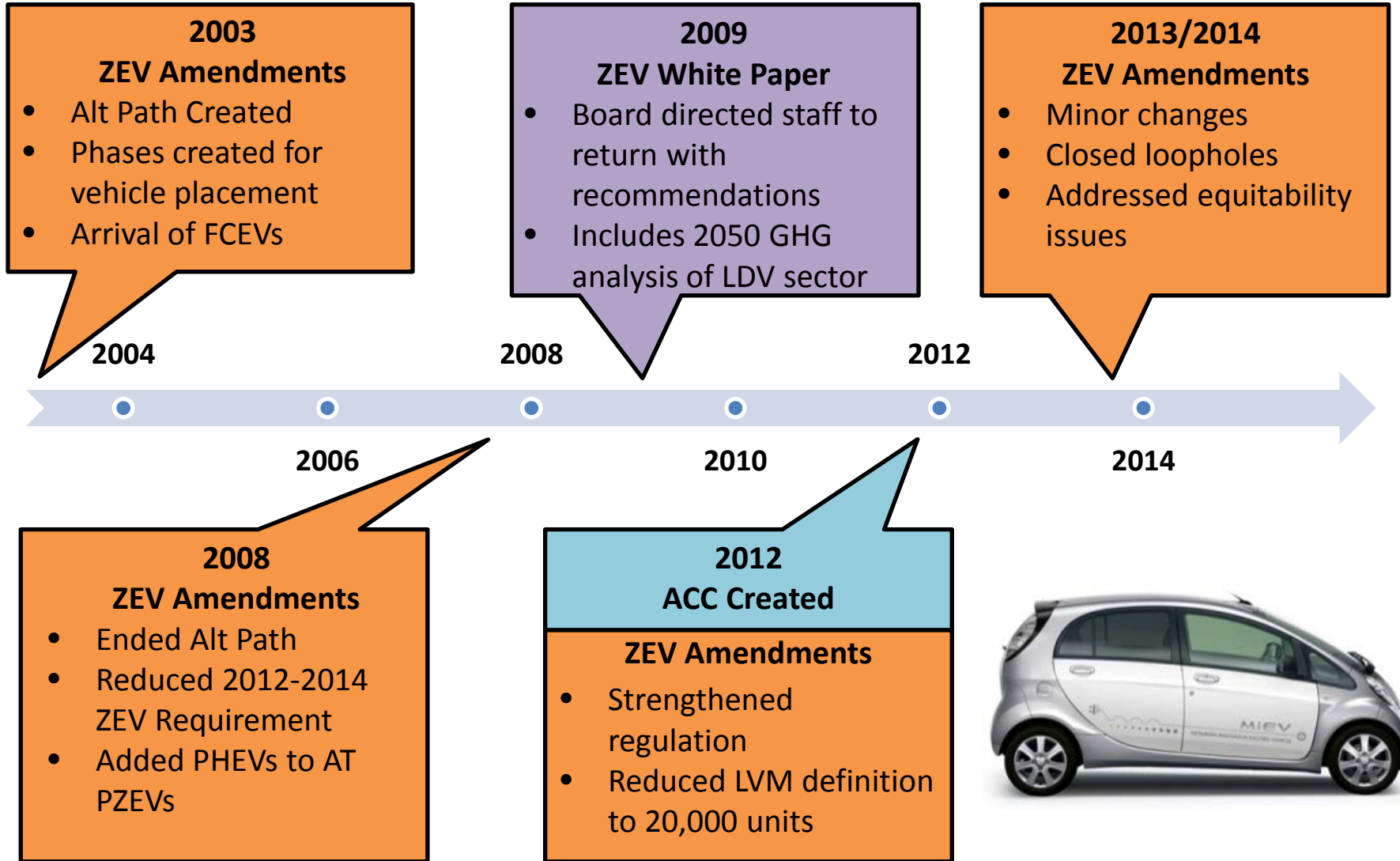


* Current rulemaking may adjust Intermediate Volume Manufacturer compliance requirements for companies in red

History of the ZEV Regulation



History of the ZEV Regulation



Vehicle Technology Overview: Pure ZEV

- Full Function Battery Electric Vehicles
- Nickname: BEVs or EVs
- Most between 75 miles and 200 miles range
- Commonly on smaller platforms (exception: Tesla, RAV4)
- Treatment: Earn between 1 and 9 credits through 2017, 1 and 4 credits 2018 and beyond



GM Spark BEV: 70 miles
Real World Range



Toyota Rav 4 BEV: 120 miles
Real World Range



Tesla Model S 85 kW: 265
miles Real World Range

Vehicle Technology Overview: Pure ZEV

- Fuel Cell Electric Vehicles

- Nickname: FCVs or FCEVs
- Most between 200 and 400 miles range
- Run on compressed hydrogen gas
- Commonly on larger platforms (exception: Toyota and Mercedes)
- Treatment: Earn 5 to 9 credits through 2017, 4 credits 2018+



Hyundai Tucson FCV: 265 mile EPA range



Toyota Mirai: 300 mile range (projected)

Vehicle Technology Overview: 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, more flexibility
- Treatment
 - Credit same as BEVs, based on zero emission miles
 - Can meet up to 50% of pure ZEV requirement



Vehicle Technology Overview: TRANSITIONAL ZEV (TZEV)

- Blended Plug-In Hybrids
 - Engine comes on before battery is fully depleted
 - Example: Plug-In Prius, Ford CMAX
- Non-Blended Plug-in Hybrids
 - Also called Range Extended Electric Vehicles (REEV), Extended Range Electric Vehicles (EREV)
 - Car maximizes electric range
 - Engine does not come on before battery is in charge sustaining mode
 - Example: Chevy Volt
- Why does it matter?
 - Environmental advantages
 - Volt proponents say its all about max e-miles
 - Blended says its all about overall fuel economy
 - Non-Blended = More “BEV”- like
 - Blended = Lower cost per vehicle

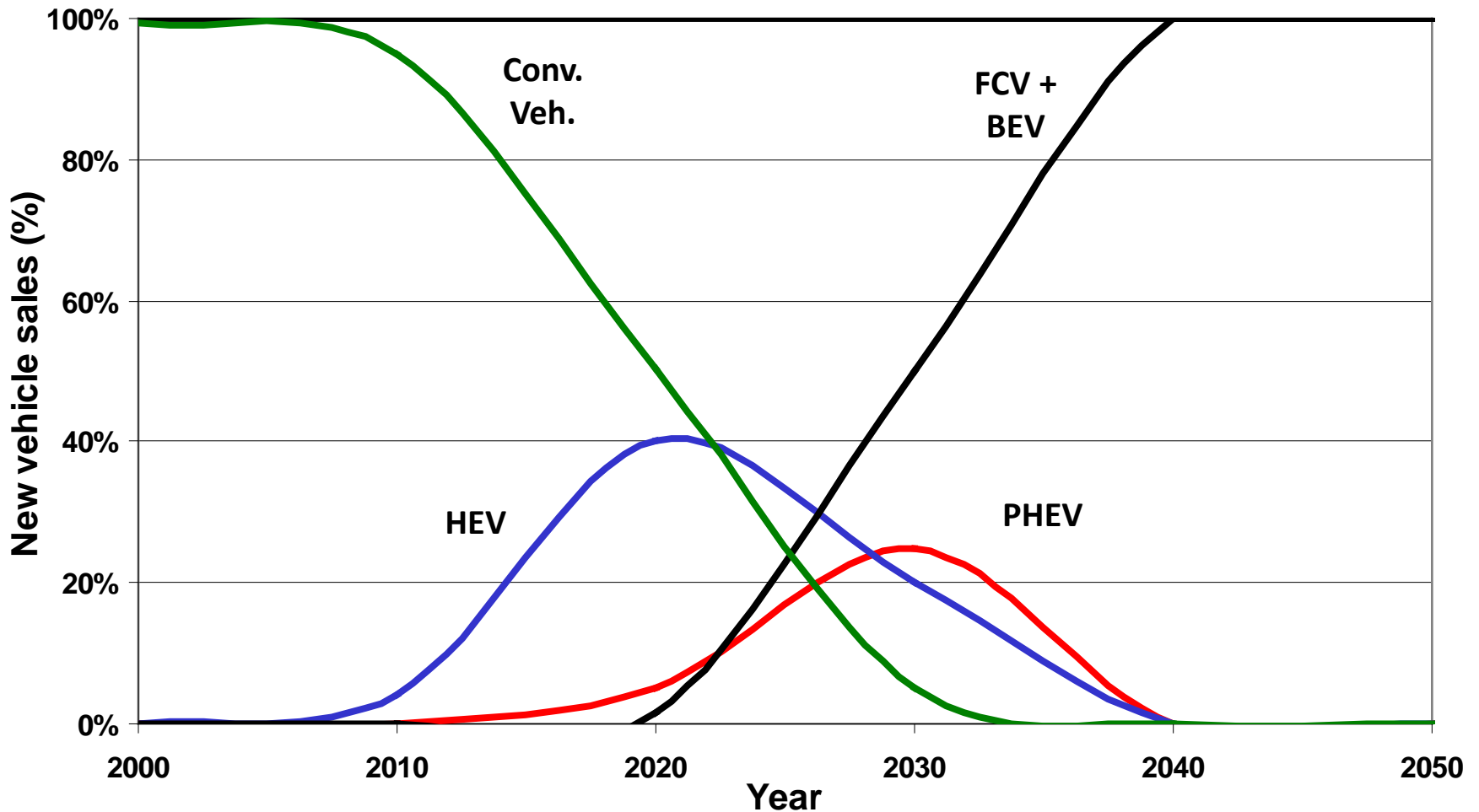


Neighborhood Electric Vehicles (NEV)

- BEV with limited range and top speed
- Not freeway capable
- Widespread fleet application
- Considered a “loophole” by some during the late 1990s; fixed in the 2001 amendments, added technical requirements in 2008
- Treatment
 - 0.15 credits each, treated as a TZEV
 - Can meet up to 25% of TZEV category












MEETING 2050 GOALS: NEW PASSENGER VEHICLE SALES



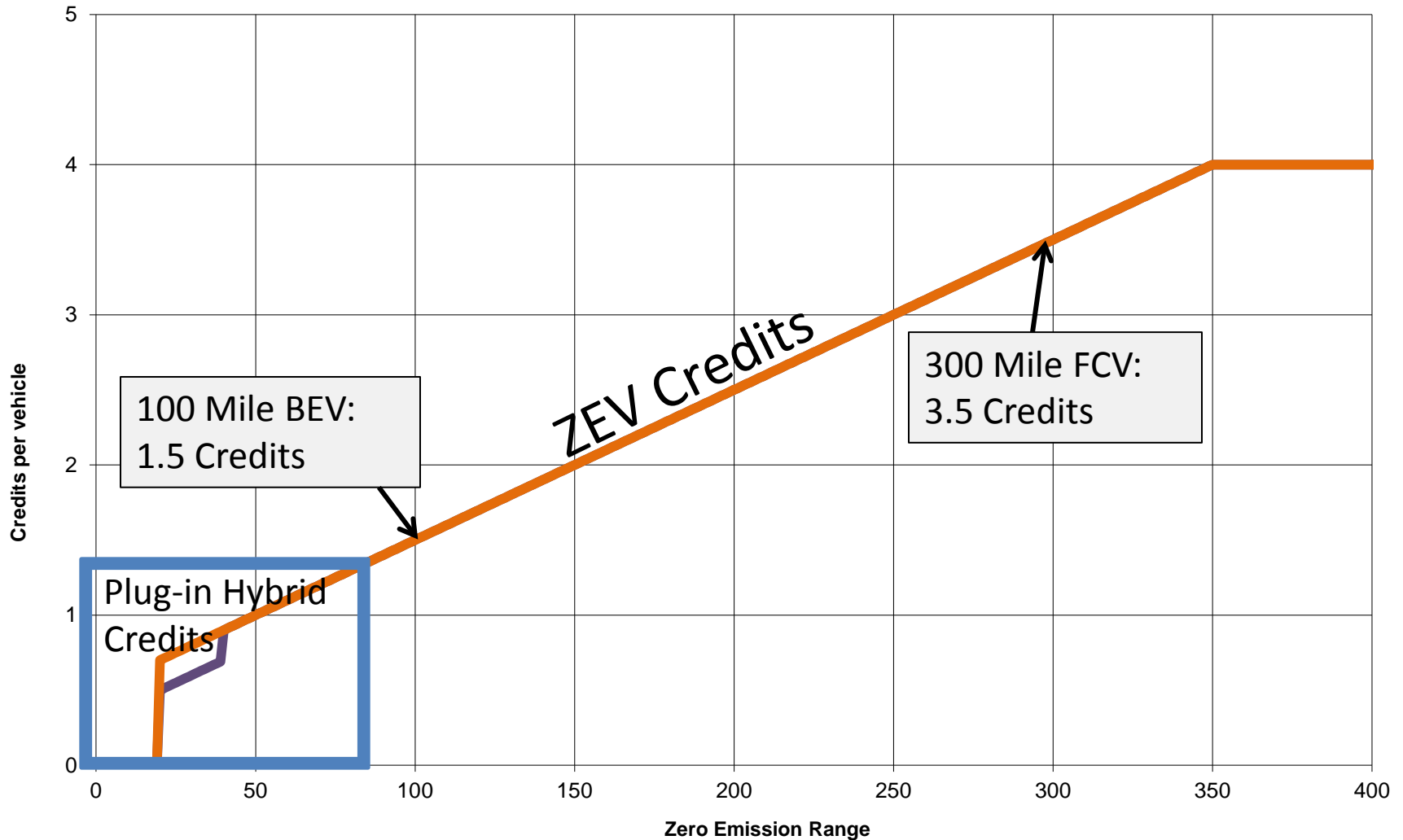
ZEV sales reach 100% by 2040, but on-road fleet is still mixed: ZEVs are 87% of on-road fleet in 2050

ZEV Regulation Success



Type of ZEV	Through MY 2013
Clean Gasoline Vehicles (PZEVs) 	3,100,000  LEV III Criteria 
Conventional Hybrid (e.g. Prius) 	560,000  LEV III GHG 
Plug-In Hybrid 	33,000
Battery Electric 	33,000
Hydrogen Fuel Cell 	500

Simplified ZEV Regulation Credits (2018 +)

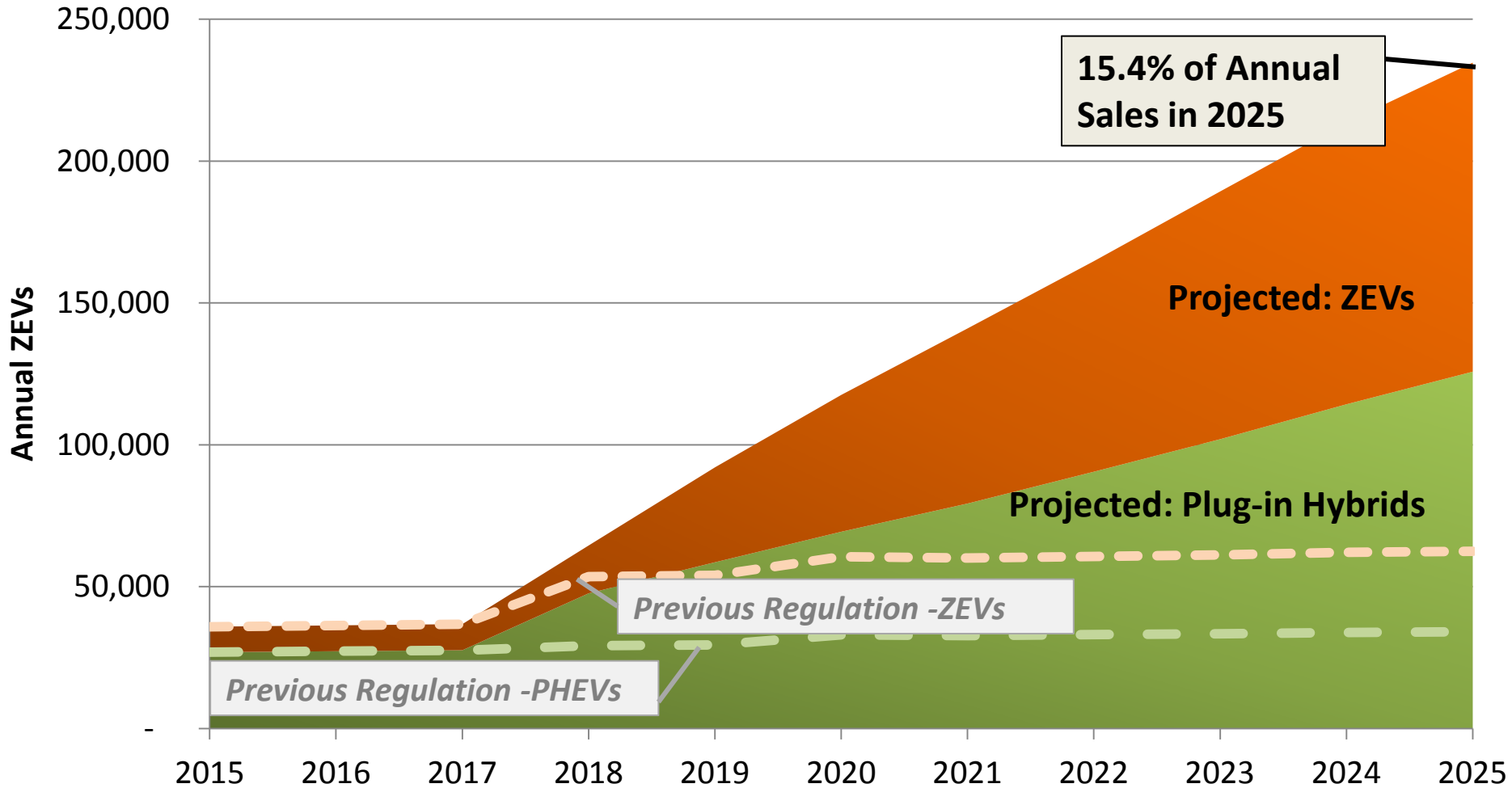


Mechanics of How it works

1. Annual Credit Percentage Requirements
2. LVMs MUST produce pure ZEVs (BEVs/FCVs)
3. Everything else (i.e. PHEVs) is an option or a “flexibility”
4. Each vehicle earns an amount of credit
 - Linear scale based on range



2015-2025 ZEV Requirements



2018-2025 Likely Compliance, Vehicles



	2018	2019	2020	2021	2022	2023	2024	2025
ZEV, annual LVM	16,816 (1.0%)	33,465 (2.0%)	48,298 (2.9%)	61,689 (3.8%)	74,189 (4.5%)	87,266 (5.2%)	99,405 (5.9%)	108,972 (6.4%)
TZEV, annual LVM + IVM	61,259	75,263	89,095	101,896	116,391	131,158	146,906	161,683
Total, annual	78,075 (4.7%)	108,728 (6.4%)	137,393 (8.1%)	163,585 (9.7%)	190,580 (11.2%)	218,424 (12.7%)	246,311 (14.1%)	270,655 (15.4%)
Total, cumulative	78,075	186,803	324,196	487,781	678,361	896,785	1,143,096	1,413,751

Section 177 States – ZEV Adoption

- Nine additional states implementing ZEV Regulation: CT, MA, MD, ME, NJ, NY, OR, RI, VT
- S177 Compliance 1.4x CA compliance
- California working with sibling states in developing and supporting activities



Electric Vehicle Charging Requirements



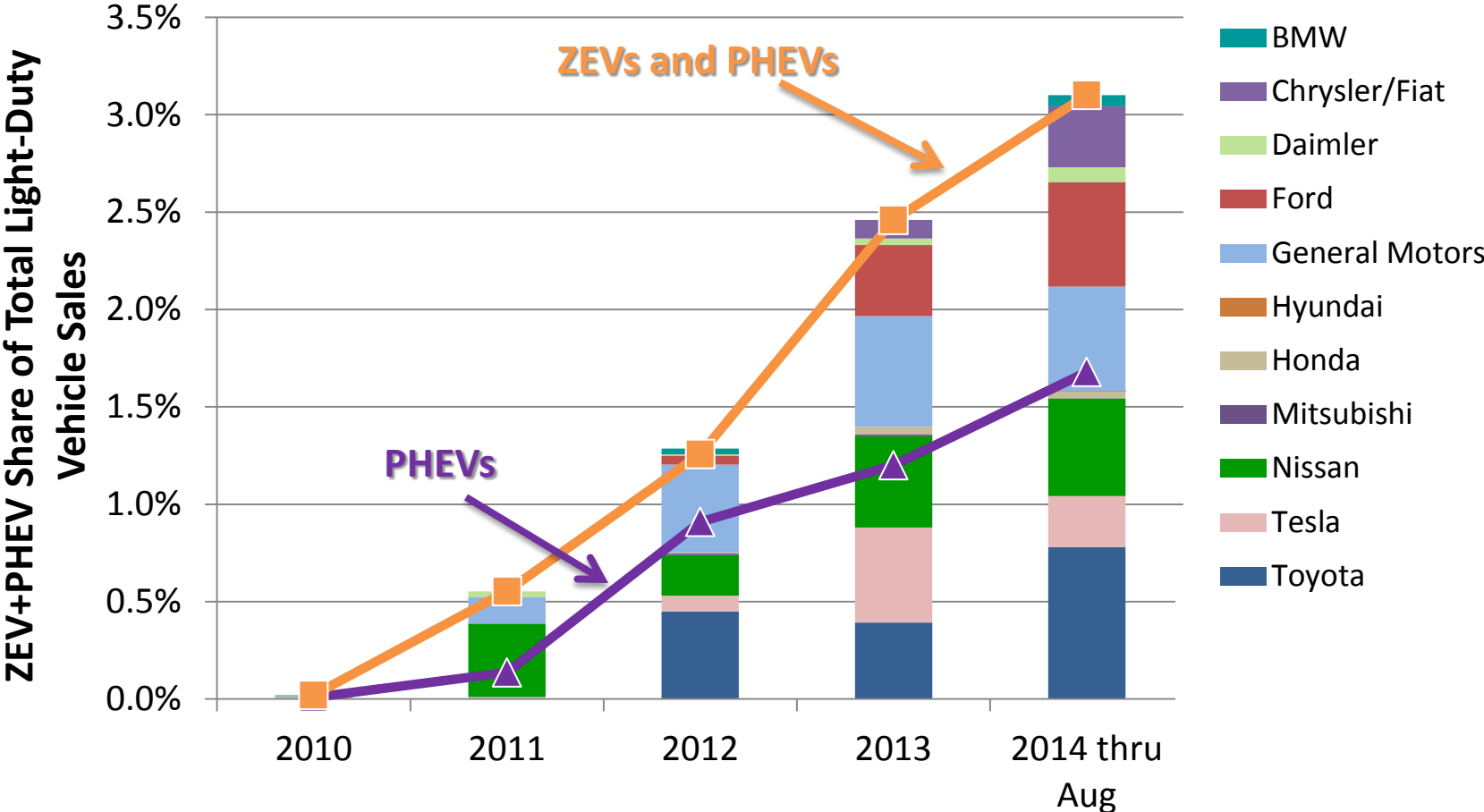
- 2001: Charging requirements adopted
- California PEVs and PHEVs must be equipped with Society of Automotive Engineering (SAE) J1772 charge connector “inlet” connectors
- On board charger requirement ($\geq 3.3\text{kW}$)
- No DC charging connector requirement

Vehicles Currently Available



Vehicle Model	Technology	Vehicle Model	Technology
BMW i3 or i3 Rex	BEV	Tesla Roadster	BEV
BYD e6	BEV	Toyota RAV4 EV	BEV
Chevrolet Spark EV	BEV	Volkswagen e-Golf	BEV
Fiat 500 EV	BEV	Cadillac ELR	PHEV
Ford Focus Electric	BEV	Chevrolet Volt	PHEV
Honda Fit EV	BEV	Ford C-Max Energi	PHEV
Kia Soul EV	BEV	Ford Fusion Energi	PHEV
Mercedes-Benz B-Class Electric Drive	BEV	Honda Accord Plug-in	PHEV
Mitsubishi i-MiEV	BEV	Toyota Prius Plug-In Hybrid	PHEV
Nissan LEAF	BEV	Honda FCX Clarity	FCEV
smart ED	BEV	Hyundai Tucson Fuel Cell	FCEV
Tesla Model S	BEV	Mercedes-Benz F-Cell	FCEV

California's ZEV and PHEV Market Shares Growing



Source: IHS Automotive, Polk new vehicle registrations for CY2010-2014 as of August, 2014.

It Takes More Than a Regulation

- The ZEV Regulation in and of itself does not guarantee success
- To assist the Regulation, the ARB has established a holistic support program that includes:
 - Providing consumer incentives
 - Establishing a robust support infrastructure
 - Supporting ZEV requirements in other states

Consumer Incentives



- Clean Vehicle Rebate Project (CVRP)
 - Funded by AQIP and LCTI
 - AQIP created by AB 118; Reauthorized by AB 8
 - LCTI associated with AB 32 GHG Reduction Fund
 - Expected FY 15-16 budget of \$116 million
 - 90,000+ rebates totaling ~ \$190 million issued
- Single Occupant Carpool Lane Access
 - BEVs and FCEVs get white decal (unlimited)
 - PHEVs get green decal (currently capped at 70K)

Building a Fueling Infrastructure

- Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP)
 - Funded by AB 118
- Both electric and hydrogen infrastructure
 - \$44 million to date for chargers
 - \$4 million for regional planning
 - \$47 million to more than double the number of H2 fueling stations to 54 on path to goal of 100



Multi-State ZEV Action Plan

- CA, CT, MA, MD, NY, OR, RI, and VT
- Informed by intensive stakeholder process
- Released May 2014
- 11 priority actions to:
 - support MOU goals
 - guide interstate coordination
 - advise state-specific action

