

IHS AUTOMOTIVE

Presentation

Catching A Falling Star: Will U.S. Automakers Keep xEVs Powered In A Low-Oil Price Environment

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More
Horsepower

Larger
Vehicles

Which Way To Go?

Larger
Combustion
Engine



Photo By: Devin Lindsay

★ Government / incentives

★ Oil prices

★ Products

Six Stars of Alignment

★ Battery evolution

★ Infrastructure

★ Consumer



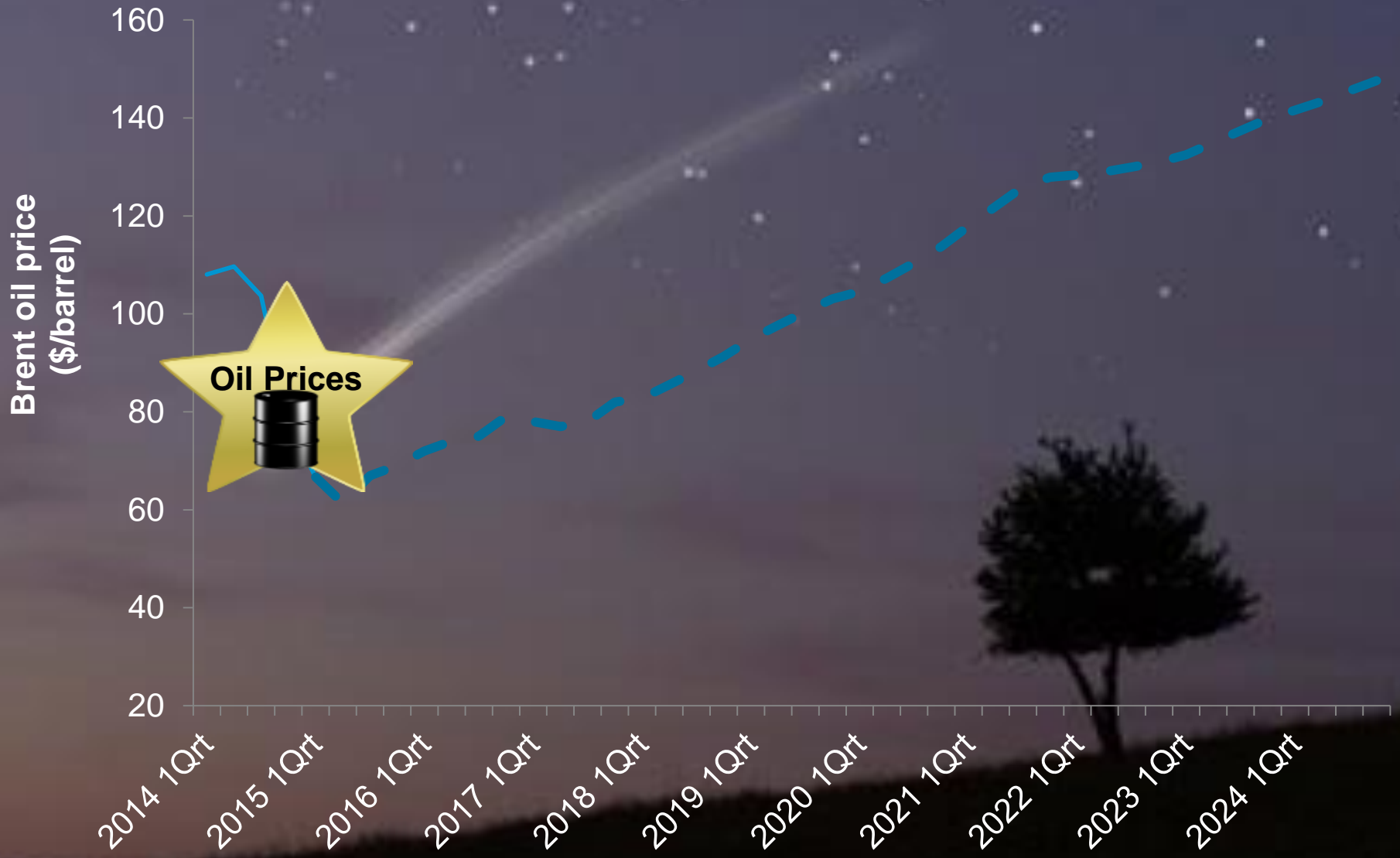
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Falling Star Creating Black Hole?



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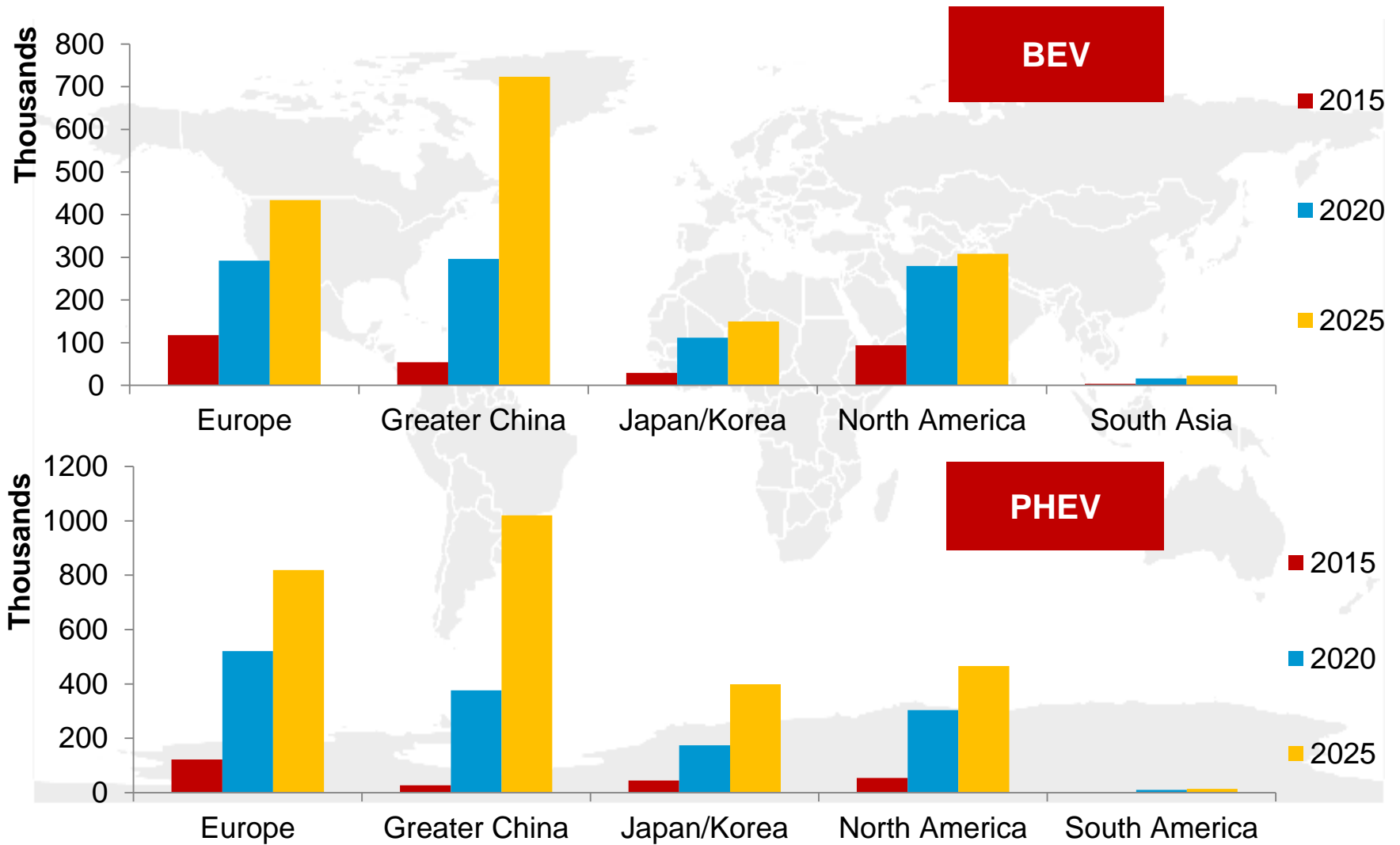
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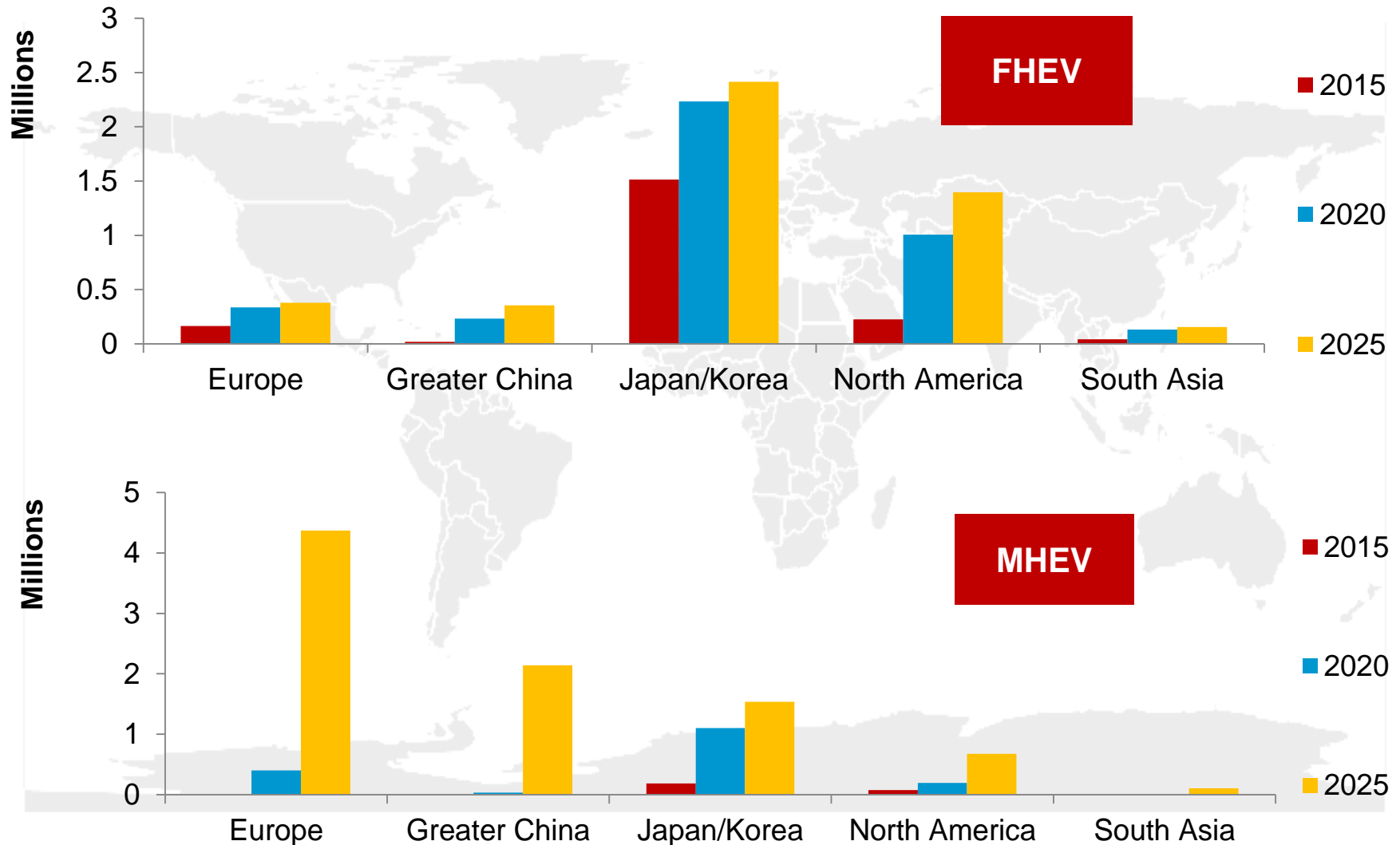
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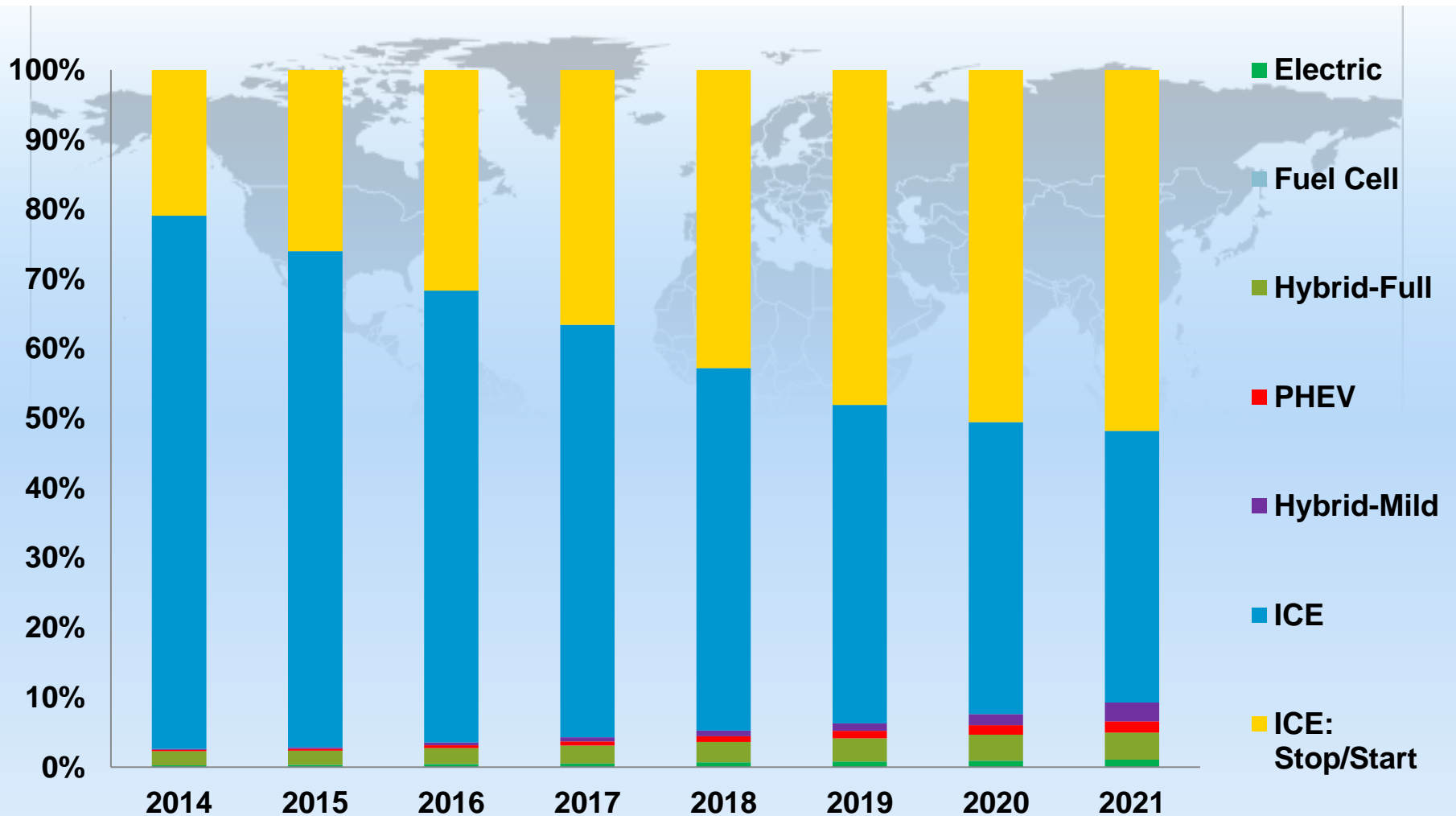
North America vs. Global Market Outlook – Production Forecast



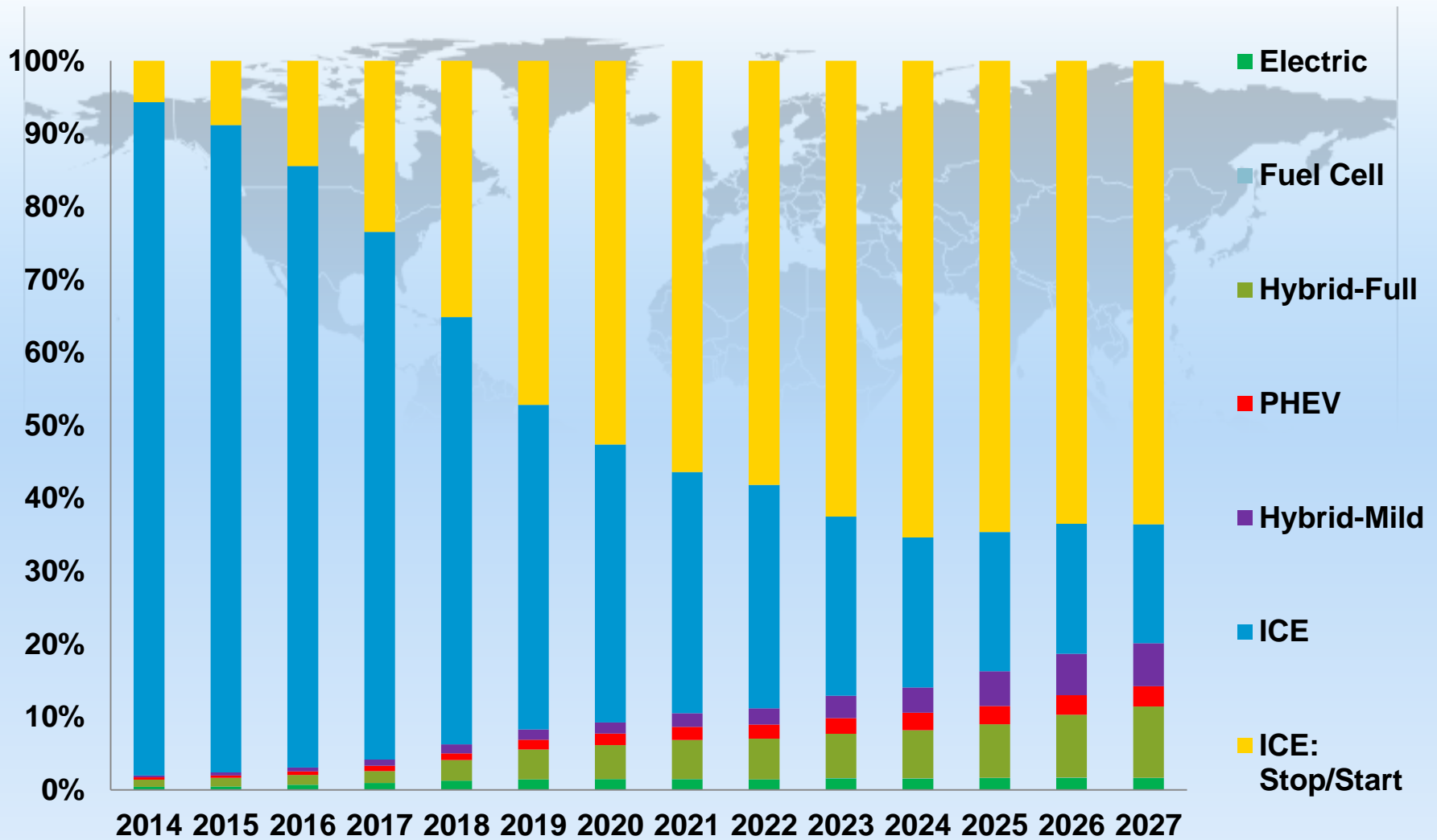
North America vs. Global Market Outlook – Production Forecast



Global Outlook – Production-Based Powertrain Forecast Percent Share



North American Outlook – Production-Based Powertrain Forecast Percent Share



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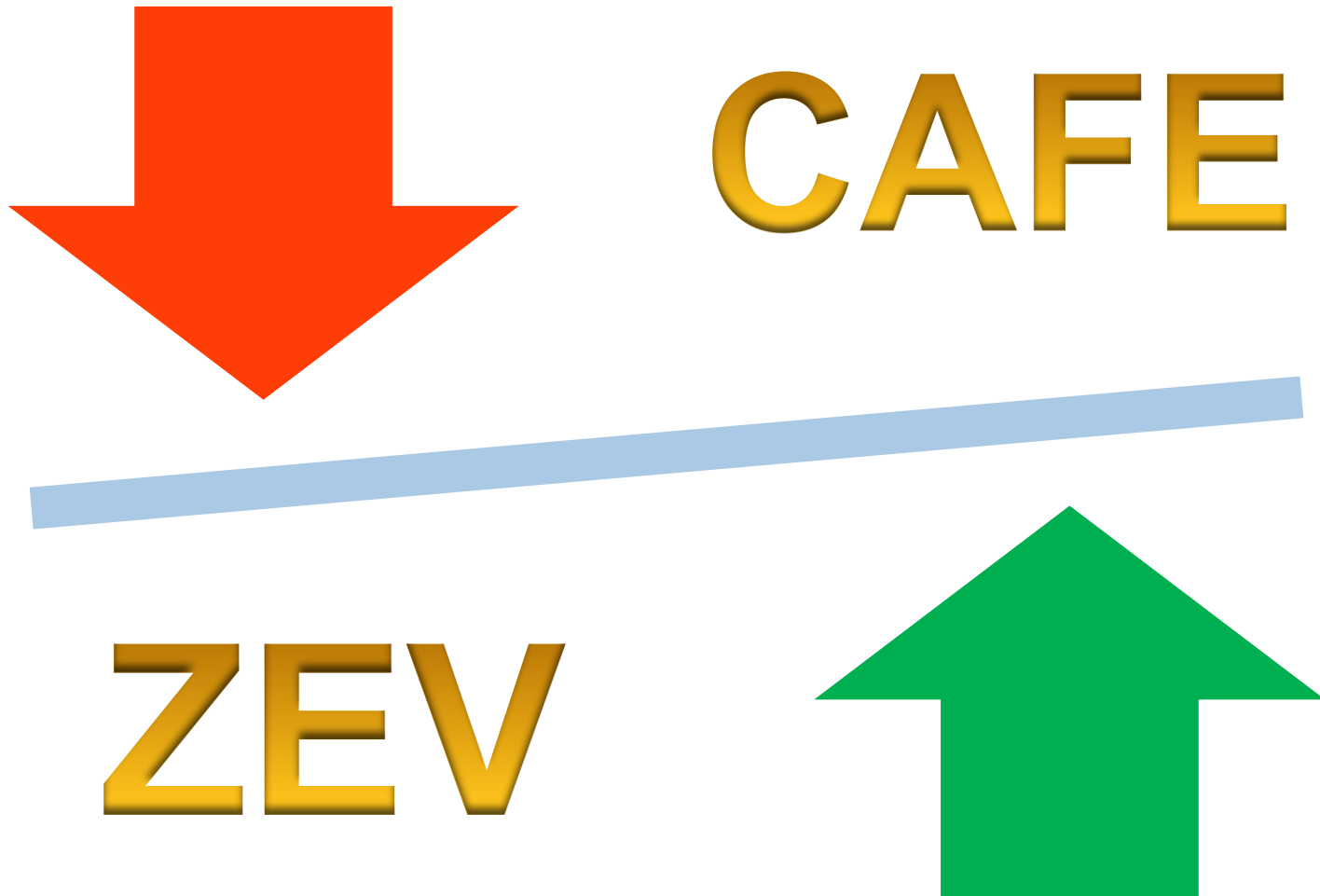
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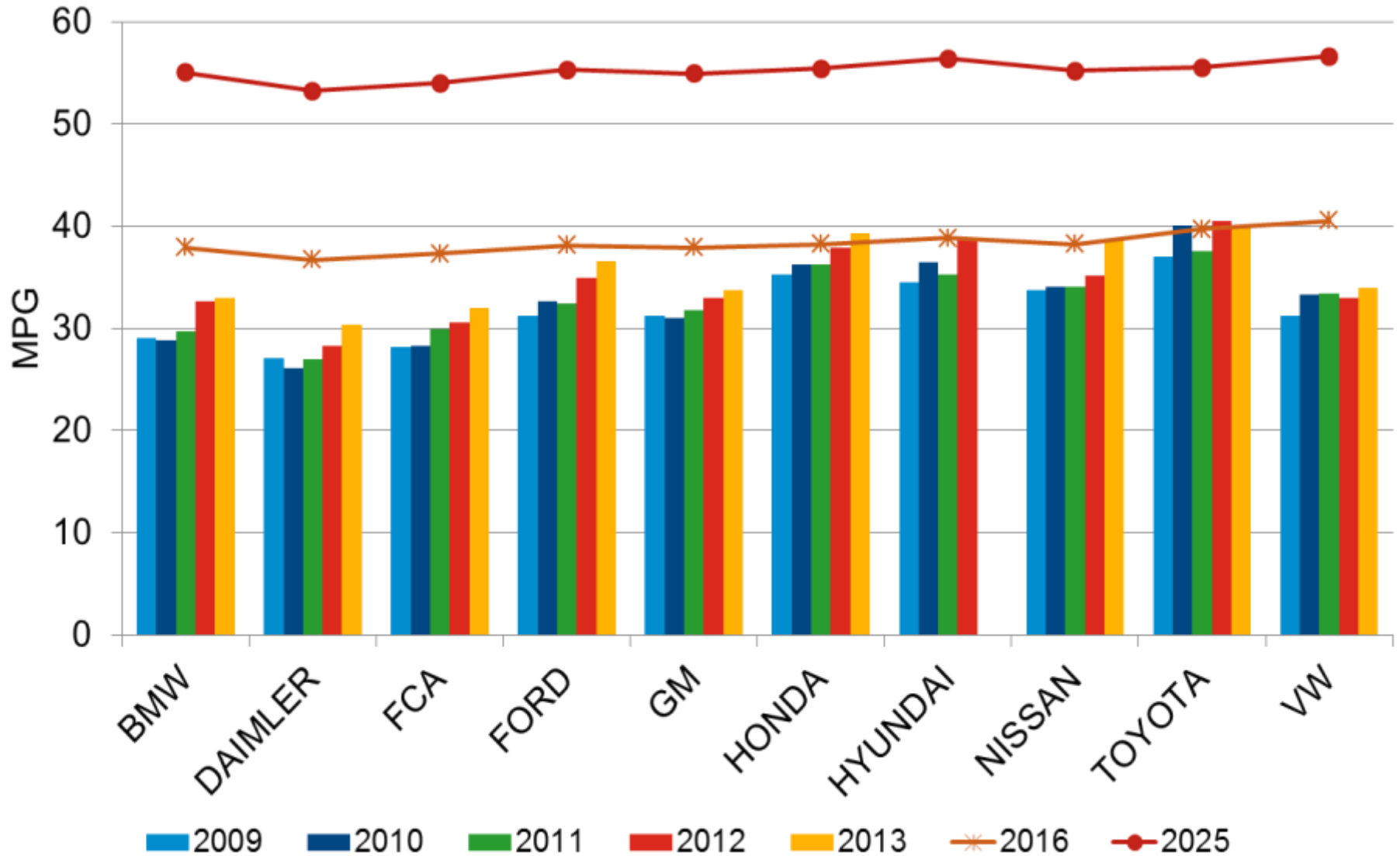
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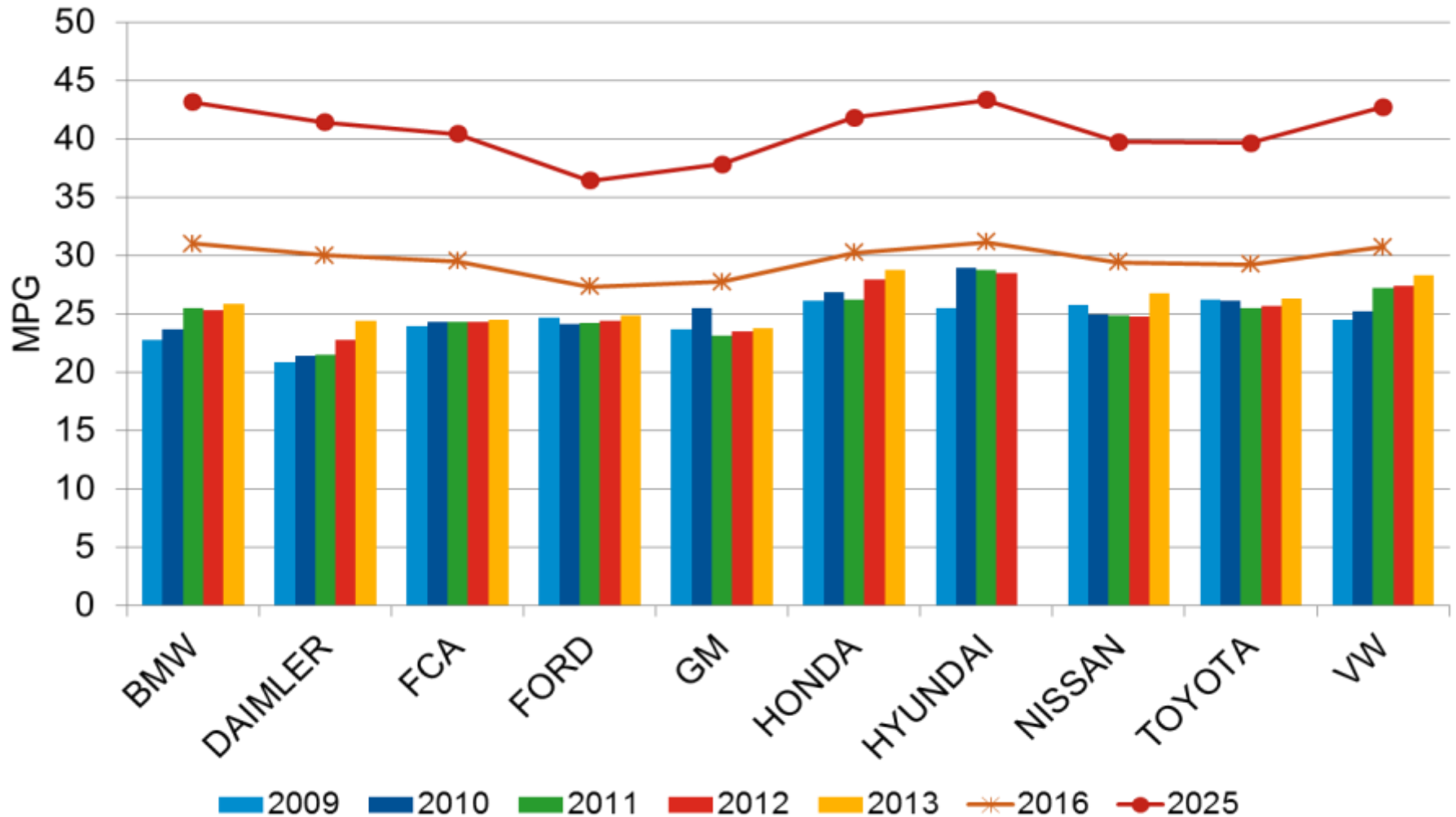
Could ZEV Be Delayed Or Adjusted & What About CAFE?



U.S. CAFE Fuel Economy Status and Targets – Car Fleet



U.S. CAFE Fuel Economy Status and Targets – Truck Fleet



Benefits of Advanced Clean Cars Program?

Fight Smog

75 percent reduction in smog-forming emissions from new vehicles by 2025 (compared to 2014 levels)

Create Jobs

additional 21,000 jobs in California in 2025, rising to 37,000 in 2030

Consumer Savings

California drivers will save \$5 billion in operating costs in 2025, and \$10 billion by 2030

Fight Climate Change

Greenhouse gas emissions from new cars cut 34 percent from 2016 levels. By 2025, greenhouse gases will be reduced by 52 million tons, the equivalent of taking 10 million cars off

Deliver Next-Generation Cars

ZEVs or PHEVs will account for one in seven new cars sold in California in 2025
>1.4 million zero-emission and plug-in hybrid vehicles will be on the road in California by 2025.

OEMs – Heavyweights Vs. Middle Weight Champs

Large Vehicle Manufacturers



Transitioning LVMs (2016-2018)

<20,000 Vehicles



DAIMLER



Other Intermediate Vehicle Manufacturers

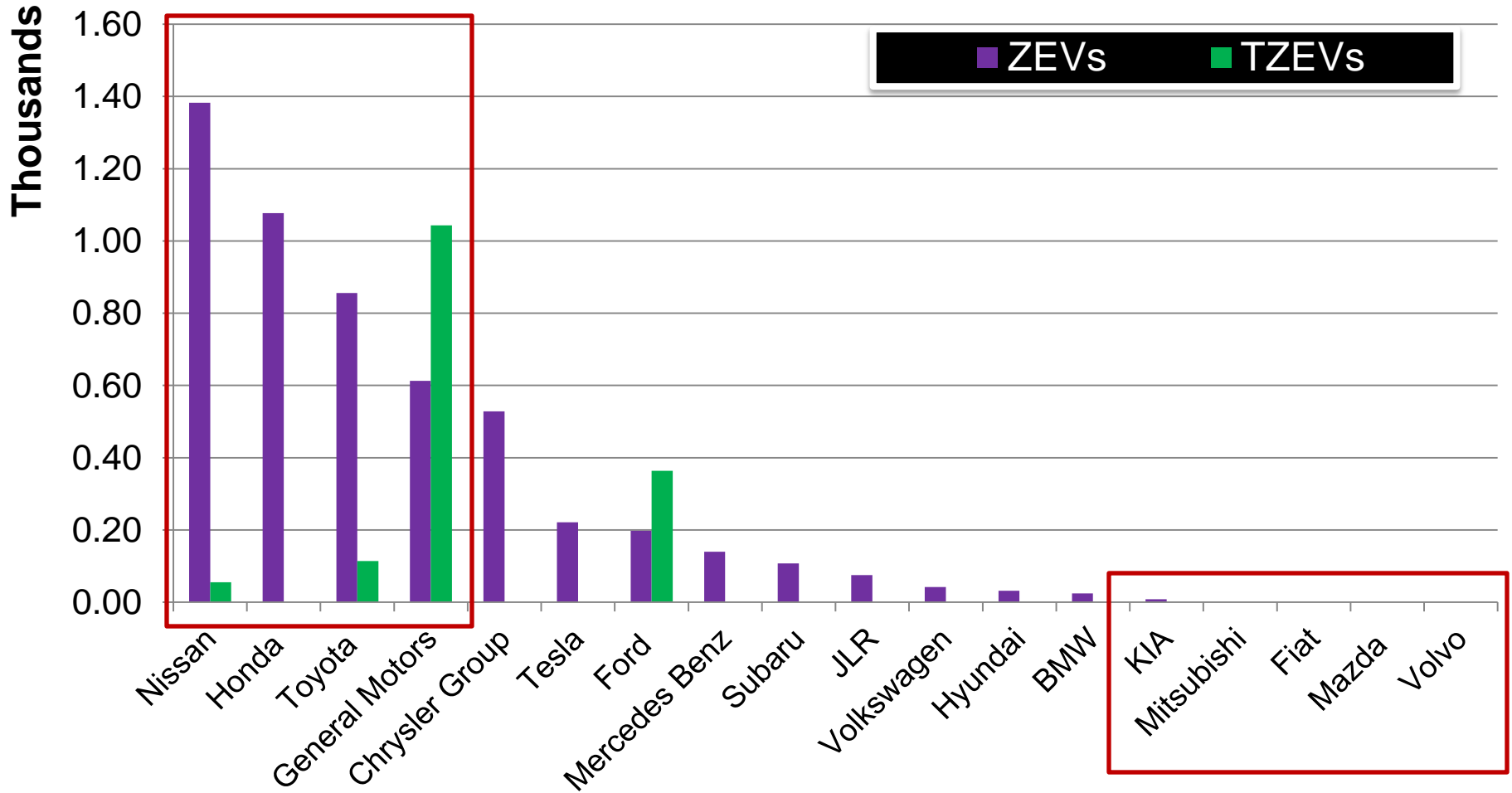


Travel Provision or "Section 177 States"



- Section 177 of the federal Clean Air Act allows other states to adopt California motor vehicle emission standards including the ZEV regulation
- Fuel cell vehicles: Travel provision allowed until sufficient complimentary policies established in S177 states

California Zero Emission Vehicle Credit Balances as of September 2014



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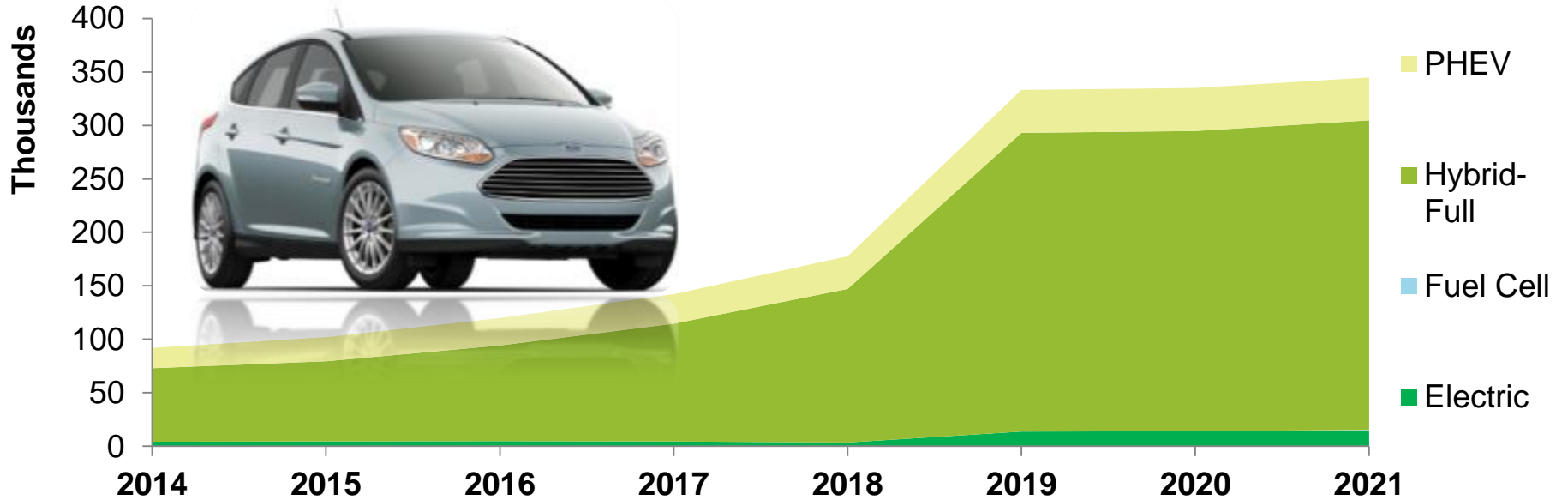
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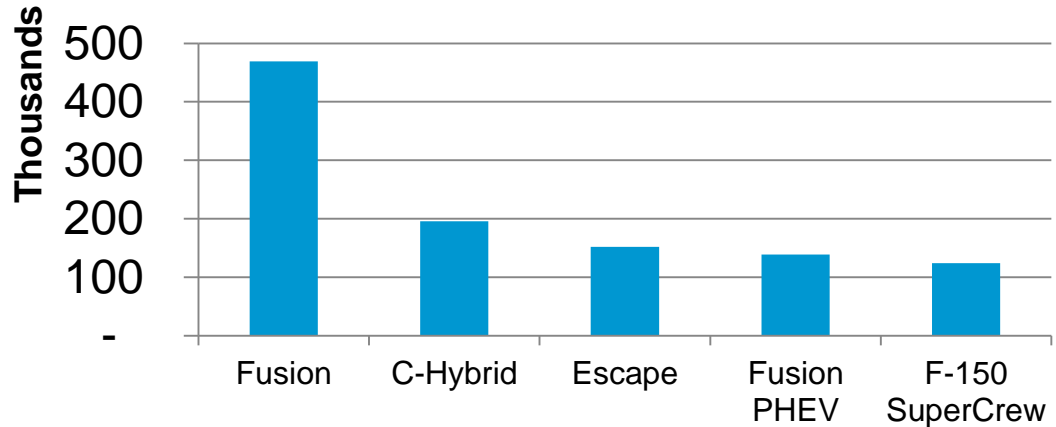
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Ford

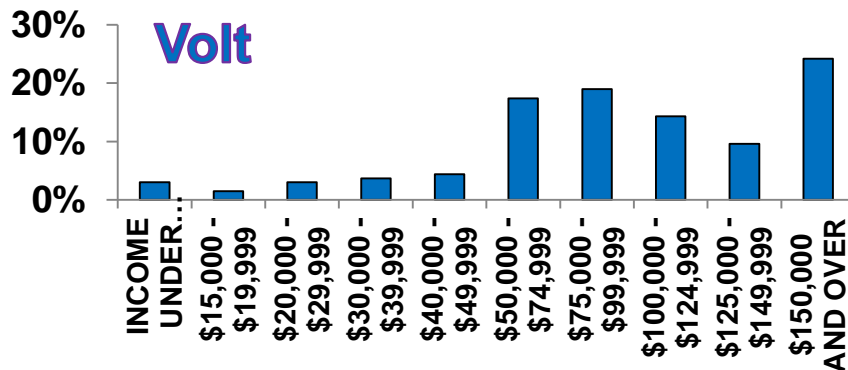
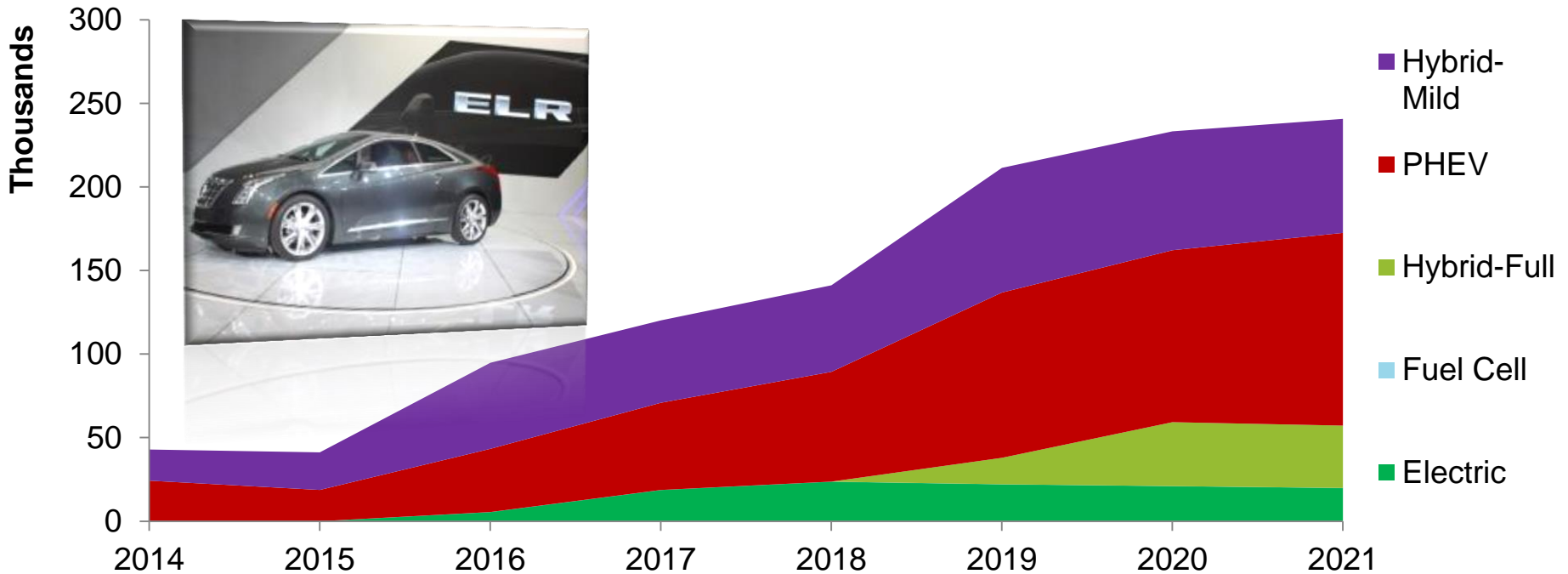


- 200 Mile BEV will rival GM Bolt
- Strong FHEV focus
- FHEV F150 pick-up truck late 2018 on 3.5L EcoBoost

Top Volume By 2021

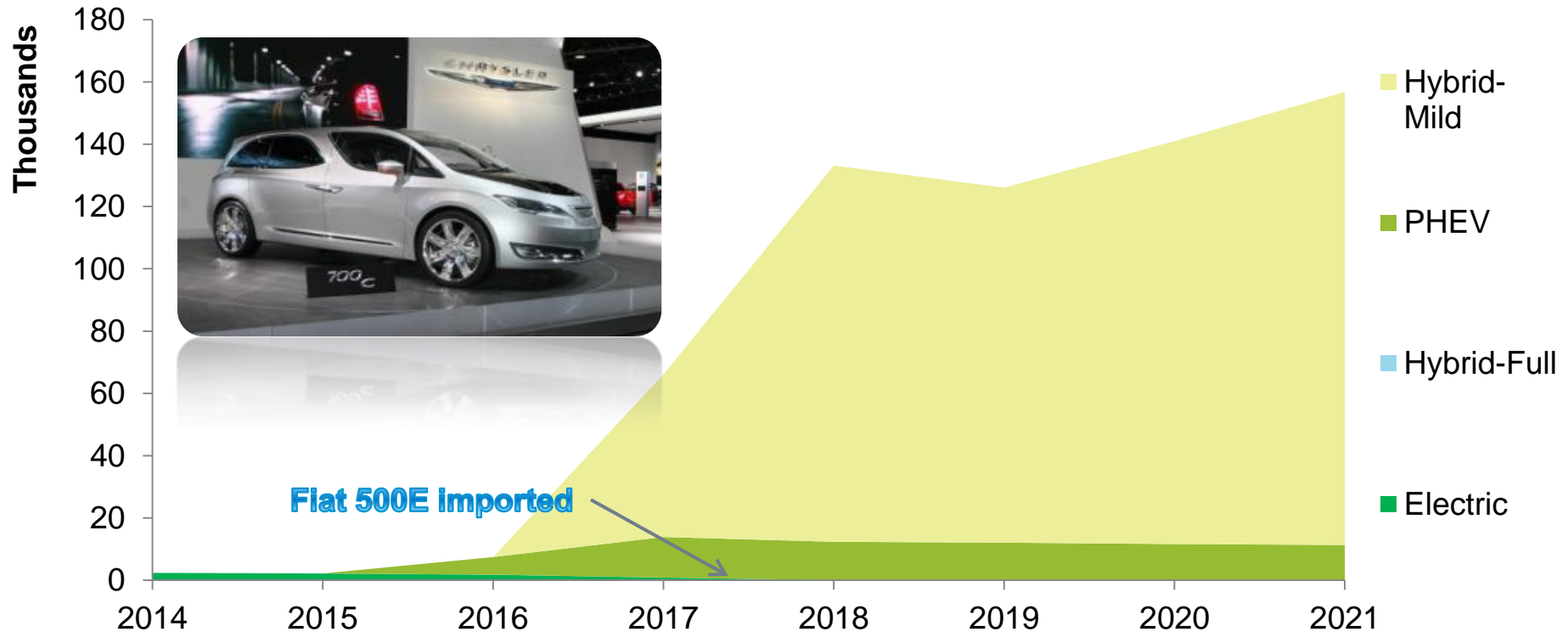


General Motors



- Significant PHEV emphasis
- Does the 200 mile range Bolt set a new standard?
- eAssist continues to lose power

Fiat-Chrysler

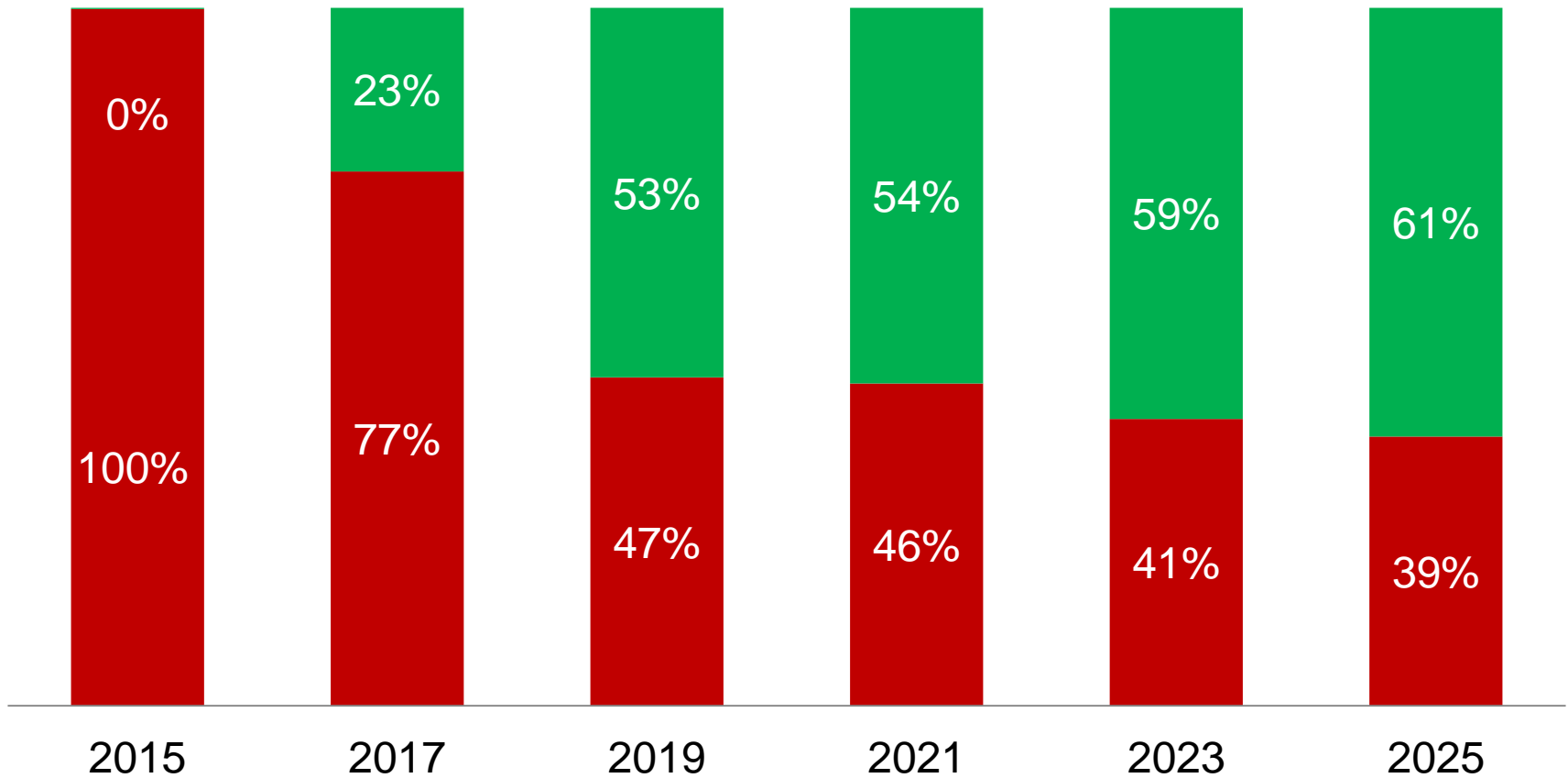


- Possible late-launch next-gen Ram 1500 48V MHEV
- Significant 48V MHEV volume possible...but is there a risk?
- PHEV minivan still planned so will Honda and Toyota wait or compete?

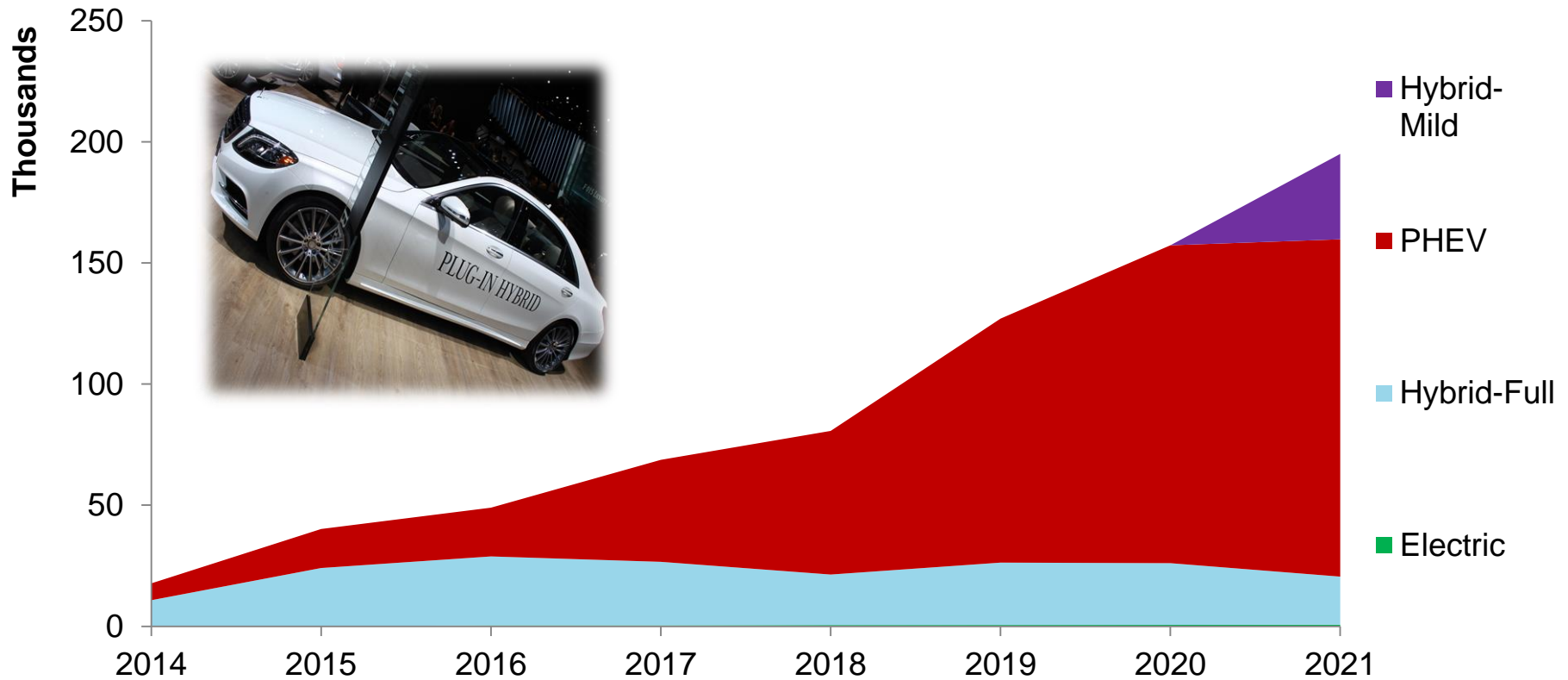


48V Systems*

■ Non-Hybrid Applications ■ Hybrid Applications



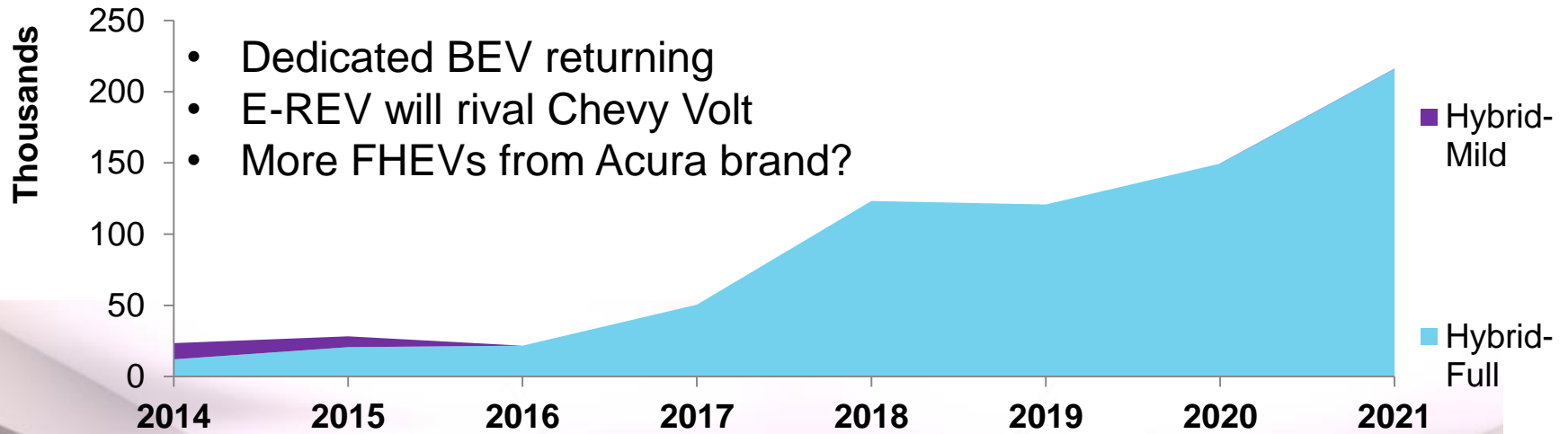
German OEMs (BMW, Daimler, VW)



- Significant 48V MHEV volume possible starting with Audi brand
- Aggressive roll-out of PHEVs



Honda

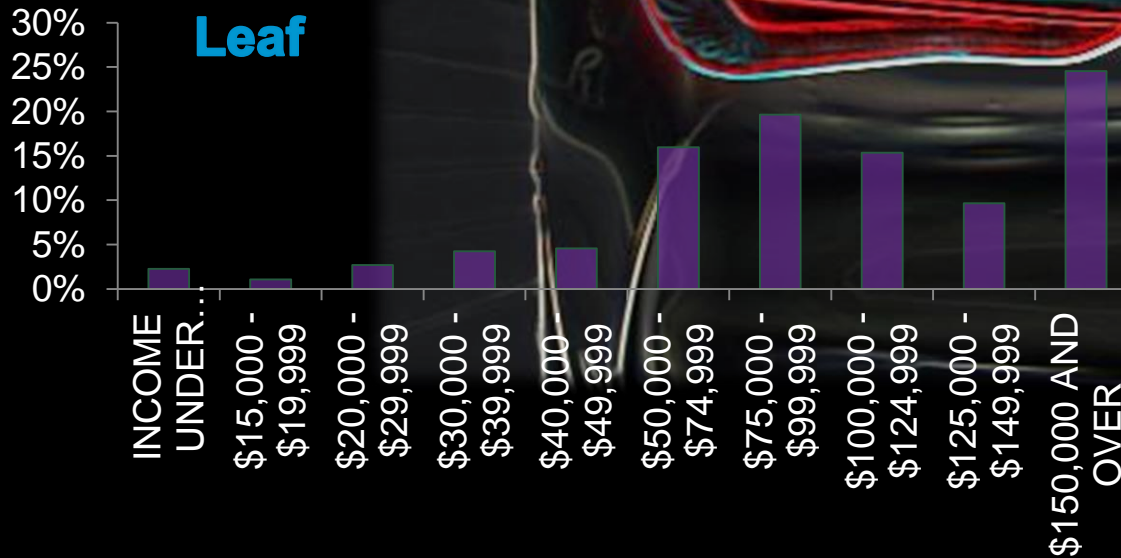


Hyundai/Kia



- Very competitive xEV models
- Soon following similar pattern if special “green” model in various configurations
- Fuel cell Tucson improves score on ZEV scoreboard

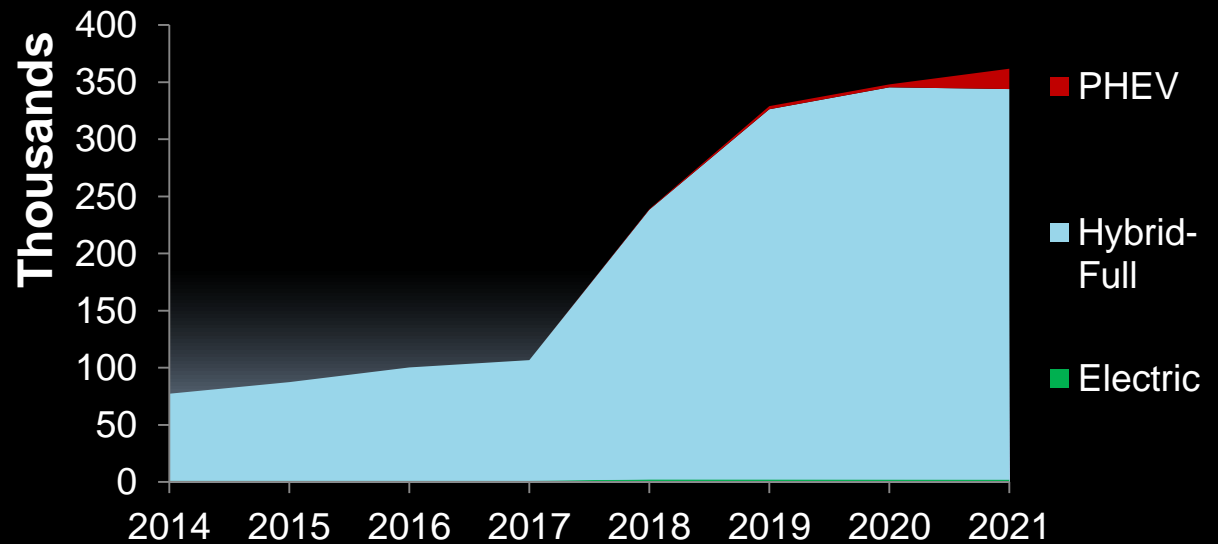
Nissan



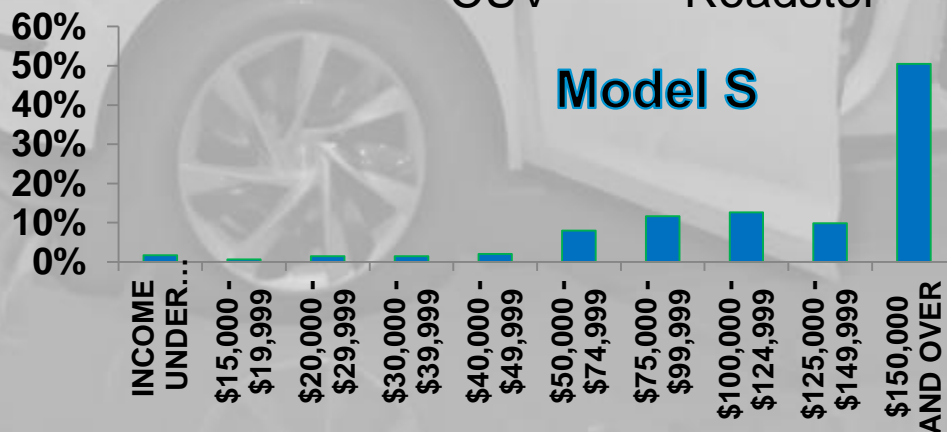
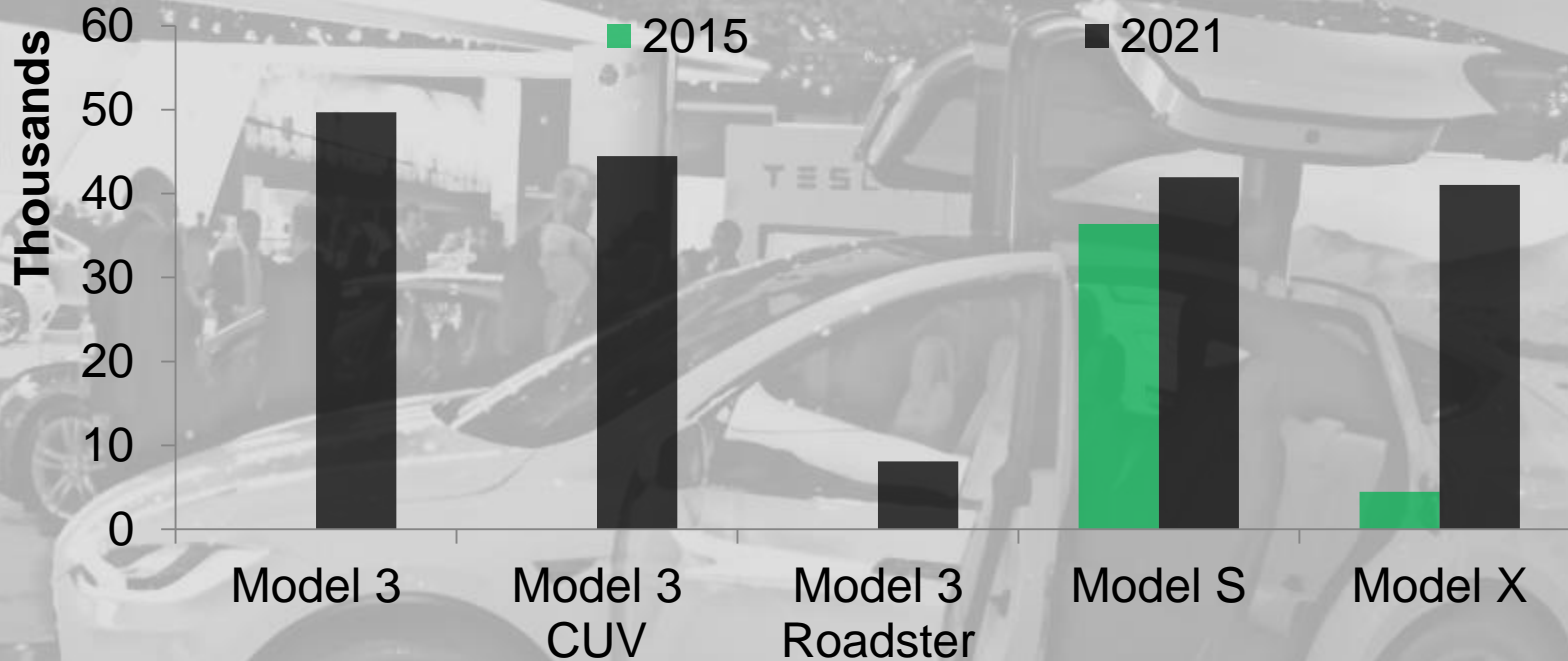
- Commitment to EVs
- Lack of SUV penetration in market
- Very positive ZEV position



- Mirai Fuel Cell
- Commitment to BEVs?
- Success of the Prius



Tesla



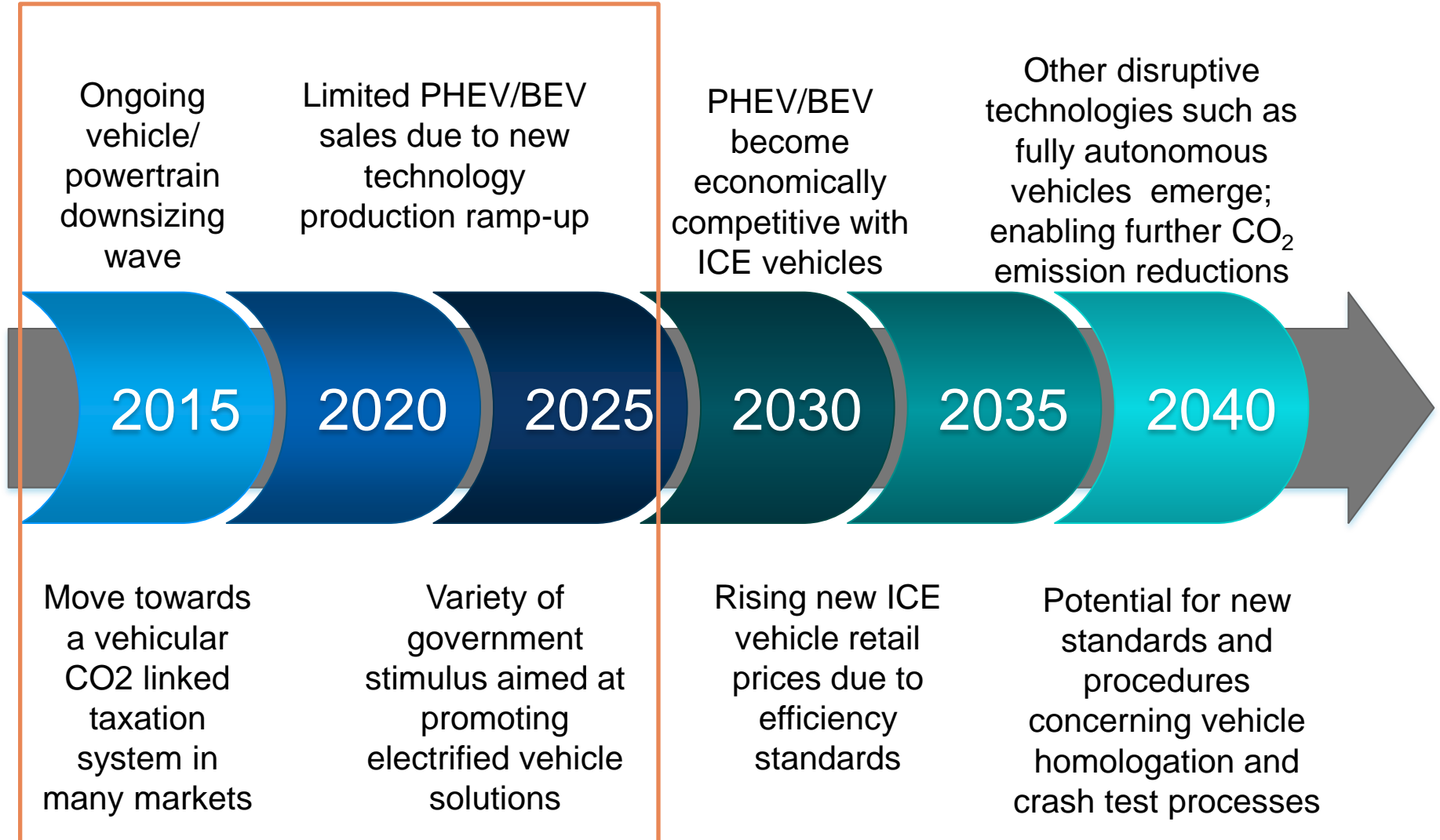
- Shows that competition is really good for the marketplace
- Model S proves that EVs are not just for A & B Segment vehicles
- Will production delays effect long-term viability?

Estimated Household Income Personal Registrations:
Dec 2014 YTD*

Tesla and Upcoming Competition



APSS New Scenario Assumptions – Rivalry Timeline



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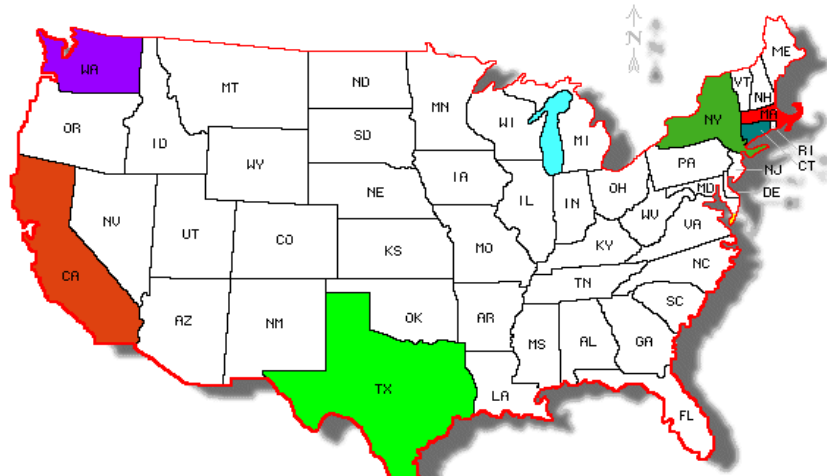
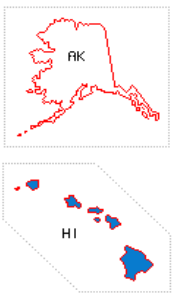
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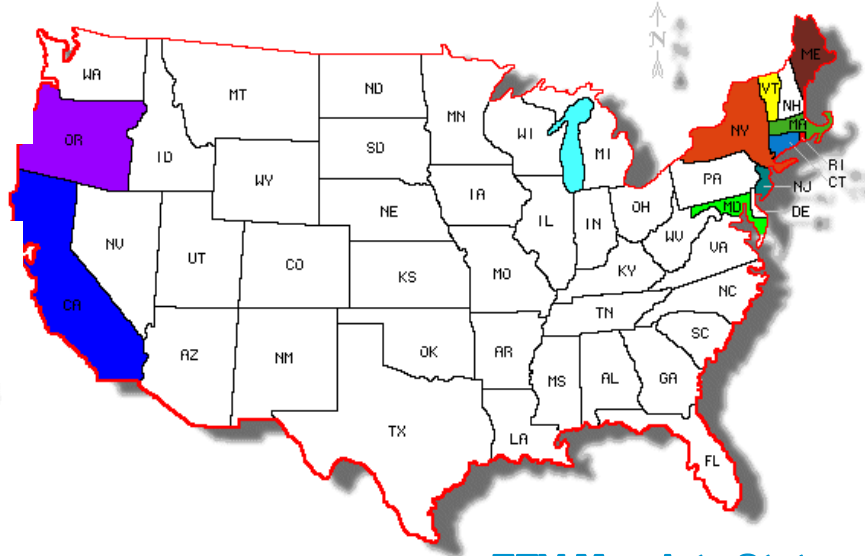
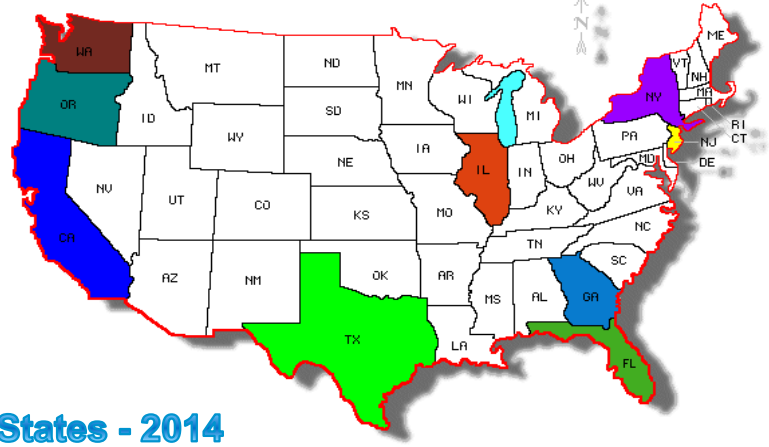
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State Consistency?



Worst Cities for Traffic

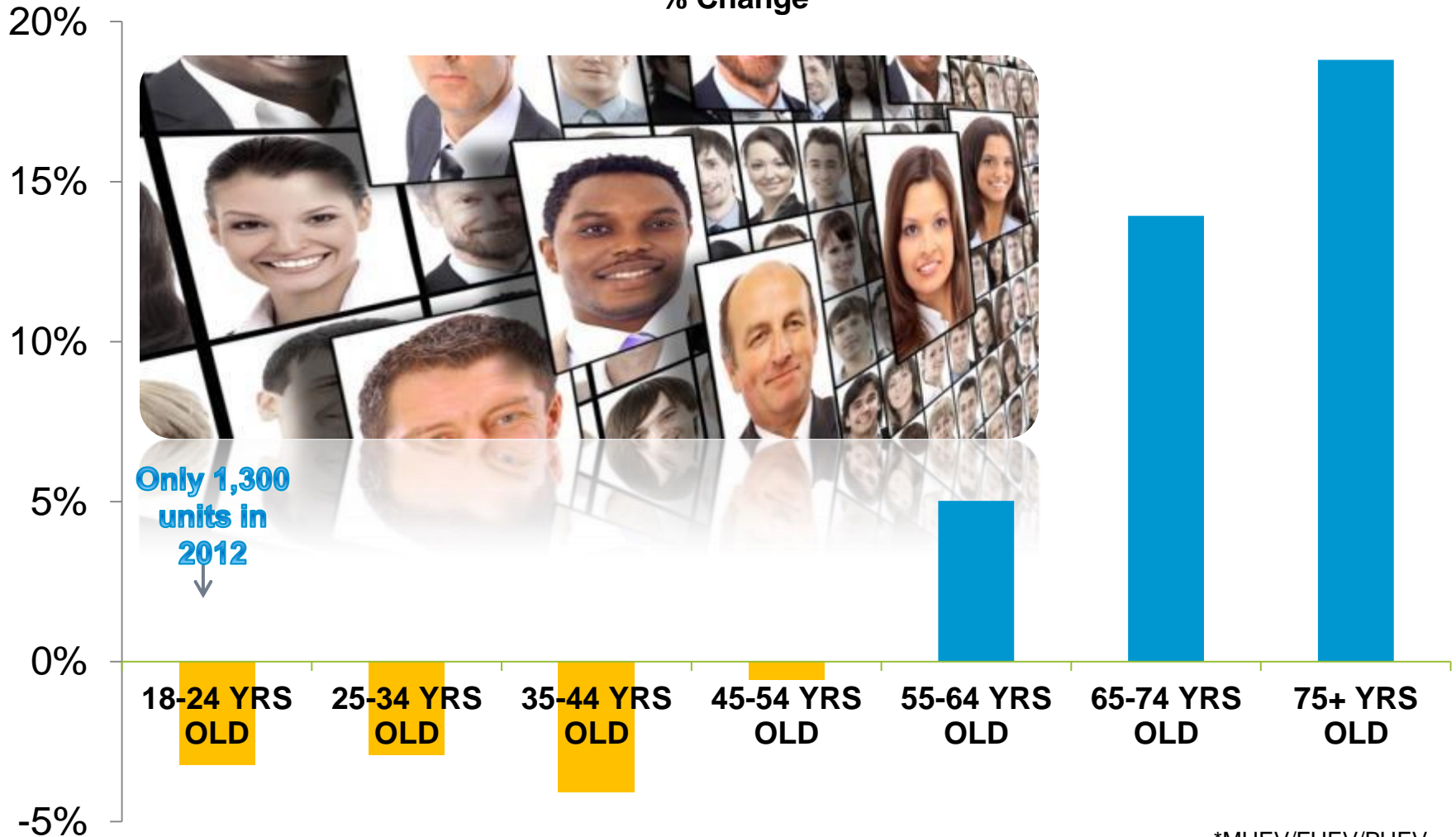


ZEV Mandate States

Top EV States - 2014

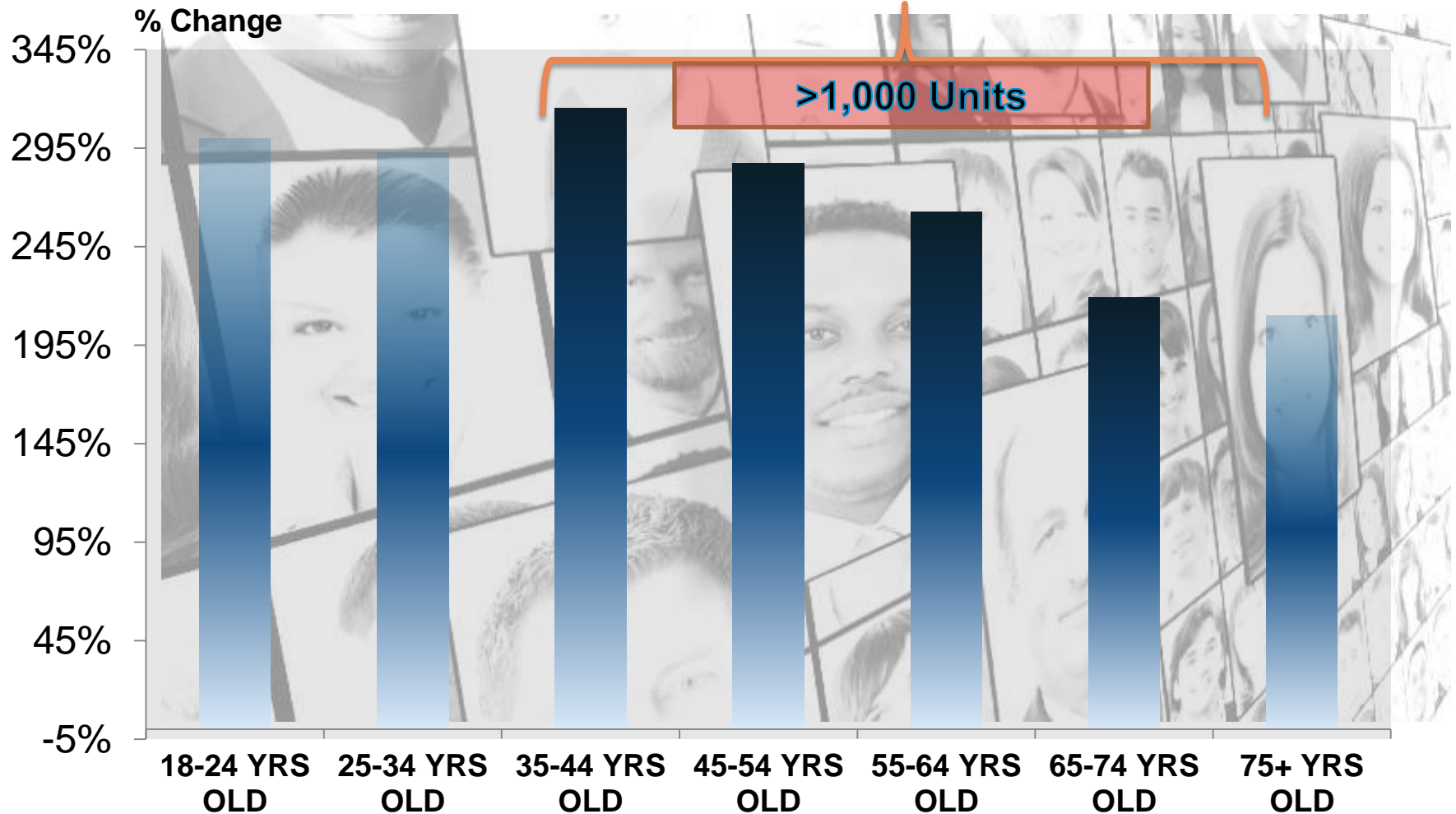
United States: xEV* Age Breakdown Personal Registrations: 2012 vs. 2013

% Change

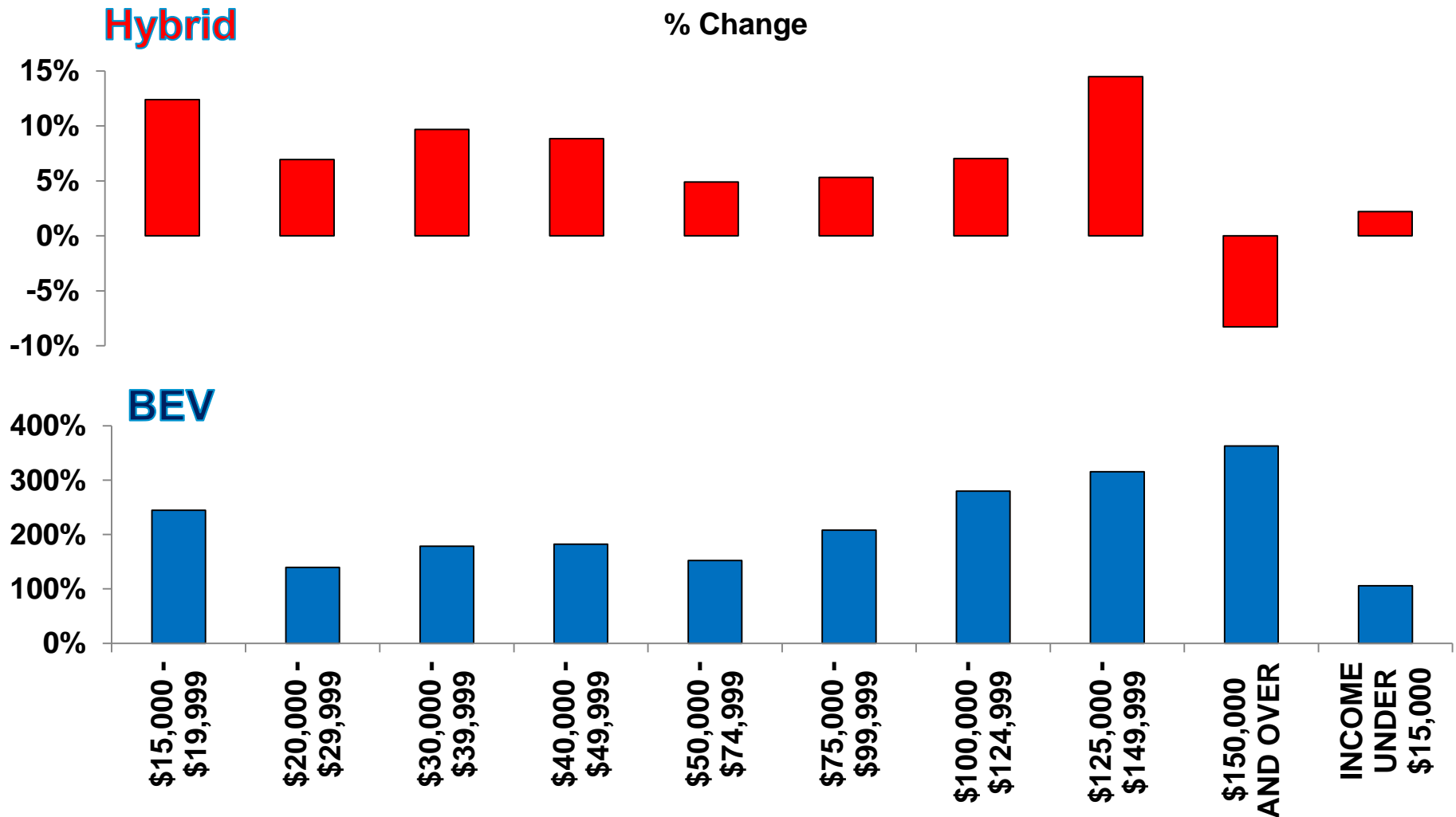


*MHEV/FHEV/PHEV

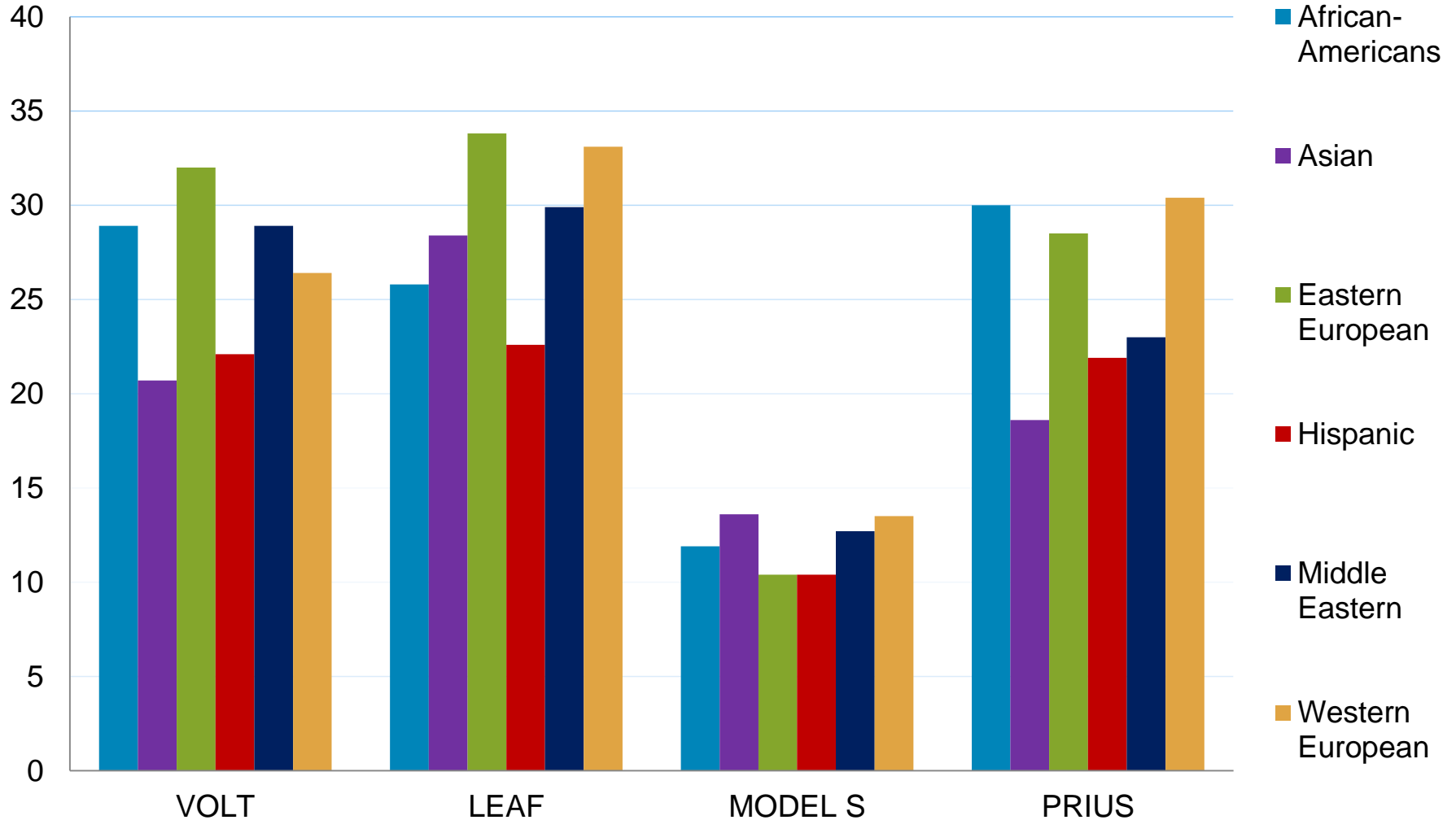
United States: **Electric Vehicle** – Consumers Age Breakdown Personal Registrations: 2012 vs. 2013*



United States: Consumers Estimated Household Income Personal Registrations: 2012 vs. 2013*



Loyalty Percentage – Select Brands By Ethnicity



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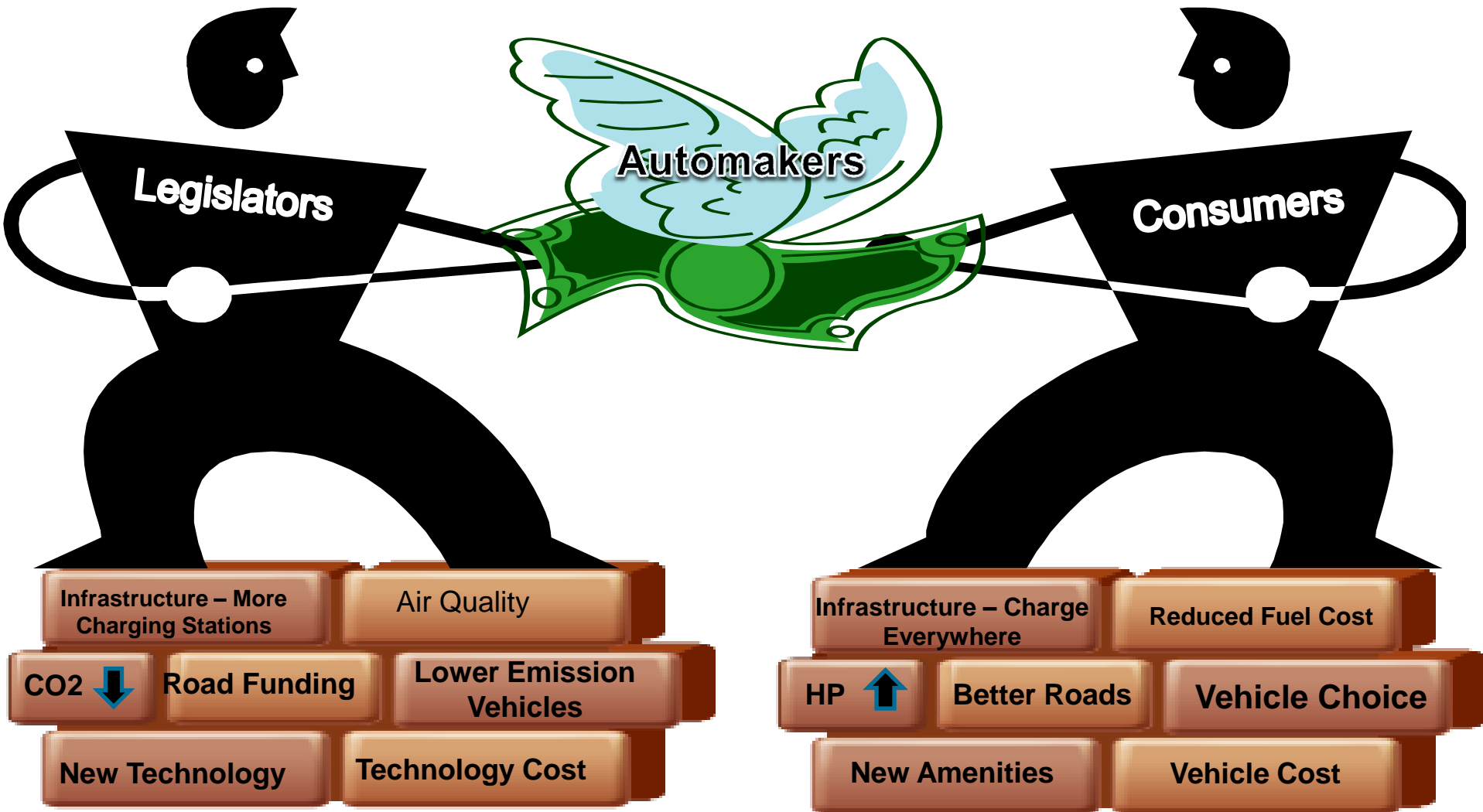
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Competing Conflicts



Key Takeaways

- Electrified vehicles are never sustained directly by oil prices, but its velocity is controlled by oil price
- Legislation determines technology winners and losers
- Automakers are beginning to choose its technology of choice to meet CAFE and ZEV regulations
- xEVs are still very immature in the market with many unreached consumers and low-penetration in most states.

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