

DOCKETED

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Light-Duty Electric Vehicle Scenarios

Scope of the California Energy Demand Forecast Update

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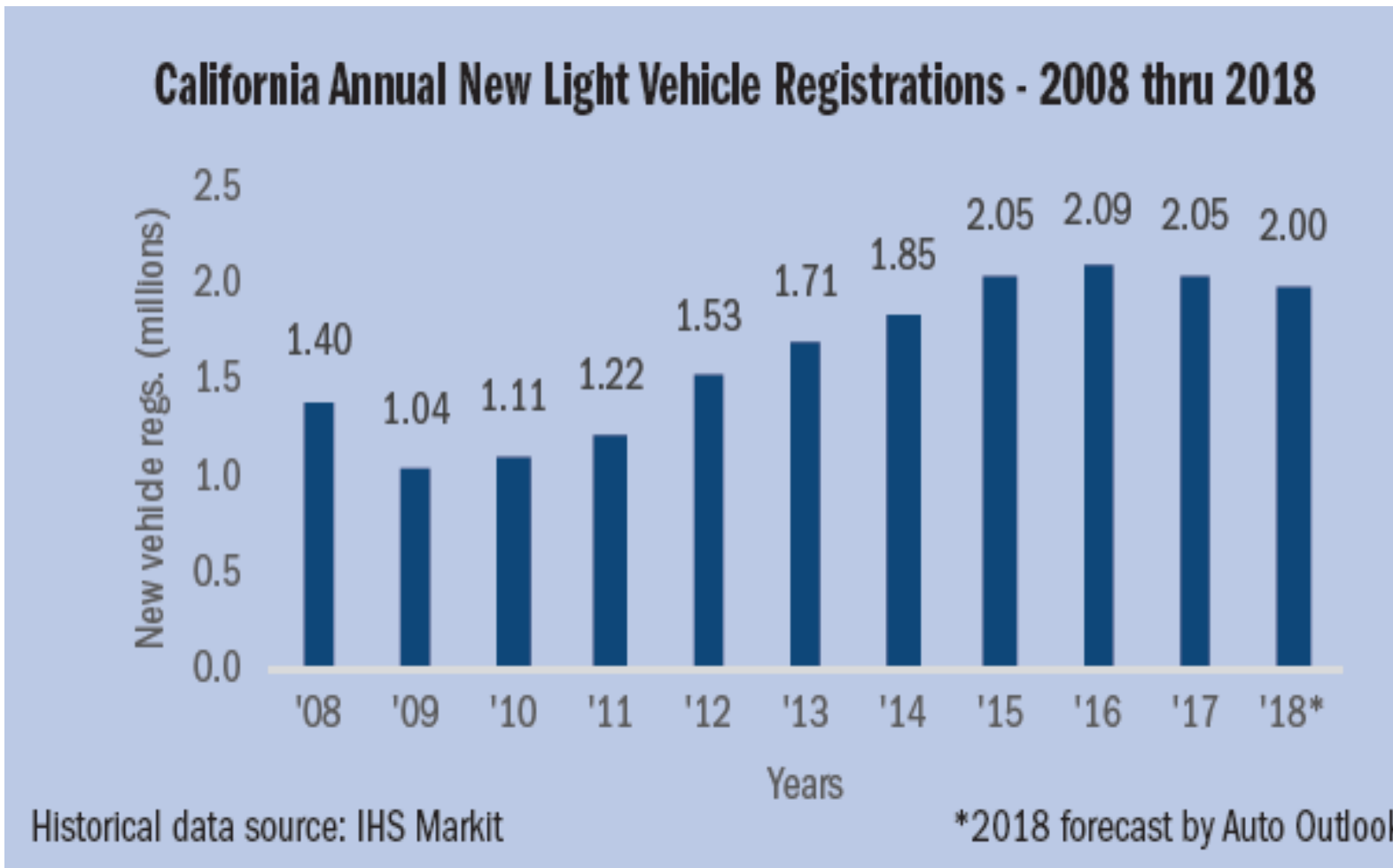


Overview

- California Market
- Scope of the Update
- Updated Inputs & Policies



New Vehicle Sales Expected to Decline

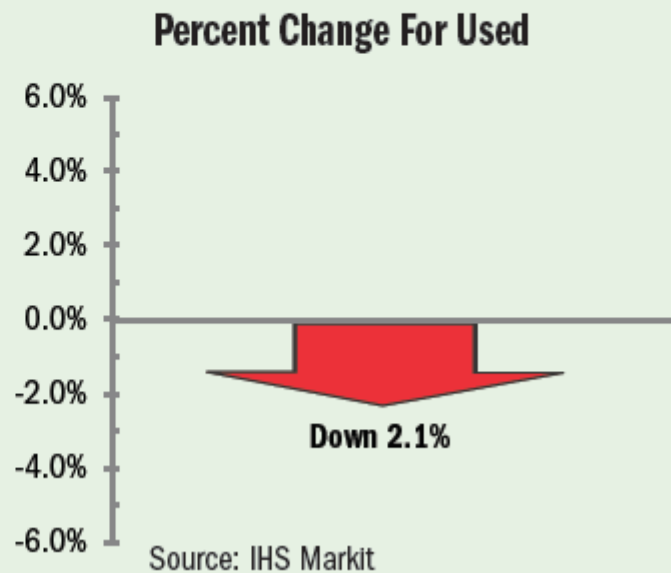
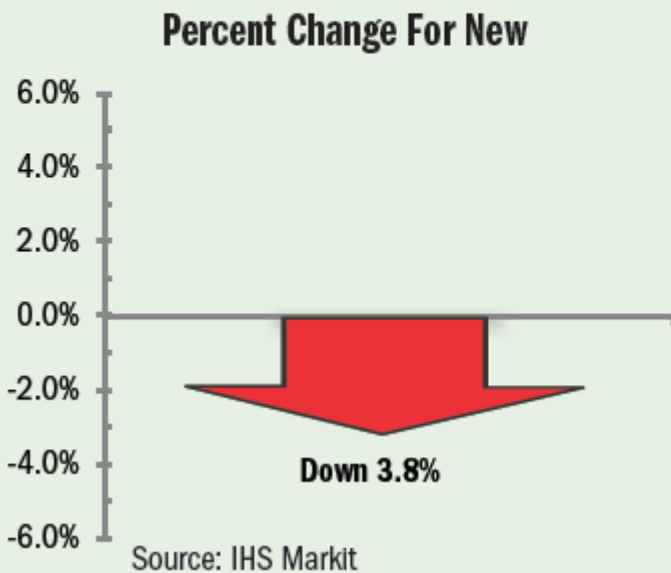


Source: CNCDA, 2018 Q1 Report <https://www.cncda.org/news/2018-quarter-1/>



Smaller Decline in Used Vehicle Sales

Comparison of California New and Used Vehicle Markets -
Percent change in registrations (YTD '18 thru March vs. YTD '17)



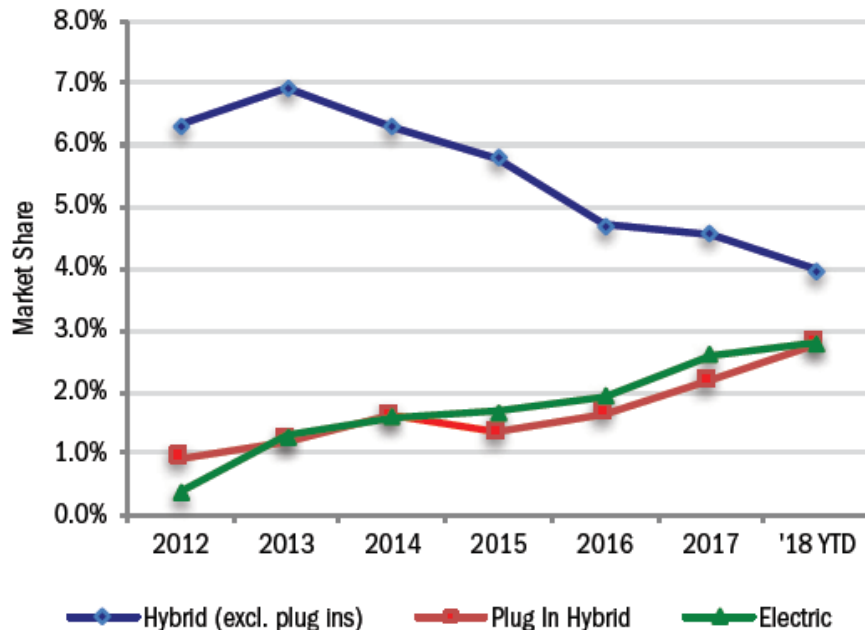
Source: CNCDA, 2018 Q1 Report <https://www.cncda.org/news/2018-quarter-1/>



But PEV Sales Continue to Increase in California

Electric and Plug In Vehicle Segments Move Higher in 2018

Hybrid and Electric Vehicle Market Share



Hybrid/electric vehicle market share in 1Q '18:
9.6 percent

Hybrid and Electric New Vehicle Registrations and Market Share					
	2014	2015	2016	2017	YTD 2018
Hybrid regs.(excl. plug ins)	116217	118981	98083	93254	19416
Hybrid share(excl. plug ins)	6.3%	5.8%	4.7%	4.6%	4.0%
Plug in hybrid regs.	29949	27740	34727	45012	13534
Plug in hybrid share	1.6%	1.4%	1.7%	2.2%	2.8%
Electric regs.	29536	34477	40347	53499	13657
Electric share	1.6%	1.7%	1.9%	2.6%	2.8%

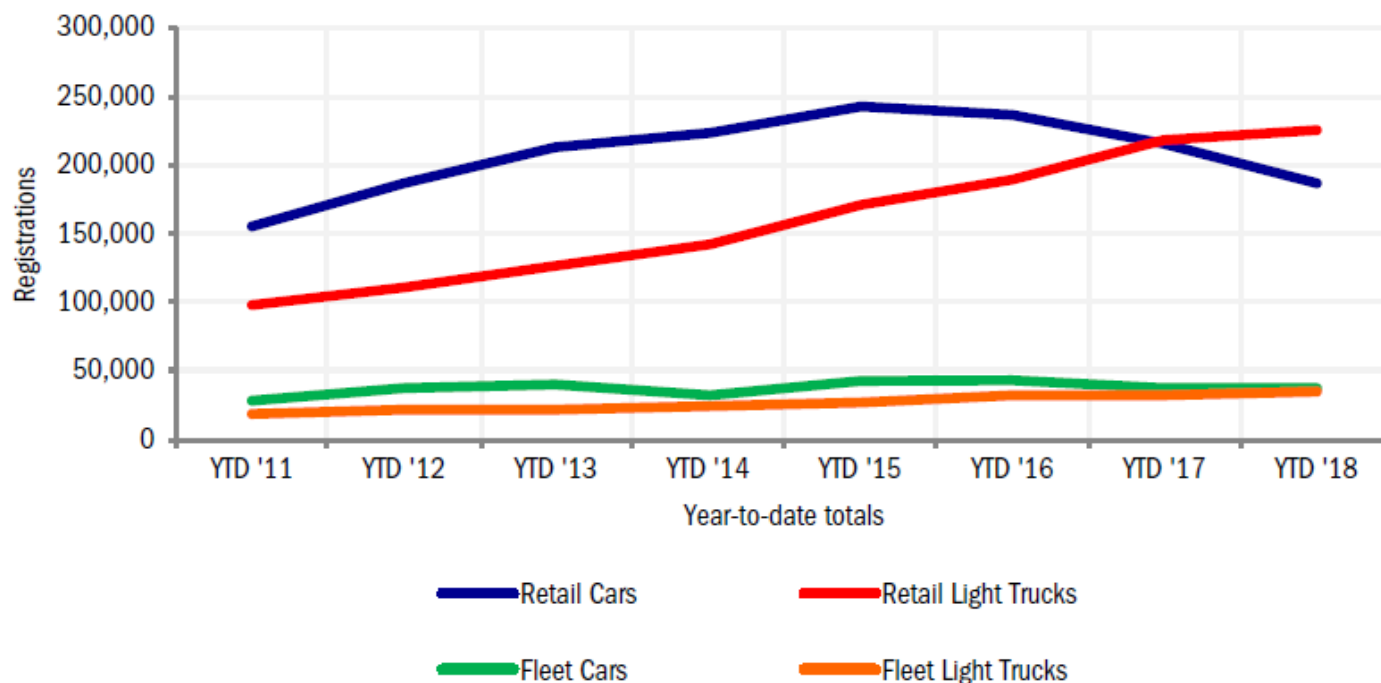
Source: IHS Markit

Source: CNCDA, 2018 Q1 Report <https://www.cncda.org/news/2018-quarter-1/>



Light Truck Sales Exceeding Car Sales

California New Car and Light Truck Retail and Fleet Registrations - 2011 thru 2018, YTD thru Mar.



PERCENT CHANGE:
1Q '18 VS. 1Q '17

- Retail cars: **DOWN** 13.2%
- Retail light trucks: **UP** 3.4%
- Fleet cars: **UP** 0.2%
- Fleet light trucks: **UP** 5.3%

Data Source: IHS Markit.

Source: CNCDA, 2018 Q1 Report <https://www.cncda.org/news/2018-quarter-1/>



OEM PEV New Model Announcements on the Rise

Technology	Class	2017	2018	2019	2020	2021	2022
EV	Car	16	17	20	29	32	32
EV	Light Truck	4	4	11	19	23	25
PHEV	Car	12	22	25	25	26	26
PHEV	Light Truck	4	9	19	27	31	36

Source: California Energy Commission



Foreign Models Share: 64% of Used LDVs & 71% of New LDVs Sold in California

California Light Vehicle Registrations - Year-to-date thru March								
	NEW				USED			
	Registrations		Market Share		Registrations		Market Share	
	YTD '17	YTD '18	YTD '17	YTD '18	YTD '17	YTD '18	YTD '17	YTD '18
Total	506,830	487,741			993,867	972,999		
Cars	254,462	226,057	50.2%	46.3%	589,352	571,168	59.3%	58.7%
Light Trucks	252,368	261,684	49.8%	53.7%	404,515	401,831	40.7%	41.3%
Detroit Three	145,755	143,207	28.8%	29.4%	365,827	349,734	36.8%	35.9%
European	75,178	71,391	14.8%	14.6%	132,220	132,990	13.3%	13.7%
Japanese	246,167	240,698	48.6%	49.3%	452,634	445,188	45.5%	45.8%
Korean	39,730	32,445	7.8%	6.7%	43,186	45,087	4.3%	4.6%

Source: IHS Markit

Source: Adapted from CNCDA, 2018 Q1 Report <https://www.cncda.org/news/2018-quarter-1/>



Scope of the Forecast: Focus on PEVs

Cases represent different levels of transportation electricity demand

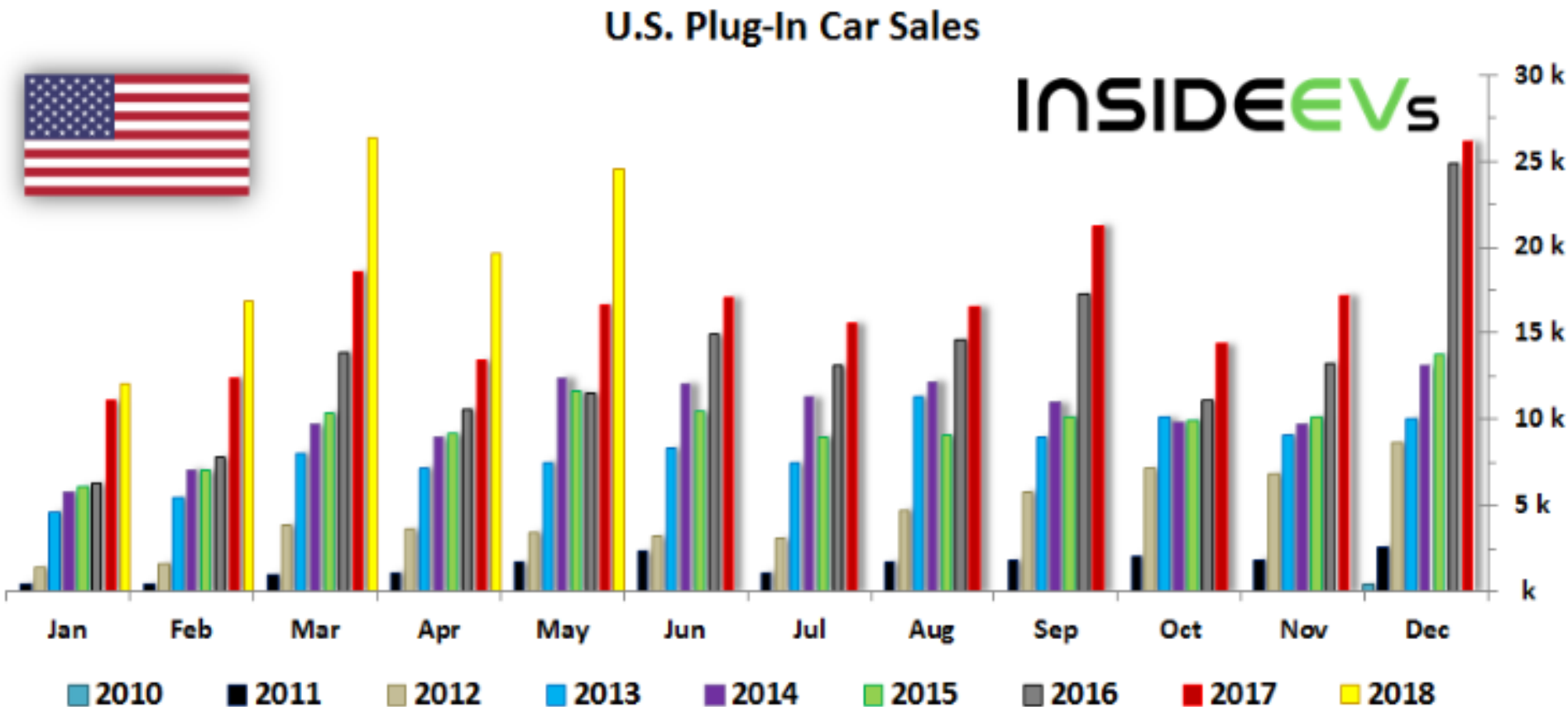
- **Transportation Demand Cases**
 - ❑ **High Electricity Demand (High Case)**
 - Inputs selected to represent high level of electricity demand
 - ❑ **Mid Electricity Demand (Mid Case)**
 - ❑ **Low Electricity Demand (Low Case)**
 - Inputs selected to represent low level of electricity demand
- **Inputs to be updated**
 - Income, population, fuel prices
 - 2016 American Community Survey
 - Selected PEV attributes: vehicle price, range, number of makes and models, time to station
 - Regional model
- **Policies**
 - ZEV state rebates funded to 2025 in the low demand case
 - Federal reversal of CAFÉ and ZEV in the low demand case
 - Federal trade policies: higher foreign & domestic vehicle prices in the low demand case



QUESTIONS?



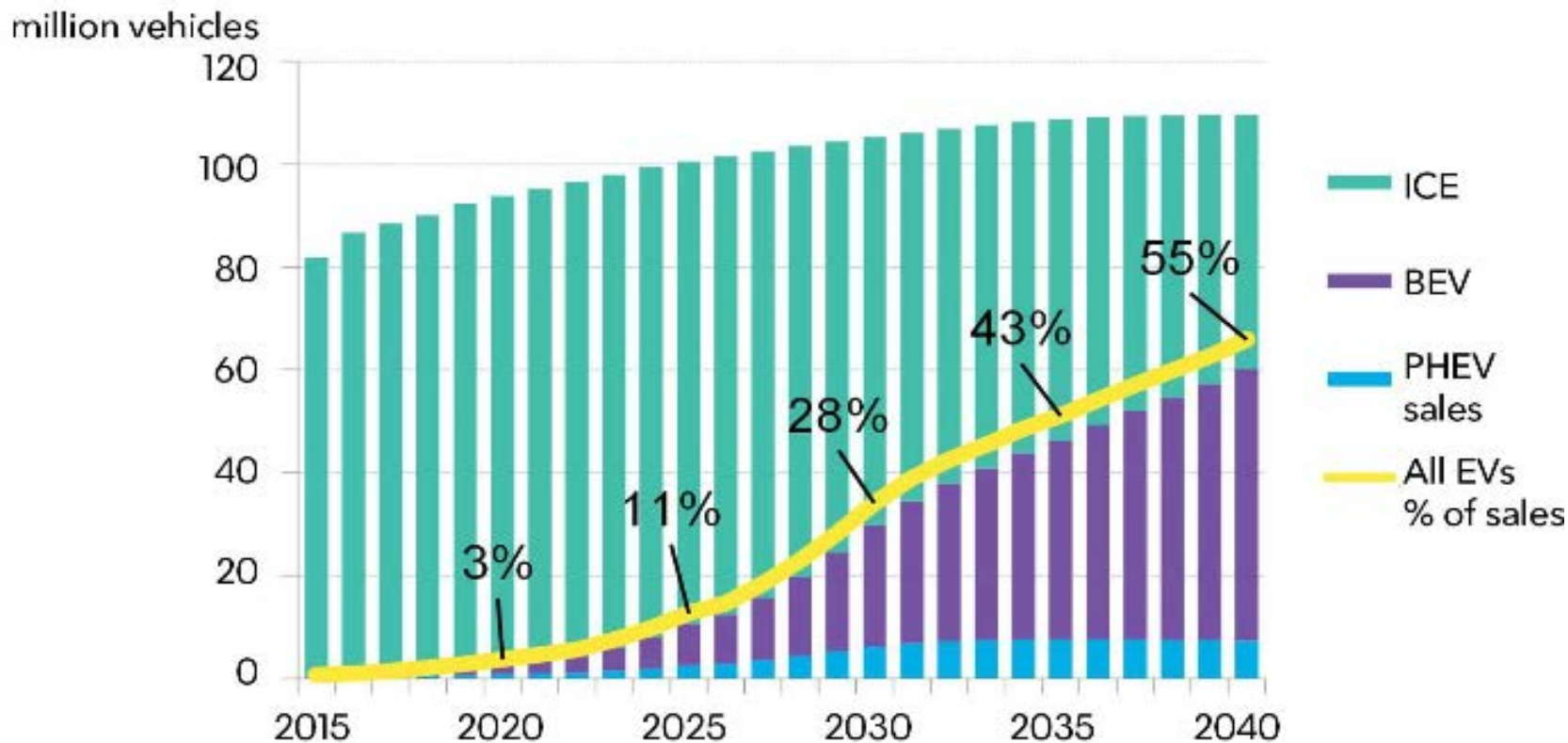
National Market: Sales Growth Continues in 2018



Source: Inside EV, <https://insideevs.com/monthly-plug-in-sales-scorecard/>



Global PEV Sales to Reach 28% of LDVs in 2030



Source: Bloomberg New Energy Finance

Source: BNEF, 2018 <https://about.bnef.com/electric-vehicle-outlook/#toc-download>



2017 PEV Scenarios

	PEV SCENARIOS				
INPUTS	Low	Mid	High	Aggressive	Bookend
PREFERENCES					
Consumers' PEV Preference	Constant at 2017 level	Increase with PEV Market Growth	Increase with PEV Market Growth	Increase with PEV Market Growth	Increase with PEV Market Growth
INCENTIVES					
Federal Tax Credit	Eliminated after 2019	Decreasing starting in	Decreasing starting in	Constant Through 2030	Constant Through 2030
State Rebate	To 2020	To 2025	To 2025	To 2030	To 2030
HOV Lane Access	To 2021	To 2025	To 2025	To 2025 for PHEV / 2030 for EV	To 2025 for PHEV / 2030 for EV
ATTRIBUTES					
Availability of PEVs (in 2030)	PEV models available in 11 of 15 CEC LDV classes	PEV models available in 11 of 15 CEC LDV classes	PEV models available in 11 of 15 CEC LDV classes	PEV models available in 13 of 15 CEC LDV classes	PEV models available in all CEC LDV classes
Vehicle / Battery Price (by 2030)	PEV prices based on battery price declining to ~ \$120/kWh	PEV prices based on battery price declining to ~ \$100/kWh	PEV prices based on battery price declining to ~ \$89/kWh	PEV prices based on battery price declining to ~ \$73/kWh	PEV prices reach parity with gasoline vehicles
Avg. Range (2030)	~ 230 miles	~ 230 miles	~ 270 miles	~ 270 miles	~ 270 miles
Refuel Time (2030)	15 - 21 min	15 - 21 min	10 - 16 min	10 - 16 min	Same as Gasoline
Time to Station (2030)	7 - 8 min	Same as gasoline	Same as gasoline	Same as gasoline	Same as gasoline by 2025
FORECAST RESULT					
PEV STOCK in 2030	2.6 mil	3.3 mil	3.9 mil	5.3 mil	5.9 mil
Cost of State Rebate Extension to 2030	-	-	-	\$7.1 billion	\$8.2 billion