

Trends

5 Minutes



IHS Markit™

Key Automotive Trends Impacting the North American Aftermarket

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May 1, 2018



Agenda

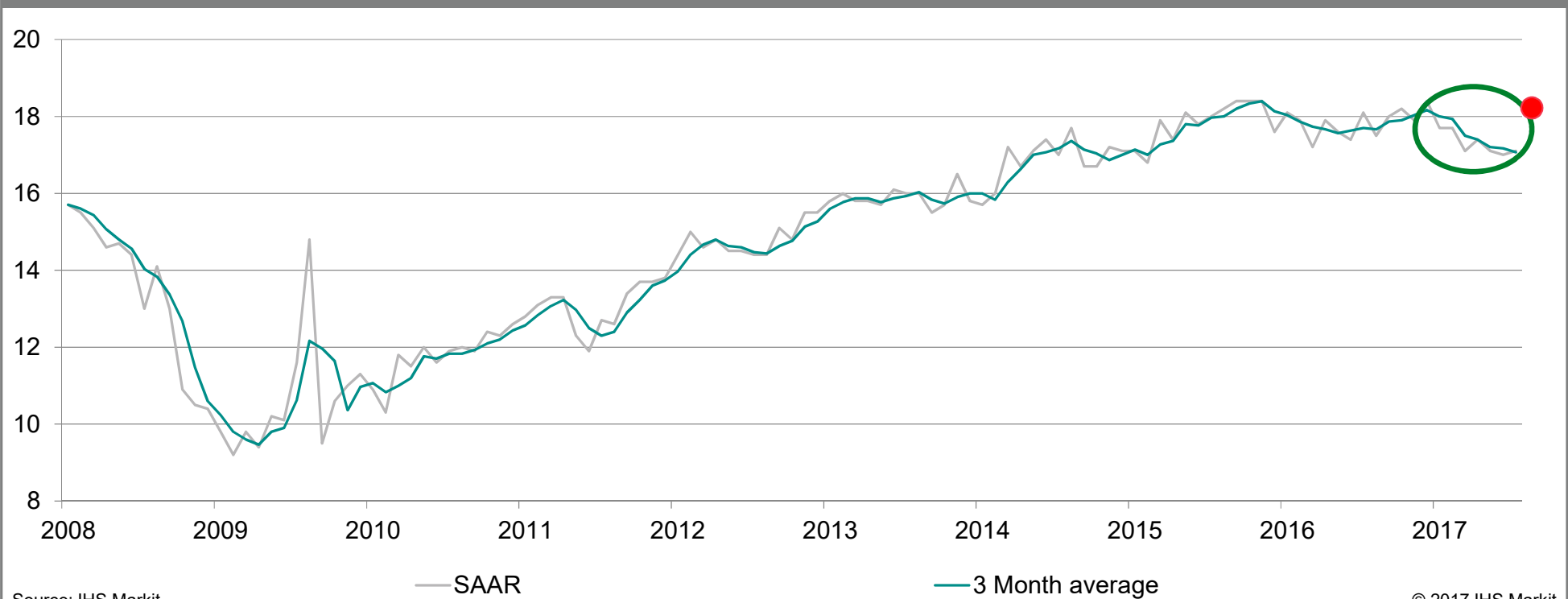
- > New Sales – *plateauing at record levels*
- > Vehicles-in-Operation (VIO) – *continues to grow*
- > Vehicle Mix – *rapidly evolving*
- > Aging Vehicle Population – *having a major impact on repair opportunities*
- > Battery Electric Vehicles – *on their way, but new ICE technology coming faster*
- > Autonomous Vehicles – *on the horizon, but enabling technology is here now*



New light vehicle sales declined...
...to 17.2 million units in 2017

SAAR Highlights Slowing Pace of Sales

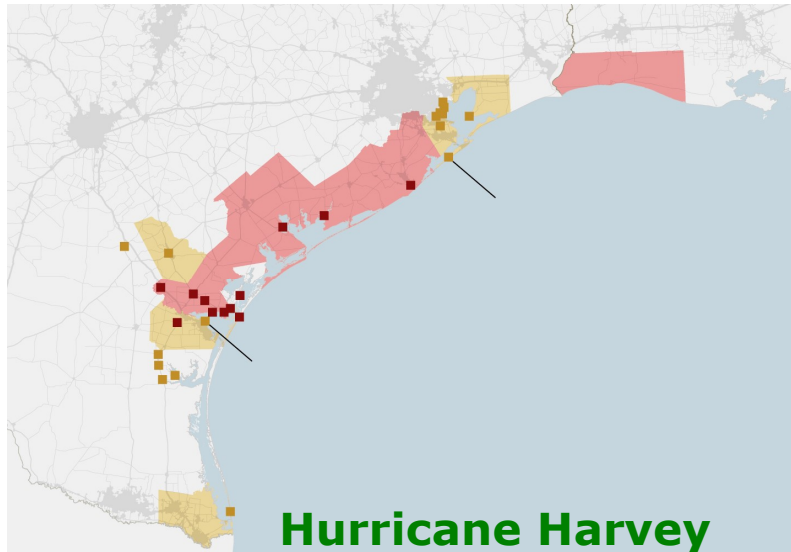
U.S. Light Vehicle Sales Seasonally Adjusted Selling Rate



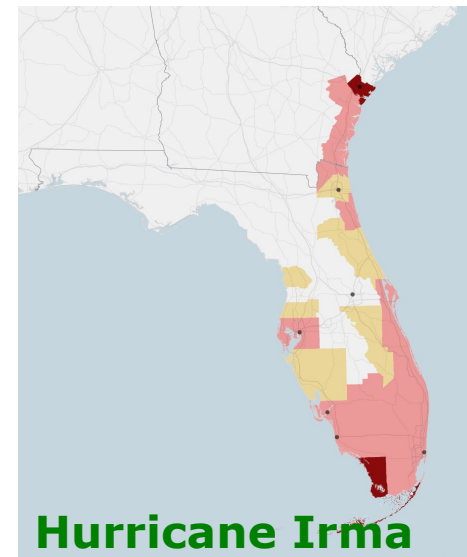
Source: IHS Markit

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Hurricane Impacts to Drive Replacement Volume & Scrappage



- Impacted areas: Houston, Corpus Christi, New Orleans and San Antonio
- Total VIO: Apprx. 9.8m
- Estimated replacement: 400-500k
- Most impacted segments: Pickup (15.9%), Midsize Car (11.9%) and Compact Car 10.2%
- Most impacted OEMs: Ford (17.8%), Chevy (15.9%) and Toyota (12.5%)



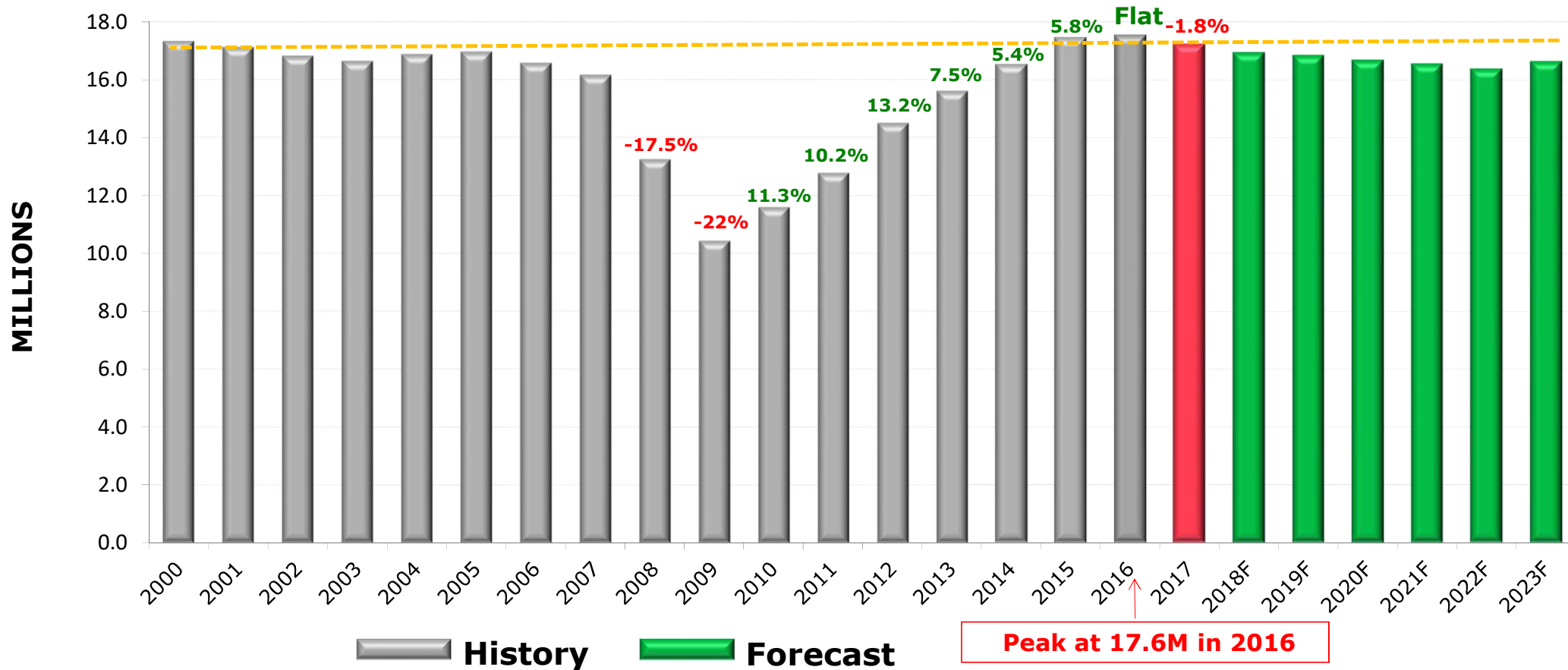
- Impacted areas: Miami, Savannah (GA), Ft. Myers, Tampa, Jacksonville and Orlando
- Total VIO: Apprx. 14.4m
- Estimated replacement: 550-700k
- Most impacted segments: Midsize Car (14%), Compact Car (13.6%) and Compact CUV (9.2%)
- Most impacted OEMs: Ford (14.5%), Toyota (13.2%) and Chevy (10.8%)



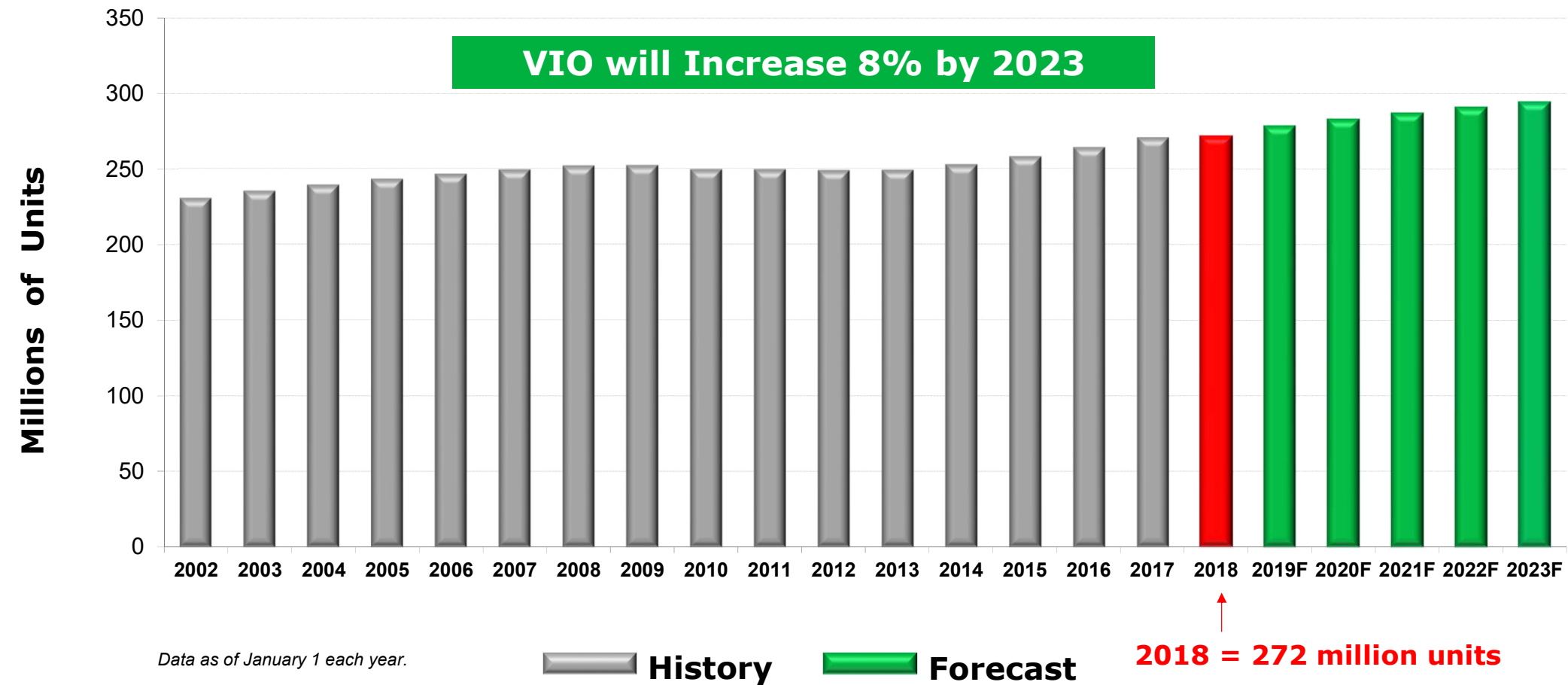
Another slight decline in 2018...
...to 16.9 million units

U.S. Light Vehicle Sales

2017 = 17.2 million units



U.S. Light Vehicles in Operation



U.S. New Light Vehicle Sales Growth



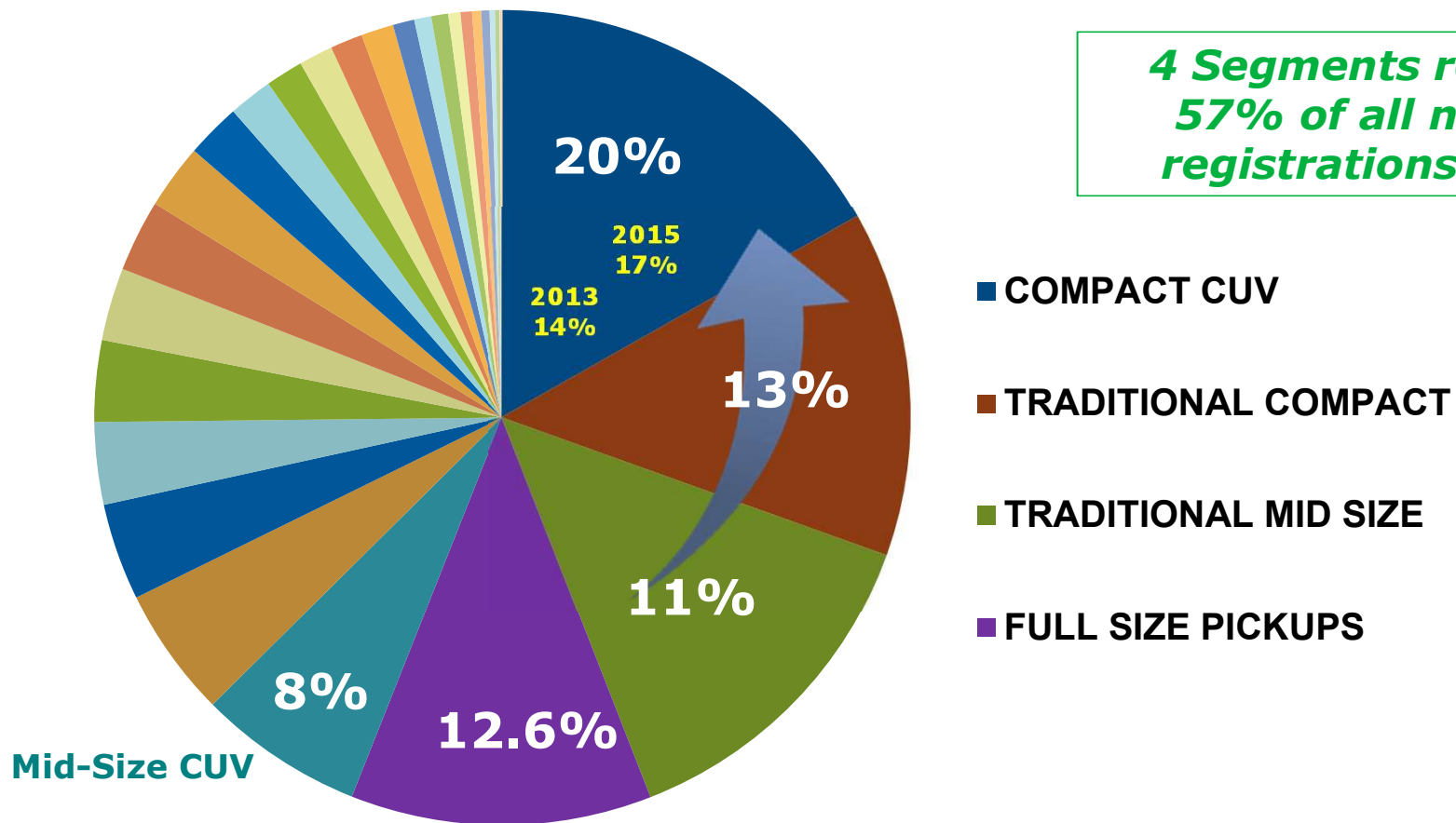
**Growth in
Annual Units
2009 v 2017**

+7 M

**54%
of Growth Came from
CUV Body Style Alone**

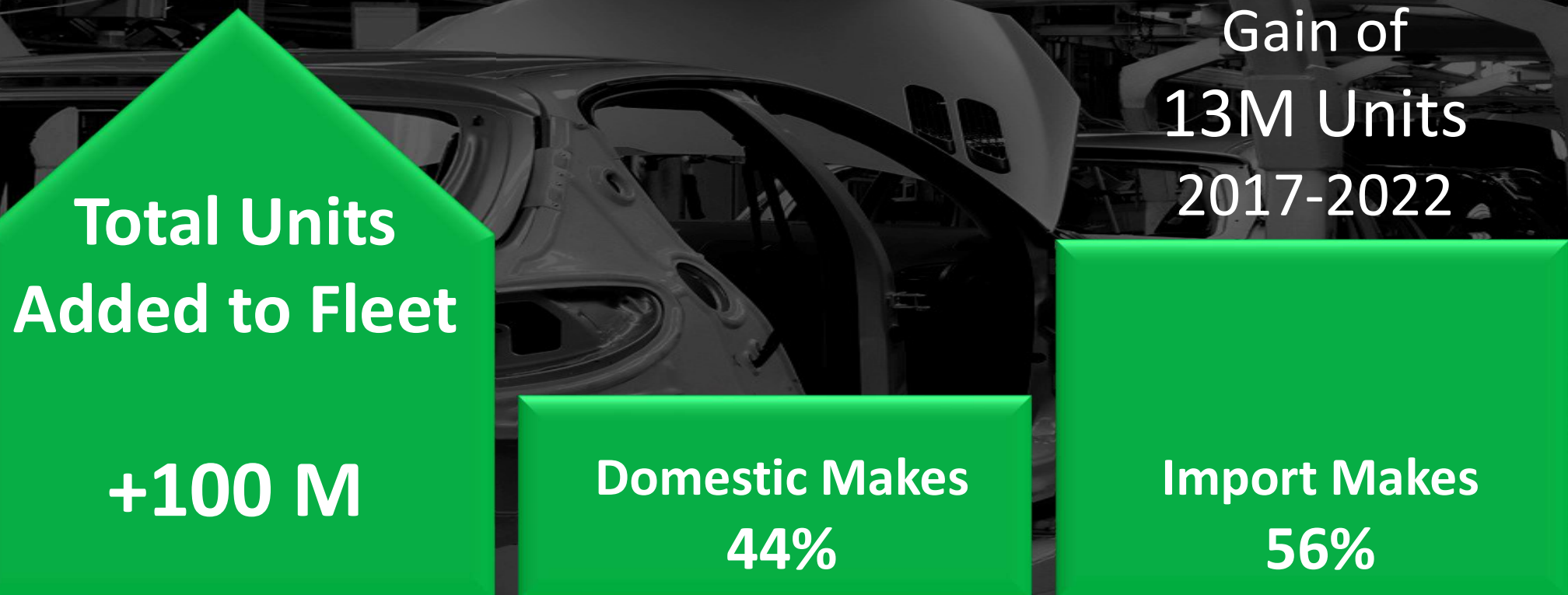
**Growth in CUV
Body Style
+3.8 M**

Change in U.S. Vehicle Mix – Crossover Body Style Dominating

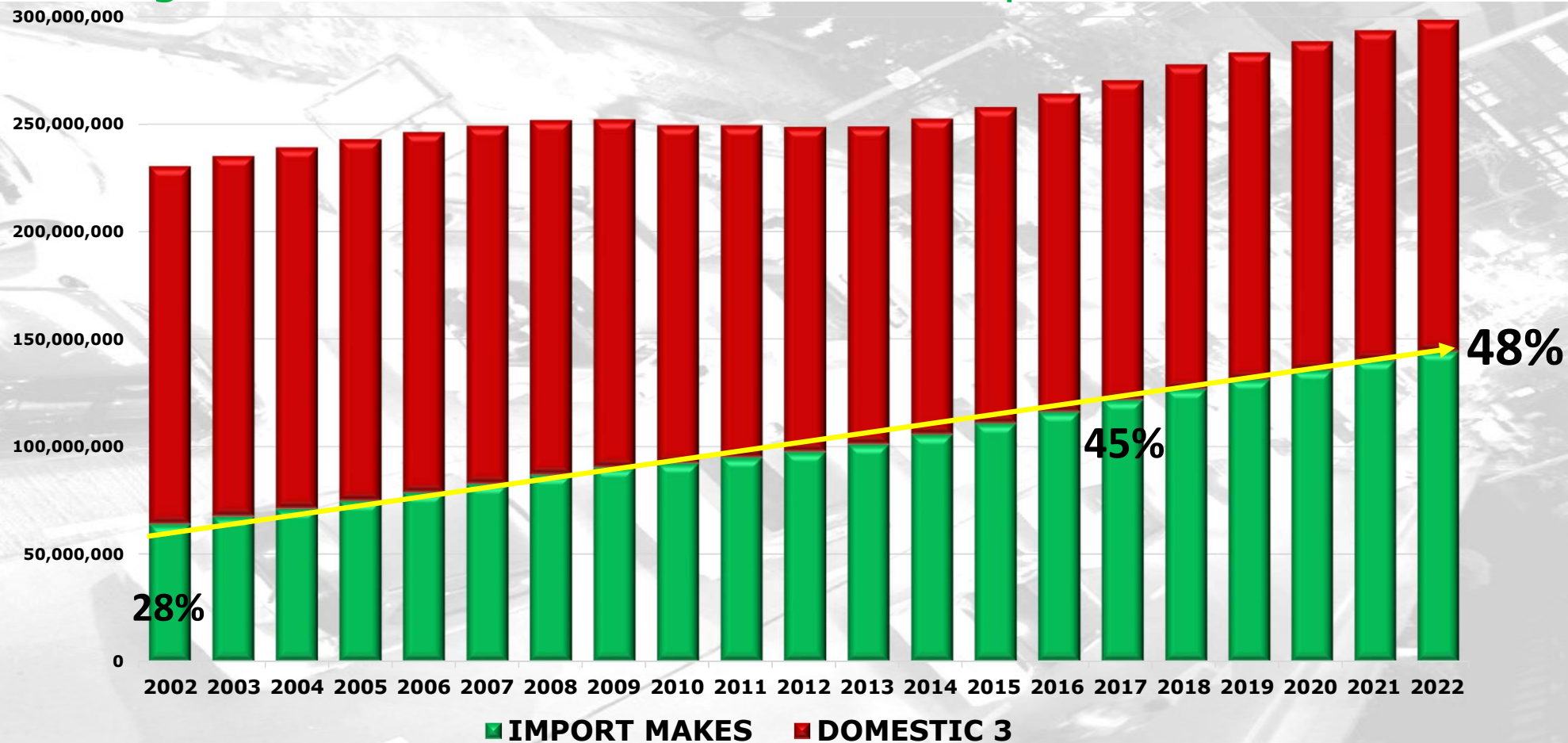


U.S. New Light Vehicle Sales: Imports v Domestic 3

Import Makes Outpace Domestics – 2017 - 2022



U.S. Light Vehicle VIO – Domestic 3 v Import Makes



U.S. Light Vehicle VIO – Growth of Import Make Units 2017-2022

2017	Total Korean Makes	13M units
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2022	Total Korean Makes	18M units
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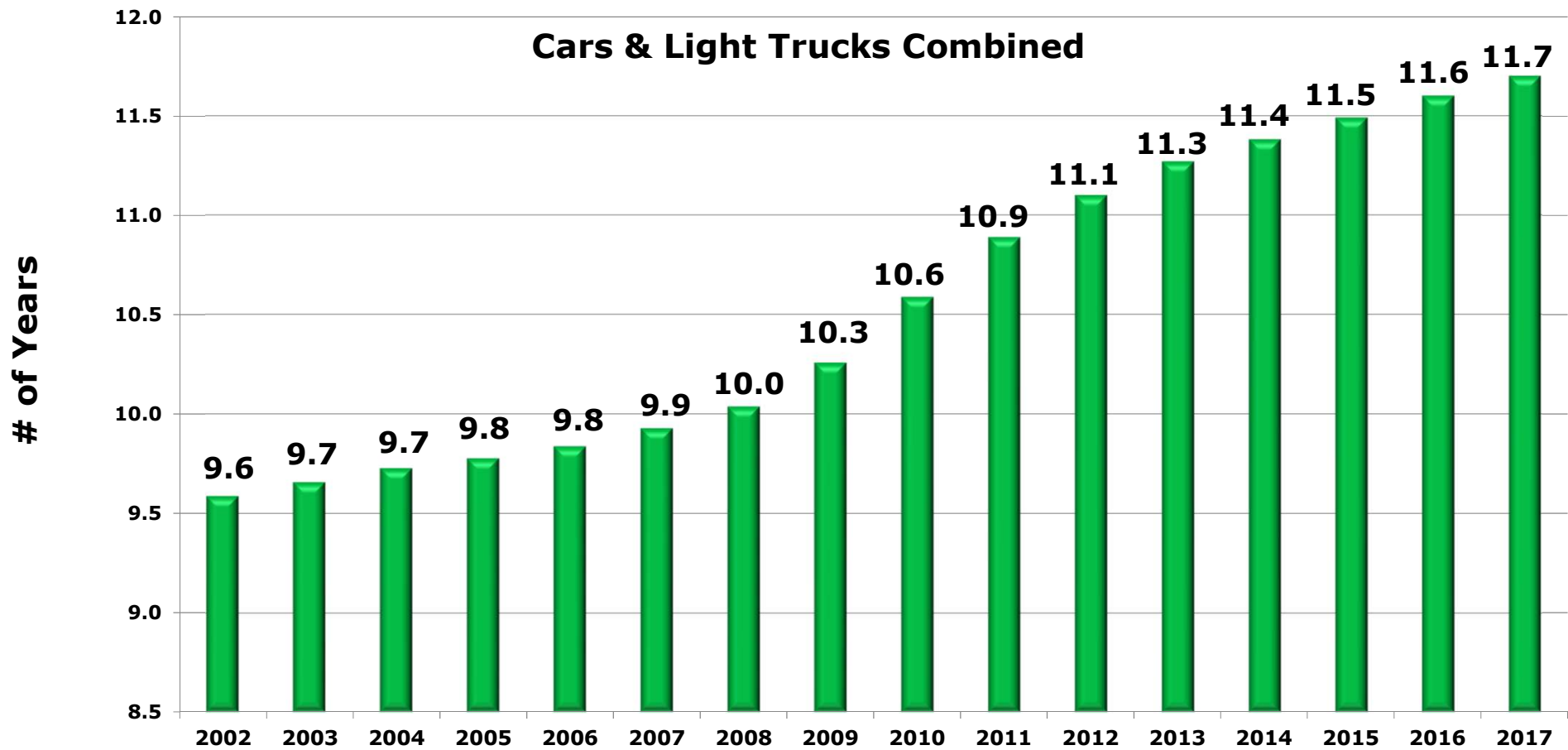
2017	Total Japanese Makes	89M units
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2022	Total Japanese Makes	102M units
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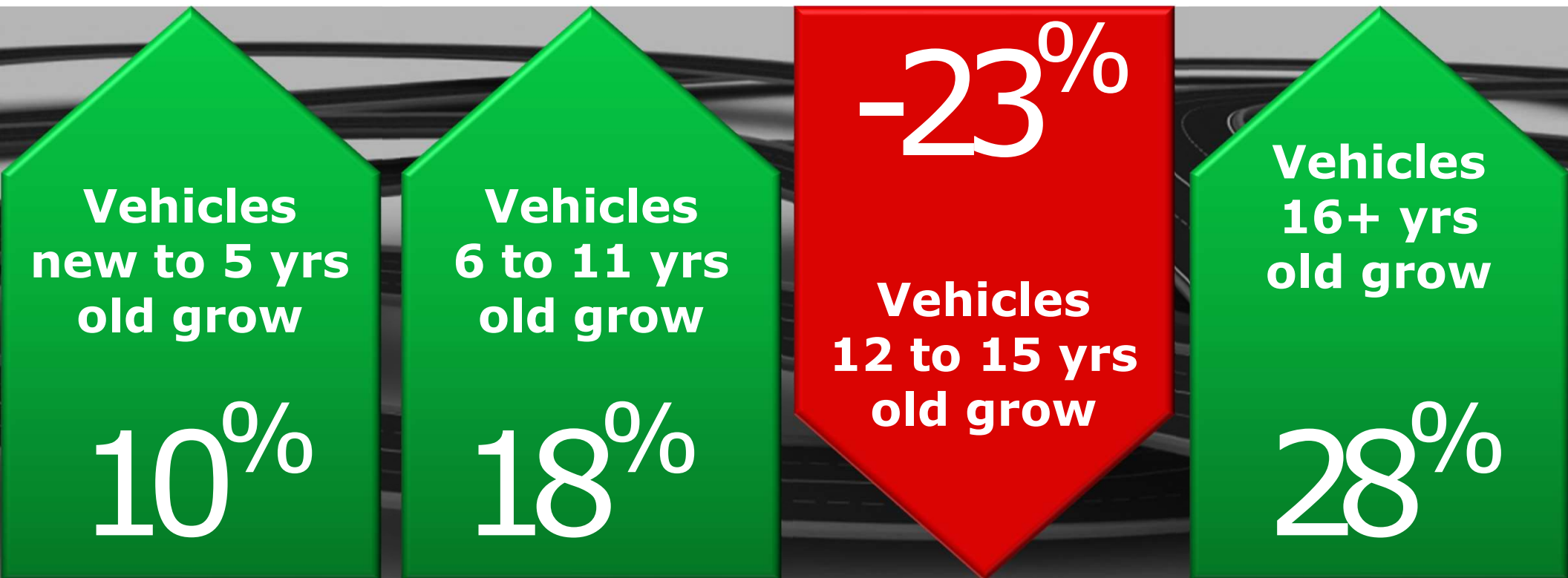
2017	Total European Makes	20M units
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2022	Total European Makes	25M units
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Average Age History



Impact on VIO Age Groups - 2017-2022



The oldest vehicles – 16 years & older – will grow nearly 30% !!

Average Age Impact on VIO Units

2002	New – 5 Year Old	84m units
2017	New – 5 Year Old	80m units
2022	New – 5 Year Old	88m units

Segment remains relatively flat after decline due to recession's impact on new vehicle sales & current plateau.

Average Age Impact on VIO Units

2002	16+ Year Old	35m units
2017	16+ Year Old	66m units
2021	16+ Year Old	85m units

20 million units will be 25 years or older by 2021!

Global CO₂ & Fuel Efficiency Regulations

CAFÉ & Global Standards
are Merging

54.5 MPG

2025

86 MPG

2030

2016

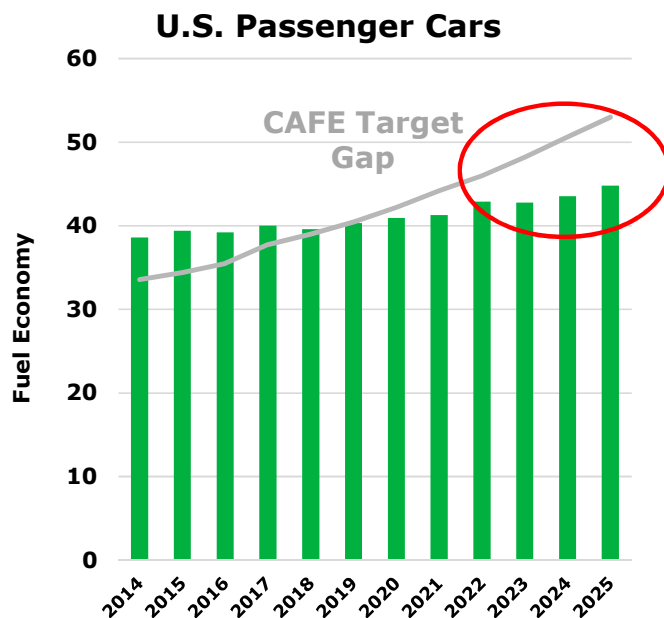
35 MPG

To reach this goal, every
OEM must improve fuel
efficiency by 5% per
year!

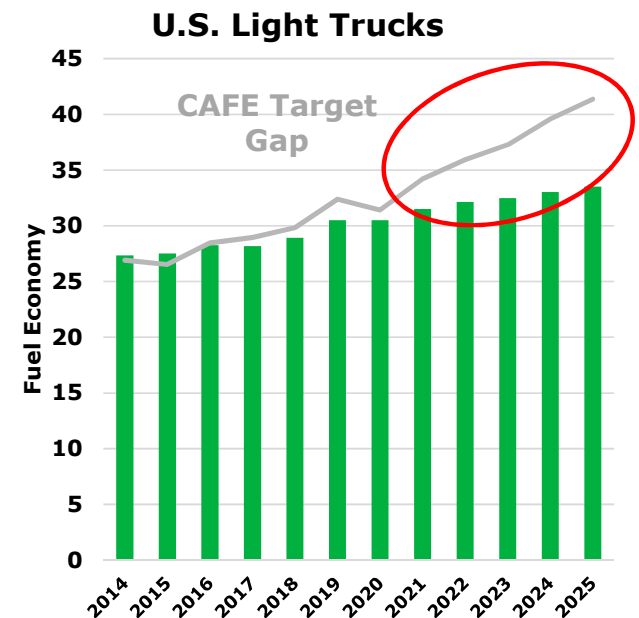
Compliance Gaps Emerging

OEMs are developing strategies for widening compliance gaps:

New technologies, light-weighting & electrification will all play critical roles.



Compliance gaps are increasing in NA, Europe and China



OEMs Preparing for Transition to Electrification

Conventional Platform

Some conventional platforms can implement batteries, but cannot change the overall architecture to form a battery driven vehicle assembly.



Multi-energy Platform

Initially designed to support both BEV and conventional powertrain vehicles. Structure is not skateboard style, but is more flexible than conventional platform.



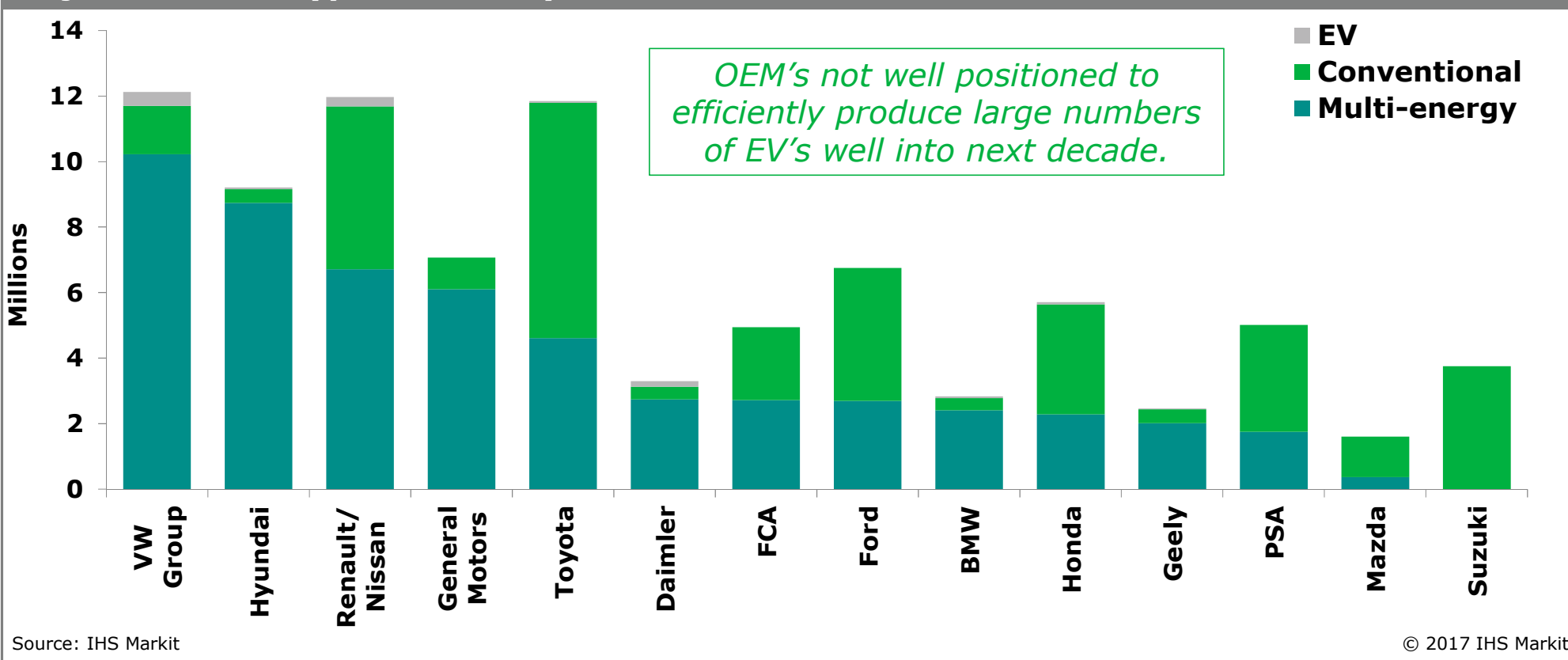
BEV Platform

Platform is designed only for pure BEV applications. Skateboard style architecture allows for more battery capacity and more interior space with the same vehicle size.



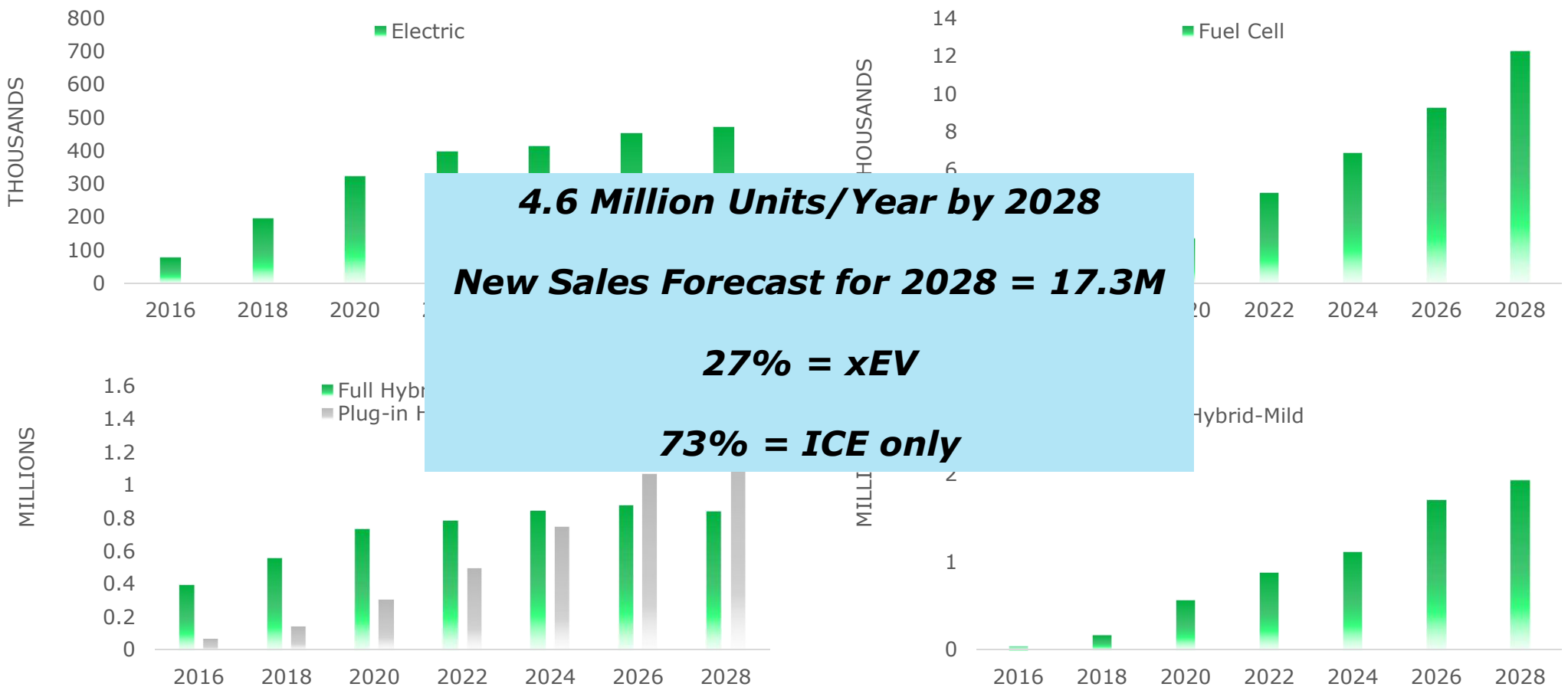
OEMs Preparing for Transition to Electrification

Major Platform Types in Use by 2024



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United States xEV Sales Volume

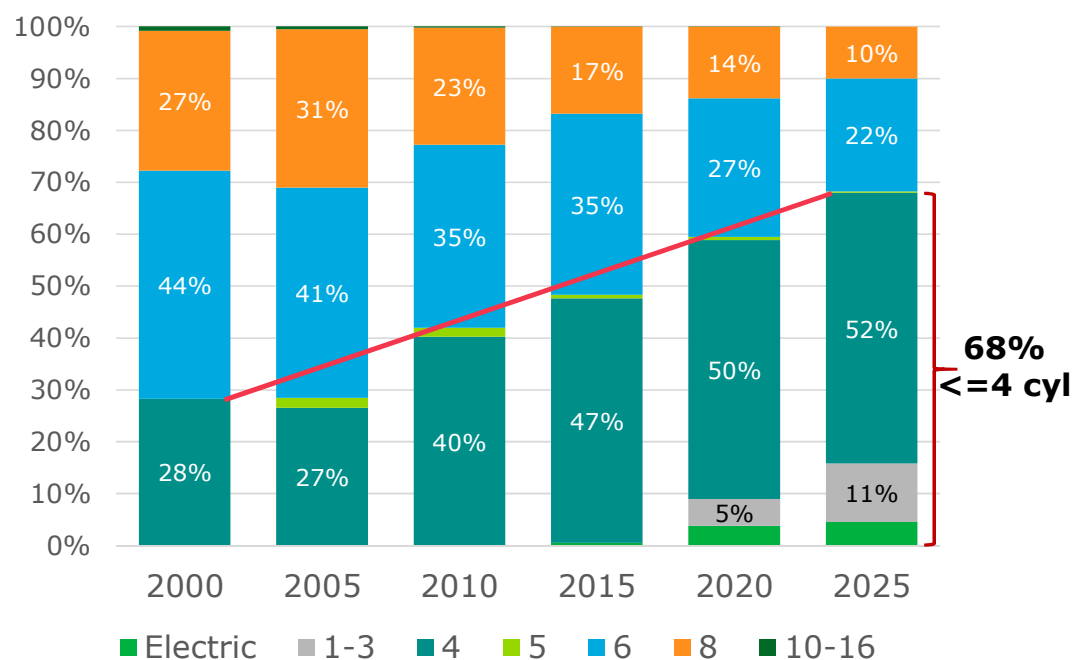


Source: IHS Markit

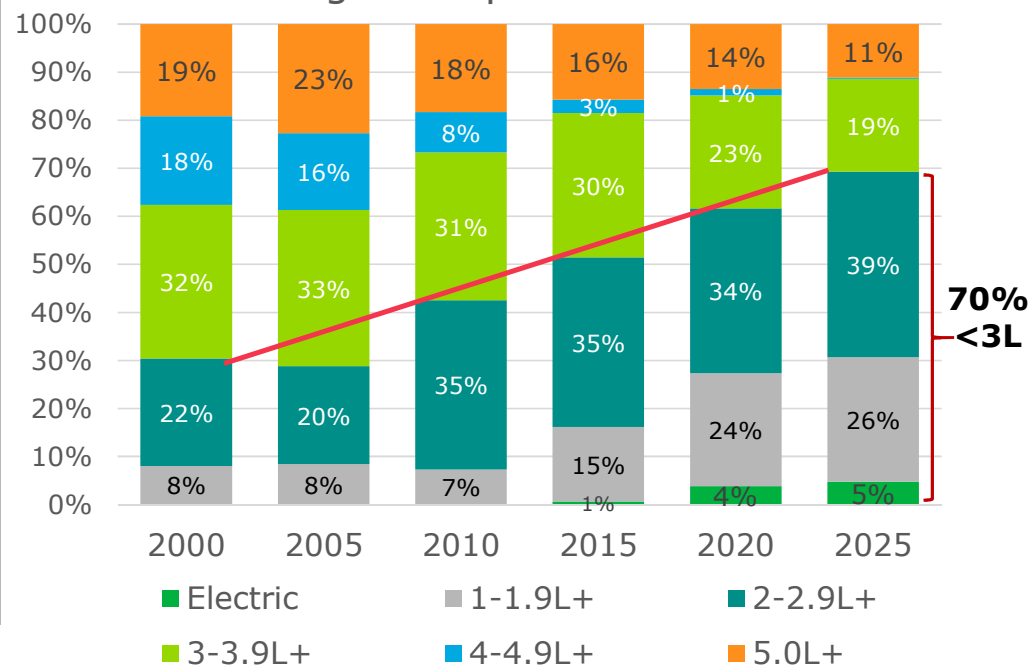
North American Powertrain Analysis

Cylinder Count and Displacement Continue to Shrink

Engine Cylinder Count

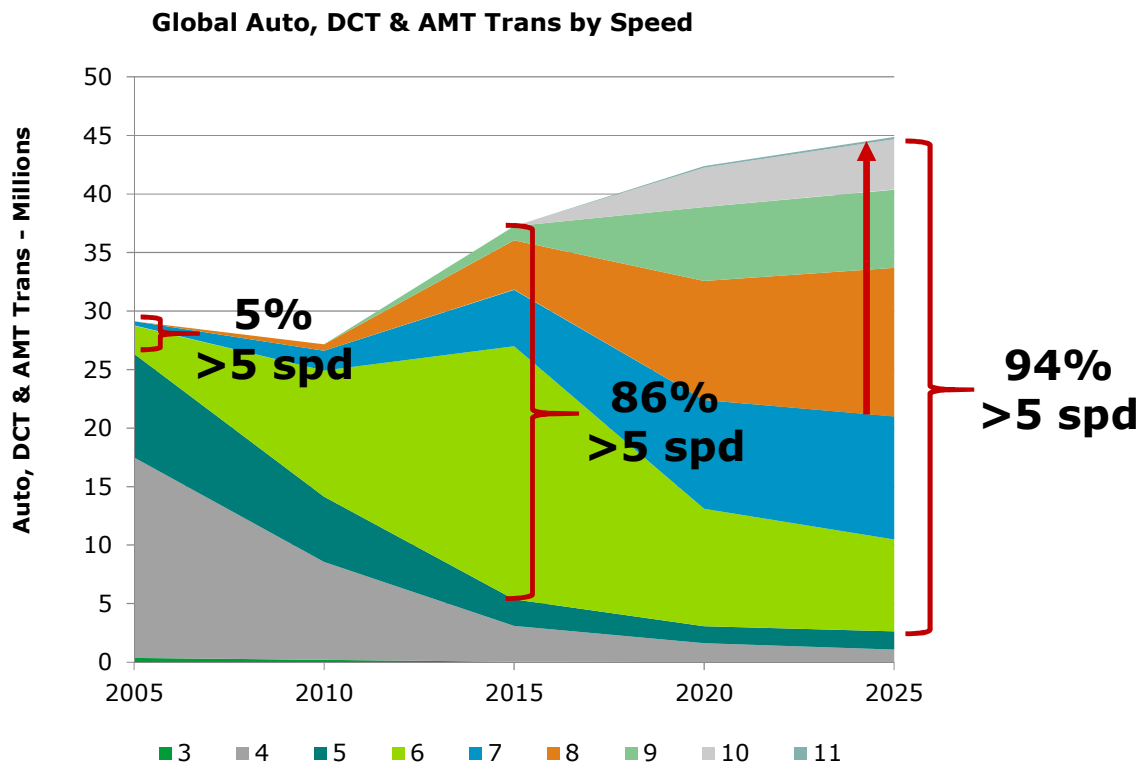


Engine Displacement

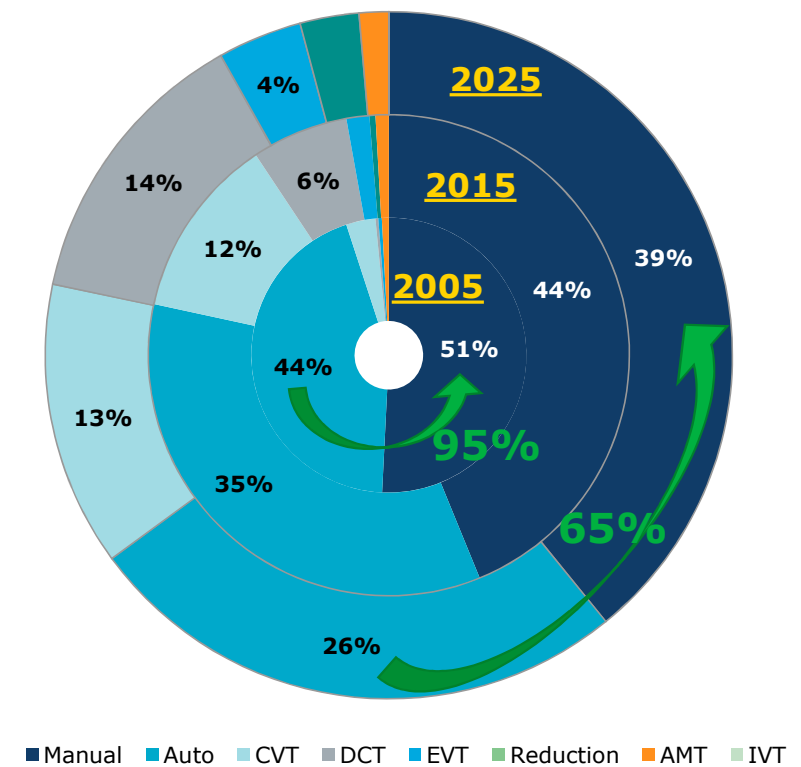


Global Transmission Production

Increased Complexity, Greater Speeds



Global Transmission Type by Share



Source: IHS Markit

Autonomous Vehicles on the Road Today – *but not for sale*

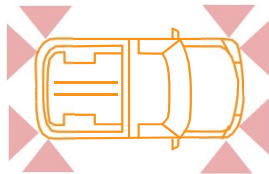
Regulatory/insurance, infrastructure & sensing/connectivity issues slowing progress



The Vehicle Sensing Systems – Under Development

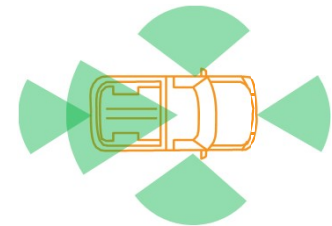
Ultrasonic

- Sound wave
- Short-range (0–2m)
- Applied in very low speeds
- Relatively inexpensive
- Snow and rain interference



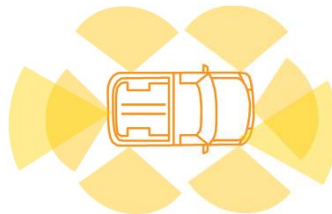
Camera

- Colors and fonts identification
- Short and long-range (0–125m)
- Traffic signs, lights, & lane markers identification
- Requires significant computing resources
- Weather condition interferences



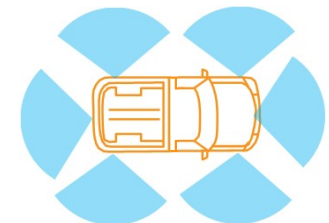
Radar

- Electromagnetic wave
- Short and long-range (0–250m)
- Other car speed and distance in real time
- Relatively high cost
- Robustness to rain, snow and fog interferences



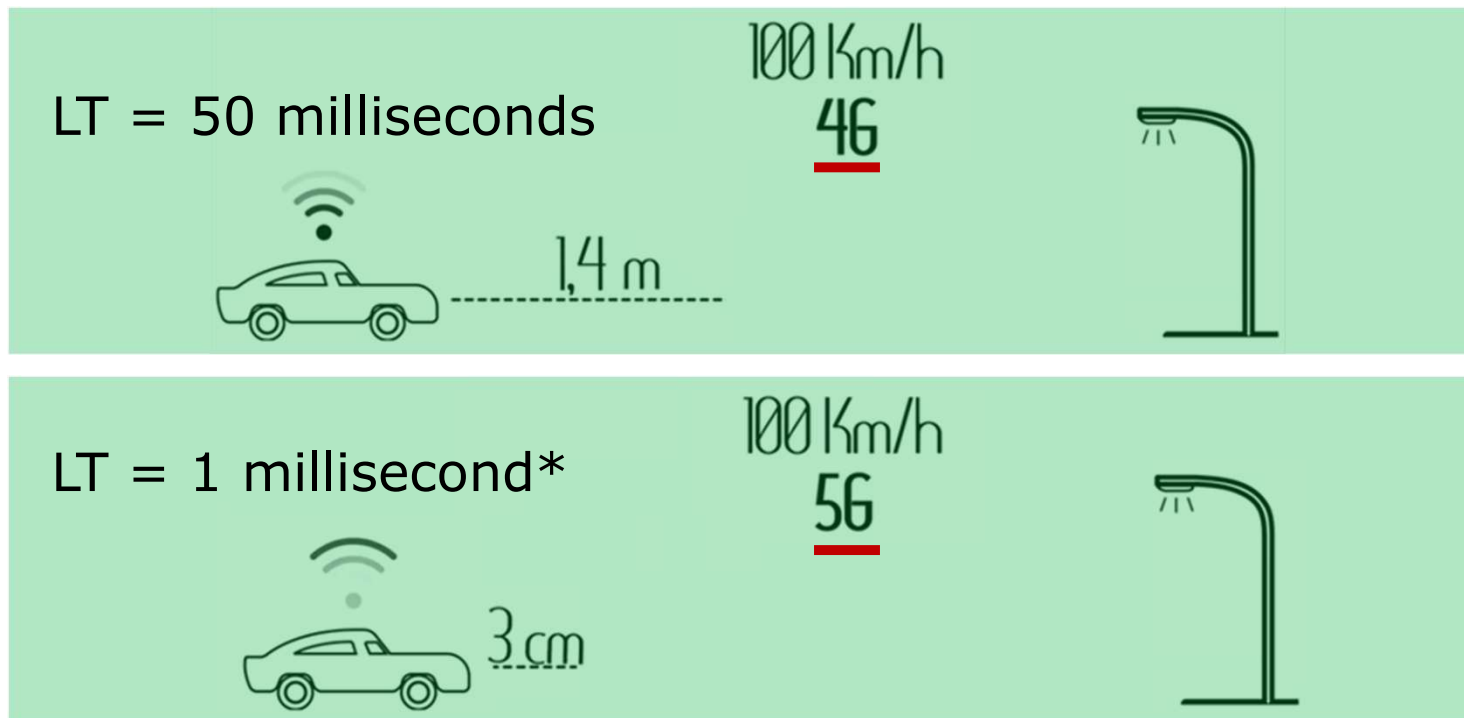
Lidar

- Laser beam
- Short & long-range (0–200m)
- Obstacles identification
- Even more expensive than radar (cost coming down)
- No interference or metallic material reflection



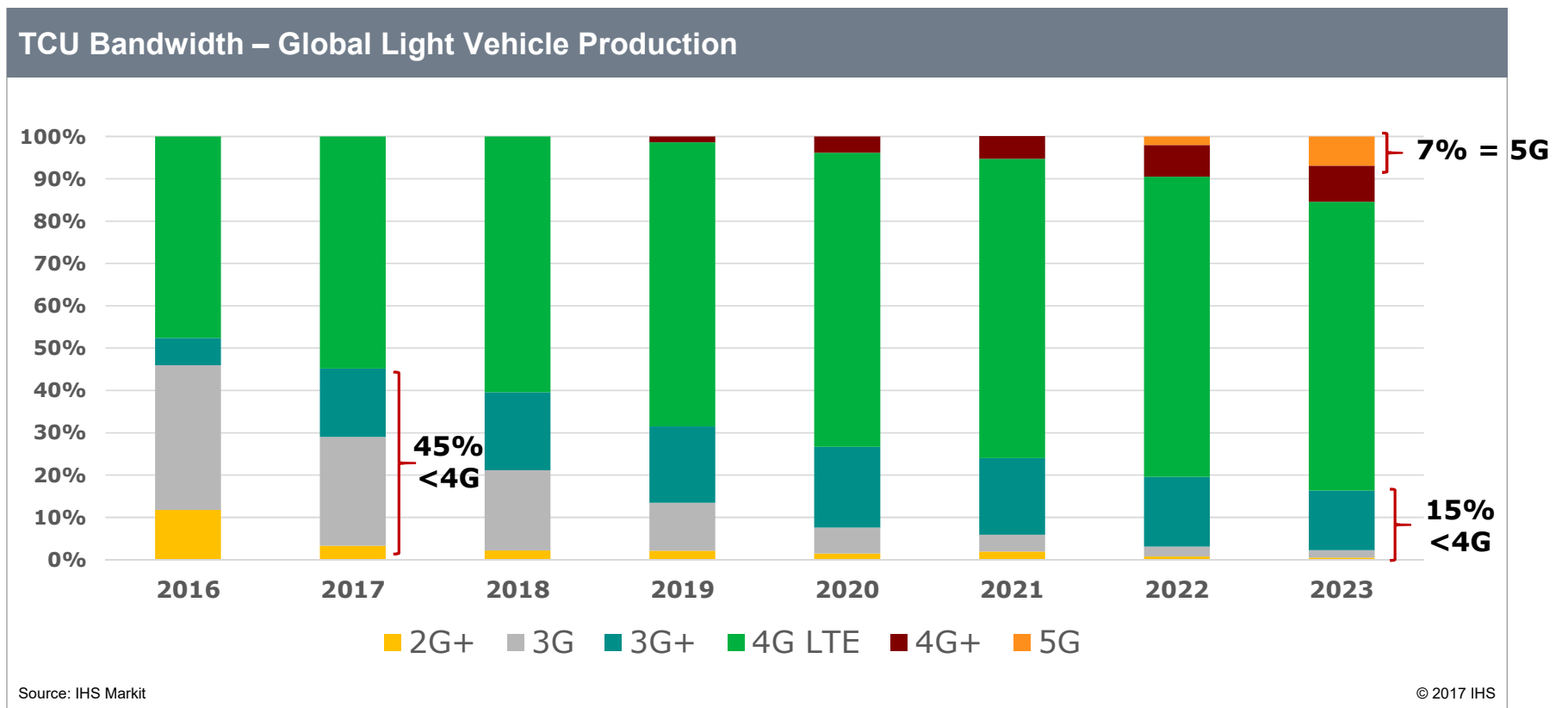
Latency Time

Waiting time for signal from vehicle to detect a road obstruction and start communication with the car to avoid the obstacle



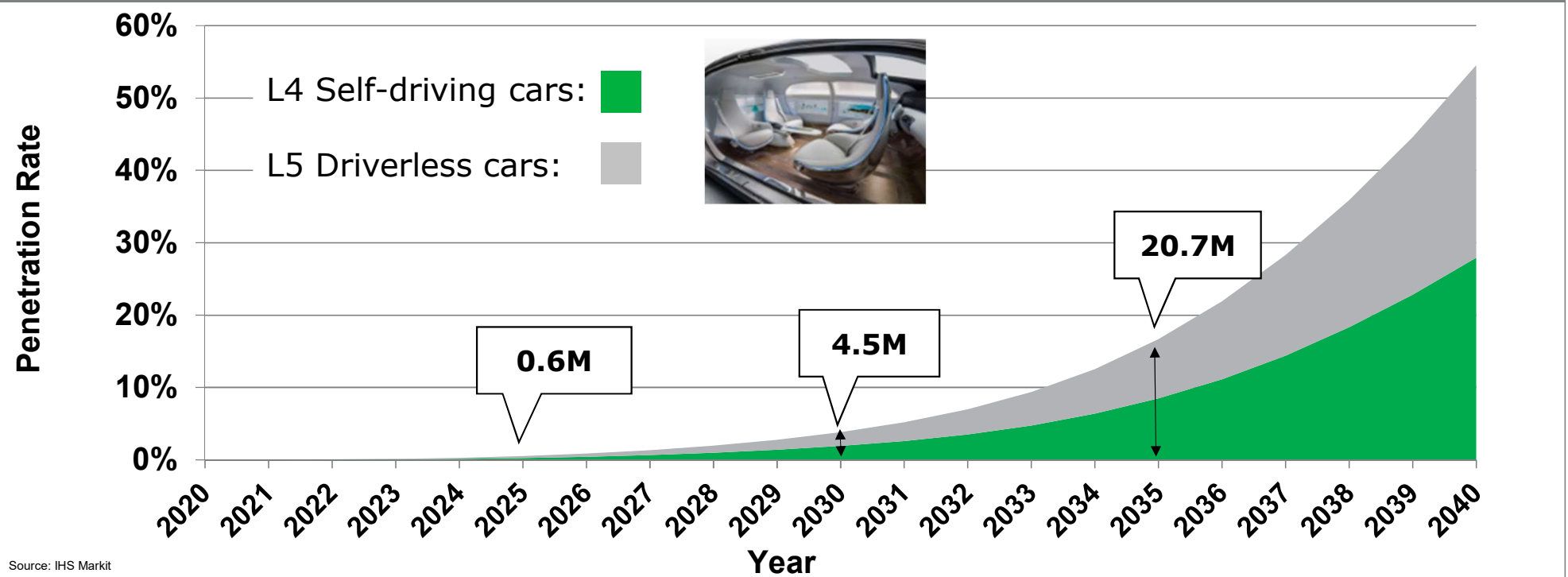
* In development

Connectivity – Telematics Control Unit (TCU) Bandwidth Group



IHS Markit Forecast: Fully autonomous driving cars global forecast

Fully Autonomous Global Light Vehicle Sales



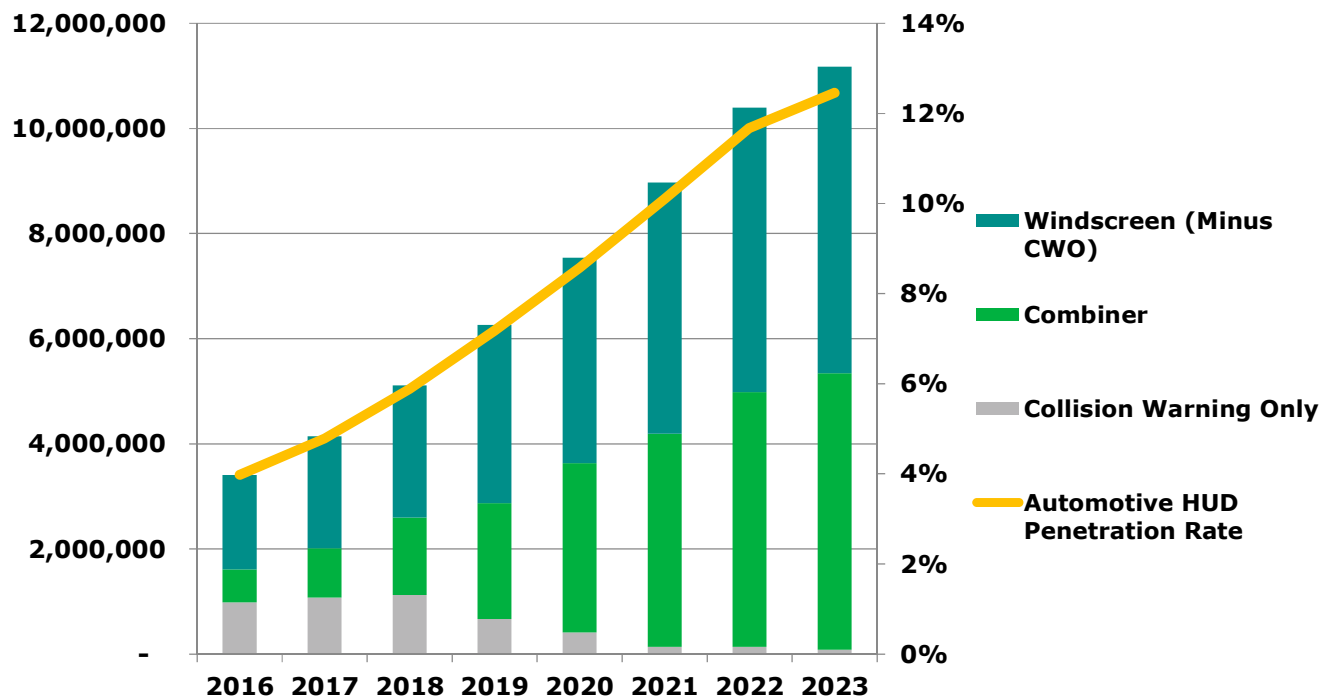
Source: IHS Markit

Heads Up Display Evolution...or *Revolution*?



Head-Up Display volume surpasses 11m units in 2023

Head-up display, location by volume – Global Production



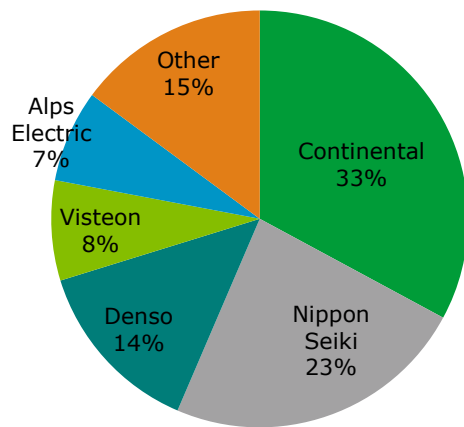
Source: IHS Markit
Head-up display model level forecast: January 2018 revision

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- HUD volume will more than **TRIPLE** over 7 year period (2016-2023)
- HUDs will reach nearly **13%** global penetration
- Windscreen projection and Combiner will essentially split the market

As HUDs proliferate, supplier opportunity emerges

Head-up display, top 5 supplier share by revenue - 2018

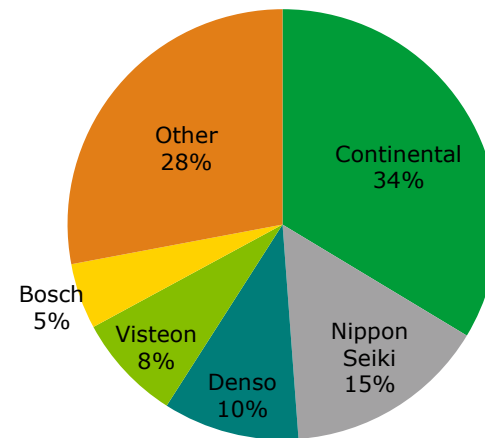


Source: IHS Markit
Head-up display model level forecast: January 2018 revision

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- **\$908m HUD market**
- **Top 5 represents 85% of total revenue**

Head-up display, top 5 supplier share by revenue - 2023



Source: IHS Markit
Head-up display model level forecast: January 2018 revision

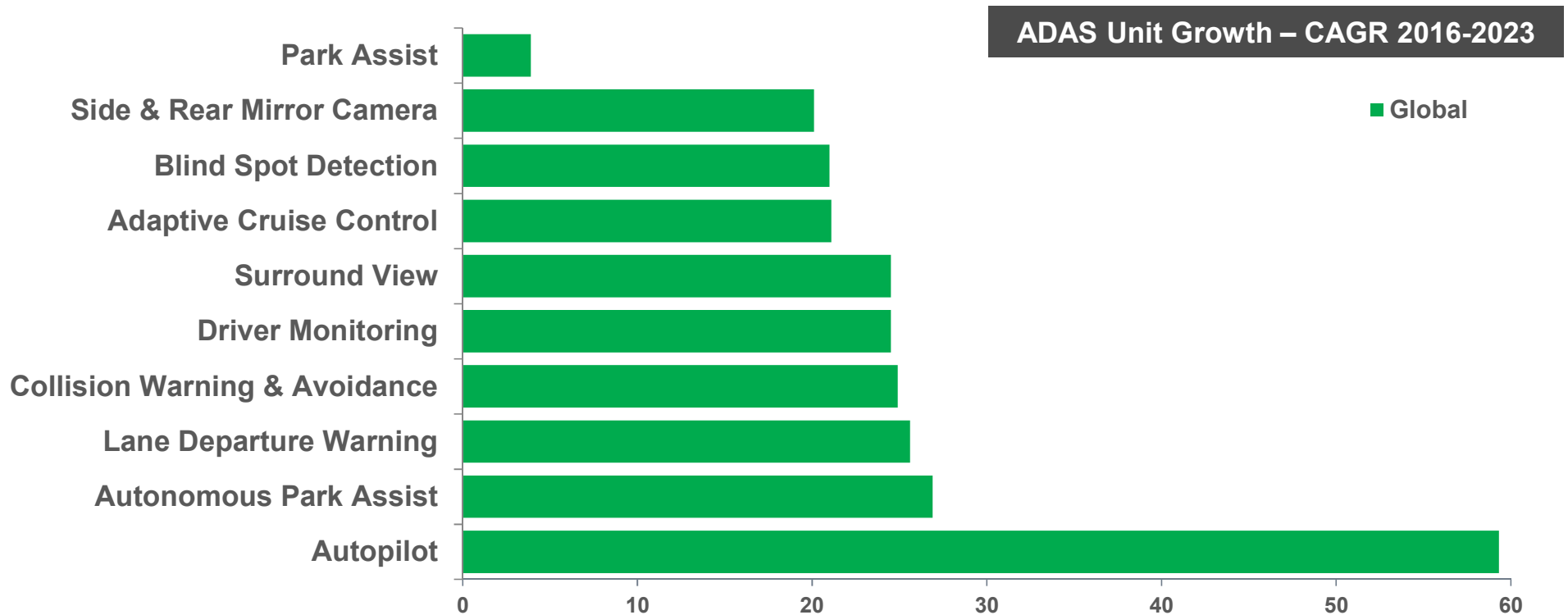
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- **\$2.6b HUD market**
- **Top 5 represents 72% of total revenue**

+1.7b +188% in 5 yrs

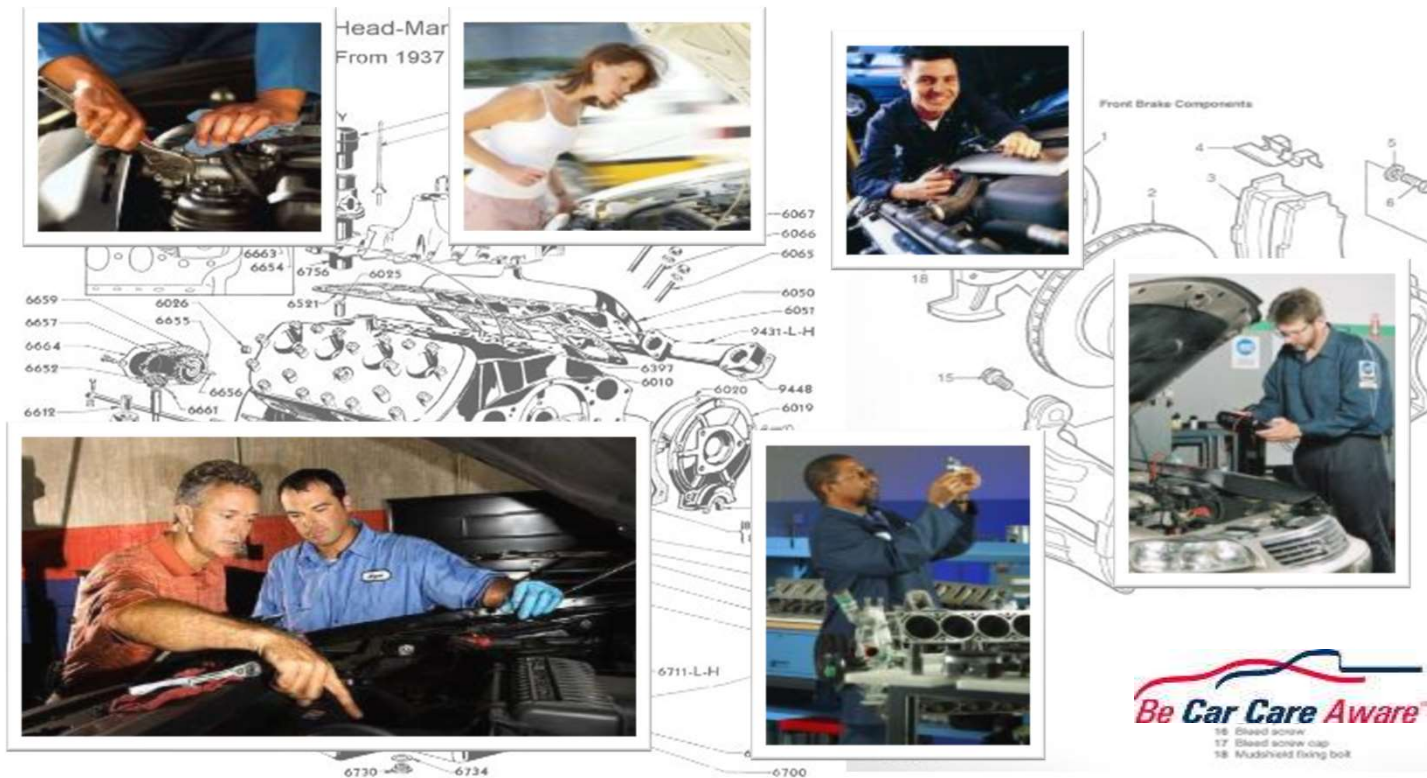
ADAS - Advanced Driver Assist Systems Growing Rapidly

Building Blocks of Autonomy Offer Compelling Near-Term Growth Prospects



Full Driver Control → Driver Assisted → Fully Autonomous Car

Aftermarket Outlook Includes both Challenges & Opportunities



Aftermarket Outlook Includes both Challenges & Opportunities

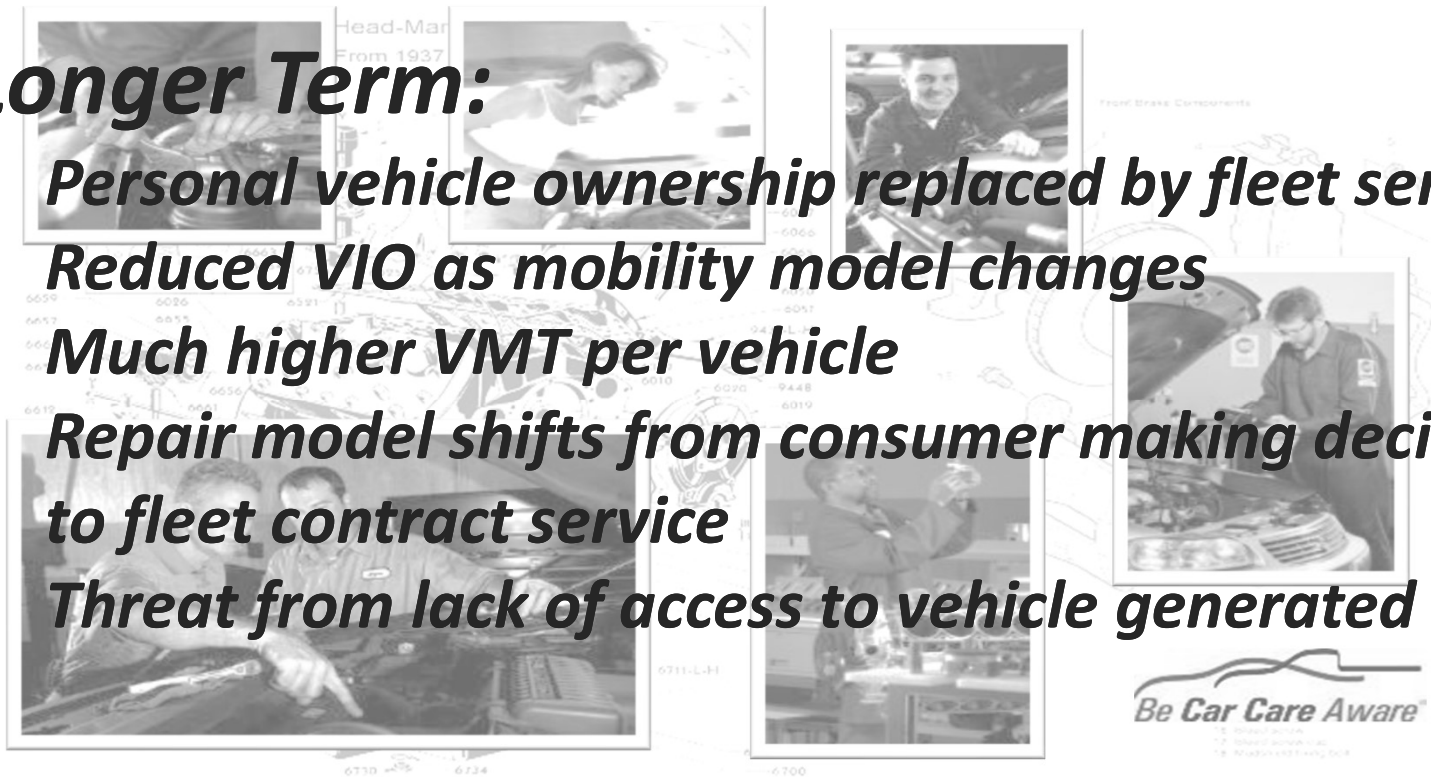
Medium Term:

- ***VIO growth continues***
- ***Aging vehicle population – selling to 3rd, 4th 5th owner***
- ***Electrification coming – but will see more ICE & transmission technology coming on even faster***
- ***ADAS technology already here and accelerating***
- ***Must convince consumer we have parts & trained technicians to repair the next generation vehicles***

Aftermarket Outlook Includes both Challenges & Opportunities

Longer Term:

- ***Personal vehicle ownership replaced by fleet services***
- ***Reduced VIO as mobility model changes***
- ***Much higher VMT per vehicle***
- ***Repair model shifts from consumer making decisions to fleet contract service***
- ***Threat from lack of access to vehicle generated data***



15 Trends in Minutes

Thank You

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