The Global Automotive Outlook

Opportunity Identification in a Disruptive Market

February 20, 2019

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MARKET DISRUPTION

BALANCING RISK & OPPORTUNITY

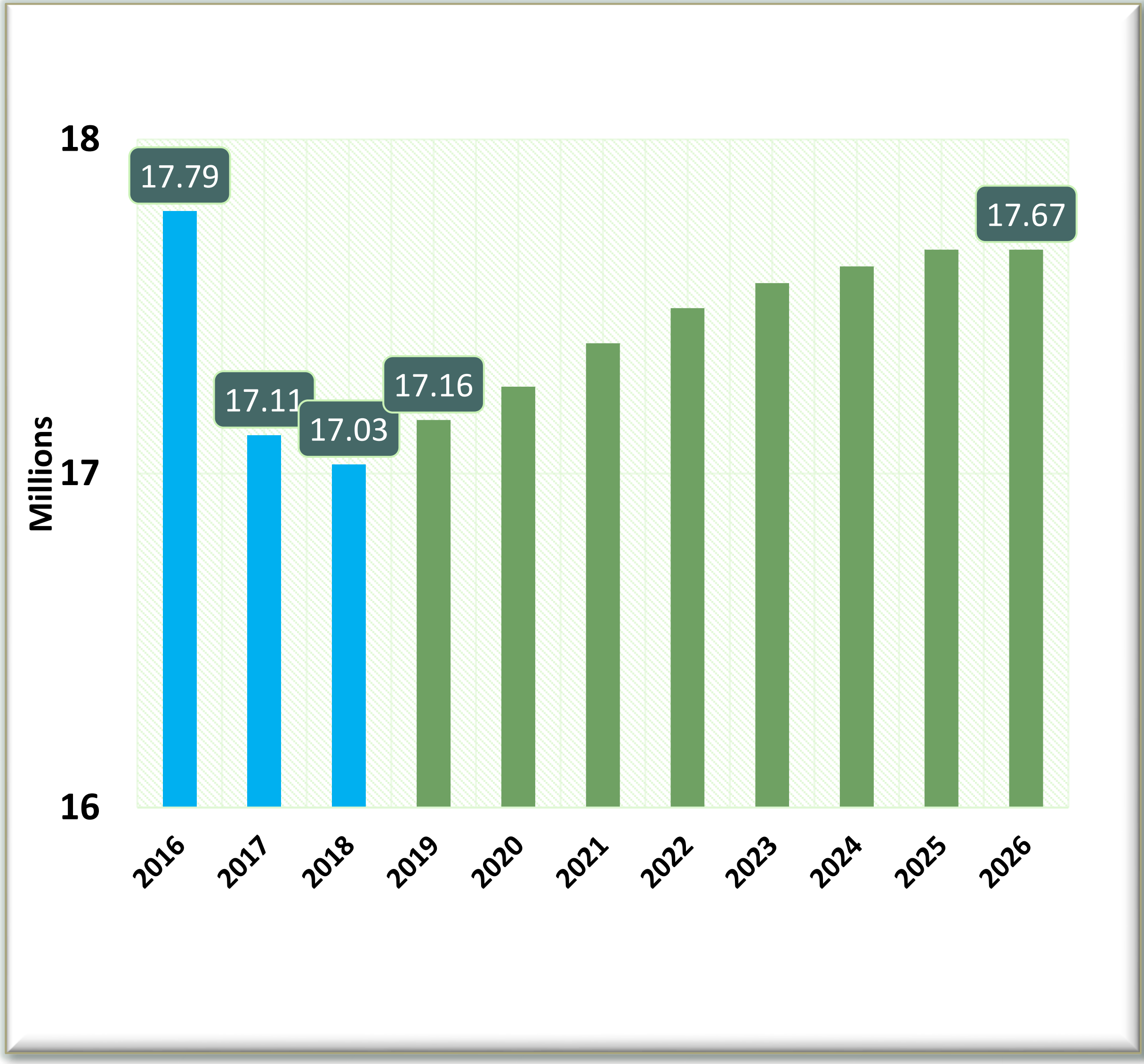
Competing in a Disruptive Global Market

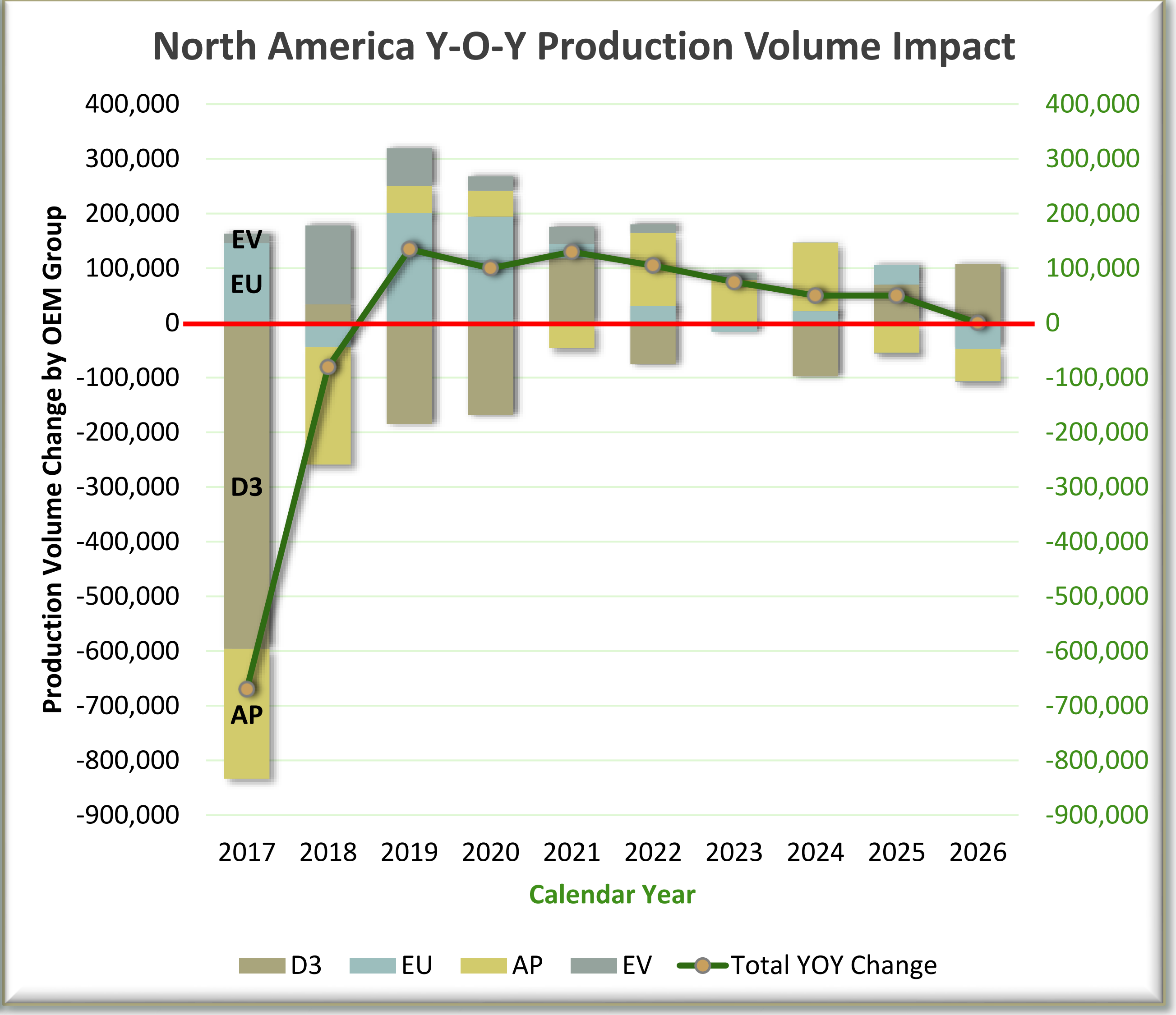
- *Consumer preference vs. market direction*
- *Shareholder value*
- *Supply chain importance to the VM strategy*
- *Innovation in product and strategy*
- *Investment strategies*
- *Regulations, incentives, and standards*
- *Geo-political impact on globalization*
- *Future players*
- *Minimize risk and maximize opportunities*
- *Defend core operations and identify areas for growth*

Market Drivers, Enablers & Constraints

NORTH AMERICA LIGHT VEHICLE PRODUCTION

NA Growth Outlook and OEM Group Contribution





Source: AutoForecast Solutions – January 2019

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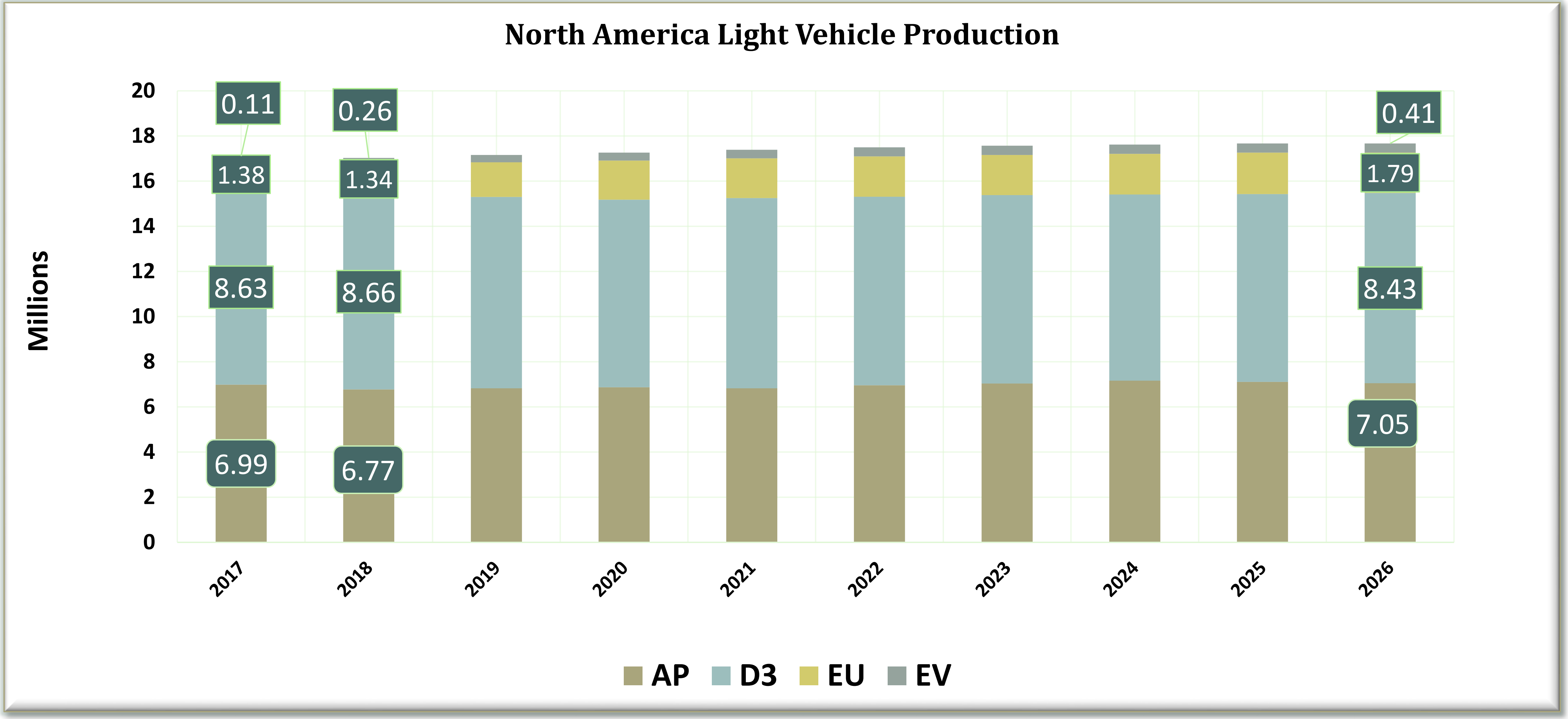
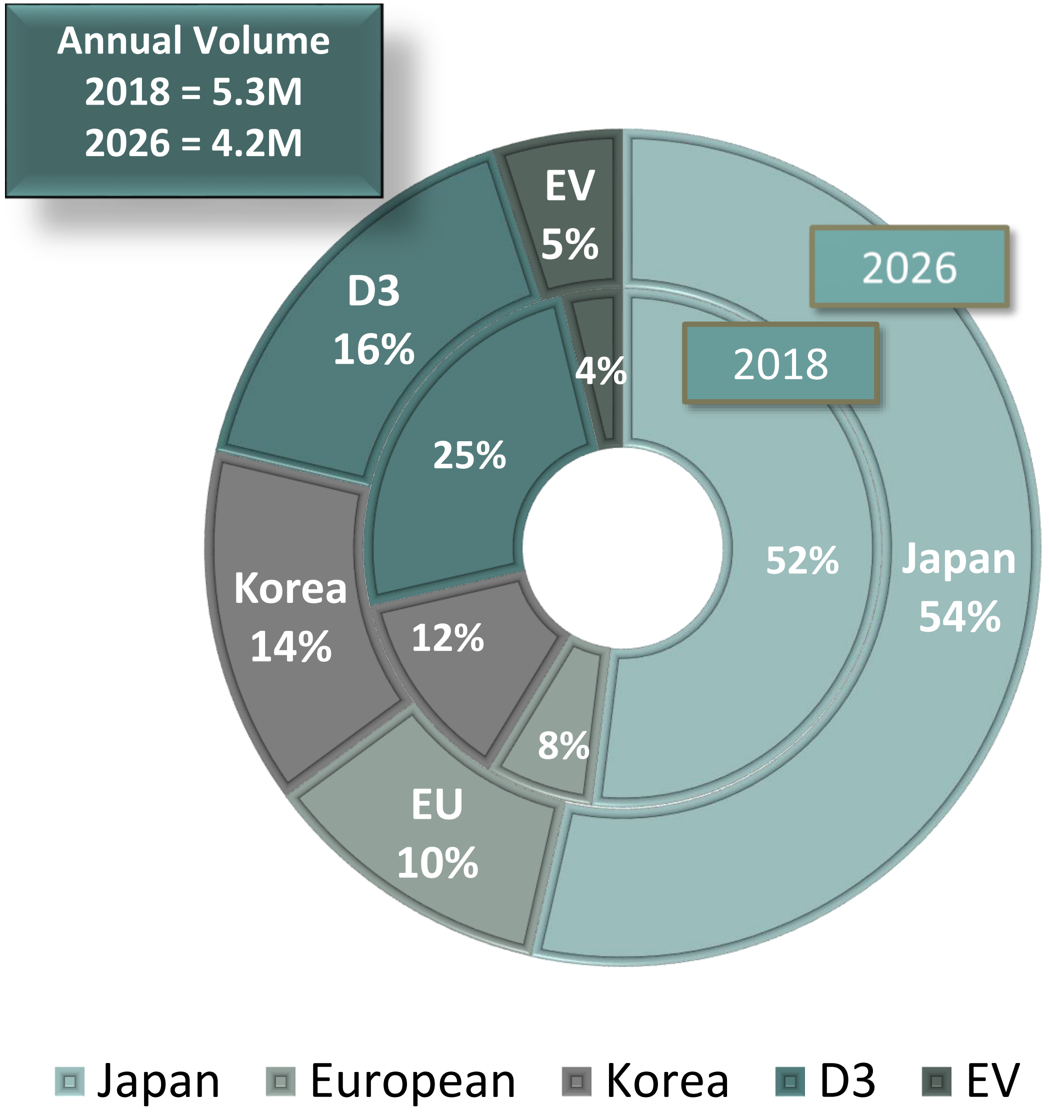
NA Production by OEM Parent Base Location



Source: AutoForecast Solutions – January 2019

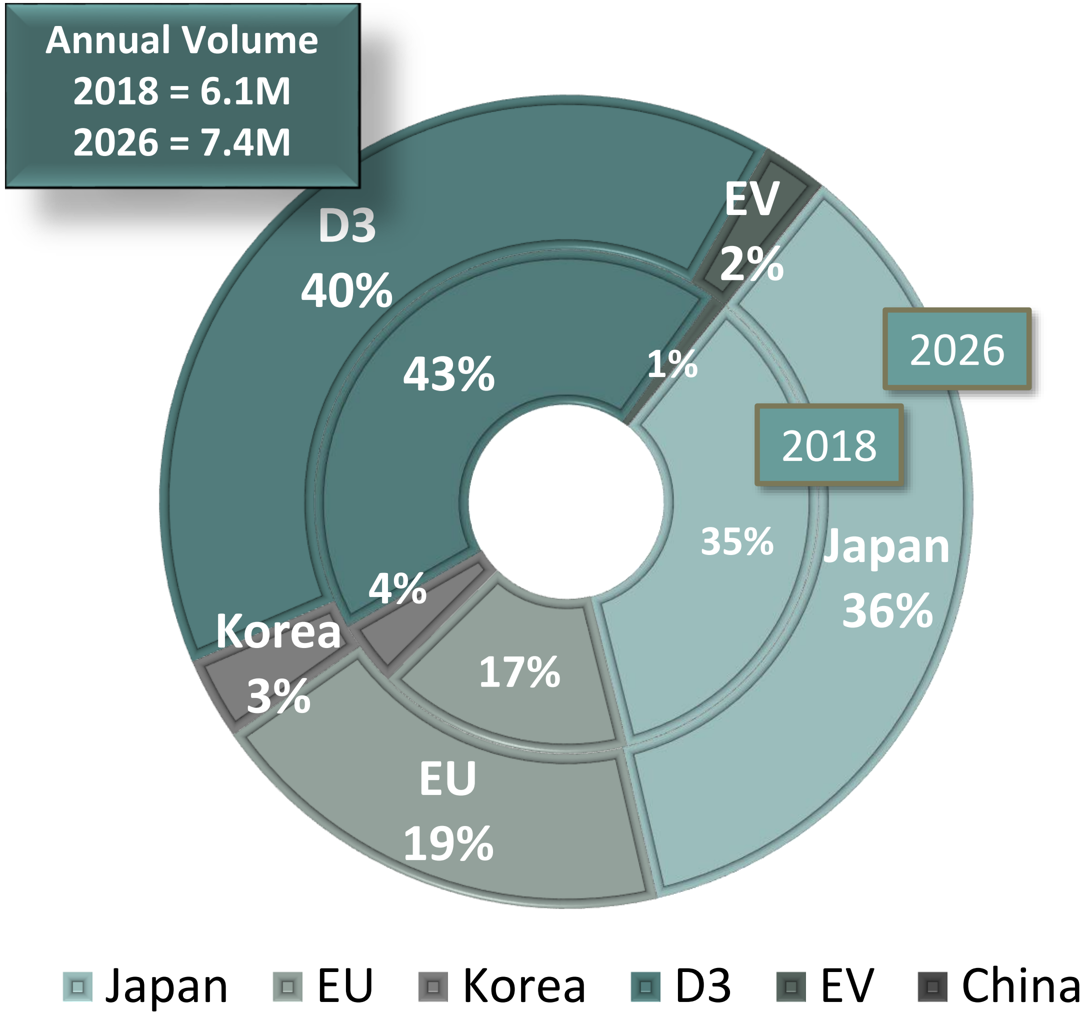
North America: Passenger Car Segment Contribution



- D3 reduce car footprint by 625K+
- Korean OEMs reduce 90K
- European OEMs gain 120K
- Japanese OEMs reduce by 490K+
- EV – primarily Tesla – reduce 8K

Source: AutoForecast Solutions – January 2019

North America: Crossover Vehicle Segment Contribution



- European OEMs add 400K units
- Japanese OEMs add nearly 485K units
- Korean OEMs down 10K
- EV group – adding about 135K
- D3 add 310K (but loses market share?)
  - Consider these imported models…
    - Jeep Renegade from Italy – 100K+
    - Buick Encore from Korea – 90K+
    - Ford EcoSport from India – 50K pace

Source: AutoForecast Solutions – January 2019

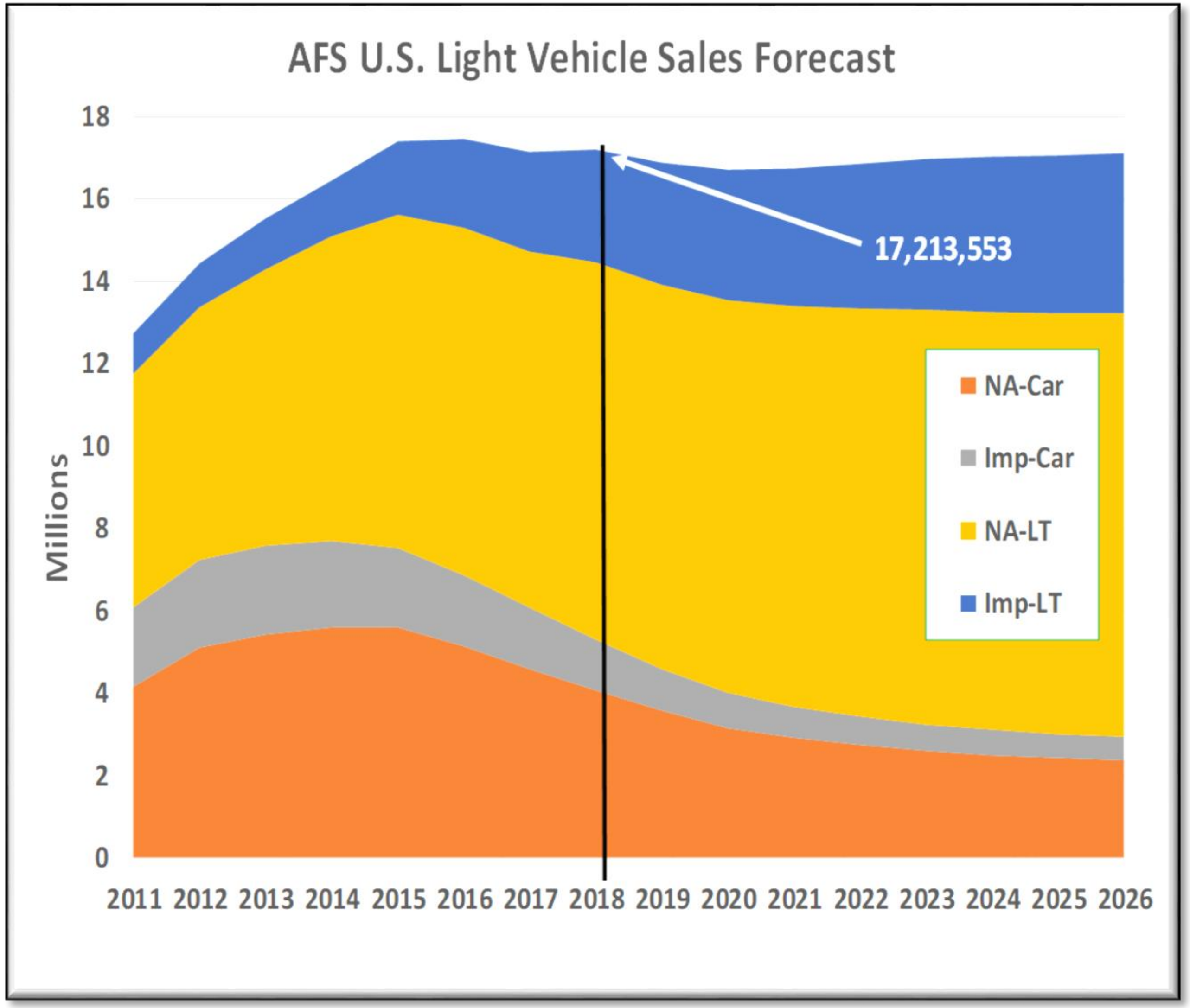
North America Production Highlights

- **U.S. Sales growth in 2018**
  - Over 17 million for 4th straight year
- **Growing mid-sized Pickups NOT cannibalizing full sized trucks (yet)**
  - Ford Ranger, expanded Jeep lineup, Ram entries
- **SUV resurgence**
  - Ford Bronco and Jeep Wrangler 4-door
- **Jeep Wagoneer / Grand Wagoneer to take on Escalade and Navigator**
  - Strong move for FCA
- **VW Atlas (both 2 and 3-row variants)**
  - to offset slow selling Passat
- **GM portfolio adjustment**
  - Product mix and plant utilization

- **Import Substitution**
  - Subaru Impreza
  - Lexus ES and RX
  - BMW passenger cars in Mexico
- **Global Export Hub**
  - VW Atlas
  - Subaru Ascent
  - Audi Q5
  - BMW CUVs
- **Mexico**
  - Strong export hub
  - Multiple global free trade agreements
  - Established supply base
  - Strong government support

U.S. SALES ANALYSIS

U.S. Light Vehicle Sales



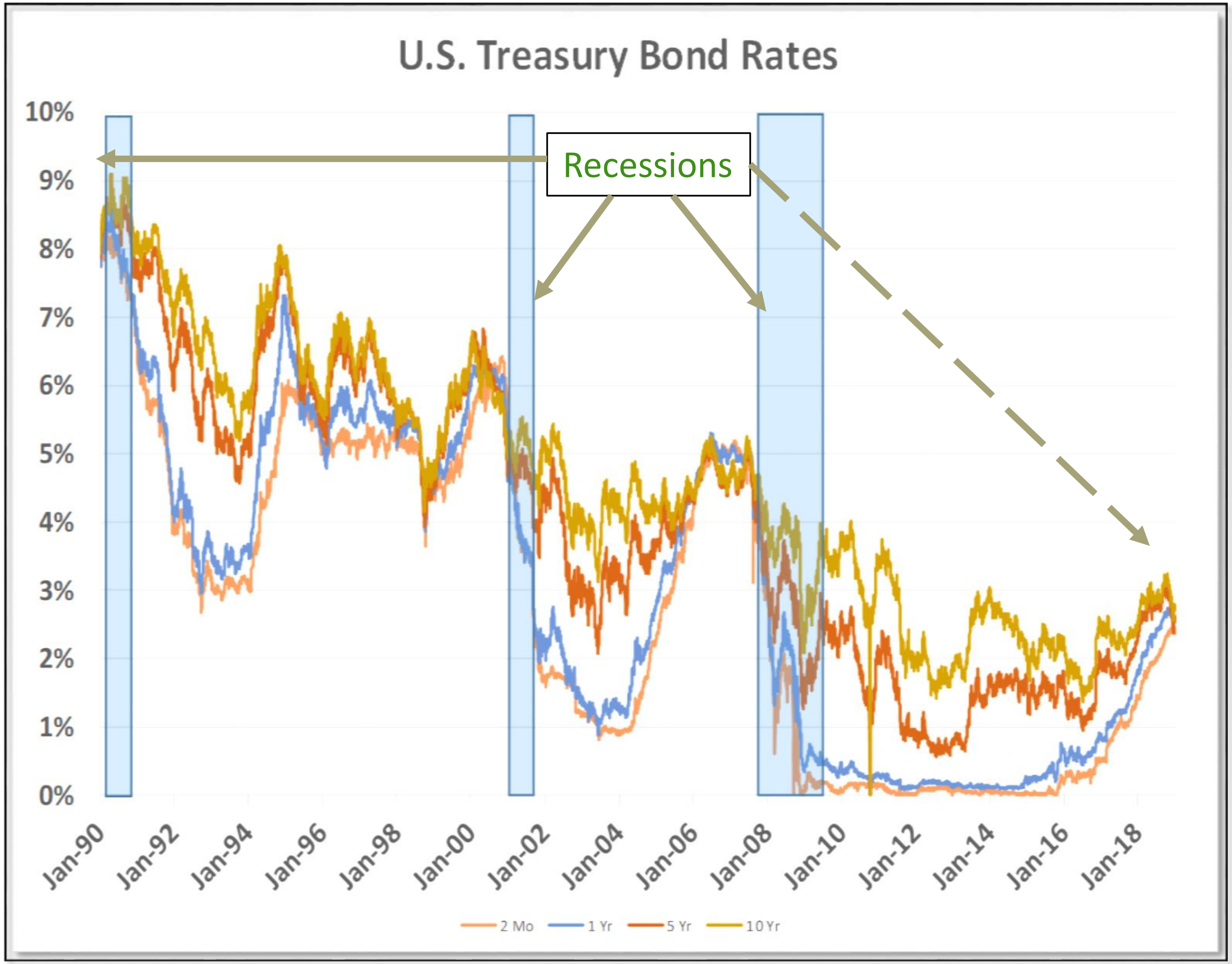
- U.S. light vehicle sales peaked in 2016
  - 17.46 million
- 2018 marked the forth straight year over 17 million units
- Slowdown expected in 2019 and 2020
  - 17 million not expected to return until 2024
  - 2% decline in 2019
- Market being driven by light truck growth
  - squeezing car share to near 27% in 2019
  - heading toward under 20% by 2023
- Import substitution offsetting future sales contributions

Source: AutoForecast Solutions – January 2019

Recession Risk

When long-term and short-term treasury rates bonds converge, the odds increase for a recession

- Recent recessions, including 2007-2009, 2001, and 1990-1991, coincided with the bond rate convergence
- Convergence typically leads to a recession within 12-18 months
- Rates converged in late ‘18 and early ‘19, pointing toward a recession in early- to mid-2020



Source: United States Department of the Treasury/AutoForecast Solutions – February 2019

NORTH AMERICA OPPORTUNITY ANALYSIS

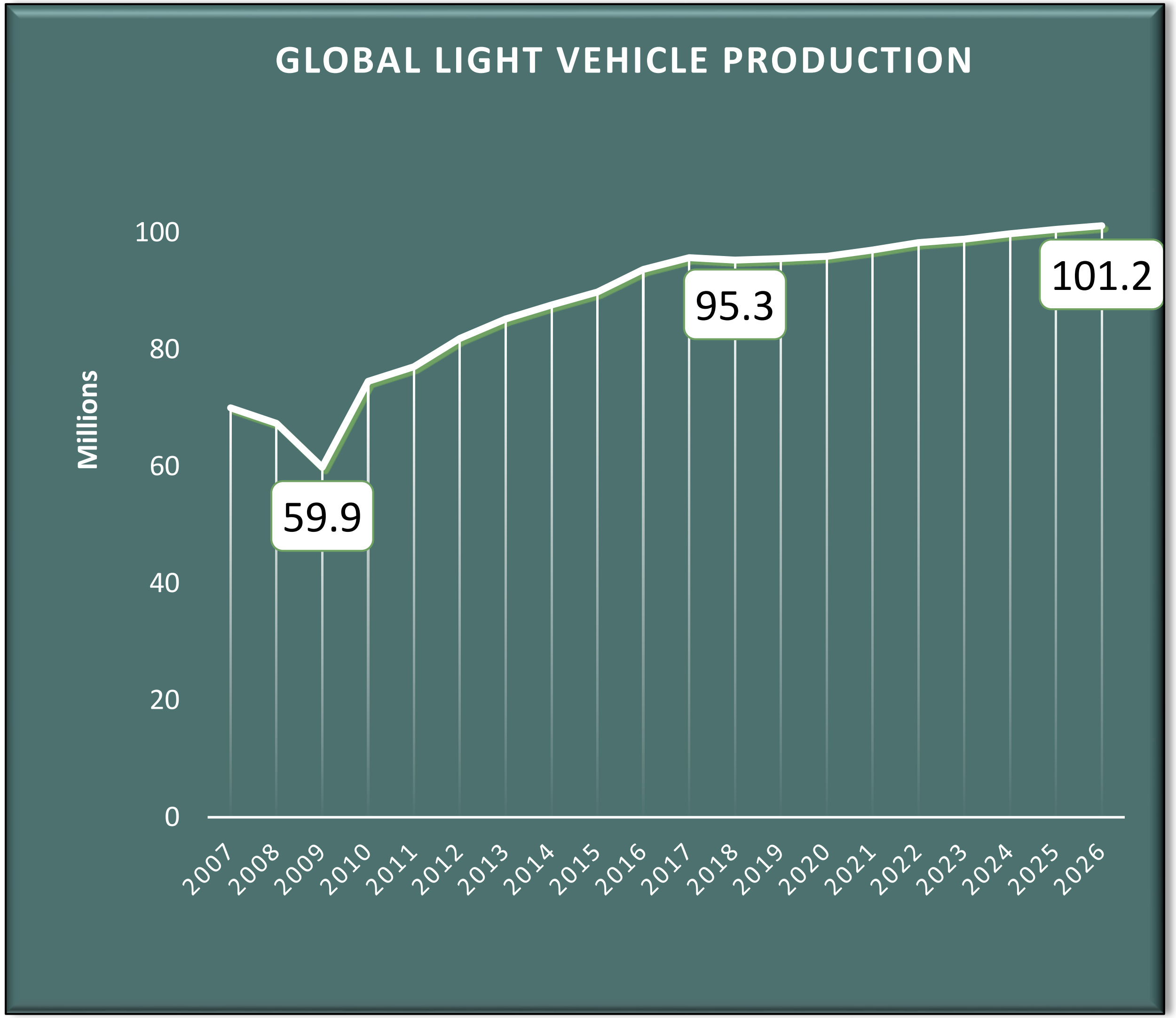
Domestic Investment Opportunity

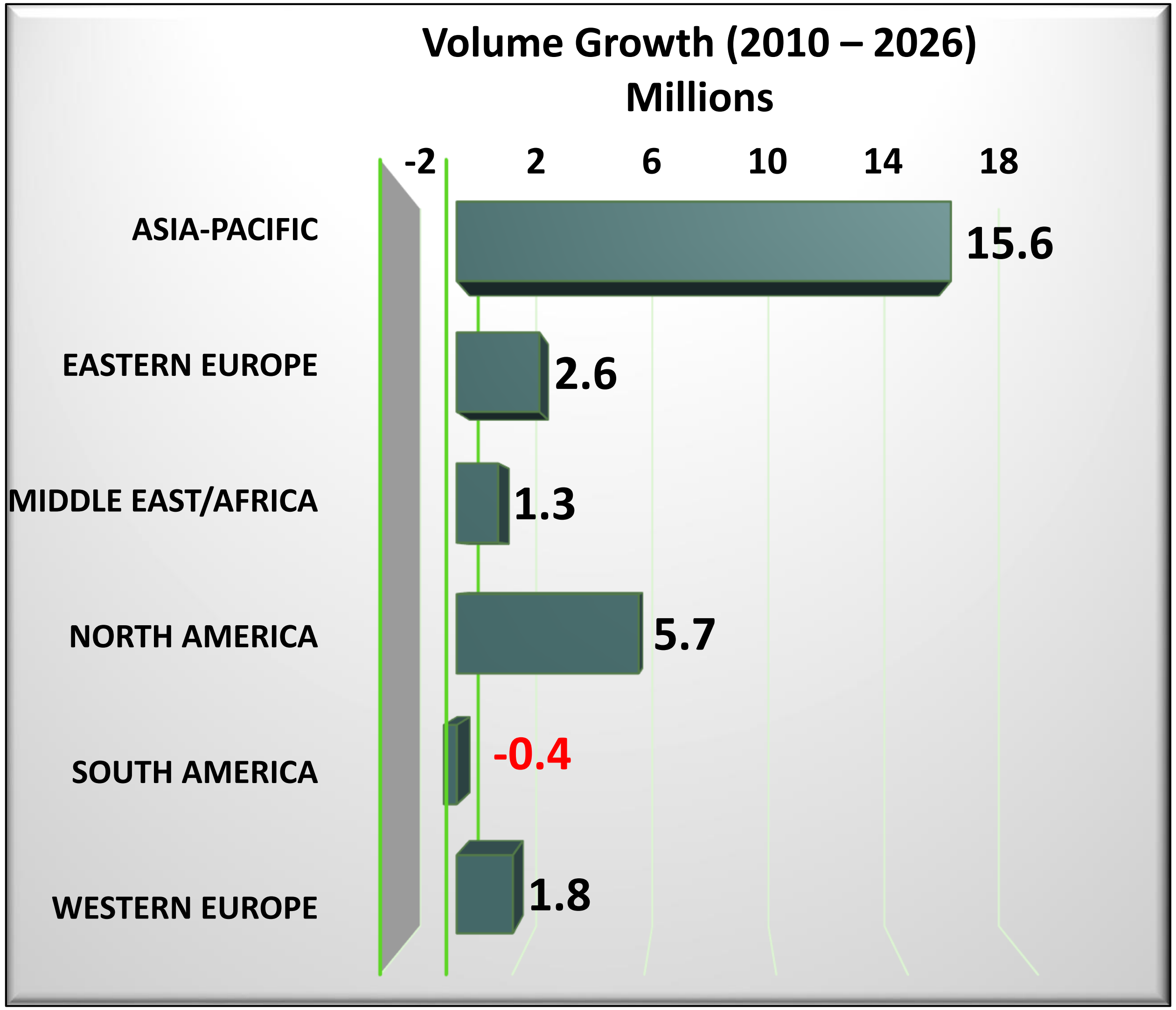
- **Nissan Rogue**
  - Sourced from Japan, South Korea, and the U.S.
  - Two-thirds of U.S. derived from imports
- **Toyota RAV4**
  - Nearly 250,000 expected from Japan this year
- **Toyota 4Runner**
  - Potential for North American sourcing
  - Not enough factory space for 150,000
- **Subaru Forester**
  - Only made in Japan
  - Subaru U.S. plant running at full speed
  - Strained production capacity in Japan
- **Subaru Crosstrek**
  - Related to the U.S. sourced Impreza
  - U.S. plant running at full-speed
  - Strained production capacity in Japan
- **Mazda CX-5**
  - Top selling Mazda product
  - Sourced from Japan
- **Hyundai Tucson**
  - Among the best selling Hyundai models
  - Sourced from South Korea
- **Kia Soul**
  - Sourced from South Korea
  - Low-cost hampers North American sourcing
- **Honda Civic**
  - Specialty models imported from U.K.
  - BREXIT - production justification still valid?
- **Jeep Renegade**
  - Globally sourced from Italian plant
  - Shares plant with related Fiat 500X

GLOBAL VEHICLE OUTLOOK

Global Light Vehicle Production

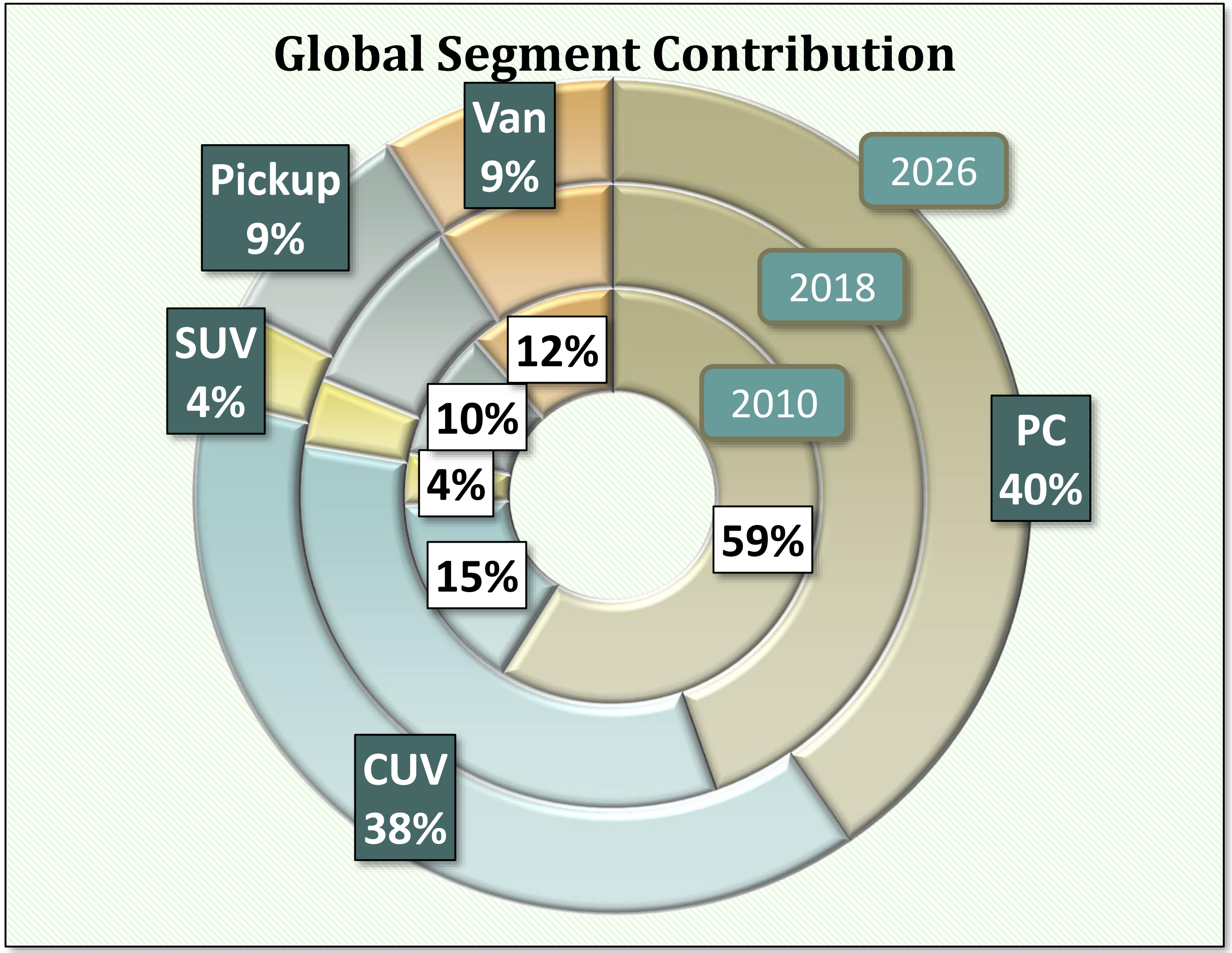
(2010 – 2026)

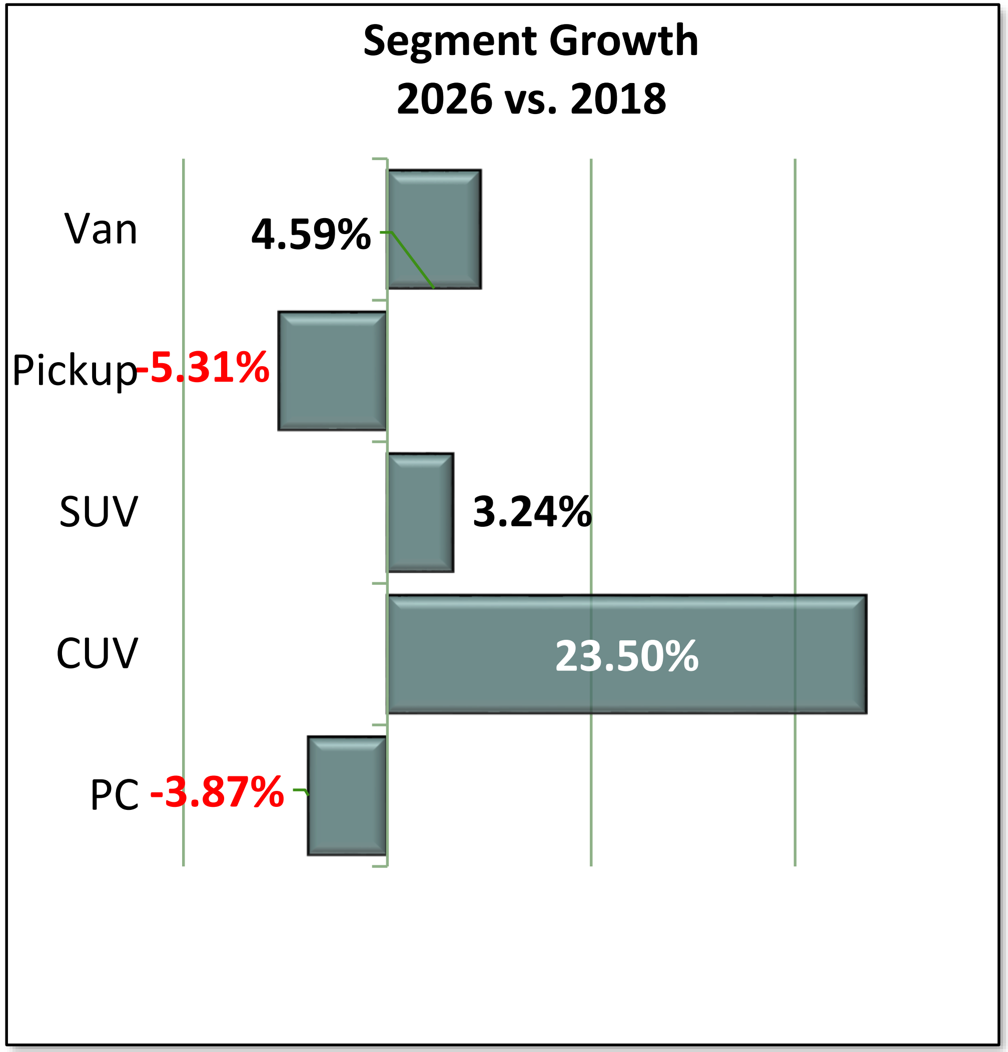




Source: AutoForecast Solutions – January 2019

Global Segment Analysis





Source: AutoForecast Solutions – January 2019

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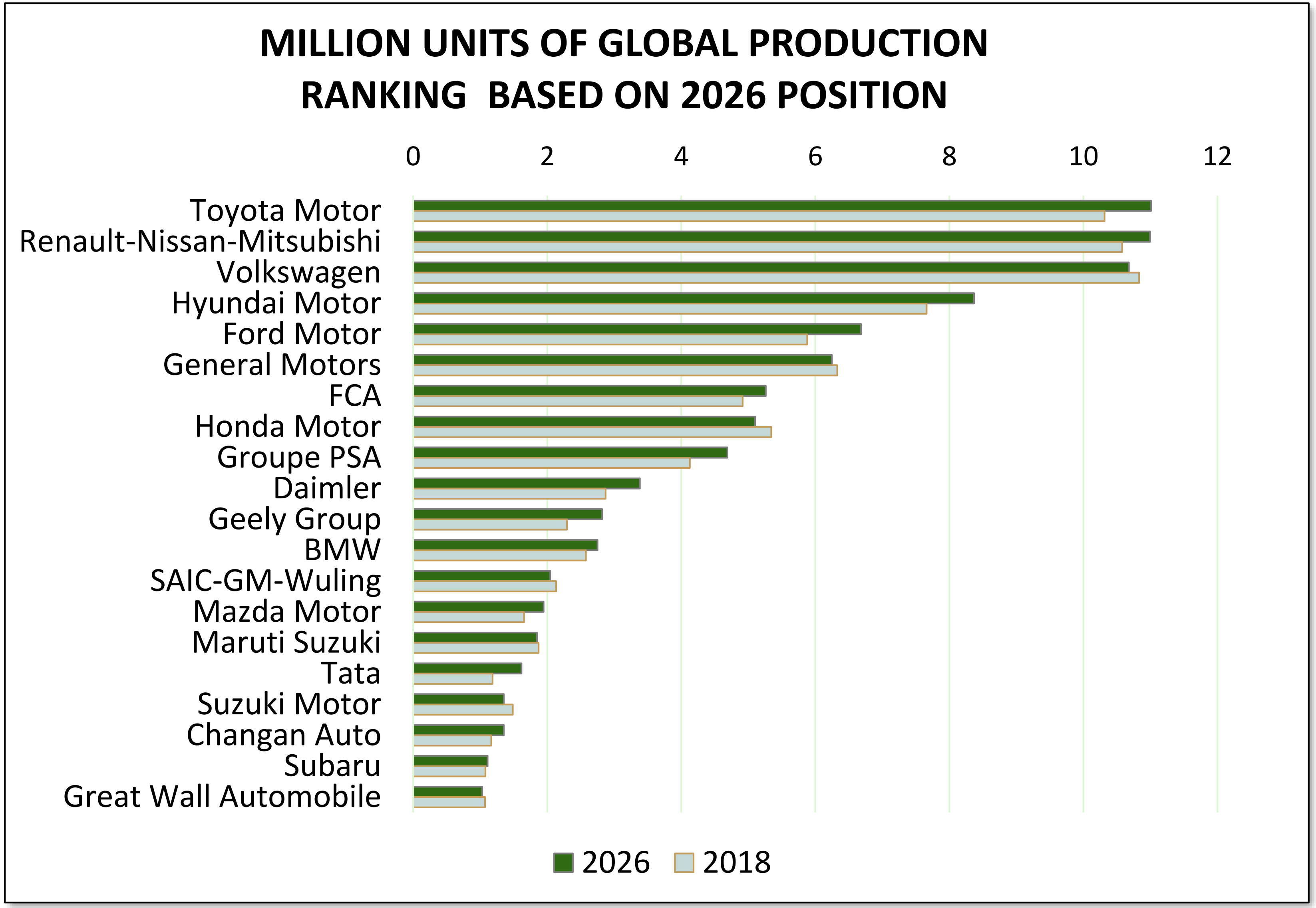
"1 Million Unit Club" Brand Owner Analysis (2018 vs. 2026)



20

Brand Owners in 2026 producing OVER 1 Million units/year

90%

Per cent of Total Global Production

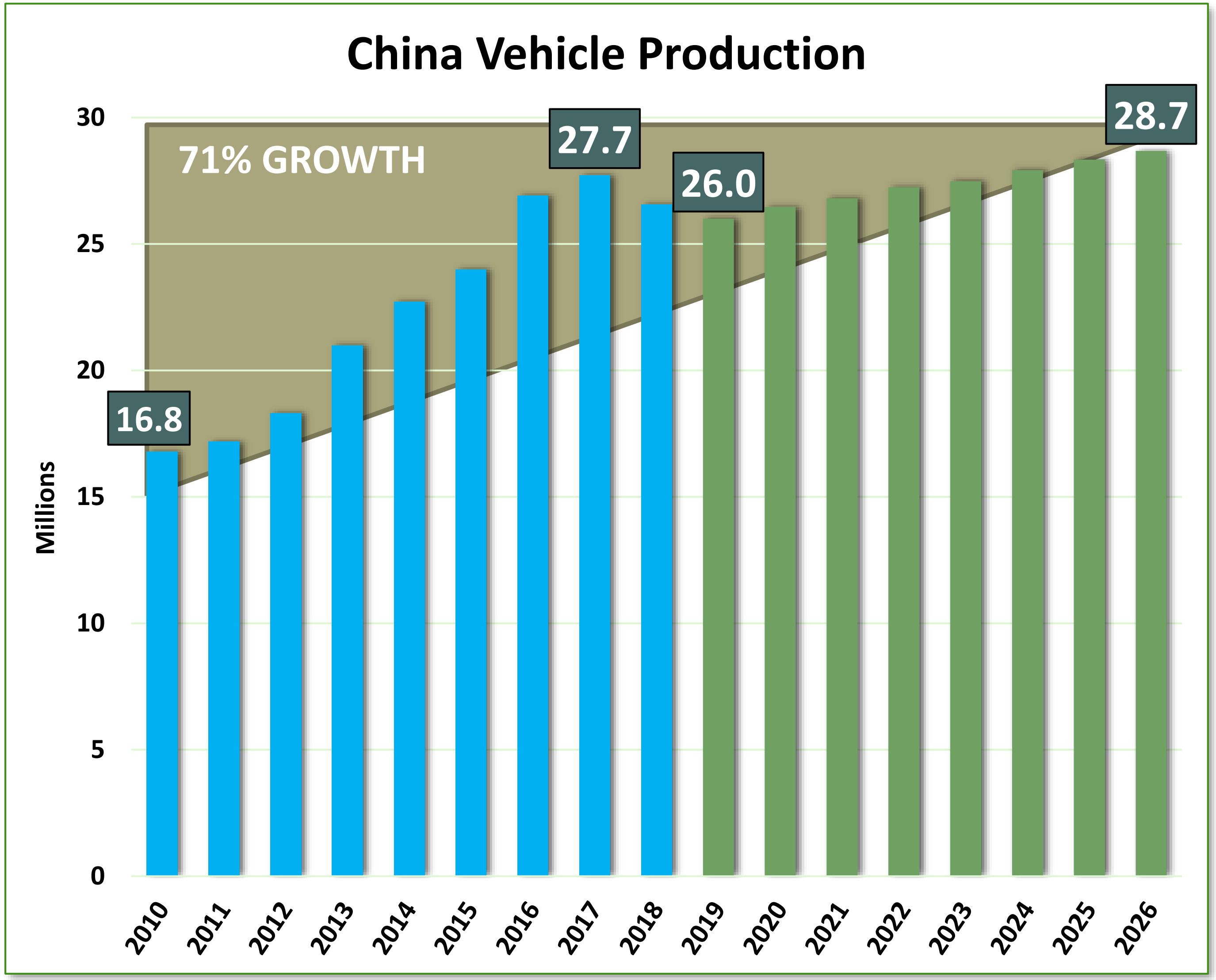
Top 10 Brand Owners

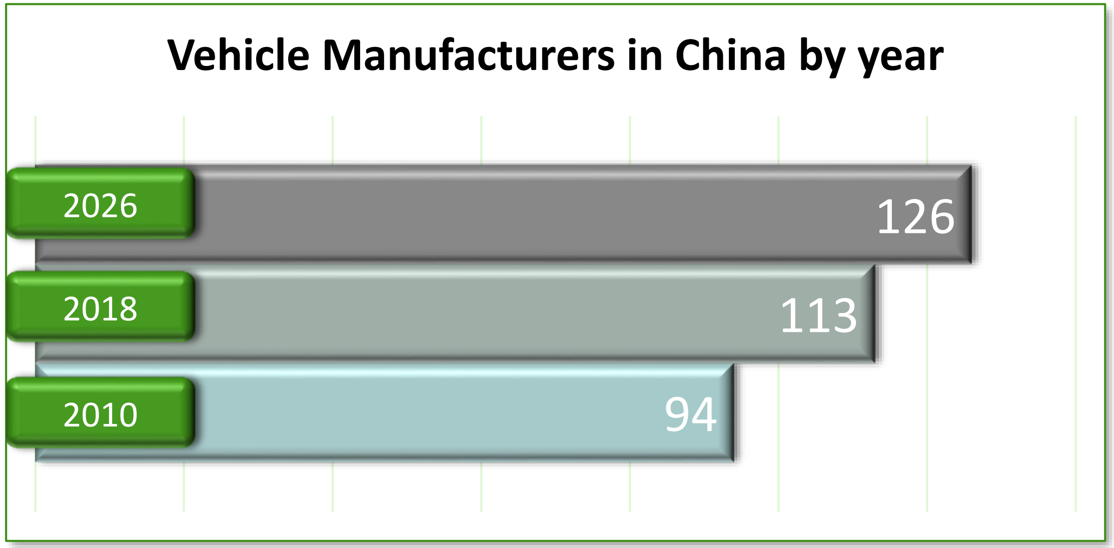
73% of total market

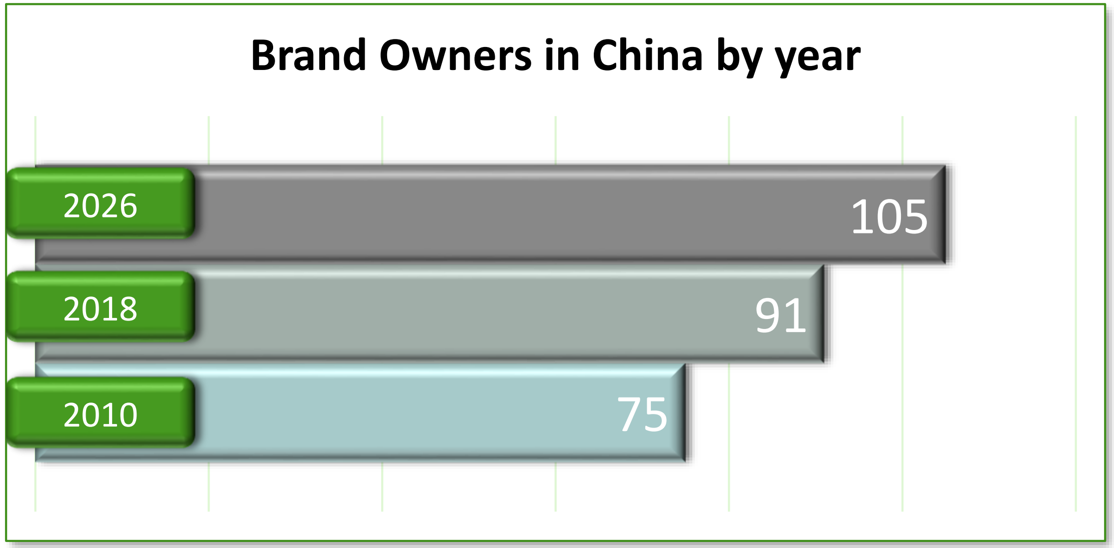
Inductees Since 2010
Beijing Automotive Group
Great Wall Automobile
Geely Group (with Volvo)
Tata
Subaru

Source: AutoForecast Solutions – January 2019

China – Vehicle Production Outlook

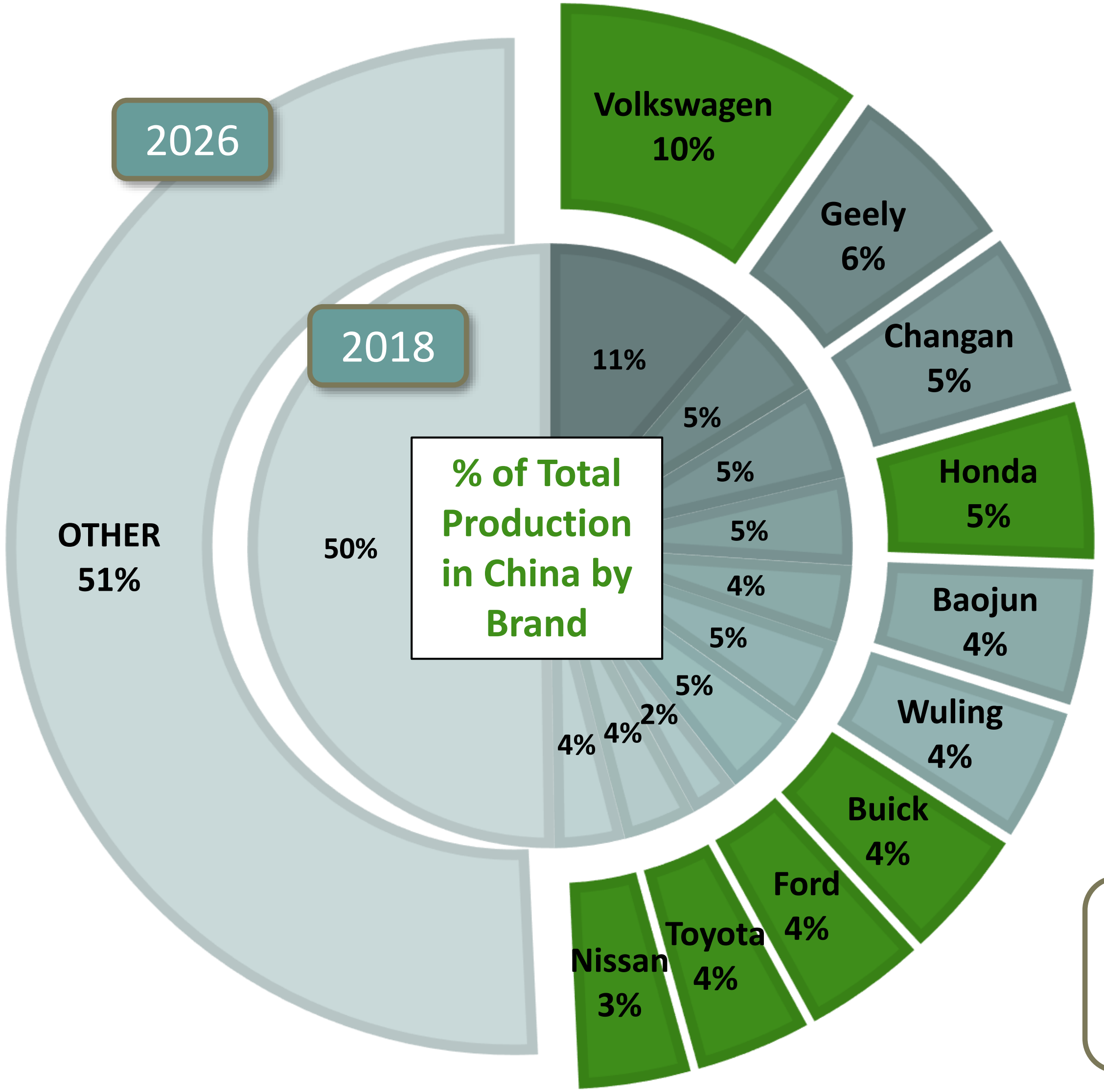






Source: AutoForecast Solutions – January 2019

China: Fractured Decision Making



28.7 Million Units in 2026

10 Brands = 50% of Market

Each producing 1M+ units

22 Vehicle Manufacturers

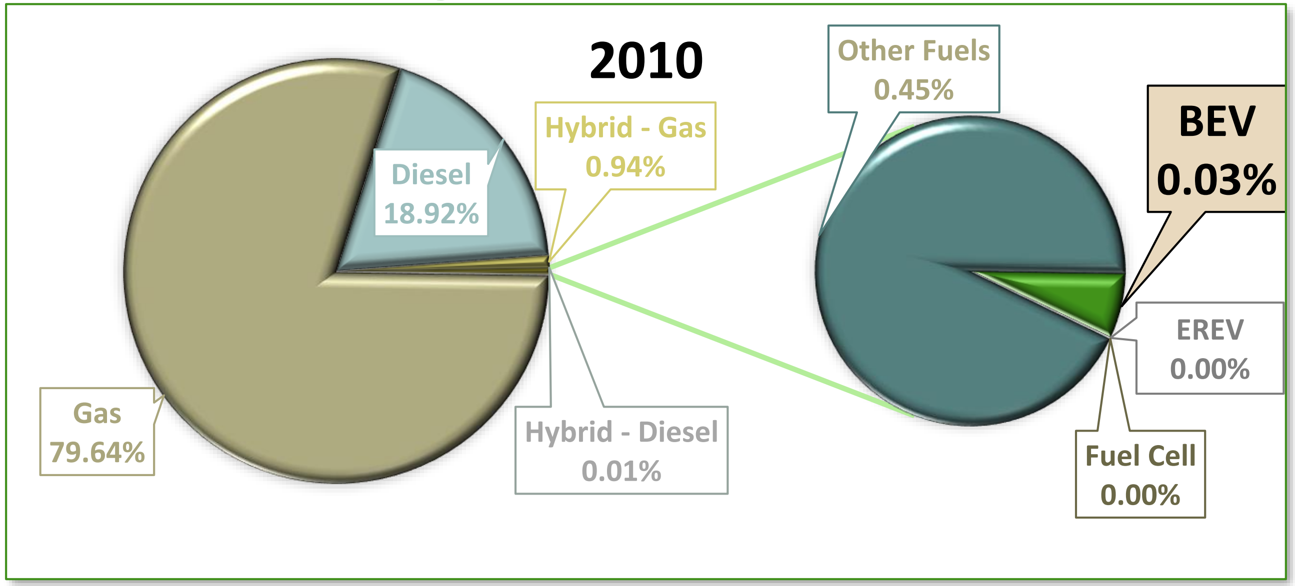
60% have foreign ownership

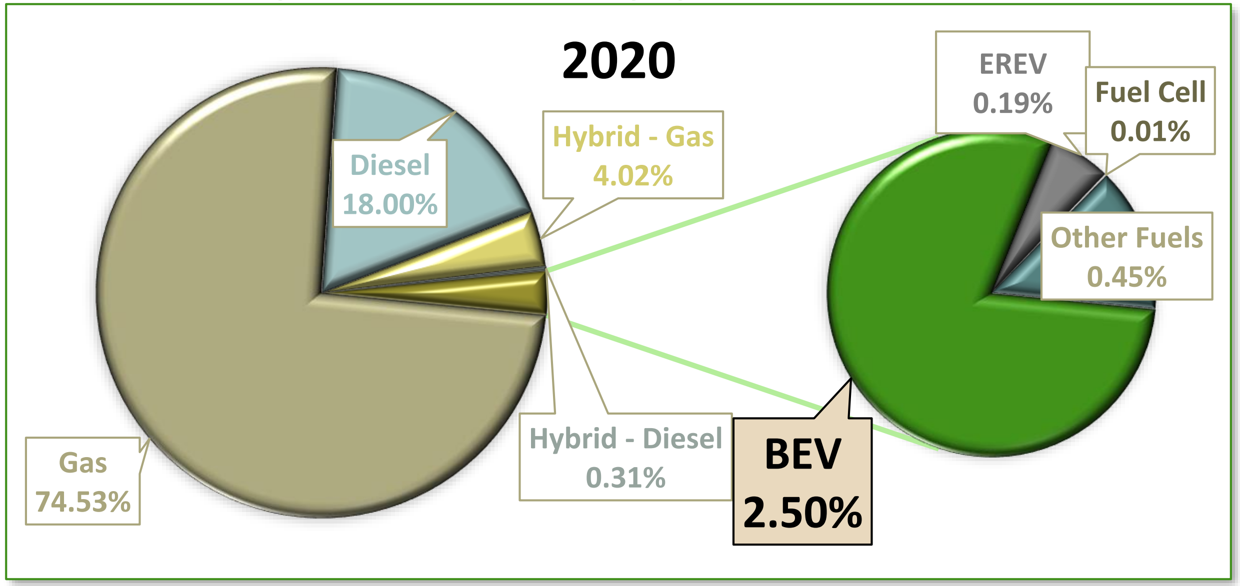
Navigating the Decision Making Process
Geography, leadership, politics, regulation, language

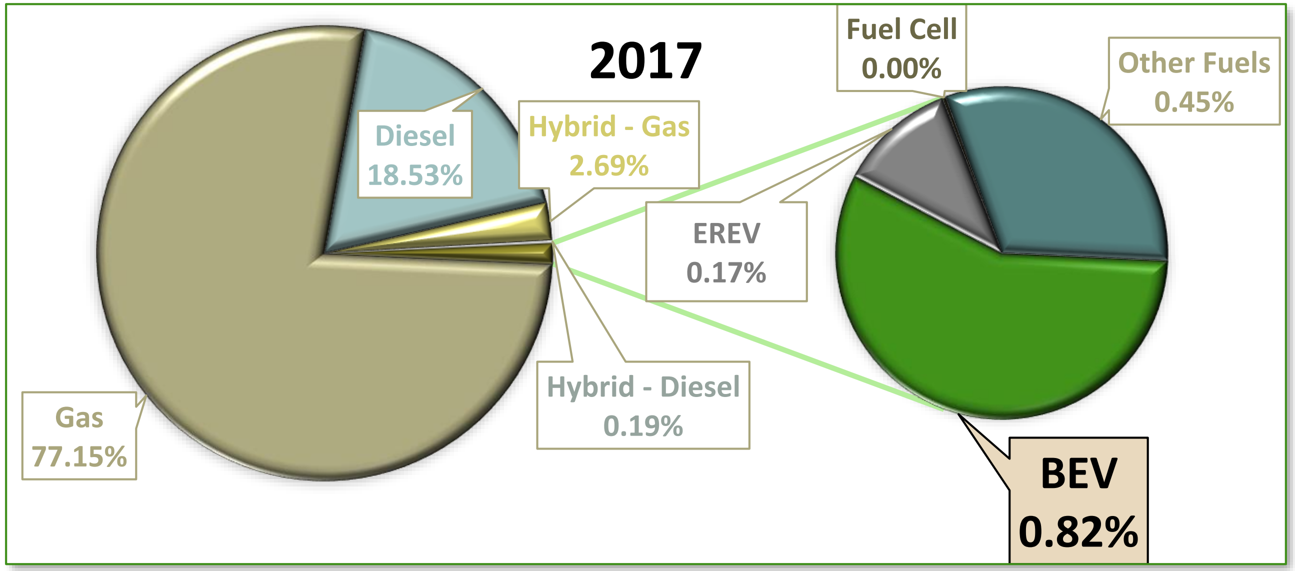
Source: AutoForecast Solutions – January 2019

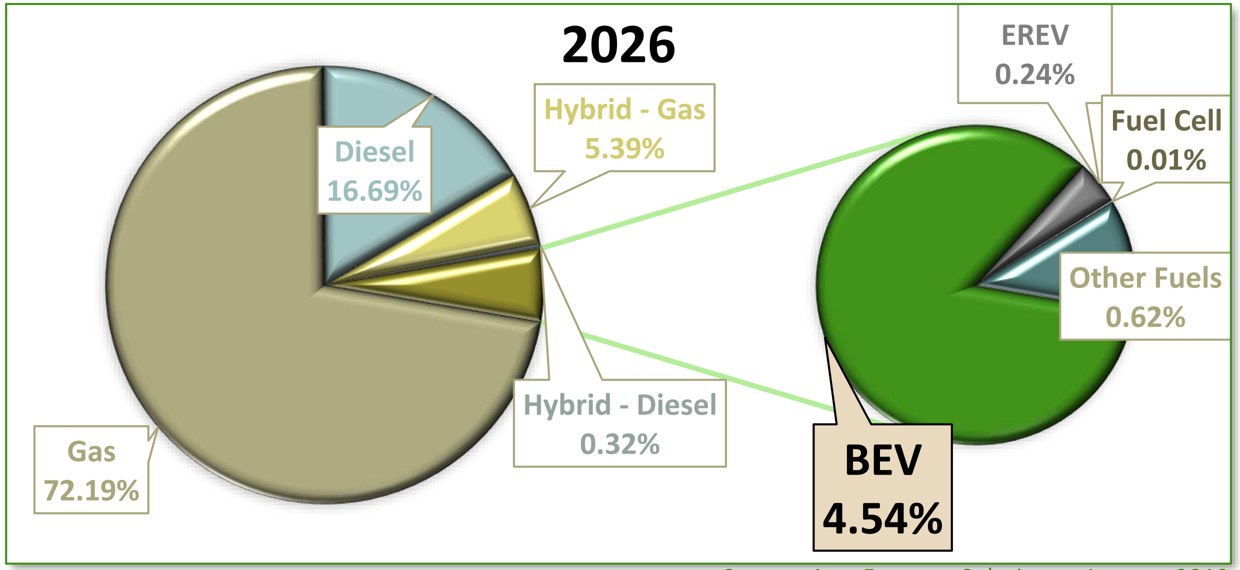
POWERTRAIN
&
ELECTRIFICATION

Global Light Vehicle Production by Fuel Type



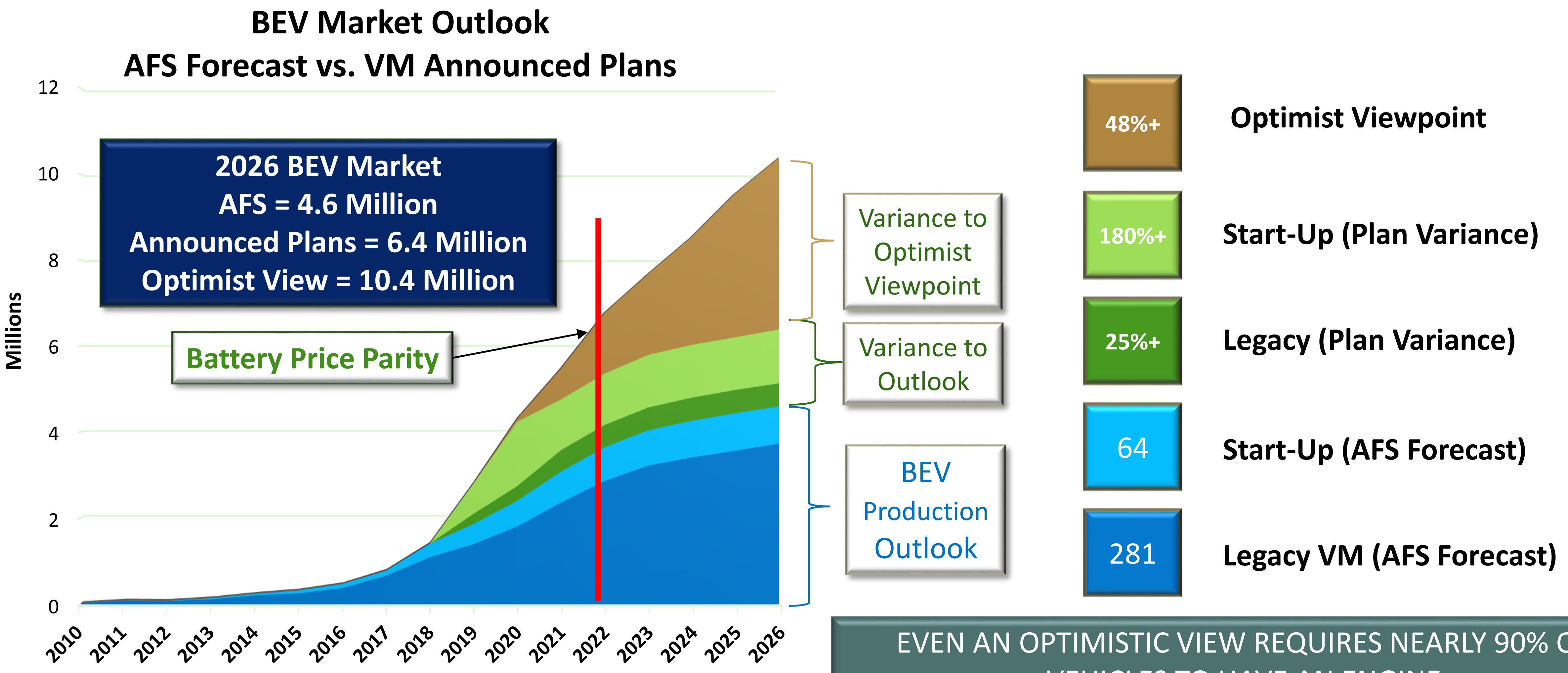






Source: AutoForecast Solutions – January 2019

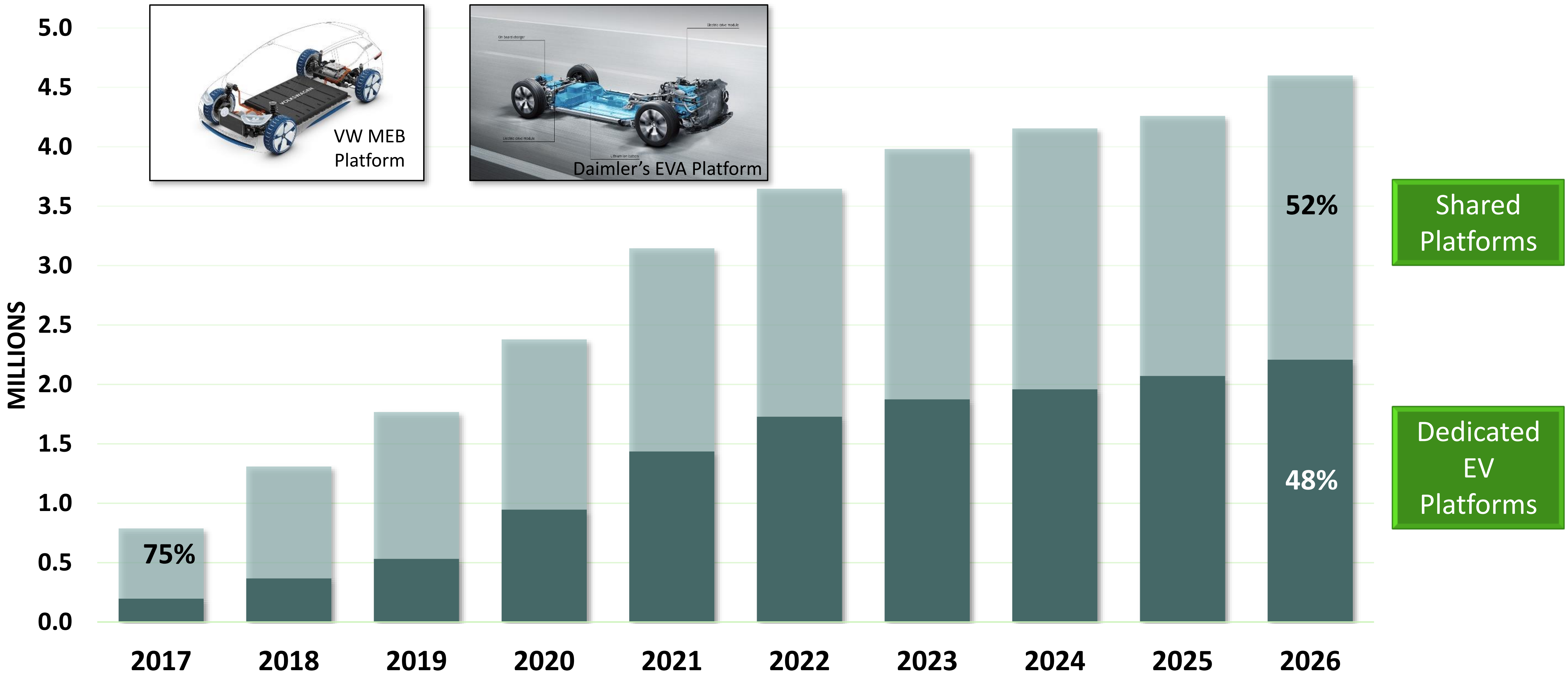
EV Market Sizing



EVEN AN OPTIMISTIC VIEW REQUIRES NEARLY 90% OF VEHICLES TO HAVE AN ENGINE

Source: AutoForecast Solutions – January 2019

Electric Platform Production Volume



Source: AutoForecast Solutions – January 2019

Differing OEM Viewpoints

Electrification Adopters

- **Renault/Nissan**
  - Nissan Leaf and NV200 EVs
  - Renault Kangoo, Zoe and Twizy EVs
- **Volkswagen**
  - New direction to avoid past diesel issues
    - Creating ID sub-brand to Volkswagen
    - "Electrifying" Audi, Porsche, and Bentley
- **Most Chinese Manufacturers**
  - Adding EVs
    - BAIC, BYD, Changan, Chery, Dongfeng, Geely, Jianghuai, Jiangling, SAIC, Zotye
  - Adding PHEVs
    - BYD, Chery, Dongfeng, FAW, GAC, Geely, SAIC

The Resistance

- **Mazda**
  - Reluctantly adding EVs and hybrids
  - Rather refine current technologies
    - CIDI gasoline engines
    - Growing diesel volumes
- **FCA**
  - Losing money on each hybrid and EV
    - Marchionne came out said not to buy Fiat 500 EVs
  - Recently started adding EV and hybrid programs
- **Toyota – Sort of**
  - Fully embracing hybrids
  - Avoiding EVs as much as possible
    - China forcing production

China BEV Market Sizing

Manufacturers Adding BEVs

- BAIC Motor (10)
- BAIC-Yinxiang (2)
- Beijing Benz (4)
- Beijing Hyundai (1)
- Beiqi Foton (2)
- Blue Sky NEV (5)
- BMW Brilliance (5)
- Brilliance Jinbei (1)
- BYD (5)
- BYD Daimler (1)
- CH Auto (1)
- Changan Auto (7)
- Changan Ford (1)
- Changan PSA (1)
- Chehejia (1)
- Chery (6)
- Chery-JLR (1)
- Chongqing Lifan (2)
- Dongfeng Honda (2)
- Dongfeng Limited (5)
- Dongfeng Motors (3)
- Dongfeng Nanchong (1)
- Dongfeng PSA (7)
- Dongfeng PV (1)
- Dongfeng Yu'an (1)
- Dongfeng Yueda Kia (1)
- Dongfeng –Luxgen (1)
- FAW Car (2)
- FAW Haima (1)
- FAW Jiqing (1)
- FAW Toyota (5)
- FAW Volkswagen (11)
- FDG Electric Vehicles (1)
- Fujian New Longma (1)
- Future Mobility (3)
- GAC Changfeng (3)
- GAC Honda (2)
- GAC Motor (5)
- GAC Toyota (6)
- Geely Group (23)
- Great Wall Automobile (3)
- Greenwheel (2)
- Guojin Auto (3)
- Haima Zhengzhou (2)
- Hawtai (2)
- HK Motors (1)
- Honda China (2)
- Hozon Auto (3)
- Jianghuai (7)
- Jiangjuai-VW (1)
- Jiangling Holdings (6)
- Kandi Electric Vehicles (1)
- LeapMotors (1)
- LeEco (1)
- Link Your (1)
- Nanjing Iveco (1)
- NEVS (2)
- NIO (2)
- Qoros (2)
- SAIC Commercial (3)
- SAIC GM (2)
- SAIC GM Dongyue (2)
- SAIC Motor (2)
- SAIC VW (10)
- SAIC-GM-Wuling (2)
- Shanghai Maple (3)
- Sichuan Auto (3)
- South-east Automobile (3)
- Tesla (2)
- WM Motor (2)
- Xiapeng (1)
- Youngman Lotus (1)
- Youxia (1)
- Yudo Auto (2)
- Zotye Auto (3)
- Zotye-Ford (4)

219

2026 BEV Models

Red Entries are OEMS only producing EVs

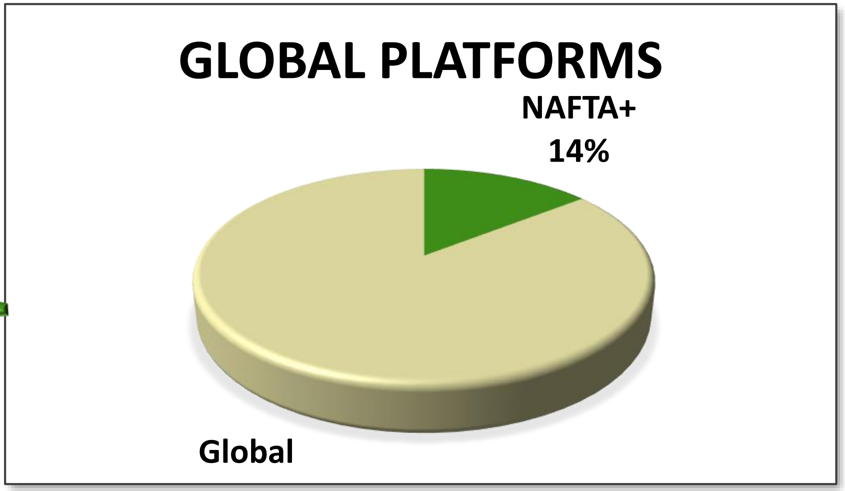
Some nameplates built by more than one OEM

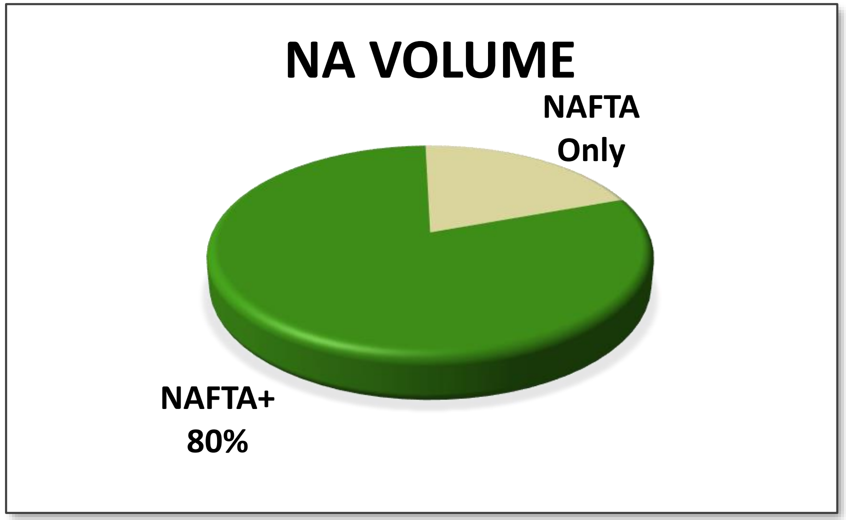
NAFTA +

THE GLOBALIZATION IMPERATIVE

NAFTA+ (2026)

Light Vehicle Platforms containing NAFTA production and at least one other country in ROW





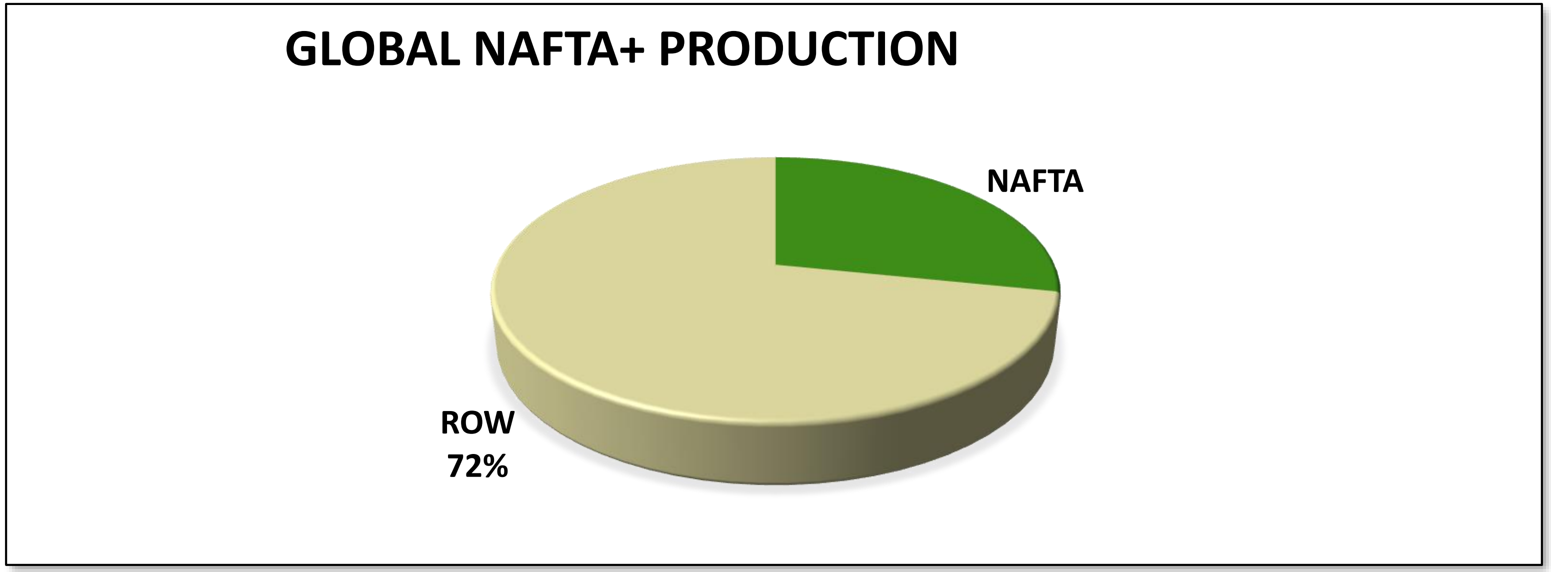
423
Platforms produced worldwide

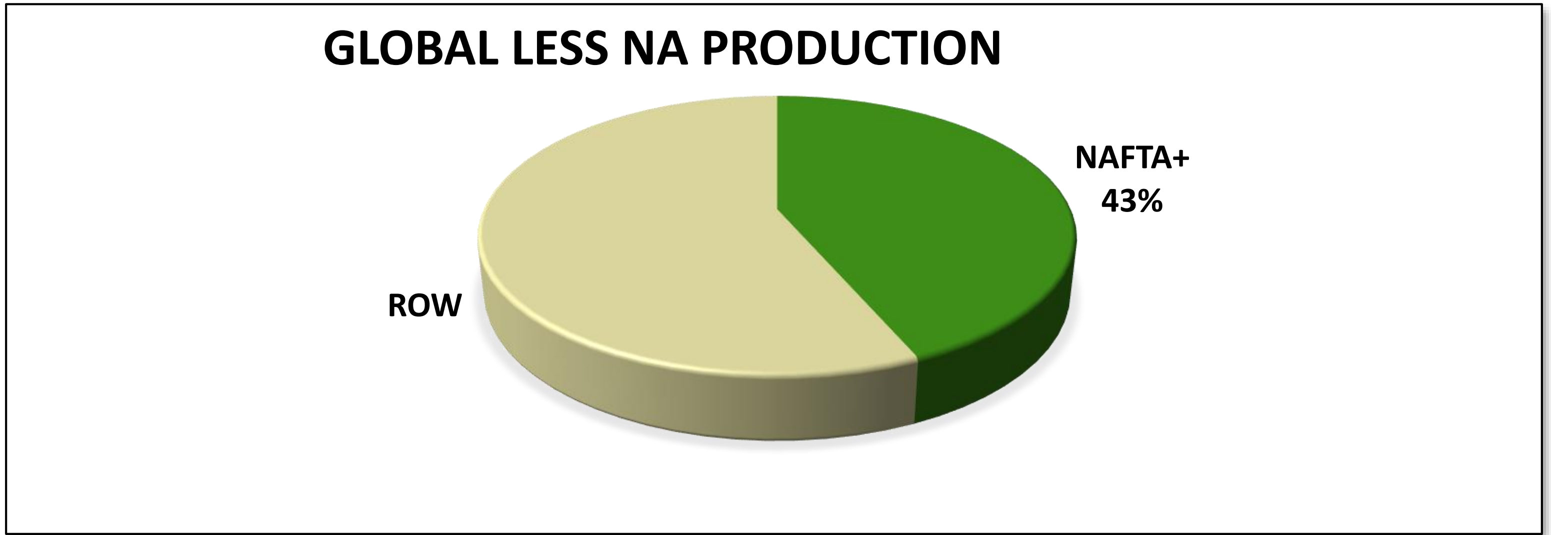
16
NAFTA+ Platforms

14.4 Million
NAFTA+ North America Volume

Source: AutoForecast Solutions – January 2019

NAFTA+ Opportunity/Risk (2026)





52.4 Million

NAFTA+
Global Volume

37.6 Million

NAFTA+ volume
Produced OUTSIDE
North America

Source: AutoForecast Solutions – January 2019

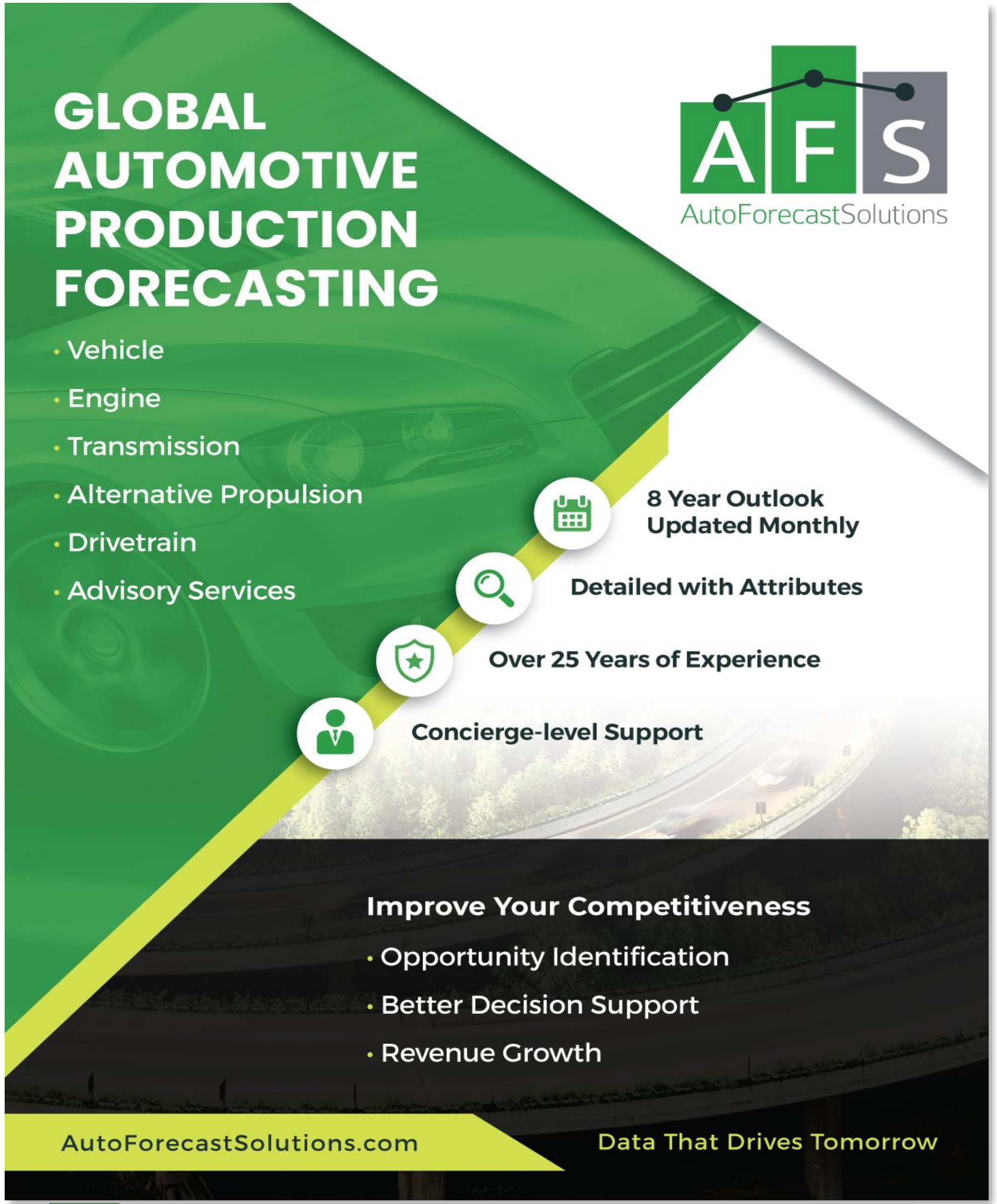
FINAL THOUGHTS

Disruption: The Fine Line Between Risk and Opportunity

Balancing a fickle consumer with an impatient shareholder

All players are jockeying for position in a race with no clear finish line

*The goal is to **understand** the opportunities,*
***develop** a value proposition to defend core operations,*
*and **identify** areas for growth.*



AutoForecast Solutions (AFS) provides ***vehicle, powertrain, and drivetrain production forecasting*** and ***advisory services*** to the global automotive industry.

AFS Forecast	AFS Portfolio
AFS Planning	AFS Scenario

Global Automotive Business Intelligence Solutions & Advisory Services

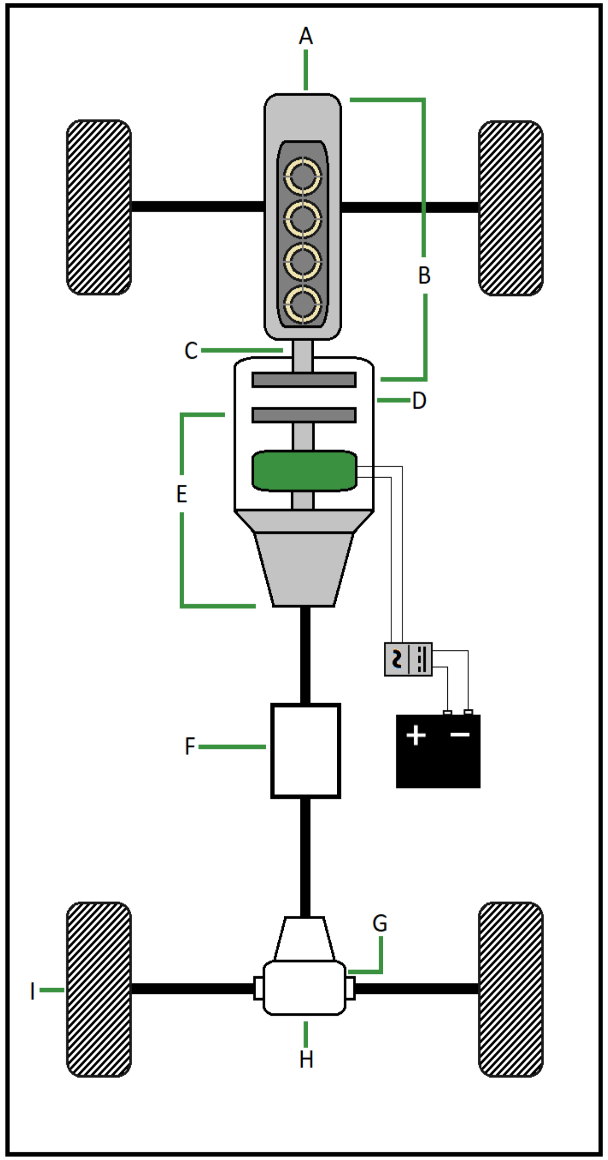
AFS helps our customer…

Understand *the opportunities*

Develop *a value proposition to defend core operations*

Identify *areas for growth.*

Alternative Propulsion Applications



A. BAS: Belt Alternator Starter (BAS) or Belt Starter Generator (BSG)

B. Central: Battery Electric Vehicle's (BEV) traction motor in place of a traditional ICE

C. Crankshaft: Traction motor mounted on the transmission side of the crankshaft

D. ISG: Traction motor mounted on the transmission input shaft

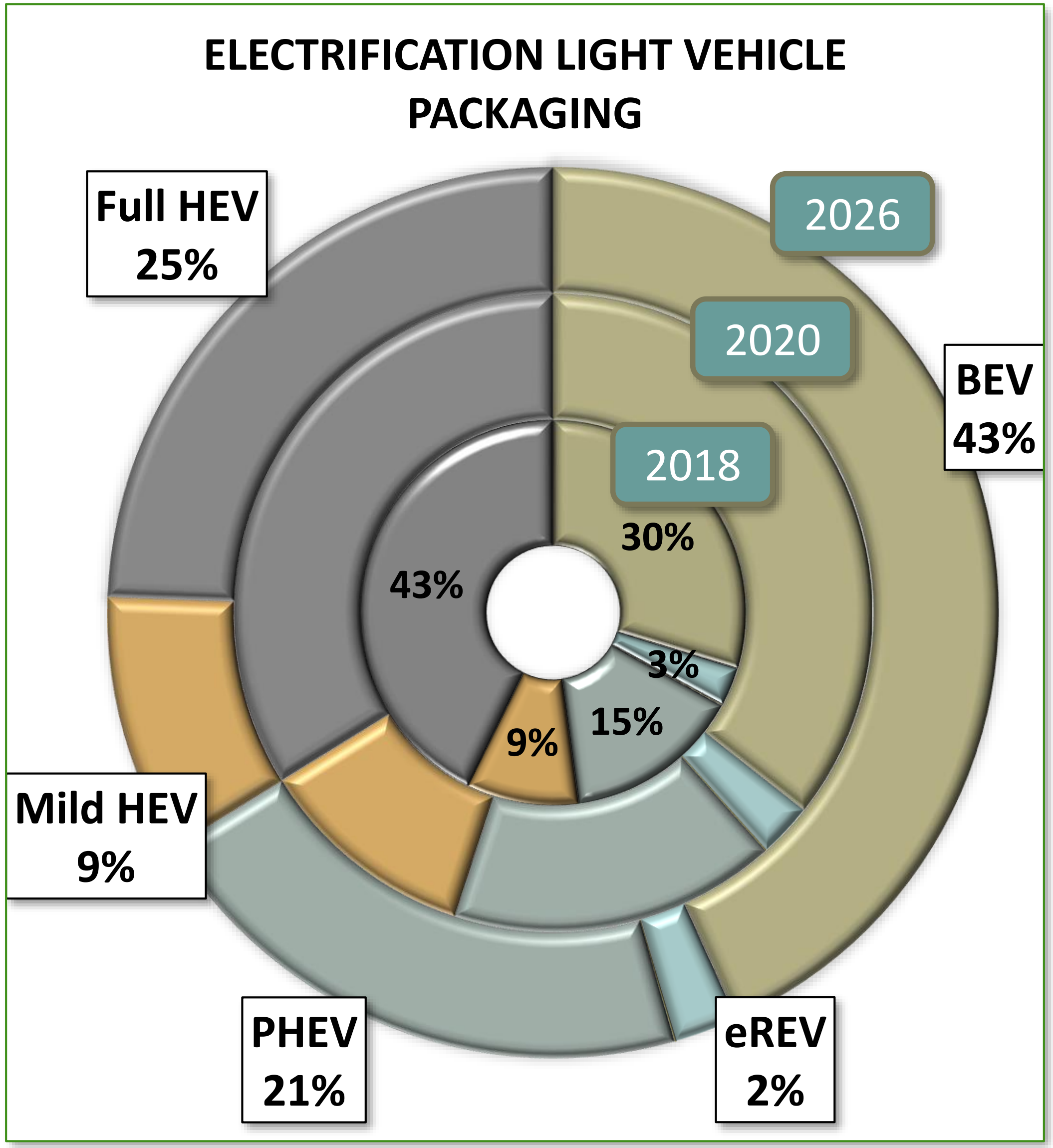
E. eTrans: Traction motor placed in or on the transmission housing, acting on the gearset

F. eDriveshaft: Traction motor propels the output shaft or driveshaft via drive chains or gears

G. eAxle (Reduction Gear): Traction motor added to, or integrated with, the differential

H. eAxleDD: Traction motor provides direct drive, attaching directly to the axle(s)

I. Hub: Traction motor mounted in wheel hub driving the wheel directly



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