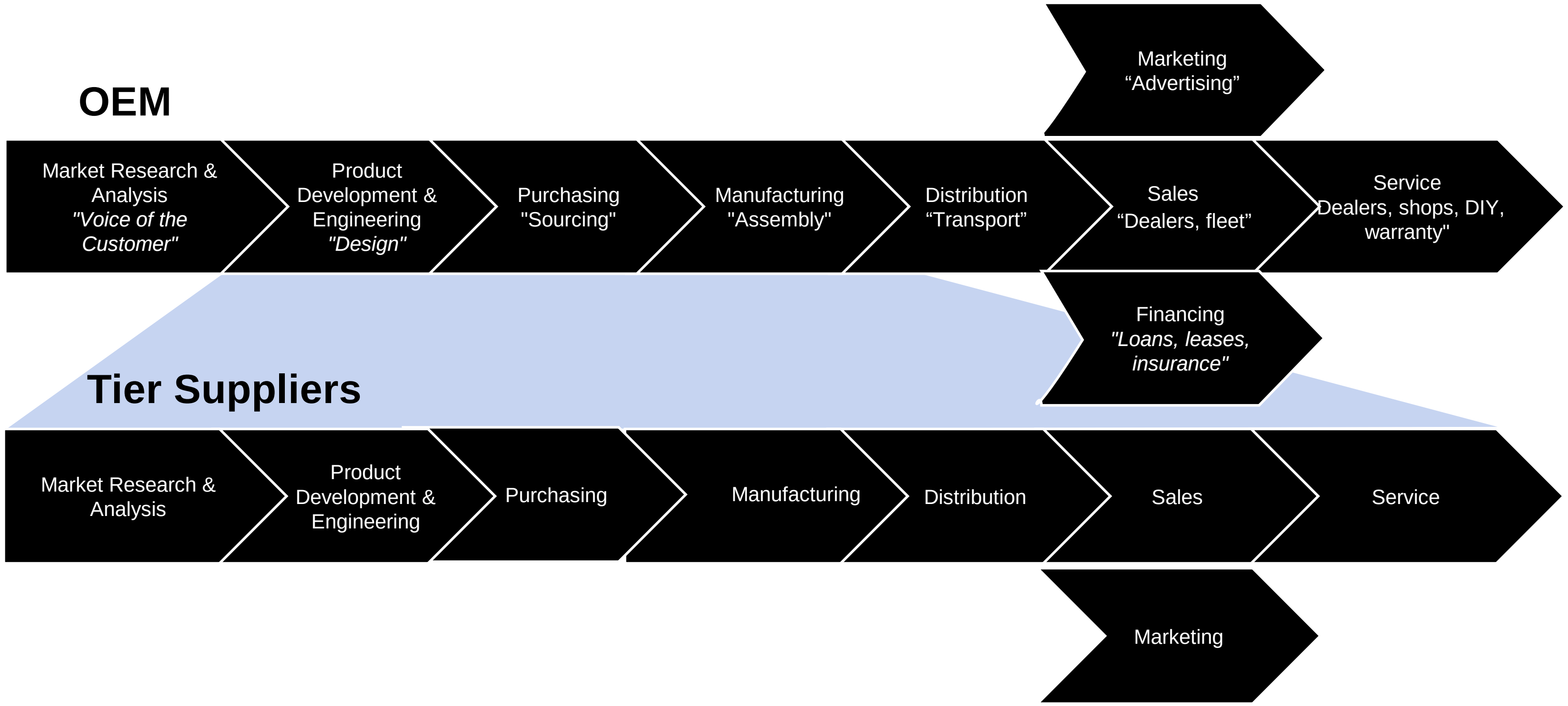
Views on the Automotive Industry’s Direction and OEM/Supplier Relations

May 15, 2018

Traditional View of Automotive Value Chain

The traditional view of the automotive value chain has focused on designing, engineering, manufacturing, selling, financing and servicing a vehicle



Where is the Automotive Industry Going?
Megatrends to Understand

1. Autonomy

2. Mobility

3. Electrification

4. Making of the Vehicle

Autonomous Vehicle Timeframe
Over 3 Extended Phases

Testing & Validation

Current State
Phase 1

2017-2020

Build Capability, Test & Validate Autonomous Technology

Geo-Fenced Autonomy

Future State
Phase 2

2020 - 2025

Launch Geo-Fenced Autonomous Rideshare Networks and Private Vehicles

Full Autonomy

Future State
Phase 3

2025-2030+

Full Autonomy beyond Geo-Fences Rideshare Networks, and Private Vehicles

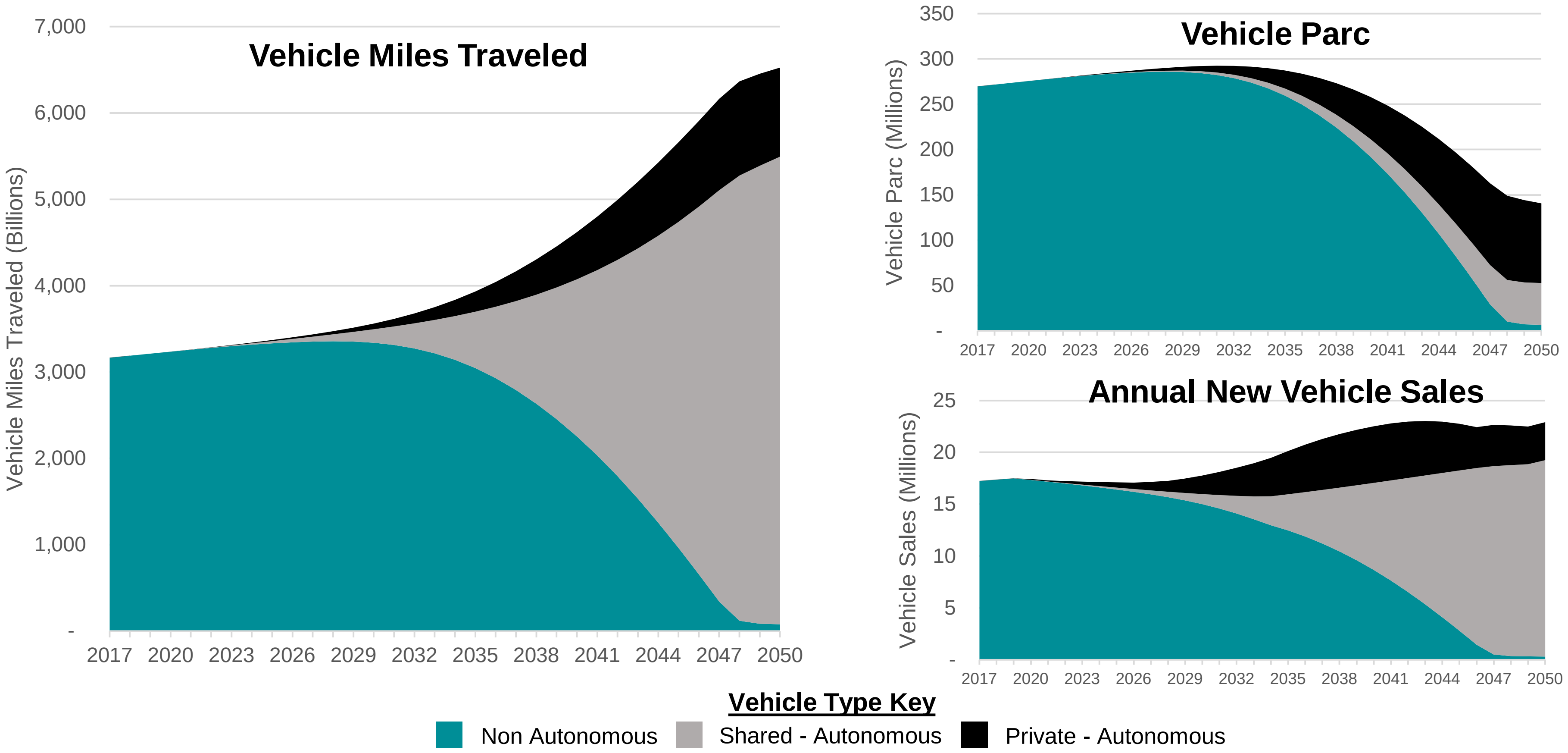
Testing & Validation in Select Cities

New York City Geo-Fenced Area With Corridors

Full Autonomy beyond Geo-Fences

U.S. Mobility Projections
Vehicle Miles Traveled will Drive Production

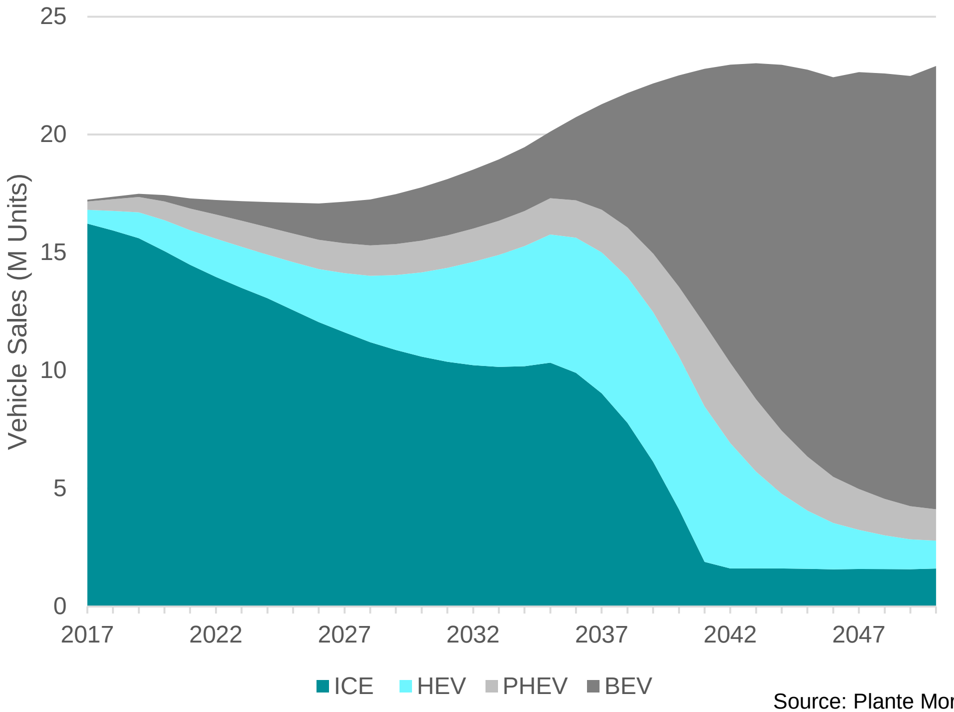
- Growth in miles traveled will be driven by autonomous vehicles capturing competitive and untouched markets
- Vehicle parc decreases over time due to the increased utilization and efficiency of shared autonomous vehicles
- Introduction of autonomy increases annual sales and shifts customer base from private ownership to shared ownership



Electrified Vehicle Projections – U.S.
Adoption will Accelerate

Mix of electrified powertrains steadily replace internal combustion engines over the next 20 years until cost, regulations and technology advances drive the rapid adoption of battery electric vehicles

U.S. EV Model Sales Projections



Source: Plante Moran

EV Model Characteristics

Model Inputs	Factors
Market Dynamics	• Lower fuel and electricity cost • Improving electric infrastructure • EVs available in most vehicle segments
Government Regulations	• CAFE requirements • Government incentives for infrastructure and EV purchases • 11 States adopting Zero Emissions vehicle standards
Technology Advances	• Electrification cost becomes comparable to ICE over time • ICE cost grows due to fuel efficiency requirements
Customer Perception	• Social pressure to reduce emissions • Range anxiety declines with increase battery efficiency and reduced costs

Note: Hydrogen fuel cell propulsion technologies did not have significant volume in projections, due to uncertain infrastructure for fueling and product costs.

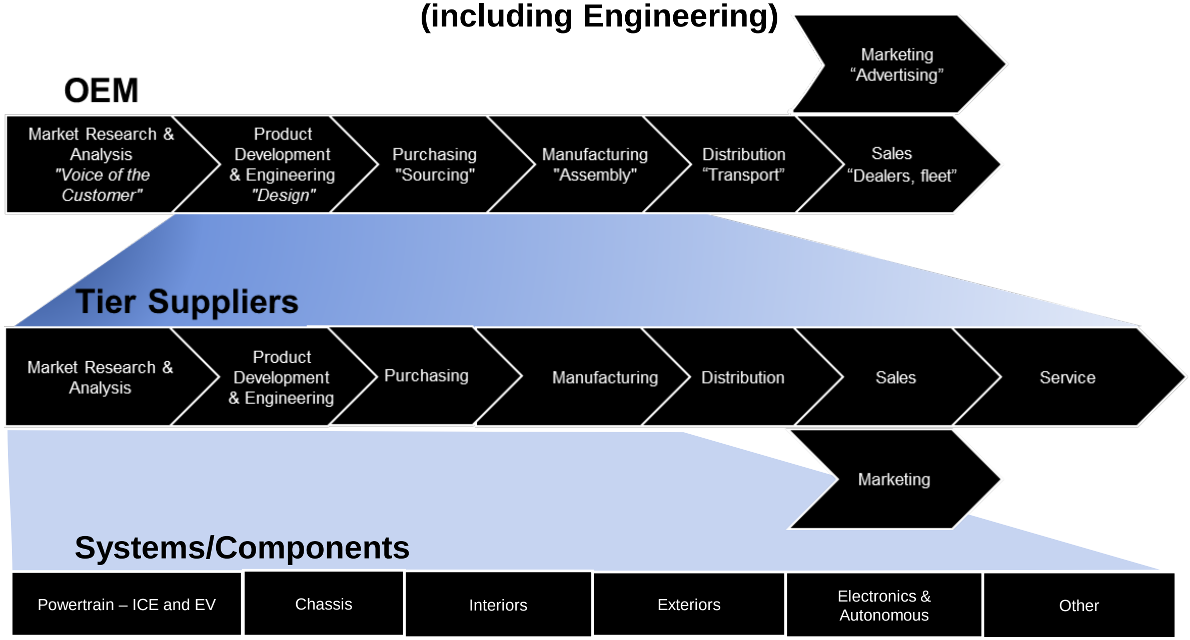
Automotive Manufacturing
Impact on the OEM/Supplier Relationship

	Now	Future
Business Model	Vehicles produced	Miles driven
Customers	Private owners	"MaaS" fleet operators
Value Proposition to Customer	Differentiated, personalized products,	Commodity product, convenience, availability
Product Design	18+ platforms requiring major redesign 7-8 year development cycle	Skateboard platform requiring refresh design 2-3 year development cycle
Research Development & Engineering	OEM internal R&D – duplicative, costly, viewed as a market differentiator	OEMs outsource R&D to proven, capable suppliers
Manufacturing	Manufacturing is core competency and OEMs control end-to-end process	OEMs focus on mobility and customer experience. Will need to partner or outsource vehicle manufacturing

Future Mobility Industry Value Chain

Manufacturing, MaaS, Mobility Operations and Energy Management will be required to enable the future mobility industry, as well as to be tightly integrated

Vehicle Manufacturing (including Engineering)



Key Vehicle Manufacturing Characteristics

- Utilitarian styled vehicles
- Common platform architectures
- Modular design for component replacement
- High volume production for cost efficiencies
- Electrified powertrains
- Autonomous capability
- Connected technology

MaaS and Mobility Operations

Ownership & Financing

Vehicle Owners
- Fleets
- Private
- Fractional

Financing
- Loans
- Leases
- Subscription
- Pay per mile

Insurance
- Personal
- Vehicle
- Ride

Mobility Services Provider
- Pay per ride/sharing
- Freight/package service
- Specialized mobility services
- Mobility technology broker/interface

Connectivity
- V2V communications
- Telecommunications access
- Vehicle data – OTA updates, monitoring
- In-vehicle infotainment services

Mobility Operations Services
- Vehicle maintenance and repair
- Vehicle staging – cleaning, charging, storage
- Vehicle roadside assistance
- Passenger biometrics support

Mobility Infrastructure
- Parking location, availability, price
- Traffic flow, route optimization
- Vehicle to infrastructure (SmartCity)