Motor Vehicle Industry Updates & Future Technology Trends

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Let’s Talk Advanced Technologies -

- Industry & Market Trends
- Advanced Manufacturing
- Materials & Safety
- Autonomy & Cyber Security
- Service & Repairs
Industry & Market Trends - 2019 Through 2023
Light Duty Vehicle Sales, 1970-2018

17.8 Million Units
Global Vehicle Product Updates - General Motors Company

GM will cease production of:
- Sedans - Cadillac CT6 & XTS, Chevrolet Cruze, Volt, Impala, HD Suburban & Buick LaCrosse

Close assembly/manufacturing plants in:
- Hamtramck (Detroit) & Warren, Michigan
- Lordstown, Ohio & Baltimore, Maryland
- Oshawa, Ontario-Canada
- Layoffs expected to exceed 14,000 in North America

Build the new Chevrolet Blazer SUV in Mexico

Build new EV models in Lake Orion, Michigan
Global Vehicle Product Updates - The Ford Motor Company

- Focus models are now assembled in China
- Cancelled Taurus sedan & Police Interceptor large sedan
- Fusion sedan to be discontinued in 2 years
- Build the new Ranger pickup truck & Bronco SUV in Dearborn, Michigan
- Curtail production in:
  - Europe & South America
  - Cease all vehicle manufacturing in The Russian Federation
- Announced a joint venture with Volkswagen AG to build trucks for sale in Europe
- Forecast of 13,000 + Jobs to be eliminated globally
Global Vehicle Product Updates - (FCA) Fiat - Chrysler Automobiles

● New JEEP assembly plant to be built in Detroit, Michigan

● Expanded JEEP production capacity at Toledo, Ohio

● Product Brands:
  ○ RAM Truck brand GOLD
  ○ JEEP brand is PLATINUM
  ○ Dodge brand in Decline
  ○ Chrysler brand in Decline

● Rumors of merger/acquisition with or by Renault/Nissan or PSA (France)

● Fiat Automobiles, S.a.P
  ○ Manufacturing in decline in Europe
  ○ Poor sales in North America
  ○ Alfa Romeo still struggling in North America

● Sold Magneti Marelli Division in 2018 for $7.1 Billion
Trade, Labor & Tariff Impacts

USA Made Content is an Issue

30% Content of this 2019 Ford Fusion is US/Canadian Content

60% Content is from Mexico
Trade, Tariff and USA/North American Vehicle Content Potential Impacts

A study by Experian said that a 25% tariff on imported cars and parts will raise the price of the 20 best-selling vehicles in the United States an average of $3,300 to $5,100, even though most of those vehicles are assembled at US factories.

General Motors (GM) has warned that tariffs would lead to higher prices for its cars, reduced sales and job cuts at US plants.

Toyota (TM) has warned that a Camry, the most popular sedan sold in America which is built in Georgetown, Kentucky, would cost $1,800 more to build, while the Tundra pickup built in San Antonio would cost $2,800 more.
Updates: Light Duty Vehicles

● Elimination of spare tires in most SIN 7-8-9-10 sedans by 2020
  ○ Replaced with run-flat tires with safe driving range up to 250 miles, or;
  ○ Inflator kits will become standard equipment in sedans
  ○ No OEM accessory compact spare will be available for sedans - aftermarket may provide that solution

● Elimination of CD Player
  ○ Replaced with FM-HD radio with Bluetooth, WiFi, Android, Apple & USB connectivity in all vehicles
Updates: Light Duty Vehicles

- Semi Autonomous technologies becoming standard equipment on all vehicle classes including trucks
- Elimination of keys & a move to wireless FOBs & keyless entry & RFID identifiers with exception of law enforcement vehicles
  - Push button ignition on/off switches
  - Coded anti-theft systems are becoming standard equipment
  - “Smart Key Fobs” will be replaced by your Smartphone, or;
  - Fingerprint access to vehicles - Hyundai will be first in 2019/20 models with this option
Updates: Light Duty Vehicles

● V8 engines will be limited to HD pickup trucks & full size vans - AND then be limited to commercial trucks

● Turbocharging & supercharging of 4 & 6 cylinder engines will be commonplace

● Diesel engines widely integrated into all truck lines

● Start/Stop, BEVs & PHEVs will be expanded into all vehicle lines

● 48-Volt electrical systems in hybrids & LEO vehicles

● Lightweight body construction – UniBody construction with greater utilization of high strength materials
Updates: Ambulance & Special Needs Vehicles

- Ambulance prices are expected to rise sharply beginning in FY 2020 thru FY 2025. This is due to:
  - Lack of competition in North America
  - Regulatory changes in construction, crash & operator safety
  - Industry can sell all it can produce to private sector to NGOs & nonprofits
  - Only 2 suppliers will sell to GSA; Federal sales are incremental revenue to suppliers
Updates: Ambulance & Special Needs Vehicles

To offset this market change, GSA plans to continue to develop:

● Relevant standard ambulance chassis & equipment packages
● Continue to consolidate all purchase requirements for price leverage
● Encourage GSA customers to participate in harmonizing common equipment packages & chassis designs for FY 2020 thru FY 2025
● Phase out some ambulance models
● Create a medical transport model - lower cost
Updates: Shuttle & Transport Buses

- Few North American supplies remain - China, Brazil & EU companies dominate global market
- China will dominate market by 2030
- Autonomous buses are <10 years away - Extensive regulations expected
- Diesel, Gasoline & CNG Fuels will continue to be relevant
- Slow Market Gains for Electric Buses & Battery Hybrid due to Cost
- This is the last “Old School” vehicle industry - assembly, quality & aftermarket service is lagging 20+years behind other vehicle manufacturers
- This is a finite market of less than 55,000 units annually in North America
Updates: Shuttle & Transport Buses

● Incremental costs for electric should be at diesel parity by 2022-2024 with driving ranges exceeding 200+ miles with rapid charging

● 20 year rated body/chassis will be industry “Gold” standard

● Warranty & post warranty service/parts will be common at OEM dealers

● Safety Compliance is a significant cost driver
  ○ New regs for seats, restraints, pedestrian detection & construction will challenge domestic supply base
  ○ Will be significant cost drivers
Updates: Medium/Heavy Duty Trucks

● Industry consolidations are limiting competition but benefit is significantly improved quality

● China & India will dominate the Global market by 2025
  ○ North America & European manufacturers struggle to remain competitive

● *Expect more optional equipment (chassis/cab & drivetrain) optional equipment to become standard*

● Expect price escalation due to new fuel economy & emission standards

● Expect more fuel management/idle technology

● Expect more BEV & Gasoline Hybrid (electric assist) trucks

● OEMs are exiting the Federal market space & supporting independent dealer/reseller sales to GSA
Some Technology Trends........
Advanced Manufacturing
Technology Trends
Advanced Materials & Safety Engineering

- ADAS – Advanced Driver Assist Systems
- Advanced Materials Engineering & Design for Crashworthiness = Reduced Injuries & Survivability
- *Super Material* - Graphene
Technology Trends

Vehicle Service Issues
Challenges with New Body Structure and Safety Technologies for GSA Fleet

● Aftermarket equipment installations can create unacceptable “loads” to vehicle electrical & ride control systems

● Sensor Units require calibration due to drift from collisions as sensors are “moulded” into the fascia and wheel side trims

● Windshield & Backlite replacement glass from aftermarket sources can be substandard - this can “confuse” active braking & other safety systems

● Tire to Wheel - Tire to GVWR is more critical than ever - especially for ATV & off road to highway applications
Challenges with Servicing New Body Structure and Safety Technologies

● MCC’s will need to develop business relationship with OEM approved repair facilities for EV’s Hybrid & Fuel Cell vehicles

● Collision Repairs - Not every shop can perform - and can be typically 250% more expensive. AMC’s will need skilled repair centers
Technology Trends........
Autonomy & (AI) Artificial Intelligence (10 Years to Go Yet)
A study of 1,250 Consumers, most stated some level of reluctance for full autonomy

68%  Uncomfortable riding in fully autonomous vehicle

39%  Uncomfortable in vehicle driven by stranger

16%  Comfortable with AV driving without option to drive themselves

84%  *Always want the option to drive themselves*
In 2016, a study asked 1,250 consumers whether they would buy a Level 5 vehicle -- vehicles without a steering wheel or pedals, and one that can’t be driven by humans.

30% Would never buy a Level 5 vehicle
In 2018, a study asked 1,250 consumers whether they would buy a Level 5 vehicle -- vehicles without a steering wheel or pedals, and one that can’t be driven by humans.

49%  Would never buy a Level 5 vehicle
Coming Soon

- Near Term Applications for Level 4 & 5 Autonomous Vehicles
- Advanced Automotive Digital Vision Systems with 3D Mapping - Reducing Traffic Congestion - (AI at Work)
- Vehicle Cyber Security
Final Thoughts & Considerations
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• Continue to purchase commercially available products only as technology is rapidly developing & changing

• Be a market “Fast Follower” & lead where appropriate with these advanced technologies

• Continue with “Fuel Agnostic “practice to fleet diversification

• LPTA & “Lowest Price as Equipped” strategy model may need to be revisited

• Target technologies with agency customers willing to pilot
Final Thoughts & Considerations

• Increases in incremental funding is critical for wide scale implementation

• Forge strong relationships with Industry, NHTSA, DOE & other Governmental agencies to leverage intellectual resources

"Everything that can be invented has been invented." .... Charles H. Duell - Commissioner of US patent office in 1899.