

The Black Box Institute

Global Automotive
Megatrends



Key Trends for the Global Automotive Industry

1



Connected Car
Technologies

2



Shifting Mobility
Needs

3



Efficiency

4



Powertrain Innovation

5

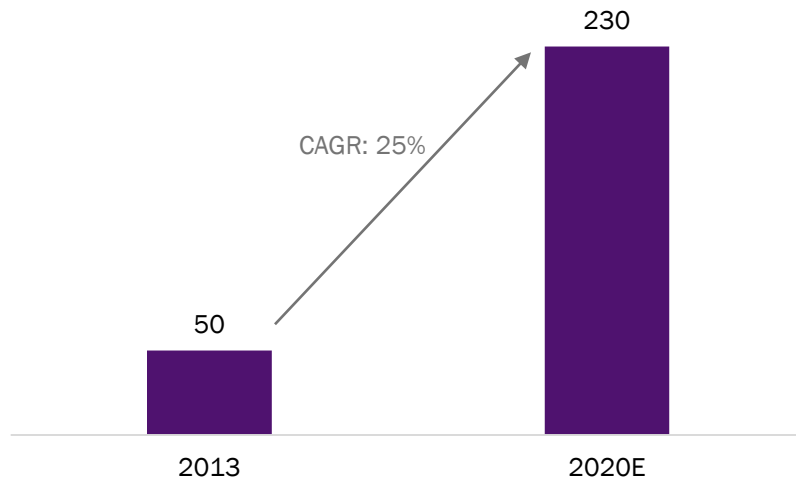


Safety



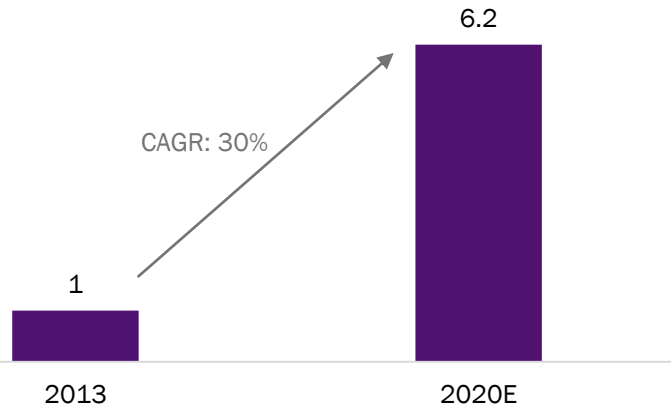
Trend #1: Connected Car Technologies

Global Connected Car Parc (M units)

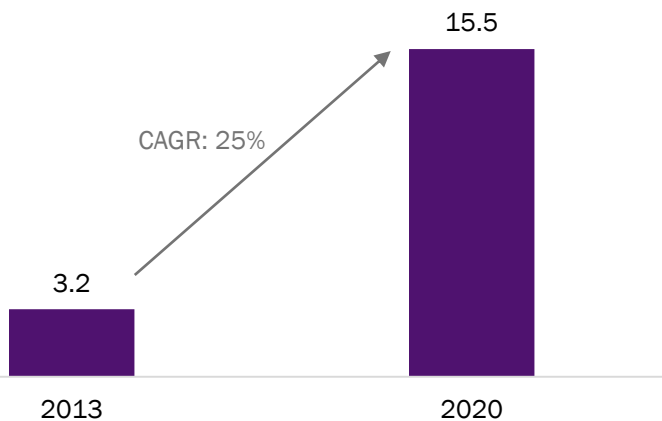


- Cars are getting smarter, just as phones have:
 - Cars are being equipped with danger-warning applications, traffic information services, a host of infotainment features and increasingly active safety features
 - The number of networked cars will rise 25% per year for the next several years; by 2020, one in five cars will be connected to the Internet
- Cars already have more lines of code than aircrafts and operating systems like Windows 8 or Apple Tiger
 - Services delivered through cars include:
 - Internet radio
 - Smartphone capabilities
 - Information/entertainment services
 - Driver-assistance apps
 - Tourism information
 - Navigation
 - Telematics

Global Car-sharing Market (\$B)



Global Ride Sharing, Bike Sharing And Shared Parking Markets (\$B)



- “Mobility as a Service” – usage is replacing ownership, particularly in urban areas
 - The entire transport business is emerging as a co-operative, interconnected ecosystem
 - The boundaries between different transport modes are being blurred
 - The ecosystem consists of transportation infrastructure, services, information and payment services
- New players will take the lead in the mobility market
 - Non-automotive companies are providing services, such as car-sharing, mobility integration, usage-based insurance and advanced car infotainment

Advanced Materials

Advanced materials increase fuel efficiency by reducing vehicle weight. These lightweight materials include:

- Aluminum frames
- High strength steel
- Carbon fiber
- Carbon nanotubes
- Composite magnesium-aluminium alloys

Design

Interior and exterior design improvements enhance a vehicle's energy efficiency. Some design improvements include:

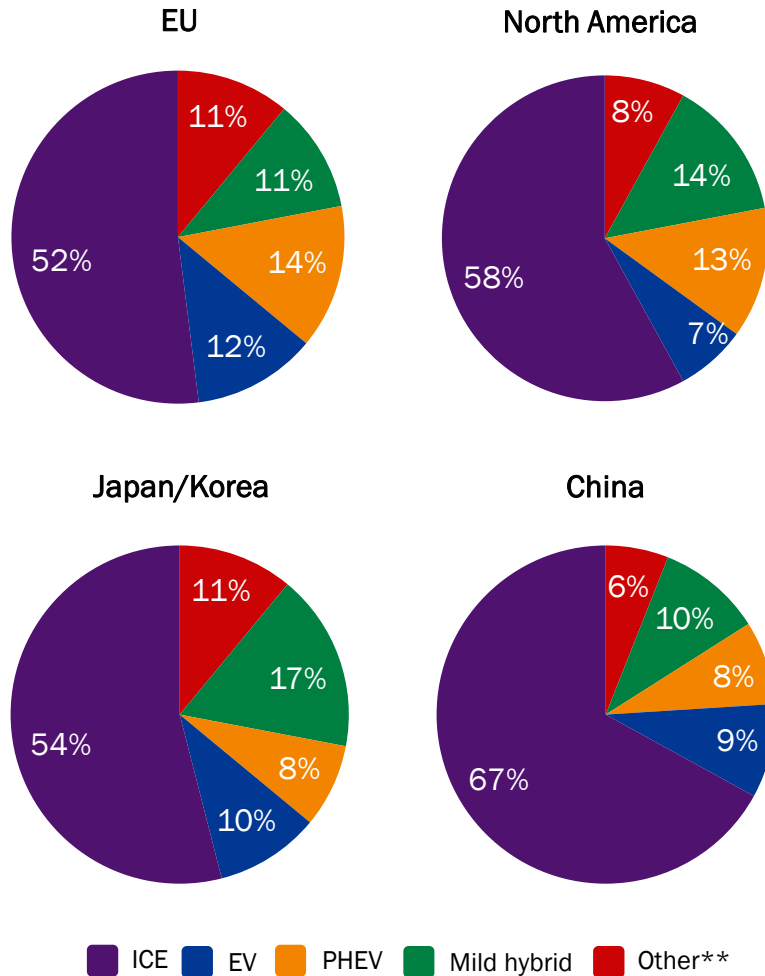
- Improved aerodynamics
- Innovative urban vehicle design concepts (e.g. personal rapid transport vehicles)
- Engine downsizing (internal combustion engine optimization)

Manufacturing

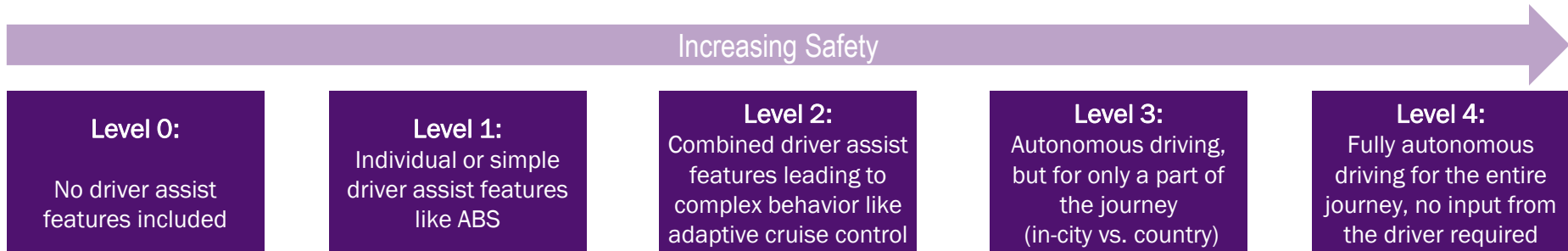
Advanced manufacturing techniques improve products and process in the automotive industry. Some of these techniques include:

- Rapid prototyping with 3D printing
- Platform sharing
- Modular manufacturing
- Robotics
- Usage of “big data” for demand planning

Share of powertrain technologies in 2025



- In the near future, automakers will need to be offering a wider range of drivetrain technologies
- This will be necessary to serve different usage patterns arising from changes in mobility behavior, as well as new regulations
- Alternate zero-emission and fuel efficient powertrains include:
 - Mild hybrids
 - Plug-in hybrids (PHEV)
 - EVs
 - Alternative fuels (CNG, LPG)
 - Biofuels (Ethanol)
 - Fuel cells
- Share of powertrain technologies will differ from one region to another



- Level 3 autonomous cars are expected to be in production within the next five to seven years
- Level 4 “fully autonomous cars” may be the product that achieves the ultimate zero-fatalities objective
- Rather than a sudden jump to full autonomy, we should expect a gradual emergence of advanced safety and emergency response capabilities for vehicles. These are:
 - Emergency braking and steering
 - Speed limit assist system
 - Pre-crash systems
 - Intelligent lights
 - Pedestrian detection
 - Blind spot detection
 - Adaptive cruise control
 - Automated crash reporting
 - Automated parking
 - Traffic sign recognition
 - Traffic jam assist
 - Night vision
 - Lane keeping



Automakers are organizing themselves to harness and direct fast-moving developments in powertrain, advanced materials, safety, connectivity and new types of mobility.



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