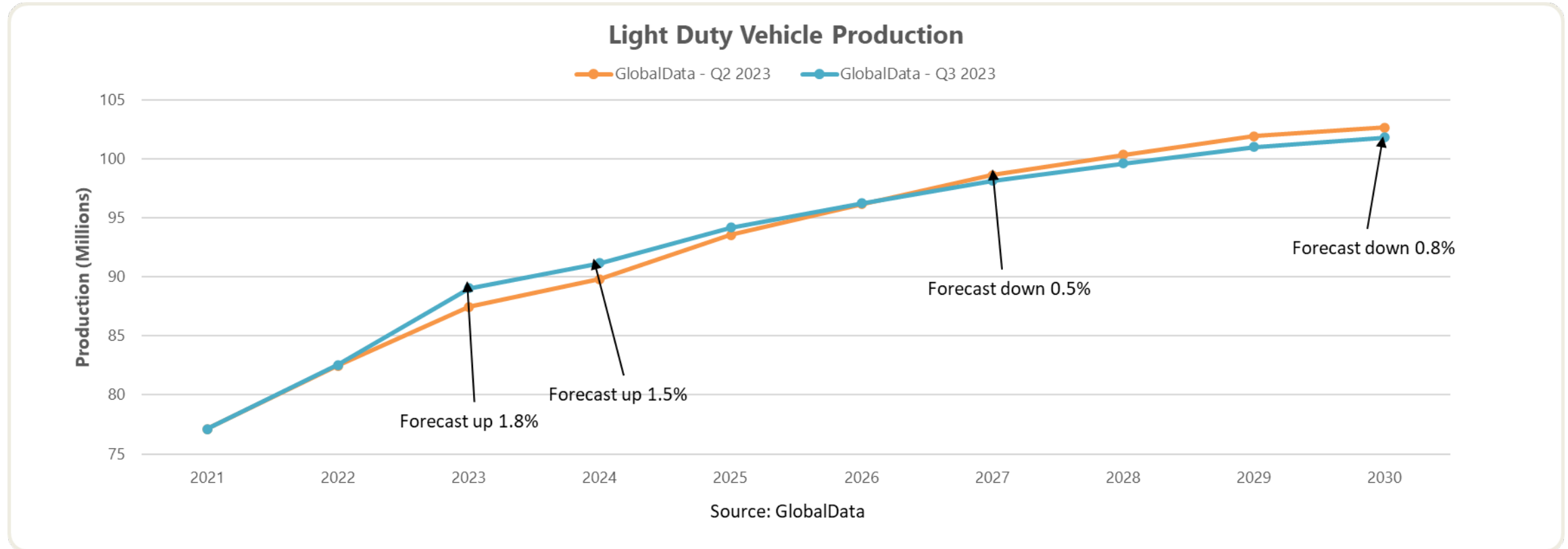


Automotive Market Update

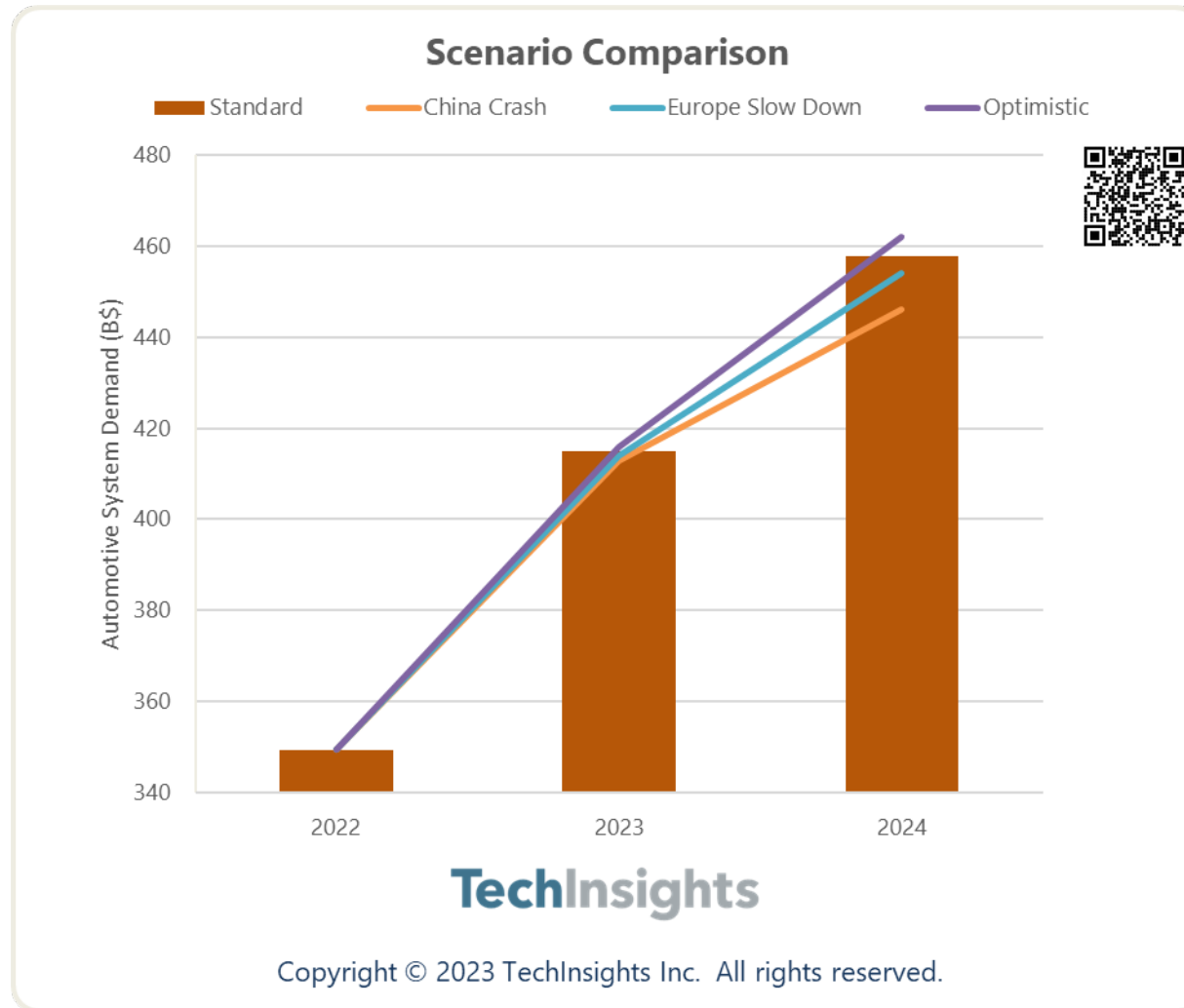


Latest Global Vehicle Production Forecast Update Shows Mixed Outlook



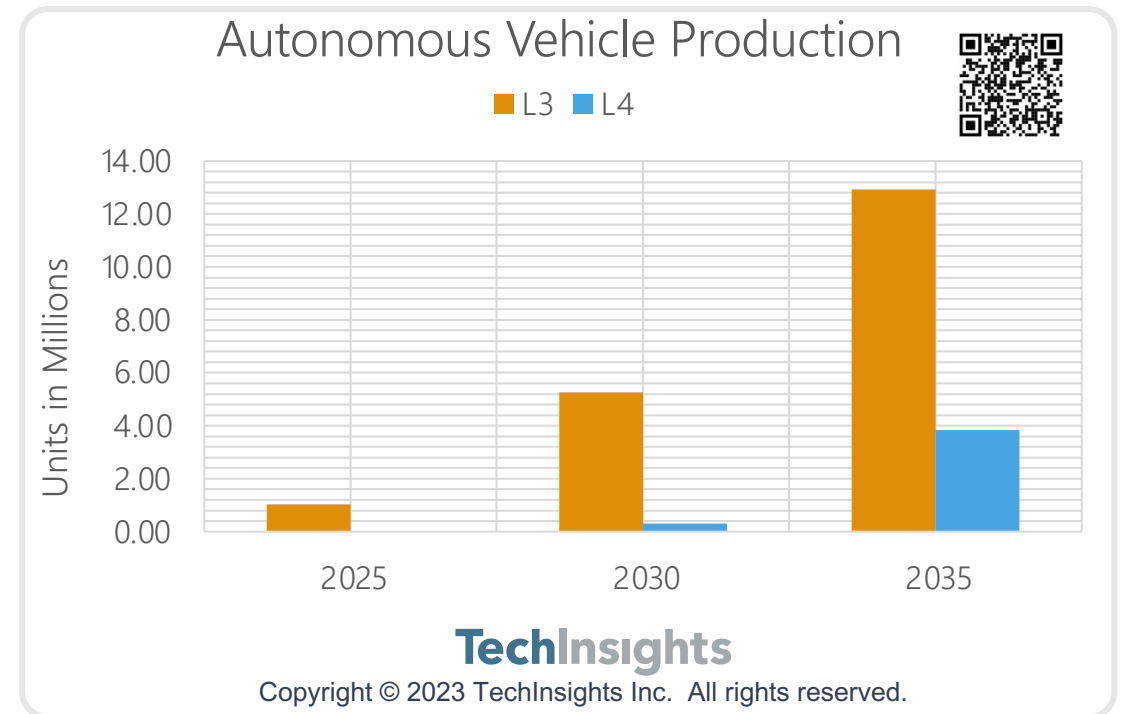
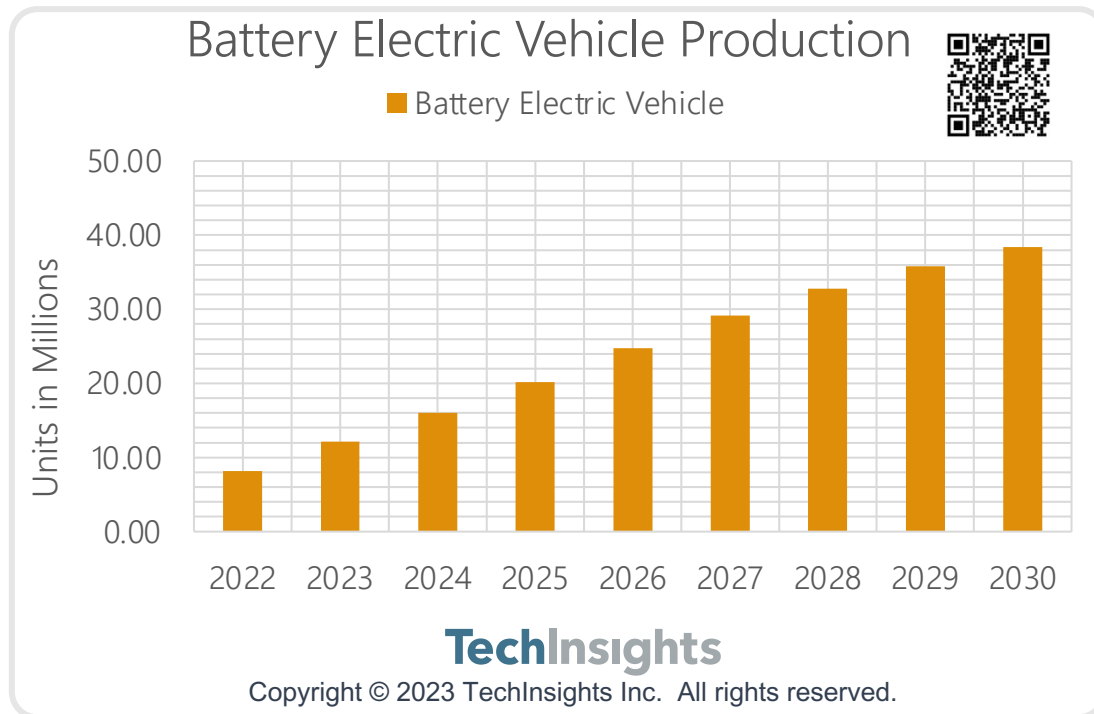
- The current outlook for the rest of 2023 is more optimistic compared to the previous forecast. Output in 2023 is expected at 89.0 MU, a 1.8% increase from the level that was expected in the previous forecast.
- Looking ahead, the gap between the two previous and current forecast then narrows. By 2026, they are essentially the same. From then onwards, the new forecast is a little lower, by under 1% each year. The current forecast expects global, annual vehicle production in 2030 to reach 101.8 MU.

Latest Production Forecast Update Shows Mixed Outlook



- **China Crash:** The debt crisis in China comes to a head, with growth in Q4 2023 curtailed and a fall in production in 2024. The impacts are felt elsewhere, especially in NA, Japan and Europe which export many cars to China. Total combined 2023/24 system market value in this scenario is \$859 billion, against \$873 billion in the standard scenario
- **Europe Slow Down:** With ongoing war in Ukraine, Europe's recovery falters, with production almost flat in 2024. There are small knock-on impacts elsewhere, especially Japan and Korea which export to Europe. Total combined 2023/24 system market value in this scenario is \$868 billion, against \$873 billion in the standard scenario
- **Optimistic:** Production is slightly higher than expected in all regions. Total combined 2023/24 system market value in this scenario is \$878 billion, against \$873 billion in the standard scenario, with increases in both 2023 and 2024.

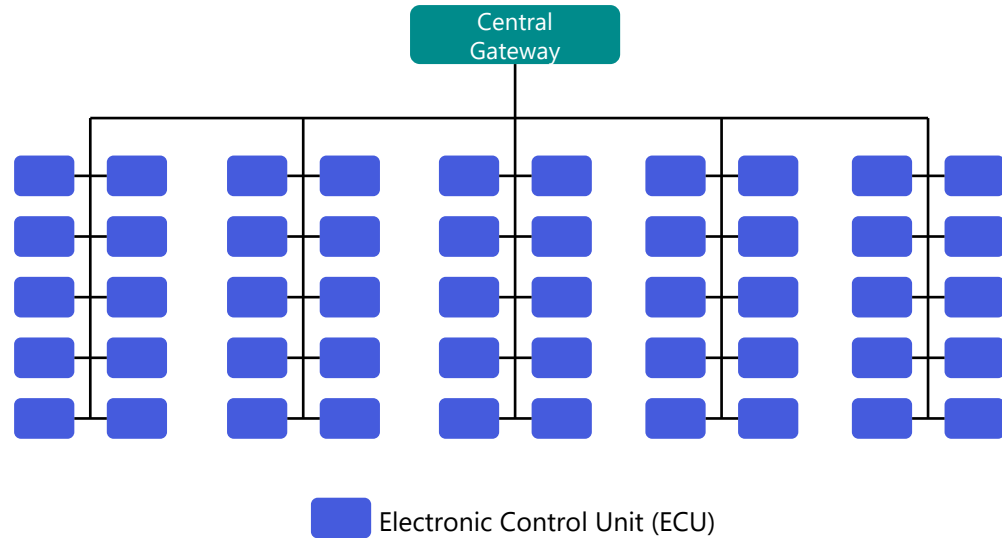
EV Rollout Moving Ahead, AV Market Moving Slowly



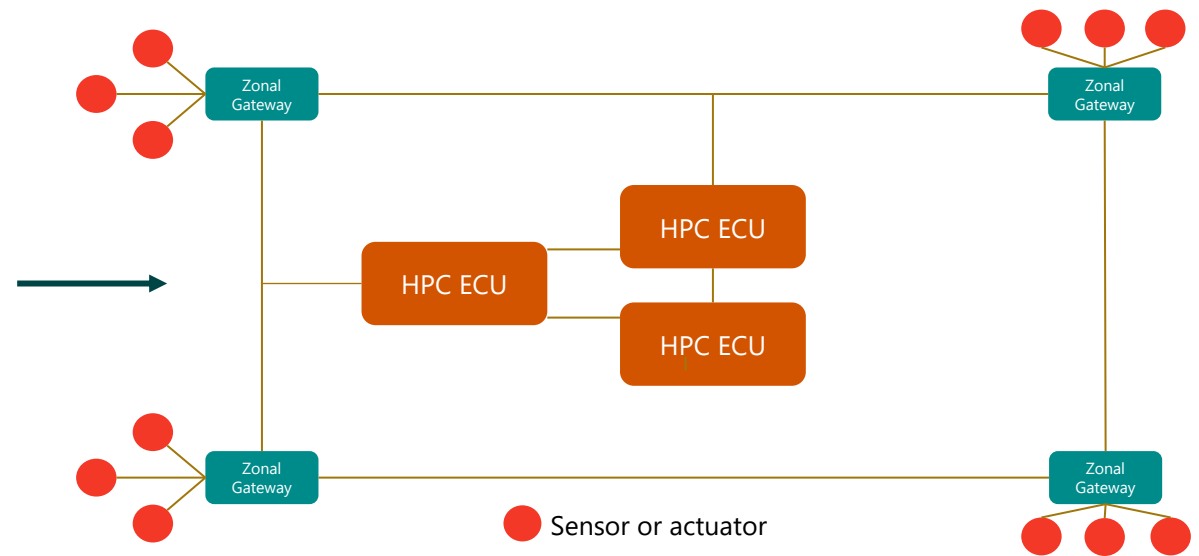
- **Battery Electric Vehicle Production:** Forecast to increase from 8.17 million units in 2022 to 38.35 million in 2030.
- **Autonomous Vehicle Production:** SAE Level 3 forecast to increase from 1.04 million units in 2025 to 12.93 million in 2035. SAE Level 4 forecast to increase from 0.3 million in 2030 to 3.83 million in 2035.
- In the U.S., the autonomous vehicle market is facing challenges with regulators looking closely at various autonomous vehicle service safety records.

Automotive E/E Architecture Consolidation

Distributed Architecture



Zonal Architecture



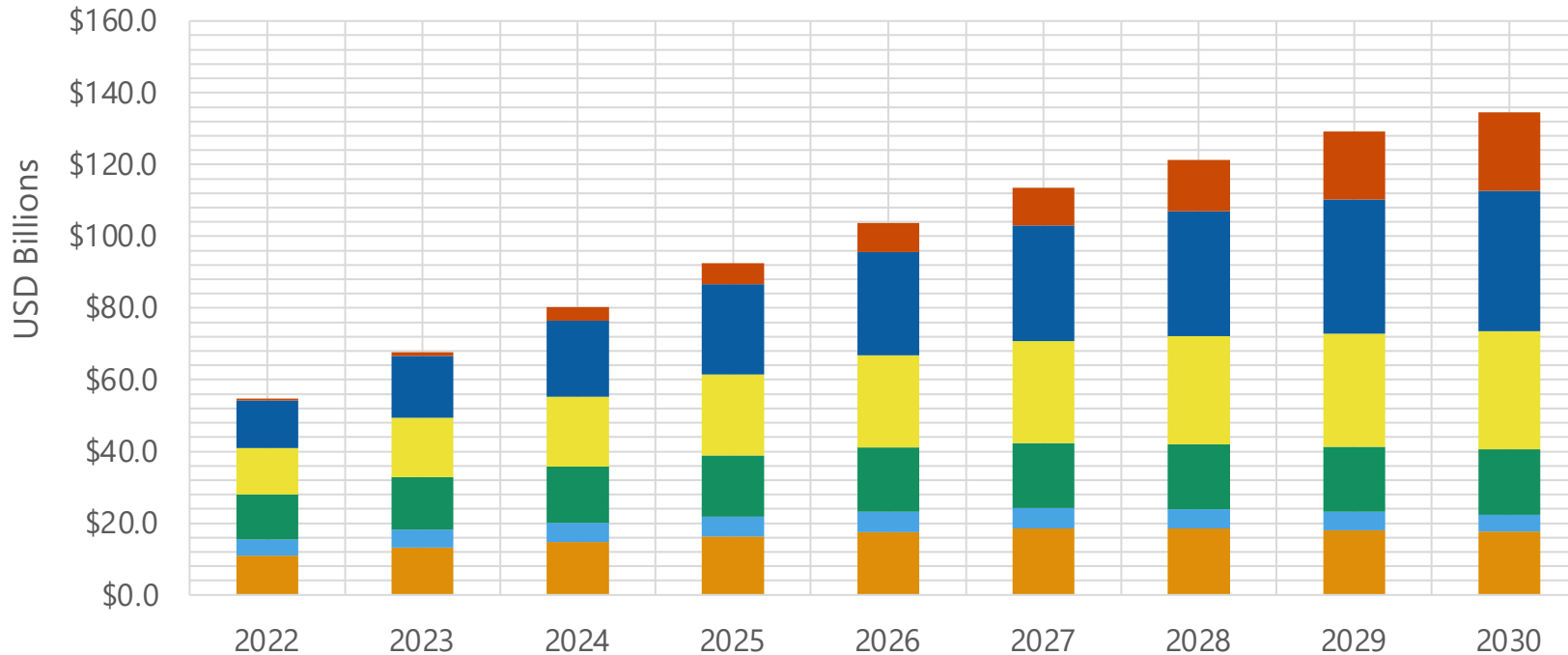
- Automakers and suppliers are adopting consolidated zonal E/E architectures that reduce the need for dozens of single-function electronic control units (ECUs).
- These new "zonal" architectures consist of a small number of powerful, multi-function ECUs (called **vehicle servers, central controllers, or high-performance compute, i.e., HPC, ECUs**) that are connected to **zonal gateway ECUs** that move data over the in-vehicle network(s).
- Vehicle servers/HPC ECUs combine the functions several discrete ECUs, thereby eliminating the need for many single-function ECUs.
- OEMs can use different network topologies (ring, star, tree) and may mix HPC and other ECU types in a hybrid zonal architecture.
- Some Tier 1 suppliers are designing "server blades," where each ECU sits in a rack in the vehicle.

Automotive Semiconductor Demand

Global Automotive Semiconductor Revenue by Domain



Body Chassis Driver Info Powertrain Safety Zonal



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Global Market: From \$54.7 billion in 2022 to \$134.5 billion in 2030

Body: From \$10.9 billion in 2022 to \$17.6 billion in 2030

Chassis: From \$4.5 billion in 2022 to \$4.8 billion in 2030

Driver Info: From \$12.7 billion in 2022 to \$18.1 billion in 2030

Powertrain: From \$13.0 billion in 2022 to \$33.0 billion in 2030

Safety: From \$13.2 billion in 2022 to \$39.2 billion in 2030

Zonal Controllers: From \$511 million in 2022 to \$21.8 billion in 2030

Note: Data applies to passenger vehicles and commercial vehicles up to Class 2 (pickup trucks, vans, etc.).

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