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3-5 JUNE 2025
MESSE BERLIN

A Hyve Event

S&P Global Mobility

Unlocking Value: Advancing Power Electronics Technology through the Value Chain Landscape

Claudio Vittori, Manager, S&P Global Mobility

Agenda

- S&P Global: research in automotive technology forecasting
- Power Electronics components demand and geographical dynamics
- Technology evolution outlook
- WBG semiconductors advantages and implications
- Conclusions

Our five divisions focus on distinct markets-and together, they deliver unmatched breadth and depth.

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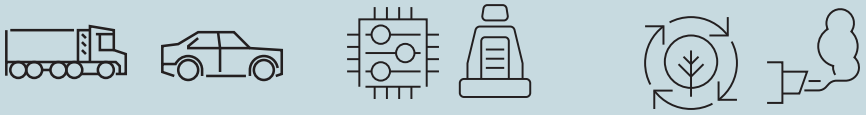
Commodity Insights

Across the value chain, we are organized into multiple product lines to focus on specific customer needs

Plan & Build

- Vehicle & Powertrain Forecasts
- Supply Chain & Technology
- Sustainable Mobility



What is the future demand for vehicles, components and powertrains? Which technologies are evolving and what are adoption rates? How will manufacturers achieve net zero?

Market & Sell

- Industry Performance International
- Network Development

What is the sales performance across markets and models? Where are the best locations for new showrooms or charging stations?

Vehicles In Use

- Parts Demand and Fitment (Aftermarket)

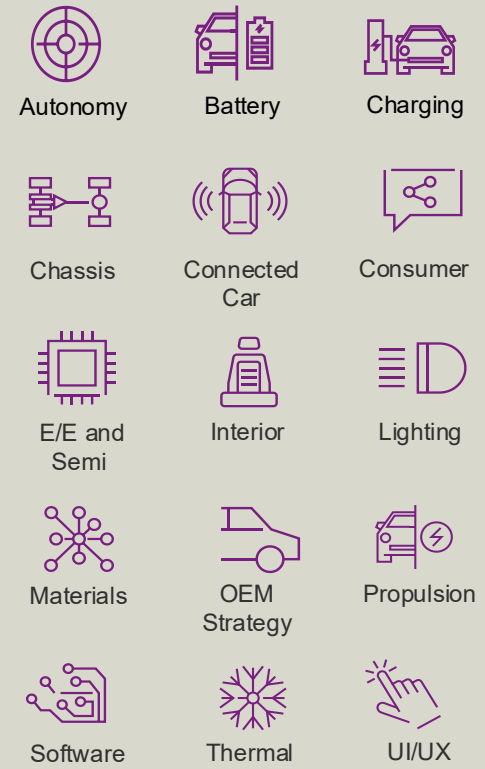
How many vehicles are on the road? Where is the demand for aftermarket parts?

Consulting

Component Forecast Analytics (CFA) - Data Structure

Light Vehicle Production*	VP: Region VP: Country/Territory VP: Manufacturing Group VP: Production Brand	VP: Production Nameplate VP: Platform, Program VP: Global Sales Segment VP: SOP, EOP
Engine*	E: Region E: Country/Territory E: Manufacturing Group E: Aspiration E: Fuel System	E: Fuel Type E: Model E: Propulsion System Design E: Platform, Program E: SOP, EOP
Transmission*	T: Region T: Country/Territory T: Manufacturer T: Design, Design 2	T: Design Parent, T: Platform, Program T: SOP, EOP
Electrical Propulsion*	EP: E-Motor Power EP: System Sub Design	AP: Battery Type AP: System Voltage

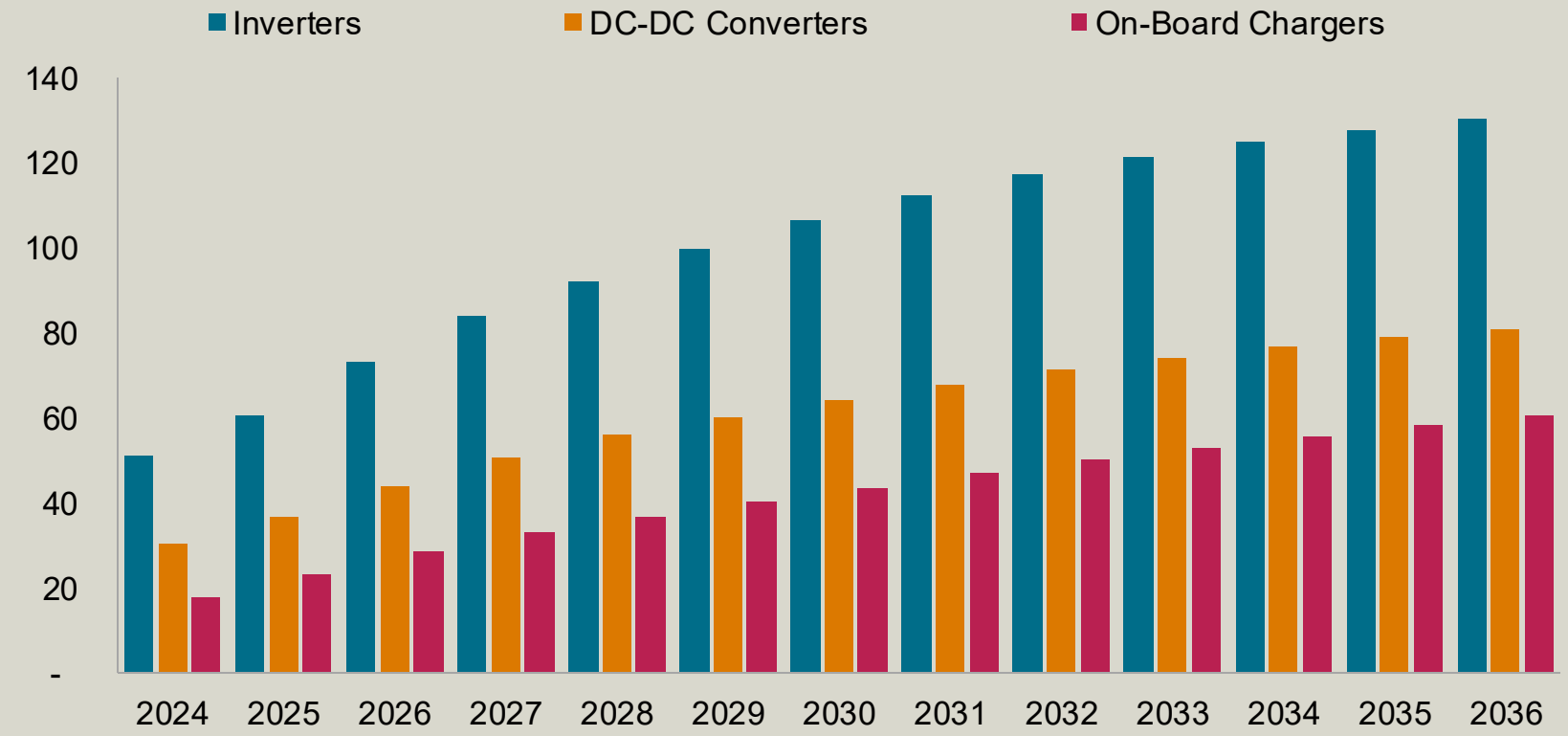
Production Component Forecast*



*The granularity of information (e.g., forecast range, technologies, regions) depends on the subscribed service

Global EV adoption Accelerating Demand for Power Electronics Components

Global Power Electronics Components demand



130M of inverter units by 2036

80M of DC-DC Converter units by 2036

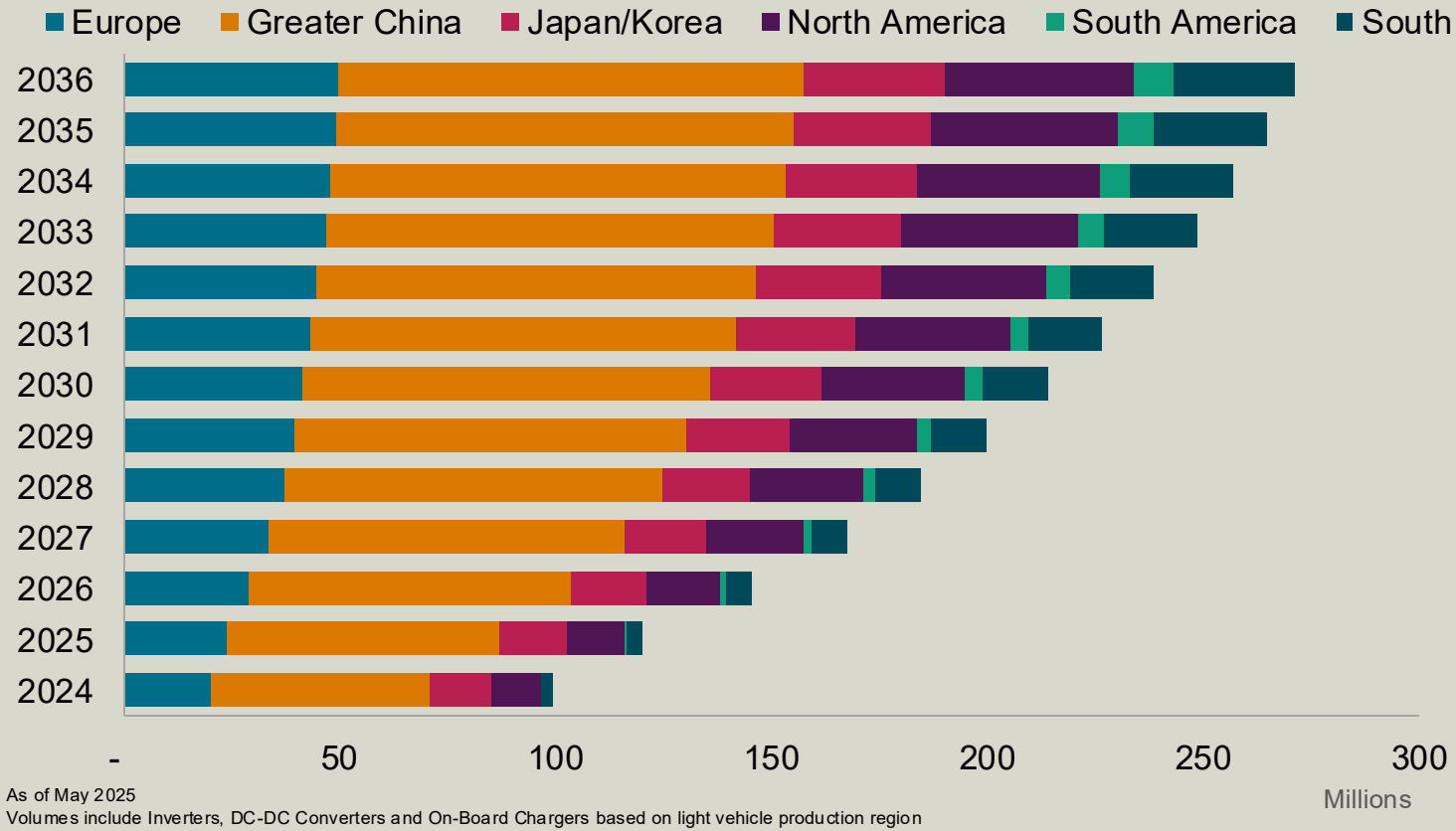
60M of On-Board Charger units by 2036

As of May 2025

Source: S&P Global Mobility, Supply Chain & Technology Team, Power Electronics Forecast].

Power Shifts: Regional Expansion of Power Electronics

Components demand by vehicle production region 2024 - 2036



As of May 2025
Volumes include Inverters, DC-DC Converters and On-Board Chargers based on light vehicle production region
Source: S&P Global Mobility, Supply Chain & Technology Team, Power Electronics Forecast].

2036

About 50M of P.E. components will be demanded in Europe representing 20% of the market

North America will contribute to **more than 15%** of the global demand with about 40M of units

APAC will account for **65%** of the total market with China representing almost half of this market with **abt. 100M of units**

China's Growing Dominion in EU Automotive Power Electronics Components Market

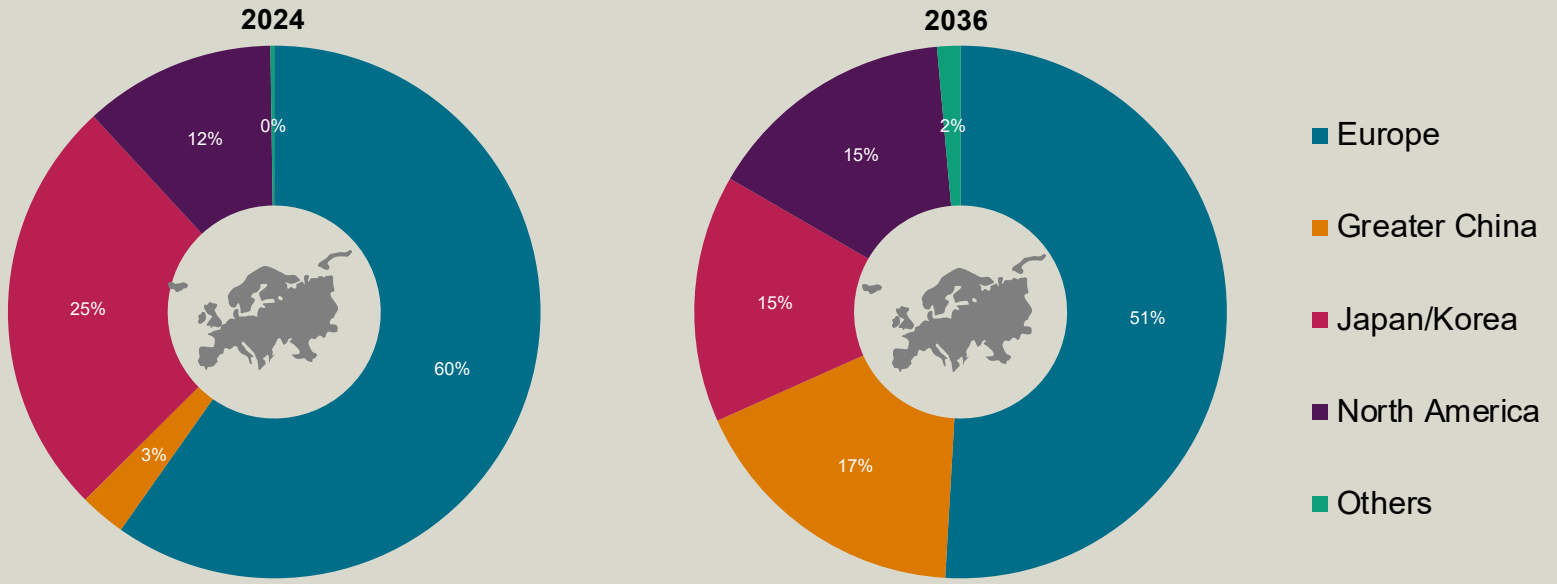
By 2036, Europe is expected to demand 50 million new power electronics components, an increase from approximately 20 million today

8.5 Million

Components supplied by Chinese origin suppliers in Europe in 2036 up from 1.5m in 2024

~ 25%

CAGR for power electronics components supplied by Chinese suppliers to European market from 2024~2036



Data compiled May'2025
Source: S&P Global Mobility. Supply Chain and Technology Team, Power Electronic Forecast

EU Footprint of Chinese PE Manufacturing

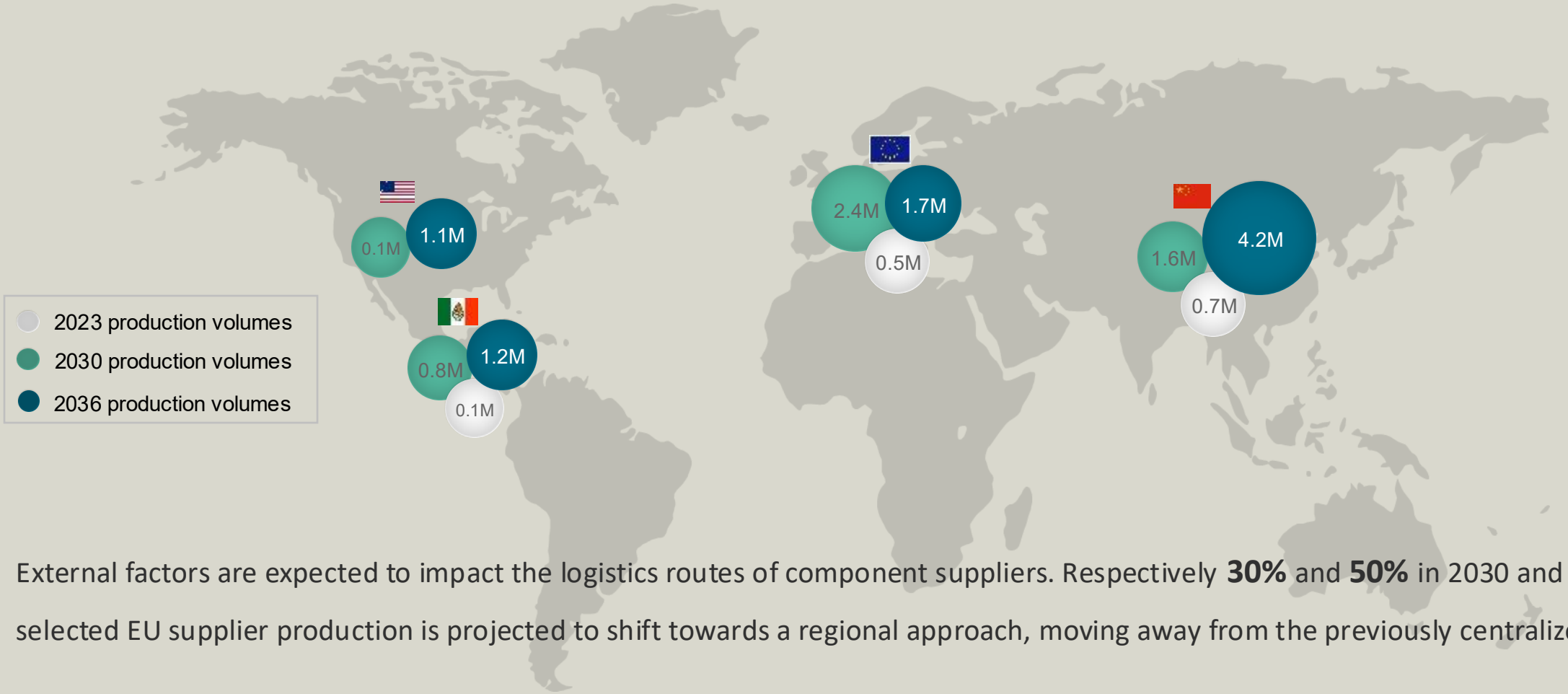
While the presence of Chinese suppliers in the global and European markets is expected to grow significantly in the coming years, a shift in production capacity is anticipated to remain quite limited for the time being

This trend is mainly correlated with the uncertainties in the industry and the limited increase in Chinese vehicles manufactured in the region compared to the sourcing strategy.

We expect the situation to evolve rapidly, considering that an initial stage of "localization" will primarily occur through strategic joint ventures with Western players (North American and European) over the next few years

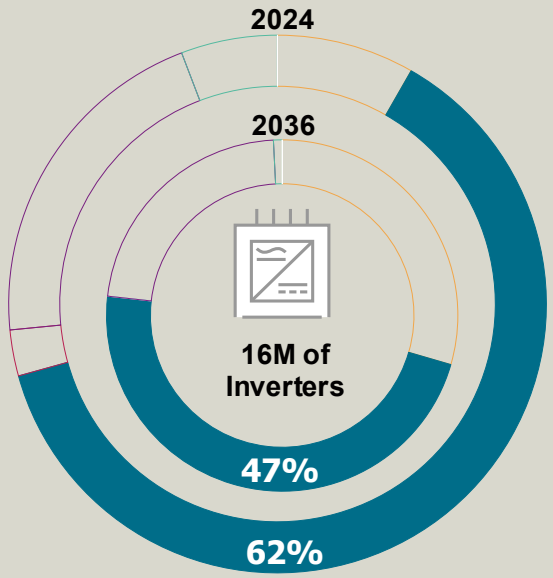
Data compiled May'2025
Source: S&P Global Mobility. Supply Chain and Technology Team, Power Electronic Forecast

Exploring how tariffs and geopolitical factors are reshaping the logistics routes for PE components in global market



External factors are expected to impact the logistics routes of component suppliers. Respectively **30%** and **50%** in 2030 and 2036 of selected EU supplier production is projected to shift towards a regional approach, moving away from the previously centralized model.

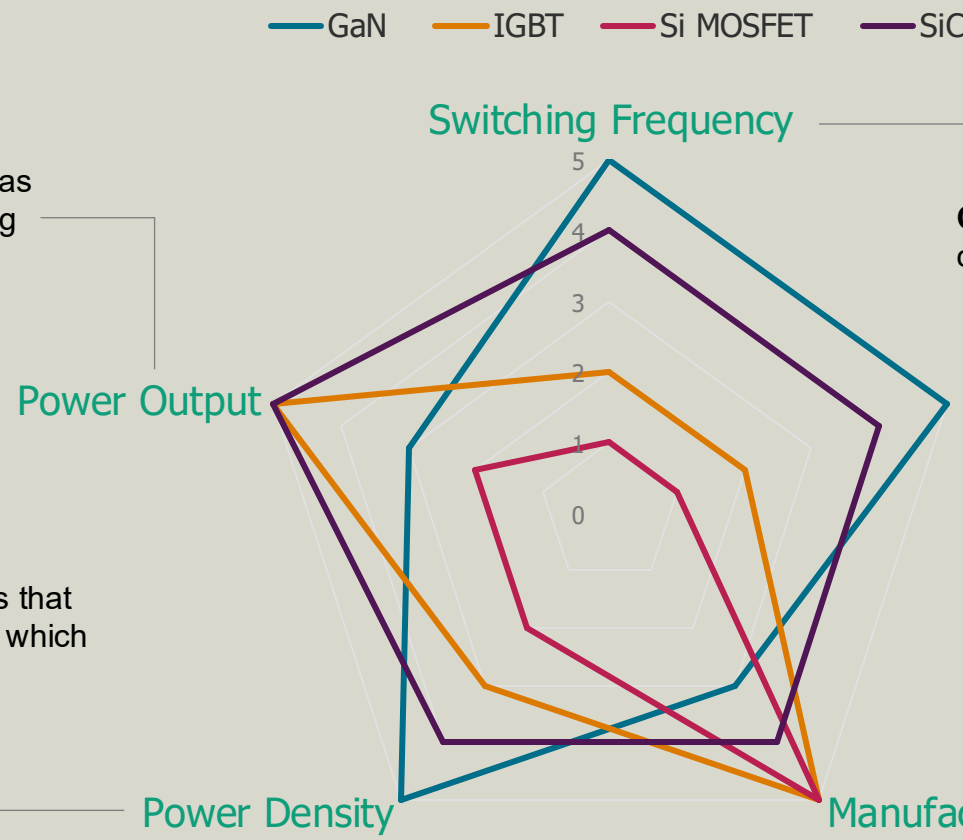
Inverter Components: The U.S. Market's Transformative Growth by 2036



Europe US Mexico Japan/Korea Mainland China Others

- By the **year 2036**, it is anticipated that approximately **16 million inverters** will be required in the **United States**, representing a significant increase from the current market of **about 4.8 million units**.
- The overall market is expected to grow approximately **four times by 2036**, with a **significant acceleration** anticipated **over the next 3-4 years,** resulting in a Compound Annual Growth Rate (CAGR) of more than **23%.**
- The production of the required inverters is expected to gradually shift towards more **localized manufacturing**. This transition is projected to increase the local production share from the current **47% to over 60% by the year 2036.**

WBG semiconductors: Flagbearers of the power electronics revolution



SiC devices, which offer voltage levels as high as 1,200V with high current-carrying capabilities, are suitable for high-power applications.

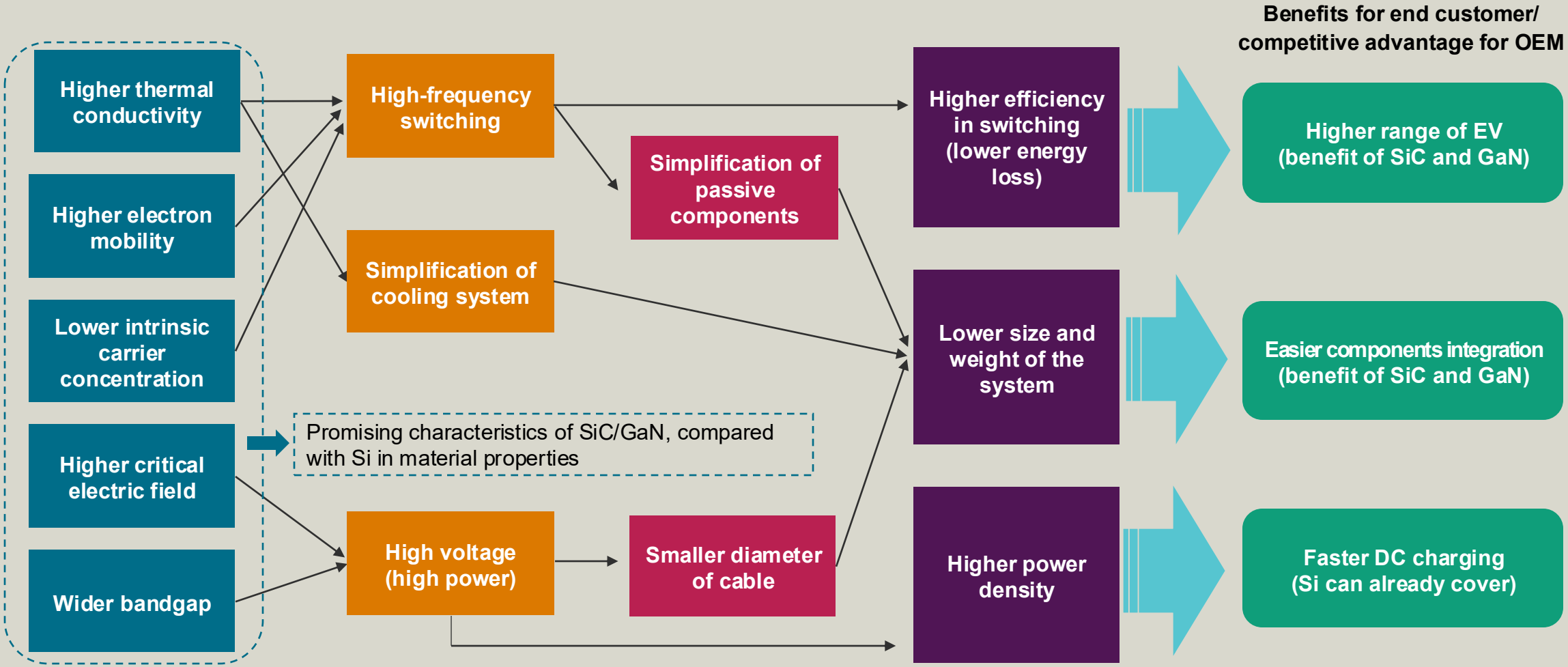
GaN's intrinsic properties allows for faster switching capability, and therefore overall better performance.

GaN and **SiC** have superior efficiency performance. GaN's performance is even higher at certain voltage architectures.

GaN has fundamental characteristics that make it a better fit for applications in which high-power density is critical.

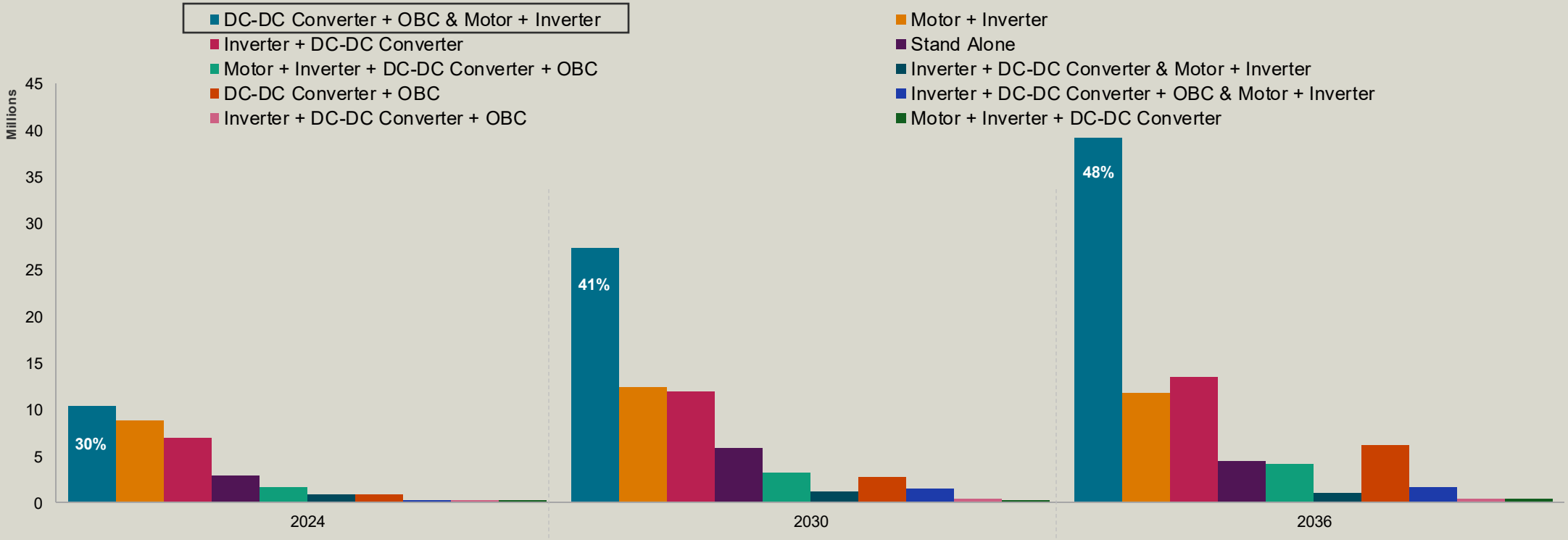
While **SiC** still requires complex manufacturing process, **GaN** still presents hurdles in certain applications.

Benefits of SiC/GaN for power electronics applications in xEVs



Power Electronics Integration Levels in the Modern xEVs

Power Electronics Integration level split

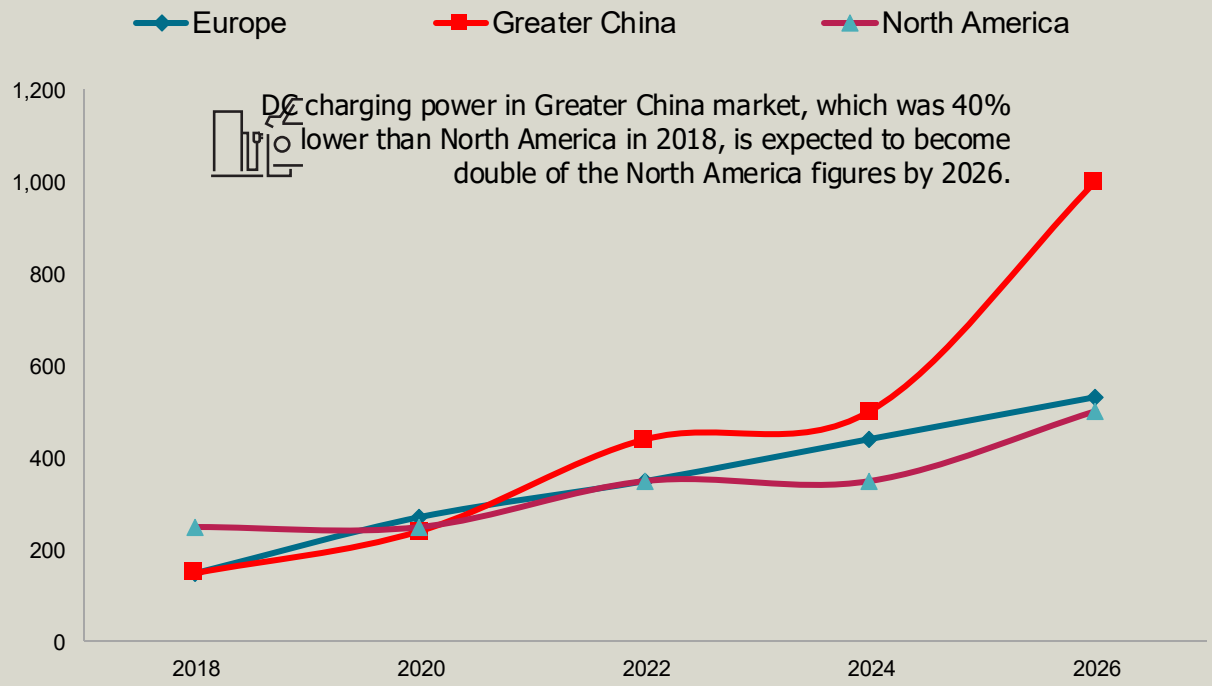


Data compiled May'25

Source: S&P Global MobilityPOwer Electronics Level 3

China’s EV charging journey: From humble beginnings to sheer dominance

Peak D.C Charging Power (kW)



Fast charging up to 1000 kW for HV platforms, twice the global benchmark.

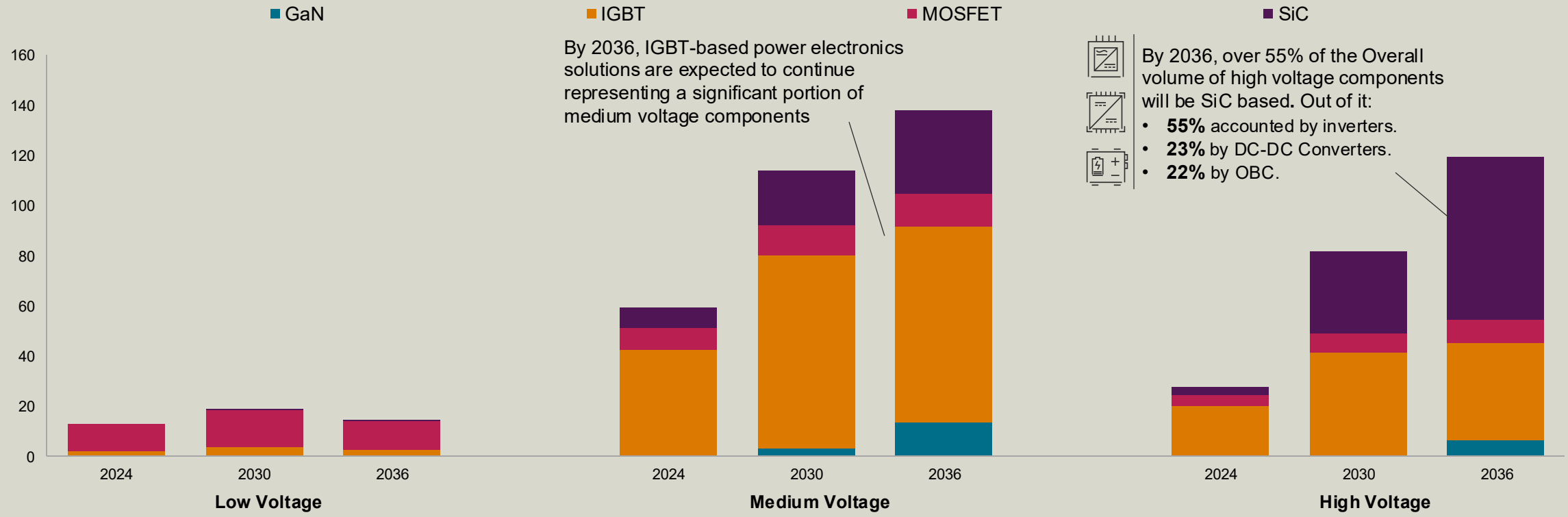
Charging in under 10 minutes, making EVs a direct rival to ICE vehicles in terms of refueling.

Goodbye, range anxiety: Over 500 km range, fully charged in just 5 minutes!

Note: Peak DC Charging capacity of the car (not to be confused with EVSE Fast charging capabilities). OEM Provenance Considered for regions
Data compiled Mar'2025
Source: S&P Global Mobility Power Electronic Level 3

Shift Towards High Voltage Platforms Fueling WBG Adoption

Power Electronics Market overview (Split by semiconductor type and voltage segment)



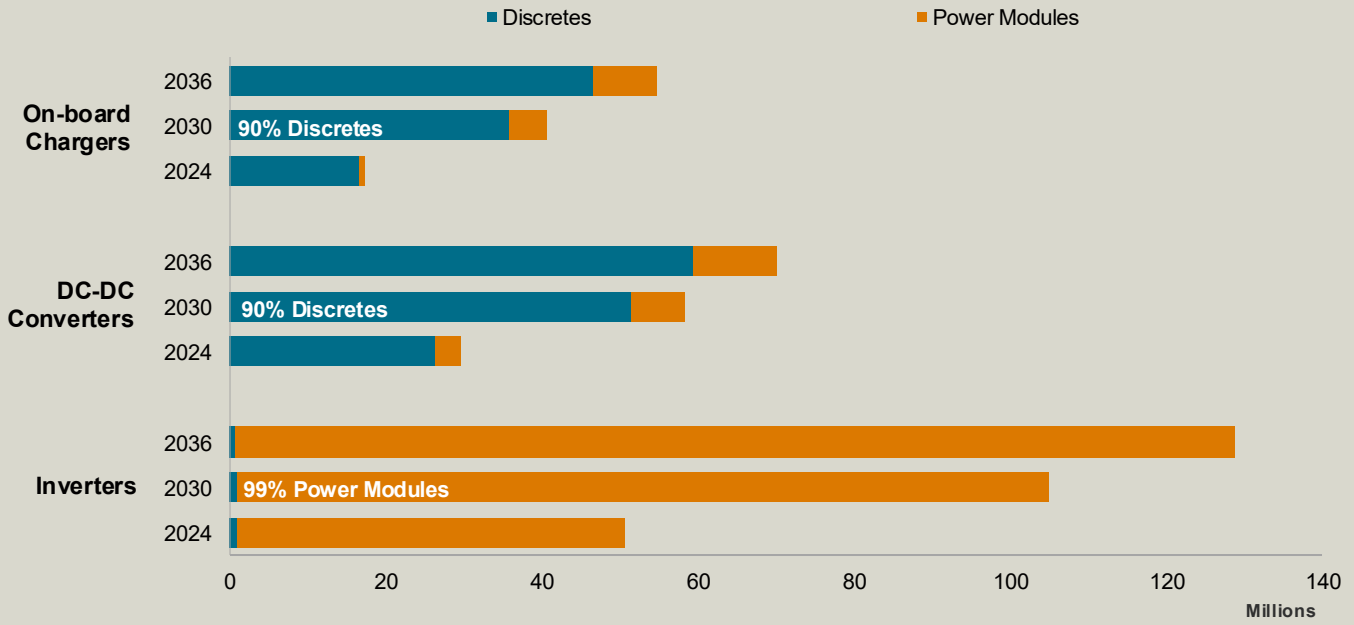
Note: Low Voltage= Below 72 (Excluding 72V), Medium Voltage= 72V~600V(including 72V); High Voltage= Above 600v (Including 600V)

Data compiled May25

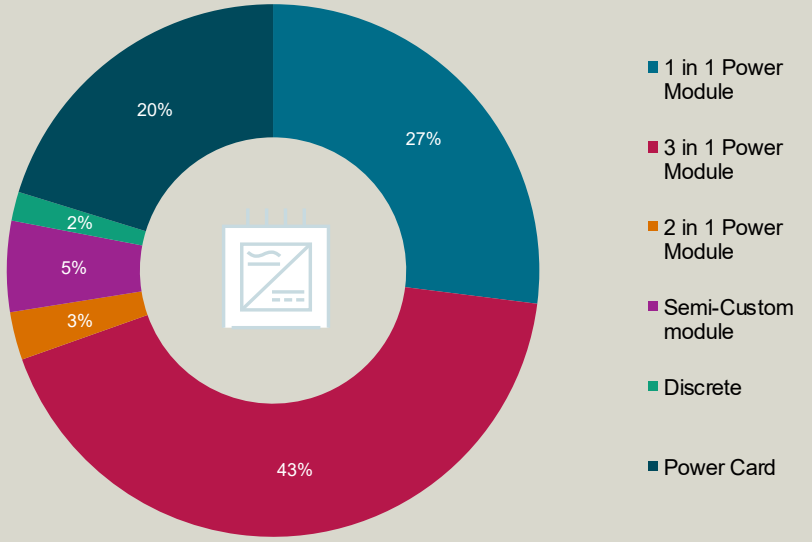
Source: S&P Global Mobility.Power Electronics Level 3

Switching device type split for Power Electronics components

Discrete and Power Module distribution for Inverters, DC-DC & OBC



Inverter Power Module Split by Design type



Data compiled May25

S&P Global Mobility, Supply Chain & Technology, Power Electronics Forecast

S&P Global Mobility: Navigating the Chinese Motor Market

Jie Yang

Senior Technical Analyst **S&P Global Mobility**

Jie Yang is a senior research analyst at Automotive Supply Chain and Technology Department. She is responsible for propulsion and thermal management technology forecasts, as well as supply chain analysis of these domains in Greater China. Jie had previously worked with Daimler China Research & Development as a powertrain engineer, in charge of the development of thermal management system. She also had experience working with tier 1 supplier in the area of engine management system. Jie graduated from The University of Southern California, USA with a Master of Science degree.

2025 Onsite Content Agenda Sessions

Navigating the Chinese Motor Market: Global Expansion, Production Dynamics, and Strategic Shifts

China's motor market continues to reshape global industry landscapes through massive domestic production, evolving supplier-OEM dynamics, and aggressive expansion plans into Europe and other international markets. This session explores how these shifts are influencing global supply chains, competitiveness, and strategic positioning.

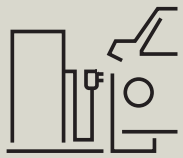
- Overview of China's domestic motor production capacity and key players
- Volume dynamics between Chinese component suppliers and OEMs
- Strategic expansion of Chinese motor manufacturers into European markets
- Implications for global competitors and supply chain resilience

Wednesday 04 June **12:20 - 12:50** **E-Mobility Stage**

Global Market Trends and Challenges

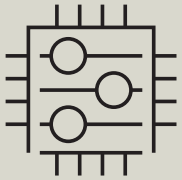
Add to calendar

Key Takeaways



The annual alternative propulsion vehicle market will likely be more than 81 million vehicles by 2035. This growth at a compound annual growth rate (CAGR) of 8.5% between 2024 and 2035 will result in the increased use of power electronics, which will drive the market in the future

Power electronics play an important role in determining how efficiently an EV operates in the real world. Along with the chemistry of the battery, another thing that can have a significant effect on the range and charging speed is the efficiency of different types of semiconductors used in power electronics components.



The adoption of higher-voltage systems in EVs is instrumental in achieving heightened efficiency and faster charging capabilities. The incorporation of advanced materials such as SiC and GaN in EVs with voltages exceeding 800V represents a notable advancement.

As volumes grow, Chinese suppliers will maintain a strong global position, with expectations of nearly sixfold growth in the European market. However, any significant shift in production capacity outside of China is likely to remain limited for now

Thank you for your attention!

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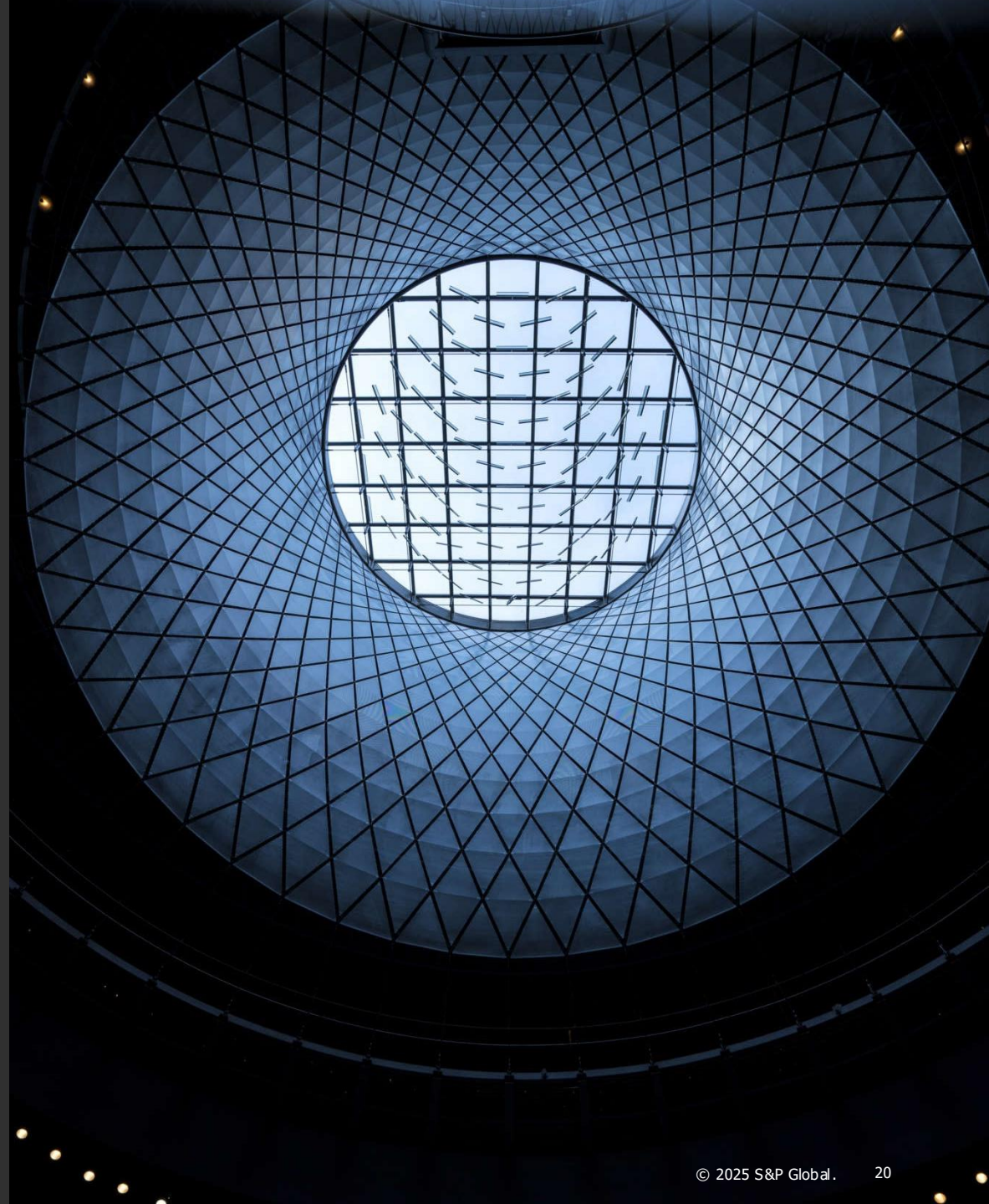

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