

Global supply chain collapse to a new beginning .

Electrification and global crises pose existential challenges to the established network of OEMs and suppliers

White Paper

Giving substance to a new reality.

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How will supply and demand change?

The rollback of globalisation and related international supply chains will continue to be a critically debated topic for many industries. This has been evident in the last two years, due to the severe restrictions of the COVID-19 pandemic, and also recently due to Russia's invasion of Ukraine. This has led to questions that examine possible alternatives to existing supply structures of global economic goods. As a management consultancy with a focus on mobility, we pursue this issue primarily from the perspective of the automotive industry and related technology sectors. We also consider the short-, medium- and long-term effects of changing supply chain structures. Both as influenced by the aforementioned geopolitical and geosocial factors, and due to the biggest structural change the industry has experienced in decades - the path to electromobility.

The global development of the passenger car industry will serve as the basis for this discussion. As can be seen in Fig. 1, we have developed three scenarios that predict varying degrees of growth in electrified powertrains by 2035. It can be seen that full battery electric vehicles will account for between 44% and 66% of the global vehicle market in the next 15 years, while drive types powered by combustion engines sharply retreat.

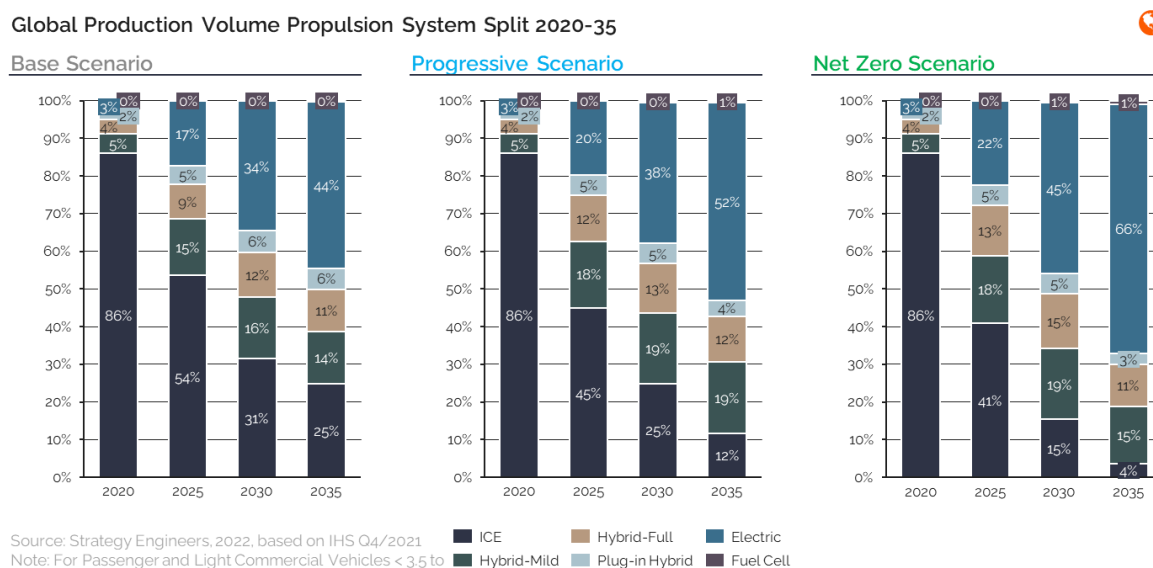


Figure 1: Global development of electrification in the passenger car sector in three different scenarios

To give a better understanding of the scenarios used, we have presented the key assumptions and hypotheses for the "Base", "Progressive" and "Net Zero" scenarios in Fig. 2.

SE Electrification Scenarios

	Key assumptions	BEV share	ICE bans ¹	Legislation
Base	<ul style="list-style-type: none"> Market as presented in IHS Q4/2021 is bottom line compared to all current forecasts No adjustment considered 	<ul style="list-style-type: none"> In line with IHS 	<ul style="list-style-type: none"> Until 2050 	<ul style="list-style-type: none"> As currently in place
Progressive	<ul style="list-style-type: none"> EU: > -50 % CO₂ until 2030 China: Lower bound of "Energy-saving Vehicles & NEV techn. roadmap 2.0" USA: -3.5 % annual CO₂ 	<ul style="list-style-type: none"> In line with OEM announcements 	<ul style="list-style-type: none"> Starting around 2030-35 Initial focus on non-hybrid ICEs 	<ul style="list-style-type: none"> As announced or generally expected
Net Zero	<ul style="list-style-type: none"> EU: -80 % CO₂ until 2030 China: Upper bound of "Energy-saving Vehicles & NEV techn. roadmap 2.0" USA: -5 % annual CO₂ 	<ul style="list-style-type: none"> Rapid increase in line with COP26 targets 	<ul style="list-style-type: none"> Starting around 2025-30 Most ICE-based powertrains ~2035 	<ul style="list-style-type: none"> As required for COP26 & "Way2Zero"

¹: No global perspective; only major leading countries considered in key regions EU, China, USA

Figure 2: Description of the electrification scenarios

In the Net Zero scenario, increased electrification is primarily driven by closer alignment with COP26 targets and an early regulatory ban on ICE-only platforms. We therefore see opportunities for a faster and stronger ramp-up of electrified vehicles, provided the development of the charging infrastructure keeps pace.

Comparable developments can be seen in the commercial vehicle sector. For example, city bus battery drive technology has already become firmly established. A similar picture emerges for light commercial vehicles, for which battery vehicles already have better life cycle costs than internal combustion engines in some of the use-cases. Only the lack of supply on the part of the OEMs and high acquisition costs are hindering a faster spread. In the medium and heavy weight classes, batteries and fuel cells will be competing for dominance in the decades to come, with still unresolved infrastructure questions for both technologies. Today, the race is relatively open and very much dependent on the future trend of hydrogen and electricity prices. Many manufacturers are open to both technologies with the aim to serve different local energy supply conditions.

The situation described above is frequently discussed across the industry and is well known. Nevertheless, these developments pose enormous challenges, not only for OEMs, but also for suppliers who are active in the ICE sector. Many of our customers approach us with

questions that concern the future positioning of their company and often also want to clarify which new business areas could be of interest. But what does this mean for the future supplier landscape in the ICE environment?

It can be assumed that the business relationships between OEMs and suppliers will change significantly in the future. Various models are conceivable, especially for assemblies and components whose importance in the market will decrease significantly in the future. Characteristic of the supply chain is the successively decreasing dominance of the OEMs, which until now have been able to dictate their specifications and conditions to the suppliers in a competitive market.

The following four developments are conceivable in the future:

1. Bought-in parts will be supplied by small, specialised companies that will continue to manufacture as specified by OEMs. Due to the expected specialisation, these companies will reduce the number of active production sites and no longer necessarily locate in the immediate vicinity of the OEMs.
2. New "mega-ICE suppliers" will emerge, which will manufacture in highly standardised, possibly low-cost countries, and no longer manufacture to the requirements of specific OEMs, or – if they do – only to a very limited extent. Therefore, a large proportion of the components on offer become catalogue goods or standard parts.
3. OEMs in-housing the production and manufacture of selected components. This is already part of the corporate strategy for many manufacturers, as various past considerations have prompted OEMs to establish or acquire their own component plants. For example, preserving know-how, maximising the ability to intervene in the supply chain or the reduction of manufacturing capacities of supplier plants. The threat of shortages of selected components adds another argument that will make this model more important in the future.
4. Suppliers pursuing a transition strategy, i.e. actively orienting themselves to the product strategy and the corresponding planned requirements of the OEMs and, thus, gradually shifting from ICE components to BEV components.

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Business relationships between OEMs and suppliers will change significantly in the future as OEM market dominance decreases

What consequences are to be expected as a result of these anticipated changes?

The effects of the developments described are manifold and can be summarised in three clusters:

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The fundamental decline in demand for ICE-specific components will lead to consolidation in the supplier industry as the long-standing relationships between OEM and supplier will break down

Reduced availability for selected components

The fundamental decline in demand for ICE-specific components will lead to consolidation in the supplier industry. Long-standing supply relationships between OEM and supplier will break down, as the corresponding range of parts is no longer offered or the continued existence of the supplier is no longer guaranteed. Oligopolies will form for certain purchasing parts, leading to a reversal of business relationships that were previously characterised by the high market power of OEMs and the strong integration of the supply chain. In addition, there is additional consolidation pressure caused by the instability in Eastern Europe and the dependence on sub-suppliers from locations in the region.

Loss of competence in the ICE environment

In addition to the challenges regarding supplier structure and supply chain, the availability of required development and production competences will occupy the mobility industry in the coming years. Suppliers whose focus is gradually shifting towards the non-ICE environment will inevitably lose their previous core competences. Qualified specialists, able to ensure essential ICE capacities in the future, will also become increasingly rare, as the educational focus of graduates – and their subsequent career choice – shifts in the direction of innovative technologies.

Change in the cost structure

Cost and price structures will also change. Due to the consolidation of the remaining suppliers, there will be less competition. While OEMs have traditionally procured the best possible overall package at the lowest cost from a large number of competing suppliers, the challenge in the future will be to find a reliable supplier for the required volumes. Therefore, in principle, the companies remaining in the market have the opportunity to improve their margins accordingly. However, this requires a consistent realignment of their own value creation processes in order to optimise product costs.

It is also to be expected that the financing of investments required to maintain and modernise manufacturing capacities will become

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One of the biggest challenges for OEMs is sourcing a reliable supplier for the quantities needed.

increasingly difficult. The use of capital in a shrinking segment is inevitably associated with higher risk and, thus, leads to higher interest costs or inability of suppliers to pre-finance investments. In turn, this will have a negative impact on the overall cost structure.

The solution for OEMs: What strategies can OEMs use to maintain supply chains in the future?

Regardless of which direction development takes, the expected changes will place much greater demands on OEMs in terms of risk hedging, control and tracking of the supply chain. Current procurement and stocking strategy has led to high cost efficiency. Ensuring the required delivery service using low inventories and optimised value creation processes between OEM and suppliers. Value chains focused solely on OEM requirements, where tier-1 suppliers take almost all responsibility for timely component delivery – to specification and required quantities – are no longer feasible.

Previously prescribed specifications and requirements will no longer necessarily be fully implemented by suppliers. The future cushioning of possible supply bottlenecks, e.g. due to failures in global logistics, shortages of raw materials, etc., must be ensured through corresponding stocking strategies ("just-in-case") and a significantly changed risk monitoring by the OEMs.

Today's vertical supply chain structures will largely disappear for ICE components. In the future, securing and cooperating with the suppliers of the lower value-added levels (tier-2 to tier-x) will become more the responsibility of the OEMs. This means both a stronger dovetailing of supplier quality, purchasing and risk management, as well as a corresponding review of resources in order to do justice to the increasing control effort. At the same time, the remaining suppliers will demand secured volume commitments from the OEMs to ensure the stability of their business relationships. In effect, we envision a supply chain setup which is characterised similarly to Japanese Keiretsu systems, providing stability to all involved partners. However, this would result in a paradigm shift for both OEM and supplier and would require an active strategy approach by all involved partners.

Furthermore, an active divestment strategy, i.e. shifting aggregate manufacturing to suppliers, might decrease cash flow requirements on the OEM side and secure critical mass on the supplier side. This development and potential bundling of ICE needs between two or

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Greater demands will be put on OEMs in terms of risk hedging, control and tracking of the supply chain

more OEMs either on system or on aggregate level might give a further push to the growth of mega suppliers as mentioned above.

The impending loss of competence can essentially be cushioned by two measures:

1. By securing long-term capacity from specialised development service providers, therefore increasing the planning lead time for resource planning.
2. Through constructive unification or standardisation of selected and non-brand-forming components in partnership with competitors; synergies can be exploited in a targeted manner, not only in terms of scarce resources.

Solution for suppliers: which growth strategies based on the existing core business are suitable to win in the new market?

Development of a sustainable "last man standing" strategy

Suppliers of ICE components and systems can rely on the fact that combustion engines will continue to be produced for decades, even as volumes decline. The decreasing number of units ensures that many competitors leave the market because they can no longer produce profitably. In order to remain profitable, companies relying on a "last-man-standing" strategy need efficient and flexible production, which is controlled to follow the margins closely. Contracts with OEMs must be structured in such a way that volume guarantees are met or adequate penalties are invoked.

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Supplier should carefully consider the feasibility of software and hardware integration, or a "stand-alone" software business

Development of new business areas/ growth strategies

For most suppliers, it makes sense to go beyond a "last-man-standing" strategy and enter new business fields. An obvious step is to enter related sectors such as commercial vehicles, construction machinery, industrial trucks or agricultural vehicles. How sensible this is depends on whether a supplier is a process or product specialist:

1. More courageous companies look at "distant" sectors such as rail vehicles, industrial machinery or aviation.
2. Process specialists should investigate which components can be produced with "their" skills in electric vehicles.

3. Product specialists are looking for new systems to apply their competences.

Building new business

If the first two strategies are not sufficient to close emerging revenue and profit gaps, companies should invest in building new businesses outside existing focus areas. A wide range of opportunities are available. For example, in development services and in servicing components of the core business. Suppliers should continue to ask themselves whether software and hardware for their products can be integrated, or whether a "stand-alone" software business is feasible. Finally, a multitude of business models are developing through the digitalisation of value creation processes and under "product-as-a-service" models.

The possibilities for growth are therefore almost unlimited. It is important to find out what is possible and suitable for the respective company.

Implications and Outlook

Nothing is more constant than change; this is especially true for the automotive industry. Supply chains will change radically, driven by electrification and global crises. For OEMs and suppliers, this will create many opportunities, but also risks that need to be managed. The winners will be those OEMs and suppliers who actively shape change and use upheavals to reposition themselves.

Project Example

A supplier of valve trains asked Strategy Engineers (SE) for support in finding new product ideas. SE produced technology roadmaps for all application areas in which the company was active. In workshops, 122 new product ideas were then developed together with the client. These were evaluated according to market size, market growth, competitive intensity, and profitability. A shortlist of 39 ideas was compiled and further prioritised according to attractiveness for the supplier and its customers. Business cases with detailed market prospects were created for 15 new products, which the company subsequently implemented for the most part.

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About SE / Strategy Engineers

Strategy Engineers is an international strategy and management consulting company focused on mobility. Our vision is to make mobility sustainable. We share one common purpose: To unlock our client's potential to navigate uncertainty towards achieving this goal. Our consulting services are based on combining commercial and technical perspectives. We understand our clients' unique situation, as trusted advisors, and deliver innovative, customised, and implementable solutions. This way, we help our clients to make robust strategic decisions and craft unique strategies to find their way to a winning place in the market.

About AVL

AVL List GmbH ("AVL") with its headquarters in Graz, is one of the world's leading mobility technology companies for development, simulation and testing in the automotive industry, and in other sectors. Drawing on its pioneering spirit, the company provides concepts, solutions and methodologies for a greener, safer and better world of mobility.



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