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From legacy capital to smart bets : Europe's path to a competitive auto industry

Guillaume Dejean
Senior Sector Advisor
guillaume.dejean@allianz-trade.com

Ano Kuhanathan
Head of Corporate Research
ano.kuhanathan@allianz-trade.com

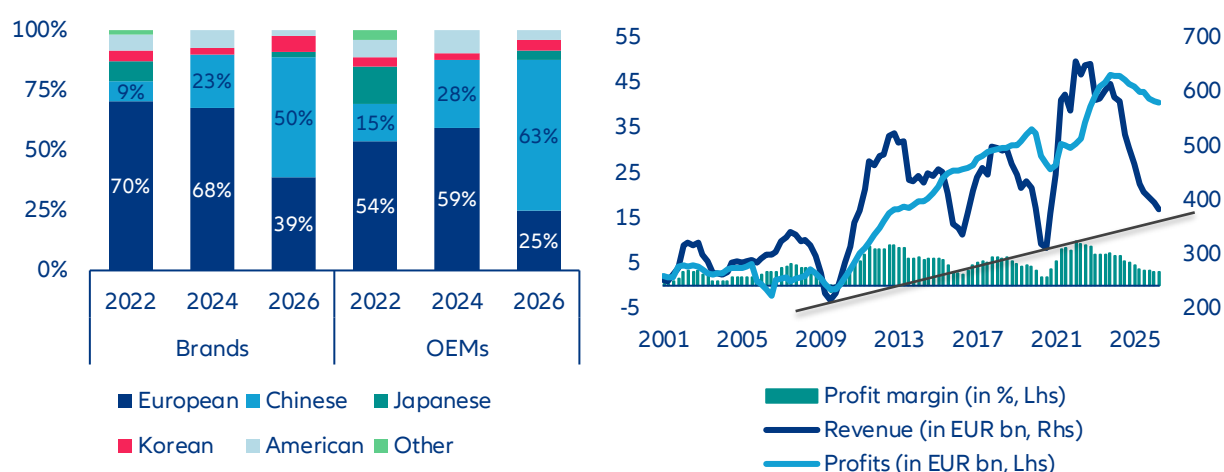
In Summary

- **Chinese brands will dominate the Paris auto show next week. They represent 50% of exhibitors versus just 23% in 2024, a visible sign of a deeper, structural shift already reshaping the market.** China holds 10% of European registrations, 16% in battery electric vehicles (BEV) and 26% in plug-in hybrid electric vehicles (PHEV). This comes as Europe's auto market defies a sluggish growth outlook, up +5% YTD through August, suggesting structural change rather than a cyclical blip. Low-carbon demand leads the charge: BEV sales are up nearly +45% YTD, reaching parity with petrol-powered engines (22%), amid energy volatility, EV cost compression and targeted subsidies for low incomes.
- **A deeper rift is opening between political ambition and industrial execution, and it risks setting a technology trap.** Easing targets now breeds complacency precisely when the shift to low-carbon production needs to accelerate. Europe is poised to soften carbon penalties and cut the 2035 zero-emission target to 90%, relieving Original Equipment Manufacturers (OEMs) who underinvested rather than forcing them to catch up. Support was needed to share the burden, but without a binding roadmap, automakers will simply buy time, falling further behind Chinese rivals. Demand itself is uneven: BEVs are today the second biggest segment in France and Germany (30 and 26%), yet lag below 10% in Italy, Spain or even in the key but less accessible US market, exposing a dangerous short-term versus long-term arbitrage.
- **Added-value erosion of EUR3bn by 2030 must be urgently contained.** The shift in dominant technology and rising competition from China have eroded the big three German carmakers' market share materially in core markets – down 10pps in Europe and 7pps in China since 2021. In Europe, where manufacturing costs are less competitive, domestic added-value per vehicle in H1 2026 was 30-45% lower than in 2021/2022 while in China that decline has been smaller, less than 20% over the same period. A further realistic 3pps market share slide in both markets by 2030 would translate into a EUR3bn added-value deterioration for German OEMs, equivalent to 4pps of EBITDA margin.
- **Whoever secures reliable, cost-competitive battery production will shape the next decade of automotive competitiveness.** Vehicle value is migrating from the factory floor to the software stack: Engine and chassis once represented 35–45% of an internal combustion engine (ICE) car's value, but battery and software now account for 50–60% of a BEV's. "Made-in-Europe" content requirements would preserve some manufacturing jobs, but at a steep cost: ~EUR2,000 per vehicle (+5% retail price), coverage of only ~50% of domestic battery demand by 2035 and a wider technology gap with global peers. They would do little to reduce sovereign risk either: over 70% of European-based battery technology will be held by Asian firms, according to the current pipeline. The more achievable path is to grow Europe's footprint in capital-light, high-value segments (design and IP), capturing added value without the capital risk of manufacturing.
- **Europe should pursue smart partnerships over full sovereignty, anchoring Asian battery and chip production on European soil, pooling procurement and R&D and consolidating onto fewer EV platforms under strict capital discipline.** Diversifying further into into defense looks relevant it has strong public funding but is running out of capacity. The long-term bets worth making are solid-state batteries, recycling, proprietary chip design, local AI infrastructure and autonomous trucking and logistics, where Europe can differentiate without competing head on against entrenched US and Chinese leaders.

A legacy capital mindset behind a structural crisis

The 2026 Paris auto show is emblematic of the changing global order in the automotive industry. European brands account for just 40% of exhibitors in this year's edition of the flagship industry event, to be held from 12-18 October, down from 68% compared to 2022 and 2024. This pullback reflects intense cost-cutting measures amid a severe profitability crisis, with manufacturers engaging in tactical arbitrage. Meanwhile, Chinese players are seizing the opportunity and confirming their strong interest in the European market: Chinese brands surged from 9% to 50% of exhibitors at the event, and Chinese OEMs from 15% to a dominant 63% by 2026, using this prime European stage to attract new audiences and accelerate their continental expansion. This highlights the rebalancing of power within the automotive industry, where dynamic and innovative new competitors are openly contesting the long-held dominance of Europe's established giants. While this is not the industry's first downturn, this time the weakness is structural rather than cyclical, and its root is identifiable: a legacy capital mindset that, for two decades, funded the defense of mature ICE assets and short-term margins instead of the electric, digital and industrial bets that would determine the next cycle. The technology lag, the China shock and the brand erosion are best read not as separate failures but as symptoms of that same underlying capital allocation culture.

Figures 1 & 2 : Breakdown of attendees of Paris auto show by origin of OEMs and brands / 12-month trailing revenue, profits and margin rate from largest German automakers



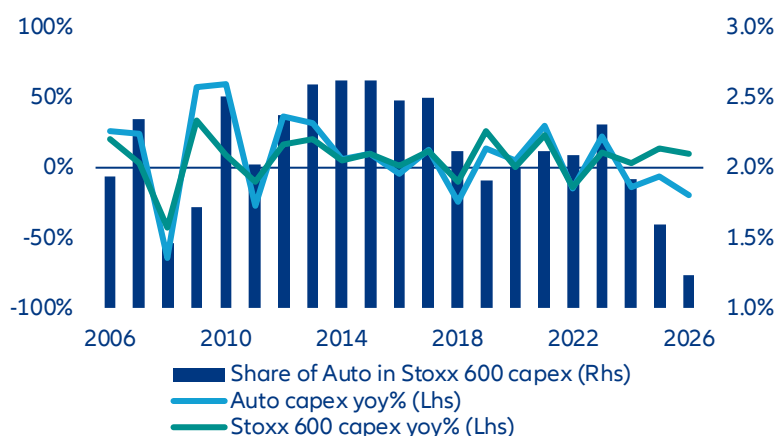
Sources: Salon de l'Auto notice, LSEG Datastream, Allianz Research

A legacy capital mindset: capital defended the past, chased the quarter and bet small when it finally moved.

European automakers' balance sheets tell the story of a capital culture built for a different era. For years, capital was steered to sustain and optimize mature ICE platforms and defend near-term margins – the sunk-cost logic of an incumbent reluctant to cannibalize its own cash cow – rather than to pre-fund the electric and digital transition while there was still runway to do it gradually. When bets were finally placed, they were sized and governed like legacy capex, not like venture-style industrial transitions: The ill-fated decision to internalize middleware software development, a domain far removed from automakers' core competencies, burned time and money for negligible results, while billions in diesel-related penalties and surging impairment charges drained cash reserves that could instead have funded the transition of ICE plants to EV production lines, scaled battery gigafactories or fueled critical R&D. Historically, the auto sector led capex growth during expansion years but proved more vulnerable in downturns. Yet today's situation is uniquely alarming: The broader economic cycle remains steady while auto capex is collapsing (-20%, its strongest contraction since 2018) even as non-auto European blue-chip capex expands by +10%. That is short-termism showing up directly in the numbers: capital retreating precisely when software-defined vehicles, AI-powered autonomous systems and the early diffusion of robotaxis are reshaping the industry's competitive frontier. Having already missed the EV wave and fallen behind in the software revolution, European carmakers cannot afford to sit out the autonomous race. Yet the pause on Level 3 development is another example of risk-averse, low-conviction capital deployment at exactly the wrong moment. In this industry, moats and

technology edges erode fast. Today's investments are tomorrow's profits, and a mindset built to defend yesterday's assets has left financial leeway too thin to allow another misjudgment.

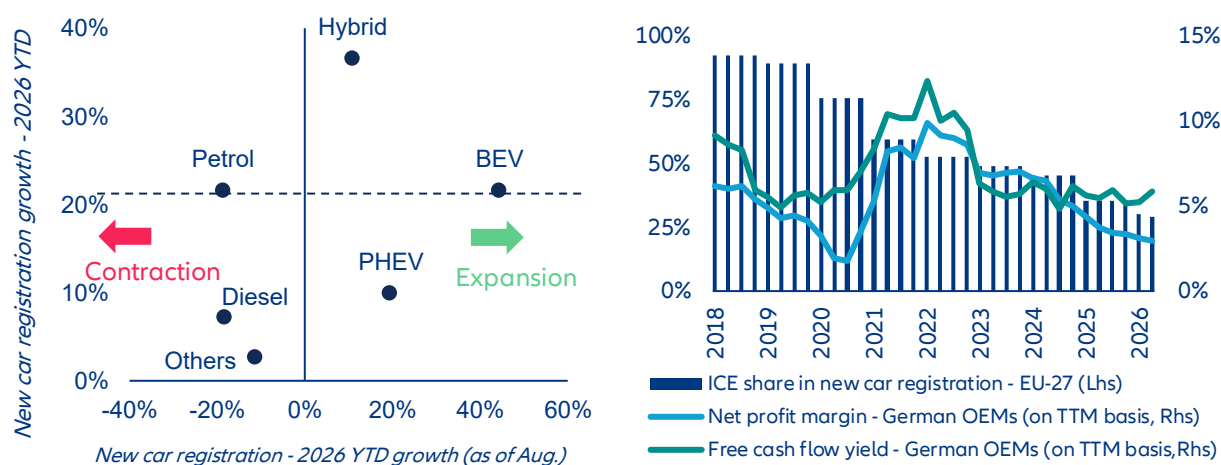
Figure 3 : Evolution of capex from European automakers vs. Stoxx 600 benchmark (annual growth & share)



Sources: LSEG Datastream, Allianz Research

The second structural weakness is a late EV transition. European OEMs didn't just misjudge the pace of electrification, they kept capital deployed to defend ICE production and margins for as long as the balance sheet allowed, leaving too little invested when the pivot could no longer be delayed. Electrification diffused faster than they bet on: BEVs now account for over 20% of EU registrations (on par with ICE this year) and nearly 50% in China, the fastest-growing segment on both continents, and European carmakers are scrambling to catch up. The late pivot from ICE to EV and hybrid production is now compressing costs into a brutal timeframe: what could have been a gradual, capital-light transition is instead an expensive, chaotic restructuring. German OEM margins have collapsed from 13% in 2022 to roughly 4% today. BEV profitability remains structurally lower than ICE, while Chinese competitors deliver advanced technology at aggressive price points. The same mindset shows up in how setbacks were funded: Diesel-gate alone cost Volkswagen over USD34bn, capital that was unavailable to fund a decade of electrification R&D instead. The traditional European advantage – a deep, local supplier ecosystem built on mechanical engineering – is eroding fast as EV supply chains shift toward Asian battery and component makers. European OEMs may have caught up on sales volumes at home, but their cost structures remain bloated, their margins thin and their competitive moat narrower by the quarter.

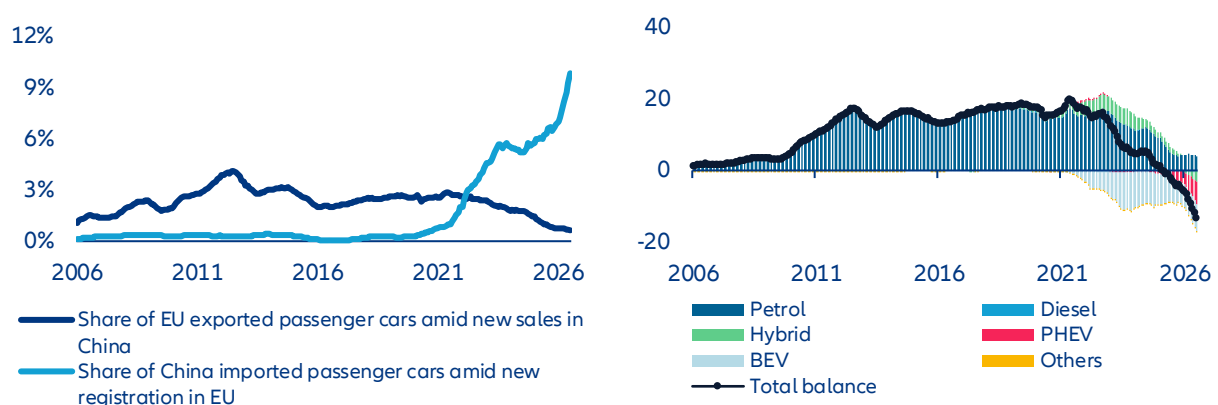
Figures 4 & 5 : 2026 car registration and market share per powertrain technology / ICE market share in new car registration in EU-27 vs. margin rate and free cash flow yield from top German OEMs



Sources: ACEA, LSEG Datastream, Allianz Research

The third structural weakness is competition from China: the price of capital that protected margins instead of market share. Over the past decade, China was the biggest and most profitable market for German OEMs, accounting for over 30% of group revenue, and capital allocation treated that profit pool as something to protect rather than a market worth fighting for with scale. That era is over as the balance of power has been fully disrupted by the rise of local players that quickly absorbed foreign brands' market share. The miscalculation was strategic as much as financial: European OEMs underestimated Beijing's electrification ambition and the speed at which domestic, and in some cases less-experienced, firms would scale, while committing far less capital to matching that scale than the threat warranted. Competition has been exported over the past years, with Chinese brands redirecting overcapacity mainly towards Europe as high tariffs have almost entirely closed access to the US market. Their EU market share surged from about 2% to nearly 10% by mid-2026, totaling over 1mn cars sold on the continent for the first time. EU tariffs of up to 35% barely slowed them: Chinese OEMs pivoted to hybrids and PHEVs, offered advanced tech at aggressive prices and adopted European-style design. The trade picture tells the rest. Europe's historical automotive surplus with China, once peaking near EUR20bn, has flipped into an unprecedented deficit. EU auto exports to China halved in two years. In the opposite direction, Chinese EV and hybrid exports to the EU doubled to USD14.2bn in H1 2026 alone, with hybrid shipments surging +206%. The deficit is no longer just about BEVs; it spans hybrids, PHEVs and components, reflecting the broader penetration of Chinese brands while the European footprint in China fades. There is no reason to believe this wave will recede in the near future as OEMs intensify relocation of some production capacities in Europe to dodge any trade barrier threat. In the meantime, much improvement has been made on the after-sales networks and client relationships that remained one of the last Achilles' heels of Chinese firms in Europe, and the value proposition is perfectly adapted to European customer demand: a good-looking and affordable advanced technology which is precisely the segment European capital under-invested in.

Figures 6 & 7 : Share of imported Chinese brands in Europe vs. exported European brands in China / trade balance between EU-27 and China per powertrain breakdown (in EUR bn)

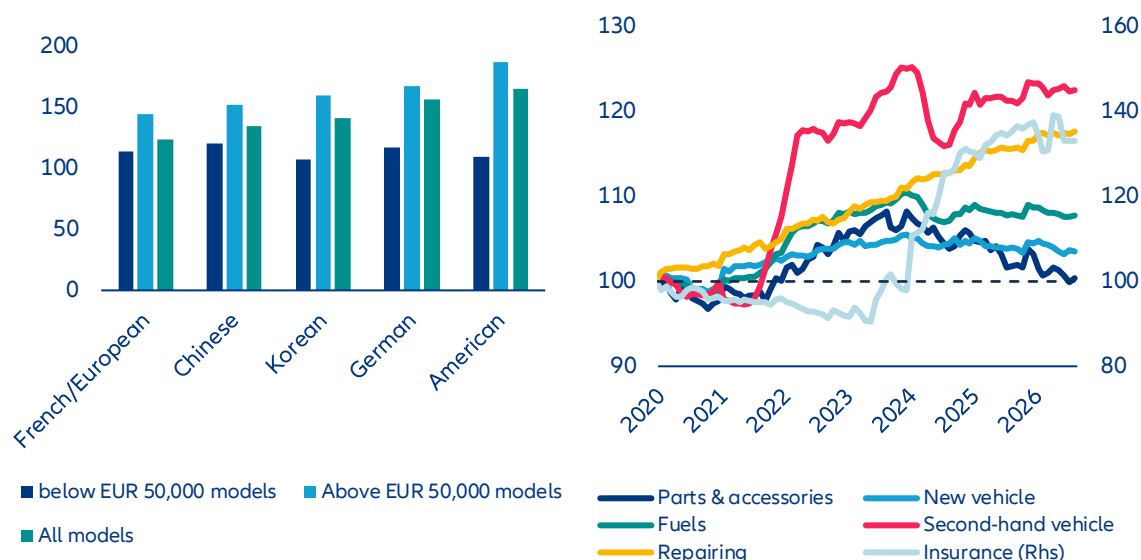


Sources: Eurostat, CAAM, Allianz Research

The fourth structural weakness: Brand power fades once the capital behind the premium stops compounding. The aura of German automotive excellence, built on decades of engineering prestige and glossy design, was itself a form of capital, accumulated through sustained investment in mechanical engineering. It is cracking now that the industry pivots toward electrification and digitalization. The core value in a 2026 vehicle now sits in software-defined solutions and battery systems, both firmly controlled by Asian firms, leaving European carmakers defending a premium price tag no longer backed by technological superiority. Competitors, notably Chinese brands, deliver a sharper performance-to-price ratio, while consumer price sensitivity has surged since the 2022 energy crisis as car-related costs (i.e. insurance, energy and maintenance) skyrocketed by 20-30% over the core inflation rate since 2020. The 2026 EV boom cannot be decoupled from volatile energy prices and aggressive price compression driven by fiercer competition and widening supply. This mirrors the broader luxury backlash: heritage alone no longer justifies the invoice when the capital that built it was never reinvested in the technology that now defines the category. Meanwhile, Europe's most popular segment (i.e. sedans and hatchbacks below EUR50,000) carries a 3 to 5% better price-to-range ratio than Chinese BEV models currently sold in Europe yet low export value as different consumer tastes and cheaper local alternatives in emerging markets cap revenue upside. Brand awareness, once the

industry's most durable moat and the clearest return on decades of engineering capital, fades into irrelevance as competitive advantage shifts from mechanical prowess to digital intelligence, demanding reinvention of where capital goes, not incremental adjustment.

Figure 8 & 9: Ranking of BEV retail price to distance ratio per brand origins and models price range (in EUR/km) / consumer price evolution of car-related costs vs. core HCIP index in Germany (rebased to 100 on 1/1/2020)



Sources: EV database.org, Agence fédérale de statistiques en Allemagne, Allianz Research

Not a premium purchase anymore? EV adoption is increasingly breaking the psychological glass ceiling that has long confined electric cars to an affluent, early-adopter customer base. The shift from broad-based subsidies towards targeted support is making EVs more accessible to mainstream households, while falling vehicle prices and improving total cost of ownership are progressively chasing away the perception of EVs as a premium goods. This virtuous circle is particularly important for the fleet market: As companies increasingly electrify their fleets, a growing volume of relatively young EVs will enter the second-hand market, expanding choice and bringing prices within reach of a much broader consumer base. This lifts one of the main structural barriers to adoption so far: the limited maturity of the used-EV market and the sharp depreciation suffered by first-generation models, which made residual values difficult to predict and leasing costs comparatively high. Energy-price volatility is another factor that adds up this year and strengthens the economic case.

Table 1: Most recent EV subsidy scheme for retail market

Market	Main retail support in force	Targeting / key conditions
France	~€3,100–€5,700 CEE support, potentially up to €7,700 for eligible high-mileage households; social leasing <€200/month	Income-targeted; high-mileage scheme targets middle-income workers driving ≥12,000 km/year
Germany	€1,500–€6,000 purchase/lease subsidy	New 2026 scheme explicitly targets lower/middle-income households and families; income and family size determine amount
UK	£1,500–£3,750 Electric Car Grant	Available at point of sale; BEV price capped generally at £37k, with sustainability criteria
Spain	€4,500–€7,000 for BEVs depending on scrappage	BEV price capped at €45k excl. VAT (€53k for 8/9-seat BEVs)
Portugal	€4,000 for individuals; €5,000 for eligible social/public organisations	BEV price capped at €38.5k (or €55k for >5 seats) / 2026 allocation was limited
Croatia	€7,000–€9,000 purchase subsidy	BEV price capped at €62,500 ex. VAT (vs. €50,000 before) / Limited to a total budget of €45mn

Sources: National government, Allianz Research

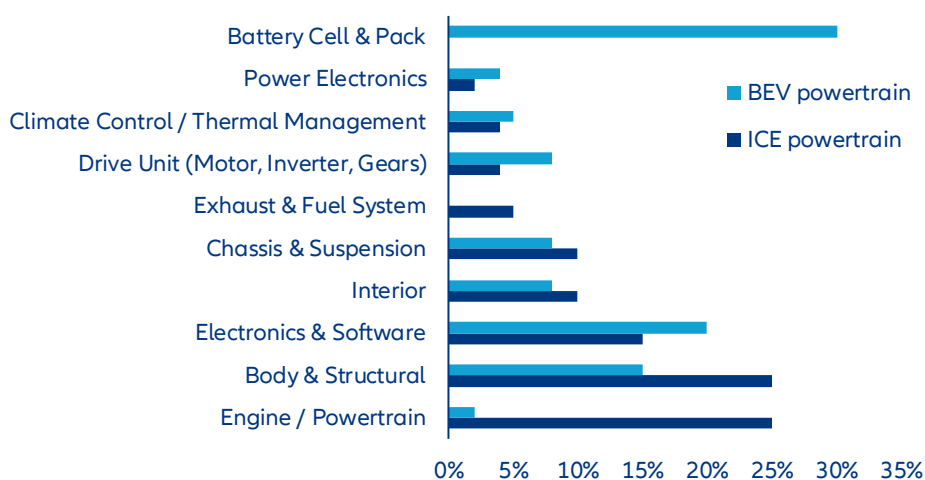
Four industrial equations and the capital choices that solve them

Solving the battery puzzle

A must-have to support ongoing fleet electrification. As the automotive industry undergoes its most profound transformation in a century, batteries have become the undisputed centerpiece of the electric vehicle. Representing 30–35% of a BEV's total value, no other single component carries as much influence on vehicle cost, range, performance and, ultimately, consumer adoption. This makes battery supply not just a procurement question but a strategic one – for OEMs, for governments and for Europe's industrial base at large. With BEV penetration rates climbing steadily to come close to a 100% share by 2035, the volume of cells required is set to grow exponentially. Whoever secures reliable, cost-competitive access to battery production will shape the next decade of automotive competitiveness. For Europe, carmakers cannot continue depending on external suppliers for such a critical components. This is one of the keys to solving the profitability gap.

The added-value of European-sold vehicles has depreciated by 30-45% since 2021/2022 period. Looking at the top three German carmakers' balance sheets and the annual evolution of car sales per market over the past years, we find that added-value per vehicle in H1 2026 declined by around -30% and -45% Europe since 2021/2022 period, while in China current added-value declined by -20% since the 2022 peak but is today almost equivalent to 2021 level. Over this period we can observe a sharp decline of German OEM market share by 10% in Europe and 7% in China as the technology shift and consumer demand change reframe the market structure. Based on our calculations, we then estimate that a market share decline of 50bps in China and Europe, which would mean an annual deterioration of added-value by EUR480mn. A realistic continuous slide based on actual momentum by -3% market share in each market by 2030 would then account for a loss of around EUR3bn of added-value, or 4% of annualized 2026 EBITDA.

Figure 10: Breakdown of added-value of car components per powertrain models



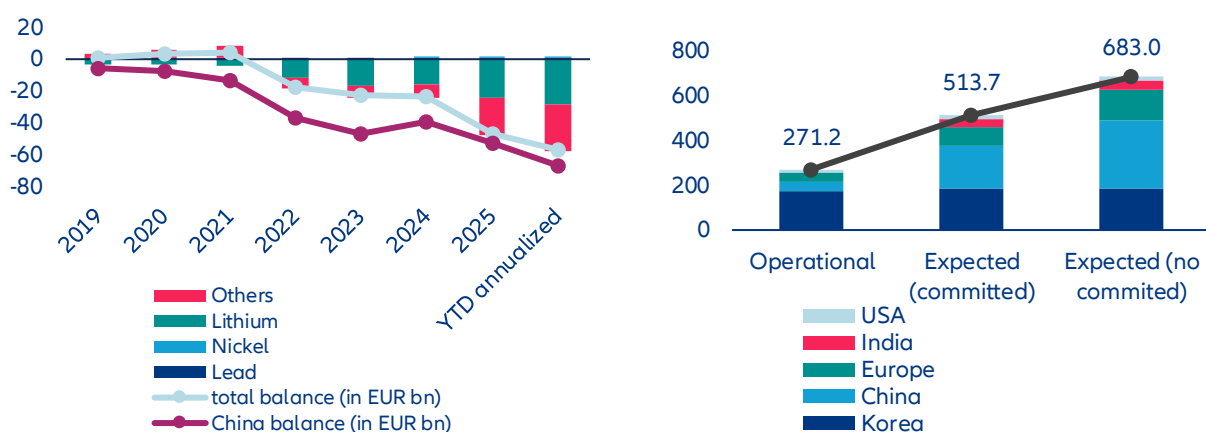
Source: Allianz Research

Self-autonomous production is not for today but can be considered tomorrow. The bloc has built enough pack-assembly capacity to match domestic BEV and PHEV demand, yet production remains overwhelmingly foreign-controlled: South Korean manufacturers alone operate roughly 65% of installed capacity, concentrated in heavier, shorter-lived nickel-ion chemistry (NMC). However, European production is less competitive compared to Asian peers, and notably China. Due to a poor resource base in lithium, cobalt and rare earths, a drastic labor cost differential (roughly 1 per 5) and initially weak domestic demand, European-branded cell production was recording thin-razor margins. Several projects collapsed under scale constraints even as order books were full. On this basis, there was not much choice other than imports of foreign technology, hence a widening trade deficit in a strategic inputs that has sharply intensified over the past quarter as BEV demand in Europe increased massively. On batteries, the EU recorded a record high deficit last year of EUR47bn, which should be broken again this year based on current trends (EUR57bn as of July on an annualized basis).

Chasing full supply-chain autonomy now is the wrong fight: Europe arrived too late and has too little runway to out-scale Chinese lithium-ion economics. Policy should pivot from building a sovereign chain to securing one, using instruments like the EU's localization rules (IAA-style content requirements) to anchor foreign capital and technology on European soil. Importing South Korean and, selectively, Chinese lithium-ion know-how is not capitulation; it preserves jobs, de-risks logistics and buys time, while accepting that near-term competitiveness in conventional cells is structurally out of reach. It seems to be the path picked by European automakers as we have seen over the past month a multiplication of greenfield investment into European battery capacity from Chinese firms. Based on current public announcements, China's pipeline expects an increase of capacity of roughly 150 GW by 2030, multiplying the country's market share by more than three from 15% to 37% (and even 45% when including no-committed options).

Europe should not confound industry support with sovereignty protection. On 7 October, Germany and France agreed to push for a further easing of the EU's 2035 car CO₂ targets – seeking an 80% reduction rather than the Commission's already softened 90% proposal – in exchange for "Buy European" local-content requirements on batteries sold in Europe. This deal comes alongside the EU's new EUR1.5bn Battery Booster Facility, designed to help European cell manufacturers ramp up production. Yet the two measures risk working at cross-purposes. Relaxing emission standards would inevitably slow EV adoption, shrinking the very demand that European battery makers need to achieve the scale economies required to compete. Europe's battery landscape remains overwhelmingly dominated by Asian players: current greenfield investment pipelines suggest South Korean and Chinese suppliers will command at least 70% of European market share by 2030–2035, leaving homegrown firms with a modest 15–20%. By diluting the regulatory signal that underpins EV uptake, the Franco-German compromise may shield legacy automotive jobs in the short term, but it risks starving Europe's fledgling battery industry of the volumes essential to close the cost gap with entrenched Asian competitors – ultimately deepening, rather than reducing, the continent's technological dependence.

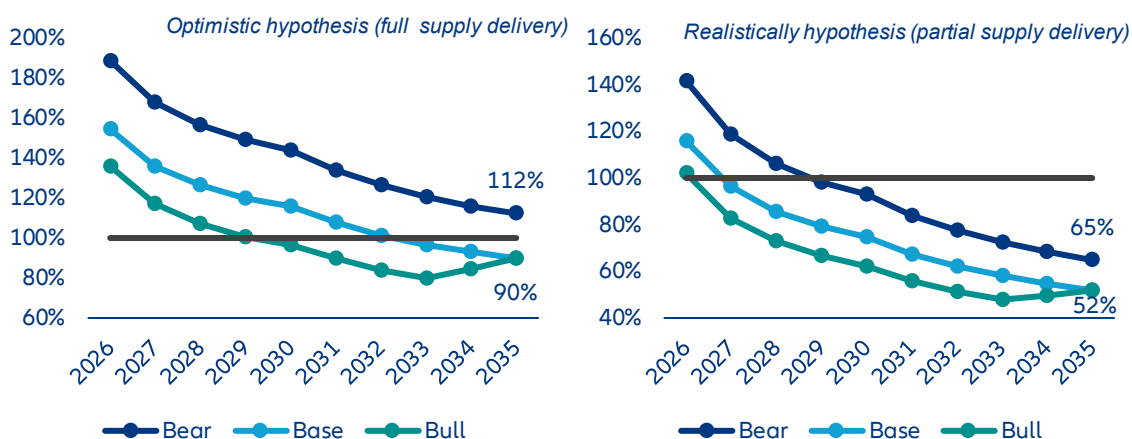
Figures 11 & 12: EU-27 annual trade balance on cell battery per category breakdown, global and China (in EUR bn) / European capacity of car battery pack, current and expected, per origin of manufacturer (in GW)



Sources: Eurostat, Corporate public information, Allianz Research

Regulation is a necessary defensive step but not the ultimate solution. The economics are blunt: we estimate Made-in-Europe content requirements add roughly EUR2,000, or about a 5% mark-up, to a battery pack's final price – a premium consumers absorb at precisely the moment BEV-ICE cost parity is meant to narrow, and when energy-price volatility and tighter credit are already denting appetite for large purchases. The passing-through strategy is not timely and could be unfruitful as it could grip the scale-up pattern on demand. A quick look at domestic battery capacity pipeline in Europe backs up our point. Even under the most optimistic scenario (i.e. every announced and pipeline project realized, every factory running at full nameplate utilization), European cell capacity will not cover all retail demand. In a more realistic approach – a path toward a BEV share at or near 100% by 2035 – we calculate that European capacity would cover barely half of retail demand by 2035. That is meaningful progress, but it is not self-sufficiency, and it leaves no realistic path to excluding Chinese technology without rationing consumer choice or inviting retaliation. The honest conclusion: sovereignty is worth pursuing, but only paced to what capacity actually allows. Europe cannot build from zero to one hundred, and has no time to try. The better bet is to use today's dependence as a bridge by protecting jobs and the ecosystem while demand scales and direct policy not at refighting yesterday's lithium-ion battle, but at owning the chemistries, solid-state and beyond that will define the next one.

Figures 13 & 14 : Share of absorption of made-in Europe car battery production (ex. export) based on EU-27 BEV demand



Bear scenario = 80% BEV share by 2035, Base scenario = 100% share by 2035, Bull scenario = 100% share by 2033. Battery capacity projections based on committed and non-committed investment announcement made by manufacturers. Sources: Allianz Research

Not doomsday, but the path forward is narrow. Europe cannot afford to treat batteries as a secondary concern: EV traction is set to intensify under current mandates, and carbon-neutrality commitments are too consequential to let such a critical technology layer remain overwhelmingly dependent on foreign supply. But the response has to be realistic. Weaker cash reserves, thinner market support and tightening lending conditions are real investment constraints for European OEMs, and attempting to build a fully sovereign, vertically integrated battery industry from scratch is neither financially viable nor strategically sound, especially when domestic players cannot yet match the cost or technology benchmarks set by Asian champions; carrying that burden alone would divert capital from areas where Europe can genuinely differentiate. A EUR1bn battery factory inaugurated in Germany in early October shows what a realistic middle path looks like: While cells continue to be sourced from China, the factory's true added value lies in its operational verticality (i.e. a full-stack deployment spanning R&D, design, battery pack manufacturing and recycling). It demonstrates how supply-chain dependencies can be mitigated, even if fully eliminating them remains realistically unachievable.

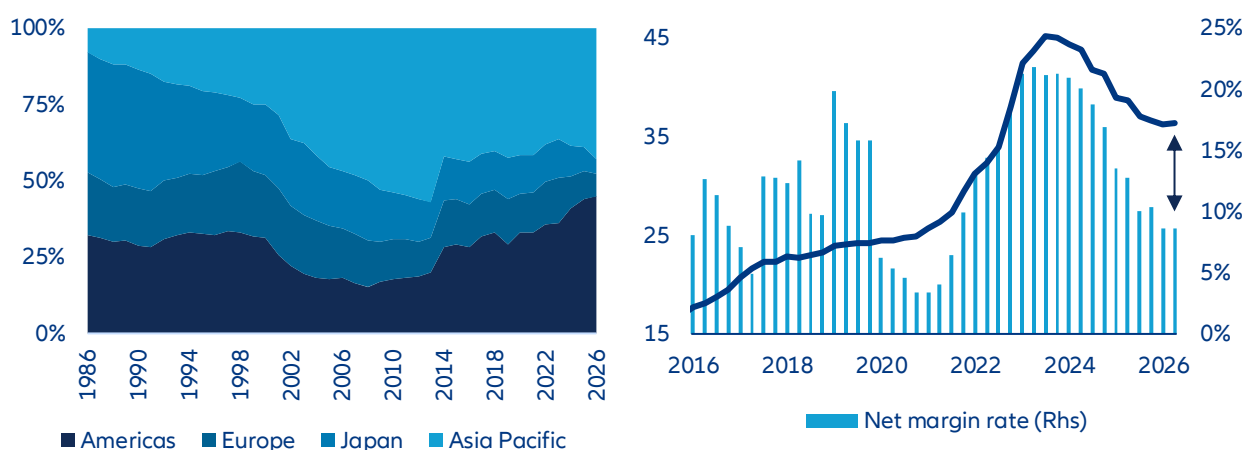
In the short run, the sector should embrace smart partnerships, and turn recycling into a domestic feedstock. Strategic alliances with leading South Korean and Chinese cell manufacturers should be actively pursued but provided production is anchored on European soil to secure local employment, build industrial know-how and reduce supply-chain disruption risks. This should be alongside a pan-European procurement or spending-pooling mechanism that consolidates bargaining power and lowers unit costs without resorting to protectionism. In parallel, battery recycling should be scaled into a genuine domestic feedstock: recovery of lithium, cobalt and nickel from end-of-life packs is costly today, but as cell volumes scale with BEV penetration, unit economics should improve sharply, reducing reliance on imported raw inputs without requiring Europe to out-build Asian cell economics.

In the longer run, bet on solid-state, the next chemistry generation. China's lead there remains unsettled even as it targets the technology in its latest five-year plan. Lithium is finite while Europe holds meaningful sodium reserves, and performance-per-lifespan economics should eventually undercut today's chemistries. This is the one battery front where Europe can compete on a reset map rather than catch up on an existing one.

Balance the software vs hardware

From engine to code line, the control center has shifted away. Europe has no choice but to take into consideration the new paradigm that is expected to intensify under a broader adoption of AI-empowered solutions and accelerated development of autonomous mobility tools. Though the leaders of automotive chips are mostly located in Europe, European-made production dramatically declined in 40 years, down from 20% to hardly more than 5% this year. And Europe does not produce or design the leading-edge chips used for AI development (frontier model, robotics, software). The sharp decline in revenue and margins (slashed by 2.5x from its 2023 peak of over 20%) of Europe's leading auto chipmakers is as much evidence of weak European industrial demand as of late deployment of domestic production supporting both AI-powered and autonomous mobility solutions. Today, European carmakers prefer using US technology and hardware due to their high-performance computing capacities. With Level 2+ autonomous features already accounting for roughly a third of new registrations this year, and forecast to surpass 70% by 2035, it is an addressable market of almost between 585-650mn of vehicles over the 2026-2035 period. If Europe's chip champions remain anchored to legacy power and analog niches while the car becomes a rolling data center, the continent risks permanent relegation in the technology race that will define the next decade of mobility.

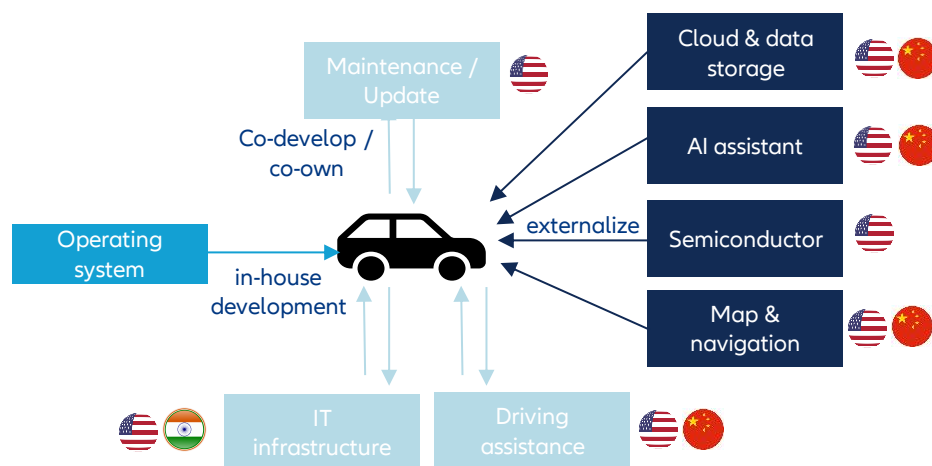
Figures 15 & 16 : Semiconductor sales per region / revenue and profit margin from top three European leaders into auto-specific chip



Sources: SEMI, LSEG Datastream, Allianz Research

Europe's software blind spot: the hidden dependency behind next-generation autonomous cars. Even the most advanced European car models, featuring L2+ driving assistance, AI-powered cockpits and cloud-connected services, rest on a technology stack overwhelmingly controlled by non-European players. As the architecture map of a leading European vehicle platform reveals, the critical layers, from semiconductors to AI assistants to cloud & data storage and mapping are sourced almost entirely from US and, for local market variants, Chinese providers. This is a structural exposure. Semiconductors represent the sharpest vulnerability, where Europe faces a persistent technology gap with US leaders like NVIDIA and Qualcomm, and no credible short-term substitute exists at the performance frontier required for autonomous driving compute. Yet the picture is not entirely bleak. European OEMs have strategically retained in-house control over the operating system ensuring sovereignty over the core software layer that orchestrates all other functions. Co-development models on driving assistance stacks allow European players to maintain architectural oversight and avoid full dependency on licensed black-box solutions. IT infrastructure is similarly co-owned rather than fully externalized. On AI assistance, emerging European alternatives such as Mistral offer a credible path to reduce reliance on US hyperscalers. The imperative is clear: Europe cannot eliminate its dependency overnight, but it can, and must, deepen internal OS mastery, expand co-development leverage, nurture homegrown AI capabilities and treat semiconductor sovereignty as a decade-long strategic investment rather than a problem to be solved quarterly.

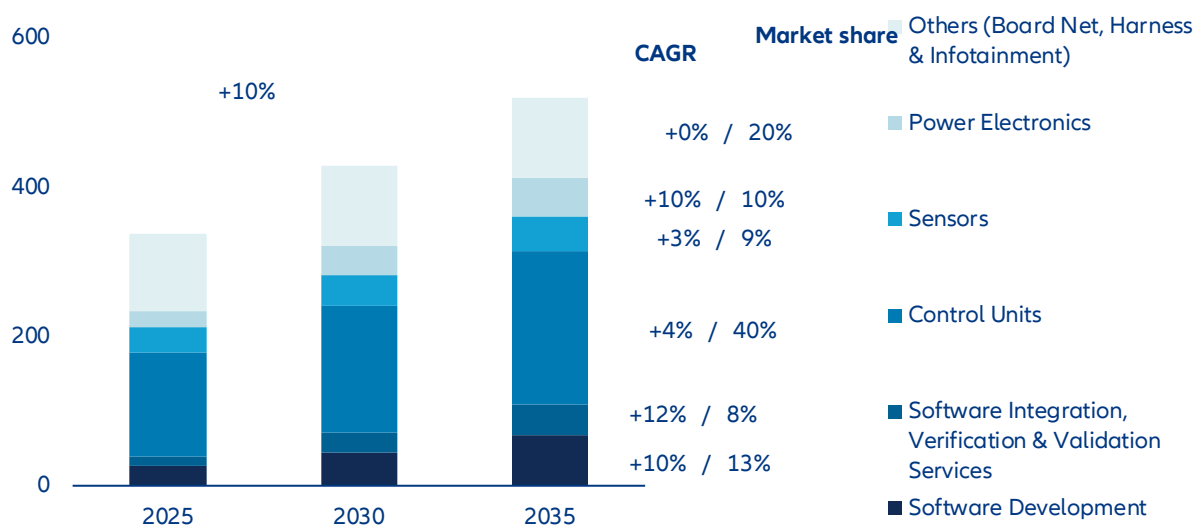
Figure 17 : Current software and hardware infrastructure of most-advanced European L2+ car model



Sources: Corporate public information, Allianz Research

Software as a driver of revenue migration from mechanical to data-centered operations. The end-to-end car software market is set to grow from roughly USD340bn in 2025 to USD520bn by 2035, a sustained +10% CAGR, with the fastest growth concentrated in AI-driven and automation segments (i.e. software verification and validation services and software development itself), outpacing hardware segments like control units or sensors. The value chain is migrating from mechanical engineering to code, and with it comes a new revenue layer already visible in the market: over-the-air conduct and performance features (heated seats, horsepower monitoring, acceleration boost), advanced automated driving assistance (FSD) and usage-based insurance and predictive-maintenance services built on vehicle telemetry. These models convert a one-off hardware sale into recurring, higher-margin revenue, improving cash-flow visibility well beyond unit sales. The diversification approach made by the US manufacturer Tesla could be an example as the services segment accounted for 16% of its total revenue (vs. 6% in 2022) and offset a part of the decline of cash flow generated by the direct sales of cars that account for roughly 70% of its revenue against 85% at its peak in 2022.

Figure 18: Estimation of end-to-end car software market by 2035 (in USD bn)



Sources: McKinsey, Allianz Research

Connected service value is locked up into recurrence: a 8% additional revenue share to not overlook. A simple simulation illustrates the point: assuming 1mn vehicles sold per year over a decade, a EUR50/month subscription plan with consumer adoption gradually rising from 33% to 50%, cumulative recurring revenue reaches approximately EUR3bn by year 10, translating into a roughly 70% CAGR from a modest ~EUR200mn base in year one. In context, that terminal run-rate would represent around 8% of the average 2025 annual revenue of top European carmakers, making it a meaningful diversification channel rather than a rounding error. Crucially, software-driven services carry structurally higher margins than vehicle manufacturing, and the EUR50 price point is conservative, as advanced features such as autonomous driving upgrades, predictive maintenance or in-car digital ecosystems mature, willingness to pay should rise in tandem. Once retention loops are proven and the service portfolio deepens, this segment has the potential to evolve from a supplementary income stream into a core profit engine as the business model is fully optimized.

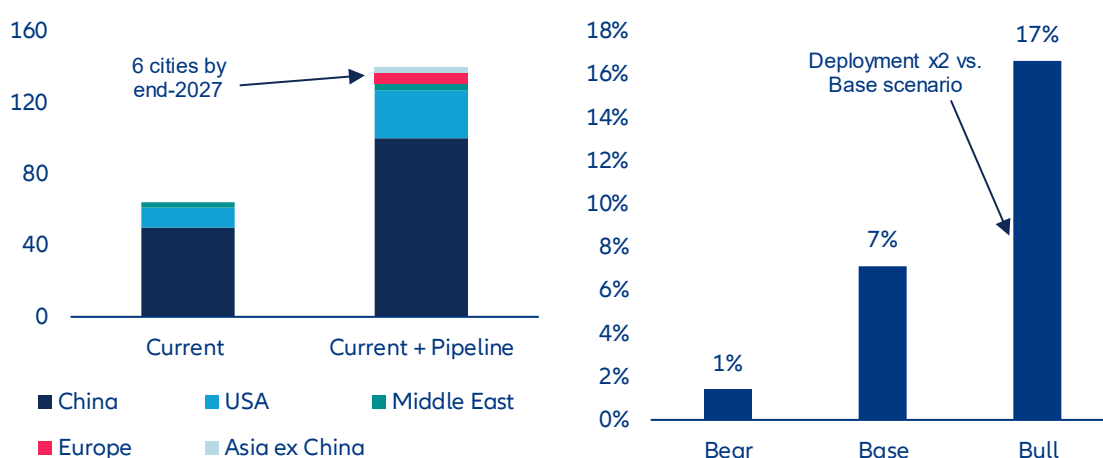
In the short run, firms should secure a foothold in assembly, and stop duplicating R&D. Full onshoring is neither realistic nor necessary: Building domestic chip assembly and packaging capacity, even on licensed foreign technology, as the battery segment demonstrates, is vastly preferable to total dependence on Asian production, provided a recalibrated public-private financing mix and faster infrastructure permitting remove the region's self-inflicted red-tape deterrent. The same logic applies to R&D: high competition should not preclude partnership in non-core, pre-competitive domains. VW's Cariad experience, billions spent with limited scale, is a cautionary tale worth internalizing; Pooling R&D capital across OEMs to explore frontier technologies where no single player holds a decisive lead, then differentiating at the product and service layer, is a model already emerging in Japan that Europe should engage with, provided governance structures ensure ecosystem-wide benefit.

Going forward, European automakers should own the chip IP, and treat software as the real upside. Europe won't close the semiconductor manufacturing gap, but it doesn't need to: Much like the GPU/CPU ecosystem where value accrues to designers rather than fabs alone, Europe should channel its engineering depth and thriving SME-AI ecosystem into proprietary, industry-specific chip design, particularly for next-generation autonomous vehicle architectures as the intellectual property moat matters more than the production line. The same shift in where value sits applies to software: the revenue and margin potential of data-driven services and physical-AI applications in vehicles is still largely unsized, yet the digitalization of cars is an irreversible trend. Capturing that value requires reducing strategic dependence on US and Chinese hyperscalers, prioritizing local cloud and AI infrastructure would unlock economic returns while materially lowering disruption risk.

Getting ready for autonomous mobility

Robotaxis are arriving in Europe, but regulatory gates are opening gradually. Berlin's autonomous bus pilot alone spans a 2023-2027 runway from planning to launch, with authorization landing only mid-2027, while China and the US have already built a 100+ city blueprint to borrow from. The bigger brake may be cultural: European approval of autonomous vehicles sits near 33%, against roughly 60% in China. That gap is narrowing, but slowly, and 2027-2028 will stay experimental rather than commercial. Even generously scaled, Europe's robotaxi fleet reaches only 300-600k vehicles by 2035, half the US, a third of China's, and capturing at best 17% of global volume in a bull case, 7% in base. Europe's approval architecture is consumer-protection-first, business-case second, and it shows in the timeline. Each extra approval layer compresses the payback window on capex-heavy hardware, and that asymmetry is precisely what deters a European manufacturing play: no domestic tech champion exists, entry costs are steep and the regulatory calendar guarantees Europe will always scale second.

Figures 19 & 20 : Current and expected deployment of robotaxi services in city, per region breakdown / projections of European share of robotaxi distribution by 2035 (in volume)



Sources: Corporate public filings, BCG, Counterpoint, Allianz Research

Figure 21: Timeline of adoption process of autonomous bus service project* in Berlin

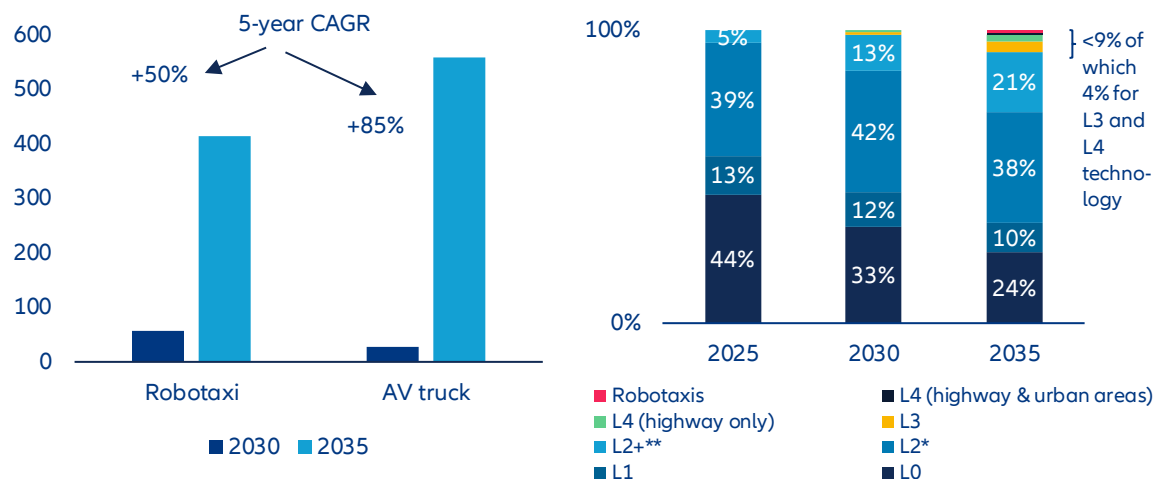


*VW ID. Buzz AD shuttles equipped with Level-4 autonomous driving technology. Sources: Mobilityportal.EU, Allianz Research

Robotaxis are the headline, but not the biggest or the smartest door into autonomy. Autonomous trucking is set to scale faster and bigger than robotaxis, a projected five-year CAGR of roughly +85% versus +50% for robotaxis, with the truck segment reaching close to USD550bn by 2035 against robotaxi's USD420bn, while L3/L4 technology is still expected to represent under 9% of new car registrations that same year. That's a small, capital-intensive, already-concentrated market: China and the US dominate deployment and the upfront fleet, and software costs are steep. A European OEM entering now would be underwriting high risk for thin, late-mover reward. The smarter play is backing adoption, not owning it, by partnering with established tech providers to secure distribution rights and data access across a market that will fragment into multiple channels (freight, transit, passenger) rather than building proprietary stacks from scratch. Robotaxis' real value to Europe are as a technology bridge: the same sensing and routing layers proven there translate directly into autonomous public transport, which aligns far better

with the continent's own agenda (i.e. decarbonizing cities, easing urban congestion and extending mobility services to an aging population etc.). Partnership is how Europe can capture the technology without paying the first-mover bill.

Figure 22 & 23: Estimated global market size of robotaxis and autonomous trucks (in USD bn) / estimated market share of new global car registration per autonomous technology level breakdown



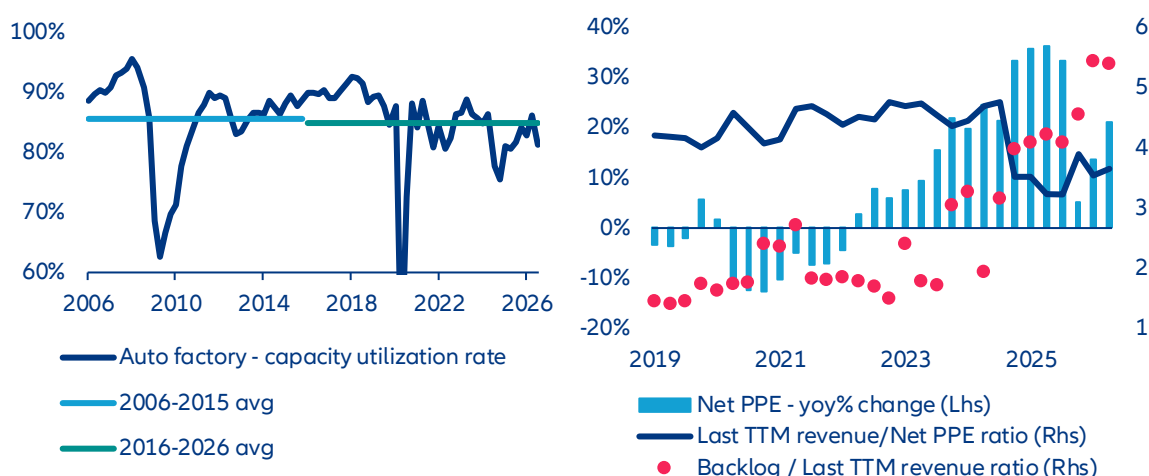
Sources: Goldman Sachs, WEF, Allianz Research

Firms should invest for the next decade, not the next earnings call. Short-termism is the enemy of disruptive technology: Autonomous mobility demands heavy upfront capital with payback horizons that don't fit a quarterly mindset. The temptation is to chase whichever segment looks hottest today and retreat at the first cost overrun, exactly the pattern that made Cariad expensive and robotaxi economics forbidding. The discipline needed is the opposite: identify which autonomous layers compound in value over 10 years, commit capital in stages tied to proof points and resist the urge to fund flashy pilots that don't scale into durable operational channels.

A tactical and timely shift toward defense

Defense diversification is the elephant in the piece, but not yet plainly assumed by carmakers. Defense diversification remains the unspoken opportunity for European carmakers, but the window to act is narrowing. As EU defense budgets surpass 2% of GDP, with frontrunners like Poland exceeding 4%, automakers are quietly exploring adjacencies in the defense sector. The industrial logic is compelling: Advanced mechanical engineering, scalable manufacturing capacity, and overlapping supply chains position them naturally to address surging demand for unarmored vehicles, armored platforms and UAV components. These are precisely categories where volumes have accelerated sharply since the onset of the Russia-Ukraine conflict. Historically, European automakers have pivoted to defense production during periods of geopolitical stress, making this convergence neither new nor far-fetched. The timing is uniquely favorable: defense primes face capacity bottlenecks despite record backlogs and are integrating AI-driven autonomous systems, while automakers urgently need to absorb excess capacity and amortize R&D in autonomous driving. On paper, this is a textbook win-win. Yet tangible P&L impact remains absent. Carmakers should move beyond exploratory postures, through joint ventures, dedicated defense units or co-development programs in order to capture a share of the unprecedented public funding flowing into European defense. This is not about abandoning core business; it is about extending industrial horizons where growth is most visible today.

Figures 24 & 25: German automotive factory, capacity utilization rate / European defense companies: backlog, revenue and plant & equipment value increase



Sources: LSEG Datastream, German federal office of statistics, Allianz Research

Capital discipline and capacity management are key

The constraint is behavioral, not financial. Auto capex is collapsing (-20%, the sharpest contraction since 2018) even as non-auto European blue-chip capex expands by +10%, and European auto assembly plants ran near only 60% utilization in 2023, a fixed-cost drag with no revenue offset. The sector isn't short of cash or ambition, as Cariad, battery megafactories and robotaxi flirtations all show; it is short of a filter for where that capital and capacity should go. Closing this equation means fixing the allocation process itself, not raising more money.

Cut platform complexity, and make discipline the filter. European automakers are still running bloated multi-platform ICE/hybrid/EV lineups that dilute scale economies on all three; with BEVs on track to dominate European registrations within the decade, the rational move is to consolidate platforms now rather than stagger the transition. Fewer, better-scaled EV architectures beat a wide portfolio hedging against a shift that's already underway. That same discipline needs to extend to capital allocation more broadly: harder capital-allocation frameworks, with kill-criteria on projects before launch, smaller bets sized to realistic market share rather than blue-sky TAM and a bias toward partnership over proprietary build where the technology isn't core (software OS, autonomous stacks, battery chemistry).

Stop absorbing idle capacity, redeploy it into defense. Rather than mothball or subsidize underutilized plants, diversify output toward adjacent, high-demand sectors. Defense is the clearest fit, given sustained European rearmament budgets and long-dated procurement commitments. Precision manufacturing, electronics and systems-integration skills transfer directly, turning spare capacity into a second, less cyclical revenue stream rather than dead weight on the balance sheet.

Table 2 : Summary of strategic options for European auto

Batteries: anchor foreign cell production on EU soil + pool EU procurement	Short run	Partnership / sourcing	Medium	High	Positive
Chips: secure assembly & packaging foothold (not full fab)	Medium run	Onshoring on licensed tech	Medium	Medium	Positive
Batteries: scale recycling into domestic feedstock	Medium run	Import substitution	Medium	Medium	Positive
Cross-OEM R&D: pool pre-competitive spend	Short run	Cost / risk-sharing partnership	Low	High	Neutral
Fleet strategy: consolidate EV platforms	Short run	Portfolio rationalization	Low	High	Negative
Capital allocation: kill-criteria & smaller, disciplined bets	Short run	Governance / process change	Low	High	Neutral
Batteries: solid-state chemistry	Long run	New product / technology bet	High	Low-medium	Positive (long run)
Chips: own IP, design-centric model	Long run	New business model (IP)	Low	Medium	Positive
Software: local cloud/AI infra, monetize as recurring revenue	Medium run	New revenue / cash management efficiency	Low	Medium	Neutral
Capacity: diversify idle plants into defense manufacturing	Short run	New customer / cost optimization	Low	High	Positive
Autonomous mobility	Long run	Staged venture-style investment	High	Medium	Positive (long run), uncertain near-term

Source: Allianz Research

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